



DESIGN GUIDE

PULTRUDED SECTIONS MATERIAL & SECTIONAL PROPERTIES

GRP AUSTRALIA | 2024 | PART 1

GRP
AUSTRALIA®

DESIGN GUIDE

NOTATIONS

A	Section area (mm ²)
A_x	Shear area in minor axis
A_y	Shear area in major direction
B	Section width (mm)
c	Coordinate of centroid
d_o	Section outer diameter (mm)
E	Modulus of Elasticity (GPa)
f_b	Flexural Strength (MPa)
f_c	Compressive Strength (MPa)
f_{cb}	Pin Bearing Strength (MPa)
f_t	Tensile Strength (MPa)
f_v	Shear Strength (MPa)
G	Shear Modulus of Elasticity (GPa)
H	Section height (mm)
I	Moment of inertia (mm ⁴)
L	Length of Span; or segment length (m)
L_e	Effective length of a compression member (m)
r	Radius of gyration (mm)
T	Section thickness (mm)
ν	Poisson's Ratio
$Wt.$	Section weight (kg/m)
W	Uniformly Applied Distributed load
Z	Elastic Section Modulus (mm ³)

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1.0 INTRODUCTION

GRP Australia is an independent supplier of GRP products including pultruded GRP structural sections, pultruded decking, pultruded grating and GRP moulded grating. We source and import pultruded products from international manufacturers to ensure we provide our customers with quality products at competitive prices. GRP Australia also has in-house engineers capable of providing design services to our customers and assisting in the design of custom pultruded shapes to suit client specific requirements.

The pultruded GRP sections displayed in this guide are a selection of the most common pultruded sections however, these do not include the full range of profiles available. Please contact GRP Australia for assistance with custom or specific profiles not contained in this manual. This manual has been divided into three parts:

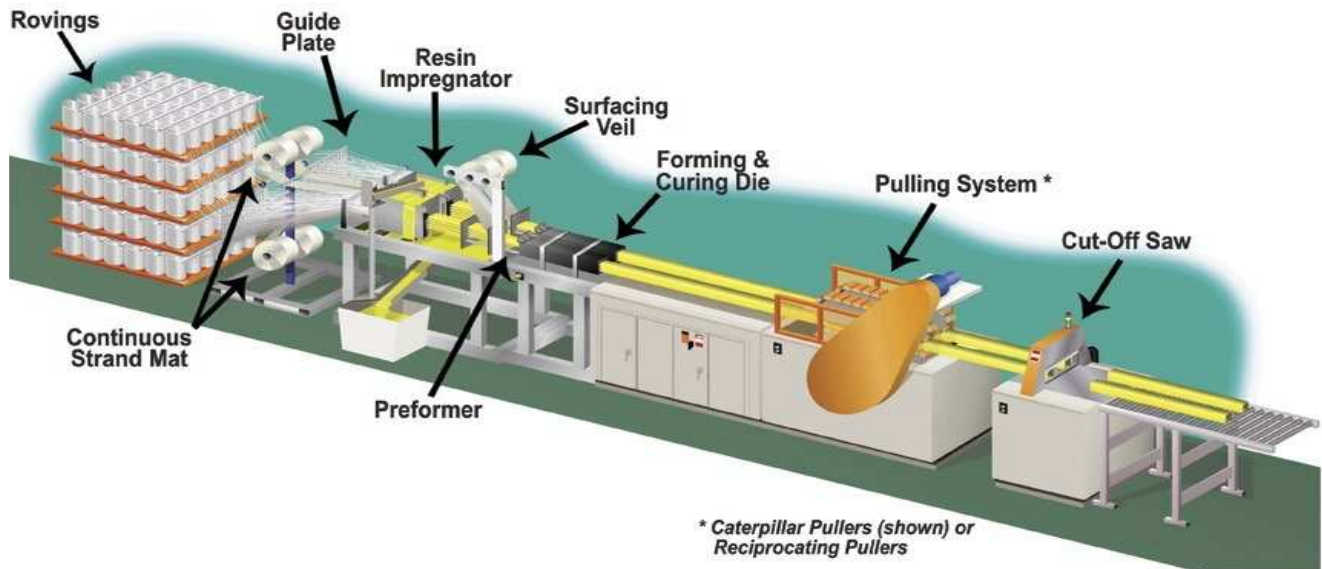
Part 1 - Introduction, material and sectional properties (this section)

