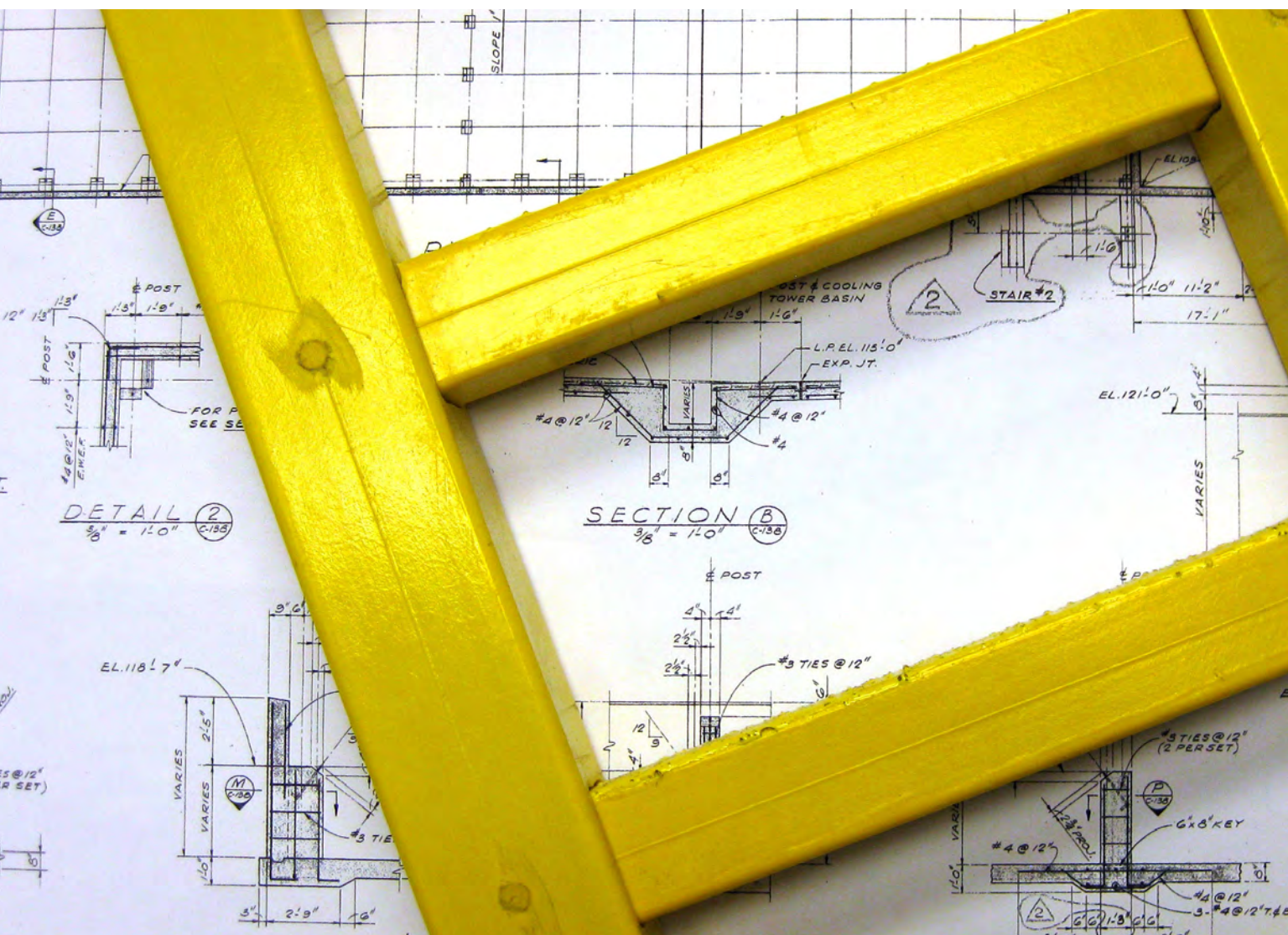




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To receive a fax of the Standard Definition of Terms relating to Reinforced Plastic Pultruded Products call ASTM's Customer Service Line at 610-832-9585 for Designation: D 3918 - 80

ASTM definitions of Fiberglass Reinforced Products can also be found at www.astm.org



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INTRODUCTION



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8/2021

CUSTOMER SERVICE COMMITMENT

Since 1974, one simple philosophy has guided our business at Bedford Reinforced Plastics - our Customer Service Commitment:

- We believe in providing quality products at a fair price, delivered when and where you want them.
- We believe it should be easy to place an order without restrictive policies, hidden conditional or time-consuming hassles.
- We believe every customer is entitled to the same level of service we expect for ourselves.
- Total Customer Satisfaction.

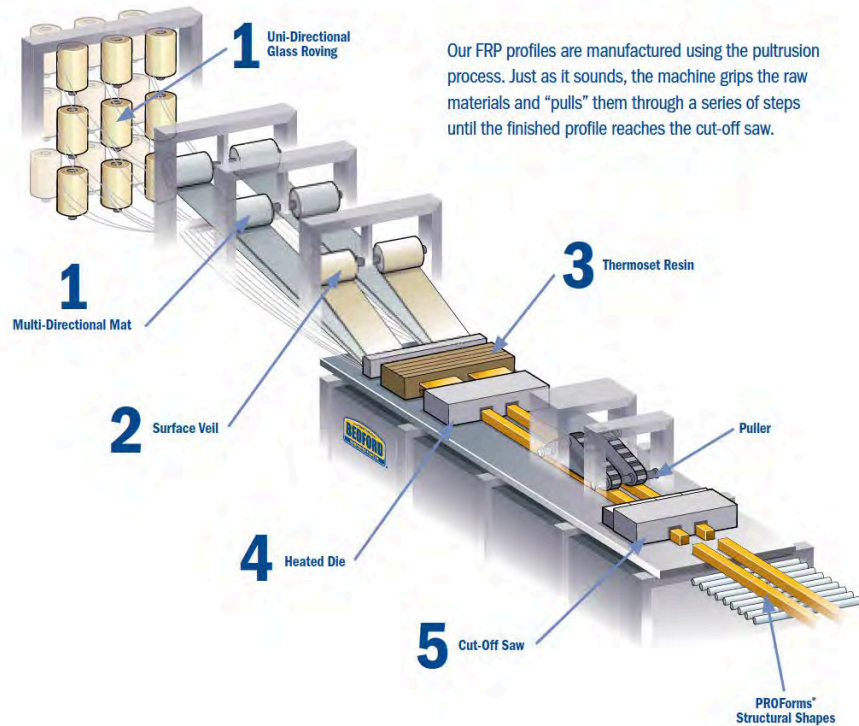
These basic principles have become as natural to us as our central Pennsylvania landscape. The next time you need high-performance structural fiberglass components, give us a call and find out about our simple, efficient customer service.

- **Special Applications** - Will a particular product perform as you require? We have detailed technical data, application histories and over thirty years' experience to help insure you get the right material for your application.
- **Special Requirements** - Need a different color? Specific tolerance? Unusual reinforcement sequence? How about a custom profile engineered to meet your particular application? Special requirements are not a problem and are a standard part of our Customer Service Commitment.
- **Special Discounts** - Interested in volume discounts or an annual contract? We will be glad to quote your requirements.
- **Warranty** - All of our PROForms material carries a full one-year limited warranty. Our commitment to quality means products you can count on.
- **Fast turnaround** - Order by phone, fax, email or mail. Stocked shapes will be shipped same day if the order is received by 11:00am, after 11:00am - next day. This pertains to the Bedford, PA warehouse. The Idaho and Houston facilities are next day after receipt of order if the order is received by 3:00pm eastern time. If after 3:00pm, the order will be shipped within 2 days.
- We currently have inventory stocked on the East, West and Gulf coast. You can check for stocked items on our website at www.bedfordreinforced.com Each inventory is updated four times a day.
- **Full-Service Supplier** - Bedford Reinforced Plastics has:
 - More than 74,000 square feet of production space
 - More than 16,000 square feet of fabrication space
 - 16 pultrusion machines
 - More than 190 employees
 - Experienced engineering staff / CAD / CAM
 - Fabrication and assembly / CNC
 - Full-service machine shop / CNC

Whether it is a simple standard shape or a highly complex custom profile, we take pride in our ability to fulfill our Customer Service Commitment by rapidly responding to customers' product needs.



PULTRUSION PROCESS



Pultrusion is the continuous processing of raw materials by pulling resin-rich reinforcements through a heated steel die to form profiles of constant cross section of continuous length.

Pultrusion gets its name from the method by which the profiles are made. Raw materials are literally pulled by what is called the “puller.” The puller is the machine made of pulling pads, which grip the product, and a drive system that keeps the product moving. The puller is located just before the cut-off saw.

The process starts with the reinforcements. Typically, unidirectional glass roving begins the process. This is the fiber that runs along the length of the profile. Then, the fiberglass mat is added, which is a multidirectional reinforcement. Next, the glass reinforcements are “wet-out” with a thermoset resin, typically polyester or vinylester. Finally, just before all the material is pulled into the heated die, surface veil may be added to enhance the surface appearance of the final product.

Next in the pultrusion process is the curing of the composite. The curing or hardening occurs while the wet-out reinforcements are being pulled through the heated die. The heat from the die causes the resin to cure and by the time the part exits the die, a hard part in the exact shape of the die cavity has been formed. The final result is a solid, rigid profile with all the reinforcements laminated within.

The puller then pulls the product exiting the die to the cut-off saw, which cuts it to the desired length.

REINFORCEMENTS

Roving

Roving is made up of fiberglass unidirectional filaments, which are manufactured in continuous rolls. Roving is always present in pultruded products comprising 50% to 70% of the total glass content. In addition to supplying the necessary strength to pull the profile, roving supplies the product with high tensile, flexural properties and is a big contributor to the overall section stiffness.

Generally, fiberglass roving is used in pultrusion to achieve the required properties. In special structural applications where more stiffness is required, graphite roving can be used. Conversely, polyester roving may be used in applications where more flex is needed.

Mat

Continuous strand mat is the remainder of glass reinforcement used in the pultrusion process. Typically, it is 30%-50% of the total glass content. Unlike hand-laid-up or press-molded processes that use short chopped fibers, the pultrusion process must have a multidirectional mat that has good pull strength to facilitate getting it to the die after it has been wet-out with the resin. This continuous strand mat is designed specifically for the pultrusion process and offers good wet-out characteristics, conformability to a variety of shapes, and good physical properties including the required pull strength.

Generally, fiberglass continuous strand mat is used to obtain the desired transverse properties of the product. Whereas the roving ties the composite together in the longitudinal direction, the mat is responsible for tying the composite together in all directions, but mainly in the transverse direction. Although continuous strand mat is suitable for most applications, a variety of products such as woven roving, stitched roving, and woven fabrics can be used in custom applications to increase the desired transverse properties.

Veil

Veils are used to enhance the surface of pultruded profiles. Most widely used today are synthetic veils. A veil is added to the outside of a profile just prior to entrance of the die. As a result, the finished profile has a resin-rich surface that aids in resistance to ultraviolet (UV) degradation and makes the profile more hand-friendly. Since the veil brings more resin to the surface and the resin is the ingredient that gives the corrosion resistance, adding the veil increases the corrosion resistance.

All standard structural shapes are manufactured using a surface veil as well as UV inhibitors to protect against UV degradation.

RESIN SYSTEMS

Generally, two types of resins are most often used in the pultrusion process. They are isophthalic polyester resin and vinylester resin. Each resin is available in a fire retardant version as well as non-fire retardant. In selecting the proper resin, one must consider the environment in which the product will be used. Generally, polyester resin will be adequate to handle most environments. However, the vinylester will handle the more severe applications where better chemical resistance is needed. It is a good idea to check the resin corrosion guide for proper selection of system.

Standard structural shapes are stocked in three series: standard polyester, fire retardant polyester and fire retardant vinylester resin systems.

Standard Polyester (ST) Resin System

Standard structural shapes are manufactured using isophthalic polyester resin. This resin system is olive green in color and contains UV inhibitors. Polyester resin exhibits good corrosion resistance, good dielectric properties, low thermal conductivity, and excellent mechanical properties.

Fire Retardant Polyester (FR) Resin System

This resin system exhibits the same characteristics as standard polyester along with a fire retardant rating of 25 or less when tested in accordance with ASTM E-84 and exhibits low smoke generation. Products manufactured using this resin system are gray and yellow in color.

Fire Retardant Vinylester (VE) Resin System

Being fire retardant, this resin meets a rating of 25 or less when tested per ASTM E-84 and has low smoke generation. It is produced in beige and yellow. This system exhibits excellent corrosion resistance and is capable of higher service temperatures than polyester resin systems.

Generally, these resin systems cover most applications, and can be custom mixed to meet more stringent requirements for a specific application.

TEMPERATURE AND WEATHERING

Design Considerations for Fiberglass Pultrusion When Exposed to Continuous High Temperatures

Property loss is experienced in Fire Retardant (FR), Polyester, and Vinylester Fiberglass pultrusion when exposed to continuous high temperatures. The loss of properties should be considered during the designing stages. The following table shows the percentage of property retention at certain continuous temperatures.

ULTIMATE STRESS	TEMPERATURE	FR/POLYESTER	VINYLESTER
	100° F (37°C)	85%	90%
	125° F (51°C)	70%	80%
	150° F (65°C)	50%	80%
	175° F (79°C)	NOT RECOMMENDED	75%
	200° F (93°C)	NOT RECOMMENDED	50%
MODULUS OF ELASTICITY	TEMPERATURE	FR/POLYESTER	VINYLESTER
	100° F (37°C)	100%	100%
	125° F (51°C)	90%	95%
	150° F (65°C)	85%	90%
	175° F (79°C)	NOT RECOMMENDED	88%
	200° F (93°C)	NOT RECOMMENDED	85%

Weathering

After exposure to outdoor weathering, almost all plastics undergo some degradation in surface appearance.

The surface of pultrusions typically have good water and ambient temperature resistance, but are attacked by ultraviolet light.

Ultraviolet light is the light spectrum 290 to 400 nanometers. The light has higher energy and can significantly degrade polymers by breaking chemical bonds or starting chemical reactions that lead to polymer degradation. Fire retardant polyester formulations, which contain a halogen, are typically more susceptible to ultraviolet light degradation, due to the halogen additive.

Ultraviolet light will cause the surface of the pultrusion to fade (yellow) and lose gloss. Over a longer period of time, fiberglass closest to the surface will be exposed. This condition is known as fiberbloom. Physical Properties are not affected by this surface degradation.

Bedford Reinforced Plastics, Inc. adds a UV stabilizer to our resin mix formulation. This slows the affects of UV degradation. We also incorporate a layer of polyester veil directly to the surface of the pultrusion during processing. This veil gives a resin rich surface and acts as a barrier between the surface and the top layer of fiberglass reinforcement. Pigments used in our resin formulations also slow the effects of weathering. The best method to protect the pultrusion from the effects of outdoor weathering is to apply a protective coating. Urethane based paints can be used.

TYPICAL COUPON PROPERTIES

Below are test results for typical coupon properties of Bedford Reinforced Plastics' structural fiberglass profiles (Standard, Fire Retardant, & Vinylester shapes). Properties are derived per the ASTM test method shown. Synthetic surfacing veil and ultraviolet inhibitors are standard.

	ASTM	ENGLISH		METRIC	
		Units	Value	Units	Value
MECHANICAL PROPERTIES					
Tensile Stress, LW	D-638	psi	30,000	MPa	206.8
Tensile Stress, CW	D-638	psi	7,000	MPa	48.2
Tensile Modulus, LW	D-638	10 ⁶ psi	2.5	GPa	17.2
Tensile Modulus, CW	D-638	10 ⁶ psi	.8	GPa	5.5
Compressive Stress, LW	D-695	psi	30,000	MPa	206.8
Compressive Stress, CW	D-695	psi	15,000	MPa	103.4
Compressive Modulus, LW	D-695	10 ⁶ psi	2.5	GPa	17.2
Compressive Modulus,CW	D-695	10 ⁶ psi	1.0	GPa	6.9
Flexural Stress, LW	D-790	psi	30,000	MPa	206.8
Flexural Stress, CW	D-790	psi	10,000	MPa	68.9
Flexural Modulus, LW	D-790	10 ⁶ psi	1.8	GPa	12.4
Flexural Modulus, CW	D-790	10 ⁶ psi	.8	GPa	5.5
Modulus of Elasticity, E	Full Section	10 ⁶ psi	2.8	GPa	19.3
Shear Modulus	— —	10 ⁶ psi	0.450	GPa	3.1
Short Beam Shear	D-2344	psi	4,500	MPa	31.0
Punch Shear	D-732	psi	10,000	MPa	68.9
Notched Izod Impact, LW	D-256	ft.-lbs./in.	25	J/mm	1.33
Notched Izod Impact, CW	D-256	ft.-lbs./in.	4	J/mm	.21
PHYSICAL PROPERTIES					
Barcol Hardness	D-2583	— -	45	— -	45
24 Hour Water Absorbtion	D-570	% max.	0.45	% max.	0.45
Density	D-792	lbs./in. ³	.062-.070	g/cc	1.72-1.94
Coefficient of Thermal Expansion, LW	D-696	10 ⁻⁶ in./in./°F	7	10 ⁻⁶ cm./cm./°C	12
ELECTRICAL PROPERTIES					
Arc Resistance, LW	D-495	seconds	120	seconds	120
Dielectric Strength, LW	D-149	kv./in.	35	kv./mm	1.37
Dielectric Strength, PF	D-149	volts/mil.	200	volts/mil.	200
Dielectric Constant, PF	D-150	@60hz	5	@60hz	5
Fire Retardant Polyester and Fire Retardant Vinylester Structural Profiles:					
FLAMMABILITY PROPERTIES		ASTM	Units	Value	
Tunnel Test	E-84	Flame Spread		25 max.	
Flammability	D-635	— —		Nonburning	
UL	94	VO			
NBS Smoke Chamber	E-662	Smoke Density	600-700		

LW = Lengthwise

CW = Crosswise

PF = Perpendicular to Laminate Face



TYPICAL PROPERTIES OF THREADED ROD / NUTS

Bedford Reinforced Plastics' threaded rod and nuts are manufactured using premium vinylester resin containing UV inhibitors. The properties listed below are the result of the ASTM test method indicated.

PROPERTIES	ASTM	UNITS English <i>Metric</i>	VALUE (Diameter - Threads Per Inch (UNC))				
			3/8-16 <i>9.5mm</i>	1/2-13 <i>12.7mm</i>	5/8-11 <i>15.9mm</i>	3/4-10 <i>19.0mm</i>	1-8 <i>25.4mm</i>
Ultimate Transverse Shear (Double Shear)	B-565	lb. <i>Newton</i>	4,200 <i>18,680</i>	6,800 <i>30,240</i>	10,000 <i>44,480</i>	13,400 <i>59,600</i>	24,000 <i>106,750</i>
Longitudinal Compressive Strength	D-695	psi <i>MPa</i>	50,000 <i>344</i>	50,000 <i>344</i>	50,000 <i>344</i>	50,000 <i>344</i>	50,000 <i>344</i>
Flexural Strength	D-790	psi <i>MPa</i>	70,000 <i>482</i>	70,000 <i>482</i>	70,000 <i>482</i>	70,000 <i>482</i>	70,000 <i>482</i>
Flexural Modulus	D-790	psi x 10 ⁶ <i>GPa</i>	2.5 <i>17.2</i>	2.5 <i>17.2</i>	2.5 <i>17.2</i>	2.5 <i>17.2</i>	2.5 <i>17.2</i>
Flammability	D-635	Self-extinguishing for all					
Fire Retardant	E-84	Class 1					
Water Absorption (24 hr. immersion)	D-570	% max.	0.8	0.8	0.8	0.8	0.8
Longitudinal Coefficient of Thermal Expansion	D-696	10 ⁻⁶ in./in./°F <i>10⁻⁶ mm/mm/°C</i>	6 <i>11</i>	6 <i>11</i>	6 <i>11</i>	6 <i>11</i>	6 <i>11</i>
Ultimate Thread Shear using fiberglass nut	— —	lb. <i>Newton</i>	1,200 <i>5,337</i>	2,400 <i>10,670</i>	3,600 <i>16,010</i>	4,000 <i>17,790</i>	8,200 <i>36,470</i>
Ultimate Torque Strength fiberglass nut lubricated with SAE 10W30 motor oil		ft.-lb. <i>NewtonMeter</i>	8 <i>10</i>	16 <i>21</i>	35 <i>47</i>	50 <i>67</i>	110 <i>149</i>
Rod Weight	— —	lb./ft. <i>Kg./m</i>	0.07 <i>0.104</i>	0.14 <i>0.119</i>	0.2 <i>0.297</i>	0.3 <i>0.447</i>	0.5 <i>0.789</i>
Nut Weight	— —	lb. <i>grams</i>	0.01 <i>4.5</i>	0.02 <i>9.1</i>	0.04 <i>18.1</i>	0.06 <i>27.2</i>	0.14 <i>63.6</i>
Nut Dimensions	— —	in. (square) x in. (thick) <i>mm. (square)</i> <i>x mm. (thick)</i>	.68 x .45 <i>17.2x11.4</i>	.86 x .56 <i>21.8x14.2</i>	1.06 x .69 <i>26.9x17.5</i>	1.24 x .82 <i>31.5x20.8</i>	1.63 x 1.1 <i>41.4x27.9</i>
Color	Gray						



TYPICAL PROPERTIES OF ROD, BAR, AND FLATSTRIP

Below are test results for typical coupon properties of Bedford Reinforced Plastics' Rod, Bar, and Flatstrip reinforced with all unidirectional longitudinal fiberglass roving. Properties are derived per the ASTM test method shown.

MECHANICAL PROPERTIES	ASTM	UNITS	ROD	BAR	FLATSTRIP
Tensile Stress	D-638	psi <i>MPa</i>	90,000 <i>620.5</i>	80,000 <i>165.5</i>	90,000 <i>620.5</i>
Tensile Modulus	D-638	10 ⁶ psi <i>GPa</i>	5.0 <i>34.7</i>	4.0 <i>27.6</i>	5.0 <i>34.7</i>
Compressive Stress	D-695	psi <i>MPa</i>	60,000 <i>413.7</i>	50,000 <i>344.7</i>	50,000 <i>344.7</i>
Flexural Stress	D-790	psi <i>MPa</i>	100,000 <i>689.5</i>	90,000 <i>620.5</i>	100,000 <i>689.5</i>
Flexural Modulus	D-790	10 ⁶ psi <i>GPa</i>	6.0 <i>41.4</i>	4.5 <i>31.0</i>	4.5 <i>31.0</i>
Barcol Hardness	D-2583		60	60	60
Izod Impact	D-256	ft-lbs/in <i>J/mm</i>	40 <i>2.14</i>	40 <i>2.14</i>	40 <i>2.14</i>
Density	D-792	lbs/in ³ <i>gr/cc</i>	.065-.075 <i>1.80-2.07</i>	.065-.075 <i>1.80-2.07</i>	.065-.075 <i>1.80-2.07</i>
Water Absorption (24 hour)	D-570	%	0.2	0.2	0.2



TYPICAL COUPON PROPERTIES OF FLAT SHEET

Below are test results for typical coupon properties of Bedford Reinforced Plastics' Standard, Fire Retardant and Vinylester Flat Sheet. Properties are derived per the ASTM test method shown. Synthetic surfacing veil and ultraviolet inhibitors are standard.

MECHANICAL PROPERTIES	ASTM	UNITS	THICKNESS (ENGLISH - METRIC)					
			STD & FR			VE		
			1/8" - 3.2	3/16"-1/4" - 4.8 - 6.4	3/8"-1" - 9.5-25.4	1/8" - 3.2	3/16"-1/4" - 4.80-6.4	3/8"-1" - 9.5-25.4
Tensile Stress, LW	D-638	psi - <i>MPa</i>	24,000 - 165.5	24,000 - 165.5	24,000 - 165.5	24,000 - 165.5	24,000 - 165.5	24,000 - 165.5
Tensile Stress, CW	D-638	psi - <i>MPa</i>	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	D-638	10 ⁶ psi - <i>GPa</i>	2.0 - 13.8	2 - 13.8	2.0 - 13.8	2.0 - 13.8	2.0 - 13.8	2.0 - 13.8
Tensile Modulus, CW	D-638	10 ⁶ psi - <i>GPa</i>	1.0 - 6.9	1.1 - 7.6	1.4 - 9.6	1.0 - 6.9	1.1 - 7.6	1.4 - 9.6
Compressive Stress, LW	D-695	psi - <i>MPa</i>	24,000 - 165.5	24,000 - 165.5	24,000 - 165.5	24,000 - 165.5	24,000 - 165.5	24,000 - 165.5
Compressive Stress, CW	D-695	psi - <i>MPa</i>	15,500 - 106.9	16,500 - 113.8	16,500 - 113.8	16,500 - 113.8	17,500 - 120.7	17,500 - 120.7
Compressive Modulus, LW	D-695	10 ⁶ psi - <i>GPa</i>	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	D-695	10 ⁶ psi - <i>GPa</i>	1.0 - 6.9	1.0 - 6.9	1.0 - 6.9	1.0 - 6.9	1.0 - 6.9	1.0 - 6.9
Flexural Stress, LW	D-790	psi - <i>MPa</i>	35,000 - 241.3	35,000 - 241.3	30,000 - 206.8	35,000 - 241.3	35,000 - 241.3	30,000 - 206.8
Flexural Stress, CW	D-790	psi - <i>MPa</i>	15,000 - 103.4	15,000 - 103.4	18,000 - 124.1	15,000 - 103.4	15,000 - 103.4	18,000 - 124.1
Flexural Modulus, LW	D-790	10 ⁶ psi - <i>GPa</i>	1.6 - 11.0	2.0 - 13.8	2.0 - 13.8	1.6 - 11.0	2.0 - 13.8	2.0 - 13.8
Flexural Modulus, CW	D-790	10 ⁶ psi - <i>GPa</i>	0.9 - 6.2	1.1 - 7.6	1.4 - 9.6	0.9 - 6.2	1.1 - 7.6	1.4 - 9.6
Perpendicular Shear Stress, LW	D-3846	psi - <i>MPa</i>	6,000 - 41.3	6,000 - 41.3	6,000 - 41.3	6,000 - 41.3	6,000 - 41.3	6,000 - 41.3
Perpendicular Shear Stress, CW	D-3846	psi - <i>MPa</i>	6,000 - 41.3	6,000 - 41.3	6,000 - 41.3	6,000 - 41.3	6,000 - 41.3	6,000 - 41.3
Bearing Stress, LW	D-953	psi - <i>MPa</i>	32,000 - 220.6	32,000 - 220.6	32,000 - 220.6	32,000 - 220.6	32,000 - 220.6	32,000 - 220.6
Notched Izod Impact, LW	D-256	ft-lbs/in- <i>J/mm</i>	18.5 - 0.99	20 - 1.1	20 - 1.1	18.5 - 1.0	20 - 1.1	20 - 1.06
Notched Izod Impact, CW	D-256	ft-lbs/in- <i>J/mm</i>	5 - 0.27	5 - 0.3	5 - 0.3	5 - 0.3	5 - 0.3	5 - 0.27
PHYSICAL PROPERTIES								
Barcol Hardness	D-2583	----	40.0	40.0	40.0	40.0	40.0	40.0
		----	40.0	40.0	40.0	40.0	40.0	40.0
24 Hour Water Absorption	D-570	% max.	0.6	0.6	0.6	0.6	0.6	0.6
		% max.	0.6	0.6	0.6	0.6	0.6	0.6
Density	D-792	lbs./in. ³	.062-.070	.062-.070	.062-.070	.062-.070	.062-.070	.062-.070
		<i>g/cc</i>	1.72-1.94	1.72-1.94	1.72-1.94	1.72-1.94	1.72-1.94	1.72-1.94
Coefficient Thermal Expansion, (Typical), LW	D-696	10 ⁻⁶ in./in./°F	8.0	8.0	8.0	8.0	8.0	8.0
		10 ⁻⁶ mm/mm/°C	14.5	14.5	14.5	14.5	14.5	14.5
ELECTRICAL PROPERTIES								
Arc Resistance, LW	D-495	seconds	120.0	120.0	120.0	120.0	120.0	120.0
		<i>seconds</i>	120.0	120.0	120.0	120.0	120.0	120.0
Dielectric Strength, LW	D-149	kv./in.	35	35	35	35	35	35
		<i>kv./mm</i>	1.37	1.37	1.37	1.37	1.37	1.37
Dielectric Strength, PF	D-149	volts/mil.	200.0			200.0		
		<i>volts/mil.</i>	200.0			200.0		
FLAMMABILITY PROPERTIES FOR FR & VE								
Tunnel Test	E-84	Flame Spread 25 max.						
Flammability	D-635	Nonburning						
UL	94	VO						
NBS Smoke Chamber	E-662	Smoke Density 600-700						

LW = Lengthwise

CW = Crosswise

PF = Perpendicular to Laminate Face



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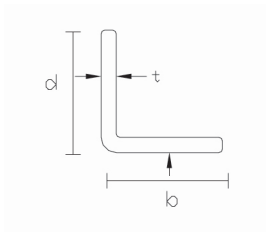
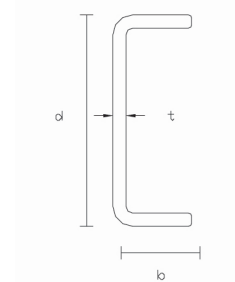
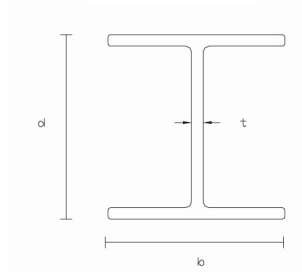
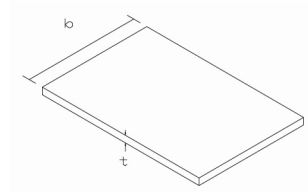
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GENERAL TOLERANCES

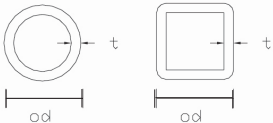
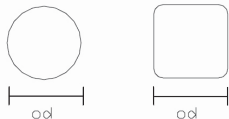


CROSS SECTIONAL TOLERANCES

SHAPE	DIMENSION	TOLERANCE % of Nominal	* MAXIMUM OR MINIMUM TOLERANCES
ANGLES 	t = thickness	± 10%	± 0.010" min. ±0.26mm min.
	b = flange width	± 4%	± 0.094" max. ±2.4 mm max
	d = depth	± 4%	± 0.094" max. ±2.4 mm max
CHANNELS 	t = thickness	± 10%	± 0.010" min. ±0.26mm min.
	b = flange width	± 4%	± 0.094" max. ±2.4 mm max
	d = depth	± 4%	± 0.094" max. ±2.4 mm max
BEAMS 	t = thickness	± 10%	± 0.010" min. ±0.26mm min.
	b = flange width	± 4%	± 0.094" max. ±2.4 mm max
	d = depth	± 4%	± 0.094" max. ±2.4 mm max
FLAT SHEET 	t ≤ 0.125" (3.175 mm) t ≥ 0.125" (3.175 mm)	± 15% ± 10%	± 0.01"/(0.25 mm) min ± 0.05"/(1.27 mm) max
	b = width	± 4%	+0.094" max. ±2.4mm max.

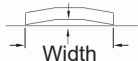
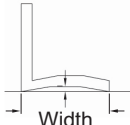
*ENGLISH
METRIC

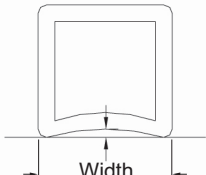
CROSS SECTIONAL TOLERANCES

SHAPE	DIMENSION	OUTSIDE DIMENSION CONDITION	TOLERANCES
CLOSED SHAPES (Round, Square and Rectangular Tubes) 	t = thickness	All	$\pm 20\%$ $\pm 0.01''/(0.25 \text{ mm})$ min
	od = outside dimension	All	$\pm 4\%$ $\pm 0.094''/(2.39 \text{ mm})$ max
ROUND ROD & SQUARE BAR 	od = outside dimension	All	$\pm 4\%$ $\pm 0.094''/(2.39 \text{ mm})$ max

FLATNESS

Flatness is the deviation measured vertically at the center of the part cross section with the weight of the profile minimizing the deviation by contact with the flat surface as shown below.

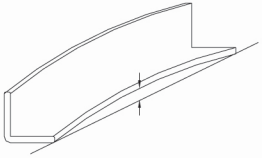
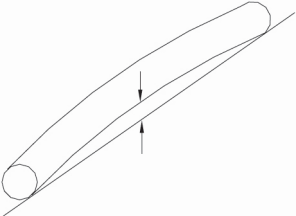
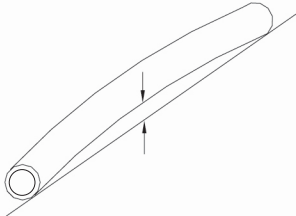
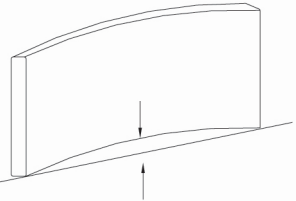
STRUCTURAL SHAPES RODS, BARS, & FLAT SHEET 	Allowable deviation from flat	
	Width	All Thickness
	Up to 1" (25.4 mm)	0.008" (0.2 mm)
	Over 1" (25.4 mm)	0.008" x Width of Part (0.25" (6.3 mm) Max for Flat Sheets)
	In any 1" width (25.4 mm) (for parts over 1" width (25.4 mm))	0.008" (0.2 mm)

HOLLOW SHAPES 	Allowable deviation from flat		
	Width	Thickness under 0.188"	Thickness 0.188" and over
	Up to 1" or any 1" increments of wider surfaces	0.012" (0.3 mm)	0.008" (0.2 mm)
	Over 1"	0.012" x width (in) (mm)	0.008" x width (in) (mm)

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STRAIGHTNESS

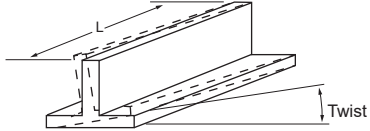
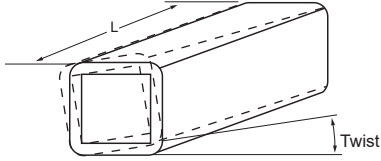
Straightness is the deviation measured vertically at the center along the length of the part with the weight of the profile minimizing the deviation by contact with the flat surface as shown below.

ANGLE, BEAM AND CHANNEL 	Allowable deviation from straight		
	All widths		0.050"/ft. <i>4.2 mm/m</i>
RODS AND BARS 	Width	Thickness	Allowable deviation from straight
	Under 1.5" <i>(38.1 mm)</i>	under 0.095"	0.05"/ft <i>(4.17 mm/m)</i>
		0.095" <i>(2.4mm)</i> and over	0.04"/ft <i>(3.33 mm/m)</i>
	1.5" <i>(38.1 mm)</i> and over	All Thickness	0.04"/ft <i>(3.33 mm/m)</i>
ROUND, SQUARE, AND RECTANGULAR TUBE 	Allowable deviation from straight		
	Diameter/Depth		Per Foot <i>Per Meter</i>
	All		0.03"/ft <i>2.5 mm</i>
FLAT SHEET AND PLATE 	Allowable deviation from straight		
	All thickness and widths		0.03"/ft <i>2.5 mm</i>

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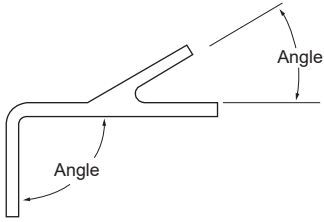
TWIST

Twist is the angle measured at the end of the profile with the weight of the profile minimizing the twist as shown below.

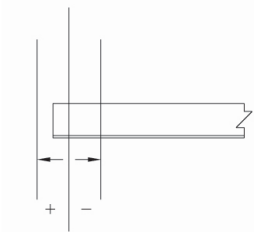
BARS AND OTHER STRUCTURAL PROFILES OTHER THAN TUBES 	Allowable twist	
	1°/ft	
CLOSED PROFILES (TUBES) 	1°/ft 7° max	

ANGULARITY

Angularity is the angle measured between two perpendicular faces of the profile.

ALL PROFILES 	Allowable deviation from specific angle	
	Thickness up to 0.75" <i>Thickness up to 19mm</i>	2°

CUT LENGTHS

ALL PROFILES 	Allowable deviation from specific length	
	up to 8'	-0 +1/4
	8' <= 24'	-0 +1/2
	> 24'	-0 +3

*All parts being cut from stock must allow for blade width.

SQUARENESS OF ENDCUT

ALL PROFILES	Allowable deviation from specific length	
	Profiles 2" and under	$\pm 2^{\circ}$
	Profiles over 2"	$\pm 1^{\circ}$

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SECTION PROPERTIES



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SECTION PROPERTIES

Elements of Sections of Structural Shapes

The section table values on the following pages have been calculated from nominal dimensions. All shapes shown in the tables are available, but not all are stocked. A shape availability list is included in the manual and, for convenience, availability information is noted on the individual uniform load tables.

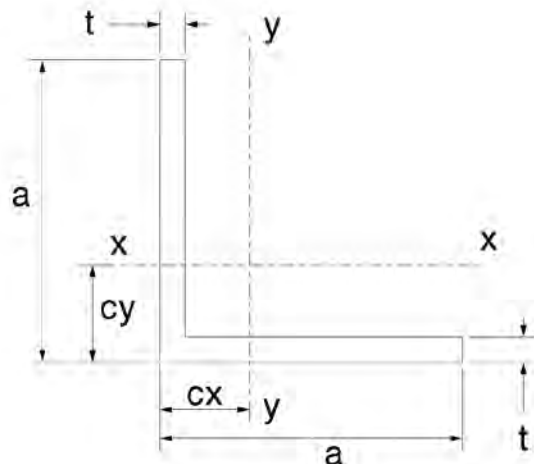
Notation

A	cross sectional area (in. ² / <i>mm</i> . ²)
b	width of section (in. / <i>mm</i> .)
d	depth of section / diameter of rod (in. / <i>mm</i> .)
h	length of angle leg (in. / <i>mm</i> .)
I	moment of inertia (in. ⁴ / <i>mm</i> . ⁴)
od	outside diameter of tube (in. / <i>mm</i> .)
r	radius of gyration (in. / <i>mm</i> .)
S	section modulus (in. ³ / <i>mm</i> . ³)
t	thickness (in. / <i>mm</i> .)
t_b	thickness of width dimension (in. / <i>mm</i> .)
t_d	thickness of depth dimension (in. / <i>mm</i> .)
$Wt.$	weight of section (lbs./ft. / <i>kgs./m.</i>)

EQUAL LEG ANGLE

SECTION DIMENSIONS				SECTION PROPERTIES			
Depth	Wall			X - X / Y - Y			
Width, in	Thickness, in	A, in ²	Wt., lb/ft	I, in ⁴	S, in ³	r, in	C _x or C _y , in
in. / mm.	in. / mm.	in. ² / mm. ²	lb./ft. Kg./m	in. ⁴ / mm. ⁴	in. ³ / mm. ³	in. / mm.	in. / mm.
1.00	0.125	0.23	0.18	0.02	0.03	0.30	0.30
25.4	3.18	151.17	0.27	9042.40	505.56	7.73	7.51
1.25	0.125	0.30	0.23	0.04	0.05	0.38	0.36
31.75	3.18	191.48	0.35	18291.87	807.85	9.77	9.11
1.50	0.187	0.53	0.41	0.11	0.10	0.46	0.44
38.10	4.75	339.29	0.61	45676.24	1702.22	11.60	11.27
1.50	0.250	0.69	0.54	0.14	0.13	0.45	0.47
38.10	6.35	443.44	0.80	57658.00	2195.17	11.40	11.83
2.00	0.250	0.94	0.73	0.35	0.25	0.61	0.59
50.8	6.35	604.69	1.09	144678.36	4044.50	15.47	15.03
3.00	0.250	1.44	1.12	1.24	0.58	0.93	0.84
76.2	6.35	927.19	1.67	517891.66	9450.02	23.63	21.40
3.00	0.375	2.11	1.65	1.76	0.83	0.91	0.89
76.2	9.53	1360.55	2.45	732434.19	13650.17	23.20	22.54
3.00	0.5	2.75	2.15	2.22	1.07	0.90	0.93
76.2	12.7	1773.75	3.20	922528.08	17561.32	22.80	23.67
4.00	0.25	1.94	1.51	3.04	1.05	1.25	1.09
101.6	6.35	1249.69	2.25	1265062.58	17131.47	31.81	27.76
4.00	0.375	2.86	2.23	4.36	1.52	1.23	1.14
101.6	9.53	1844.30	3.32	1814196.10	24959.13	31.36	28.91
4.00	0.5	3.75	2.93	5.56	1.97	1.22	1.18
101.6	12.7	2418.75	4.36	2314853.73	32355.97	30.93	30.06
6.00	0.375	4.36	3.40	15.39	3.53	1.88	1.64
152.4	9.53	2811.80	5.07	6404379.33	57818.72	47.72	41.63
6.00	0.5	5.75	4.49	19.91	4.61	1.86	1.68
152.4	12.70	3708.75	6.68	8286266.60	75600.12	47.26	42.79

*ENGLISH / METRIC

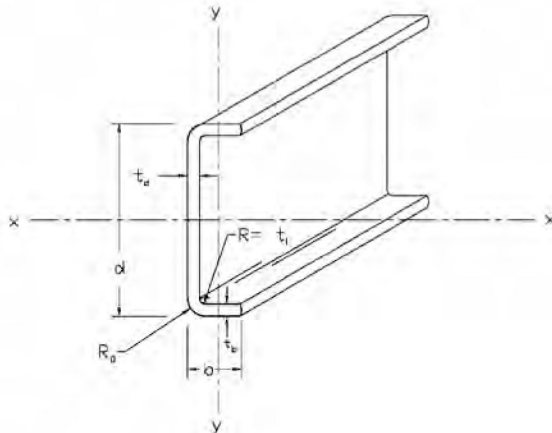


CHANNEL

SECTION DIMENSIONS						SECTION PROPERTIES										
						X - X			Y - Y							
	b	t _w	t _f	A	Wt.	I _x	S _x	r _x	I _y	S _y	r _y	J, in ⁴	h	C _x	C _y	A _w
in.	in.	in.	in.	in. ²	lb./ft.	in ⁴	in ³	in.	in ⁴	in ³	in.	in.	in.	in.	in.	in.
mm.	mm.	mm.	mm.	mm ²	kg./m	mm ⁴	mm ³	mm.	mm ⁴	mm ³	mm.	mm.	mm.	mm.	mm.	mm.
2	9/16	1/8	1/8	.36	.28	0.18	0.18	0.71	0.01	0.02	0.15	0.002	1.75	0.15	1.00	0.219
50.8	14.2875	3.175	3.175	231.854375	0.417666	74757.63	2943.205	17.95644	3366.77	319.8575	3.810652	846.8241	44.45	3.761685	25.4	141.129
3	7/8	1/4	1/4	1.06	0.83	1.15	0.77	1.04	0.06	0.09	0.23	0.025	2.5	0.25	1.50	0.625
76.2	6.35	6.35	6.35	685.4825	1.234838	480725.1	12617.42	26.481.98	23434.11	1484.895	5.846909	10297.38	63.5	6.443382	38.1	403.225
3	1	1/4	1/4	1.13	0.88	1.27	0.85	1.06	0.08	0.12	0.27	0.03	2.5	0.29	1.5	0.63
76.2	25.4	6.35	6.35	725.805	1.307475	530044.2	13911.88	27.02379	34956.9	1942.944	6.939956	10839.35	63.5	7.408333	38.1	403.225
3	1 1/2	1/4	1/4	1.38	1.07	1.75	1.16	1.13	0.28	0.27	0.45	0.03	2.5	0.47	1.5	0.63
76.2	38.1	6.35	6.35	887.095	1.598025	727320.3	19089.72	28.633.74	115315.9	4390.313	11.40144	13007.22	63.5	11.83409	38.1	403.225
3 1/2	1 3/16	1/8	1/8	0.84	0.65	1.54	0.88	1.36	0.11	0.13	0.37	0	3.13	0.35	1.75	0.39
88.9	30.1625	3.175	3.175	539.313438	0.971527	641312.6	14427.69	34.48375	46437.71	2171.325	9.279295	1592.029	79.375	8.775759	44.45	252.016
3 1/2	1 1/2	3/16	3/16	1.15	0.90	2.02	1.16	1.33	0.23	0.21	0.45	0.014	3.125	0.42	1.75	0.586
88.9	38.1	4.7625	4.7625	740.925938	1.334714	841417.2	18929.47	33.69912	96058.44	3486.12	11.38625	5944.705	79.375	10.54554	44.45	378.023
4	1 1/8	1/4	1/4	1.44	1.12	2.87	1.44	1.41	0.13	0.16	0.3	0.03	3.5	0.3	2	0.88
101.6	28.575	6.35	6.35	927.4175	1.670663	1196122	23545.62	35.91289	53868.32	2558.86	7.621304	13549.19	88.9	7.52337	50.8	564.515
4	1 3/8	3/16	3/16	1.2	0.93	2.62	1.31	1.48	0.19	0.18	0.40	0.02	3.63	0.35	2.00	0.68
101.6	34.925	4.7625	4.7625	771.167813	1.389192	1090307	21462.68	37.60107	77665.79	2982.765	10.03554	6173.348	92.075	8.886887	50.8	438.507
5 1/2	1 1/2	1/4	1/4	2.00	1.56	7.78	2.83	1.97	0.33	0.29	0.41	0.044	5	0.36	2.75	1.250
139.7	38.1	6.35	6.35	1290.32	2.3244	3236630	46336.73	50.08388	137456.5	4744.467	10.32129	18426.89	127	9.128125	69.85	806.450
6	1 5/8	1/4	1/4	2.19	1.71	10.19	3.4	2.16	0.43	0.34	0.44	0.05	5.5	0.38	3	1.38
152.4	41.275	6.35	6.35	1411.2875	2.542313	4239811	55640.41	54.81075	177874.7	5626.449	11.22663	20052.8	139.7	9.661071	76.2	887.095
6	1 11/16	3/8	3/8	3.23	2.52	14.55	4.85	2.12	0.66	0.53	0.45	0.17	5.25	0.44	3	1.97
152.4	42.8625	9.525	9.525	2086.68938	3.758991	6055368	79466.55	53.86933	272708.4	8636.152	11.43196	68592.76	133.35	11.28505	76.2	1270.159
8	2 3/16	3/8	3/8	4.36	3.40	35.77	8.94	2.86	1.53	0.92	0.59	0.22	7.25	0.53	4.00	2.72
203.2	55.5625	9.525	9.525	2812.49438	5.066466	14890522	146559.8	72.76279	635340	15077.91	15.02995	90542.44	184.15	13.42547	101.6	1754.029
10	2 3/4	1/2	1/2	7.25	5.66	92.48	18.5	3.57	3.99	1.92	0.74	0.65	9.00	0.68	5.00	4.50
254	69.85	12.7	12.7	4677.41	8.42595	38492696	303091.2	90.71658	1659560	31513.82	18.83623	268815.9	228.6	17.18879	127	2903.220
11 1/2	2 3/4	1/2	1/2	8	6.24	131.48	22.87	4.05	4.13	1.95	0.72	0.71	10.50	0.64	5.75	5.25
292.1	69.85	12.7	12.7	5161.28	9.2976	54725705	374704.2	102.9715	1717580	31998.13	18.24231	294830.3	266.7	16.17266	146.05	3387.090
12	3	1/2	1/2	8.50	6.63	154.71	25.78	4.27	5.40	2.34	0.80	0.750	11	0.69	6.00	5.500
304.8	76.2	12.7	12.7	5483.86	9.8787	64394404	422534.2	422534.2	108.363	2246678	38310.27	20.24079	279.4	17.55588	152.4	3548.380
14	3 1/2	3/4	3/4	14.63	11.41	352.74	50.39	4.91	12.16	4.62	0.91	2.953	12.5	0.87	7.00	9.375
355.6	88.9	19.05	19.05	9435.465	16.99718	146822233.4	825769.5	124.7425	5061997	75735.3	23.16218	1229182	317.5	22.06218	177.8	6048.375
18	2 3/8	3/8	3/8	8.25	6.44	298.76	33.20	6.02	2.31	1.17	0.53	0.40	17.25	.40	9.00	6.469
457.2	60.325	9.525	9.525	5322.57	9.58815	124952263.10	543971.6	152.8503	961388.7	19197.61	13.43968	166451.8	438.15	10.24659	228.6	4173.379