Part 2 - Capacity tables

Part 3 - Common connections

1.1 PRODUCTION PROCESS

Pultruded glass reinforced products (GRP) are a composite material made by a continuous moulding process using fibre reinforcement in a thermosetting resin. Glass mat and roving are drawn through a resin bath and then pulled through a heated steel die to form the desired shape. This process ensures the quality of the product remains consistent. Pultruded profiles are available in a wide variety of shapes and colours, they are dimensionally stable and easy to work with.



1.2 REINFORCEMENTS

Roving

Fiberglass roving provides the high longitudinal strength of pultruded products. The amount and location of these reinforcements can be determined in the design stage and can alter the subsequent physical properties of the finished product. Roving also provides the tensile strength needed to pull the other reinforcements through the die and is therefore a necessary ingredient in the profile design. The roving used in GRP pultrusions is E Glass Direct.

Mat

Continuous strand mat provides the most economical method of obtaining a high degree of transverse physical properties. The mats are layered with roving, which forms the basic composition found in most pultruded products. The ratio of mat to roving determines the relationship of transverse to longitudinal physical properties.

Veil

Veils are used to enhance the surface of pultruded profiles and can influence the appearance, corrosion resistance and ease of handling of the finished product. All standard structural shapes are manufactured using a surface veil as well as UV inhibitors to protect against UV degradation. The total glass content of GRP pultrusions is typically 65 to 66%.

1.3 RESINS

The resins that form the matrix in the composite profile bind the reinforcement together and hold them in the right position within the pultruded section, giving the structure the required properties. There are two main types of resins used as the matrix in our products:

Isophthalic polyester resin

Isophthalic polyester resin is the most commonly used resin in our products and is suitable for most applications. Its all round properties include corrosion resistance, dielectric properties, low thermal conductivity, and excellent mechanical properties. This is supplied in two fire rating classes, IFR-10, ASTM E-84 class 1 flame spread rating 10 or less, and IFR25, class 1 flame spread rating 25 or less. Both contain UV inhibitors.

Vinyl ester resin

Vinyl ester resin is chosen when greater corrosion resistance and thermal properties are required. This resin also has increased impact resistance and fatigue properties than isophthalic polyester. This resin is supplied in two fire rating classes, VER-10, ASTM E-84 class 1 flame spread rating 10 or less, and VER-25, class 1 flame spread rating 25 or less. Both contain UV inhibitors. GRP Australia stock products that are manufactured from VER-25.

The table below is a summary of the general properties of the resins.

Resin type	Resin base	Description	Corrosion resistance	Flame Spread Rating ASTM E84	Cost
VEFR-25	Vinyl ester	Superior corrosion resistance and retardant.	Excellent	Class 1, 25 or less	
VEFR-10	Vinyl ester	Superior corrosion resistance and enhanced retardant	Excellent	Class 1, 10 or less	Most Expensive
IFR-25	Isophthalic polyester	Industrial grade corrosion resistance and fire retardant	Very good	Class 1, 25 or less	Least Expensive
IFR-10	Isophthalic polyester	Industrial grade corrosion resistance and extra fire retardant	Very good	Class 1, 10 or less	

1.4 DISCLAIMER

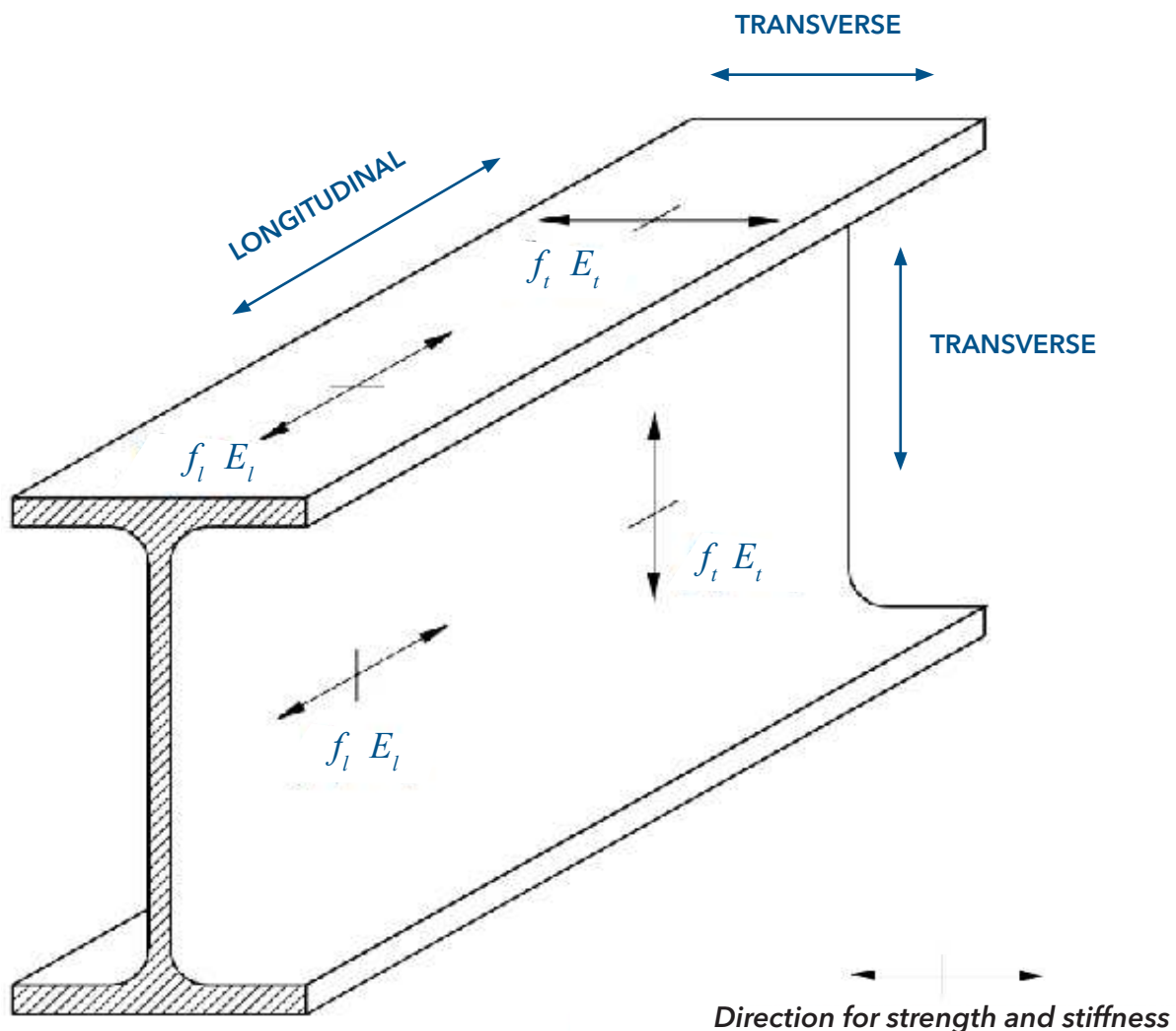
The data presented in this manual is to the best current knowledge of GRP Australia and may be subject to change at any time. GRP Australia does not warrant or certify the information provided to be free of errors or dediciencies.

2.0 MATERIAL PROPERTIES: STRUCTURAL

2.1 PROPERTY DEFINITIONS

The property values stated are valid for temperatures in the range of -20°C to 50°C. The values are based on ASTM (American Society for Testing and Materials) coupon and full section testing. For temperatures above 50°C the strength and stiffness must be reduced by amount as stated in section 2.4, "Temperature and Weathering".