*ENGLISH

METRIC



I-BEAM

SECTION DIMENSIONS						SECTION PROPERTIES										
						X - X			Y - Y							
d, in.	b, in.	t _f in	t _w in	A, in.	Wt.	I	S	r	I	S	r	J	h	A	C	C
in.	in.	in.	in.	in. ²	lb./ft.	in. ⁴	in. ³	in.	in. ⁴	in. ³	in.	in. ⁴	in.	in. ²	in.	in.
mm.	mm.	mm.	mm.	mm. ²	kg./m	mm. ⁴	mm. ³	mm.	mm. ⁴	mm. ³	mm.	mm.	mm.	mm.	mm.	mm.
3	1.5	0.25	1/4	1/4	1.38	1.75	1.16	1.13	0.14	0.19	0.32	0.029	2 1/2	0.625	0.75	1.50
76.2	38.1	6.35	6.35	886.88	1.60	727321.06	19089.79	28.63	59887.46	3143.70	8.22	11923.30	63.50	403.23	19.05	38.10
3.5	1.5	3/16	3/16	1.15	0.90	2.02	1.16	1.33	0.11	0.14	0.31	0.013	3 1/8	0.586	0.75	1.75
88.90	38.10	4.76	4.76	740.74	1.33	841418.03	18929.54	33.70	44613.92	2341.94	7.76	5601.75	79.38	378.02	19.05	44.45
4	2	1/4	1/4	1.88	1.46	4.41	2.21	1.53	.34	.34	.42	0.039	3.5	0.875	1.00	2.00
101.60	50.80	6.35	6.35	1209.38	2.18	1837271.53	36166.76	38.97	140640.70	5537.04	10.78	16259.04	88.90	564.52	25.40	50.80
5.5	2.5	1/4	1/4	2.50	1.95	11.22	4.08	2.12	0.66	0.53	0.51	0.052	5	1.25	1.25	2.75
139.70	63.50	6.35	6.35	1612.50	2.91	4671764.18	66882.81	53.82	273693.84	8620.28	13.03	21678.72	127.00	806.45	31.75	69.85
6	3	1/4	1/4	2.88	2.24	15.87	5.29	2.35	1.13	0.75	0.63	0.060	5 1/2	1.375	1.5	3.00
152.40	76.20	6.35	6.35	1854.38	3.34	6606589.95	86700.66	59.68	471241.18	12368.53	15.94	24930.53	139.70	887.10	38.10	76.20
6	3	3/8	3/8	4.22	3.29	22.35	7.45	2.30	1.71	1.14	0.64	0.198	5 1/4	1.969	1.5	3.00
152.40	76.20	9.53	9.53	2721.09	4.90	9301187.11	122062.82	58.46	711993.53	18687.49	16.17	82311.39	133.35	1270.16	38.10	76.20
8	4	3/8	3/8	5.72	4.46	55.55	13.89	3.12	4.03	2.02	0.84	0.268	7 1/4	2.719	2.00	4.00
203.20	101.60	9.53	9.53	3688.59	6.65	23121371.16	227572.55	79.16	1678186.98	33035.18	21.33	111577.66	184.15	1754.03	50.80	101.60
8	4	1/2	1/2	7.50	5.85	70.63	17.66	3.07	5.41	2.70	0.85	0.625	7	3.500	2.00	4.00
203.20	101.60	12.70	12.70	4837.50	8.72	29396344.43	289334.10	77.94	2250251.14	44296.28	21.57	260144.64	177.80	2258.06	50.80	101.60
10	5	3/8	3/8	7.22	5.63	111.63	22.33	3.93	7.85	3.14	1.04	0.338	9 1/4	3.469	2.50	5.00
254.00	127.00	9.53	9.53	4656.09	8.39	46462849.07	365849.21	99.88	3268727.58	51476.02	26.49	140843.93	234.95	2237.90	63.50	127.00
10	5	1/2	1/2	9.50	7.41	143.29	28.66	3.88	10.51	4.20	1.05	0.792	9	4.500	2.50	5.00
254.00	127.00	12.70	12.70	6127.50	11.04	59642494.69	469625.94	98.65	4374765.71	68893.95	26.72	329516.55	228.60	2903.22	63.50	127.00
12	6	1/2	1/2	11.50	8.97	253.96	42.33	4.70	18.11	6.04	1.26	0.958	11	5.500	3.00	6.00
304.80	152.40	12.70	12.70	7417.50	13.37	105705439.13	693605.24	119.36	7539858.84	98948.28	31.88	398888.45	279.40	3548.38	76.20	152.20
*18	4 1/2	1/2	3/8	10.88	8.48	498.16	55.35	6.77	7.67	3.41	0.84	0.674	17	6.375	2.25	9.00
*457.20	114.30	12.70	9.53	7014.38	12.64	207348286.11	907035.37	171.91	3191852.80	55850.44	21.33	280468.44	431.80	4112.90	57.15	228.60
*24	7 1/2	3/4	3/8	19.69	15.36	1876.82	156.40	9.76	52.83	14.09	1.64	2.505	22 1/2	8.438	3.75	12.00
*609.6	190.5	19.05	9.53	12698.44	22.88	781189968.36	2562959.21	248.00	21990859.78	230875.17	41.61	1042610.94	571.50	5443.54	95.25	304.80

*18" I Beam - Web = 3/8" Flange = 1/2"

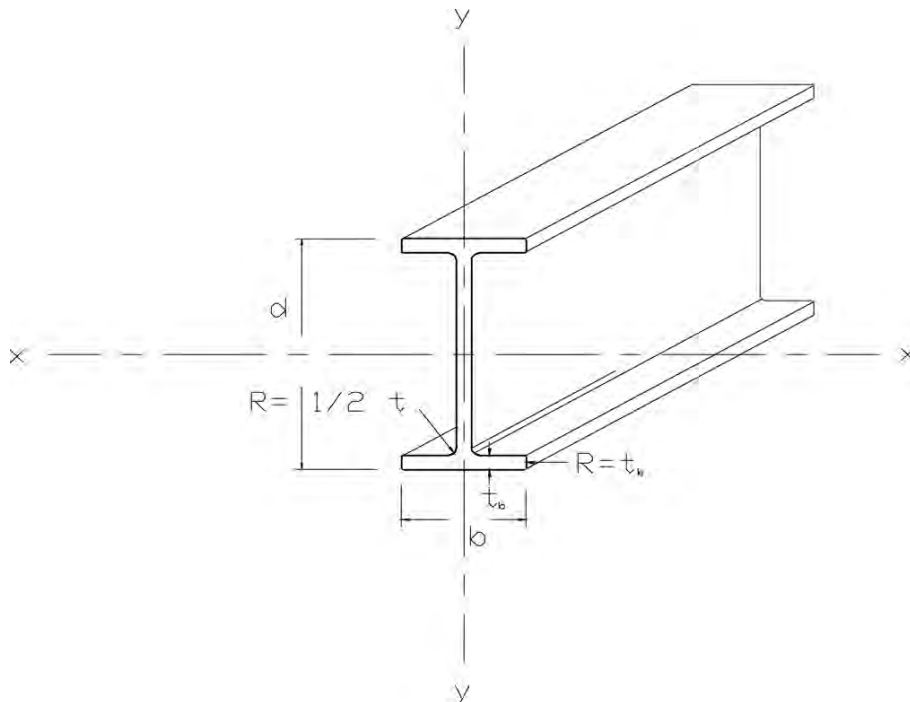
*457.20 I Beam - Web = 9.53mm Flange = 12.70mm

*24" I Beam - Web = 3/8" Flange = 3/4"

*609.60 I Beam - Web = 9.53mm Flange = 19.05mm

*ENGLISH

METRIC

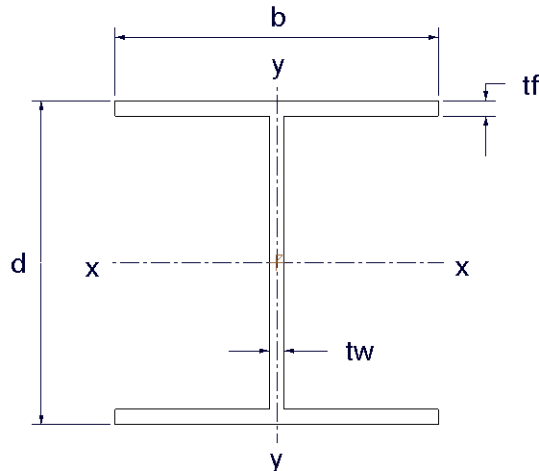


WF-BEAM

SECTION DIMENSIONS					SECTION PROPERTIES					
					X - X			Y - Y		
d	b	t	A	Wt.	I	S	r	I	S	r
in. <i>mm.</i>	in. <i>mm.</i>	in. <i>mm.</i>	in. ² <i>mm.²</i>	lb./ft. <i>kg./m</i>	in. ⁴ <i>mm.⁴</i>	in. ³ <i>mm.³</i>	in. <i>mm.</i>	in. ⁴ <i>mm.⁴</i>	in. ³ <i>mm.³</i>	in. <i>mm.</i>
3	3	1/4	2.13	1.64	3.17	2.11	1.22	1.13	0.75	0.73
<i>76.2</i>	<i>76.2</i>	<i>6.4</i>	<i>1374.2</i>	<i>2.44</i>	<i>1319454</i>	<i>34577</i>	<i>31.0</i>	<i>470342</i>	<i>12290</i>	<i>18.5</i>
4	4	1/4	2.89	2.15	7.94	3.97	1.66	2.67	1.34	0.96
<i>101.6</i>	<i>101.6</i>	<i>6.4</i>	<i>1864.5</i>	<i>3.20</i>	<i>3304878</i>	<i>65057</i>	<i>42.2</i>	<i>1111338</i>	<i>21959</i>	<i>24.4</i>
6	6	1/4	4.39	3.40	28.28	9.43	2.54	9.01	3.00	1.43
<i>152.4</i>	<i>152.4</i>	<i>6.4</i>	<i>2832.3</i>	<i>5.06</i>	<i>11771025</i>	<i>154530</i>	<i>64.5</i>	<i>3750245</i>	<i>49161</i>	<i>36.3</i>
6	6	3/8	6.48	4.90	40.17	13.39	2.49	13.52	4.51	1.44
<i>152.4</i>	<i>152.4</i>	<i>9.5</i>	<i>4180.6</i>	<i>7.29</i>	<i>16720016</i>	<i>219423</i>	<i>63.2</i>	<i>5627449</i>	<i>73906</i>	<i>36.6</i>
8	8	3/8	8.73	6.49	99.19	24.80	3.37	32.03	8.01	1.92
<i>203.2</i>	<i>203.2</i>	<i>9.5</i>	<i>5632.2</i>	<i>9.66</i>	<i>41285995</i>	<i>406399</i>	<i>85.6</i>	<i>13331893</i>	<i>131260</i>	<i>48.8</i>
8	8	1/2	11.51	8.70	126.96	31.74	3.32	42.74	10.69	1.93
<i>203.2</i>	<i>203.2</i>	<i>12.7</i>	<i>7425.8</i>	<i>12.95</i>	<i>52844742</i>	<i>520125</i>	<i>84.3</i>	<i>17789731</i>	<i>175178</i>	<i>49.0</i>
10	10	3/8	11.06	8.74	198.53	39.71	4.24	62.54	12.51	2.38
<i>254.0</i>	<i>254.0</i>	<i>9.5</i>	<i>7135.5</i>	<i>13.01</i>	<i>82634425</i>	<i>650730</i>	<i>107.7</i>	<i>26031113</i>	<i>205002</i>	<i>60.5</i>
10	10	1/2	14.51	10.90	256.20	51.24	4.21	83.42	16.68	2.4
<i>254.0</i>	<i>254.0</i>	<i>12.7</i>	<i>9361.3</i>	<i>16.22</i>	<i>106638491</i>	<i>839673</i>	<i>106.9</i>	<i>34722026</i>	<i>273336</i>	<i>61.0</i>
12	12	1/2	17.51	13.20	452.45	75.45	5.08	144.11	24.02	2.87
<i>304.8</i>	<i>304.8</i>	<i>12.7</i>	<i>11296.8</i>	<i>19.64</i>	<i>188323909</i>	<i>1236404</i>	<i>129.0</i>	<i>59983111</i>	<i>393617</i>	<i>72.9</i>

*ENGLISH

METRIC

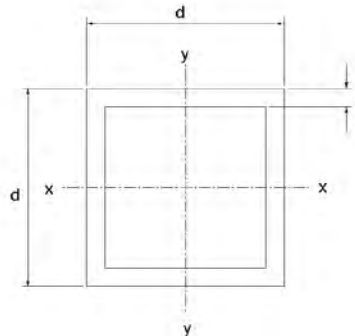


SQUARE TUBE

SECTION DIMENSIONS				SECTION PROPERTIES					
$d=d_p$, in	t, in	A, in ²	Wt, Lbs/ft	I, in ⁴	S, in ³	r, in	J, in ⁴	d_w	a_w
in.	in.	in ²	lb./ft.	in ⁴	in ³	in.	in ⁴	in ³	in.
mm.	mm.	mm. ²	kg./m	mm. ⁴	mm. ³	mm.	mm. ⁴	mm. ³	mm.
1.5	1/4	1.25	0.98	0.34	0.45	0.52	0.41	1	0.50
38.10	6.35	806.25	1.45	140911.54	7396.91	13.22	169364.83	25.40	322.50
1	1/8	0.44	0.34	0.06	0.11	0.36	0.07	0.75	0.19
25.40	3.18	282.19	0.51	23711.08	1867.01	9.17	30498.37	19.05	120.94
1	1/4	0.75	0.59	0.08	0.16	0.32	0.08	0.5	0.25
25.40	6.35	483.75	0.87	32518.05	2560.47	8.20	32924.52	12.70	161.25
1 1/4	1/8	0.56	0.44	0.12	0.19	0.46	0.16	1	0.25
31.75	3.18	362.81	0.65	49996.50	3149.38	11.74	66672.16	25.40	161.25
1 1/4	1/4	1	0.78	0.18	0.28	0.42	0.2	0.75	0.38
31.75	6.35	645.00	1.16	73707.57	4642.98	10.69	83246.20	19.05	241.88
1 1/2	1/8	0.69	0.54	0.22	0.29	0.56	0.3	1.25	0.31
38.10	3.18	443.44	0.80	90915.04	4772.43	14.32	123983.52	31.75	201.56
1 1/2	1/4	1.25	0.98	0.34	0.45	0.52	0.41	1	0.5
38.10	6.35	806.25	1.45	140911.54	7396.91	13.22	169364.83	25.40	322.50
1 3/4	1/8	0.81	0.63	0.36	0.41	0.67	0.5	1.5	0.38
44.45	3.18	524.06	0.94	149718.51	6736.47	16.90	207309.81	38.10	241.88
1.75	1/4	1.5	1.17	0.58	0.66	0.62	0.72	1.25	0.63
44.45	6.35	967.50	1.74	240633.55	10827.13	15.77	301024.21	31.75	403.13
2	1/8	0.94	0.73	0.55	0.55	0.77	0.77	1.75	0.44
50.80	3.18	604.69	1.09	229658.71	9041.66	19.49	321528.54	44.45	282.19
2	1/4	1.75	1.37	0.91	0.91	0.72	1.17	1.5	0.75
50.80	6.35	1128.75	2.03	379377.21	14936.07	18.33	487973.94	38.10	483.75
2	3/8	2.44	1.9	1.13	1.13	0.68	1.31	1.25	0.94
50.80	9.53	1572.19	2.83	470292.25	18515.39	17.29	544188.24	31.75	604.69
2 1/4	1/8	1.06	0.83	0.80	0.71	0.87	1.13	2.00	0.50
57.15	3.18	685.31	1.23	333987.44	11688.07	22.07	471517.33	50.80	322.50
2.25	1/4	2.00	1.56	1.35	1.2	0.82	1.78	1.75	0.88
57.15	6.35	1290.00	2.32	563646.15	19725.09	20.90	739966.22	44.45	564.38
3	1/8	1.44	1.12	1.98	1.32	1.17	2.85	2.75	0.69
76.20	3.18	927.19	1.67	825822.90	21675.08	29.84	1184880.57	69.85	443.44
3	1/4	2.75	2.15	3.49	2.33	1.13	4.77	2.50	1.25
76.20	6.35	1773.75	3.20	1454640.63	38179.43	28.63	1983736.35	63.50	806.25
3.5	1/4	3.25	2.54	5.76	3.29	1.33	7.97	3.00	1.50
88.90	6.35	2096.25	3.78	2395496.12	53891.77	33.80	3316956.92	76.20	967.50
4	3/8	5.44	4.24	12.04	6.02	1.49	16.19	3.25	2.44
101.60	9.53	3507.19	6.32	5009811.60	98618.05	37.79	6738104.51	82.55	1572.19
4	1/4	3.75	2.93	8.83	4.41	1.53	12.36	3.50	1.75
101.60	6.35	2418.75	4.36	3674539.30	72333.24	38.97	5144456.63	89.90	1128.75
6	3/8	8.44	6.58	44.69	14.9	2.3	62.57	5.25	3.94
152.40	9.53	5442.19	9.81	18602355.19	244124.69	58.46	26043811.71	133.35	2539.69

*ENGLISH

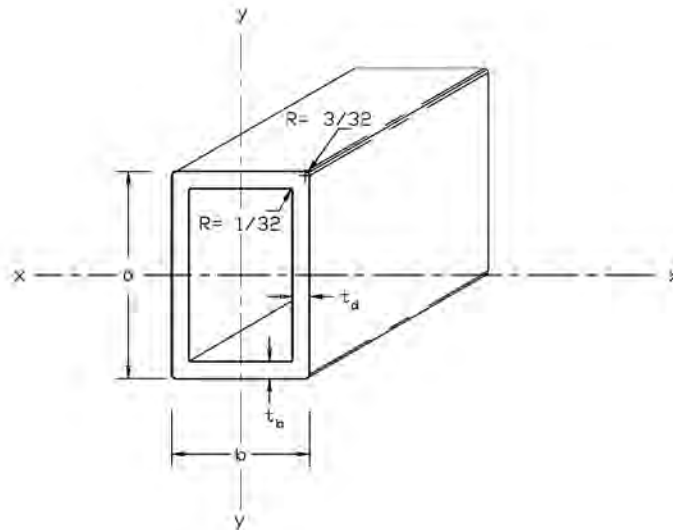
METRIC



RECTANGULAR TUBE

SECTION DIMENSIONS						SECTION PROPERTIES								
						X - X				Y - Y				
d,in	b,in	t _d ,in	t _b ,in	A _v ,in ²	Wt.	I _x ,in ⁴	S _x ,in ³	r _x ,in	A _w ,in ²	I _y ,in ⁴	S _y ,in ³	r _y ,in	A _w ,in ²	J _x ,in ⁴
in.	in.	in.	in.	in. ²	lb./ft.	in. ⁴	in. ³	in.	in.	in. ⁴	in. ³	in.	in.	in.
mm.	mm.	mm.	mm.	mm. ²	kg./m	mm. ⁴	mm. ³	mm.	mm.	mm. ⁴	mm. ³	mm.	mm.	mm.
1 1/2	3/4	1/8	1/8	0.5000	0.39	0.13	0.17	0.51	0.31	0.04	0.11	0.28	0.13	0.09
38.1	19.05	3.18	3.18	322.5000	0.58	53925.82	2830.75	12.93	7.94	16530.02	1735.44	7.16	80.65	38424.68
1 1/2	1	1/8	1/8	0.5625	0.44	0.16	0.21	0.53	0.31	0.08	0.16	0.38	0.19	0.16
38.1	25.4	3.18	3.18	362.8100	0.65	66255.59	3477.98	13.51	7.94	33737.51	2656.50	9.64	120.97	66944.34
2	1/2	1/8	1/8	0.5625	0.44	0.22	0.22	0.63	0.44	0.02	0.07	0.18	0.06	0.05
50.8	12.7	3.18	3.18	362.8100	0.65	92270.05	3632.68	15.95	11.11	7723.04	1216.23	4.61	40.32	22864.28
2	1	1/8	1/8	0.6875	0.54	0.33	0.33	0.69	0.44	0.11	0.21	0.39	0.19	0.24
50.8	25.4	3.18	3.18	443.4400	0.80	138066.35	5435.68	17.64	11.11	43763.92	3445.98	9.93	120.97	101849.95
4	1	1/8	1/8	1.1875	0.93	2.04	1.02	1.31	0.94	0.20	0.40	0.41	0.19	0.61
101.6	25.4	3.18	3.18	765.9400	1.38	848044.43	16693.79	33.27	23.81	83869.55	6603.90	10.46	120.97	251849.32
4	2	1/8	1/4	1.8750	1.46	4.41	2.21	1.53	0.88	1.10	1.10	.77	0.88	2.64
101.6	50.8	3.18	6.35	1209.3800	2.18	1837271.53	36166.76	38.97	22.23	459317.88	18083.38	19.49	564.52	1097485.20
4 3/8	1 3/8	1/8	3/16	1.5156	1.18	3.60	1.64	1.54	1	0.47	0.69	0.56	0.42	1.36
111.13	34.93	3.18	4.76	977.5800	1.76	1496449.87	26932.73	39.12	25.40	196946.09	11278.23	14.19	272.18	567843.60
4 1/2	1 3/4	1/8	3/16	1.6875	1.32	4.52	2.01	1.64	1.03	0.85	0.97	0.71	0.56	2.28
114.3	44.45	3.18	4.76	1088.4400	1.96	1879443.41	32886.15	41.55	26.19	353634.12	15911.55	18.02	362.90	947068.29
5	2	1/8	1/8	1.6875	1.32	5.2	2.08	1.76	1.19	1.21	1.21	0.85	0.44	3.09
127.0	50.8	3.18	3.18	1088.4400	1.96	2166110.61	34111.98	44.61	30.16	504436.72	19859.71	21.53	282.26	1288020.83
5 1/2	3 1/2	1/4	1/4	4.2500	3.32	17.28	6.28	2.02	2.5	8.4	4.8	1.41	1.5	17.13
139.70	88.90	6.35	6.35	2741.2500	4.94	7190831.45	102946.76	51.21	63.50	3496777.55	78667.66	35.71	967.74	7128058.80
6	4	1/4	1/4	4.7500	3.71	23.47	7.82	2.22	2.75	12.35	6.17	1.61	1.75	24.47
152.40	101.60	6.35	6.35	3063.7500	5.52	9770599.14	128223.09	56.47	69.85	5140024.53	101181.59	40.95	1129.03	10185432.86
9	6	0.31	5/16	8.9844	7.01	101.38	22.53	3.36	5.23	53.62	17.87	2.44	3.36	106.15
228.60	152.40	7.94	7.94	5794.9200	10.44	42198094.40	369187.18	85.32	132.95	22319385.54	292905.32	62.05	2167.33	44181401.17

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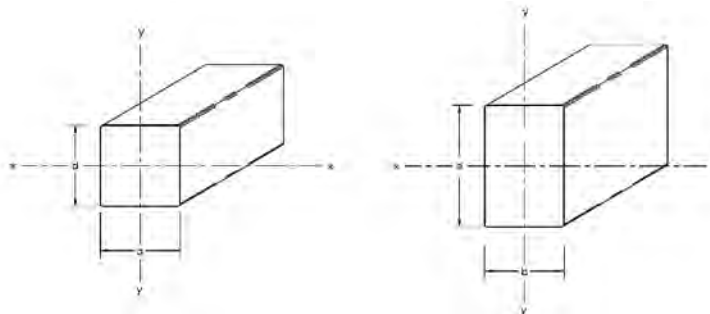
SQUARE BAR

SECTION DIMENSIONS				SECTION PROPERTIES					
				X - X			Y - Y		
d	b	A	Wt.	I	S	r	I	S	r
in. <i>mm.</i>	in. <i>mm.</i>	in. ² <i>mm.²</i>	lb./ft. <i>kg./m</i>	in. ⁴ <i>mm.⁴</i>	in. ³ <i>mm.³</i>	in. <i>mm.</i>	in. ⁴ <i>mm.⁴</i>	in. ³ <i>mm.³</i>	in. <i>mm.</i>
1	1	1.00	0.88	0.08	0.17	0.29	0.08	0.17	0.29
<i>25.4</i>	<i>25.4</i>	<i>645.2</i>	<i>1.31</i>	<i>33299</i>	<i>2786</i>	<i>7.4</i>	<i>33299</i>	<i>2786</i>	<i>7.4</i>
1 1/4	1 1/4	1.56	1.37	0.20	0.33	0.36	0.20	0.33	0.36
<i>31.8</i>	<i>31.8</i>	<i>1006.4</i>	<i>2.04</i>	<i>83246</i>	<i>5408</i>	<i>9.1</i>	<i>83246</i>	<i>5408</i>	<i>9.1</i>
1 1/2	1 1/2	2.25	1.98	0.42	0.56	0.43	0.42	0.56	0.43
<i>38.1</i>	<i>38.1</i>	<i>1451.6</i>	<i>2.95</i>	<i>174817</i>	<i>9177</i>	<i>10.9</i>	<i>174817</i>	<i>9177</i>	<i>10.9</i>

RECTANGULAR BAR

SECTION DIMENSIONS				SECTION PROPERTIES					
				X - X			Y - Y		
d, in	b, in	A, in ²	Wt, lb/ft	I _x , in ⁴	S _x , in ³	r _x , in	I _y , in ⁴	S _y , in ³	r _y , in
in. <i>mm.</i>	in. <i>mm.</i>	in. ² <i>mm.²</i>	lb./ft. <i>kg./m</i>	in. ⁴ <i>mm.⁴</i>	in. ³ <i>mm.³</i>	in. <i>mm.</i>	in. ⁴ <i>mm.⁴</i>	in. ³ <i>mm.³</i>	in. <i>mm.</i>
1 1/2	3/4	1.13	0.88	0.21	0.28	0.43	0.05	0.14	0.22
<i>38.1</i>	<i>19.05</i>	<i>725.81</i>	<i>1.31</i>	<i>87798.82</i>	<i>4608.86</i>	<i>11.00</i>	<i>21949.70</i>	<i>2304.43</i>	<i>5.50</i>
1 1/2	1	1.50	1.17	0.28	0.38	0.43	0.13	0.25	0.29
<i>38.10</i>	<i>25.4</i>	<i>967.74</i>	<i>1.74</i>	<i>117065.09</i>	<i>6145.15</i>	<i>11.</i>	<i>52028.93</i>	<i>4096.77</i>	<i>7.33</i>
2	1/2	1.00	0.78	0.33	0.33	0.58	0.02	0.08	0.14
<i>50.8</i>	<i>12.7</i>	<i>645.16</i>	<i>1.16</i>	<i>138743.81</i>	<i>5462.35</i>	<i>14.66</i>	<i>8671.49</i>	<i>1365.59</i>	<i>3.67</i>
2	1	2.00	1.56	0.67	0.67	0.58	0.17	0.33	0.29
<i>50.8</i>	<i>25.4</i>	<i>1290.32</i>	<i>2.32</i>	<i>277487.62</i>	<i>10924.71</i>	<i>14.66</i>	<i>69371.90</i>	<i>5462.35</i>	<i>7.33</i>
3	1/2	1.50	1.17	1.13	0.75	0.87	0.03	0.13	0.14
<i>76.2</i>	<i>12.7</i>	<i>967.74</i>	<i>1.74</i>	<i>468260.35</i>	<i>12290.30</i>	<i>22.00</i>	<i>13007.23</i>	<i>2048.38</i>	<i>3.67</i>

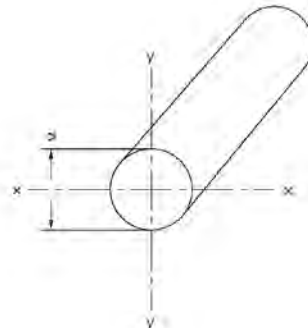
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SOLID ROUND ROD

SECTION DIMENSIONS			SECTION PROPERTIES		
d	A	Wt.	I	S	r
in. <i>mm.</i>	in. ² <i>mm.²</i>	lb./ft. <i>kg./m</i>	in. ⁴ <i>mm.⁴</i>	in. ³ <i>mm.³</i>	in. <i>mm.</i>
0.2500	0.049	0.044	0.0002	0.0016	0.0625
<i>6.4</i>	<i>31.6</i>	<i>0.07</i>	<i>83</i>	<i>26</i>	<i>1.6</i>
0.3000	0.071	0.062	0.0004	0.0027	0.0750
<i>7.6</i>	<i>45.8</i>	<i>0.09</i>	<i>166</i>	<i>44</i>	<i>1.9</i>
0.3125	0.077	0.067	0.0005	0.0030	0.0781
<i>7.9</i>	<i>49.7</i>	<i>0.10</i>	<i>208</i>	<i>49</i>	<i>2.0</i>
0.3500	0.096	0.083	0.0007	0.0042	0.0875
<i>8.9</i>	<i>619</i>	<i>0.12</i>	<i>291</i>	<i>69</i>	<i>2.2</i>
0.3750	0.110	0.095	0.0010	0.0052	0.0938
<i>9.5</i>	<i>71.0</i>	<i>0.14</i>	<i>416</i>	<i>85</i>	<i>2.4</i>
0.4375	0.150	0.133	0.0018	0.0082	0.1094
<i>11.1</i>	<i>96.8</i>	<i>0.20</i>	<i>749</i>	<i>134</i>	<i>2.8</i>
0.4720	0.175	0.150	0.0024	0.0103	0.1180
<i>12.0</i>	<i>112.9</i>	<i>0.22</i>	<i>999</i>	<i>169</i>	<i>3.0</i>
0.4800	0.181	0.160	0.0026	0.0109	0.1200
<i>12.2</i>	<i>116.8</i>	<i>0.24</i>	<i>1082</i>	<i>179</i>	<i>3.0</i>
0.5000	0.196	0.172	0.0031	0.0123	0.1250
<i>12.7</i>	<i>126.5</i>	<i>0.26</i>	<i>1290</i>	<i>202</i>	<i>3.2</i>
0.6250	0.307	0.270	0.0075	0.0240	0.1563
<i>15.9</i>	<i>198.1</i>	<i>0.40</i>	<i>3122</i>	<i>393</i>	<i>4.0</i>
0.7500	0.442	0.397	0.0156	0.0414	0.1875
<i>19.1</i>	<i>285.2</i>	<i>0.59</i>	<i>6493</i>	<i>678</i>	<i>4.8</i>
0.8125	0.518	0.460	0.0214	0.0527	0.2031
<i>20.6</i>	<i>334.2</i>	<i>0.68</i>	<i>8907</i>	<i>864</i>	<i>5.2</i>
0.8750	0.601	0.534	0.0288	0.0658	0.2188
<i>22.2</i>	<i>387.7</i>	<i>0.79</i>	<i>11987</i>	<i>1078</i>	<i>5.6</i>
1.0000	0.785	0.697	0.0491	0.0982	0.2500
<i>25.4</i>	<i>506.5</i>	<i>1.04</i>	<i>20437</i>	<i>1609</i>	<i>6.4</i>
1.2500	1.227	1.094	0.1198	0.1917	0.3125
<i>31.8</i>	<i>791.6</i>	<i>163</i>	<i>49865</i>	<i>3141</i>	<i>7.9</i>
1.5000	1.766	1.571	0.2485	0.3313	0.3750
<i>38.1</i>	<i>1139.4</i>	<i>2.34</i>	<i>103434</i>	<i>5429</i>	<i>9.5</i>

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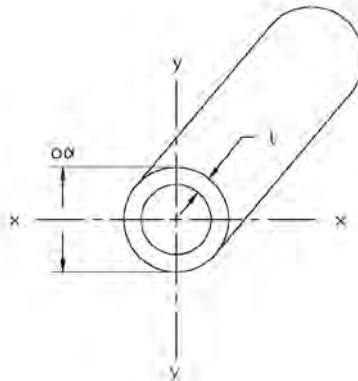


ROUND TUBE

SECTION DIMENSIONS				SECTION PROPERTIES		
od	t	A	Wt.	I	S	r
in. <i>mm.</i>	in. <i>mm.</i>	in. ² <i>mm.²</i>	lb./ft. <i>kg./m</i>	in. ⁴ <i>mm.⁴</i>	in. ³ <i>mm.³</i>	in. <i>mm.</i>
1	3/32	0.27	0.22	0.03	0.06	0.32
25.4	2.4	174.2	0.33	12487	983	8.1
1	1/8	0.34	0.25	0.03	0.07	0.31
25.4	3.2	219.4	0.37	12487	1147	7.9
1 1/8	1/8	0.39	0.33	0.05	0.09	0.36
28.6	3.2	251.6	0.49	20812	1475	9.1
1 1/4	3/32	0.34	0.27	0.06	0.09	0.41
31.8	2.4	219.4	0.40	24974	1475	10.4
1 1/4	1/8	0.44	0.32	0.07	0.11	0.40
31.8	3.2	283.9	0.48	29136	1803	10.2
1 1/4	1/4	0.79	0.61	0.10	0.17	0.36
31.8	6.4	509.7	0.91	41623	2786	9.1
1 1/2	1/8	0.54	0.45	0.13	0.17	0.49
38.1	3.2	348.4	0.67	54110	2786	12.4
1 1/2	1/4	0.98	0.79	0.20	0.27	0.45
38.1	6.4	632.3	1.18	83246	4425	11.4
1 3/4	1/8	0.64	0.51	0.21	0.24	0.58
44.5	3.2	412.9	0.76	87409	3933	14.7
1 3/4	1/4	1.18	0.94	0.34	0.39	0.54
44.5	6.4	761.3	1.40	141519	6391	13.7
1 7/8	3/16	0.99	0.88	0.36	0.38	0.60
47.6	4.8	638.7	1.31	149843	6227	15.2
2	1/4	1.37	1.08	0.54	0.54	0.62
50.8	6.4	883.9	1.61	224765	8849	15.7
3	1/4	2.16	1.70	2.06	1.37	0.98
76.2	6.4	1393.5	2.53	857437	22450	24.9
3	1/2	3.93	2.98	3.19	2.13	0.90
76.2	12.7	2535.5	4.43	1327778	34904	22.9

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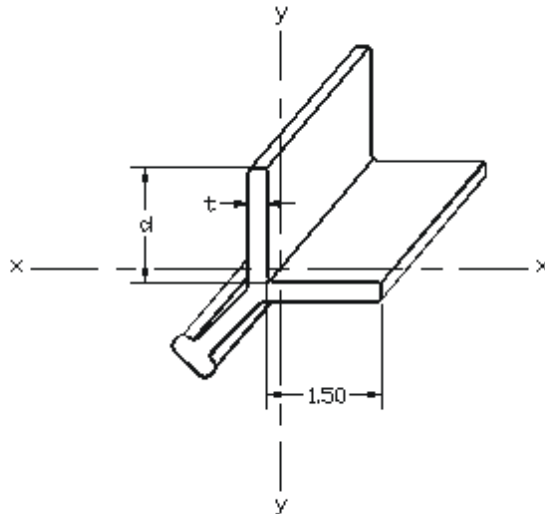
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EMBEDMENT ANGLE

SECTION DIMENSIONS				SECTION PROPERTIES					
				X - X			Y - Y		
d	t	A	Wt.	I	S	r	I	S	r
in. <i>mm.</i>	in. <i>mm.</i>	in. ² <i>mm.²</i>	lb./ft. <i>kg./m.</i>	in. ⁴ <i>mm.⁴</i>	in. ³ <i>mm.³</i>	in. <i>mm.</i>	in. ⁴ <i>mm.⁴</i>	in. ³ <i>mm.³</i>	in. <i>mm.</i>
1	1/4	1.08	.96	.28	.30	.51	.51	.33	.69
<i>25.4</i>	<i>6.4</i>	<i>696.8</i>	<i>1.43</i>	<i>116544</i>	<i>4916</i>	<i>12.9</i>	<i>212278</i>	<i>5407</i>	<i>17.5</i>
1 1/2	1/4	1.20	1.10	.51	.33	.65	.51	.33	.65
<i>38.1</i>	<i>6.4</i>	<i>774.2</i>	<i>1.64</i>	<i>212278</i>	<i>5407</i>	<i>16.5</i>	<i>212278</i>	<i>5407</i>	<i>16.5</i>
2	0.25	1.33	1.13	.88	.54	.81	.51	.33	.62
<i>50.8</i>	<i>6.4</i>	<i>858.1</i>	<i>1.68</i>	<i>366283</i>	<i>8849</i>	<i>20.6</i>	<i>212278</i>	<i>5407</i>	<i>15.7</i>

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BEAMS



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8/2021

BEAMS

Allowable Uniform Load Tables

Full section 3-point bending tests were conducted on Bedford Reinforced Plastics' H-Beams, I-Beams, Channels, and Square Tubes. The allowable uniform load tables were generated using these tests results as well as the formulas, properties, and assumptions listed below. Formulas for critical buckling and lateral-torsional buckling are developed from theory presented in Chapter 6 and 7 of the ASCE Structural Plastics Design Manual*.

Notation

A_w	area of web (in. ² / mm. ²)
b	flange width (in. / mm.)
b_c	channel flange minus thickness (in. / mm.)
b_h	1/2 of flange width (in. / mm.)
d	depth of section (in. / mm.)
E	modulus of elasticity (lbs./in. ² / GPa)
f_b	actual flexural stress (lbs./in. ² / MPa)
F_b	maximum allowable flexural stress (lbs./in. ² / MPa)
F_{aCB}	maximum allowable buckling stress (lbs./in. ² / MPa)
F_{aLTB}	maximum allowable lateral-torsional buckling stress (lbs./in. ² / MPa)
f_v	actual shear stress (lbs./in. ² / MPa)
F_v	maximum allowable shear stress (lbs./in. ² / MPa)
G	shear modulus (lbs./in. ² / GPa)
I	moment of inertia (in. ⁴ / mm. ⁴)
J	torsion constant (in. ⁴ / mm. ⁴)
L	length of span (in. / mm.)
M	maximum moment (lbs.-in. / N.-m.)
S_x	section modulus (in. ³ / mm. ³)
t	flange thickness (in. / mm.)
V	vertical shear force (lbs. / N.)
w	uniform load (lbs./in. / N/m.)
ν_L	poission's ratio (longitudinal)
ν_r	poission's ratio (transverse)

Assumptions

Beam simply supported at both ends
Uniformly distributed load
Load is applied perpendicular to major axis
Part weight has been deducted in tables
Safety factor of 3.0 for both ultimate material flexural and shear stress and 2.5 for buckling stresses

* ASCE Manuals and Reports on Engineering Practice No. 63, Structural Plastics Design Manual Volumes 1 & 2, 1984

BEAMS

Properties / Allowables

$$E = 2.8 \times 10^6 \text{ lbs./in.}^2$$

$$E = 19.3 \text{ GPa}$$

$$G = 450,000 \text{ lbs./in.}^2$$

$$G = 3.1 \text{ GPa}$$

$$F_b = 10,000 \text{ lbs./in.}^2$$

$$F_b = 68.9 \text{ MPa}$$

$$F_v = 1500 \text{ lbs./in.}^2$$

$$F_v = 10.3 \text{ MPa}$$

Formulas

$$\Delta = \frac{5wL^4}{384EI} + \frac{wL^2}{8A_w G}$$

$$f_b = \frac{M}{S_x}$$

$$f_v = \frac{V}{A_w}$$

Allowable Critical Buckling Stress for laterally supported WF and I Beams

$$F_{aCB} = \frac{\pi^2}{b_h^2 t} \left[.935 \sqrt{\left(\frac{Et^3}{12\lambda} \right) \left(\frac{\nu_T Et^3}{12\lambda} \right)} - (.656) \left(\frac{\nu_T Et^3}{12\lambda} \right) + (2.082) \left(\frac{Gt^3}{12} \right) \right] / 2.5$$

$$\lambda = (1 - \nu_L \nu_T)$$

Allowable Lateral-Torsional Buckling Stress for laterally unsupported WF and I Beams

$$F_{aLTB} = \left[\frac{C\pi}{S(KL)} \sqrt{EI_y GJ + \frac{d^2 \pi^2 E^2 I_y^2}{(4)(KL)^2}} \right] / 2.5$$

C = 1.13 and K = 1.0 for uniform load simple beam*

Allowable Critical Buckling Stress for Channels laterally supported to eliminate warping and twist

$$F_{aCB} = G(t/b)^2 / 2.5$$

Allowable Bending Stress for Square Tube (b/t <=16)

$$F_b = 10,000 \text{ psi.}$$

* ASCE Manuals and Reports on Engineering Practice No. 63, Structural Plastics Design Manual Volumes 1 & 2, 1984

3 X 1 X 1/4 CHANNEL

76.2 x 25.4 x 6.4 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 0.625 \text{ in.}^2 / 403.2 \text{ mm.}^2$$

$$I = 1.27 \text{ in.}^4 / 528614 \text{ mm.}^4$$

$$Wt. = 0.79 \text{ lbs./ft.} / 1.18 \text{ kg/m.}$$

$$S = 0.85 \text{ in.}^3 / 13929 \text{ mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
3 / 0.91	624/9110	F _v	591/8622	394/5744	328/4785	246/3586	164/2387
4 / 1.22	353/5157	F _b	267/3901	178/2597	148/2162	111/1619	74/1075
5 / 1.52	226/3296	F _b	141/2063	94/1371	78/1141	58/853	39/565
6 / 1.83	157/2286	F _b	83/1213	55/805	46/669	34/498	23/328
7 / 2.13	115/1676	F _b	53/769	35/509	29/422	21/314	14/205
8 / 2.44	88/1281	F _b	35/515	23/340	19/281	14/208	9/135
9 / 2.74	69/1009	F _b	25/360	16/236	13/195	10/143	6/92
10 / 3.05	56/815	F _b	18/261	12/170	10/140	7/102	4/64

The part weight has been deducted in the above table.

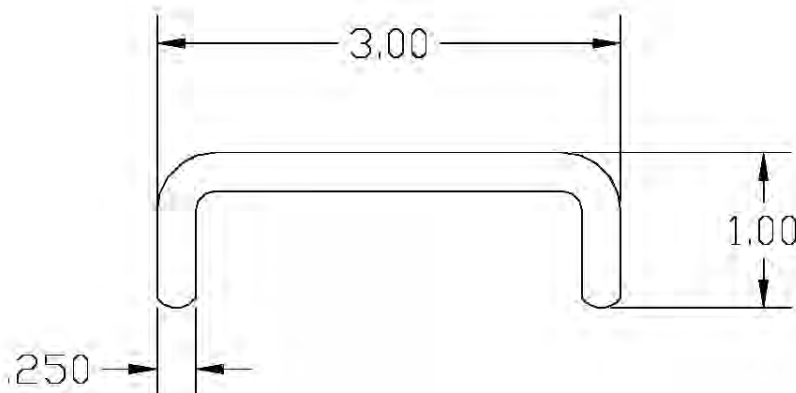
English/Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 1,500 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



3 X 1 1/2 X 1/4 CHANNEL

76.2 x 38.1 x 6.4 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*)

Laterally Supported

$$A_w = 0.625 \text{ in.}^2 / 403.2 \text{ mm}^2$$

$$I = 1.75 \text{ in.}^4 / 728405 \text{ mm}^4$$

$$Wt. = 1.01 \text{ lbs./ft.} / 1.50 \text{ kg/m.}$$

$$S = 1.16 \text{ in.}^3 / 19009 \text{ mm}^3$$

SPAN FT/ <i>m</i>	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
3 / <i>0.91</i>	617/ <i>8999</i>	F_v	----/----	511/ <i>7456</i>	425/ <i>6208</i>	319/ <i>4649</i>	212/ <i>3090</i>
4 / <i>1.22</i>	346/ <i>5049</i>	F_v	----/----	236/ <i>3440</i>	196/ <i>2862</i>	147/ <i>2139</i>	97/ <i>1416</i>
5 / <i>1.52</i>	221/ <i>3221</i>	F_b	189/ <i>2763</i>	126/ <i>1832</i>	104/ <i>1522</i>	78/ <i>1134</i>	51/ <i>746</i>
6 / <i>1.83</i>	153/ <i>2228</i>	F_b	112/ <i>1629</i>	74/ <i>1077</i>	61/ <i>892</i>	45/ <i>662</i>	30/ <i>432</i>
7 / <i>2.13</i>	112/ <i>1629</i>	F_b	71/ <i>1032</i>	46/ <i>679</i>	38/ <i>561</i>	28/ <i>413</i>	18/ <i>266</i>
8 / <i>2.44</i>	85/ <i>1240</i>	F_b	47/ <i>690</i>	31/ <i>450</i>	25/ <i>370</i>	19/ <i>270</i>	12/ <i>170</i>
9 / <i>2.74</i>	67/ <i>974</i>	F_b	33/ <i>479</i>	21/ <i>310</i>	17/ <i>253</i>	13/ <i>183</i>	8/ <i>112</i>
10 / <i>3.05</i>	54/ <i>783</i>	F_b	24/ <i>340</i>	15/ <i>219</i>	12/ <i>178</i>	9/ <i>126</i>	5/ <i>74</i>

The part weight has been deducted in the above table.

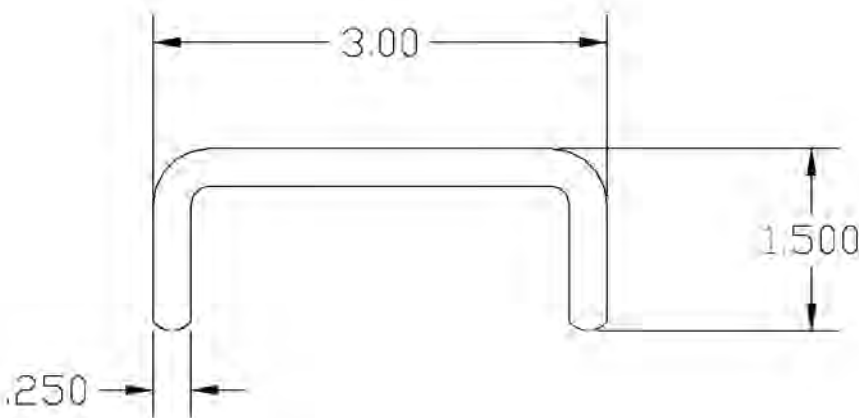
English/*Metric*

This item is stocked in 20-foot lengths in Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 1,200 feet.

Orders for less than mill run quantities will be subject to set up charges as well as premium per foot cost.



3 1/2 X 1 1/2 X 3/16 CHANNEL

88.9 x 38.1 x 4.8 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

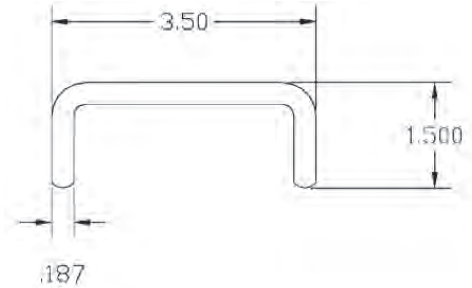
*****Laterally Supported *****

$$A_w (\text{in.}^2/\text{mm.}^2)=0.54 / 348.3$$

$$I (\text{in.}^4/\text{mm.}^4)=1.92 / 799164$$

$$Wt. (\text{lbs./kg/m})=0.86 / 1.28$$

$$S (\text{in.}^3/\text{mm.}^3)=1.10 / 18026$$



SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
3/0.91	298/4353	Fv	---/---	---/---	---/---	---/---	221/3228
4/1.22	167/2442	Fv	---/---	---/---	---/---	157/2286	104/1519
5/1.52	107/1558	Fb	---/---	---/---	---/---	84/1233	56/817
6/1.83	74/1077	Fb	---/---	---/---	67/980	50/731	33/483
7/2.13	54/788	Fb	---/---	52/753	43/625	32/465	21/305
8/2.44	41/600	Fb	---/---	35/506	29/419	21/311	14/202
9/2.74	32/471	Fb	---/---	24/355	20/293	15/216	10/139
10/3.05	26/378	Fb	---/---	18/256	14/211	11/155	7/98
11/3.35	21/310	Fb	20/292	13/190	11/156	8/113	5/71
12/3.66	18/258	Fb	15/223	10/144	8/117	6/84	4/51

3 1/2 X 1 1/2 X 1/4 CHANNEL

88.9 x 38.1 x 6.35 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

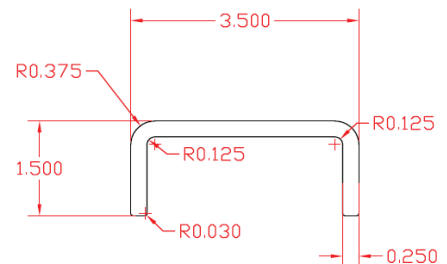
*****Laterally Supported *****

$$A_w (\text{in.}^2/\text{mm.}^2)=0.75 / 483.8$$

$$I (\text{in.}^4/\text{mm.}^4)=2.39 / 994793$$

$$Wt. (\text{lbs./kg/m})=1.17 / 1.74$$

$$S (\text{in.}^3/\text{mm.}^3)=1.37 / 22450$$



SPAN FT	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
3	727	Fb	---	680	566	425	283
4	409	Fb	---	318	265	198	132
5	261	Fb	257	171	142	106	71
6	181	Fb	153	101	84	63	42
7	133	Fb	98	65	54	40	26
8	101	Fb	66	43	36	27	17
9	80	Fb	46	30	25	19	12

The part weight has been deducted in the above table.

4 X 1 1/8 X 1/4 CHANNEL

101.6 x 28.6 x 6.4 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 0.875 \text{ in.}^2 / 564.5 \text{ mm}^2$$

$$I = 2.87 \text{ in.}^4 / 1194584 \text{ mm}^4$$

$$Wt. = 1.05 \text{ lbs./ft.} / 1.56 \text{ kg./m.}$$

$$S = 1.44 \text{ in.}^3 / 23597 \text{ mm}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
3/0.91	874/12755	F_v	----/----	812/11843	676/9867	507/7396	338/4926
4/1.22	532/7767	F_b	----/----	381/5553	317/4625	237/3465	158/2305
5/1.52	340/4965	F_b	308/4497	205/2993	171/2492	128/1865	85/1238
6/1.83	236/3444	F_b	183/2677	122/1779	101/1480	76/1106	50/733
7/2.13	173/2526	F_b	117/1712	78/1136	65/944	48/705	32/465
8/2.44	132/1930	F_b	79/1156	52/766	44/636	32/473	21/310
9/2.74	104/1522	F_b	56/815	37/538	31/446	23/331	15/215
10/3.05	84/1230	F_b	41/594	27/391	22/323	16/238	11/154

The part weight has been deducted in the above table.

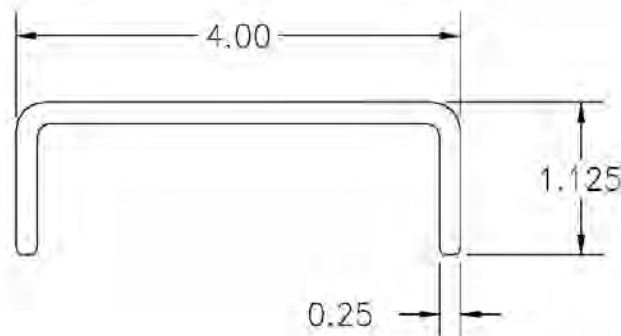
English/Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 1,200 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



4 X 1 3/8 X 3/16 CHANNEL

101.6 x 34.9 x 4.8 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 0.680 \text{ in.}^2 / 438.7 \text{ mm}^2$$

$$I = 2.62 \text{ in.}^4 / 1090526 \text{ mm}^4$$

$$Wt. = 0.88 \text{ lbs./ft.} / 1.31 \text{ kg/m.}$$

$$S = 1.31 \text{ in.}^3 / 21467 \text{ mm}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
3/0.91	435/6343	F _v	---/---	---/---	---/---	---/---	296/4322
4/1.22	244/3562	F _v	---/---	---/---	---/---	211/3086	141/2053
5/1.52	156/2275	F _b	---/---	---/---	153/2237	115/1675	76/1112
6/1.83	108/1576	F _b	---/---	---/---	92/1336	68/999	45/662
7/2.13	79/1154	F _b	---/---	71/1029	59/855	44/638	29/421
8/2.44	60/881	F _b	---/---	48/695	40/577	29/430	19/282
9/2.74	48/693	F _b	---/---	34/490	28/406	21/301	13/196
10/3.05	38/559	F _b	37/540	24/356	20/295	15/218	10/141

The part weight has been deducted in the above table.

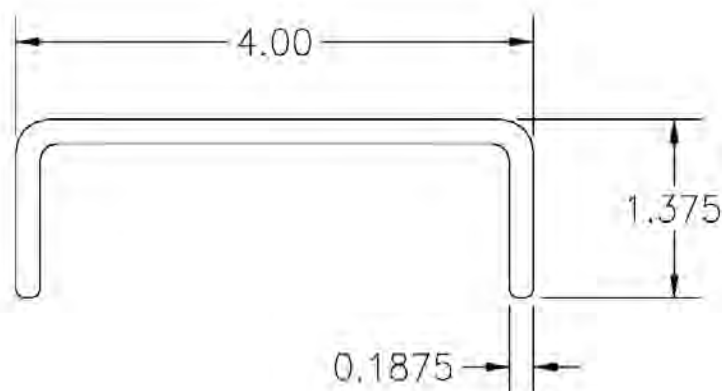
English/Metric

This item is stocked in 20-foot lengths in Standard Polyester (ST) and Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 1,000 feet.

Orders for less than mill run quantities will be subject to set up charges as well as premium per foot cost.



5 1/2 X 1 1/2 X 1/4 CHANNEL

139.7 x 38.1 x 6.4 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

Major Axis

*****Laterally Supported *****

$$A_w(\text{in.}^2 / \text{mm.}^2) = 1.3125 / 846.7$$

$$I(\text{in.}^4 / \text{mm.}^4) = 7.38 / 3071788$$

$$Wt.(\text{lbs.} / \text{kg/m}) = 1.49 / 2.22$$

$$S(\text{in.}^3 / \text{mm.}^3) = 2.684 / 43917.00$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
3/0.91	1311/19127	Fv	---/---	---/---	---/---	1118/16318	745/10869
4/1.22	803/11722	Fv	---/---	---/---	739/10781	554/8078	368/5376
5/1.52	513/7491	Fb	---/---	493/7200	411/5995	308/4489	204/2983
6/1.83	356/5193	Fb	---/---	299/4365	249/3633	186/2717	123/1802
7/2.13	261/3808	Fb	---/---	194/2825	161/2349	120/1755	79/1160
8/2.44	199/2908	Fb	199/2899	132/1923	109/1597	82/1191	54/784
9/2.74	157/2292	Fb	141/2057	93/1362	77/1130	58/840	38/550
10/3.05	127/1851	Fb	103/1507	68/995	56/825	42/611	27/398
11/3.35	104/1525	Fb	78/1134	51/746	42/617	31/456	20/294
12/3.66	87/1276	Fb	60/872	39/572	32/472	24/346	15/221
13/3.96	74/1083	Fb	47/683	31/446	25/367	18/268	12/169
14/4.27	64/930	Fb	37/543	24/352	20/289	14/209	9/130
15/4.57	55/806	Fb	30/438	19/282	16/230	11/165	7/100

Minor Axis

*****Laterally Supported *****

$$A_w(\text{in.}^2 / \text{mm.}^2) = 0.56 / 361.2$$

$$I(\text{in.}^4 / \text{mm.}^4) = 0.32 / 133194$$

$$Wt.(\text{lbs.} / \text{kg/m}) = 1.49 / 2.22$$

$$S(\text{in.}^3 / \text{mm.}^3) = 0.287 / 4752.00$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
3/0.91	211/3073	Fb	166/2423	110/1607	91/1334	68/993	45/652
4/1.22	118/1716	Fb	71/1029	46/676	38/559	28/412	18/265
5/1.52	75/1088	Fb	36/518	23/336	19/275	14/199	8/123
6/1.83	51/746	Fb	20/289	13/183	10/148	7/104	4/59

The part weight has been deducted in the above tables.

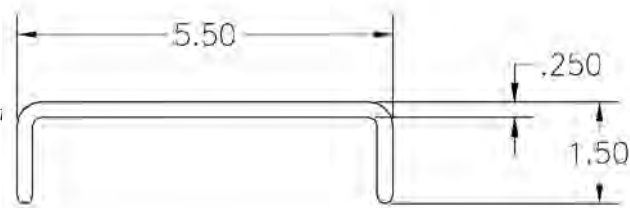
English/ Metric

This item is stocked in 20-foot lengths in Standard Polyester (STD) and Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 1,000 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



6 X 1 5/8 X 1/4 CHANNEL

152.4 x 41.3 x 6.4 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 1.375 \text{ in.}^2 / 887.1 \text{ mm.}^2$$

$$I = 10.18 \text{ in.}^4 / 4237236 \text{ mm.}^4$$

$$Wt. = 1.67 \text{ lbs./ft.} / 2.49 \text{ kg/m.}$$

$$S = 3.39 \text{ in.}^3 / 5552 \text{ mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
5/1.52	536/7820	F _v	----/----	----/----	----/----	405/5908	269/3929
6/1.83	371/5422	F _b	----/----	----/----	332/4845	249/3627	165/2408
7/2.13	272/3976	F _b	----/----	261/3803	217/3164	162/2366	107/1567
8/2.44	208/3037	F _b	----/----	179/2607	149/2167	111/1618	73/1069
9/2.74	164/2394	F _b	----/----	127/1857	106/1542	79/1149	52/757
10/3.05	132/1933	F _b	----/----	93/1364	78/1132	58/842	38/551
11/3.35	109/1593	F _b	107/1557	70/1028	58/852	43/632	28/411
12/3.66	91/1334	F _b	82/1202	54/792	45/655	33/484	21/313
13/3.96	78/1132	F _b	65/945	43/620	35/512	26/377	17/241
14/4.27	67/972	F _b	52/755	34/493	28/406	20/297	13/189
15/4.57	58/843	F _b	42/611	27/397	22/326	16/237	10/149

The part weight has been deducted in the above table.

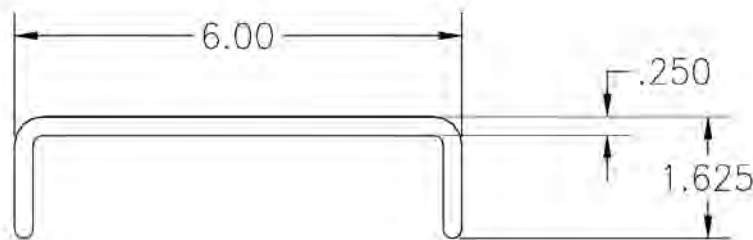
English/ Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 1,000 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



6 X 1 11/16 X 3/8 CHANNEL

152.4 x 42.9 x 9.5 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

Laterally Supported

$$A_w = 1.969 \text{ in.}^2 / 1270.3 \text{ mm.}^2$$

$$I = 14.55 \text{ in.}^4 / 6056167 \text{ mm.}^4$$

$$Wt. = 2.39 \text{ lbs./ft.} / 3.87 \text{ kg/m.}$$

$$S = 4.85 \text{ in.}^3 / 79477 \text{ mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
5/1.52	1178/17199	F_v	---/---	928/13538	773/11274	579/8445	385/5615
6/1.83	895/13063	F_b	857/12500	570/8319	475/6925	355/5183	236/3441
7/2.13	657/9586	F_b	560/8173	372/5434	310/4521	232/3380	153/2239
8/2.44	502/7329	F_b	384/5608	255/3724	212/3096	158/2311	105/1526
9/2.74	396/5782	F_b	274/4000	182/2652	151/2203	112/1641	74/1079
10/3.05	320/4675	F_b	202/2944	133/1948	111/1616	82/1201	54/786
11/3.35	264/3856	F_b	152/2224	101/1468	83/1216	62/901	40/586
12/3.66	222/3233	F_b	118/1716	77/1130	64/934	47/690	31/445
13/3.96	188/2748	F_b	92/1349	61/885	50/730	37/537	24/343
14/4.27	162/2364	F_b	74/1077	48/703	40/579	29/423	18/267
15/4.57	141/2053	F_b	60/871	39/566	32/464	23/337	14/210

The part weight has been deducted in the above table.

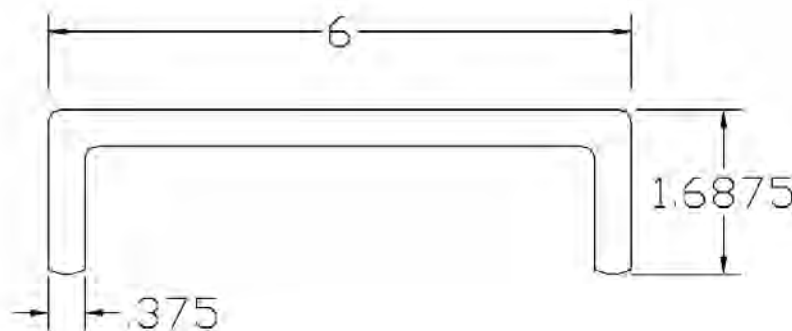
English/ Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 800 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



8 X 2 3/16 X 3/8 CHANNEL

203.2 x 55.6 x 9.5 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*)

Laterally Supported

$$A_w = 2.719 \text{ in.}^2 / 1754 \text{ mm.}^2$$

$$I = 35.77 \text{ in.}^4 / 14888598 \text{ mm.}^4$$

$$Wt. = 3.20 \text{ lbs./ft.} / 4.76 \text{ kg/m.}$$

$$S = 8.94 \text{ in.}^3 / 146500 \text{ mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
5/1.52	1627/23752	F _v	----/----	----/----	----/----	1235/18030	822/12001
6/1.83	1271/18545	F _v	----/----	1261/18405	1050/15327	787/11481	523/7634
7/2.13	932/13610	F _v	----/----	845/12333	704/10268	527/7686	350/5105
8/2.44	713/10406	F _b	----/----	590/8613	491/7168	367/5361	244/3555
9/2.74	563/8210	F _b	----/----	426/6224	355/5177	265/3868	175/2559
10/3.05	455/6639	F _b	----/----	317/4627	264/3846	197/2870	130/1894
11/3.35	375/5477	F _b	364/5314	241/3523	201/2926	149/2180	98/1434
12/3.66	315/4593	F _b	283/4135	188/2737	156/2271	116/1689	76/1106
13/3.96	268/3905	F _b	224/3275	148/2164	123/1793	91/1330	59/867
14/4.27	230/3359	F _b	180/2633	119/1736	98/1437	73/1063	47/689
15/4.57	200/2918	F _b	147/2145	97/1410	80/1165	59/860	38/554
16/4.88	175/2558	F _b	121/1767	79/1159	65/956	48/702	31/449
17/5.18	155/2259	F _b	101/1471	66/961	54/791	40/579	25/366
18/5.49	138/2009	F _b	85/1235	55/804	45/660	33/480	21/301
19/5.79	123/1797	F _b	72/1045	46/677	38/555	27/401	17/248
20/6.10	111/1616	F _b	61/890	39/574	32/469	23/337	14/205

The part weight has been deducted in the above table.

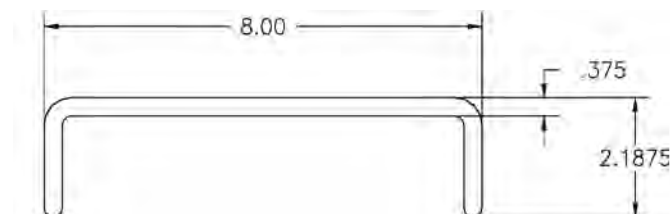
English/ *Metric*

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 800 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



10 X 2 3/4 X 1/2 CHANNEL

254.0 x 69.9 x 12.7 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

Laterally Supported

$$A_w = 4.50 \text{ in.}^2 / 2903.2 \text{ mm.}^2$$

$$I = 92.49 \text{ in.}^4 / 38497245 \text{ mm.}^4$$

$$Wt. = 5.30 \text{ lbs./ft.} / 7.89 \text{ kg/m.}$$

$$S = 18.50 \text{ in.}^3 / 303161 \text{ mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
6/1.83	1869/27278	F _v	----/----	----/----	----/----	1802/26298	1199/17503
7/2.13	1601/23369	F _v	----/----	----/----	----/----	1239/18077	824/12022
8/2.44	1400/20437	F _v	----/----	----/----	1177/17183	882/12865	586/8548
9/2.74	1244/18156	F _v	----/----	1037/15140	864/12602	646/9430	429/6257
10/3.05	1090/15910	F _b	----/----	781/11393	650/9479	486/7088	322/4696
11/3.35	900/13133	F _b	----/----	600/8762	499/7287	373/5443	247/3600
12/3.66	755/11022	F _b	709/10347	470/6866	391/5707	292/4258	193/2810
13/3.96	643/9378	F _b	565/8246	375/5468	311/4542	232/3385	153/2227
14/4.27	553/8074	F _b	457/6670	303/4418	251/3667	187/2728	123/1790
15/4.57	481/7022	F _b	374/5464	248/3614	205/2997	153/2226	100/1455
16/4.88	422/6161	F _b	310/4526	205/2988	170/2476	126/1835	82/1194
17/5.18	373/5448	F _b	259/3787	171/2495	141/2065	105/1527	68/989
18/5.49	332/4850	F _b	219/3196	144/2101	119/1737	88/1281	56/825
19/5.79	298/4344	F _b	186/2719	122/1783	101/1471	74/1082	47/692
20/6.10	268/3912	F _b	160/2329	104/1523	86/1255	63/919	40/584
21/6.40	243/3540	F _b	138/2008	90/1309	74/1077	54/786	34/495
22/6.71	220/3218	F _b	119/1741	78/1132	64/928	46/674	29/420
23/7.01	201/2936	F _b	104/1517	67/982	55/804	40/581	25/358
24/7.32	184/2690	F _b	91/1329	59/857	48/699	34/503	21/306
25/7.62	169/2472	F _b	80/1168	51/750	42/610	30/436	18/261

The part weight has been deducted in the above table.

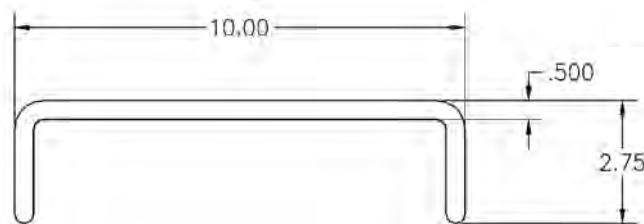
English/Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 800 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



11 1/2 X 2 3/4 X 1/2 CHANNEL

292.1 x 69.9 x 12.7 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 5.25 \text{ in.}^2 / 3387.1 \text{ mm.}^2$$

$$I = 124.6 \text{ in.}^4 / 51862436 \text{ mm.}^4$$

$$Wt. = 6.07 \text{ lbs./ft.} / 9.04 \text{ kg/m.}$$

$$S = 21.67 \text{ in.}^3 / 315007 \text{ mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
6/1.83	2618/31822	F _v	---/---	---/---	---/---	---/---	1540/22472
7/2.13	1868/27261	F _v	---/---	---/---	---/---	1605/23429	1068/15585
8/2.44	1634/23841	F _v	---/---	---/---	1537/22430	1151/16797	765/11164
9/2.74	1451/21181	F _v	---/---	1362/19875	1134/16545	849/12383	563/8222
10/3.05	1277/18635	F _b	---/---	1029/15023	857/12502	641/9351	425/6200
11/3.35	1054/15383	F _b	---/---	795/11596	661/9646	494/7209	327/4772
12/3.66	885/12910	F _b	---/---	625/9114	519/7578	388/5658	256/3738
13/3.96	753/10985	F _b	752/10968	499/7278	414/6048	309/4510	204/2973
14/4.27	648/9458	F _b	609/8891	404/5893	335/4894	250/3645	164/2396
15/4.57	564/8225	F _b	500/7296	331/4830	275/4008	204/2981	134/1953
16/4.88	495/7217	F _b	415/6054	274/4002	227/3318	169/2463	110/1608
17/5.18	437/6381	F _b	348/5072	229/3348	190/2773	141/2054	91/1335
18/5.49	389/5681	F _b	294/4287	194/2824	160/2336	118/1727	77/1117
19/5.79	349/5088	F _b	250/3652	164/2401	136/1984	100/1462	64/941
20/6.10	314/4582	F _b	215/3133	141/2055	116/1695	85/1246	55/796
21/6.40	284/4147	F _b	185/2705	121/1769	100/1457	73/1067	46/678
22/6.71	258/3769	F _b	161/2348	105/1532	86/1259	63/919	40/579
23/7.01	236/3440	F _b	140/2050	91/1332	75/1093	54/794	34/496
24/7.32	216/3151	F _b	123/1797	80/1164	65/953	47/689	29/425
25/7.62	198/2896	F _b	108/1583	70/1021	57/834	41/600	25/366

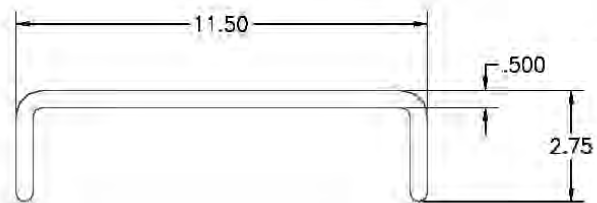
The part weight has been deducted in the above table.

English/Metric

At the time of this printing, this was a non-stocked part.

The mill run on this item is 600 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



12 X 3 X 1/2 CHANNEL

304.8 x 76.2 x 12.7 CHANNEL

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*)

Laterally Supported

$$A_w = 5.5 \text{ in.}^2 / 3548.4 \text{ mm.}^2$$

$$I = 143.5 \text{ in.}^4 / 59729209 \text{ mm.}^4$$

$$Wt. = 6.50 \text{ lbs./ft.} / 9.68 \text{ kg/m.}$$

$$S = 23.90 \text{ in.}^3 / 391651 \text{ mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
6/1.83	2285/33342	F _v	---/---	---/---	---/---	---/---	1714/25014
7/2.13	1957/28564	F _v	---/---	---/---	---/---	1799/26248	1197/17465
8/2.44	1712/24981	F _v	---/---	---/---	---/---	1296/18916	862/12577
9/2.74	1409/20565	F _v	---/---	---/---	1282/18705	960/14003	637/9301
10/3.05	1140/16638	F _v	---/---	---/---	972/14181	727/10610	482/7039
11/3.35	941/13733	F _v	---/---	903/13185	752/10971	562/8202	372/5434
12/3.66	790/11523	F _b	---/---	712/10387	592/8639	442/6453	292/4268
13/3.96	672/9803	F _b	---/---	569/8310	473/6908	353/5156	233/3403
14/4.27	578/8439	F _b	---/---	462/6740	384/5600	286/4174	188/2749
15/4.57	503/7338	F _b	---/---	379/5533	315/4594	234/3420	154/2246
16/4.88	441/6437	F _b	---/---	315/4591	261/3809	194/2831	127/1853
17/5.18	390/5690	F _b	---/---	264/3846	218/3188	162/2365	106/1543
18/5.49	347/5065	F _b	337/4924	223/3249	184/2690	137/1992	89/1294
19/5.79	311/4535	F _b	288/4199	190/2766	157/2288	116/1690	75/1093
20/6.10	280/4083	F _b	247/3606	162/2370	134/1958	99/1443	64/928

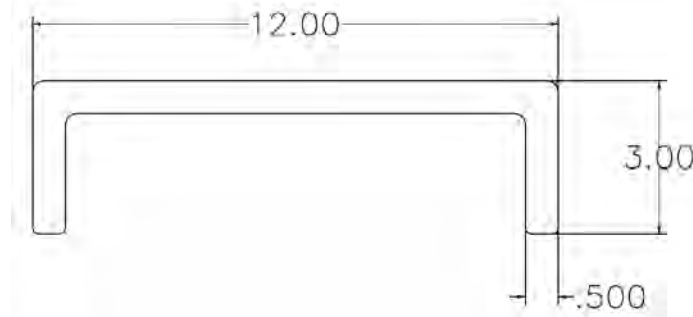
The part weight has been deducted in the above table.

English/ *Metric*

At the time of this printing, this was a non-stocked item.

The mill run on this item is 600 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



3 X 1 1/2 X 1/4 I-BEAM

76.2 x 38.1 x 6.41 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 0.63 \text{ in.}^2 / 403.2 \text{ mm.}^2$$

$$I = 1.75 \text{ in.}^4 / 728405 \text{ mm.}^4$$

$$Wt. = 1.10 \text{ lbs./ft.} / 1.64 \text{ kg/m.}$$

$$S = 1.17 \text{ in.}^3 / 19173 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
4/1.22	102/1488	468/6825	F_v	355/5188	237/3453	197/2875	147/2152	98/1429
5/1.52	50/724	311/4537	F_b	190/2776	126/1845	105/1535	79/1147	52/759
6/1.83	28/403	216/3146	F_b	113/1643	75/1090	62/905	46/675	30/445
7/2.13	17/244	158/2307	F_b	72/1046	47/692	39/574	29/426	19/279
8/2.44	11/156	121/1762	F_b	48/703	32/463	26/383	19/283	13/184
9/2.74	7/104	95/1389	F_b	34/493	22/323	18/266	13/196	9/125
10/3.05	5/71	77/1122	F_b	24/357	16/232	13/191	10/139	6/87

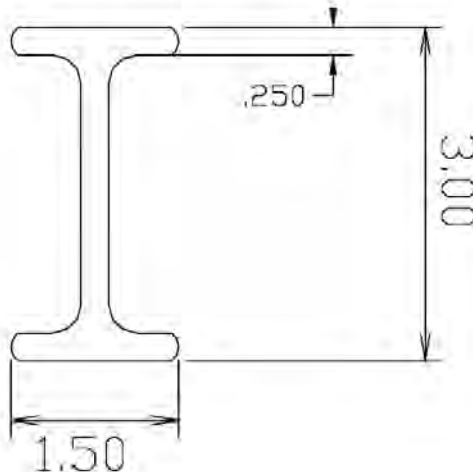
The part weight has been deducted in the above table.

English/ Metric

At the time of this printing, this was a non-stocked item.

The mill run on this item is 1,400 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



3 1/2 X 1 1/2 X 3/16 I-BEAM

88.9 x 38.1 x 4.7

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

A_w (in.2 / $mm.^2$) = 0.585 / 377.4

I (in.4 / $mm.^4$) = 2.01 / 836625

Wt. (lbs. / $kg.m.$) = 0.88 / 1.31

S (in.3 / $mm.^3$) = 1.15 / 18845

SPAN FEET/ METERS	NO LATERAL SUPPORT MAXIMUM LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
4/1.22	84/984	430/6388	Fb	397/5795	264/3858	220/3213	165/2406	110/1599
5/1.52	40/461	275/4460	Fb	215/3131	143/2083	119/1733	89/1296	59/859
6/1.83	22/249	191/3093	Fb	128/1865	85/1238	71/1029	53/768	35/507
7/2.13	13/146	140/2269	Fb	82/1192	54/790	45/656	33/488	22/321
8/2.44	8/91	107/1733	Fb	55/804	36/531	30/440	22/327	15/213
9/2.74	5/59	84/1367	Fb	39/566	26/372	21/308	16/227	10/147
10/3.05	4/38	68/1104	Fb	28/411	18/269	15/222	11/163	7/104

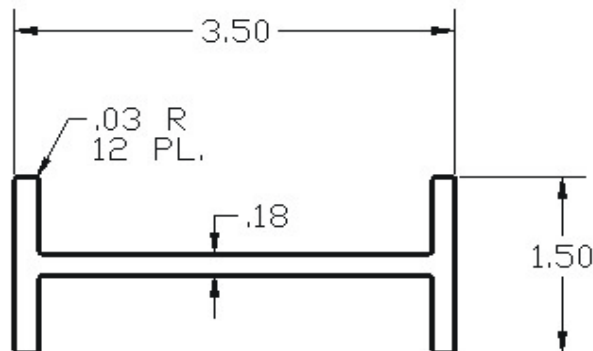
The part weight has been deducted in the above table.

This item is stocked in 20-foot lengths in Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 1000 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



4 X 2 X 1/4 I-BEAM

101.6 x 50.8 x 6.4 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 0.875 \text{ in.}^2 / 564.5 \text{ mm.}^2$$

$$I = 4.41 \text{ in.}^4 / 1835581 \text{ mm.}^4$$

$$Wt. = 1.50 \text{ lbs./ft.} / 2.23 \text{ kg/m.}$$

$$S = 2.21 \text{ in.}^3 / 36215 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
4/1.22	224/3265	655/9555	F_v	----/----	542/7915	452/6592	338/4939	225/3285
5/1.52	104/1514	524/7640	F_v	450/6565	299/4369	249/3638	187/2723	124/1808
6/1.83	56/817	408/5950	F_b	272/3965	181/2636	150/2193	112/1639	74/1085
7/2.13	33/486	299/4366	F_b	175/2560	116/1699	97/1412	72/1054	48/695
8/2.44	21/310	229/3337	F_b	119/1740	79/1153	66/957	49/712	32/468
9/2.74	14/207	180/2632	F_b	84/1232	56/814	46/675	34/500	22/326
10/3.05	10/142	146/2128	F_b	62/901	41/593	34/491	25/362	16/234
11/3.35	7/100	120/1755	F_b	46/676	30/443	25/366	18/269	12/172
12/3.66	5/71	101/1471	F_b	36/519	23/338	19/278	14/203	9/128

The part weight has been deducted in the above table.

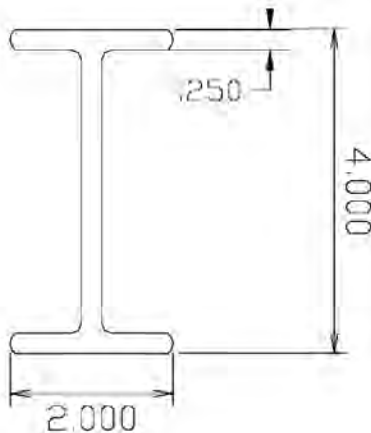
English/Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 1,000 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



5 1/2 X 2 1/2 X 1/4 I-BEAM

139.7 x 63.5 x 6.4

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*)

$$A_w \text{ (in.}^2 \text{ / } mm.^2 \text{)} = 1.25 \text{ / } 806$$

$$I \text{ (in.}^4 \text{ / } mm.^4 \text{)} = 11.21 \text{ / } 4665954$$

$$Wt. \text{ (lbs. / } kg.m. \text{)} = 1.92 \text{ / } 2.86$$

$$S \text{ (in.}^3 \text{ / } mm.^3 \text{)} = 4.08 \text{ / } 66859.00$$

SPAN FEET/ <i>METERS</i>	NO LATERAL SUPPORT	LATERALLY SUPPORTED						
	MAXIMUM	MAXIMUM	DEFLECTION					
	LOAD	LOAD	L/100	L/150	L/180	L/240	L/360	
4/1.22	482/7034	936/13654	Fv	---/---	---/---	---/---	742/10829	494/7210
5/1.52	265/3874	748/10917	Fv	---/---	686/10013	571/8340	428/6248	285/4156
6/1.83	138/2010	623/9093	Fv	---/---	426/6221	355/5179	266/3878	176/2576
7/2.13	80/1164	498/7262	Fb	422/6156	281/4094	233/3407	175/2549	116/1690
8/2.44	50/728	381/5554	Fb	291/4247	193/2822	161/2347	120/1753	79/1159
9/2.74	33/482	300/4382	Fb	208/3041	138/2018	115/1677	86/1251	57/825
10/3.05	23/332	243/3544	Fb	154/2246	102/1488	85/1235	63/919	41/604
11/3.35	16/236	200/2924	Fb	117/1701	77/1125	64/933	47/692	31/452
12/3.66	12/171	168/2453	Fb	90/1316	59/868	49/719	36/532	24/345
13/3.96	9/126	143/2086	Fb	71/1037	47/682	39/564	28/416	18/268
14/4.27	6/94	123/1795	Fb	57/830	37/544	31/449	23/329	14/210
15/4.57	5/70	107/1560	Fb	46/673	30/439	25/361	18/264	11/167

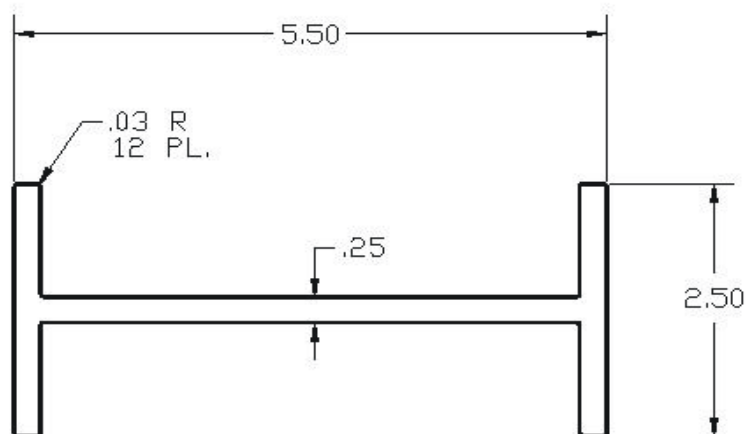
The part weight has been deducted in the above table.

This item is stocked in 20-foot lengths in Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 1000 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



6 X 3 X 1/4 I-BEAM

152.4 x 76.2 x 6.4 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*)

Laterally Supported

$$A_w = 1.375 \text{ in.}^2 / 887.1 \text{ mm.}^2$$

$$I = 15.87 \text{ in.}^4 / 7071772 \text{ mm.}^4$$

$$Wt. = 2.20 \text{ lbs./ft.} / 3.27 \text{ kg/m.}$$

$$S = 5.29 \text{ in.}^3 / 92751 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
5/1.52	364/5307	823/12008	F _v	---/---	---/---	759/11083	569/8304	379/5525
6/1.83	184/2689	685/10001	F _v	---/---	576/8400	479/6995	359/5238	239/3481
7/2.13	104/1524	587/8568	F _v	576/8403	383/5591	319/4654	239/3483	158/2311
8/2.44	64/936	513/7493	F _v	400/5844	266/3885	221/3232	166/2416	110/1600
9/2.74	42/610	433/6321	F _v	289/4211	192/2796	159/2325	119/1736	79/1146
10/3.05	28/415	350/5114	F _b	214/3124	142/2072	118/1721	88/1283	58/845
11/3.35	20/292	289/4221	F _b	163/2376	108/1573	89/1306	67/971	44/637
12/3.66	14/210	243/3542	F _b	126/1845	84/1219	69/1011	51/750	34/489
13/3.96	11/154	206/3013	F _b	100/1458	66/961	55/796	40/589	26/382
14/4.27	8/114	178/2594	F _b	80/1170	53/769	44/636	32/469	21/302
15/4.57	6/84	155/2255	F _b	65/951	43/623	35/514	26/377	17/241

The part weight has been deducted in the above table.

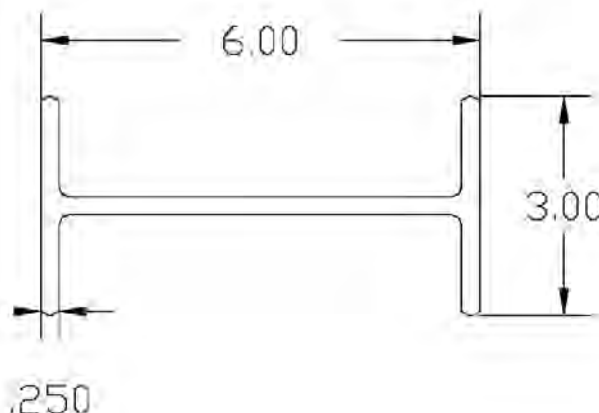
English/*Metric*

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 800 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



6 X 3 X 3/8 I-BEAM

152.4 x 76.2 x 9.5 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

Laterally Supported

$$A_w = 1.969 \text{ in.}^2 / 1270 \text{ mm.}^2$$

$$I = 22.35 \text{ in.}^4 / 9302772 \text{ mm.}^4$$

$$\text{Wt.} = 3.20 \text{ lbs./ft.} / 4.76 \text{ kg/m.}$$

$$S = 7.45 \text{ in.}^3 / 122084 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
5/1.52	634/9256	1178/17195	F _v	----/----	----/----	1074/15678	805/11747	536/7816
6/1.83	333/4860	981/14321	F _v	----/----	813/11870	677/9884	507/7401	337/4918
7/2.13	195/2847	841/12268	F _v	813/11865	541/7894	450/6571	337/4916	224/3262
8/2.44	123/1801	735/10729	F _v	565/8246	376/5482	313/4561	234/3409	155/2257
9/2.74	83/1206	610/8901	F _b	407/5939	270/3944	225/3279	168/2447	111/1616
10/3.05	58/842	493/7201	F _b	302/4405	200/2921	166/2426	124/1808	82/1190
11/3.35	42/607	407/5943	F _b	229/3349	152/2217	126/1840	94/1368	61/896
12/3.66	31/449	342/4986	F _b	178/2599	118/1717	98/1423	72/1056	47/688
13/3.96	23/338	291/4242	F _b	141/2053	93/1353	77/1120	57/828	37/537
14/4.27	18/258	250/3651	F _b	113/1647	74/1082	61/894	45/659	29/424
15/4.57	14/199	218/3174	F _b	92/1339	60/877	50/723	36/530	23/338
16/4.88	11/154	191/2784	F _b	75/1100	49/718	40/591	30/431	19/272
17/5.18	8/120	169/2461	F _b	63/913	41/593	33/487	24/353	15/220
18/5.49	6/93	150/2190	F _b	52/765	34/494	28/404	20/291	12/179

The part weight has been deducted in the above table.

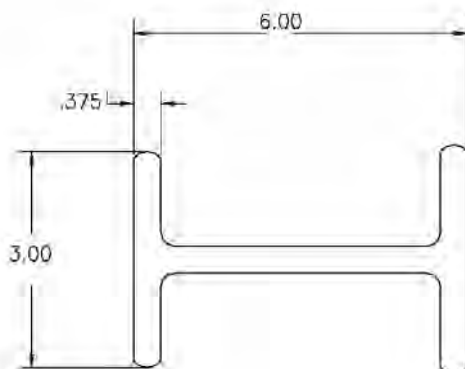
English/Metric

This item is stocked in 20-foot lengths in Polyester Fire Retardant (FR) and Vinylester Fire Retardant (VE).

Other lengths available in mill run quantities.

The mill run on this item is 800 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



8 X 4 X 3/8 I-BEAM

203.2 x 101.6 x 9.5 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

Laterally Supported

$$A_w = 2.719 \text{ in.}^2 / 1754 \text{ mm.}^2$$

$$I = 55.55 \text{ in.}^4 / 23121656 \text{ mm.}^4$$

$$Wt. = 4.30 \text{ lbs./ft.} / 6.4 \text{ kg/m.}$$

$$S = 13.89 \text{ in.}^3 / 227616 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
4/1.22	2035/29698	2035/29698	F _v	---/---	---/---	---/---	---/---	1744/25452
5/1.52	1627/23746	1627/23746	F _v	---/---	---/---	---/---	---/---	1094/15970
6/1.83	837/12217	1355/19778	F _v	---/---	---/---	---/---	1084/15815	721/10522
7/2.13	471/6880	1161/16943	F _v	---/---	---/---	994/14506	744/10864	495/7222
8/2.44	288/4210	1015/14818	F _v	---/---	850/12400	707/10323	529/7727	352/5130
9/2.74	188/2741	902/13164	F _v	---/---	623/9093	518/7567	388/5659	257/3752
10/3.05	128/1872	811/11841	F _v	705/10289	469/6838	390/5688	291/4250	193/2813
11/3.35	91/1327	737/10759	F _v	542/7915	360/5256	299/4370	223/3261	148/2153
12/3.66	66/969	639/9321	F _b	425/6205	282/4116	234/3420	175/2549	115/1678
13/3.96	50/724	544/7933	F _b	339/4945	224/3276	186/2720	139/2024	91/1328
14/4.27	38/551	468/6831	F _b	274/3998	181/2644	150/2193	112/1629	73/1065
15/4.57	29/426	407/5943	F _b	224/3273	148/2161	123/1790	91/1327	59/864
16/4.88	23/332	357/5216	F _b	186/2709	122/1785	101/1477	75/1092	48/707
17/5.18	18/261	316/4613	F _b	155/2265	102/1489	84/1230	62/907	40/584
18/5.49	14/206	281/4108	F _b	131/1910	86/1252	71/1033	52/759	33/485
19/5.79	11/163	252/3680	F _b	111/1623	73/1061	60/874	44/640	28/406
20/6.10	9/129	227/3315	F _b	95/1389	62/905	51/744	37/542	23/341

The part weight has been deducted in the above table.