Pultruded GRP is an anisotropic material in that the material properties are different in different directions. This is due to the manufacturing process whereby the glass roving runs along the longitudinal length of the members. For this reason, the material properties noted in section 2.2 have been defined for the longitudinal direction and the transverse direction which are defined in the diagram below.



2.2 MECHANICAL PROPERTIES

Mechanical Properties	Symbol	ASTM	Value	Units
Flexural Strength - Longitudinal	$f_{b,l}$	D790-10	250	MPa
Flexural Strength - Transverse	$f_{b,t}$	D790-10	100	MPa
Tensile Strength - Longitudinal	$f_{t,l}$	D638-14	250	MPa
Tensile Strength - Transverse	$f_{t,t}$	D638-14	55	MPa
Compressive Strength - Longitudinal	$f_{c,l}$	D695-15	240	MPa
Compressive Strength - Transverse	$f_{c,t}$	D695-15	70	MPa
Short Beam Shear Strength	f_v	D2344-16	25	MPa
Pin Bearing strength—Longitudinal	$f_{cb,l}$	D953-10	150	MPa
Pin Bearing strength—Transverse	$f_{cb,t}$	D953-10	70	MPa
Modulus of Elasticity, E , Longitudinal Full Section, angle and channels, I Beam	E_l	D790-17	23	GPa
Modulus of Elasticity, E , Longitudinal Full Section, square, rectangular hollow sections	E_l	D790-17	26	GPa
Modulus of Elasticity, E , Transverse Full Section	E_t	D790-17	9.0	GPa
Compressive Modulus - Longitudinal			180	GPa
Compressive Modulus - Transverse			60	GPa
Shear Modulus	G		3	GPa
Short Term Safety Factor	Y_{me}		3.00	
Interlaminar Shear Strength			24	MPa

2.3 PHYSICAL PROPERTIES

Physical Properties	Value	Units
Density	1850 - 1950	kg/m³
Coefficient of Linear Thermal Expansion (LW)	7.92	10 ⁻⁶ m/m °C
Thermal Conductivity	0.3	W/m*K

2.4 TEMPERATURE

When exposed to continuous high temperatures, polyester and vinyl ester pultrusion sections experience property loss, which should be considered during the designing stages. The following table shows the percentage of property retention at certain continuous temperatures.

Ultimate Stress (% of property retention)		
Continuous Temperature	Polyester	Vinyl Ester
37	85%	90%
50	70%	80%
65	50%	80%
79	Not recommended	75%
93	Not recommended	50%

Modulus of Elasticity (% of property retention)		
Continuous Temperature °C	Polyester	Vinyl Ester
37	100%	100%
50	90%	95%
65	85%	90%
79	Not recommended	88%
93	Not recommended	85%

2.5 WEATHERING

GRP Australia products include UV inhibitors, however direct exposure to UV radiation will eventually degrade the surface leading to poor visual appearance. Accelerated weathering tests conducted in Australia, have shown that up to 10 years direct exposure has limited affect on the structural integrity of pultruded profiles but samples tested have a loss of gloss, colour change and light checking. Surface protection of pultruded profiles is recommended if pultruded products are to be exposed to direct sunlight.

2.6 CHEMICAL RESISTANCE GUIDE

This chemical resistance guide provides guidance to engineers for the selection of resin type of pultruded sections to be used in the particular application. The selection of the resin type depends on the following:

- Corrosion environment
- Normal operating chemical concentration
- Normal operating temperature

This table is to be treated as a guide only, further testing or field trials may be required prior to final selection.