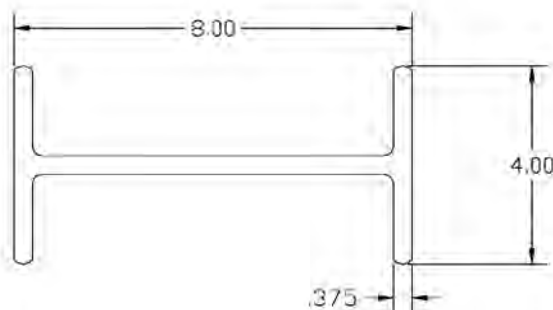
English/Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 600 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



8 X 4 X 1/2 I-BEAM

203.2 x 101.6 x 12.7 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 3.50 \text{ in.}^2 / 2258 \text{ mm.}^2$$

$$I = 70.62 \text{ in.}^4 / 29394263 \text{ mm.}^4$$

$$Wt. = 5.70 \text{ lbs./ft.} / 8.48 \text{ kg/m.}$$

$$S = 17.66 \text{ in.}^3 / 289396 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
6/1.83	1233/17993	1744/25456	F_v	---/---	---/---	---/---	1383/20182	920/13427
7/2.13	709/10346	1494/21808	F_v	---/---	---/---	1267/18497	949/13852	631/9207
8/2.44	442/6455	1307/19071	F_v	---/---	1083/15802	901/13154	675/9845	448/6536
9/2.74	293/4280	1161/16943	F_v	---/---	794/11581	660/9637	494/7207	327/4777
10/3.05	204/2972	1044/15240	F_v	898/13101	597/8706	496/7241	371/5410	245/3579
11/3.35	147/2140	949/13847	F_v	690/10075	458/6689	381/5560	284/4149	188/2738
12/3.66	109/1586	812/11847	F_b	541/7896	359/5236	298/4350	222/3241	146/2133
13/3.96	82/1203	691/10083	F_b	431/6291	285/4166	237/3458	176/2573	116/1687
14/4.27	64/929	595/8682	F_b	348/5084	230/3362	191/2788	142/2070	93/1352
15/4.57	50/728	518/7552	F_b	285/4161	188/2746	156/2275	115/1685	75/1096
16/4.88	40/577	454/6628	F_b	236/3444	155/2268	129/1876	95/1386	61/896
17/5.18	32/462	402/5862	F_b	197/2878	130/1891	107/1562	79/1151	51/739
18/5.49	25/372	358/5219	F_b	166/2426	109/1590	90/1311	66/962	42/614
19/5.79	21/301	320/4676	F_b	141/2061	92/1346	76/1108	56/810	35/512
20/6.10	17/244	289/4212	F_b	121/1763	79/1148	65/943	47/686	29/430

The part weight has been deducted in the above table.

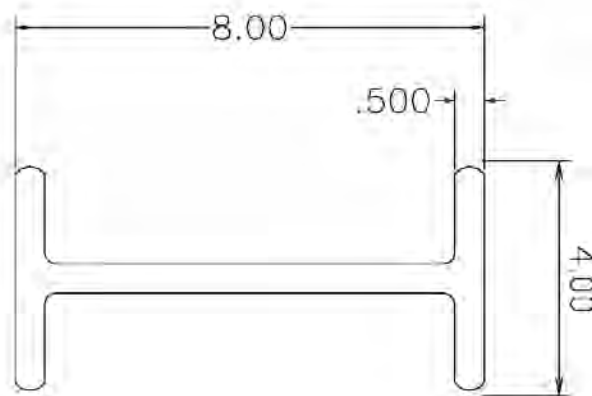
English/Metric

This item is stocked in 20-foot and 25-foot lengths in Polyester Fire Retardant (FR) and Vinylester Fire Retardant (VE).

Other lengths available in mill run quantities.

The mill run on this item is 600 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



10 X 5 X 3/8 I-BEAM

254 x 127 x 9.5 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

Laterally Supported

$$A_w = 3.469 \text{ in.}^2 / 2237 \text{ mm.}^2$$

$$I = 111.63 \text{ in.}^4 / 46463914 \text{ mm.}^4$$

$$\text{Wt.} = 5.78 \text{ lbs./ft.} / 8.6 \text{ kg/m.}$$

$$S = 22.33 \text{ in.}^3 / 365923 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
7/2.13	1032/15066	1481/21613	F _v	---/---	---/---	---/---	1305/19046	868/12669
8/2.44	618/9026	1295/18900	F _v	---/---	---/---	1271/18543	952/13886	632/9229
9/2.74	395/5761	1151/16791	F _v	---/---	1141/16652	950/13860	711/10374	472/6888
10/3.05	265/3863	1035/15104	F _v	---/---	871/12717	725/10583	542/7916	360/5249
11/3.35	185/2694	940/13723	F _v	---/---	678/9898	564/8235	422/6155	279/4075
12/3.66	133/1939	861/12572	F _v	808/11793	537/7834	446/6514	333/4864	220/3215
13/3.96	98/1432	795/11599	F _v	649/9478	431/6291	358/5228	267/3900	176/2572
14/4.27	74/1080	738/10764	F _v	529/7719	351/5118	291/4251	217/3167	143/2083
15/4.57	57/828	656/9570	F _b	436/6359	289/4211	240/3496	178/2601	117/1706
16/4.88	44/644	576/8401	F _b	363/5294	240/3501	199/2904	148/2157	97/1410
17/5.18	35/506	509/7432	F _b	305/4449	201/2938	167/2434	124/1804	81/1175
18/5.49	27/401	454/6620	F _b	258/3770	170/2485	141/2057	104/1521	68/986
19/5.79	22/319	407/5933	F _b	221/3218	145/2117	120/1750	89/1292	57/833
20/6.10	17/255	366/5346	F _b	190/2766	124/1816	103/1499	76/1103	48/708
21/6.40	14/203	332/4842	F _b	164/2393	107/1567	89/1292	65/948	41/604
22/6.71	11/162	302/4404	F _b	143/2081	93/1359	77/1119	56/818	35/517
23/7.01	9/128	276/4022	F _b	125/1819	81/1185	67/973	49/709	30/444
24/7.32	7/100	253/3687	F _b	109/1598	71/1037	58/850	42/616	26/383
25/7.62	5/77	232/3391	F _b	97/1409	62/911	51/745	37/538	23/330

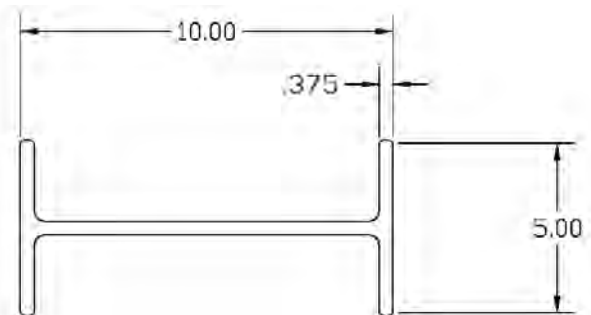
The part weight has been deducted in the above table.

English/Metric

At the time of this printing, this was a non-stocked item.

The mill run on this item is 700 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



10 X 5 X 1/2 I-BEAM

254 x 127 x 12.7 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

Laterally Supported

$$A_w = 4.50 \text{ in.}^2 / 2903\text{mm.}^2$$

$$I = 143.29 \text{ in.}^4 / 59641801\text{mm.}^4$$

$$\text{Wt.} = 7.20 \text{ lbs./ft.} / 10.71 \text{ kg/m.}$$

$$S = 28.66 \text{ in.}^3 / 469653\text{mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
7/2.13	1471/21472	1921/28040	F _v	---/---	---/---	---/---	1682/24542	1119/16326
8/2.44	894/13050	1680/24522	F _v	---/---	---/---	1636/23879	1225/17883	815/11887
9/2.74	579/8452	1493/21786	F _v	---/---	1468/21429	1222/17840	915/13354	608/8868
10/3.05	394/5752	1343/19597	F _v	---/---	1121/16363	933/13618	698/10188	463/6757
11/3.35	279/4070	1220/17806	F _v	---/---	873/12733	726/10594	543/7919	359/5244
12/3.66	204/2973	1118/16313	F _v	1039/15165	690/10075	574/8378	429/6258	283/4137
13/3.96	153/2228	1031/15050	F _v	835/12187	554/8090	461/6724	344/5017	227/3309
14/4.27	117/1705	957/13968	F _v	680/9924	451/6581	375/5466	279/4074	184/2681
15/4.57	91/1327	842/12287	F _b	560/8175	371/5415	308/4495	229/3345	150/2195
16/4.88	72/1048	739/10786	F _b	466/6806	308/4502	256/3734	190/2774	124/1815
17/5.18	57/837	654/9542	F _b	392/5719	259/3777	215/3130	159/2322	104/1513
18/5.49	46/675	582/8500	F _b	332/4846	219/3196	181/2645	134/1958	87/1270
19/5.79	38/548	522/7618	F _b	283/4137	187/2723	154/2252	114/1663	74/1073
20/6.10	31/448	470/6865	F _b	244/3557	160/2336	132/1929	97/1421	62/912
21/6.40	25/367	426/6217	F _b	211/3076	138/2016	114/1662	84/1221	53/779
22/6.71	21/301	388/5656	F _b	183/2676	120/1749	99/1440	72/1054	46/667
23/7.01	17/247	354/5165	F _b	160/2339	104/1525	86/1253	63/913	39/574
24/7.32	14/202	324/4735	F _b	141/2055	91/1335	75/1095	54/795	34/495
25/7.62	11/165	298/4356	F _b	124/1812	80/1173	66/960	48/694	29/428

The part weight has been deducted in the above table.

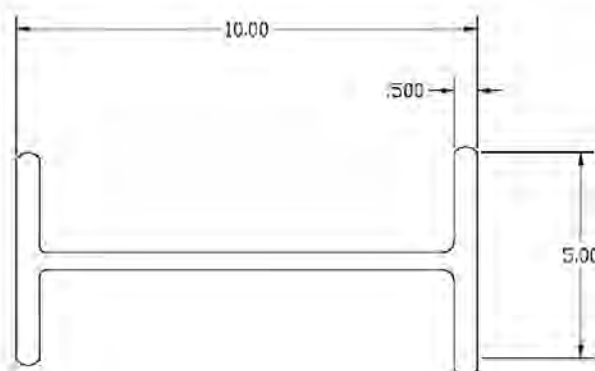
English / Metric

This item is stocked in 20-foot and 25-foot lengths in Polyester Fire Retardant (FR) and Vinylester Fire Retardant (VE).

Other lengths available in mill run quantities.

The mill run on this item is 600 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



12 X 6 X 1/2 I-BEAM

304.8 x 152.4 x 12.7 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 5.5 \text{ in.}^2 / 3548 \text{ mm.}^2$$

$$I = 253.96 \text{ in.}^4 / 105706133 \text{ mm.}^4$$

$$Wt. = 8.70 \text{ lbs./ft.} / 12.95 \text{ kg/m.}$$

$$S = 42.33 \text{ in.}^3 / 693664 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
7/2.13	2348/34273	2348/34273	F _v	---/---	---/---	---/---	---/---	1715/25029
8/2.44	1693/24706	2054/29973	F _v	---/---	---/---	---/---	1922/28049	1278/18657
9/2.74	1080/15757	1825/26629	F _v	---/---	---/---	---/---	1463/21350	972/14191
10/3.05	724/10567	1641/23953	F _v	---/---	---/---	1515/22105	1134/16547	753/10989
11/3.35	505/7377	1491/21764	F _v	---/---	1434/20929	1194/17420	893/13033	592/8646
12/3.66	365/5322	1366/19940	F _v	---/---	1147/16739	954/13928	714/10414	473/6901
13/3.96	270/3945	1261/18396	F _v	---/---	929/13564	773/11282	578/8430	382/5578
14/4.27	205/2990	1170/17073	F _v	1147/16746	762/11121	634/9247	473/6903	312/4560
15/4.57	158/2310	1091/15926	F _v	952/13886	631/9215	525/7658	391/5712	258/3766
16/4.88	124/1812	1023/14923	F _v	797/11627	528/7709	439/6403	327/4770	215/3138
17/5.18	99/1441	962/14038	F _v	673/9820	446/6504	370/5399	275/4018	181/2636
18/5.49	79/1159	862/12583	F _b	573/8360	379/5531	314/4588	234/3409	153/2230
19/5.79	64/940	773/11280	F _b	491/7168	325/4736	269/3926	200/2913	130/1899
20/6.10	53/768	697/10168	F _b	424/6187	280/4082	232/3381	172/2504	111/1627
21/6.40	43/631	631/9211	F _b	368/5372	242/3539	201/2928	148/2164	96/1400
22/6.71	36/521	574/8381	F _b	321/4690	211/3084	175/2549	129/1880	83/1211
23/7.01	30/431	525/7658	F _b	282/4115	185/2701	152/2230	112/1640	72/1051
24/7.32	24/357	481/7022	F _b	249/3627	163/2376	134/1959	98/1437	63/916
25/7.62	20/296	443/6462	F _b	220/3211	144/2098	118/1727	87/1264	55/800
26/7.92	17/245	409/5965	F _b	196/2853	127/1860	105/1529	76/1115	48/701
27/8.23	14/201	378/5522	F _b	174/2545	113/1654	93/1357	68/986	42/615
28/8.53	11/165	351/5126	F _b	156/2277	101/1476	83/1208	60/875	37/541
29/8.84	9/133	327/4770	F _b	140/2044	90/1320	74/1079	53/777	33/476
30/9.14	7/106	305/4449	F _b	126/1839	81/1184	66/965	47/692	29/419

The part weight has been deducted in the above table.

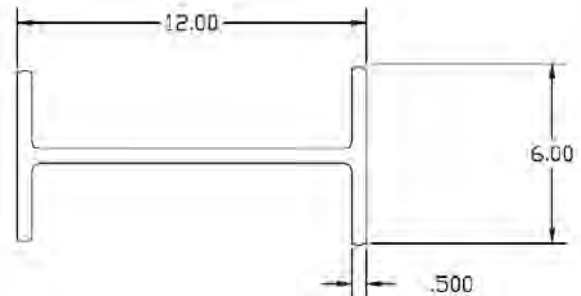
English/Metric

This item is stocked in 20-foot and 25-foot lengths in Polyester Fire Retardant (FR) and Vinylester Fire Retardant (VE).

Other lengths available in mill run quantities.

The mill run on this item is 400 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



18 X 3/8 X 4 1/2 X 1/2 I-BEAM

457.2 x 9.5 x 114.3 x 12.7 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*) Laterally Supported

$$A_w = 6.375 \text{ in.}^2 / 4112 \text{ mm}^2$$

$$I = 498.15 \text{ in.}^4 / 207345685 \text{ mm}^4$$

$$Wt. = 8.70 \text{ lbs./ft.} / 12.95 \text{ kg/m.}$$

$$S = 55.35 \text{ in.}^3 / 907024 \text{ mm}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
6/1.83	2864/41793	3179/46391	F _v	---/---	---/---	---/---	---/---	3032/44253
7/2.13	1566/22848	2723/39746	F _v	---/---	---/---	---/---	---/---	2301/33580
8/2.44	930/13571	2382/34762	F _v	---/---	---/---	---/---	---/---	1777/25940
9/2.74	588/8585	2116/30885	F _v	---/---	---/---	---/---	2096/30585	1394/20348
10/3.05	391/5705	1904/27784	F _v	---/---	---/---	---/---	1667/24334	1109/16180
11/3.35	270/3942	1730/25247	F _v	---/---	---/---	---/---	1343/19601	892/13025
12/3.66	193/2810	1585/23132	F _v	---/---	---/---	1462/21333	1094/15968	727/10603
13/3.96	141/2055	1462/21343	F _v	---/---	1446/21106	1204/17567	901/13143	598/8720
14/4.27	105/1535	1357/19809	F _v	---/---	1203/17550	1001/14604	748/10921	496/7239
15/4.57	80/1165	1266/18480	F _v	---/---	1009/14723	839/12248	627/9154	415/6060
16/4.88	61/896	1187/17317	F _v	---/---	853/12451	709/10354	530/7734	350/5114
17/5.18	48/696	1116/16291	F _v	1095/15975	727/10608	604/8818	451/6582	298/4346
18/5.49	37/545	1054/15379	F _v	940/13712	623/9099	518/7562	386/5639	255/3717
19/5.79	29/428	998/14563	F _v	812/11846	538/7855	447/6524	333/4862	219/3199
20/6.10	23/337	914/13335	F _b	705/10293	467/6820	388/5662	289/4215	190/2768
21/6.40	18/264	828/12083	F _b	616/8993	408/5953	338/4940	252/3673	165/2406
22/6.71	14/206	754/10998	F _b	541/7897	358/5222	297/4331	220/3216	144/2102
23/7.01	11/159	689/10052	F _b	477/6967	315/4602	261/3814	194/2829	126/1843
24/7.32	8/121	632/9221	F _b	423/6173	279/4073	231/3373	171/2498	111/1623
25/7.62	6/89	582/8488	F _b	376/5491	248/3619	205/2994	152/2214	98/1434
26/7.92	4/62	537/7838	F _b	336/4904	221/3227	183/2668	135/1969	87/1270
27/8.23	3/39	497/7259	F _b	301/4394	198/2887	163/2385	120/1757	77/1129
28/8.53	1/20	462/6741	F _b	271/3950	178/2591	147/2138	108/1572	69/1006
29/8.84	---/---	430/6276	F _b	244/3562	160/2332	132/1922	97/1410	62/898
30/9.14	---/---	401/5856	F _b	221/3221	144/2105	119/1733	87/1268	55/803

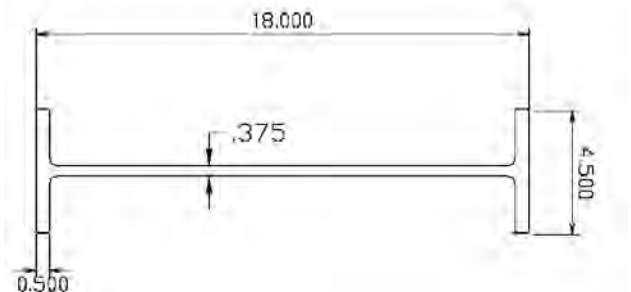
The part weight has been deducted in the above table.

English/*Metric*

At the time of this printing, this was a non-stocked item.

The mill run on this item is 600 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



24 X 3/8 X 7 1/2 X 3/4 I-BEAM

609.6 x 9.5 x 190.5 x 19.1 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*)

Laterally Supported

$$A_w = 8.44 \text{ in.}^2 / 5445 \text{ mm.}^2$$

$$I = 1877 \text{ in.}^4 / 781266386 \text{ mm.}^4$$

$$\text{Wt.} = 15.20 \text{ lbs./ft.} / 22.62 \text{ kg/m.}$$

$$S = 156.42 \text{ in.}^3 / 2563265 \text{ mm.}^3$$

SPAN FT/ <i>m</i>	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		D E F L E C T I O N				
				L/100	L/150	L/180	L/240	L/360
10/3.05	2517/36730	2517/36730	F _v	---/---	---/---	---/---	---/---	2421/35335
11/3.35	2287/33371	2287/33371	F _v	---/---	---/---	---/---	---/---	2048/29887
12/3.66	1649/24071	2095/30571	F _v	---/---	---/---	---/---	---/---	1744/25450
13/3.96	1204/17569	1932/28203	F _v	---/---	---/---	---/---	---/---	1494/21804
14/4.27	899/13127	1793/26172	F _v	---/---	---/---	---/---	---/---	1287/18782
15/4.57	686/10006	1673/24413	F _v	---/---	---/---	---/---	---/---	1114/16262
16/4.88	532/7760	1567/22873	F _v	---/---	---/---	---/---	1462/21330	969/14146
17/5.18	419/6108	1474/21514	F _v	---/---	---/---	---/---	1278/18651	847/12360
18/5.49	334/4870	1391/20307	F _v	---/---	---/---	---/---	1122/16378	743/10844
19/5.79	269/3926	1317/19226	F _v	---/---	---/---	---/---	989/14439	655/9552
20/6.10	219/3196	1251/18254	F _v	---/---	---/---	1172/17111	876/12778	579/8445
21/6.40	180/2624	1191/17374	F _v	---/---	---/---	1042/15205	778/11348	513/7492
22/6.71	149/2170	1136/16574	F _v	---/---	1118/16314	929/13558	693/10113	457/6668
23/7.01	124/1806	1086/15844	F _v	---/---	1000/14598	831/12128	619/9041	408/5953
24/7.32	104/1511	1040/15174	F _v	---/---	898/13104	746/10883	556/8107	365/5331

25-40 see following page

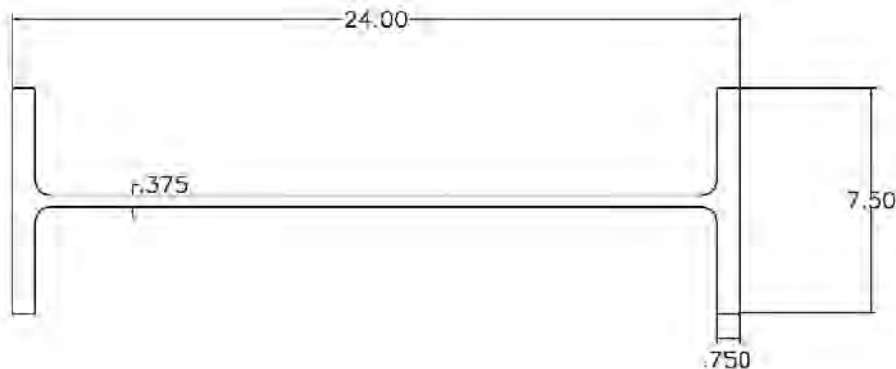
The part weight has been deducted in the above table.

English/*Metric*

At the time of this printing, this was a non-stocked item.

The mill run on this item is 500 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



24 X 3/8 X 7 1/2 X 3/4 I-BEAM

609.6 x 9.5 x 190.5 x 19.1 I-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*) Laterally Supported

$$A_w = 8.44 \text{ in.}^2 / 5445 \text{ mm.}^2$$

$$I = 1877 \text{ in.}^4 / 781266386 \text{ mm.}^4$$

$$\text{Wt.} = 15.20 \text{ lbs./ft.} / 22.62 \text{ kg/m.}$$

$$S = 156.42 \text{ in.}^3 / 2563265 \text{ mm.}^3$$

SPAN FT/ <i>m</i>	NO LATERAL SUPPORT	LATERALLY SUPPORTED						
		MAXIMUM LOAD	D E F L E C T I O N					
	MAX. LOAD			L/100	L/150	L/180	L/240	L/360
10-24 see preceding page								
25/7.62	87/1269	998/14559	F _v	----/----	808/11798	671/9794	500/7290	328/4786
26/7.92	73/1069	959/13990	F _v	----/----	730/10651	606/8839	450/6574	295/4309
27/8.23	62/903	923/13464	F _v	----/----	661/9641	548/7997	407/5943	266/3888
28/8.53	52/764	889/12975	F _v	----/----	600/8749	497/7254	369/5385	241/3516
29/8.84	44/647	858/12520	F _v	826/12049	545/7959	452/6596	335/4891	218/3187
30/9.14	37/547	829/12095	F _v	753/10996	497/7256	412/6010	305/4452	198/2894
31/9.45	32/462	802/11698	F _v	689/10056	454/6630	376/5488	278/4061	180/2633
32/9.75	27/389	776/11326	F _v	632/9216	416/6070	344/5022	254/3711	164/2400
33/10.06	22/325	752/10976	F _v	580/8463	382/5568	315/4603	233/3397	150/2191
34/10.36	19/271	730/10646	F _v	534/7787	351/5117	290/4227	213/3115	137/2003
35/10.67	15/223	708/10336	F _v	492/7177	323/4711	266/3889	196/2861	126/1834
36/10.97	12/181	688/10043	F _v	454/6627	298/4344	246/3583	180/2632	115/1681
37/11.28	10/144	669/9765	F _v	420/6129	275/4012	227/3306	166/2424	106/1542
38/11.58	8/112	651/9502	F _v	389/5677	254/3711	209/3055	153/2236	97/1417
39/11.89	6/83	634/9253	F _v	361/5267	236/3437	194/2827	141/2065	89/1303
40/12.19	4/58	618/9016	F _v	335/4893	218/3188	179/2620	131/1909	82/1199

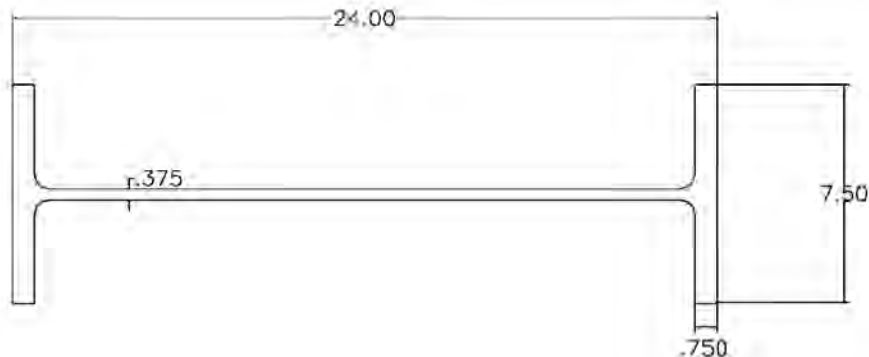
The part weight has been deducted in the above table.

English/*Metric*

At the time of this printing, this was a non-stocked item.

The mill run on this item is 500 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



3 X 3 X 1/4 WF-BEAM

76.2 x 76.2 x 6.4 WF-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = .625 \text{ in.}^2 / 403.2 \text{ mm.}^2$$

$$I = 3.17 \text{ in.}^4 / 1319454 \text{ mm.}^4$$

$$Wt. = 1.64 \text{ lbs./ft.} / 2.44 \text{ kg/m.}$$

$$S = 2.11 \text{ in.}^3 / 34577 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
4/1.22	467/6817	467/6817	F_v	----/----	389/5674	324/4724	242/3537	161/2350
5/1.52	225/3278	373/5449	F_v	323/4707	214/3130	178/2604	133/1947	88/1290
6/1.83	119/1741	311/4537	F_v	195/2840	129/1885	107/1567	80/1169	53/772
7/2.13	70/1028	266/3885	F_v	125/1831	83/1213	69/1007	51/749	34/491
8/2.44	45/654	218/3183	F_b	85/1242	56/820	47/679	35/504	22/328
9/2.74	30/439	172/2510	F_b	60/877	40/577	33/477	24/351	16/226
10/3.05	21/306	139/2029	F_b	44/639	29/418	24/344	17/252	11/160

The part weight has been deducted in the above table.

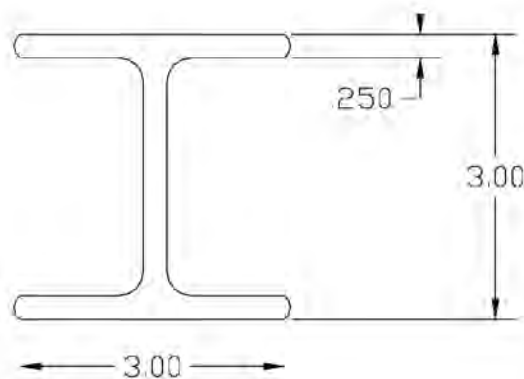
English/Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 1,000 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



4 X 4 X 1/4 WF-BEAM

101.6 x 101.6 x 6.4 WF-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = .875 \text{ in.}^2 / 564.5 \text{ mm.}^2$$

$$I = 7.94 \text{ in.}^4 / 3304878 \text{ mm.}^4$$

$$Wt. = 2.15 \text{ lbs./ft.} / 3.20 \text{ kg/m.}$$

$$S = 3.97 \text{ in.}^3 / 65057 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
4/1.22	654/9546	654/9546	F _v	---/---	---/---	---/---	523/7630	348/5076
5/1.52	523/7630	523/7630	F _v	---/---	484/7062	403/5879	302/4402	200/2924
6/1.83	289/4219	435/6353	F _v	---/---	301/4386	250/3650	187/2729	124/1809
7/2.13	164/2396	373/5441	F _v	297/4342	198/2884	164/2398	123/1791	81/1183
8/2.44	101/1477	326/4757	F _v	205/2993	136/1985	113/1649	84/1229	55/809
9/2.74	66/967	285/4156	F _b	147/2140	97/1417	81/1175	60/874	39/572
10/3.05	45/663	230/3360	F _b	108/1578	71/1041	59/863	44/639	28/416
11/3.35	32/471	190/2772	F _b	82/1193	54/785	44/649	33/479	21/309
12/3.66	24/344	159/2324	F _b	63/920	41/603	34/497	25/365	16/233
13/3.96	18/256	135/1976	F _b	50/723	32/471	27/388	19/283	12/178
14/4.27	13/194	116/1699	F _b	39/576	26/373	21/306	15/222	9/137
15/4.57	10/149	101/1476	F _b	32/465	21/299	17/244	12/175	7/106

The part weight has been deducted in the above table.

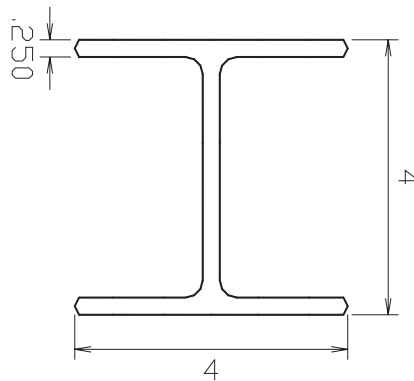
English/Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 800 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



6 X 6 X 1/4 WF-BEAM

152.4 x 152.4 x 6.4 WF-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

Laterally Supported

$$A_w = 1.375 \text{ in.}^2 / 887.1 \text{ mm.}^2$$

$$I = 28.28 \text{ in.}^4 / 11771025 \text{ mm.}^4$$

$$Wt. = 3.40 \text{ lbs./ft.} / 5.06 \text{ kg/m.}$$

$$S = 9.43 \text{ in.}^3 / 154530 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
5/1.52	822/11990	822/11990	F _v	---/---	---/---	---/---	---/---	554/8091
6/1.83	678/9896	678/9896	F _b	---/---	---/---	---/---	549/8016	365/5328
7/2.13	497/7258	497/7258	F _b	---/---	---/---	---/---	377/5504	250/3652
8/2.44	380/5545	380/5545	F _b	---/---	---/---	358/5230	268/3910	177/2590
9/2.74	260/3790	299/4371	F _b	---/---	---/---	262/3830	196/2860	130/1890
10/3.05	173/2522	242/3531	F _b	---/---	237/3460	197/2875	147/2144	97/1413
11/3.35	120/1746	199/2909	F _b	---/---	182/2656	151/2205	112/1641	74/1078
12/3.66	85/1248	167/2437	F _b	---/---	142/2076	118/1722	88/1279	57/836
13/3.96	63/915	142/2069	F _b	---/---	113/1649	94/1366	69/1012	45/658
14/4.27	47/685	122/1777	F _b	---/---	91/1328	75/1098	56/811	36/524
15/4.57	36/522	106/1542	F _b	---/---	74/1082	61/893	45/658	29/422

The part weight has been deducted in the above table.

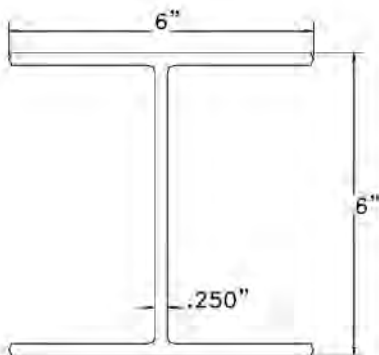
English/Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 700 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



6 X 6 X 3/8 WF-BEAM

152.4 x 152.4 x 9.5 WF-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 1.969 \text{ in.}^2 / 1270 \text{ mm.}^2$$

$$I = 40.17 \text{ in.}^4 / 16720016 \text{ mm.}^4$$

$$Wt. = 4.90 \text{ lbs./ft.} / 7.29 \text{ kg/m.}$$

$$S = 13.39 \text{ in.}^3 / 219423 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		D E F L E C T I O N				
				L/100	L/150	L/180	L/240	L/360
4/1.22	1472/21480	1472/21480	F _v	----/----	----/----	----/----	----/----	1260/18393
5/1.52	1177/17170	1177/17170	F _v	----/----	----/----	----/----	----/----	790/11529
6/1.83	980/14296	980/14296	F _v	----/----	----/----	----/----	782/11415	520/7586
7/2.13	839/12244	839/12244	F _v	----/----	----/----	717/10468	537/7833	356/5198
8/2.44	670/9783	733/10704	F _v	----/----	613/8943	510/7441	381/5563	252/3685
9/2.74	432/6306	651/9507	F _v	----/----	449/6551	373/5447	279/4067	184/2688
10/3.05	293/4272	586/8549	F _v	508/7416	337/4920	280/4088	209/3048	138/2008
11/3.35	206/3011	532/7765	F _v	390/5699	259/3775	215/3134	160/2333	105/1531
12/3.66	150/2191	487/7112	F _v	306/4462	202/2951	168/2447	125/1817	81/1188
13/3.96	112/1636	449/6560	F _v	243/3550	161/2343	133/1941	99/1438	64/935
14/4.27	86/1249	395/5765	F _b	196/2865	129/1886	107/1560	79/1152	51/744
15/4.57	66/970	343/5013	F _b	160/2341	105/1537	87/1269	64/934	41/599

The part weight has been deducted in the above table.

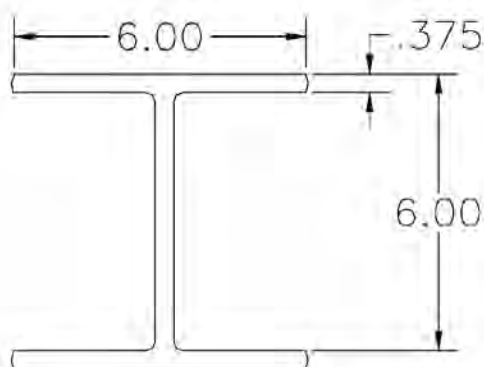
English/Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 600 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



8 X 8 X 3/8 WF-BEAM

203.2 x 203.2 x 9.5 WF-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 2.719 \text{ in.}^2 / 1754 \text{ mm.}^2$$

$$I = 99.19 \text{ in.}^4 / 41285995 \text{ mm.}^4$$

$$Wt. = 6.49 \text{ lbs./ft.} / 9.66 \text{ kg/m.}$$

$$S = 24.80 \text{ in.}^3 / 406399 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
4/1.22	2033/29666	2033/29666	Fv	—/—	—/—	—/—	—/—	—/—
5/1.52	1625/23714	1625/23714	Fv	—/—	—/—	—/—	—/—	1483/21636
6/1.83	1353/19746	1353/19746	Fv	—/—	—/—	—/—	—/—	1028/15008
7/2.13	1159/16911	1159/16911	Fv	—/—	—/—	—/—	1106/16139	735/10727
8/2.44	1013/14786	1013/14786	Fv	—/—	—/—	—/—	812/11849	539/7868
9/2.74	900/13132	900/13132	Fv	—/—	—/—	815/11898	610/8900	404/5902
10/3.05	803/11716	809/11810	Fv	—/—	752/10968	625/9125	467/6820	309/4515
11/3.35	556/8108	668/9755	Fb	—/—	587/8566	488/7123	364/5318	241/3514
12/3.66	397/5800	561/8182	Fb	—/—	466/6797	387/5648	289/4212	190/2777
13/3.96	292/4265	477/6958	Fb	—/—	375/5469	311/4541	232/3382	152/2223
14/4.27	220/3210	410/5986	Fb	—/—	305/4455	253/3696	188/2749	123/1801
15/4.57	169/2463	356/5202	Fb	—/—	251/3669	208/3042	155/2258	101/1474
16/4.88	132/1922	313/4561	Fb	—/—	209/3052	173/2527	128/1872	83/1216
17/5.18	104/1521	276/4029	Fb	266/3888	175/2561	145/2118	107/1565	69/1012
18/5.49	83/1219	246/3584	Fb	226/3295	148/2165	123/1789	90/1318	58/847
19/5.79	68/986	220/3207	Fb	193/2813	126/1844	104/1521	77/1117	49/713
20/6.10	55/805	198/2885	Fb	166/2417	108/1580	89/1301	65/952	41/603

The part weight has been deducted in the above table.

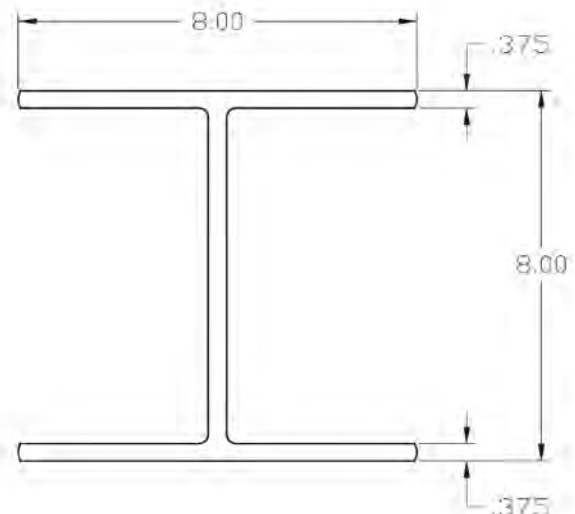
English/Metric

This item is stocked in 20-foot lengths in Polyester Fire Retardant (FR) and Vinylester Fire Retardant (VE).

Other lengths available in mill run quantities.

The mill run on this item is 400 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



8 X 8 X 1/2 WF-BEAM

203.2 x 203.2 x 12.7 WF-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

Laterally Supported

$$A_w = 3.5 \text{ in.}^2 / 2258 \text{ mm.}^2$$

$$I = 126.96 \text{ in.}^4 / 52844742 \text{ mm.}^4$$

$$Wt. = 8.70 \text{ lbs./ft.} / 12.95 \text{ kg/m.}$$

$$S = 31.74 \text{ in.}^3 / 520125 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
6/1.83	1741/25412	1741/25412	F _v	---/---	---/---	---/---	---/---	1319/19254
7/2.13	1491/21764	1491/21764	F _v	---/---	---/---	---/---	1418/20696	943/13755
8/2.44	1304/19028	1304/19028	F _v	---/---	---/---	---/---	1041/15189	691/10083
9/2.74	1158/16899	1158/16899	F _v	---/---	---/---	1045/15247	781/11404	518/7560
10/3.05	1041/15197	1041/15197	F _v	---/---	963/14052	801/11689	599/8735	396/5781
11/3.35	795/11596	946/13804	F _v	---/---	752/10972	625/9122	467/6810	308/4497
12/3.66	574/8378	866/12643	F _v	---/---	596/8703	495/7231	369/5391	243/3552
13/3.96	426/6222	799/11660	F _v	724/10563	480/7000	398/5812	297/4327	195/2843
14/4.27	324/4730	741/10818	F _v	590/8614	391/5701	324/4729	241/3515	158/2301
15/4.57	251/3667	691/10089	F _v	487/7104	322/4694	267/3890	198/2886	129/1882
16/4.88	198/2890	648/9450	F _v	405/5918	267/3903	221/3231	164/2392	106/1552
17/5.18	158/2311	609/8887	F _v	341/4974	224/3273	185/2707	137/1998	88/1290
18/5.49	128/1870	565/8242	F _b	289/4214	190/2767	157/2285	115/1682	74/1079
19/5.79	105/1529	506/7385	F _b	246/3597	161/2355	133/1942	98/1425	62/907
20/6.10	86/1262	456/6652	F _b	212/3090	138/2017	114/1660	83/1213	53/767
21/6.40	72/1049	413/6022	F _b	183/2670	119/1738	98/1427	71/1038	45/650
22/6.71	60/878	375/5476	F _b	159/2319	103/1504	84/1232	61/892	38/553
23/7.01	51/738	343/4999	F _b	139/2025	90/1308	73/1068	53/770	32/471
24/7.32	43/623	314/4581	F _b	122/1775	78/1141	64/930	46/666	28/401
25/7.62	36/528	289/4212	F _b	107/1563	68/999	56/812	40/577	23/342

The part weight has been deducted in the above table.

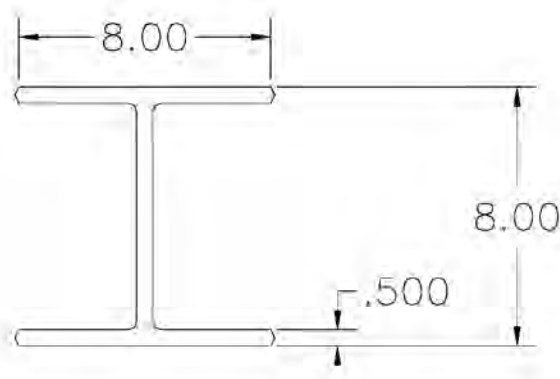
English/Metric

This item is stocked in 20-foot and 25-foot lengths in Polyester Fire Retardant (FR) and Vinylester Fire Retardant (VE).

Other lengths available in mill run quantities.

The mill run on this item is 400 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



10 X 10 X 3/8 WF-BEAM

254 x 254 x 9.5 WF-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 3.469 \text{ in.}^2 / 2237 \text{ mm.}^2$$

$$I = 198.53 \text{ in.}^4 / 82634425 \text{ mm.}^4$$

$$Wt. = 8.74 \text{ lbs./ft.} / 13.01 \text{ kg/m.}$$

$$S = 39.71 \text{ in.}^3 / 650730 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
7/2.13	1478/21569	1478/21569	F _v	---/---	---/---	---/---	---/---	1211/17668
8/2.44	1292/18857	1292/18857	F _v	---/---	---/---	---/---	---/---	915/13349
9/2.74	1025/14953	1025/14953	F _b	---/---	---/---	---/---	---/---	703/10266
10/3.05	828/12088	828/12088	F _b	---/---	---/---	---/---	---/---	550/8022
11/3.35	683/9968	683/9968	F _b	---/---	---/---	---/---	658/9600	436/6357
12/3.66	573/8355	573/8355	F _b	---/---	---/---	---/---	529/7718	350/5103
13/3.96	487/7100	487/7100	F _b	---/---	---/---	---/---	430/6278	284/4143
14/4.27	418/6105	418/6105	F _b	---/---	---/---	---/---	354/5161	233/3398
15/4.57	363/5301	363/5301	F _b	---/---	---/---	---/---	293/4283	193/2813
16/4.88	294/4288	318/4644	F _b	---/---	---/---	---/---	246/3585	161/2348
17/5.18	231/3375	281/4099	F _b	---/---	---/---	279/4075	207/3024	135/1974
18/5.49	184/2690	250/3643	F _b	---/---	---/---	238/3467	176/2569	114/1670
19/5.79	149/2169	223/3256	F _b	---/---	---/---	203/2970	150/2195	97/1421
20/6.10	121/1765	201/2926	F _b	---/---	---/---	175/2558	129/1887	83/1215
21/6.40	99/1448	181/2642	F _b	---/---	---/---	152/2216	112/1630	72/1044
22/6.71	82/1197	164/2396	F _b	---/---	160/2339	132/1928	97/1414	62/900
23/7.01	68/996	149/2182	F _b	---/---	140/2048	115/1685	84/1232	53/779
24/7.32	57/832	137/1993	F _b	---/---	123/1800	101/1479	74/1077	46/676
25/7.62	48/698	125/1827	F _b	---/---	109/1588	89/1302	65/945	40/587

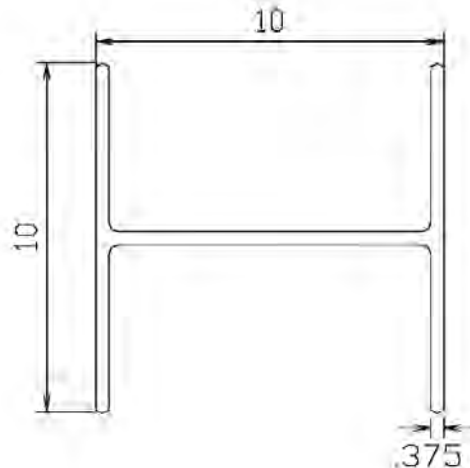
The part weight has been deducted in the above table.

English/Metric

At the time of this printing, this was a non-stocked item.

The mill run on this item is 400 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



10 X 10 X 1/2 WF-BEAM

254 x 254 x 12.7 WF-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 4.50 \text{ in.}^2 / 2903 \text{ mm}^2$$

$$I = 256.20 \text{ in.}^4 / 106638491 \text{ mm}^4$$

$$Wt. = 10.90 \text{ lbs./ft.} / 16.22 \text{ kg/m.}$$

$$S = 51.24 \text{ in.}^3 / 839673 \text{ mm}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
7/2.13	1918/27986	1918/27986	F _v	---/---	---/---	---/---	---/---	1567/22865
8/2.44	1677/24468	1677/24468	F _v	---/---	---/---	---/---	---/---	1183/17270
9/2.74	1489/21732	1489/21732	F _v	---/---	---/---	---/---	1370/19999	910/13280
10/3.05	1339/19543	1339/19543	F _v	---/---	---/---	---/---	1072/15642	711/10375
11/3.35	1216/17752	1216/17752	F _v	---/---	---/---	1138/16603	851/12413	563/8222
12/3.66	1114/16259	1114/16259	F _v	---/---	1101/16062	915/13358	684/9979	452/6600
13/3.96	929/13552	1028/14996	F _v	---/---	896/13083	745/10876	556/8117	367/5358
14/4.27	698/10190	953/13914	F _v	---/---	738/10772	613/8950	457/6673	301/4396
15/4.57	536/7819	842/12294	F _b	---/---	614/8956	510/7437	379/5538	249/3639
16/4.88	418/6105	739/10786	F _b	---/---	515/7513	427/6234	318/4636	208/3038
17/5.18	332/4839	653/9536	F _b	---/---	435/6353	361/5268	268/3911	175/2554
18/5.49	266/3886	582/8489	F _b	562/8197	371/5411	307/4483	228/3323	148/2162
19/5.79	216/3157	521/7603	F _b	482/7039	318/4640	263/3840	195/2840	126/1841
20/6.10	178/2591	469/6846	F _b	417/6083	274/4002	227/3309	167/2442	108/1575
21/6.40	147/2145	424/6195	F _b	362/5287	238/3471	196/2866	145/2110	93/1354
22/6.71	123/1789	386/5630	F _b	316/4618	207/3026	171/2495	126/1832	80/1168
23/7.01	103/1502	352/5138	F _b	278/4054	182/2650	149/2181	109/1596	69/1011
24/7.32	87/1268	322/4705	F _b	245/3574	160/2330	131/1915	96/1396	60/878
25/7.62	74/1076	296/4324	F _b	217/3163	141/2056	116/1687	84/1225	52/764
26/7.92	63/917	273/3986	F _b	193/2810	125/1820	102/1491	74/1078	46/666
27/8.23	54/783	252/3684	F _b	172/2505	111/1617	91/1321	65/951	40/581
28/8.53	46/671	234/3415	F _b	153/2240	99/1440	80/1174	58/841	35/507
29/8.84	39/576	217/3173	F _b	138/2009	88/1286	72/1045	51/744	30/443
30/9.14	34/495	202/2954	F _b	124/1806	79/1151	64/933	45/660	26/387

The part weight has been deducted in the above table.

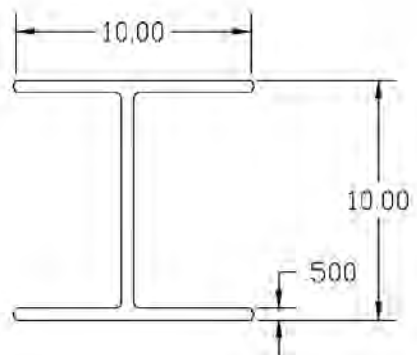
English/ Metric

This item is stocked in 20-foot and 25-foot lengths in Polyester Fire Retardant (PFR) and Vinylester Fire Retardant (VE).

Other lengths available in mill run quantities.

The mill run on this item is 400 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



12 X 12 X 1/2 WF-BEAM

304.8 x 304.8 x 12.7 WF-BEAM

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 5.5 \text{ in.}^2 / 3548 \text{ mm.}^2$$

$$I = 452.45 \text{ in.}^4 / 188323909 \text{ mm.}^4$$

$$Wt. = 13.20 \text{ lbs./ft.} / 19.64 \text{ kg/m.}$$

$$S = 75.45 \text{ in.}^3 / 1236404 \text{ mm.}^3$$

SPAN FT/m	NO LATERAL SUPPORT MAX. LOAD	LATERALLY SUPPORTED						
		MAXIMUM LOAD		DEFLECTION				
				L/100	L/150	L/180	L/240	L/360
7/2.13	2344/34207	2344/34207	F _v	---/---	---/---	---/---	---/---	2274/33180
8/2.44	2049/29907	2049/29907	F _v	---/---	---/---	---/---	---/---	1761/25696
9/2.74	1820/26563	1820/26563	F _v	---/---	---/---	---/---	---/---	1384/20199
10/3.05	1637/23887	1637/23887	F _v	---/---	---/---	---/---	---/---	1102/16087
11/3.35	1487/21698	1487/21698	F _v	---/---	---/---	---/---	1339/19544	888/12965
12/3.66	1350/19702	1350/19702	F _b	---/---	---/---	---/---	1092/15938	724/10561
13/3.96	1148/16759	1148/16759	F _b	---/---	---/---	---/---	900/13128	595/8688
14/4.27	988/14424	988/14424	F _b	---/---	---/---	---/---	748/10913	494/7211
15/4.57	859/12540	859/12540	F _b	---/---	---/---	840/12261	627/9148	413/6034
16/4.88	754/10998	754/10998	F _b	---/---	---/---	710/10367	529/7727	349/5087
17/5.18	642/9363	666/9720	F _b	---/---	---/---	605/8827	450/6572	296/4317
18/5.49	513/7485	593/8649	F _b	---/---	---/---	518/7566	386/5626	253/3687
19/5.79	415/6055	531/7743	F _b	---/---	---/---	447/6524	332/4845	217/3166
20/6.10	339/4950	478/6969	F _b	---/---	468/6827	388/5657	287/4194	187/2732
21/6.40	280/4084	432/6304	F _b	---/---	408/5654	338/4930	250/3649	162/2369
22/6.71	233/3398	392/5726	F _b	---/---	358/5218	296/4316	219/3189	141/2062
23/7.01	195/2847	358/5223	F _b	---/---	315/4593	260/3795	192/2798	123/1801
24/7.32	165/2401	328/4781	F _b	---/---	278/4059	230/3350	169/2465	108/1579
25/7.62	140/2036	301/4391	F _b	---/---	247/3600	203/2968	149/2178	95/1388
26/7.92	119/1736	277/4045	F _b	---/---	220/3205	181/2638	132/1931	84/1223
27/8.23	102/1486	256/3737	F _b	---/---	196/2861	161/2352	118/1716	74/1080
28/8.53	87/1277	237/3461	F _b	---/---	176/2562	144/2103	105/1529	65/955
29/8.84	75/1100	220/3214	F _b	---/---	158/2300	129/1885	94/1366	58/846
30/9.14	65/951	205/2990	F _b	---/---	142/2070	116/1693	84/1222	51/750
31/9.45	56/823	191/2788	F _b	---/---	128/1868	104/1524	75/1095	46/666
32/9.75	49/713	179/2605	F _b	---/---	116/1688	94/1375	67/983	40/591
33/10.06	42/619	167/2438	F _b	164/2389	105/1529	85/1242	61/883	36/525
34/10.36	37/537	157/2286	F _b	149/2176	95/1387	77/1123	54/794	32/465
35/10.67	32/465	147/2146	F _b	136/1986	86/1260	70/1018	49/715	28/412

The part weight has been deducted in the above table.

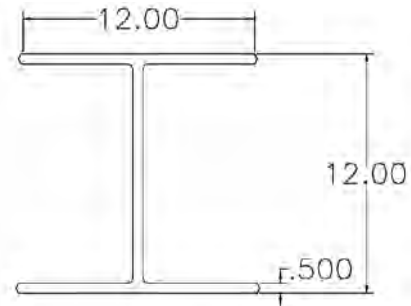
English/ Metric

This item is stocked in 20-foot and 25-foot lengths in Polyester Fire Retardant (FR) and Vinylester Fire Retardant (VE).

Other lengths available in mill run quantities.

The mill run on this item is 300 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



4 X 1/8 X 2 X 1/4 RECT TUBE

101.6 X 3.2 X 50.8 X 6.4 RECT TUBE

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*)

Laterally Supported

$$A_w = 0.44 \text{ in.}^2 / 283\text{mm.}^2$$

$$I = 4.38 \text{ in.}^4 / 1823093\text{mm.}^4$$

$$\text{Wt.} = 1.46 \text{ lbs./ft.} / 2.17\text{kg/m.}$$

$$S = 2.19 \text{ in.}^3 / 35887\text{mm.}^3$$

SPAN FT/ <i>m</i>	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
5/ <i>1.52</i>	262/ <i>3824</i>	F_v	----/----	260/ <i>3794</i>	217/ <i>3167</i>	162/ <i>2364</i>	107/ <i>1562</i>
6/ <i>1.83</i>	218/ <i>3181</i>	F_b	----/----	162/ <i>2364</i>	135/ <i>1970</i>	101/ <i>1474</i>	66/ <i>963</i>
7/ <i>2.13</i>	187/ <i>2729</i>	F_b	161/ <i>2350</i>	107/ <i>1562</i>	89/ <i>1299</i>	66/ <i>963</i>	43/ <i>628</i>
8/ <i>2.44</i>	163/ <i>2379</i>	F_b	111/ <i>1620</i>	73/ <i>1065</i>	61/ <i>890</i>	45/ <i>657</i>	29/ <i>423</i>
9/ <i>2.74</i>	145/ <i>2116</i>	F_b	79/ <i>1153</i>	52/ <i>759</i>	43/ <i>628</i>	32/ <i>467</i>	21/ <i>306</i>
10/ <i>3.05</i>	130/ <i>1897</i>	F_b	58/ <i>846</i>	38/ <i>555</i>	32/ <i>467</i>	23/ <i>336</i>	15/ <i>219</i>
11/ <i>3.35</i>	118/ <i>1722</i>	F_b	44/ <i>642</i>	29/ <i>423</i>	24/ <i>350</i>	17/ <i>248</i>	11/ <i>161</i>
12/ <i>3.66</i>	99/ <i>1445</i>	F_b	34/ <i>496</i>	22/ <i>321</i>	18/ <i>263</i>	13/ <i>190</i>	8/ <i>117</i>

The part weight has been deducted in the above table.

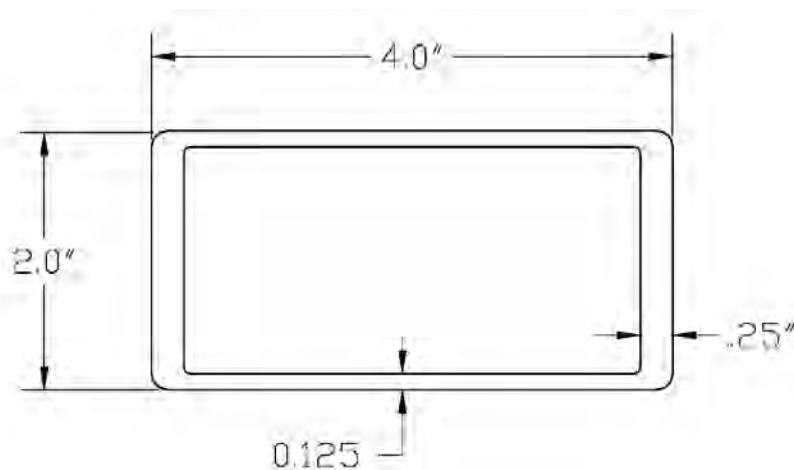
English/*Metric*

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 1200 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



6 X 4 X 1/4 RECT TUBE

152.4 x 101.6 x 6.4 RECT TUBE

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

Laterally Support

Major Axis

$$A_w = 2.42 \text{ in.}^2 / 1561 \text{ mm.}^2$$

$$I = 22.89 \text{ in.}^4 / 9527537 \text{ mm.}^4$$

$$\text{Wt.} = 3.80 \text{ lbs./ft.} / 5.66 \text{ kg/m.}$$

$$S = 7.63 \text{ in.}^3 / 125033 \text{ mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
6/1.83	1004/14652	F _v	---/---	862/12580	718/10478	537/7837	357/5210
7/2.13	1033/15076	F _b	855/12478	569/8304	473/6903	354/5166	235/3430
8/2.44	791/11544	F _b	591/8625	392/5721	326/4758	244/3561	161/2350
9/2.74	624/9107	F _b	423/6173	281/4101	233/3400	174/2539	115/1678
10/3.05	505/7370	F _b	313/4568	207/3021	172/2510	128/1868	84/1226
11/3.35	416/6071	F _b	237/3459	157/2291	130/1897	96/1401	63/919
12/3.66	349/5093	F _b	184/2685	121/1766	100/1459	74/1080	48/701
13/3.96	297/4334	F _b	145/2116	95/1386	79/1153	58/846	37/540
14/4.27	255/3721	F _b	116/1693	76/1109	63/919	46/671	29/423
15/4.57	222/3240	F _b	94/1372	61/890	50/730	37/540	23/336
16/4.88	195/2846	F _b	77/1124	50/730	41/598	30/438	18/263

Minor Axis

$$A_w = 1.54 \text{ in.}^2 / 993 \text{ mm.}^2$$

$$I = 12.09 \text{ in.}^4 / 5032237 \text{ mm.}^4$$

$$\text{Wt.} = 3.80 \text{ lbs./ft.} / 5.66 \text{ kg/m.}$$

$$S = 6.05 \text{ in.}^3 / 99141 \text{ mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
6/1.83	638/9311	F _v	---/---	468/6830	389/5677	291/4247	193/2817
7/2.13	546/7968	F _v	461/6728	306/4466	254/3707	190/2773	125/1824
8/2.44	477/6961	F _v	316/4612	209/3050	174/2539	129/1883	85/1240
9/2.74	424/6188	F _v	225/3284	149/2175	123/1795	92/1343	60/876
10/3.05	381/5560	F _v	166/2423	109/1591	90/1313	67/978	43/628
11/3.35	329/4801	F _b	125/1824	82/1197	68/992	50/730	32/467
12/3.66	276/4028	F _b	96/1401	63/919	52/759	38/555	24/350
13/3.96	235/3430	F _b	75/1095	49/715	40/584	29/423	18/263
14/4.27	202/2948	F _b	60/876	38/555	31/452	23/336	14/204
15/4.57	175/2554	F _b	48/701	31/452	25/365	18/263	10/146
16/4.88	154/2247	F _b	39/569	25/365	20/292	14/204	8/117

The part weight has been deducted in the above tables

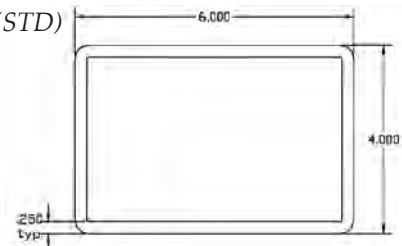
English/ Metric

This item is stocked in 20-foot and 25-foot lengths in Standard Polyester (STD) and Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 1,200 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



3 X 1/4 SQUARE TUBE

76.2 x 6.4 SQUARE TUBE

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*) Laterally Supported

$$A_w = 1.25 \text{ in.}^2 / 806 \text{ mm.}^2$$

$$I = 3.50 \text{ in.}^4 / 1456810 \text{ mm.}^4$$

$$\text{Wt.} = 2.07 \text{ lbs./ft.} / 3.08 \text{ kg/m.}$$

$$S = 2.33 \text{ in.}^3 / 38182 \text{ mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
4/1.22	935/13645	F_v	710/10362	472/6888	393/5735	294/4291	195/2846
5/1.52	618/9019	F_b	380/5546	252/3678	210/3065	156/2277	103/1503
6/1.83	428/6246	F_b	224/3269	149/2175	123/1795	92/1343	60/876
7/2.13	314/4583	F_b	142/2072	94/1372	78/1138	58/846	37/540
8/2.44	240/3503	F_b	96/1401	63/919	52/759	38/555	24/350
9/2.74	189/2758	F_b	67/978	43/628	36/525	26/379	16/234
10/3.05	152/2218	F_b	48/701	31/452	25/365	18/263	11/161
11/3.35	125/1824	F_b	36/525	23/336	18/263	13/190	8/117
12/3.66	105/1532	F_b	27/394	17/248	14/204	9/131	5/73

The part weight has been deducted in the above table.

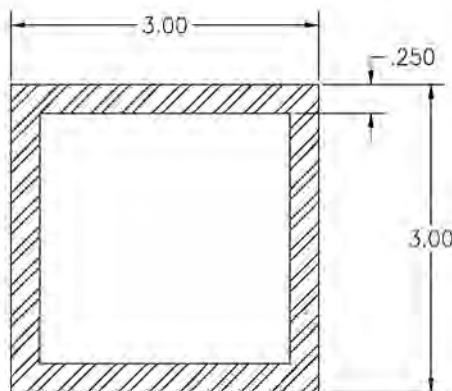
English/ *Metric*

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 800 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



3 1/2 X 1/4 SQUARE TUBE

88.9 x 6.4 SQUARE TUBE

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.) Laterally Supported

$$A_w = 1.5 \text{ in.}^2 / 967\text{mm.}^2$$

$$I = 5.73 \text{ in.}^4 / 2385006\text{mm.}^4$$

$$Wt. = 2.49 \text{ lbs./ft.} / 3.71 \text{ kg/m.}$$

$$S = 3.27 \text{ in.}^3 / 53585\text{mm.}^3$$

SPAN FT/m	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
4/1.22	1122/16374	F _v	1113/16243	741/10814	617/9004	462/6742	307/4480
5/1.52	869/12682	F _b	605/8829	402/5867	335/4889	250/3649	166/2423
6/1.83	602/8786	F _b	361/5268	240/3503	199/2904	149/2175	98/1430
7/2.13	442/6451	F _b	231/3741	153/2233	127/1853	95/1386	62/905
8/2.44	338/4933	F _b	156/2277	103/1503	85/1240	63/919	41/598
9/2.74	266/3882	F _b	110/1605	72/1051	60/876	44/642	28/409
10/3.05	215/3138	F _b	80/1168	52/759	43/628	32/467	20/292
11/3.35	177/2583	F _b	60/876	39/569	32/467	23/336	14/204
12/3.66	148/2160	F _b	45/657	29/423	24/350	17/248	10/146
13/3.96	126/1839	F _b	35/511	22/321	18/263	13/190	8/117
14/4.27	108/1576	F _b	28/409	17/248	14/204	10/146	6/88

The part weight has been deducted in the above table.

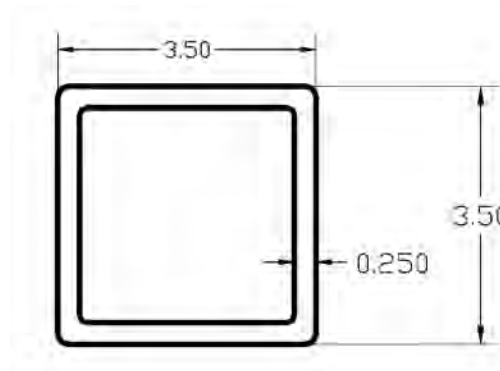
English/ Metric

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 800 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



4 X 1/4 SQUARE TUBE

101.6 x 6.4 SQUARE TUBE

ALLOWABLE UNIFORM LOADS (lbs./ft.)

Aw(in ²)=	1.75	Wt.(lbs.)=	2.83
I(in ⁴)=	8.82	S(in ³)=	4.41

SPAN FEET	LATERALLY SUPPORTED						
	MAXIMUM		DEFLECTION				
	LOAD		L/100	L/150	L/180	L/240	L/360
4	1310	Fv	-----	1085	903	677	450
5	1047	Fv	900	599	499	373	248
6	814	Fb	543	361	301	225	149
7	597	Fb	351	233	194	144	95
8	456	Fb	238	158	131	98	64
9	360	Fb	169	112	92	69	45
10	291	Fb	123	81	67	50	32
11	240	Fb	93	61	50	37	24
12	201	Fb	71	46	38	28	18
13	171	Fb	56	36	30	21	13
14	147	Fb	44	28	23	17	10

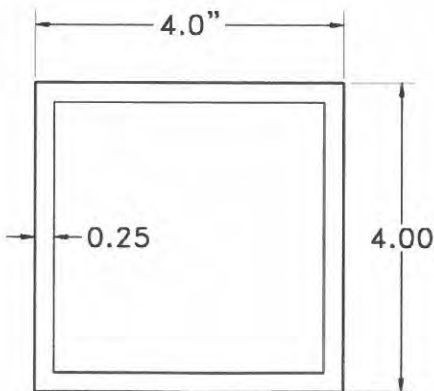
The part weight has been deducted in the above table.

This item is stocked in 20-foot lengths.

Other lengths available in mill run quantities.

The mill run on this item is 700 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



4 X 3/8 SQUARE TUBE

101.6 x 9.5 SQUARE TUBE

ALLOWABLE UNIFORM LOADS (lbs./ft. / *N/m.*)

Laterally Supported

Aw= 2.44in.² / *1574mm.²*

Wt. = 4.24lbs. / *6.31 kg/m.*

I = 12.03in.⁴ / *5007264mm.⁴*

S = 6.01in.³ / *98486mm.³*

SPAN FT/ <i>m</i>	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
5/ <i>1.52</i>	1459/ <i>21293</i>	F _v	1230/ <i>17951</i>	818/ <i>11938</i>	681/ <i>9939</i>	510/ <i>7443</i>	338/ <i>4933</i>
6/ <i>1.83</i>	1108/ <i>16170</i>	F _b	742/ <i>10829</i>	493/ <i>7195</i>	410/ <i>5984</i>	306/ <i>4466</i>	202/ <i>2948</i>
7/ <i>2.13</i>	813/ <i>11865</i>	F _b	478/ <i>6976</i>	317/ <i>4626</i>	264/ <i>3853</i>	196/ <i>2860</i>	129/ <i>1883</i>
8/ <i>2.44</i>	621/ <i>9063</i>	F _b	325/ <i>4743</i>	215/ <i>3138</i>	178/ <i>2598</i>	132/ <i>1926</i>	87/ <i>1270</i>
9/ <i>2.74</i>	490/ <i>7151</i>	F _b	230/ <i>3357</i>	151/ <i>2204</i>	125/ <i>1824</i>	93/ <i>1357</i>	60/ <i>876</i>
10/ <i>3.05</i>	396/ <i>5779</i>	F _b	168/ <i>2452</i>	110/ <i>1605</i>	91/ <i>1328</i>	67/ <i>978</i>	43/ <i>628</i>
11/ <i>3.35</i>	326/ <i>4758</i>	F _b	126/ <i>1839</i>	82/ <i>1197</i>	68/ <i>992</i>	49/ <i>715</i>	31/ <i>452</i>
12/ <i>3.66</i>	273/ <i>3984</i>	F _b	96/ <i>1401</i>	62/ <i>905</i>	51/ <i>744</i>	37/ <i>540</i>	23/ <i>336</i>
13/ <i>3.96</i>	232/ <i>3386</i>	F _b	75/ <i>1095</i>	48/ <i>701</i>	39/ <i>569</i>	28/ <i>409</i>	17/ <i>248</i>
14/ <i>4.27</i>	199/ <i>2904</i>	F _b	59/ <i>861</i>	38/ <i>555</i>	31/ <i>452</i>	22/ <i>321</i>	13/ <i>190</i>
15/ <i>4.57</i>	173/ <i>2525</i>	F _b	47/ <i>686</i>	30/ <i>438</i>	24/ <i>350</i>	17/ <i>248</i>	10/ <i>146</i>
16/ <i>4.88</i>	151/ <i>2204</i>	F _b	38/ <i>555</i>	24/ <i>350</i>	19/ <i>277</i>	13/ <i>190</i>	7/ <i>102</i>
17/ <i>5.18</i>	134/ <i>1956</i>	F _b	31/ <i>452</i>	19/ <i>277</i>	15/ <i>219</i>	10/ <i>146</i>	5/ <i>73</i>
18/ <i>5.49</i>	119/ <i>1737</i>	F _b	25/ <i>365</i>	15/ <i>219</i>	12/ <i>175</i>	8/ <i>117</i>	3/ <i>44</i>
19/ <i>5.79</i>	106/ <i>1547</i>	F _b	21/ <i>306</i>	12/ <i>175</i>	9/ <i>131</i>	6/ <i>88</i>	2/ <i>29</i>
20/ <i>6.10</i>	95/ <i>1386</i>	F _b	17/ <i>248</i>	10/ <i>146</i>	7/ <i>102</i>	4/ <i>58</i>	1/ <i>15</i>

The part weight has been deducted in the above table.

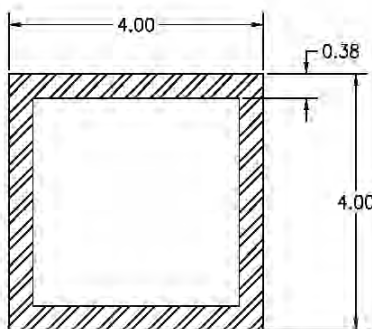
English/*Metric*

This item is stocked in 20-foot lengths in Standard Polyester (STD) and Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 700 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



6 X 6 X 3/8 SQUARE TUBE

152.4 x 152.4 x 9.5 SQUARE TUBE

ALLOWABLE UNIFORM LOADS (lbs./ft. / N/m.)

$$Aw(\text{in}^2/\text{mm}^2) = 3.938 \text{ in}^2 / 2540 \text{ mm}^2$$

$$I(\text{in}^4/\text{mm}^4) = 44.69 \text{ in}^4 / 18601382 \text{ mm}^4$$

$$Wt. (\text{lbs/ft/kg/m}) = 6.58 \text{ lbs./ft.} / 9.79 \text{ kg/m}$$

$$S(\text{in}^3/\text{mm}^3) = 14.9 \text{ in}^3 / 244167 \text{ mm}^3$$

SPAN FT/m	LATERALLY SUPPORTED						
	MAXIMUM LOAD		DEFLECTION				
			L/100	L/150	L/180	L/240	L/360
5/1.52	1879/27428	Fv	—/—	—/—	—/—	1577/23009	1049/15305
6/1.83	1565/22839	Fv	—/—	—/—	1324/19325	991/14469	659/9612
7/2.13	1340/19562	Fv	—/—	1056/15416	879/12829	658/9597	436/6364
8/2.44	1172/17104	Fv	1103/16090	733/10693	609/8894	455/6645	301/4396
9/2.74	1041/15192	Fv	793/11578	527/7685	438/6387	326/4765	215/3142
10/3.05	936/13663	Fv	588/8581	390/5686	324/4722	241/3516	158/2310
11/3.35	792/11563	Fb	447/6518	295/4311	245/3576	182/2656	119/1737
12/3.66	665/9700	Fb	346/5055	229/3336	189/2763	140/2047	91/1330
13/3.96	565/8250	Fb	273/3991	180/2626	149/2172	110/1603	71/1035
14/4.27	486/7099	Fb	219/3198	144/2098	119/1731	87/1273	56/815
15/4.57	423/6171	Fb	178/2597	116/1697	96/1397	70/1022	44/648
16/4.88	371/5411	Fb	146/2132	95/1387	78/1139	57/829	36/518
17/5.18	328/4782	Fb	121/1768	78/1145	64/937	46/677	29/417
18/5.49	292/4254	Fb	101/1479	65/952	53/776	38/556	23/337
19/5.79	261/3808	Fb	85/1246	55/796	44/647	31/459	19/272
20/6.10	235/3426	Fb	72/1056	46/670	37/541	26/381	15/220

The part weight has been deducted in the above table.

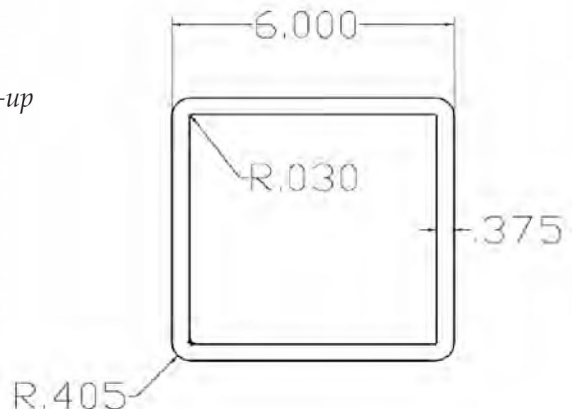
English/Metric

This item is stocked in 20-foot lengths in Standard Polyester (STD) and Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 700 feet.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



12" INTERLOCKING DECKBOARD

Load / Deflection Table

Wt. = 3.01 lbs / 4.48 kg/m.

S = 1.27in³ / 20811mm³

I = 1.84 in⁴ / 765865mm⁴

U Inches deflection for Uniform Load

C Inches deflection for Concentrated Load

LOAD Lbs/square ft. for Uniform Load or lbs. across width of deck for Concentrated Center load.

SPAN FEET	LOAD	50 lb.	100 lb.	150 lb.	200 lb.	300 lb.	500 lb.	1000 lb.	1500 lb.
2	U	0.006	0.012	0.018	0.024	0.036	0.060	0.120	0.180
	C	0.004	0.008	0.012	0.016	0.024	0.040	0.080	0.119
2.5	U	0.012	0.024	0.037	0.049	0.073	0.122	0.245	
	C	0.007	0.014	0.020	0.027	0.041	0.068	0.136	0.204
3	U	0.023	0.045	0.068	0.091	0.136	0.227	0.453	
	C	0.011	0.022	0.033	0.043	0.065	0.109	0.217	0.326
3.5	U	0.039	0.078	0.117	0.156	0.234	0.389		
	C	0.016	0.033	0.049	0.066	0.098	0.164	0.328	
4	U	0.063	0.126	0.189	0.252	0.378	0.631		
	C	0.024	0.047	0.071	0.094	0.142	0.236	0.472	
4.5	U	0.097	0.195	0.292	0.389	0.584			
	C	0.033	0.066	0.098	0.131	0.197	0.328	0.656	
5	U	0.144	0.289	0.433	0.577				
	C	0.044	0.088	0.133	0.177	0.265	0.442		
5.5	U	0.207	0.414	0.621	0.828				
	C	0.058	0.116	0.174	0.232	0.348	0.580		
6	U	0.288	0.577	0.865	1.154				
	C	0.075	0.149	0.224	0.298	0.447	0.746		

English

U Millimeters deflection for Uniform Load

C Millimeters deflection for Concentrated Load

LOAD Total Newtons uniformly loaded across length of span and width of one deckboard or Total Newtons Concentrated Center load across width of one deckboard.

SPAN METER	LOAD	250	500	750	1000	1500	2000	4000	6000
0.5	U	0.1	0.1	0.2	0.2	0.3	0.5	0.9	1.4
	C	0.1	0.1	0.2	0.3	0.4	0.6	1.2	1.8
0.75	U	0.1	0.3	0.4	0.5	0.8	1.1	2.2	3.2
	C	0.2	0.4	0.6	0.7	1.1	1.5	3.0	4.5
1	U	0.3	0.5	0.8	1.1	1.6	2.2	4.3	6.5
	C	0.4	0.8	1.2	1.6	2.4	3.1	6.3	
1.25	U	0.5	1.0	1.4	1.9	2.9	3.9	7.7	11.6
	C	0.7	1.4	2.2	2.9	4.3	5.8	11.6	
1.5	U	0.8	1.6	2.4	3.2	4.7	6.3	12.6	19.0
	C	1.2	2.4	3.6	4.8	7.2	9.6		
1.75	U	1.2	2.4	3.6	4.9	7.3	9.7	19.4	
	C	1.9	3.7	5.6	7.5	11.2	15.0		
2	U	1.8	3.5	5.3	7.1	10.6	14.2		
	C	2.8	5.5	8.3	11.0	16.6	22.1		

Metric

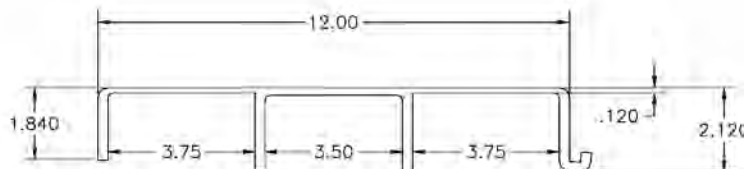
This item is stocked in 20-foot lengths in Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 600 feet.

Options: Anti-skid Surface (When used as a horizontal walking surface anti-skid surface is necessary) and Vented Surface.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



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8/2021

24" X 1 1/8" INTERLOCKING DECKBOARD

Load / Deflection Table

Wt. = 3.80 lbs / 5.66 kg/m.

S = 0.51in³ / 8357mm³

I = 0.44 in⁴ / 183142mm⁴

U Inches deflection for Uniform Load

C Inches deflection for Concentrated Load

LOAD Lbs/square ft. for Uniform Load or lbs. across width of deck for Concentrated Center load.

SPAN FEET	LOAD	20 lb.	40 lb.	60 lb.	80 lb.	100 lb.	150 lb.	200 lb.	300 lb.
2	U	0.011	0.022	0.032	0.043	0.054	0.081	0.108	0.161
	C	0.004	0.008	0.012	0.016	0.020	0.030	0.041	0.061
2.5	U	0.025	0.050	0.074	0.099	0.124	0.186	0.248	
	C	0.008	0.015	0.023	0.031	0.038	0.057	0.076	0.114
3	U	0.050	0.100	0.149	0.199	0.249	0.373	0.498	
	C	0.013	0.026	0.039	0.052	0.065	0.097	0.129	0.194
3.5	U	0.090	0.181	0.271	0.361	0.452	0.677		
	C	0.020	0.040	0.061	0.081	0.101	0.152	0.202	0.303
4	U	0.152	0.304	0.456	0.608	0.760			
	C	0.030	0.060	0.090	0.120	0.150	0.225	0.299	0.449
4.5	U	0.241	0.482	0.724	0.965				
	C	0.042	0.085	0.127	0.169	0.212	0.318	0.424	0.636
5	U	0.365	0.730	1.095					
	C	0.058	0.116	0.174	0.231	0.289	0.434	0.579	
5.5	U	0.532	1.064	1.596					
	C	0.077	0.154	0.230	0.307	0.384	0.576	0.768	
6	U	0.750	1.501						
	C	0.099	0.199	0.298	0.398	0.497	0.746		

English

U Millimeters deflection for Uniform Load

C Millimeters deflection for Concentrated Load

LOAD Total Newtons uniformly loaded across length of span and width of one deckboard or Total Newtons Concentrated Center load across width of one deckboard.

SPAN METER	LOAD	250	500	750	1000	1500	2000	4000	5000
0.5	U	0.1	0.2	0.3	0.5	0.7	0.9	1.8	2.3
	C	0.2	0.3	0.5	0.7	1.0	1.3	2.7	3.4
0.75	U	0.3	0.7	1.0	1.4	2.0	2.7	5.4	6.8
	C	0.5	1.0	1.6	2.1	3.1	4.2	8.3	10.4
1	U	0.8	1.5	2.3	3.1	4.6	6.1	12.2	
	C	1.2	2.4	3.6	4.8	7.2	9.6		
1.25	U	1.5	2.9	4.4	5.8	8.8	11.7		
	C	2.3	4.6	6.9	9.2	13.8			
1.5	U	2.5	5.0	7.5	10.0	14.9	19.9		
	C	3.9	7.9	11.8	15.8				
1.75	U	3.9	7.8	11.8	15.7	23.5			
	C	6.2	12.5	18.7					
2	U	5.8	11.7	17.5	23.3				
	C	9.3	18.5	27.8					

Metric

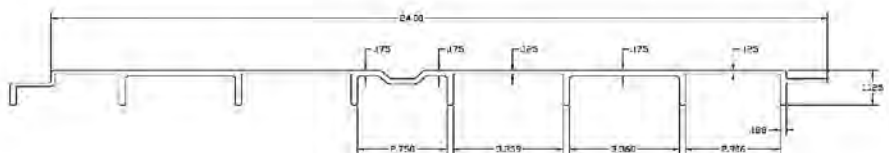
This item is stocked in 20-foot lengths in Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 600 feet.

Options: Anti-skid Surface (When used as a horizontal walking surface anti-skid surface is necessary) and Vented Surface.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



24" X 1 1/2" INTERLOCKING DECKBOARD

Load / Deflection Table

Wt. = 4.71 lbs / 7.02 kg/m.

S = 0.88in³ / 14421mm³

I = 1.03 in⁴ / 428718mm⁴

U Inches deflection for Uniform Load

C Inches deflection for Concentrated Load

LOAD Lbs/square ft. for Uniform Load or lbs. across width of deck for Concentrated Center load.

SPAN FEET	LOAD	20 lb.	40 lb.	60 lb.	80 lb.	100 lb.	150 lb.	200 lb.	300 lb.
2	U	0.005	0.010	0.015	0.020	0.025	0.038	0.051	0.076
	C	0.002	0.004	0.006	0.007	0.009	0.014	0.019	0.028
2.5	U	0.011	0.023	0.034	0.045	0.057	0.085	0.114	0.171
	C	0.003	0.007	0.010	0.014	0.017	0.026	0.034	0.051
3	U	0.022	0.045	0.067	0.089	0.112	0.168	0.224	0.336
	C	0.006	0.011	0.017	0.023	0.028	0.043	0.057	0.085
3.5	U	0.040	0.080	0.120	0.160	0.200	0.301	0.401	
	C	0.009	0.018	0.027	0.035	0.044	0.066	0.089	0.133
4	U	0.067	0.134	0.201	0.268	0.335	0.502	0.669	
	C	0.013	0.026	0.039	0.052	0.065	0.098	0.130	0.196
4.5	U	0.106	0.211	0.317	0.422	0.528			
	C	0.018	0.037	0.055	0.074	0.092	0.138	0.184	0.276
5	U	0.159	0.318	0.477	0.636				
	C	0.025	0.050	0.075	0.100	0.125	0.188	0.250	0.375
5.5	U	0.231	0.462	0.693					
	C	0.033	0.066	0.099	0.133	0.166	0.249	0.331	0.497
6	U	0.325	0.650						
	C	0.043	0.086	0.129	0.171	0.214	0.321	0.429	0.643

English

U Millimeters deflection for Uniform Load

C Millimeters deflection for Concentrated Load

LOAD Total Newtons uniformly loaded across length of span and width of one deckboard or Total Newtons Concentrated Center load across width of one deckboard.

SPAN METER	LOAD	250	500	750	1000	1500	2000	4000	5000
0.5	U	0.1	0.1	0.2	0.2	0.3	0.4	0.9	1.1
	C	0.1	0.2	0.2	0.3	0.5	0.6	1.3	1.6
0.75	U	0.2	0.3	0.5	0.6	0.9	1.2	2.5	3.1
	C	0.2	0.5	0.7	0.9	1.4	1.9	3.7	4.7
1	U	0.3	0.7	1.0	1.4	2.0	2.7	5.5	6.8
	C	0.5	1.1	1.6	2.1	3.2	4.2	8.4	
1.25	U	0.6	1.3	1.9	2.6	3.9	5.1	10.3	12.8
	C	1.0	2.0	3.0	4.0	6.0	8.0		
1.5	U	1.1	2.2	3.3	4.3	6.5	8.7	17.4	
	C	1.7	3.4	5.1	6.8	10.2	13.6		
1.75	U	1.7	3.4	5.1	6.8	10.2	13.6		
	C	2.7	5.4	8.1	10.7	16.1	21.5		
2	U	2.5	5.0	7.6	10.1	15.1			
	C	4.0	8.0	12.0	15.9	23.9			

Metric

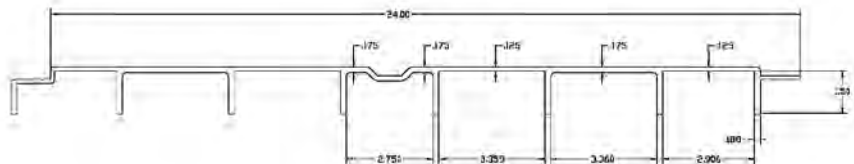
This item is stocked in 20-foot lengths in Polyester Fire Retardant (FR).

Other lengths available in mill run quantities.

The mill run on this item is 600 feet.

Options: Anti-skid Surface (When used as a horizontal walking surface anti-skid surface is necessary) and Vented Surface.

Orders for less than mill run quantities will be subject to set-up charges as well as premium per foot cost.