		ISOPHTHALIC	VINYL ESTER
Chemical Environment	% CONC.	Max. Temp. °C	Max. Temp. °C
Acetic Acid	0-50	NR	38
Acetone	100	NR	NR
Aluminium Hydroxide	5-20	NR	65
Aluminium Chloride	10	NR	65
Ammonium Bicarbonate	15	NR	50
Ammonium Hydroxide	5-20	NR	50
Ammonium Sulphate	15	50	65
Barium Sulphate	100	NR	38
Benzene	100	NR	NR
Benzoic Acid	5-20	NR	38
Borax	5-20	38	65
Calcium Carbonate	10	NR	38
Calcium Hydroxide	5-20	NR	38
Calcium Hypochlorite	10	NR	50
Calcium Nitrate	5	50	65
Chlorine - Dry Gas	ALL	NR	70
Chlorine Water	10	NR	50
Chromic Acid	50	NR	38
Citric Acid	5-30	50	65
Copper Chloride	5	65	82
Copper Cyanide	5	65	82
Copper Nitrate	ALL	65	NR
Crude Oil	ALL	NR	65
Ethanol Glycol	ALL	38	65
Ferric Chloride	10	50	65
Ferric Nitrate	10	50	65
Ferrous Chloride	ALL	65	70
Fluoro silicic Acid	10	NR	70

2.6 CHEMICAL RESISTANCE GUIDE - CONT.

		ISOPHTHALIC	VINYL ESTER
Chemical Environment	% CONC.	Max. Temp. °C	Max. Temp. °C
Formaldehyde	5-30	NR	38
Gasoline	ALL	NR	70
Glucose	ALL	65	82
Glycerin	ALL	65	82
Hydrobromic Acid	5-50	38	65
Hydrogen Peroxide	30	NR	50
Lactic Acid	100	NR	70
Lithium Chloride	25	NR	50
Magnesium Chloride	10	38	65
Magnesium Nitrate	10	NR	50
Magnesium Sulphate	10	38	50
Mercuric Chloride	10	50	65
Mercurous Chloride	10	50	65
Nickle Chloride	10	50	65
Nickle Sulphate	10	50	65
Nitric Acid	5-30	NR	38
Oxalic Acid	ALL	65	70
Phosphoric Acid	5-50	38	65
Potassium Chloride	100	NR	50
Potassium Dichromate	100	NR	50
Potassium Nitrate	10	50	65
Potassium Sulphate	10	50	65
Propylene Glycol	100	65	65
Sodium Acetate	ALL	NR	70
Sodium Bisulfate	ALL	65	70
Sodium Bromide	ALL	65	70
Sodium Cyanide	ALL	NR	70
Sodium Hydroxide	0-50	NR	65
Sodium Nitrate	ALL	65	70
Sodium Sulphate	ALL	65	70
Sulphuric Acid	0-30	65	70
Sulphuric Acid	30-50	NR	70
Sulphuric Acid	50-70	NR	50
Tartaric Acid	ALL	65	70
Vinegar	ALL	65	70
Water (Distilled)	ALL	C	C

NR = Not recommended for the Concentrations and Temperatures listed.

GRP Australia believes the data to be true and accurate but no guarantee is expressed or implied as to specific performance. Testing for specific environments is recommended. Responsibility for claims arising from breach of warranty, negligence or otherwise is limited to the purchase price of the material sold.

2.7 FIRE PROPERTIES

All GRP Australia products contain fire retardants, typically alumina trihydrate. Our standard profiles are classified as class 1,25 or less flame spread index to ASTM E84. The ultimate fire rating properties of GRP pultruded products will depend on the composite mix. Pultruded profiles tested to AS 1530.3 achieved the following results:

	Range	IFR10	IFR 25
Spread of Flame index	(0-10)	0	2
Heat Evolved Index	(0-10)	1	5
Smoke developed Index	(0-10)	5	5
Ignitability Index	(0-20)	13	10

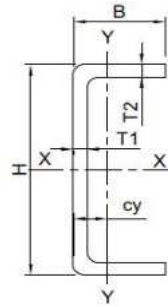
2.8 ENVIRONMENTAL & DISPOSAL

GRP pultruded profiles (fiberglass–reinforced unsaturated polyesters) are a stable and virtually non-degradable material. Offcuts and profiles which are at the end of their service life, can be disposed as normal industrial waste as the materials do not give off substances which can harm the environment.