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8/2021

FLAT SHEETS



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8/2021

1/4" FLAT SHEET

6.35mm. FLAT SHEET

LOAD/DEFLECTION TABLE

SPAN Lengthwise direction of the Flat Sheet

For span in the crosswise direction of the Flat Sheet multiply Load by .55

Maximum Loads shown are for deflections of the lesser of t/2 or L/100

SPAN FEET	LOAD	20	40	60	80	100	108	120	140	160	174
1	U	0.014	0.029	0.043	0.058	0.072	0.078	0.086	0.101	0.115	0.125
	C	0.023	0.046	0.070	0.093	0.116	0.125				
1.5	LOAD	10	20	30	32	35					
	U	0.036	0.073	0.109	0.116	0.127					
	C	0.039	0.078	0.118	0.125						
2	LOAD	5	10	11	14						
	U	0.058	0.115	0.127							
	C	0.046	0.093	0.102	0.130						

English

LOAD Lbs./Sq. Ft. for Uniform Load or Lbs./Ft. of Width for Concentrated Center Load

U Inches Deflection for Uniform Load

C Inches Deflection for Concentrated Load

SPAN METER	LOAD	200	300	400	500	750	1000	1200			
0.5	U	0.55	0.83	1.10	1.38	2.07	2.76	3.31			
	C	1.78	2.68	3.57							
0.75	LOAD	100	125	200	250						
	U	1.40	1.75	2.80	3.49						
	C	3.01	3.76								
1	LOAD	50	75								
	U	2.21	3.31								
	C	3.57									

Metric

LOAD N/m.² for Uniform Load or N/m. of Width for Concentrated Center Load

U mm. Deflection for Uniform Load

C mm. Deflection for Concentrated Load



3/8" FLAT SHEET

LOAD/DEFLECTION TABLE

SPAN Lengthwise direction of the Flat Sheet

For span in the crosswise direction of the Flat Sheet multiply Load by .70

Maximum Loads shown are for deflections of the lesser of t/2 or L/100

SPAN FEET	LOAD	20	40	100	150	200	250	300	350	400	500	550	700	800	885
1	U	0.004	0.009	0.021	0.032	0.043	0.053	0.064	0.075	0.085	0.106	0.117	0.149	0.170	0.188
	C	0.007	0.014	0.034	0.052	0.069	0.086	0.103	0.120	0.138	0.172	0.189			
1.5	LOAD	20	40	60	80	100	120	140	162	170	174				
	U	0.022	0.043	0.065	0.086	0.108	0.129	0.151	0.175	0.183	0.188				
2	C	0.023	0.046	0.070	0.093	0.116	0.139	0.163	0.188						
	LOAD	10	20	30	40	50	55	60	68						
2.5	U	0.034	0.068	0.102	0.136	0.170	0.187								
	C	0.028	0.055	0.083	0.110	0.138	0.151	0.165	0.187						
3	LOAD	10	20	23	30	35									
	U	0.083	0.166	0.191											
	C	0.054	0.108	0.124	0.161	0.188									
	LOAD	10	11	20											
	U	0.173	0.190												
	C	0.093	0.102	0.186											

English

LOAD Lbs./Sq. Ft. for Uniform Load or Lbs./Ft. of Width for Concentrated Center Load

U Inches Deflection for Uniform Load

C Inches Deflection for Concentrated Load

SPAN METER	LOAD	500	1000	2000	4000	6000	9500	15000	20000	30000	40000	60000
0.5	U	0.03	0.05	0.10	0.20	0.31	0.49	0.77	1.02	1.53	2.05	3.07
	C	0.17	0.33	0.66	1.32	1.98	3.14					
0.75	LOAD	200	500	1000	1500	1800	3000	4000	5000	6000		
	U	0.16	0.41	0.82	1.23	1.47	2.45	3.27	4.09	4.91		
1	C	0.53	1.32	2.64	3.97	4.76						
	LOAD	100	200	400	550	600	800	1000	1200			
0.75	U	0.41	0.83	1.66	2.28	2.49	3.31	4.14	4.97			
	C	0.89	1.78	3.57	4.91							
1	LOAD	100	200	225	300	360						
	U	1.31	2.62	2.95	3.93	4.71						
	C	2.11	4.23	4.76								
	LOAD	50	100	120	150							
	U	1.60	3.20	3.84	4.79							
	C	2.07	4.13	4.96								

Metric

LOAD N/m.² for Uniform Load or N/m. of Width for Concentrated Center Load

U mm. Deflection for Uniform Load

C mm. Deflection for Concentrated Load



1/2" FLAT SHEET

12.7mm. FLAT SHEET

LOAD/DEFLECTION TABLE

SPAN Lengthwise direction of the Flat Sheet

For span in the crosswise direction of the Flat Sheet multiply Load by .70

Maximum Loads shown are for deflections of the lesser of t/2 or L/100

SPAN FEET	LOAD	50	100	200	300	400	500	600	700	800	825	1000	1200	1340
1	U	0.004	0.009	0.018	0.027	0.036	0.045	0.054	0.063	0.072	0.074	0.090	0.108	0.120
	C	0.007	0.015	0.029	0.044	0.058	0.073	0.087	0.102	0.116	0.120			
1.5	LOAD	50	100	150	200	250	300	350	384	400	414			
	U	0.023	0.045	0.068	0.091	0.114	0.136	0.159	0.175	0.182	0.188			
2	C	0.024	0.049	0.073	0.098	0.122	0.147	0.171	0.188					
	LOAD	20	30	40	50	100	150	174	200	215				
2.5	U	0.029	0.043	0.058	0.072	0.144	0.216	0.250						
	C	0.023	0.035	0.046	0.058	0.116	0.174	0.202	0.232	0.250				
3	LOAD	20	30	50	60	70	72	80	100	110				
	U	0.070	0.105	0.176	0.211	0.246	0.253							
3.5	C	0.045	0.068	0.113	0.136	0.159	0.163	0.181	0.227	0.249				
	LOAD	10	20	30	35	50	60	64						
4	U	0.073	0.146	0.218	0.255									
	C	0.039	0.078	0.118	0.137	0.196	0.235	0.251						

English

LOAD Lbs./Sq. Ft. for Uniform Load or Lbs./Ft. of Width for Concentrated Center Load

U Inches Deflection for Uniform Load

C Inches Deflection for Concentrated Load

SPAN METER	LOAD	5000	10000	20000	30000	40000	50000	60000	70000	80000	90000	100000
0.25	U	0.02	0.11	0.22	0.43	0.86	1.08	1.29	1.51	1.73	1.94	1.94
	C	0.14	0.70	1.39	2.79							
0.5	LOAD	1000	2000	4000	4500	6000	7000	8000	9000	10000	12000	15000
	U	0.35	0.69	1.38	1.55	2.07	2.42	2.76	3.11	3.45	4.14	5.18
0.75	C	1.12	2.23	4.46	5.02							
	LOAD	500	1000	1500	1700	2000	2500	3000	3500	3650		
1	U	0.87	1.75	2.62	2.97	3.49	4.37	5.24	6.12	6.38		
	C	1.88	3.76	5.65	6.40							
1.25	LOAD	200	300	500	715	800	900	1000	1100	1150		
	U	1.10	1.66	2.76	3.95	4.42	4.97	5.52	6.07	6.35		
1.5	C	1.78	2.68	4.46	6.38							
	LOAD	50	100	200	300	370	400	475				
1.75	U	0.67	1.35	2.70	4.04	4.99	5.39	6.40				
	C	0.87	1.74	3.48	5.23	6.45						

Metric

LOAD N/m.² for Uniform Load or N/m. of Width for Concentrated Center Load

U mm. Deflection for Uniform Load

C mm. Deflection for Concentrated Load



5/8" FLAT SHEET

15.9mm. FLAT SHEET

LOAD/DEFLECTION TABLE

SPAN Lengthwise direction of the Flat Sheet

For span in the crosswise direction of the Flat Sheet multiply Load by .70

Maximum Loads shown are for deflections of the lesser of t/2 or L/100

SPAN FEET	LOAD	50	100	200	400	600	800	1000	1200	1500	1610	2000	2300	2600
1	U	0.002	0.005	0.009	0.018	0.028	0.037	0.046	0.055	0.069	0.074	0.092	0.106	0.120
	C	0.004	0.007	0.015	0.030	0.045	0.059	0.074	0.089	0.111	0.120			
1.5	LOAD	50	100	200	300	400	500	600	700	716	774			
	U	0.012	0.023	0.047	0.070	0.093	0.116	0.140	0.163	0.167	0.180			
2	C	0.013	0.025	0.050	0.075	0.100	0.125	0.150	0.176	0.176	0.180			
	LOAD	50	100	150	200	250	300	326	403					
2.5	U	0.037	0.074	0.110	0.147	0.184	0.221	0.240						
	C	0.030	0.059	0.089	0.119	0.149	0.178	0.194	0.240					
3	LOAD	20	40	60	80	100	150	167	200	258				
	U	0.036	0.072	0.108	0.144	0.180	0.270	0.300						
3.5	C	0.023	0.046	0.070	0.093	0.116	0.174	0.194	0.232	0.300				
	LOAD	20	40	60	80	84	100	156						
4	U	0.075	0.149	0.224	0.298	0.313								
	C	0.040	0.080	0.120	0.161	0.169	0.201	0.313						
4.5	LOAD	10	20	30	40	45	75	98						
	U	0.069	0.138	0.207	0.276	0.311								
5	C	0.032	0.064	0.096	0.127	0.143	0.239	0.312						
	LOAD	10	20	27	40	50	66							
5.5	U	0.118	0.236	0.318										
	C	0.048	0.095	0.128	0.190	0.238	0.314							
6	LOAD	10	16	30	46									
	U	0.189	0.302											
6.5	C	0.068	0.108	0.203	0.312									
	LOAD	10	11	20	33									
7	U	0.288	0.316											
	C	0.093	0.102	0.186	0.307									

English

LOAD Lbs./Sq. Ft. for Uniform Load or Lbs./Ft. of Width for Concentrated Center Load

U Inches Deflection for Uniform Load

C

Inches Deflection for Concentrated Load

SPAN METER	LOAD	5000	10000	15000	20000	30000	35000	40000	50000	100000	200000	230000
0.25	U	0.06	0.11	0.17	0.22	0.33	0.39	0.44	0.55	1.10	2.21	2.54
	C	0.36	0.71	1.07	1.43	2.14	2.50					
0.5	LOAD	1000	2000	4000	6000	8800	10000	15000	20000	25000	28000	
	U	0.18	0.35	0.71	1.06	1.56	1.77	2.65	3.53	4.42	4.95	
0.75	C	0.57	1.14	2.28	3.43	5.02						
	LOAD	1000	2000	3000	3900	5000	6000	7000	8400			
1	U	0.89	1.79	2.68	3.49	4.47	5.37	6.26	7.52			
	C	1.93	3.85	5.78	7.52							
1.25	LOAD	500	600	800	1000	1500	1650	2000	2500	2700		
	U	1.41	1.70	2.26	2.83	4.24	4.67	5.66	7.07	7.63		
1.5	C	2.28	2.74	3.65	4.57	6.85	7.54					
	LOAD	200	400	600	800	850	1000	1100				
1.75	U	1.38	2.76	4.14	5.52	5.87	6.90	7.59				
	C	1.78	3.57	5.35	7.14	7.58						
2	LOAD	200	300	400	500	530						
	U	2.86	4.29	5.73	7.16	7.59						
2.25	C	3.08	4.62	6.17	7.71							
	LOAD	200	300	310								
2.5	U	5.30	7.96									
	C	4.90	7.34	7.59								

Metric

LOAD N/m.² for Uniform Load or N/m. of Width for Concentrated Center Load

U mm. Deflection for Uniform Load

C

mm. Deflection for Concentrated Load



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3/4" FLAT SHEET

19.0mm. FLAT SHEET

LOAD/DEFLECTION TABLE

SPAN Lengthwise direction of the Flat Sheet

For span in the crosswise direction of the Flat Sheet multiply Load by .70

Maximum Loads shown are for deflections of the lesser of t/2 or L/100

SPAN FEET	LOAD	100	200	300	400	800	1000	1000	1500	2000	3000	3500	4000	4500
1	U	0.003	0.005	0.008	0.011	0.021	0.027	0.027	0.040	0.053	0.080	0.093	0.106	0.120
	C	0.004	0.009	0.013	0.017	0.034	0.043	0.043	0.065	0.086	0.129			
1.5	LOAD	100	200	300	500	600	700	800	900	1000	1200	1300	1400	
	U	0.013	0.027	0.040	0.067	0.081	0.094	0.108	0.121	0.135	0.162	0.175	0.189	
2	C	0.015	0.029	0.044	0.073	0.087	0.102	0.116	0.131	0.145	0.174	0.189		
	LOAD	50	100	150	200	250	300	350	400	500	588	700	726	
2.5	U	0.021	0.043	0.064	0.085	0.106	0.128	0.149	0.170	0.213	0.250			
	C	0.017	0.034	0.052	0.069	0.086	0.103	0.120	0.138	0.172	0.202	0.241	0.250	
3	LOAD	25	50	100	150	167	200	250	310					
	U	0.054	0.108	0.216	0.323	0.360								
3.5	C	0.029	0.058	0.116	0.174	0.194	0.232	0.290	0.360					
	LOAD	25	50	75	94	100	150	204						
4	U	0.100	0.200	0.300	0.376									
	C	0.046	0.092	0.138	0.173	0.184	0.277	0.376						
4.5	LOAD	20	30	40	55	75	100	136						
	U	0.136	0.204	0.273	0.375									
5	C	0.055	0.083	0.110	0.151	0.206	0.275	0.374						
	LOAD	10	20	35	50	75	96							
	U	0.109	0.218	0.382										
	C	0.039	0.078	0.137	0.196	0.294	0.376							
	LOAD	10	20	23	50	70								
	U	0.166	0.333	0.383										
	C	0.054	0.108	0.124	0.269	0.376								

English

LOAD Lbs./Sq. Ft. for Uniform Load or Lbs./Ft. of Width for Concentrated Center Load

U Inches Deflection for Uniform Load

C

Inches Deflection for Concentrated Load

SPAN METER	LOAD	5000	10000	20000	30000	40000	50000	61000	100000	150000	200000
0.25	U	0.03	0.06	0.13	0.19	0.26	0.32	0.39	0.64	0.96	1.28
	C	0.21	0.41	0.83	1.24	1.65	2.07	2.52			
0.5	LOAD	1000	2000	5000	8000	10000	12000	15000	20000	25000	30000
	U	0.10	0.20	0.51	0.82	1.02	1.23	1.53	2.05	2.56	3.07
0.75	C	0.33	0.66	1.65	2.64	3.30	3.97	4.96	6.61	8.26	9.91
	LOAD	1000	2000	3000	4000	5000	6000	6800	8000	10000	12000
1	U	0.52	1.04	1.55	2.07	2.59	3.11	3.52	4.14	5.18	6.21
	C	1.12	2.23	3.35	4.46	5.58	6.69	7.58			
1.25	LOAD	1000	2000	2500	3000	3600	4000	4500	5000	5500	5900
	U	1.64	3.27	4.09	4.91	5.89	6.55	7.36	8.18	9.00	9.65
1.5	C	2.64	5.29	6.61	7.93	9.52					
	LOAD	1000	1200	1500	1850	2000	2200	2300	2400		
	U	3.99	4.79	5.99	7.39	7.99	8.79	9.19	9.59		
	C	5.16	6.20	7.74	9.55						
	LOAD	400	600	700	800	900	1000	1150			
	U	3.31	4.97	5.80	6.63	7.46	8.28	9.53			
	C	3.57	5.35	6.24	7.14	8.03	8.92	10.26			

Metric

LOAD N/m.² for Uniform Load or N/m. of Width for Concentrated Center Load

U mm. Deflection for Uniform Load

C

mm. Deflection for Concentrated Load

1" FLAT SHEET

25.4mm. FLAT SHEET

LOAD/DEFLECTION TABLE

SPAN Lengthwise direction of the Flat Sheet

For span in the crosswise direction of the Flat Sheet multiply Load by .70

Maximum Loads shown are for deflections of the lesser of t/2 or L/100

SPAN FEET	LOAD	100	200	500	800	1000	2000	3000	4000	5000	6640	8000	9000	10720
1	U	0.001	0.002	0.006	0.009	0.011	0.022	0.034	0.045	0.056	0.075	0.090	0.101	0.120
	C	0.002	0.004	0.009	0.015	0.018	0.036	0.054	0.073	0.091	0.120			
1.5	LOAD	100	200	300	400	500	750	1000	1500	2000	2500	3000	3075	3315
	U	0.006	0.011	0.017	0.023	0.028	0.043	0.057	0.085	0.114	0.142	0.171	0.175	0.188
2	C	0.006	0.012	0.018	0.024	0.031	0.046	0.061	0.092	0.122	0.153	0.184	0.188	
	LOAD	50	100	200	300	400	500	600	800	1000	1335	1500	1650	
2.5	U	0.009	0.018	0.036	0.054	0.072	0.090	0.108	0.144	0.180	0.240			
	C	0.007	0.015	0.029	0.044	0.058	0.073	0.087	0.116	0.145	0.194	0.218	0.240	
3	LOAD	50	100	200	300	400	500	600	684	800	900	1057		
	U	0.022	0.044	0.088	0.132	0.176	0.219	0.263	0.300					
3.5	C	0.014	0.028	0.057	0.085	0.113	0.142	0.170	0.194	0.227	0.255	0.300		
	LOAD	50	100	200	300	396	500	600	735					
4	U	0.045	0.091	0.182	0.273	0.360								
	C	0.024	0.049	0.098	0.147	0.194	0.245	0.294	0.360					
4.5	LOAD	50	100	200	249	300	400	540						
	U	0.084	0.169	0.337	0.420									
5	C	0.039	0.078	0.156	0.194	0.233	0.311	0.420						
	LOAD	50	100	167	300	350	413							
5	U	0.144	0.288	0.480										
	C	0.058	0.116	0.194	0.348	0.406	0.480							
4.5	LOAD	25	50	109	200	302								
	U	0.115	0.230	0.502										
5	C	0.041	0.083	0.180	0.331	0.499								
	LOAD	25	50	71	100	220								
5	U	0.176	0.351	0.498										
	C	0.057	0.113	0.161	0.227	0.499								

English

LOAD Lbs./Sq. Ft. for Uniform Load or Lbs./Ft. of Width for Concentrated Center Load

U Inches Deflection for Uniform Load

C Inches Deflection for Concentrated Load

SPAN METER	LOAD	100	200	500	800	1000	2000	3000	4000	5000	6640	8000
0.5	U	0.22	0.43	0.65	0.86	1.08	1.29	1.55	2.16	3.24	4.31	5.00
	C	0.70	1.39	2.09	2.79	3.48	4.18	5.02				
0.75	LOAD	1000	5000	7500	10000	15000	16000	20000	25000	30000	34500	
	U	0.22	1.09	1.64	2.18	3.28	3.49	4.37	5.46	6.55	7.54	
1	C	0.47	2.35	3.53	4.70	7.06	7.53					
	LOAD	1000	2000	5000	7500	9000	10000	12000	14000	14500		
1.25	U	0.69	1.38	3.45	5.18	6.21	6.90	8.28	9.66	10.01		
	C	1.12	2.23	5.58	8.36	10.04						
1.5	LOAD	1000	2000	3000	4000	5000	6000	7000	7500			
	U	1.69	3.37	5.06	6.74	8.43	10.11	11.80	12.64			
1.75	C	2.18	4.36	6.53	8.71	10.89	13.07					
	LOAD	1000	2000	3000	3400	3600						
2	U	3.49	6.99	10.48	11.88	12.58						
	C	3.76	7.53	11.29	12.80							
2	LOAD	1000	1500	2000	2100							
	U	6.47	9.71	12.95								
2	C	5.98	8.96	11.95	12.55							
	LOAD	1000	1150	1450								
2	U	11.05	12.70	16.02								
	C	8.92	10.26	12.94								

Metric

LOAD N/m.² for Uniform Load or N/m. of Width for Concentrated Center Load

U mm. Deflection for Uniform Load

C mm. Deflection for Concentrated Load



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COLUMNS



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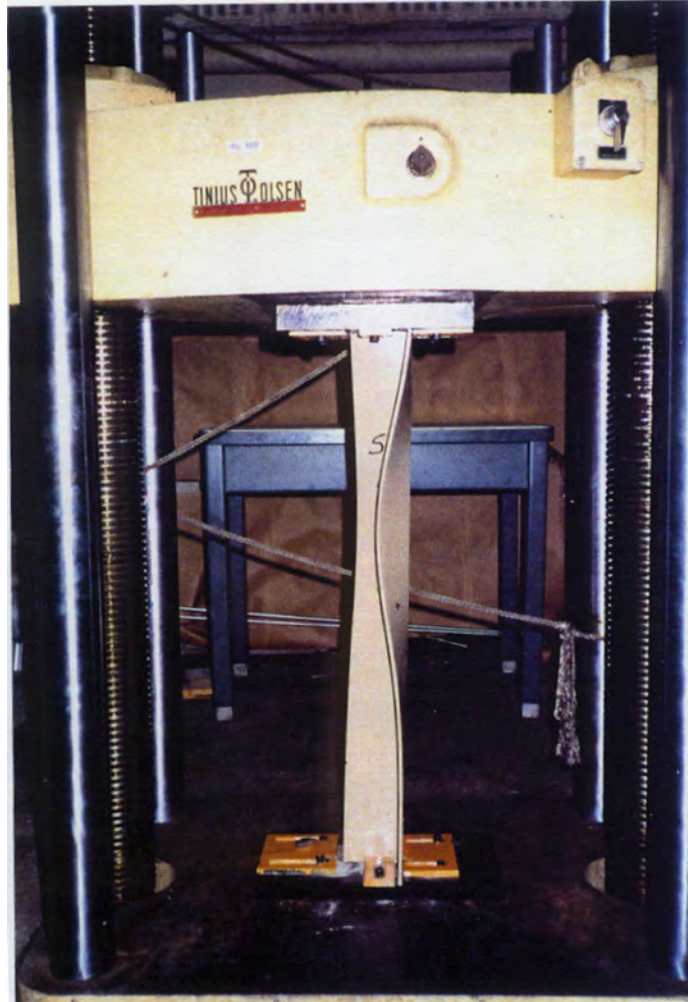
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COLUMNS



Full section column testing was conducted on Bedford Reinforced Plastics' Equal Leg Angles, I-Beams, H-Beams, and Square Tubes.

Ultimate stress vs. slenderness ratio curves were developed from the testing. The curves developed are based on the Euler Buckling Stress Equation $\left[\pi^2 E / \left(\frac{K}{r} \right)^2 \right]$ and a straight line transition from Euler Buckling to ultimate stress.

The allowable concentric axial load tables were generated from these curves.

The tables are based on a safety factor of three.

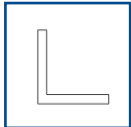
COLUMN TABLES

ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS



Notation

- A area (in.² / *mm*.²)
- b width of flange/leg/wall (in. / *mm*.)
- t thickness of flange (in. / *mm*.)
- r minimum radius gyration (in. / *mm*.)
- l length (in. / *m*.)
- K effective column length factor
- F_a allowable column concentric axial stress (psi / *MPa*)
- P_a allowable column centric axial load (lbs. / *N*.)



Angle

Maximum allowable stress:

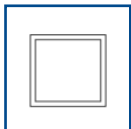
$b/t = 6$	6,000 psi / <i>41.3MPa</i>
$b/t = 8$	4,862 psi / <i>33.5MPa</i>
$b/t = 10.7$	3,501 psi / <i>24.1MPa</i>
$b/t = 12$	2,833 psi / <i>19.5MPa</i>
$b/t = 16$	1,833 psi / <i>12.6MPa</i>



WF- & I-Beam

Maximum allowable stress:

$b/t \leq 12$	10,000 psi / <i>68.9MPa</i>
$b/t = 13.3$	10,000 psi / <i>68.9MPa</i>
$b/t = 16$	7,318 psi / <i>50.5MPa</i>
$b/t = 20$	4,684 psi / <i>32.3MPa</i>
$b/t = 21.3$	4,117 psi / <i>28.4MPa</i>
$b/t = 24$	3,253 psi / <i>22.4MPa</i>
$b/t = 26.7$	2,635 psi / <i>18.1MPa</i>



Square Tube (1/4" wall)

Maximum allowable stress:

$b/t \leq 16$	10,000 psi / <i>68.9MPa</i>
---------------	-----------------------------

2 X 2 X 1/4 ANGLE

50.8 x 50.8 x 6.4 ANGLE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = .92 \text{ in.}^2 / 593.5 \text{ mm.}^2$$

$$r = .38 \text{ in.} / 9.65 \text{ mm.}$$

$$b/t = 8$$

Effective Length (ft. / m)	$\frac{Kl}{r}$	F_a (psi/ <i>kPa</i>)	P_a (lbs./ <i>N</i>)
1.00/0.30	31.6	3511/24207	3230/14368
1.50/0.46	47.4	2835/19550	2609/11604
2.00/0.61	63.2	2160/14892	1987/8839
2.50/0.76	78.9	1484/10234	1366/6075
3.00/0.91	94.7	1026/7077	944/4200
3.50/1.07	110.5	754/5199	694/3086
4.00/1.22	126.3	577/3981	531/2363
4.50/1.37	142.1	456/3145	420/1867
5.00/1.52	157.9	369/2548	340/1512
5.50/1.68	173.7	305/2105	281/1250
6.00/1.83	189.5	257/1769	236/1050

English/*Metric*

3 X 3 X 1/4 ANGLE

76.2 x 76.2 x 6.4 ANGLE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 1.42 \text{ in.}^2 / 916.1 \text{ mm.}^2$$

$$r = .59 \text{ in.} / 14.99 \text{ mm.}$$

$$b/t = 12$$

Effective Length (ft/m)	$\frac{KL}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.00/0.30	20.3	2444/16852	3471/15438
1.50/0.46	30.5	2250/15511	3195/14210
2.00/0.61	40.7	2055/14171	2919/12982
2.50/0.76	50.8	1861/12830	2642/11754
3.00/0.91	61.0	1666/11490	2366/10526
3.50/1.07	71.2	1472/10149	2090/9298
4.00/1.22	81.4	1278/8809	1814/8070
4.50/1.37	91.5	1083/7468	1538/6842
5.00/1.52	101.7	891/6141	1265/5626
5.50/1.68	111.9	736/5075	1045/4650
6.00/1.83	122.0	619/4265	878/3907
6.5/1.98	132.2	527/3634	748/3329
7.0/2.13	142.4	454/3133	645/2871
7.5/2.29	152.5	396/2729	562/2501
8.0/2.44	162.7	348/2399	494/2198
8.5/2.59	172.9	308/2125	438/1947
9.0/2.74	183.1	275/1895	390/1736
9.5/2.90	193.2	247/1701	350/1559

English/*Metric*

3 X 3 X 3/8 ANGLE

76.2 x 76.2 x 9.5 ANGLE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 2.09 \text{ in.}^2 / 1348.4 \text{ mm.}^2$$

$$r = .59 \text{ in.} / 14.99 \text{ mm.}$$

$$b/t = 8$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.00/0.30	20.3	3992/27523	8343/37111
1.50/0.46	30.5	3557/24523	7434/33066
2.00/0.61	40.7	3122/21523	6524/29021
2.50/0.76	50.8	2687/18523	5615/24976
3.00/0.91	61.0	2251/15523	4706/20932
3.50/1.07	71.2	1816/12524	3796/16887
4.00/1.22	81.4	1392/9596	2909/12939
4.50/1.37	91.5	1100/7582	2298/10223
5.00/1.52	101.7	891/6141	1862/8281
5.50/1.68	111.9	736/5075	1539/6844
6.00/1.83	122.0	619/4265	1293/5751
6.5/1.98	132.2	527/3634	1102/4900
7.0/2.13	142.4	454/3133	950/4225
7.5/2.29	152.5	396/2729	827/3680
8.0/2.44	162.7	348/2399	727/3235
8.5/2.59	172.9	308/2125	644/2865
9.0/2.74	183.1	275/1895	575/2556
9.5/2.90	193.2	247/1701	516/2294

English/Metric

3 X 3 X 1/2 ANGLE

76.2 x 76.2 x 12.7 ANGLE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 2.70 \text{ in.}^2 / 1741.9 \text{ mm.}^2$$

$$r = .59 \text{ in.} / 14.99 \text{ mm.}$$

$$b/t = 6$$

Effective Length (ft./m.)	$\frac{Kl}{r}$	F_a (psi/ <i>kPa</i>)	P_a (lbs./ <i>N</i>)
1.00/0.30	20.3	4833/33326	13050/58051
1.50/0.46	30.5	4250/29304	11476/51046
2.00/0.61	40.7	3667/25283	9901/44041
2.50/0.76	50.8	3084/21262	8326/37036
3.00/0.91	61.0	2474/17059	6680/29716
3.50/1.07	71.2	1818/12533	4908/21832
4.00/1.22	81.4	1392/9596	3758/16715
4.50/1.37	91.5	1100/7582	2969/13207
5.00/1.52	101.7	891/6141	2405/10698
5.50/1.68	111.9	736/5075	1988/8841
6.00/1.83	122.0	619/4265	1670/7429
6.5/1.98	132.2	527/3634	1423/6330
7.0/2.13	142.4	454/3133	1227/5458
7.5/2.29	152.5	396/2729	1069/4755
8.0/2.44	162.7	348/2399	939/4179
8.5/2.59	172.9	308/2125	832/3702
9.0/2.74	183.1	275/1895	742/3302
9.5/2.90	193.2	247/1701	666/2963

English/*Metric*

4 X 4 X 1/4 ANGLE

101.6 x 101.6 x 6.4 ANGLE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 1.92 \text{ in.}^2 / 1225.8 \text{ mm.}^2$$

$$r = .80 \text{ in.} / 20.32 \text{ mm.}$$

$$b/t = 16$$

Effective Length (ft./m.)	$\frac{Kl}{r}$	F_a (psi/ <i>kPa</i>)	P_a (lbs./ <i>N</i>)
1.00/0.30	15.0	1684/11610	3233/14381
1.50/0.46	22.5	1609/11095	3090/13744
2.00/0.61	30.0	1535/10581	2947/13107
2.50/0.76	37.5	1460/10067	2803/12470
3.00/0.91	45.0	1386/9553	2660/11833
3.50/1.07	52.5	1311/9039	2517/11196
4.00/1.22	60.0	1236/8524	2374/10559
4.50/1.37	67.5	1162/8010	2231/9922
5.00/1.52	75.0	1087/7496	2087/9285
5.50/1.68	82.5	1013/6982	1944/8648
6.00/1.83	90.0	938/6467	1801/8011
6.5/1.98	97.5	863/5953	1658/7374
7.0/2.13	105.0	789/5439	1515/6737
7.5/2.29	112.5	714/4925	1371/6100
8.0/2.44	120.0	640/4411	1228/5463
8.5/2.59	127.5	567/3907	1088/4840
9.0/2.74	135.0	505/3485	970/4317
9.5/2.90	142.5	454/3128	871/3874
10.0/3.05	150.0	409/2823	786/3497

English/*Metric*

4 X 4 X 3/8 ANGLE

101.6 x 101.6 x 9.5 ANGLE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 2.84 \text{ in.}^2 / 1832.3 \text{ mm}^2$$

$$r = .79 \text{ in.} / 20.07 \text{ mm}$$

$$b/t = 10.7$$

Effective Length (ft./m.)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs./N)
1.00/0.30	15.2	3102/21388	8810/39188
1.50/0.46	22.8	2903/20013	8243/36668
2.00/0.61	30.4	2703/18637	7677/34148
2.50/0.76	38.0	2504/17262	7110/31628
3.00/0.91	45.6	2304/15887	6544/29108
3.50/1.07	53.2	2105/14511	5977/26588
4.00/1.22	60.8	1905/13136	5411/24068
4.50/1.37	68.4	1706/11761	4844/21549
5.00/1.52	75.9	1506/10385	4278/19029
5.50/1.68	83.5	1307/9010	3711/16509
6.00/1.83	91.1	1109/7646	3150/14010
6.5/1.98	98.7	945/6515	2684/11937
7.0/2.13	106.3	815/5618	2314/10293
7.5/2.29	113.9	710/4894	2016/8966
8.0/2.44	121.5	624/4301	1772/7881
8.5/2.59	129.1	553/3810	1569/6981
9.0/2.74	136.7	493/3398	1400/6227
9.5/2.90	144.3	442/3050	1256/5588
10.0/3.05	151.9	399/2753	1134/5044
10.5/3.20	159.5	362/2497	1028/4575
11.0/3.35	167.1	330/2275	937/4168
11.5/3.51	174.7	302/2081	857/3814
12.0/3.66	182.3	277/1912	787/3502
12.5/3.81	189.9	256/1762	726/3228

English/*Metric*

4 X 4 X 1/2 ANGLE

101.6 x 101.6 x 12.7 ANGLE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 3.70 \text{ in.}^2 / 2387.1 \text{ mm}^2$$

$$r = .78 \text{ in.} / 19.81 \text{ mm}$$

$$b/t = 8$$

Effective Length (ft./m.)	$\frac{KL}{r}$	F_a (psi/kPa)	P_a (lbs./N)
1.00/0.30	15.4	4204/28984	15554/69188
1.50/0.46	23.1	3875/26715	14336/63771
2.00/0.61	30.8	3546/24446	13119/58355
2.50/0.76	38.5	3216/22177	11901/52938
3.00/0.91	46.1	2887/19908	10683/47522
3.50/1.07	53.8	2558/17639	9466/42105
4.00/1.22	61.5	2229/15370	8248/36689
4.50/1.37	69.2	1900/13101	7030/31272
5.00/1.52	76.9	1571/10831	5813/25856
5.50/1.68	84.6	1287/8871	4760/21175
6.00/1.83	92.3	1081/7454	4000/17793
6.5/1.98	100.0	921/6351	3408/15161
7.0/2.13	107.7	794/5476	2939/13072
7.5/2.29	115.4	692/4770	2560/11388
8.0/2.44	123.1	608/4193	2250/10009
8.5/2.59	130.8	539/3714	1993/8866
9.0/2.74	138.5	480/3313	1778/7908
9.5/2.90	146.2	431/2973	1596/7098
10.0/3.05	153.8	389/2683	1440/6406
10.5/3.20	161.5	353/2434	1306/5810
11.0/3.35	169.2	322/2218	1190/5294
11.5/3.51	176.9	294/2029	1089/4843
12.0/3.66	184.6	270/1863	1000/4448

English/Metric

6 X 6 X 3/8 ANGLE

152.4 x 152.4 x 9.4 ANGLE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 4.33 \text{ in.}^2 / 2794 \text{ mm}^2$$

$$r = 1.14 \text{ in.} / 28.96 \text{ mm}$$

$$b/t = 16$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	10.5	1728/11916	7484/33289
1.5/0.46	15.8	1676/11556	7257/32281
2.0/0.61	21.1	1624/11195	7030/31273
2.5/0.76	26.3	1571/10834	6804/30265
3.0/0.91	31.6	1519/10473	6577/29257
3.5/1.07	36.8	1467/10112	6351/28249
4.0/1.22	42.1	1414/9751	6124/27241
4.5/1.37	47.4	1362/9390	5897/26232
5.0/1.52	52.6	1310/9030	5671/25224
5.5/1.68	57.9	1257/8669	5444/24216
6.0/1.83	63.2	1205/8308	5217/23208
6.5/1.98	68.4	1153/7947	4991/22200
7.0/2.13	73.7	1100/7586	4764/21192
7.5/2.29	78.9	1048/7225	4538/20184
8.0/2.44	84.2	996/6864	4311/19176
8.5/2.59	89.5	943/6504	4084/18168
9.0/2.74	94.7	891/6143	3858/17160
9.5/2.90	100.0	839/5782	3631/16152
10.0/3.05	105.3	786/5421	3404/15144

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
10.5/3.20	110.5	734/5060	3178/14136
11.0/3.35	115.8	682/4699	2951/13128
11.5/3.51	121.1	629/4334	2722/12108
12.0/3.66	126.3	577/3981	2500/11120
12.5/3.81	131.6	532/3668	2304/10248
13.0/3.96	136.8	492/3392	2130/9475
13.5/4.12	142.1	456/3145	1975/8786
14.0/4.27	147.4	424/2924	1837/8170
14.5/4.42	152.6	395/2726	1712/7616
15.0/4.57	157.9	369/2548	1600/7117
15.5/4.72	163.2	346/2386	1498/6665
16.0/4.88	168.4	325/2239	1406/6255
16.5/5.03	173.7	305/2105	1322/5882
17.0/5.18	178.9	288/1983	1246/5541
17.5/5.33	184.2	271/1872	1175/5229
18.0/5.49	189.5	257/1769	1111/4942
18.5/5.64	194.7	243/1675	1052/4679
19.0/5.79	200.0	230/1588	997/4436

English/Metric

6 X 6 X 1/2 ANGLE

152.4 x 152.4 x 12.7 ANGLE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 5.70 \text{ in.}^2 / 3677.4 \text{ mm}^2$$

$$r = 1.19 \text{ in.} / 30.2 \text{ mm}$$

$$b/t = 12$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	10.1	2640/18204	15049/66942
1.5/0.46	15.1	2544/17539	14500/64498
2.0/0.61	20.2	2447/16874	13950/62054
2.5/0.76	25.2	2351/16210	13401/59610
3.0/0.91	30.3	2255/15545	12851/57166
3.5/1.07	35.3	2158/14881	12302/54722
4.0/1.22	40.3	2062/14216	11752/52278
4.5/1.37	45.4	1965/13551	11203/49834
5.0/1.52	50.4	1869/12887	10654/47390
5.5/1.68	55.5	1773/12222	10104/44945
6.0/1.83	60.5	1676/11557	9555/42501
6.5/1.98	65.5	1580/10893	9005/40057
7.0/2.13	70.6	1483/10228	8456/37613
7.5/2.29	75.6	1387/9564	7906/35169
8.0/2.44	80.7	1291/8899	7357/32725
8.5/2.59	85.7	1194/8234	6807/30281
9.0/2.74	90.8	1098/7570	6258/27837
9.5/2.90	95.8	1001/6905	5709/25393
10.0/3.05	100.8	906/6246	5164/22968

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
10.5/3.20	105.9	822/5665	4683/20833
11.0/3.35	110.9	749/5162	4267/18982
11.5/3.51	116.0	685/4723	3904/17367
12.0/3.66	121.0	629/4337	3586/15950
12.5/3.81	126.1	580/3997	3305/14700
13.0/3.96	131.1	536/3696	3055/13591
13.5/4.12	136.1	497/3427	2833/12603
14.0/4.27	141.2	462/3187	2634/11719
14.5/4.42	146.2	431/2971	2456/10924
15.0/4.57	151.3	403/2776	2295/10208
15.5/4.72	156.3	377/2600	2149/9560
16.0/4.88	161.3	354/2440	2017/8972
16.5/5.03	166.4	333/2294	1897/8437
17.0/5.18	171.4	313/2161	1787/7948
17.5/5.33	176.5	296/2039	1686/7500
18.0/5.49	181.5	280/1928	1594/7089
18.5/5.64	186.6	265/1825	1509/6711
19.0/5.79	191.6	251/1730	1430/6362

English/Metric

3 X 1 1/2 X 1/4 I-BEAM

76.2 x 38.1 x 6.4 I-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 1.38 \text{ in.}^2 / 890 \text{ mm}^2$$

$$r = .32 \text{ in.} / 8 \text{ mm}$$

$$b/t = 6$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	37.5	5245/36164	7238/32198
1.5/0.46	56.3	2911/20073	4018/17871
2.0/0.61	75.0	1638/11291	2260/10053
2.5/0.76	93.8	1048/7226	1446/6434
3.0/0.91	112.5	728/5018	1004/4468
3.5/1.07	131.3	535/3687	738/3283
4.0/1.22	150.0	409/2823	565/2513
4.5/1.37	168.8	323/2230	446/1986
5.0/1.52	187.5	262/1807	362/1608
5.5/1.68	206.3	217/1493	299/1329
6.0/1.83	225.0	182/1255	251/1117
6.5/1.98	243.8	155/1069	214/952
7.0/2.13	262.5	134/922	184/821
7.5/2.29	281.3	116/803	161/715
8.0/2.44	300.0	102/706	141/628
8.5/2.59	318.8	91/625	125/557
9.0/2.74	337.5	81/558	112/496
9.5/2.90	356.3	73/500	100/446
10.0/3.05	375.0	66/452	90/402
10.5/3.20	393.8	59/410	82/365

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	412.5	54/373	75/332
11.5/3.51	431.3	50/342	68/304
12.0/3.66	450.0	45/314	63/279
12.5/3.81	468.8	42/289	58/257
13.0/3.96	487.5	39/267	53/238
13.5/4.12	506.3	36/248	50/221
14.0/4.27	525.0	33/230	46/205
14.5/4.42	543.8	31/215	43/191
15.0/4.57	562.5	29/201	40/179
15.5/4.72	581.3	27/188	38/167
16.0/4.88	600.0	26/176	35/157
16.5/5.03	618.8	24/166	33/148
17.0/5.18	637.5	23/156	31/139
17.5/5.33	656.3	21/147	30/131
18.0/5.49	675.0	20/139	28/124
18.5/5.64	693.8	19/132	26/117
19.0/5.79	712.5	18/125	25/111
19.5/5.94	731.3	17/119	24/106
20.0/6.10	750.0	16/113	23/101

English/Metric

4 X 2 X 1/4 I-BEAM

101.6 x 50.8 x 6.4 I-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 1.88 \text{ in.}^2 / 1213 \text{ mm}^2$$

$$r = .43 \text{ in.} / 11 \text{ mm}$$

$$b/t = 8$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	27.9	6462/44551	12148/54036
1.5/0.46	41.9	4692/32352	8822/39240
2.0/0.61	55.8	2957/20388	5559/24728
2.5/0.76	69.8	1892/13048	3558/15823
3.0/0.91	83.7	1314/9061	2471/10990
3.5/1.07	97.7	966/6657	1815/8075
4.0/1.22	111.6	739/5097	1390/6182
4.5/1.37	125.6	584/4027	1098/4885
5.0/1.52	139.5	473/3262	889/3957
5.5/1.68	153.5	391/2696	735/3270
6.0/1.83	167.4	329/2265	618/2748
6.5/1.98	181.4	280/1930	526/2341
7.0/2.13	195.3	241/1664	454/2019
7.5/2.29	209.3	210/1450	395/1758
8.0/2.44	223.3	185/1274	347/1546
8.5/2.59	237.2	164/1129	308/1369
9.0/2.74	251.2	146/1007	275/1221
9.5/2.90	265.1	131/904	246/1096
10.0/3.05	279.1	118/816	222/989
10.5/3.20	293.0	107/740	202/897

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	307.0	98/674	184/817
11.5/3.51	320.9	89/617	168/748
12.0/3.66	334.9	82/566	154/687
12.5/3.81	348.8	76/522	142/633
13.0/3.96	362.8	70/483	132/585
13.5/4.12	376.7	65/447	122/543
14.0/4.27	390.7	60/416	113/505
14.5/4.42	404.7	56/388	106/470
15.0/4.57	418.6	53/362	99/440
15.5/4.72	432.6	49/339	93/412
16.0/4.88	446.5	46/319	87/386
16.5/5.03	460.5	43/300	82/363
17.0/5.18	474.4	41/282	77/342
17.5/5.33	488.4	39/266	73/323
18.0/5.49	502.3	37/252	69/305
18.5/5.64	516.3	35/238	65/289
19.0/5.79	530.2	33/226	62/274
19.5/5.94	544.2	31/214	58/260
20.0/6.10	558.1	30/204	56/247

English/*Metric*

6 X 3 X 1/4 I-BEAM

152.4 x 76.2 x 6.4 I-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 2.88 \text{ in.}^2 / 1858 \text{ mm}^2$$

$$r = .63 \text{ in.} / 16 \text{ mm}$$

$$b/t = 12$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	19.0	7585/52296	21844/97169
1.5/0.46	28.6	6377/43970	18367/81699
2.0/0.61	38.1	5170/35644	14889/66229
2.5/0.76	47.6	3962/27318	11411/50759
3.0/0.91	57.1	2821/19451	8125/36140
3.5/1.07	66.7	2073/14290	5969/26552
4.0/1.22	76.2	1587/10941	4570/20329
4.5/1.37	85.7	1254/8645	3611/16062
5.0/1.52	95.2	1016/7002	2925/13011
5.5/1.68	104.8	839/5787	2417/10753
6.0/1.83	114.3	705/4863	2031/9035
6.5/1.98	123.8	601/4143	1731/7699
7.0/2.13	133.3	518/3573	1492/6638
7.5/2.29	142.9	451/3112	1300/5782
8.0/2.44	152.4	397/2735	1143/5082
8.5/2.59	161.9	351/2423	1012/4502
9.0/2.74	171.4	313/2161	903/4016
9.5/2.90	181.0	281/1940	810/3604
10.0/3.05	190.5	254/1751	731/3253
10.5/3.20	200.0	230/1588	663/2950

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	209.5	210/1447	604/2688
11.5/3.51	219.0	192/1324	553/2459
12.0/3.66	228.6	176/1216	508/2259
12.5/3.81	238.1	162/1120	468/2082
13.0/3.96	247.6	150/1036	433/1925
13.5/4.12	257.1	139/961	401/1785
14.0/4.27	266.7	130/893	373/1660
14.5/4.42	276.2	121/833	348/1547
15.0/4.57	285.7	113/778	325/1446
15.5/4.72	295.2	106/729	304/1354
16.0/4.88	304.8	99/684	286/1271
16.5/5.03	314.3	93/643	269/1195
17.0/5.18	323.8	88/606	253/1125
17.5/5.33	333.3	83/572	239/1062
18.0/5.49	342.9	78/540	226/1004
18.5/5.64	352.4	74/511	214/950
19.0/5.79	361.9	70/485	203/901
19.5/5.94	371.4	67/460	192/855
20.0/6.10	381.0	63/438	183/813

English/*Metric*

6 X 3 X 3/8 I-BEAM

152.4 x 76.2 x 9.5 I-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 4.23 \text{ in.}^2 / 2729 \text{ mm}^2$$

$$r = .64 \text{ in.} / 16 \text{ mm}$$

$$b/t = 8$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	18.8	7623/52556	32244/143427
1.5/0.46	28.1	6434/44360	27215/121060
2.0/0.61	37.5	5245/36164	22187/98694
2.5/0.76	46.9	4057/27969	17159/76327
3.0/0.91	56.3	2911/20073	12315/54780
3.5/1.07	65.6	2139/14748	9048/40246
4.0/1.22	75.0	1638/11291	6927/30814
4.5/1.37	84.4	1294/8921	5473/24347
5.0/1.52	93.8	1048/7226	4433/19721
5.5/1.68	103.1	866/5972	3664/16298
6.0/1.83	112.5	728/5018	3079/13695
6.5/1.98	121.9	620/4276	2623/11669
7.0/2.13	131.3	535/3687	2262/10062
7.5/2.29	140.6	466/3212	1970/8765
8.0/2.44	150.0	409/2823	1732/7703
8.5/2.59	159.4	363/2500	1534/6824
9.0/2.74	168.8	323/2230	1368/6087
9.5/2.90	178.1	290/2002	1228/5463
10.0/3.05	187.5	262/1807	1108/4930
10.5/3.20	196.9	238/1639	1005/4472

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	206.3	217/1493	916/4075
11.5/3.51	215.6	198/1366	838/3728
12.0/3.66	225.0	182/1255	770/3424
12.5/3.81	234.4	168/1156	709/3155
13.0/3.96	243.8	155/1069	656/2917
13.5/4.12	253.1	144/991	608/2705
14.0/4.27	262.5	134/922	565/2515
14.5/4.42	271.9	125/859	527/2345
15.0/4.57	281.3	116/803	493/2191
15.5/4.72	290.6	109/752	461/2052
16.0/4.88	300.0	102/706	433/1926
16.5/5.03	309.4	96/664	407/1811
17.0/5.18	318.8	91/625	384/1706
17.5/5.33	328.1	86/590	362/1610
18.0/5.49	337.5	81/558	342/1522
18.5/5.64	346.9	77/528	324/1441
19.0/5.79	356.3	73/500	307/1366
19.5/5.94	365.6	69/475	291/1297
20.0/6.10	375.0	66/452	277/1233

English/*Metric*

8 X 4 X 3/8 I-BEAM

203.2 x 101.6 x 9.5 I-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 5.73 \text{ in.}^2 / 3697 \text{ mm}^2$$

$$r = .84 \text{ in.} / 21 \text{ mm}$$

$$b/t = 10.7$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	14.3	8189/56459	46921/208715
1.5/0.46	21.4	7283/50214	41731/185631
2.0/0.61	28.6	6377/43970	36542/162547
2.5/0.76	35.7	5472/37726	31352/139462
3.0/0.91	42.9	4566/31481	26163/116378
3.5/1.07	50.0	3660/25237	20973/93294
4.0/1.22	57.1	2821/19451	16165/71904
4.5/1.37	64.3	2229/15368	12772/56813
5.0/1.52	71.4	1805/12448	10345/46019
5.5/1.68	78.6	1492/10288	8550/38032
6.0/1.83	85.7	1254/8645	7184/31958
6.5/1.98	92.9	1068/7366	6122/27230
7.0/2.13	100.0	921/6351	5278/23479
7.5/2.29	107.1	802/5533	4598/20453
8.0/2.44	114.3	705/4863	4041/17976
8.5/2.59	121.4	625/4307	3580/15923
9.0/2.74	128.6	557/3842	3193/14203
9.5/2.90	135.7	500/3448	2866/12748
10.0/3.05	142.9	451/3112	2586/11505
10.5/3.20	150.0	409/2823	2346/10435

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	157.1	373/2572	2137/9508
11.5/3.51	164.3	341/2353	1956/8699
12.0/3.66	171.4	313/2161	1796/7989
12.5/3.81	178.6	289/1992	1655/7363
13.0/3.96	185.7	267/1841	1530/6808
13.5/4.12	192.9	248/1708	1419/6313
14.0/4.27	200.0	230/1588	1320/5870
14.5/4.42	207.1	215/1480	1230/5472
15.0/4.57	214.3	201/1383	1149/5113
15.5/4.72	221.4	188/1295	1077/4789
16.0/4.88	228.6	176/1216	1010/4494
16.5/5.03	235.7	166/1143	950/4226
17.0/5.18	242.9	156/1077	895/3981
17.5/5.33	250.0	147/1016	845/3757
18.0/5.49	257.1	139/961	798/3551
18.5/5.64	264.3	132/909	756/3361
19.0/5.79	271.4	125/862	716/3187
19.5/5.94	278.6	119/818	680/3026
20.0/6.10	285.7	113/778	647/2876

English/*Metric*

8 X 4 X 1/2 I-BEAM

203.2 x 101.6 x 12.7 I-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 7.51 \text{ in.}^2 / 4845 \text{ mm}^2$$

$$r = .85 \text{ in.} / 22 \text{ mm}$$

$$b/t = 8$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	14.1	8210/56606	61657/274263
1.5/0.46	21.2	7315/50435	54935/244364
2.0/0.61	28.2	6420/44264	48214/214465
2.5/0.76	35.3	5525/38093	41492/184566
3.0/0.91	42.4	4630/31922	34770/154666
3.5/1.07	49.4	3735/25751	28049/124767
4.0/1.22	56.5	2889/19916	21694/96498
4.5/1.37	63.5	2282/15736	17141/76246
5.0/1.52	70.6	1849/12747	13884/61759
5.5/1.68	77.6	1528/10534	11474/51040
6.0/1.83	84.7	1284/8852	9642/42888
6.5/1.98	91.8	1094/7542	8215/36544
7.0/2.13	98.8	943/6503	7084/31510
7.5/2.29	105.9	822/5665	6171/27448
8.0/2.44	112.9	722/4979	5423/24125
8.5/2.59	120.0	640/4411	4804/21370
9.0/2.74	127.1	571/3934	4285/19061
9.5/2.90	134.1	512/3531	3846/17108
10.0/3.05	141.2	462/3187	3471/15440
10.5/3.20	148.2	419/2890	3148/14004

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	155.3	382/2634	2869/12760
11.5/3.51	162.4	349/2410	2625/11675
12.0/3.66	169.4	321/2213	2410/10722
12.5/3.81	176.5	296/2039	2221/9881
13.0/3.96	183.5	273/1886	2054/9136
13.5/4.12	190.6	254/1748	1905/8472
14.0/4.27	197.6	236/1626	1771/7877
14.5/4.42	204.7	220/1516	1651/7344
15.0/4.57	211.8	205/1416	1543/6862
15.5/4.72	218.8	192/1326	1445/6427
16.0/4.88	225.9	181/1245	1356/6031
16.5/5.03	232.9	170/1170	1275/5671
17.0/5.18	240.0	160/1103	1201/5342
17.5/5.33	247.1	151/1041	1133/5042
18.0/5.49	254.1	143/984	1071/4765
18.5/5.64	261.2	135/931	1014/4511
19.0/5.79	268.2	128/883	961/4277
19.5/5.94	275.3	122/838	913/4060
20.0/6.10	282.4	116/797	868/3860

English/Metric

10 X 5 X 3/8 I-BEAM

254 x 127 x 9.5 I-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 7.22 \text{ in.}^2 / 4658 \text{ mm}^2$$

$$r = 1.04 \text{ in.} / 26 \text{ mm}$$

$$b/t = 13.3$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	11.5	8537/58860	61637/274175
1.5/0.46	17.3	7805/53817	56356/250682
2.0/0.61	23.1	7074/48773	51074/227189
2.5/0.76	28.8	6342/43730	45793/203696
3.0/0.91	34.6	5611/38686	40511/180202
3.5/1.07	40.4	4879/33643	35230/156709
4.0/1.22	46.2	4148/28599	29948/133216
4.5/1.37	51.9	3416/23556	24667/109723
5.0/1.52	57.7	2768/19082	19982/88885
5.5/1.68	63.5	2287/15770	16514/73458
6.0/1.83	69.2	1922/13251	13876/61725
6.5/1.98	75.0	1638/11291	11824/52594
7.0/2.13	80.8	1412/9736	10195/45349
7.5/2.29	86.5	1230/8481	8881/39504
8.0/2.44	92.3	1081/7454	7805/34721
8.5/2.59	98.1	958/6603	6914/30756
9.0/2.74	103.8	854/5889	6167/27434
9.5/2.90	109.6	767/5286	5535/24622
10.0/3.05	115.4	692/4770	4996/22221
10.5/3.20	121.2	628/4327	4531/20155

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	126.9	572/3943	4129/18365
11.5/3.51	132.7	523/3607	3777/16802
12.0/3.66	138.5	480/3313	3469/15431
12.5/3.81	144.2	443/3053	3197/14222
13.0/3.96	150.0	409/2823	2956/13149
13.5/4.12	155.8	380/2618	2741/12193
14.0/4.27	161.5	353/2434	2549/11337
14.5/4.42	167.3	329/2269	2376/10569
15.0/4.57	173.1	308/2120	2220/9876
15.5/4.72	178.8	288/1986	2079/9249
16.0/4.88	184.6	270/1863	1951/8680
16.5/5.03	190.4	254/1752	1835/8162
17.0/5.18	196.2	239/1651	1729/7689
17.5/5.33	201.9	226/1558	1631/7256
18.0/5.49	207.7	214/1472	1542/6858
18.5/5.64	213.5	202/1394	1460/6493
19.0/5.79	219.2	192/1321	1384/6155
19.5/5.94	225.0	182/1255	1314/5844
20.0/6.10	230.8	173/1193	1249/5555

English/*Metric*

10 X 5 X 1/2 I-BEAM

254 x 127 x 12.7 I-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 9.51 \text{ in.}^2 / 6135 \text{ mm}^2$$

$$r = 1.04 \text{ in.} / 26 \text{ mm}$$

$$b/t = 10$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	11.5	8537/58860	81187/361137
1.5/0.46	17.3	7805/53817	74230/330192
2.0/0.61	23.1	7074/48773	67273/299247
2.5/0.76	28.8	6342/43730	60317/268303
3.0/0.91	34.6	5611/38686	53360/237358
3.5/1.07	40.4	4879/33643	46404/206413
4.0/1.22	46.2	4148/28599	39447/175469
4.5/1.37	51.9	3416/23556	32490/144524
5.0/1.52	57.7	2768/19082	26320/117076
5.5/1.68	63.5	2287/15770	21752/96757
6.0/1.83	69.2	1922/13251	18278/81303
6.5/1.98	75.0	1638/11291	15574/69276
7.0/2.13	80.8	1412/9736	13428/59733
7.5/2.29	86.5	1230/8481	11698/52034
8.0/2.44	92.3	1081/7454	10281/45733
8.5/2.59	98.1	958/6603	9107/40511
9.0/2.74	103.8	854/5889	8123/36135
9.5/2.90	109.6	767/5286	7291/32431
10.0/3.05	115.4	692/4770	6580/29269
10.5/3.20	121.2	628/4327	5968/26548

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	126.9	572/3943	5438/24189
11.5/3.51	132.7	523/3607	4975/22132
12.0/3.66	138.5	480/3313	4569/20326
12.5/3.81	144.2	443/3053	4211/18732
13.0/3.96	150.0	409/2823	3893/17319
13.5/4.12	155.8	380/2618	3610/16060
14.0/4.27	161.5	353/2434	3357/14933
14.5/4.42	167.3	329/2269	3130/13921
15.0/4.57	173.1	308/2120	2924/13008
15.5/4.72	178.8	288/1986	2739/12183
16.0/4.88	184.6	270/1863	2570/11433
16.5/5.03	190.4	254/1752	2417/10751
17.0/5.18	196.2	239/1651	2277/10128
17.5/5.33	201.9	226/1558	2149/9557
18.0/5.49	207.7	214/1472	2031/9034
18.5/5.64	213.5	202/1394	1923/8552
19.0/5.79	219.2	192/1321	1823/8108
19.5/5.94	225.0	182/1255	1730/7697
20.0/6.10	230.8	173/1193	1645/7317

English/*Metric*

12 X 6 X 1/2 I-BEAM

304.8 x 152.4 x 12.7 I-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 11.51 \text{ in.}^2 / 7426 \text{ mm}^2$$

$$r = 1.26 \text{ in.} / 32 \text{ mm}$$

$$b/t = 12$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	9.5	8792/60622	101201/450164
1.5/0.46	14.3	8189/56459	94251/419251
2.0/0.61	19.0	7585/52296	87302/388338
2.5/0.76	23.8	6981/48133	80352/357425
3.0/0.91	28.6	6377/43970	73403/326512
3.5/1.07	33.3	5774/39807	66453/295598
4.0/1.22	38.1	5170/35644	59504/264685
4.5/1.37	42.9	4566/31481	52554/233772
5.0/1.52	47.6	3962/27318	45605/202859
5.5/1.68	52.4	3357/23148	38643/171891
6.0/1.83	57.1	2821/19451	32471/144436
6.5/1.98	61.9	2404/16573	27667/123070
7.0/2.13	66.7	2073/14290	23856/106116
7.5/2.29	71.4	1805/12448	20781/92439
8.0/2.44	76.2	1587/10941	18265/81245
8.5/2.59	81.0	1406/9692	16179/71968
9.0/2.74	85.7	1254/8645	14431/64194
9.5/2.90	90.5	1125/7759	12952/57614
10.0/3.05	95.2	1016/7002	11689/51997
10.5/3.20	100.0	921/6351	10603/47163

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	104.8	839/5787	9661/42973
11.5/3.51	109.5	768/5295	8839/39317
12.0/3.66	114.3	705/4863	8118/36109
12.5/3.81	119.0	650/4481	7481/33278
13.0/3.96	123.8	601/4143	6917/30767
13.5/4.12	128.6	557/3842	6414/28531
14.0/4.27	133.3	518/3573	5964/26529
14.5/4.42	138.1	483/3330	5560/24731
15.0/4.57	142.9	451/3112	5195/23110
15.5/4.72	147.6	423/2915	4866/21643
16.0/4.88	152.4	397/2735	4566/20311
16.5/5.03	157.1	373/2572	4294/19099
17.0/5.18	161.9	351/2423	4045/17992
17.5/5.33	166.7	332/2286	3817/16979
18.0/5.49	171.4	313/2161	3608/16048
18.5/5.64	176.2	297/2046	3415/15193
19.0/5.79	181.0	281/1940	3238/14404
19.5/5.94	185.7	267/1841	3074/13674
20.0/6.10	190.5	254/1751	2922/12999

English/Metric

3 X 3 X 1/4 WF-BEAM

76.2 x 76.2 x 6.4 WF-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 2.13 \text{ in}^2 / 1374.19 \text{ mm}^2$$

$$r = .73 \text{ in.} / 18.54 \text{ mm}$$

$$b/t = 12$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.00/0.30	16.4	7916/54577	16860/74999
1.50/0.46	24.7	6874/47392	14641/65125
2.00/0.61	32.9	5831/40206	12421/55251
2.50/0.76	41.1	4789/33021	10201/45377
3.00/0.91	49.3	3747/25835	7981/35503
3.50/1.07	57.5	2783/19187	5927/26366
4.00/1.22	65.8	2131/14690	4538/20187
4.50/1.37	74.0	1683/11607	3586/15950
5.00/1.52	82.2	1364/9402	2904/12920
5.50/1.68	90.4	1127/7770	2400/10677
6.00/1.83	98.6	947/6529	2017/8972
6.5/1.98	106.8	807/5563	1719/7645
7.0/2.13	115.1	696/4797	1482/6592
7.5/2.29	123.3	606/4178	1291/5742
8.0/2.44	131.6	533/3672	1135/5047
8.5/2.59	139.7	472/3253	1005/4470
9.0/2.74	147.9	421/2902	896/3988
9.5/2.90	156.2	378/2604	805/3579
10.0/3.05	164.4	341/2350	726/3230
10.5/3.20	172.6	309/2132	659/2930
11.0/3.35	180.8	282/1942	600/2669
11.5/3.51	189.0	258/1777	549/2442
12.0/3.66	197.3	237/1632	504/2243

English/*Metric*

4 X 4 X 1/4 WF-BEAM

101.6 x 101.6 x 6.4 WF-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 2.89 \text{ in.}^2 / 1864.51 \text{ mm}^2$$

$$r = .96 \text{ in.} / 24.38 \text{ mm}$$

$$b/t = 16$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	12.5	6328/43630	18288/81348
1.5/0.46	18.8	5833/40217	16857/74984
2.0/0.61	25.0	5338/36804	15427/68621
2.5/0.76	31.3	4843/33390	13996/62257
3.0/0.91	37.5	4348/29977	12565/55893
3.5/1.07	43.8	3853/26564	11135/49529
4.0/1.22	50.0	3358/23151	9704/43166
4.5/1.37	56.3	2863/19738	8273/36802
5.0/1.52	62.5	2368/16325	6843/30438
5.5/1.68	68.8	1949/13437	5632/25054
6.0/1.83	75.0	1638/11291	4733/21052
6.5/1.98	81.3	1395/9621	4033/17938
7.0/2.13	87.5	1203/8295	3477/15467
7.5/2.29	93.8	1048/7226	3029/13473
8.0/2.44	100.0	921/6351	2662/11842
8.5/2.59	106.3	816/5626	2358/10490

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
9.0/2.74	112.5	728/5018	2103/9357
9.5/2.90	118.8	653/4504	1888/8398
10.0/3.05	125.0	590/4065	1704/7579
10.5/3.20	131.3	535/3687	1545/6874
11.0/3.35	137.5	487/3359	1408/6264
11.5/3.51	143.8	446/3074	1288/5731
12.0/3.66	150.0	409/2823	1183/5263
12.5/3.81	156.3	377/2601	1090/4850
13.0/3.96	162.5	349/2405	1008/4485
13.5/4.12	168.8	323/2230	935/4158
14.0/4.27	175.0	301/2074	869/3867
14.5/4.42	181.3	280/1933	810/3605
15.0/4.57	187.5	262/1807	757/3368
15.5/4.72	193.8	245/1692	709/3155
16.0/4.88	200.0	230/1588	666/2960

English/*Metric*

6 X 6 X 1/4 WF-BEAM

152.4 x 152.4 x 6.4 WF-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 4.39 \text{ in.}^2 / 2832.25 \text{ mm}^2$$

$$r = 1.43 \text{ in.} / 36.32 \text{ mm}$$

$$b/t = 24$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	8.4	3056/21067	13414/59668
1.5/0.46	12.6	2957/20387	12980/57740
2.0/0.61	16.8	2858/19706	12547/55812
2.5/0.76	21.0	2759/19025	12114/53884
3.0/0.91	25.2	2661/18345	11680/51957
3.5/1.07	29.4	2562/17664	11247/50029
4.0/1.22	33.6	2463/16983	10814/48101
4.5/1.37	37.8	2364/16303	10380/46173
5.0/1.52	42.0	2266/15622	9947/44245
5.5/1.68	46.2	2167/14941	9513/42317
6.0/1.83	50.3	2068/14261	9080/40390
6.5/1.98	54.5	1970/13580	8647/38462
7.0/2.13	58.7	1871/12899	8213/36534
7.5/2.29	62.9	1772/12219	7780/34606
8.0/2.44	67.1	1673/11538	7346/32678
8.5/2.59	71.3	1575/10857	6913/30750
9.0/2.74	75.5	1476/10177	6480/28823
9.5/2.90	79.7	1377/9496	6046/26895
10.0/3.05	83.9	1279/8815	5613/24967
10.5/3.20	88.1	1180/8135	5179/23039

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	92.3	1081/7454	4746/21111
11.5/3.51	96.5	989/6820	4342/19315
12.0/3.66	100.7	908/6263	3988/17739
12.5/3.81	104.9	837/5772	3675/16349
13.0/3.96	109.1	774/5337	3398/15115
13.5/4.12	113.3	718/4949	3151/14016
14.0/4.27	117.5	667/4602	2930/13033
14.5/4.42	121.7	622/4290	2731/12150
15.0/4.57	125.9	581/4009	2552/11353
15.5/4.72	130.1	544/3754	2390/10633
16.0/4.88	134.3	511/3523	2243/9978
16.5/5.03	138.5	480/3313	2109/9383
17.0/5.18	142.7	453/3121	1987/8839
17.5/5.33	146.9	427/2945	1875/8341
18.0/5.49	151.0	404/2784	1772/7884
18.5/5.64	155.2	382/2635	1678/7464
19.0/5.79	159.4	362/2498	1591/7076
19.5/5.94	163.6	344/2372	1510/6718
20.0/6.10	167.8	327/2255	1436/6386

English/Metric

6 X 6 X 3/8 WF-BEAM

152.4 x 152.4 x 9.5 WF-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 6.48 \text{ in.}^2 / 4180.64 \text{ mm}^2$$

$$r = 1.44 \text{ in.} / 36.58 \text{ mm}$$

$$b/t = 16$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	8.3	6658/45905	43144/191912
1.5/0.46	12.5	6328/43630	41005/182400
2.0/0.61	16.7	5998/41354	38867/172887
2.5/0.76	20.8	5668/39079	36728/163375
3.0/0.91	25.0	5338/36804	34590/153862
3.5/1.07	29.2	5008/34528	32451/144350
4.0/1.22	33.3	4678/32253	30313/134837
4.5/1.37	37.5	4348/29977	28174/125324
5.0/1.52	41.7	4018/27702	26036/115812
5.5/1.68	45.8	3688/25427	23897/106299
6.0/1.83	50.0	3358/23151	21759/96787
6.5/1.98	54.2	3028/20876	19620/87274
7.0/2.13	58.3	2698/18600	17482/77762
7.5/2.29	62.5	2368/16325	15343/68249
8.0/2.44	66.7	2073/14290	13431/59742
8.5/2.59	70.8	1836/12658	11897/52921
9.0/2.74	75.0	1638/11291	10612/47204
9.5/2.90	79.2	1470/10134	9524/42366
10.0/3.05	83.3	1326/9146	8596/38235
10.5/3.20	87.5	1203/8295	7796/34680

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	91.7	1096/7558	7104/31599
11.5/3.51	95.8	1003/6916	6500/28911
12.0/3.66	100.0	921/6351	5969/26552
12.5/3.81	104.2	849/5853	5501/24470
13.0/3.96	108.3	785/5412	5086/22624
13.5/4.12	112.5	728/5018	4716/20979
14.0/4.27	116.7	677/4666	4386/19508
14.5/4.42	120.8	631/4350	4088/18186
15.0/4.57	125.0	590/4065	3820/16993
15.5/4.72	129.2	552/3807	3578/15915
16.0/4.88	133.3	518/3573	3358/14936
16.5/5.03	137.5	487/3359	3157/14044
17.0/5.18	141.7	459/3165	2974/13230
17.5/5.33	145.8	433/2986	2807/12485
18.0/5.49	150.0	409/2823	2653/11801
18.5/5.64	154.2	388/2672	2511/11172
19.0/5.79	158.3	367/2533	2381/10591
19.5/5.94	162.5	349/2405	2261/10055
20.0/6.10	166.7	332/2286	2149/9559

English/*Metric*

8 X 8 X 3/8 WF-BEAM

203.2 x 203.2 x 9.5 WF-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 8.73 \text{ in.}^2 / 5632.25 \text{ mm}^2$$

$$r = 1.92 \text{ in.} / 48.77 \text{ mm}$$

$$b/t = 21.3$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	6.3	3908/26943	34115/151752
1.5/0.46	9.4	3803/26222	33202/147690
2.0/0.61	12.5	3699/25501	32289/143628
2.5/0.76	15.6	3594/24780	31376/139566
3.0/0.91	18.8	3489/24059	30463/135505
3.5/1.07	21.9	3385/23338	29550/131443
4.0/1.22	25.0	3280/22616	28636/127381
4.5/1.37	28.1	3176/21895	27723/123319
5.0/1.52	31.3	3071/21174	26810/119257
5.5/1.68	34.4	2966/20453	25897/115196
6.0/1.83	37.5	2862/19732	24984/111134
6.5/1.98	40.6	2757/19011	24071/107072
7.0/2.13	43.8	2653/18289	23158/103010
7.5/2.29	46.9	2548/17568	22244/98948
8.0/2.44	50.0	2443/16847	21331/94887
8.5/2.59	53.1	2339/16126	20418/90825
9.0/2.74	56.3	2234/15405	19505/86763
9.5/2.90	59.4	2130/14684	18592/82701
10.0/3.05	62.5	2025/13962	17679/78639
10.5/3.20	65.6	1920/13241	16766/74578

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	68.8	1816/12520	15853/70516
11.5/3.51	71.9	1711/11799	14939/66454
12.0/3.66	75.0	1607/11078	14026/62392
12.5/3.81	78.1	1502/10356	13113/58330
13.0/3.96	81.3	1395/9621	12182/54187
13.5/4.12	84.4	1294/8921	11296/50247
14.0/4.27	87.5	1203/8295	10504/46722
14.5/4.42	90.6	1122/7733	9792/43556
15.0/4.57	93.8	1048/7226	9150/40700
15.5/4.72	96.9	982/6768	8569/38117
16.0/4.88	100.0	921/6351	8042/35772
16.5/5.03	103.1	866/5972	7562/33637
17.0/5.18	106.3	816/5626	7124/31687
17.5/5.33	109.4	770/5309	6722/29902
18.0/5.49	112.5	728/5018	6354/28264
18.5/5.64	115.6	689/4751	6015/26757
19.0/5.79	118.8	653/4504	5703/25367
19.5/5.94	121.9	620/4276	5414/24083
20.0/6.10	125.0	590/4065	5147/22894

English/*Metric*

8 X 8 X 1/2 WF-BEAM

203.2 x 203.2 x 12.7 WF-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 11.51 \text{ in.}^2 / 7425.79 \text{ mm}^2$$

$$r = 1.93 \text{ in.} / 49.02 \text{ mm}$$

$$b/t = 16$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	6.2	6826/47060	78562/349461
1.5/0.46	9.3	6579/45363	75728/336854
2.0/0.61	12.4	6333/43665	72894/324248
2.5/0.76	15.5	6087/41967	70060/311641
3.0/0.91	18.7	5841/40270	67226/299034
3.5/1.07	21.8	5594/38572	64391/286427
4.0/1.22	24.9	5348/36874	61557/273821
4.5/1.37	28.0	5102/35177	58723/261214
5.0/1.52	31.1	4856/33479	55889/248607
5.5/1.68	34.2	4609/31781	53055/236000
6.0/1.83	37.3	4363/30083	50221/223394
6.5/1.98	40.4	4117/28386	47387/210787
7.0/2.13	43.5	3871/26688	44553/198180
7.5/2.29	46.6	3625/24990	41719/185573
8.0/2.44	49.7	3378/23293	38884/172967
8.5/2.59	52.8	3132/21595	36050/160360
9.0/2.74	56.0	2886/19897	33216/147753
9.5/2.90	59.1	2640/18200	30382/135146
10.0/3.05	62.2	2393/16502	27548/122540
10.5/3.20	65.3	2161/14902	24876/110656

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	68.4	1969/13578	22666/100825
11.5/3.51	71.5	1802/12423	20738/92248
12.0/3.66	74.6	1655/11409	19046/84721
12.5/3.81	77.7	1525/10515	17553/78079
13.0/3.96	80.8	1410/9721	16229/72188
13.5/4.12	83.9	1307/9015	15049/66940
14.0/4.27	87.0	1216/8382	13993/62244
14.5/4.42	90.2	1133/7814	13045/58025
15.0/4.57	93.3	1059/7302	12189/54221
15.5/4.72	96.4	992/6838	11416/50780
16.0/4.88	99.5	931/6418	10713/47655
16.5/5.03	102.6	875/6035	10074/44811
17.0/5.18	105.7	825/5685	9490/42214
17.5/5.33	108.8	778/5365	8956/39836
18.0/5.49	111.9	735/5071	8465/37654
18.5/5.64	115.0	696/4800	8014/35646
19.0/5.79	118.1	660/4551	7597/33794
19.5/5.94	121.2	627/4321	7213/32084
20.0/6.10	124.4	596/4107	6857/30499

English/*Metric*

10 X 10 X 3/8 WF-BEAM

254.0 x 254.0 x 9.5 WF-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 11.06 \text{ in.}^2 / 7135.47 \text{ mm}^2$$

$$r = 2.38 \text{ in.} / 60.45 \text{ mm}$$

$$b/t = 26.7$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	5.0	2549/17572	28187/125384
1.5/0.46	7.6	2505/17274	27710/123258
2.0/0.61	10.1	2462/16976	27232/121133
2.5/0.76	12.6	2419/16678	26754/119007
3.0/0.91	15.1	2376/16380	26276/116881
3.5/1.07	17.6	2333/16082	25798/114756
4.0/1.22	20.2	2289/15785	25320/112630
4.5/1.37	22.7	2246/15487	24842/110504
5.0/1.52	25.2	2203/15189	24365/108379
5.5/1.68	27.7	2160/14891	23887/106253
6.0/1.83	30.3	2117/14593	23409/104128
6.5/1.98	32.8	2073/14295	22931/102002
7.0/2.13	35.3	2030/13997	22453/99876
7.5/2.29	37.8	1987/13699	21975/97751
8.0/2.44	40.3	1944/13401	21497/95625
8.5/2.59	42.9	1901/13103	21020/93500
9.0/2.74	45.4	1857/12806	20542/91374
9.5/2.90	47.9	1814/12508	20064/89248
10.0/3.05	50.4	1771/12210	19586/87123
10.5/3.20	52.9	1728/11912	19108/84997

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	55.5	1684/11614	18630/82871
11.5/3.51	58.0	1641/11316	18152/80746
12.0/3.66	60.5	1598/11018	17675/78620
12.5/3.81	63.0	1555/10720	17197/76495
13.0/3.96	65.5	1512/10422	16719/74369
13.5/4.12	68.1	1468/10125	16241/72243
14.0/4.27	70.6	1425/9827	15763/70118
14.5/4.42	73.1	1382/9529	15285/67992
15.0/4.57	75.6	1339/9231	14807/65867
15.5/4.72	78.2	1296/8933	14330/63741
16.0/4.88	80.7	1252/8635	13852/61615
16.5/5.03	83.2	1209/8337	13374/59490
17.0/5.18	85.7	1166/8039	12896/57364
17.5/5.33	88.2	1123/7741	12418/55239
18.0/5.49	90.8	1080/7444	11940/53113
18.5/5.64	93.3	1036/7146	11462/50987
19.0/5.79	95.8	993/6848	10985/48862
19.5/5.94	98.3	950/6550	10507/46736
20.0/6.10	100.8	906/6246	10019/44567

English/*Metric*

10 X 10 X 1/2 WF-BEAM

254.0 x 254.0 x 12.7 WF-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 14.51 \text{ in.}^2 / 9361.27 \text{ mm}^2$$

$$r = 2.4 \text{ in.} / 60.96 \text{ mm}$$

$$b/t = 20$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	5.0	4481/30894	65016/289205
1.5/0.46	7.5	4379/30193	63541/282646
2.0/0.61	10.0	4278/29493	62067/276088
2.5/0.76	12.5	4176/28792	60592/269529
3.0/0.91	15.0	4074/28091	59118/262970
3.5/1.07	17.5	3973/27391	57644/256411
4.0/1.22	20.0	3871/26690	56169/249852
4.5/1.37	22.5	3769/25989	54695/243294
5.0/1.52	25.0	3668/25289	53220/236735
5.5/1.68	27.5	3566/24588	51746/230176
6.0/1.83	30.0	3465/23887	50271/223617
6.5/1.98	32.5	3363/23187	48797/217058
7.0/2.13	35.0	3261/22486	47322/210500
7.5/2.29	37.5	3160/21786	45848/203941
8.0/2.44	40.0	3058/21085	44373/197382
8.5/2.59	42.5	2956/20384	42899/190823
9.0/2.74	45.0	2855/19684	41424/184264
9.5/2.90	47.5	2753/18983	39950/177706
10.0/3.05	50.0	2652/18282	38475/171147
10.5/3.20	52.5	2550/17582	37001/164588

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	55.0	2448/16881	35526/158029
11.5/3.51	57.5	2347/16181	34052/151471
12.0/3.66	60.0	2245/15480	32577/144912
12.5/3.81	62.5	2144/14779	31103/138353
13.0/3.96	65.0	2042/14079	29629/131794
13.5/4.12	67.5	1940/13378	28154/125235
14.0/4.27	70.0	1839/12677	26680/118677
14.5/4.42	72.5	1737/11977	25205/112118
15.0/4.57	75.0	1635/11276	23731/105559
15.5/4.72	77.5	1534/10574	22254/98989
16.0/4.88	80.0	1439/9924	20885/92899
16.5/5.03	82.5	1353/9331	19638/87354
17.0/5.18	85.0	1275/8791	18500/82291
17.5/5.33	87.5	1203/8295	17458/77656
18.0/5.49	90.0	1137/7841	16501/73402
18.5/5.64	92.5	1077/7423	15621/69488
19.0/5.79	95.0	1021/7037	14810/65879
19.5/5.94	97.5	969/6681	14060/62544
20.0/6.10	100.0	921/6351	13366/59456

English/*Metric*

12 X 12 X 1/2 WF-BEAM

304.8 x 304.8 x 12.7 WF-BEAM

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 17.51 \text{ in.}^2 / 11296.75 \text{ mm}^2$$

$$r = 2.87 \text{ in.} / 72.90 \text{ mm}$$

$$b/t = 24$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	4.2	3155/21750	55237/245708
1.5/0.46	6.3	3105/21411	54376/241877
2.0/0.61	8.4	3056/21072	53515/238046
2.5/0.76	10.5	3007/20733	52653/234214
3.0/0.91	12.5	2958/20394	51792/230383
3.5/1.07	14.6	2909/20055	50931/226552
4.0/1.22	16.7	2859/19715	50070/222721
4.5/1.37	18.8	2810/19376	49208/218889
5.0/1.52	20.9	2761/19037	48347/215058
5.5/1.68	23.0	2712/18698	47486/211227
6.0/1.83	25.1	2663/18359	46624/207395
6.5/1.98	27.2	2614/18020	45763/203564
7.0/2.13	29.3	2564/17681	44902/199733
7.5/2.29	31.4	2515/17341	44040/195902
8.0/2.44	33.4	2466/17002	43179/192070
8.5/2.59	35.5	2417/16663	42318/188239
9.0/2.74	37.6	2368/16324	41456/184408
9.5/2.90	39.7	2318/15985	40595/180576
10.0/3.05	41.8	2269/15646	39734/176745
10.5/3.20	43.9	2220/15307	38873/172914

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	46.0	2171/14967	38011/169083
11.5/3.51	48.1	2122/14628	37150/165251
12.0/3.66	50.2	2072/14289	36289/161420
12.5/3.81	52.3	2023/13950	35427/157589
13.0/3.96	54.4	1974/13611	34566/153757
13.5/4.12	56.4	1925/13272	33705/149926
14.0/4.27	58.5	1876/12932	32843/146095
14.5/4.42	60.6	1827/12593	31982/142264
15.0/4.57	62.7	1777/12254	31121/138432
15.5/4.72	64.8	1728/11915	30259/134601
16.0/4.88	66.9	1679/11576	29398/130770
16.5/5.03	69.0	1630/11237	28537/126938
17.0/5.18	71.1	1581/10898	27676/123107
17.5/5.33	73.2	1531/10558	26814/119276
18.0/5.49	75.3	1482/10219	25953/115445
18.5/5.64	77.4	1433/9880	25092/111613
19.0/5.79	79.4	1384/9541	24230/107782
19.5/5.94	81.5	1335/9202	23369/103951
20.0/6.10	83.6	1285/8863	22508/100119

English/*Metric*

2 X 2 X 1/4 SQUARE TUBE

50.8 x 50.8 x 6.4 SQUARE TUBE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 1.74 \text{ in.}^2 / 1122.58 \text{ mm}^2$$

$$r = .73 \text{ in.} / 18.54 \text{ mm}$$

$$b/t = 8$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	16.4	7916/54577	13773/61267
1.5/0.46	24.7	6874/47395	11960/53201
2.0/0.61	32.9	5831/40206	10147/45135
2.5/0.76	41.1	4789/33021	8333/37068
3.0/0.91	49.3	3747/25835	6520/29002
3.5/1.07	57.5	2783/19187	4842/21539
4.0/1.22	65.8	2131/14690	3707/16491
4.5/1.37	74.0	1683/11607	2929/13030
5.0/1.52	82.2	1364/9402	2373/10554
5.5/1.68	90.4	1127/7770	1961/8722
6.0/1.83	98.6	947/6529	1648/7329
6.5/1.98	106.8	807/5563	1404/6245

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
7.0/2.13	115.1	696/4797	1211/5385
7.5/2.29	123.3	606/4178	1055/4691
8.0/2.44	131.5	533/3672	927/4123
8.5/2.59	139.7	472/3253	821/3652
9.0/2.74	147.9	421/2902	732/3257
9.5/2.90	156.2	378/2604	657/2924
10.0/3.05	164.4	341/2350	593/2639
10.5/3.20	172.6	309/2132	538/2393
11.0/3.35	180.8	282/1942	490/2181
11.5/3.51	189.0	258/1777	449/1995
12.0/3.66	197.3	237/1632	412/1832

English/Metric

1 1/2 X 1 1/2 X 1/4 SQUARE TUBE

38.1 x 38.1 x 6.4 SQUARE TUBE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 1.24 \text{ in.}^2 / 800.0 \text{ mm}^2$$

$$r = .52 \text{ in.} / 13.21 \text{ mm}$$

$$b/t = 8$$

Effective Length (ft/m)	$\frac{KI}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	23.1	7074/48773	8772/39019
1.5/0.46	34.6	5611/38686	6958/30949
2.0/0.61	46.2	4148/28599	5143/22879
2.5/0.76	57.7	2768/19082	3432/15265
3.0/0.91	69.2	1922/13251	2383/10601
3.5/1.07	80.8	1412/9736	1751/7789
4.0/1.22	92.3	1081/7454	1341/5963
4.5/1.37	103.8	854/5889	1059/4712
5.0/1.52	115.4	692/4770	858/3816
5.5/1.68	126.9	572/3943	709/3154
6.0/1.83	138.5	480/3313	596/2650
6.5/1.98	150.0	409/2823	508/2258
7.0/2.13	161.5	353/2434	438/1947
7.5/2.29	173.1	308/2120	381/1696
8.0/2.44	184.6	270/1863	335/1491
8.5/2.59	196.2	239/1651	297/1321

English/Metric

1 3/4 X 1 3/4 X 1/4 SQUARE TUBE

44.45 x 44.45 x 6.4 SQUARE TUBE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 1.49 \text{ in.}^2 / 961.29 \text{ mm}^2$$

$$r = .62 \text{ in.} / 15.75 \text{ mm}$$

$$b/t = 8$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	19.4	7546/52027	11243/50013
1.5/0.46	29.0	6319/43567	9415/41881
2.0/0.61	38.7	5092/35107	7587/33748
2.5/0.76	48.4	3865/26647	5759/25615
3.0/0.91	58.1	2732/18838	4071/18109
3.5/1.07	67.7	2007/13840	2991/13304
4.0/1.22	77.4	1537/10596	2290/10186
4.5/1.37	87.1	1214/8372	1809/8048
5.0/1.52	96.8	984/6782	1466/6519
5.5/1.68	106.5	813/5605	1211/5388

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
6.0/1.83	116.1	683/4710	1018/4527
6.5/1.98	125.8	582/4013	867/3857
7.0/2.13	135.5	502/3460	748/3326
7.5/2.29	145.2	437/3014	651/2897
8.0/2.44	154.8	384/2649	572/2547
8.5/2.59	164.5	340/2347	507/2256
9.0/2.74	174.2	304/2093	452/2012
9.5/2.90	183.9	272/1879	406/1806
10.0/3.05	193.5	246/1695	366/1630

English/*Metric*

2 1/2 X 2 1/2 X 1/4 SQUARE TUBE

67.2 x 67.2 x 6.4 SQUARE TUBE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 2.24 \text{ in.}^2 / 1445.16 \text{ mm}^2$$

$$r = .92 \text{ in.} / 23.37 \text{ mm}$$

$$b/t = 10$$

Effective Length (ft/m)	$\frac{KL}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	13.0	8346/57545	18695/83161
1.5/0.46	19.6	7519/51843	16843/74922
2.0/0.61	26.1	6692/46142	14991/66682
2.5/0.76	32.6	5865/40440	13138/58443
3.0/0.91	39.1	5038/34739	11286/50203
3.5/1.07	45.7	4212/29038	9434/41964
4.0/1.22	52.2	3384/23332	7580/33718
4.5/1.37	58.7	2674/18435	5989/26642
5.0/1.52	65.2	2166/14932	4851/21580
5.5/1.68	71.7	1790/12341	4009/17834
6.0/1.83	78.3	1504/10370	3369/14986
6.5/1.98	84.8	1282/8836	2871/12769
7.0/2.13	91.3	1105/7619	2475/11010
7.5/2.29	97.8	963/6637	2156/9591
8.0/2.44	104.3	846/5833	1895/8430
8.5/2.59	110.9	749/5167	1679/7467

Effective Length (ft/m)	$\frac{KL}{r}$	F_a (psi/kPa)	P_a (lbs/N)
9.0/2.74	117.4	668/4609	1497/6660
9.5/2.90	123.9	600/4136	1344/5978
10.0/3.05	130.4	541/3733	1213/5395
10.5/3.20	137.0	491/3386	1100/4893
11.0/3.35	143.5	447/3085	1002/4459
11.5/3.51	150.0	409/2823	917/4079
12.0/3.66	156.5	376/2592	842/3746
12.5/3.81	163.0	347/2389	776/3453
13.0/3.96	169.6	320/2209	718/3192
13.5/4.12	176.1	297/2048	665/2960
14.0/4.27	182.6	276/1905	619/2753
14.5/4.42	189.1	258/1776	577/2566
15.0/4.57	195.7	241/1659	539/2398

English/*Metric*

3 X 3 X 1/4 SQUARE TUBE

76.2 x 76.2 x 6.4 SQUARE TUBE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 2.74 \text{ in.}^2 / 1767.74 \text{ mm}^2$$

$$r = 1.13 \text{ in.} / 28.70 \text{ mm}$$

$$b/t = 12$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	10.6	8654/59964	23711/105470
1.5/0.46	15.9	7980/55022	21866/97264
2.0/0.61	21.2	7307/50380	20021/89059
2.5/0.76	26.5	6634/45738	18177/80853
3.0/0.91	31.9	5961/41096	16332/72648
3.5/1.07	37.2	5287/36455	14487/64442
4.0/1.22	42.5	4614/31813	12642/56236
4.5/1.37	47.8	3941/27171	10798/48031
5.0/1.52	53.1	3267/22527	8952/39823
5.5/1.68	58.4	2700/18618	7399/32911
6.0/1.83	63.7	2269/15644	6217/27655
6.5/1.98	69.0	1933/13330	5297/23564
7.0/2.13	74.3	1667/11494	4568/20318
7.5/2.29	79.6	1452/10012	3979/17699
8.0/2.44	85.0	1276/8800	3497/15556
8.5/2.59	90.3	1131/7795	3098/13779
9.0/2.74	95.6	1008/6953	2763/12291
9.5/2.90	100.9	905/6240	2480/11031
10.0/3.05	106.2	817/5632	2238/9956
10.5/3.20	111.5	741/5108	2030/9030

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	116.8	675/4654	1850/8228
11.5/3.51	122.1	618/4258	1692/7528
12.0/3.66	127.4	567/3911	1554/6914
12.5/3.81	132.7	523/3604	1432/6372
13.0/3.96	138.1	483/3332	1324/5891
13.5/4.12	143.4	448/3090	1228/5463
14.0/4.27	148.7	417/2873	1142/5079
14.5/4.42	154.0	389/2679	1065/4735
15.0/4.57	159.3	363/2503	995/4425
15.5/4.72	164.6	340/2344	932/4144
16.0/4.88	169.9	319/2200	874/3889
16.5/5.03	175.2	300/2069	822/3657
17.0/5.18	180.5	283/1949	774/3445
17.5/5.33	185.8	267/1839	731/3251
18.0/5.49	191.2	252/1738	691/3073
18.5/5.64	196.5	239/1646	654/2909

English/*Metric*

3 1/2 X 1/4 SQUARE TUBE

88.9 x 88.9 x 6.4 SQUARE TUBE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 3.25 \text{ in.}^2 / 1767.74 \text{ mm}^2$$

$$r = 1.13 \text{ in.} / 28.70 \text{ mm}$$

$$b/t = 14$$

Effective Length (ft/m)	Kl r	F _a (psi/kPa)	P _a (lbs/N)
1.0/0.30	9.1	8847/61000	28665/127510
1.5/0.46	13.6	8271/57026	26798/119203
2.0/0.61	18.2	7695/53053	24931/110897
2.5/0.76	22.7	7118/49079	23063/102591
3.0/0.91	27.3	6542/45105	21196/94284
3.5/1.07	31.8	5966/41132	19329/85978
4.0/1.22	36.4	5389/37158	17461/77672
4.5/1.37	40.9	4813/33184	15594/69365
5.0/1.52	45.5	4237/29210	13727/61059
5.5/1.68	50.0	3660/25237	11859/52753
6.0/1.83	54.5	3096/21347	10032/44622
6.5/1.98	59.1	2638/18189	8548/38021
7.0/2.13	63.6	2275/15684	7370/32784
7.5/2.29	68.2	1982/13662	6420/28558
8.0/2.44	72.7	1742/12008	5643/25100
8.5/2.59	77.3	1543/10637	4998/22234
9.0/2.74	81.8	1376/9488	4458/19832
9.5/2.90	86.4	1235/8515	4001/17800
10.0/3.05	90.9	1115/7685	3611/16064
10.5/3.20	95.5	1011/6971	3276/14571

Effective Length (ft/m)	Kl r	F _a (psi/kPa)	P _a (lbs/N)
11.0/3.35	100.0	921/6351	2985/13276
11.5/3.51	104.5	843/5811	2731/12147
12.0/3.66	109.1	774/5337	2508/11156
12.5/3.81	113.6	713/4918	2311/10281
13.0/3.96	118.2	660/4547	2137/9505
13.5/4.12	122.7	612/4217	1982/8814
14.0/4.27	127.3	569/3921	1843/8196
14.5/4.42	131.8	530/3655	1718/7640
15.0/4.57	136.4	495/3416	1605/7140
15.5/4.72	140.9	464/3199	1503/6686
16.0/4.88	145.5	435/3002	1411/6275
16.5/5.03	150.0	409/2823	1326/5900
17.0/5.18	154.5	386/2659	1250/5558
17.5/5.33	159.1	364/2509	1179/5245
18.0/5.49	163.6	344/2372	1115/4958
18.5/5.64	168.2	326/2245	1055/4694
19.0/5.79	172.7	309/2129	1000/4450
19.5/5.94	177.3	293/2021	950/4225
20.0/6.10	181.8	279/1921	903/4016

English/*Metric*

**ADDITIONAL INFORMATION IS AVAILABLE REGARDING
THIS TABLE - PLEASE CONTACT US FOR DETAILS**



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6-35

8/2021

4 X 4 X 3/8 SQUARE TUBE

101.6 x 101.6 x 9.5 SQUARE TUBE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 5.43 \text{ in.}^2 / 3503.22 \text{ mm}^2$$

$$r = 1.48 \text{ in.} / 37.59 \text{ mm}$$

$$b/t = 10.7$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	8.1	8972/61859	48718/216707
1.5/0.46	12.2	8458/58315	45926/204291
2.0/0.61	16.2	7944/54771	43135/191875
2.5/0.76	20.3	7430/51227	40344/179459
3.0/0.91	24.3	6916/47683	37553/167043
3.5/1.07	28.4	6402/44139	34762/154628
4.0/1.22	32.4	5888/40595	31970/142212
4.5/1.37	36.5	5374/37050	29179/129796
5.0/1.52	40.5	4860/33506	26388/117380
5.5/1.68	44.6	4346/29962	23597/104964
6.0/1.83	48.6	3832/26418	20806/92548
6.5/1.98	52.7	3316/22866	18008/80105
7.0/2.13	56.8	2860/19716	15528/69070
7.5/2.29	60.8	2491/17175	13526/60168
8.0/2.44	64.9	2189/15095	11888/52882
8.5/2.59	68.9	1939/13372	10531/46843
9.0/2.74	73.0	1730/11927	9393/41783
9.5/2.90	77.0	1553/10705	8430/37501
10.0/3.05	81.1	1401/9661	7609/33844
10.5/3.20	85.1	1271/8763	6901/30698

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	89.2	1158/7985	6288/27971
11.5/3.51	93.2	1060/7305	5753/25591
12.0/3.66	97.3	973/6709	5284/23503
12.5/3.81	101.4	897/6183	4869/21660
13.0/3.96	105.4	829/5717	4502/20026
13.5/4.12	109.5	769/5301	4175/18570
14.0/4.27	113.5	715/4929	3882/17268
14.5/4.42	117.6	666/4595	3619/16097
15.0/4.57	121.6	623/4294	3382/15042
15.5/4.72	125.7	583/4021	3167/14087
16.0/4.88	129.7	547/3774	2972/13220
16.5/5.03	133.8	515/3549	2795/12431
17.0/5.18	137.8	485/3343	2633/11711
17.5/5.33	141.9	458/3155	2484/11051
18.0/5.49	145.9	432/2982	2348/10446
18.5/5.64	150.0	409/2823	2223/9889
19.0/5.79	154.1	388/2676	2108/9375
19.5/5.94	158.1	368/2541	2001/8901
20.0/6.10	162.2	350/2415	1902/8461

English/Metric

4 X 4 X 1/4 SQUARE TUBE

101.6 x 101.6 x 6.4 SQUARE TUBE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 3.74 \text{ in.}^2 / 2412.90 \text{ mm}^2$$

$$r = 1.53 \text{ in.} / 38.86 \text{ mm}$$

$$b/t = 16$$

Effective Length (ft/m)	Kl r	F _a (psi/kPa)	P _a (lbs/N)
1.0/0.30	7.8	9006/62091	33681/149819
1.5/0.46	11.8	8508/58663	31821/141547
2.0/0.61	15.7	8011/55234	29961/133275
2.5/0.76	19.6	7514/51806	28102/125003
3.0/0.91	23.5	7017/48378	26242/116731
3.5/1.07	27.5	6519/44949	24382/108458
4.0/1.22	31.4	6022/41521	22523/100186
4.5/1.37	35.3	5525/38093	20663/91914
5.0/1.52	39.2	5028/34665	18803/83642
5.5/1.68	43.1	4530/31236	16944/75370
6.0/1.83	47.1	4033/27808	15084/67098
6.5/1.98	51.0	3536/24380	13225/58826
7.0/2.13	54.9	3056/21071	11430/50842
7.5/2.29	58.8	2662/18355	9957/44289
8.0/2.44	62.7	2340/16132	8751/38926
8.5/2.59	66.7	2073/14290	7752/34481
9.0/2.74	70.6	1849/12747	6914/30756
9.5/2.90	74.5	1659/11440	6206/27604
10.0/3.05	78.4	1497/10325	5601/24912
10.5/3.20	82.4	1358/9365	5080/22596

Effective Length (ft/m)	Kl r	F _a (psi/kPa)	P _a (lbs/N)
11.0/3.35	86.3	1238/8533	4629/20589
11.5/3.51	90.2	1132/7807	4235/18837
12.0/3.66	94.1	1040/7170	3889/17300
12.5/3.81	98.0	958/6608	3584/15944
13.0/3.96	102.0	886/6109	3314/14741
13.5/4.12	105.9	822/5665	3073/13669
14.0/4.27	109.8	764/5268	2857/12710
14.5/4.42	113.7	712/4911	2664/11849
15.0/4.57	117.6	666/4589	2489/11072
15.5/4.72	121.6	623/4297	2331/10369
16.0/4.88	125.5	585/4033	2188/9731
16.5/5.03	129.4	550/3792	2057/9151
17.0/5.18	133.3	518/3573	1938/8620
17.5/5.33	137.3	489/3371	1829/8135
18.0/5.49	141.2	462/3187	1729/7689
18.5/5.64	145.1	438/3017	1636/7279
19.0/5.79	149.0	415/2860	1551/6901
19.5/5.94	152.9	394/2715	1473/6552
20.0/6.10	156.9	374/2581	1400/6228

English/*Metric*

6 X 6 X 3/8 SQUARE TUBE

152.4 x 153.4 x 9.5 SQUARE TUBE

Column
Table



ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 8.27 \text{ in.}^2 / 5335.47 \text{ mm}^2$$

$$r = 2.29 \text{ in.} / 58.17 \text{ mm}$$

$$b/t = 16$$

Effective Length (ft/m)	Kl r	F _a (psi/kPa)	P _a (lbs/N)
1.0/0.30	5.2	7537/51967	62332/277266
1.5/0.46	7.9	7306/50371	60418/268753
2.0/0.61	10.5	7074/48775	58504/260239
2.5/0.76	13.1	6843/47179	56590/251725
3.0/0.91	15.7	6611/45584	54676/243211
3.5/1.07	18.3	6380/43988	52762/234697
4.0/1.22	21.0	6148/42392	50848/226183
4.5/1.37	23.6	5917/40797	48934/217669
5.0/1.52	26.2	5686/39201	47020/209155
5.5/1.68	28.8	5454/37605	45106/200641
6.0/1.83	31.4	5223/36009	43192/192127
6.5/1.98	34.1	4991/34414	41278/183613
7.0/2.13	36.7	4760/32818	39364/175099
7.5/2.29	39.3	4528/31222	37450/166585
8.0/2.44	41.9	4297/29626	35536/158071
8.5/2.59	44.5	4066/28031	33622/149557
9.0/2.74	47.2	3834/26435	31708/141043
9.5/2.90	49.8	3603/24839	29794/132529
10.0/3.05	52.4	3355/23129	27743/123407
10.5/3.20	55.0	3043/20979	25164/111934

Effective Length (ft/m)	Kl r	F _a (psi/kPa)	P _a (lbs/N)
11.0/3.35	57.6	2772/19115	22928/101981
11.5/3.51	60.3	2537/17489	20978/93313
12.0/3.66	62.9	2330/16062	19266/85699
12.5/3.81	65.5	2147/14803	17755/78980
13.0/3.96	68.1	1985/13686	16416/73021
13.5/4.12	70.7	1841/12691	15222/67713
14.0/4.27	73.4	1712/11801	14155/62963
14.5/4.42	76.0	1596/11001	13195/58693
15.0/4.57	78.6	1491/10280	12330/54841
15.5/4.72	81.2	1396/9627	11548/51360
16.0/4.88	83.8	1310/9035	10837/48200
16.5/5.03	86.5	1232/8496	10190/45320
17.0/5.18	89.1	1161/8003	9600/42701
17.5/5.33	91.7	1095/7552	9059/40296
18.0/5.49	94.3	1035/7139	8563/38089
18.5/5.64	96.9	980/6758	8106/36057
19.0/5.79	99.6	929/6407	7685/34185
19.5/5.94	102.2	882/6083	7296/32454
20.0/6.10	104.8	839/5782	6936/30852

English/*Metric*

6 X 4 X 1/4 RECTANGLE TUBE

152.4 x 101.6 x 6.4 RECTANGLE TUBE

Column
Table

ALLOWABLE CONCENTRIC AXIAL STRESSES AND LOADS

$$A = 4.68 \text{ in.}^2 / 3019.3 \text{ mm}^2$$

$$r = 1.61 \text{ in.} / 40.89 \text{ mm}$$

$$b/t = 24$$

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
1.0/0.30	7.5	4969/34263	23257/103453
1.5/0.46	11.2	4786/33000	22400/99638
2.0/0.61	14.9	4603/31736	21542/95823
2.5/0.76	18.6	4420/30473	20684/92008
3.0/0.91	22.4	4236/29209	19827/88193
3.5/1.07	26.1	4053/27946	18969/84378
4.0/1.22	29.8	3870/26682	18111/80563
4.5/1.37	33.5	3687/25419	17254/76748
5.0/1.52	37.3	3503/24155	16396/72933
5.5/1.68	41.0	3320/22892	15538/69118
6.0/1.83	44.7	3137/21628	14681/65303
6.5/1.98	48.4	2954/20365	13823/61488
7.0/2.13	52.2	2770/19101	12965/57673
7.5/2.29	55.9	2587/17838	12108/53858
8.0/2.44	59.6	2404/16574	11250/50043
8.5/2.59	63.4	2221/15311	10392/46228
9.0/2.74	67.1	2037/14047	9535/42413
9.5/2.90	70.8	1837/12668	8599/38248
10.0/3.05	74.5	1658/11433	7760/34519
10.5/3.20	78.3	1504/10370	7039/31310

Effective Length (ft/m)	$\frac{Kl}{r}$	F_a (psi/kPa)	P_a (lbs/N)
11.0/3.35	82.0	1370/9448	6413/28528
11.5/3.51	85.7	1254/8645	5868/26101
12.0/3.66	89.4	1152/7939	5389/23972
12.5/3.81	93.2	1061/7317	4967/22092
13.0/3.96	96.9	981/6765	4592/20426
13.5/4.12	100.6	910/6273	4258/18941
14.0/4.27	104.3	846/5833	3959/17612
14.5/4.42	108.1	789/5438	3691/16418
15.0/4.57	111.8	737/5081	3449/15342
15.5/4.72	115.5	690/4759	3230/14368
16.0/4.88	119.3	648/4466	3031/13484
16.5/5.03	123.0	609/4199	2850/12679
17.0/5.18	126.7	574/3956	2685/11944
17.5/5.33	130.4	541/3733	2534/11272
18.0/5.49	134.2	512/3529	2395/10654
18.5/5.64	137.9	484/3340	2267/10086
19.0/5.79	141.6	459/3167	2150/9562
19.5/5.94	145.3	436/3007	2041/9078
20.0/6.10	149.1	415/2858	1940/8630

English/*Metric*

CONNECTION DETAILS



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CONNECTION DETAILS

Typical Framing Practices for PFRP Sections

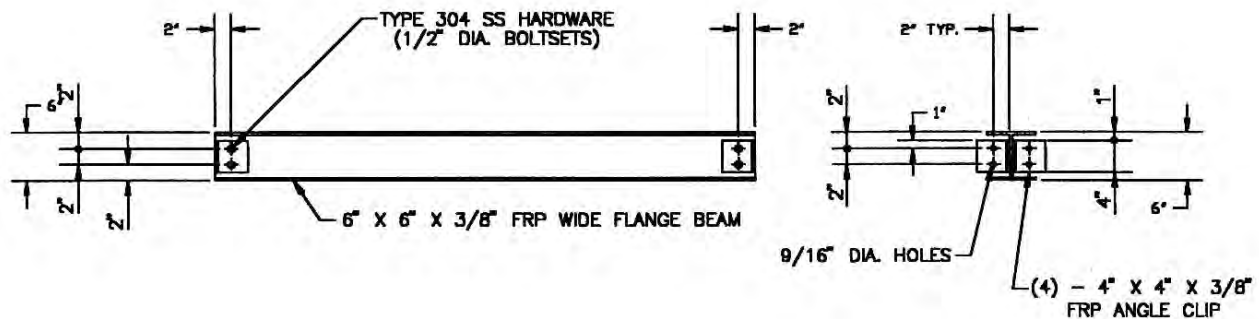
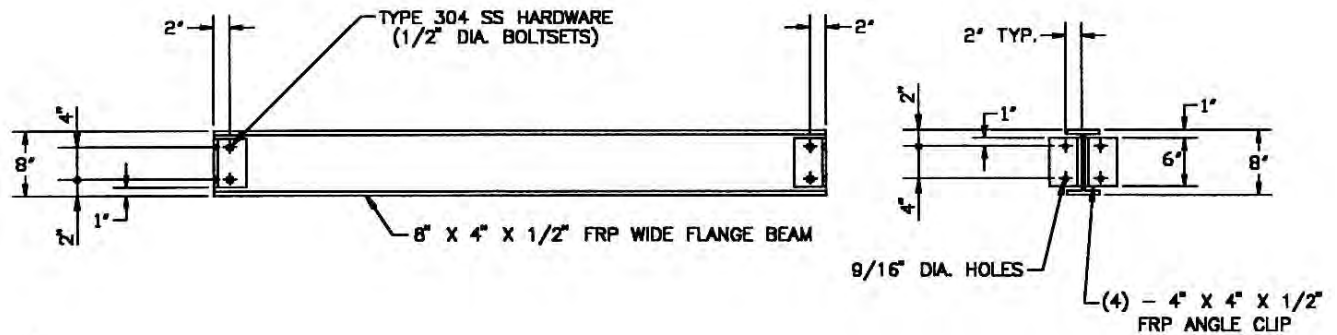
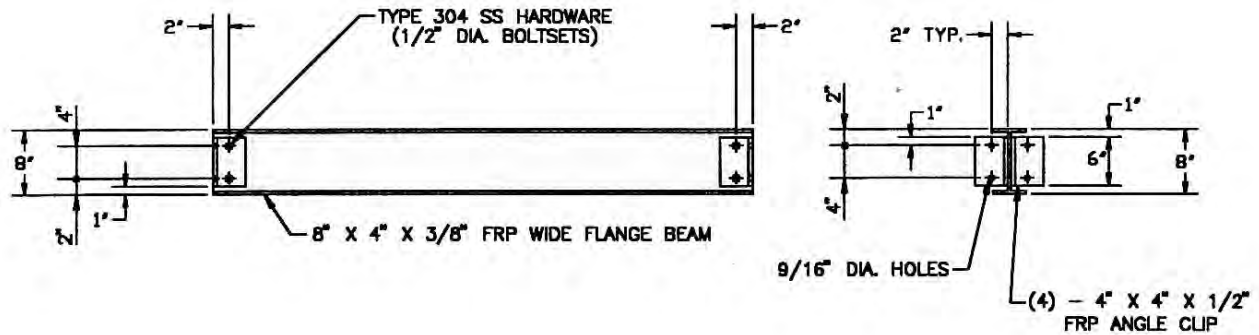
Connections for PFRP frame structures play the major role of both efficient and safe design of the frame structures. To date, most of the available connection details are duplicates of the steel connections. These sections will provide the structural engineer and the fabricator with recommended details which were the results of the current research in the area of the frame connections. Bedford Reinforced Plastics recognizes the importance of providing the Plastics Industry with the appropriate and safe state-of-the-art research development in this vital area.

The following connection details are furnished courtesy of Structural Fiberglass, Inc. and IKG Industries.

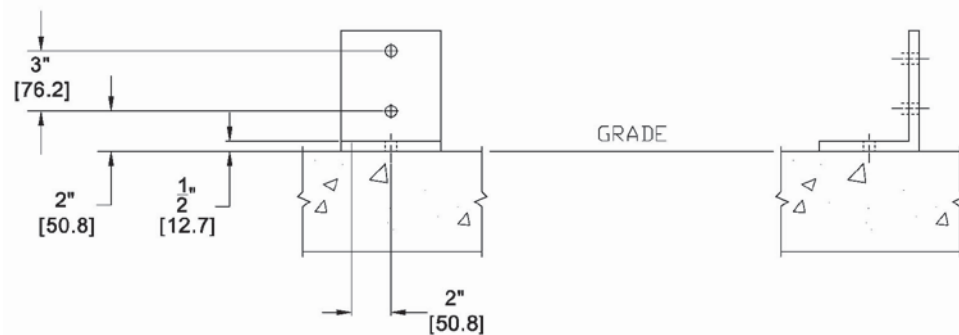
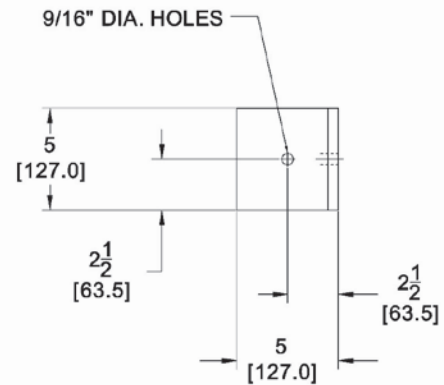
DISCLAIMER: THE INFORMATION CONTAINED IN THIS BEDFORD REINFORCED PLASTICS' DESIGN GUIDE IS HEREIN SUPPLIED AS A SERVICE TO OUR CUSTOMERS AND IS INTENDED TO BE USED AS A GENERAL GUIDE AND IS NOT A SUBSTITUTE FOR PROVED ENGINEERING PRACTICING AND DESIGNS. IT SHALL BE THE SOLE RESPONSIBILITY OF THE ENGINEER/DESIGNER TO COMPLY WITH ALL INDUSTRY STANDARDS, LOCAL CODES AND GOVERNMENT REGULATIONS. ALTHOUGH THE INFORMATION SUPPLIED HEREIN IS BELIEVED TO BE ACCURATE AND RELIABLE AS OF THE DATE OF PUBLICATION, BEDFORD REINFORCED PLASTICS, STRUCTURAL FIBERGLASS, INC., AND IKG INDUSTRIES ASSUMES NO RESPONSIBILITY OR LIABILITY FOR THE INFORMATION CONTAINED HEREIN.



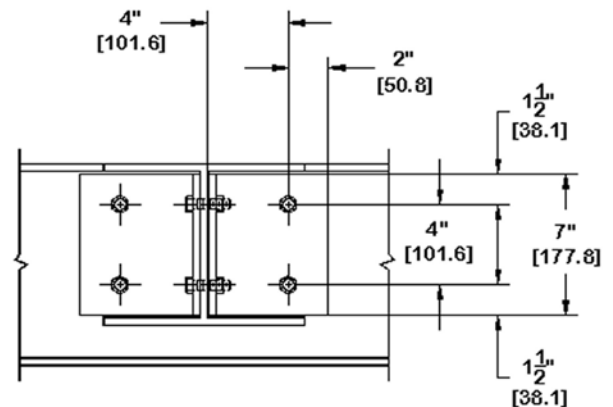
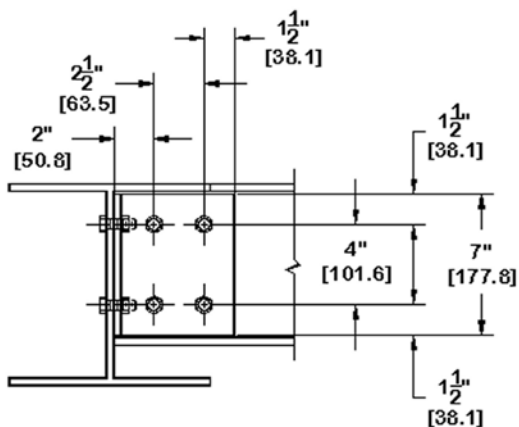
TYPICAL BEAM CONNECTION DETAILS



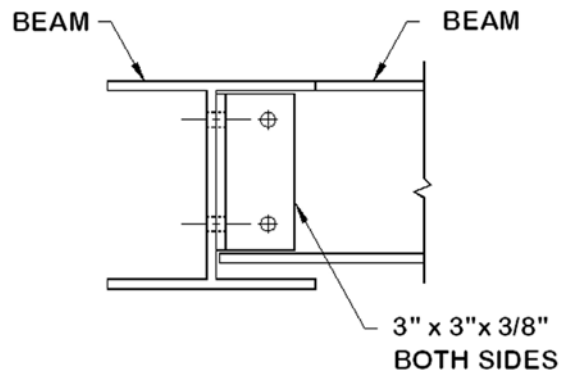
TYPICAL BASE DETAIL



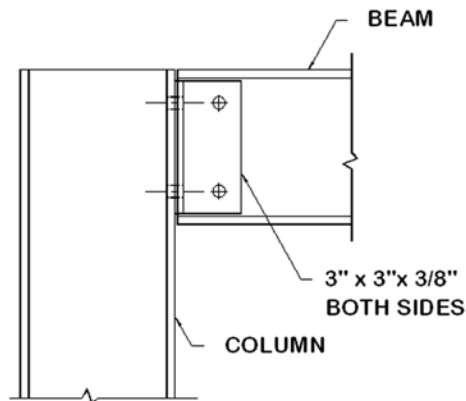
TYPICAL CONNECTION DETAIL



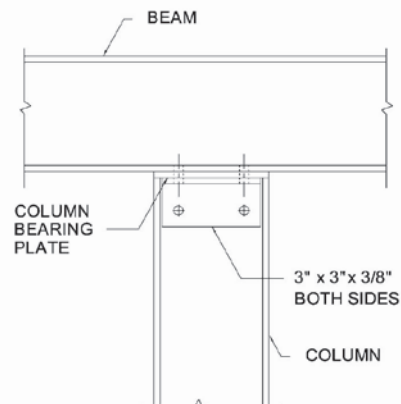
BEAM TO BEAM CONNECTION



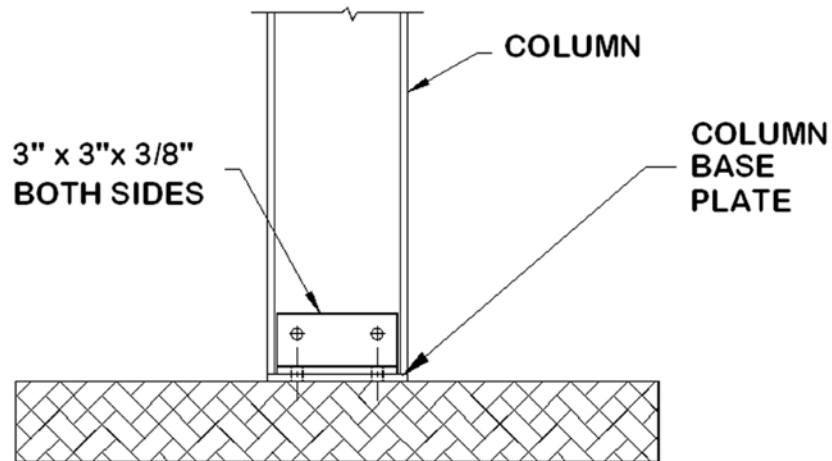
BEAM TO BEAM COLUMN



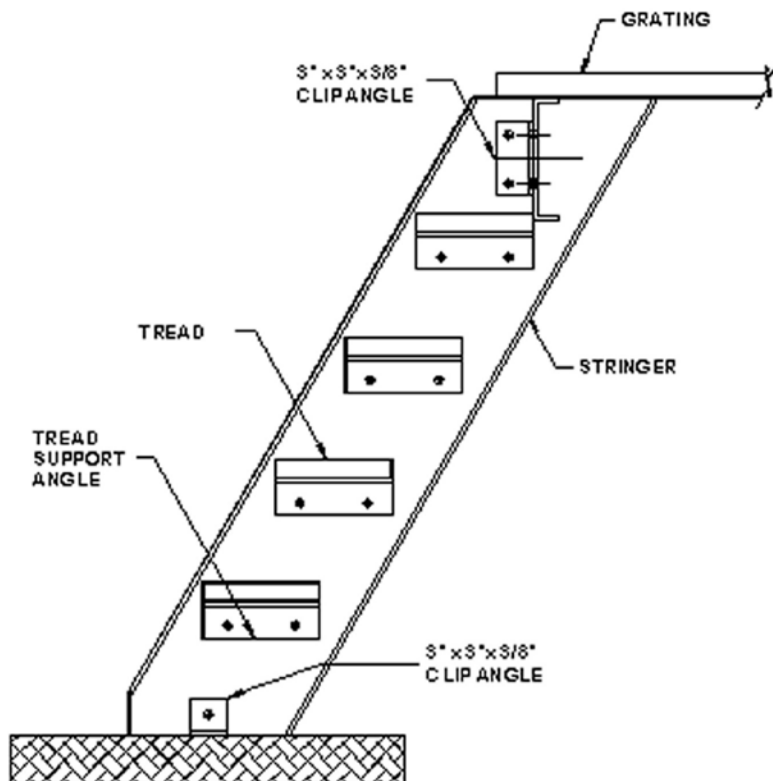
BEAM OVER COLUMN



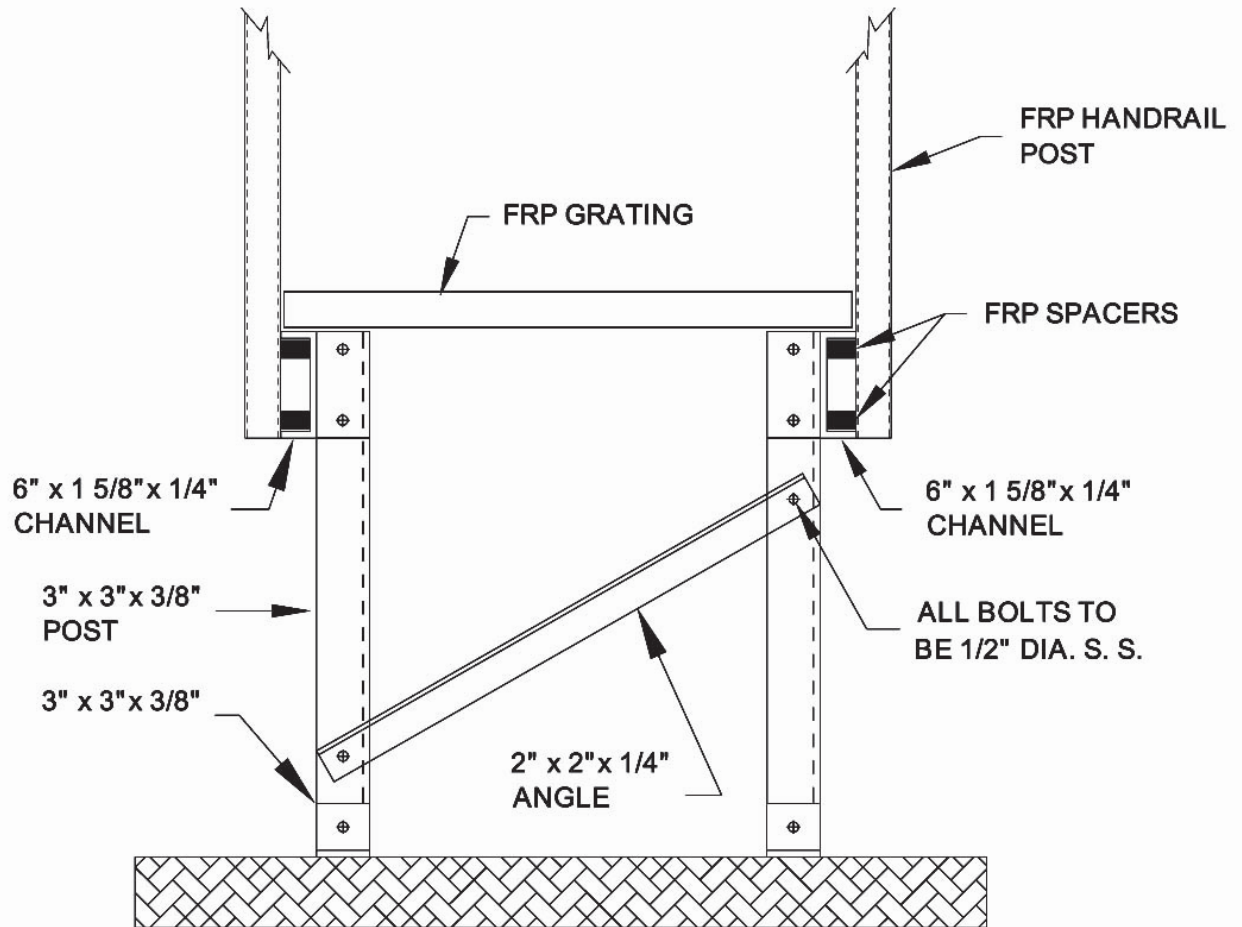
PINNED COLUMN BASE (No Uplift)



STAIR STRINGER



SMALL PLATFORM ASSEMBLY (Foot Traffic Loading)



CORROSION GUIDE



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CORROSION GUIDE

The data in this corrosion guide is based on field service performance, laboratory testing and extrapolated values from our resin manufacturers' recommendations. Data shown is intended as a guide only. It is recommended that for a specific application, testing be done in the actual chemical environment.

The following conditions will effect the suitability of a specific resin laminate:

- Periodic changes in temperature
- Changes in chemical concentrations
- Exposure to vapors only
- Exposure to intermittent splashes and spills
- Load bearing or non-load bearing requirements
- Temperature spikes
- Combinations of chemicals
- Exposure to frequent splashes and spills
- Frequency of maintenance wash down

Chemical Environment	Maximum Recommended Service Temperatures, °F / °C		Chemical Environment	Maximum Recommended Service Temperatures, °F / °C	
	Vinylester	Polyester		Vinylester	Polyester
Acetic Acid, to 10%	170 / 76	80 / 26	Butyl Acetate	NR / NR	NR / NR
Acetic Acid, to 50%	180 / 81	NR / NR	Butyl Alcohol	80 / 26	NR / NR
Acetic Acid, Glacial	NR / NR	NR / NR	Calcium Carbonate	170 / 76	120 / 49
Acetone	NR / NR	NR / NR	Calcium Hydroxide	140 / 60	120 / 49
Aluminum Chloride	170 / 76	120 / 49	Calcium Hypochlorite	120 / 49	NR / NR
Aluminum Hydroxide	140 / 60	120 / 49	Calcium Nitrate	170 / 76	120 / 49
Aluminum Nitrate	140 / 60	120 / 49	Calcium Sulfate	170 / 76	120 / 49
Aluminum Sulfate	170 / 76	120 / 49	Carbon Disulfide	NR / NR	NR / NR
Ammonium Chloride	170 / 76	120 / 49	Carbon Monoxide Gas	170 / 76	160 / 60
Ammonium Hydroxide, 5%	140 / 60	NR / NR	Carbon Dioxide Gas	170 / 76	160 / 60
Ammonium Nitrate, to 50%	170 / 76	120 / 49	Carbon Tetrachloride	70 / 20	NR / NR
Ammonium Nitrate, Saturated	170 / 76	NR / NR	Liquid or Vapor	110 / 43	NR / NR
Ammonium Persulfate, to 25%	140 / 60	90 / 32	Chlorine, Dry Gas	170 / 76	NR / NR
Ammonium Phosphate	170 / 76	120 / 49	Chlorine, Wet Gas	170 / 76	NR / NR
Ammonium Sulfate	170 / 76	120 / 49	Chlorine Water	140 / 60	NR / NR
Amyl Alcohol	80 / 26	NR / NR	Chloroform	140 / 60	NR / NR
Barium Carbonate	170 / 76	120 / 49	Chromic Acid, to 5%	110 / 43	NR / NR
Barium Chloride	170 / 76	120 / 49	Chromous Sulfate	140 / 60	120 / 49
Barium Sulfate	170 / 76	120 / 49	Citric Acid	170 / 76	120 / 49
Benzene	NR / NR	NR / NR	Copper Chloride	170 / 76	170 / 76
Benzene Sulfonic Acid 50%	110 / 43	NR / NR	Copper Cyanide	170 / 76	170 / 76
Benzoic Acid	170 / 76	120 / 49	Copper Nitrate	170 / 76	170 / 76
Benzyl Alcohol	NR / NR	NR / NR	Crude Oil, Sour	170 / 76	170 / 76
Borax	170 / 76	120 / 49	Cyclohexane, Liquid and Vapor	170 / 76	NR / NR
Brine (Sodium Chloride Sol.)	170 / 76	120 / 49	Diesel Fuel	140 / 60	90 / 32
Bromine, Liquid or Vapor	NR / NR	NR / NR	Ethyl Acetate	NR / NR	NR / NR
Ethyl Alcohol	NR / NR	NR / NR	Phosphoric Acid, Vapor	170 / 76	120 / 49
Ethylene Glycol	170 / 76	120 / 49	Potassium Aluminum Sulfate	170 / 76	120 / 49

Maximum Recommended			Maximum Recommended		
Chemical Environment	Service		Chemical Environment	Service	
	Temperatures, °F / °C			Temperatures, °F / °C	
	Vinylester	Polyester		Vinylester	Polyester
Fatty Acids	170 / 76	80 / 26	Potassium Bicarbonate	110 / 43	100 / 37
Ferric Chloride	170 / 76	110 / 43	Potassium Carbonate, to 10%	110 / 43	NR / NR
Ferric Sulfate	170 / 76	110 / 43	Potassium Chloride	170 / 76	120 / 49
Formaldehyde	110 / 43	NR / NR	Potassium Hydroxide	140 / 60	NR / NR
Fuel Oil	140 / 60	80 / 26	Potassium Nitrate	170 / 76	120 / 49
Gasoline, Aviation and Ethyl	140 / 60	80 / 26	Potassium Sulfate	170 / 76	120 / 49
Glucose	170 / 76	100 / 37	Propylene Glycol	170 / 76	120 / 49
Glycerine	170 / 76	100 / 37	Sodium Acetate	170 / 76	120 / 49
Hexane	120 / 49	90 / 32	Sodium Benzoate	140 / 60	120 / 49
Hydraulic Fluid (Glycol Based)	140 / 60	NR / NR	Sodium Bicarbonate	140 / 60	120 / 49
Hydraulic Fluid Skydraul	140 / 60	NR / NR	Sodium Bisulfate	170 / 76	120 / 49
Hydrobromic Acid	110 / 43	NR / NR	Sodium Bisulfite	170 / 76	120 / 49
Hydrochloric Acid, up to 15%	140 / 60	80 / 26	Sodium Borate	170 / 76	120 / 49
Hydrochloric Acid, Concentrated	110 / 43	NR / NR	Sodium Bromide	170 / 76	120 / 49
Hydrogen Bromide, Dry Gas	140 / 60	80 / 26	Sodium Carbonate, to 10%	140 / 60	70 / 20
Hydrogen Bromine, Wet Gas	140 / 60	NR / NR	Sodium Chloride	170 / 76	120 / 49
Hydrogen Chloride, Dry Gas	170 / 76	80 / 26	Sodium Cyanide	170 / 76	120 / 49
Hydrogen Chloride, Wet Gas	170 / 76	80 / 26	Sodium Dichromate	170 / 76	120 / 49
Hydrogen Fluoride, Sol or Vapor	NR / NR	NR / NR	Sodium Di-Phosphate	170 / 76	120 / 49
Hydrogen Peroxide, to 10%	110 / 43	NR / NR	Sodium Hydroxide, 10%	140 / 60	NR / NR
Hydrogen Sulfide, Dry Gas	140 / 60	80 / 26	Sodium Hypochlorite, to 5 1/4%	110 / 43	70 / 20
Hydrogen Sulfide, Wet Gas	140 / 60	80 / 26	Sodium Monophosphate	170 / 76	120 / 49
Isopropyl Alcohol	80 / 26	NR / NR	Sodium Nitrate	170 / 76	120 / 49
JP-4	140 / 60	80 / 26	Sodium Nitrite	170 / 76	120 / 49
Kerosene	140 / 60	110 / 43	Sodium Sulfate	170 / 76	120 / 49
Lactic Acid	170 / 76	120 / 49	Sodium Tetraborate	140 / 60	120 / 49
Lead Acetate	170 / 76	120 / 49	Sodium Thiosulfate	140 / 60	120 / 49
Linseed Oil	170 / 76	100 / 37	Soy Oil	170 / 76	100 / 37
Lithium Chloride	170 / 76	120 / 49	Stearic Acid	170 / 76	120 / 49
Magnesium Carbonate	170 / 76	120 / 49	Styrene	NR / NR	NR / NR
Magnesium Chloride	170 / 76	120 / 49	Sulfamic Acid	170 / 76	120 / 49
Magnesium Hydroxide	170 / 76	100 / 37	Sulfated Detergents	NR / NR	120 / 49
Magnesium Nitrate	170 / 76	120 / 49	Sulfite Liquor	160 / 71	100 / 37
Magnesium Sulfate	170 / 76	120 / 49	Sulfur Dioxide, gas-dry	170 / 76	120 / 49
Mercuric Chloride	170 / 76	120 / 49	Sulfur Dioxide, gas-wet	170 / 76	70 / 20
Mercury Metal	170 / 76	120 / 49	Sulfur Trioxide, gas-wet or dry	170 / 76	NR / NR
Methyl Ethyl Ketone	NR / NR	NR / NR	Sulfuric Acid, to 25%	170 / 76	80 / 26
Mineral Oil	170 / 76	120 / 49	Tartaric Acid	170 / 76	120 / 49
Monochlorobenzene	NR / NR	NR / NR	Tetrachloroethylene	NR / NR	NR / NR
Naphtha	140 / 60	120 / 49	Toluene	NR / NR	NR / NR
Nickel Chloride	170 / 76	120 / 49	Trichloroethylene vapor	NR / NR	NR / NR
Nitric Acid, to 5%	110 / 43	100 / 37	Trisodium Phosphate	170 / 76	NR / NR
Nitric Acid, Concentrated	NR / NR	NR / NR	Urea, 35%	110 / 43	NR / NR
Nitric Acid, Vapor	140 / 60	100 / 37	Vinegar	170 / 76	150 / 65
Oleic Acid	170 / 76	120 / 49	Water, Distilled	180 / 81	150 / 65
Oxalic Acid	170 / 76	120 / 49	Water, Tap	180 / 81	120 / 65
Paper Mill Liquor	100 / 37	100 / 37	Zinc Chloride	170 / 76	120 / 49
Phenol Solution or Vapor	NR / NR	NR / NR	Zinc Nitrate	170 / 76	120 / 49
Phosphoric Acid	170 / 76	100 / 37	Zinc Sulfate	170 / 76	120 / 49
Phosphoric Acid, Salts thereof	170 / 76	120 / 49			

APPENDIX



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THE PULTRUSION INDUSTRY COUNCIL

January 23, 1992

RECOMMENDED SPECIFICATION FOR MATERIALS USED IN PULTRUDED STRUCTURAL SHAPES

1.0 SCOPE

- 1.1 This model specification offers recommendations with respect to the minimum properties of various types of commercially available from open stock pultruded fiberglass reinforced structural shapes whose materials of construction, or classification, tolerances and defects are defined by existing American Society for Testing And Materials (ASTM) documents. It is not intended to restrict or limit technological changes affecting performance when those changes are agreed upon between purchaser and seller.
- 1.2 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are for information only.
- 1.3 This model specification may involve hazardous materials, operations, and equipment. This document does not purport to address all of the safety problems that may arise (with its use). It is the responsibility of the user of this document to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1.4 DISCLAIMER

This Recommended Specification has been prepared by the Pultrusion Industry Council (PIC) of the Composites Institute of the Society of the Plastics Industry, Inc. (SPI) as a service to its members and their customers. It is intended to be used only as a guide in developing appropriate final specifications suited to the purchaser's particular needs. This recommended specification is not intended as a substitute for or use as a contract specification. It is offered in good faith and is based on information believed to be accurate and reliable, but is offered without warranty to any kind, either expressed or implied. SPI and its members accept no responsibility for any harm resulting from reliance on this recommended specification. Compliance with all applicable government regulations or industry standards remains the full responsibility of the parties to whom the regulation or standard applies. SPI and CI do not endorse any particular product or process of any manufacturer.

Note 1 The classification of pultruded structural shapes into types based in relative response to laboratory flame tests shall not be considered a fire hazard classification.

Note 2 This specification is designed as a guide for existing structural shapes with thickness of approximately .250". The data should not be extrapolated to thin section (<.155") or to thick section (>.300").

2.0 REFERENCED DOCUMENTS

2.1 ASTM STANDARDS AND TEST METHODS

- D256 Test Methods for Impact Resistance of Plastics and Electrical Insulating Materials.
- D570 Test Method for Water Absorption of Plastics.
- D618 Methods of Conditioning Plastics and Electrical Insulating Material for Testing.
- D635 Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.
- D638 Test Method for Tensile Properties of Plastics.
- D695 Test Method for Compressive Properties of Rigid Plastics.
- D696 Test Methods for Coefficient of Linear Thermal Expansion of Plastics.
- D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- D792 Test Methods for Specific Gravity and Density of Plastics by Displacement.
- D833 Definitions of Terms Relating to Plastics.
- D2343 Test Method for Tensile Properties of Glass Fiber Strands, Yarns and Rovings Used in Reinforced Plastics.
- D2344 Apparent Interlaminar Shear Strength of Parallel Fiber Composites by Short-Beam Method.
- D2583 Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impresser.
- D2584 Test Method for Ignition Loss of Cured Reinforced Resins.
- D2734 Test Methods for Void Content of Reinforced Plastics.
- D3647 Practice for Classifying Reinforced Plastic Pultruded Shapes According to Composition.
- D3846 Test Method for In-Plane Shear Strength of Reinforced Plastics.
- D3914 Test Method for In-Plane Shear Strength of Pultruded Glass-Reinforced Plastic Rod.
- D3916 Test Method for Tensile Properties of Pultruded Glass-Reinforced Plastic Rod.
- D3917 Specification for Dimensional Tolerance of Thermosetting Glass-Reinforced Plastic Pultruded Shapes.
- D3918 Definitions of Terms Relating to Reinforced Plastic Pultruded Products.
- D4065 Practice for Determining and Reporting Dynamic Mechanical Properties of Plastics.
- D4357 Specifications for Plastic Laminates Made from Woven-Roving and Woven-Yarn Glass Fabrics.
- D4385 Practice for Classifying Visual Defects in Thermosetting Reinforced Plastic Pultruded Products.
- D4475 Test Methods for Apparent Horizontal Shear Strength of Pultruded Reinforced Plastic Rods by the Short-Beam Method.
- D4476 Test Method for Flexural Properties of Fiber Reinforced Pultruded Plastic Rods.
- E84 Test Method for Surface Burning Characteristic of Burning Materials.

3.0 TERMINOLOGY

- 3.1 Definition of terms relating to this specification other than those below can be found in ASTM D883 and ASTM D3918.

A pultrusion run is defined as the amount of an individual product produced during the continuous operation of a single machine. Run should not exceed six calendar months or 100,000 ft.

A pultrusion lot is defined as the amount of an individual product produced by a single machine during one calendar day (24 hours).

A producer is defined as the primary manufacturer of the material.

A supplier includes only the category of jobbers and distributors as distinct from producers.

4.0 CLASSIFICATION

- 4.1 Pultruded shapes will be classified by composition using ASTM D3647.
- 4.2 Pultruded shapes may be segregated by type based on functional performance.
- 4.2.1 TYPE I: General purpose. General purpose structural shapes meet the minimum mechanical properties of TABLE I.
- 4.2.2 TYPE II: Flame retardant. Flame retardant structural shapes meet the minimum mechanical properties of TABLE I and have a flame spread rating less than or equal to 25 when tested according to ASTM E84.
- 4.2.3 TYPE III: Chemical resistant. Chemical resistant structural shapes meet the minimum mechanical properties of TABLE I and incorporate an appropriate resin to improve corrosion resistance, such as vinyl ester, bisphenol, or chlorendic anhydride or epoxy resins.

4.3 PROPERTIES

- 4.3.1 Mechanical Properties: All three types of pultruded structural shapes meet or exceed the minimum mechanical properties as stated in TABLE I.
- 4.3.2 Physical Properties: For information only, typical physical properties of pultruded structural shapes are given in TABLE II. Actual properties may vary from these typical values owing to materials and formulation differences.

5.0 TOLERANCES

- 5.1 All tolerances on standard pultruded shapes will be defined as per ASTM D3917.

6.0 WORKMANSHIP, FINISH, AND APPEARANCE

- 6.1 Pultruded shapes will be free from defects as per ASTM D4385.

7.0 TEST METHODS

- 7.1 Samples will be conditioned for testing as per ASTM D618.
- 7.2 Samples shall be selected randomly from the pultrusion lots of a pultrusion run.
- 7.3 The mechanical properties of a pultruded structural shape will be defined as per the test methods and values found in TABLE I.

8.0 CERTIFICATION

- 8.1 The producer shall supply upon advance request Certificates of Compliance to this specification for each pultrusion run. The form of the Certificate of Compliance is to be by agreement between the buyer and seller.

9.0 PRECISION AND BIAS

- 9.1 The precision and bias statements for each of the mechanical test methods specified in TABLE 1 can be obtained from the Pultrusion Industry Council. These tests were performed in .250" thickness specimens using ASTM Round Robin Criteria and analyzed as per ASTM 691.

TABLE I
RECOMMENDED MECHANICAL PROPERTIES FOR PULTRUDED STRUCTURAL SHAPES

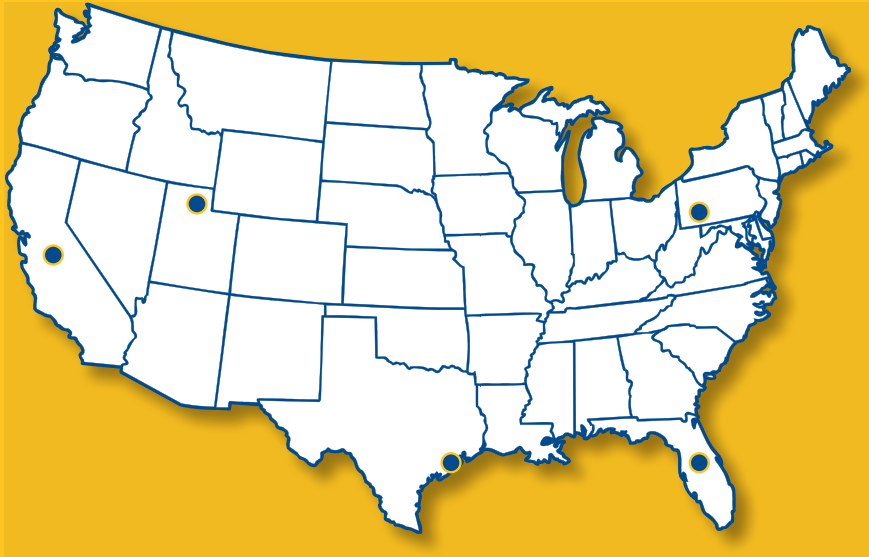
PROPERTY	UNITS	TEST METHOD	MINIMUM	
Tensile Strength	psi	D638		
Lengthwise	(MPA)		30,000	(206.80)
Crosswise			6,500	(44.80)
Tensile Modulus	psi x 10 ⁶	D638		
Lengthwise	(GPA)		2.3	(15.85)
Crosswise			0.8	(5.51)
Flexural Strength	psi	D790		
Lengthwise	(MPA)		30,000	(206.80)
Crosswise			10,000	(44.80)
Flexural Modulus	psi x 10 ⁶	D790		
Lengthwise	(GPA)		1.5	(10.30)
Crosswise			0.7	(4.80)
Compressive Strength	psi	D695		
Lengthwise	(MPA)		30,000	(206.80)
Crosswise			10,000	(44.80)
Izod Impact	Ft.-Lbs./in.	D256		
Lengthwise			20	
Crosswise			4	
Apparent Horizontal Shear	psi	D2344		
Lengthwise	MPA		3,000	-20.7

TABLE II
TYPICAL PHYSICAL PROPERTIES OF PULTRUDED STRUCTURAL SHAPES

PROPERTY	UNITS	TEST METHOD	TYPICAL
Barcol Hardness		D2583	
Flatwise			50 ¹
Water Absorption	% max.	D570	0.7 ²
Density	Lb./in. ³ (g/cm ³)	D792	.060 - .068 (1.6 - 1.9)
Specific Gravity		D792	1.6 - 1.0
Coefficient of Thermal Expansion			
Lengthwise	in./in./ °F (in./in./ °C)	D696	2.9 x 10 ⁻⁶ (5.2 x 10 ⁻⁶)
Glass Content	% by Wt.	D2584	50 ± 5

1. Surface veils could cause this number to vary.
2. Maximum value for this composite construction.

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