FRP offer significant CO2 emission benefits compared to traditional materials such as steel or concrete during construction and manufacturing. The lightweight nature of FRP reduces transportation emissions, while their durability and corrosion resistance result in longer lifespans, minimizing the need for frequent replacements and associated emissions from production.

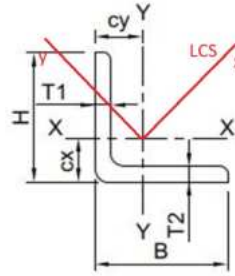
3.0 SECTION PROPERTIES

3.1 CHANNEL



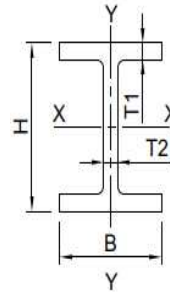
Product Number	B	H	T1 & T2	A	Wt.	I _x	I _y	Z _x	Z _y	c _x	c _y	r _x	r _y	A _y (yy Shear Area)	A _x (xx Shear Area)	J (Torsion constant)	r (Torsion radius)	I _w (Warping constant)	Internal radius	External radius
	mm	mm	mm	10 ³ mm ²	kg/m	10 ⁶ mm ⁴	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	mm	mm	mm	10 ³ mm ²	10 ³ mm ²	10 ³ mm ⁴	mm	10 ⁹ mm ⁴	mm	mm
C50x14x3.2x3.2	14	50	3.2	0.229	0.44	0.071	0.003	2.832	0.307	3.8	0.0	17.6	3.7	0.142	0.045	0.83	4.6	0.001	2.5	2.5
C75x35x5x5	35	75	5.0	0.675	1.32	0.543	0.074	14.477	3.000	10.3	0.0	28.4	10.5	0.311	0.217	5.75	8.2	0.063	2.5	2.5
C76x38x6.4x6.4	38	76	6.4	0.905	1.77	0.736	0.115	19.371	4.381	11.8	0.0	28.5	11.3	0.409	0.335	13.69	9.2	0.096	6.4	3.2
C102x27x3.2x3.2	27	102	3.2	0.481	0.94	0.658	0.026	12.902	1.248	5.9	0.0	37.0	7.4	0.296	0.079	1.71	4.3	0.046	3.2	2.5
C102x44x4.8x4.8	44	102	4.8	0.866	1.69	1.309	0.151	25.669	4.729	12.0	0.0	38.9	13.2	0.419	0.254	6.97	6.8	0.246	4.8	4.8
C102x44x6.4x6.4	44	102	6.4	1.118	2.18	1.626	0.191	31.879	6.095	12.7	0.0	38.1	13.1	0.543	0.326	15.22	10.1	0.298	2.5	6.4
C120x40x6x6	40	120	6.0	1.114	2.17	2.139	0.144	35.644	4.866	10.4	0.0	43.8	11.4	0.627	0.244	13.42	8.7	0.324	3.2	6.4
C150x100x6.4x6.4	100	150	6.4	2.144	4.18	7.899	2.196	105.317	31.908	31.2	0.0	60.7	32.0	0.727	0.883	29.33	9.5	7.859	3.2	6.4
C152x42x6.4x6.4	42	152	6.4	1.414	2.76	4.206	0.187	55.337	5.842	10.0	0.0	54.5	11.5	0.865	0.244	19.38	8.9	0.700	3.2	6.4
C152x42x9.5x9.5	42	152	9.5	2.047	3.99	5.834	0.254	76.759	8.233	11.1	0.0	53.4	11.1	1.272	0.379	61.96	14.9	0.908	3.2	6.4
C152X50X9.5X9.5	50	152	9.5	2.214	4.32	6.684	0.448	87.944	12.093	13.8	0.0	54.9	14.2	1.252	0.502	66.98	14.6	1.591	3.2	6.4
C160x48x8x8	48	160	8.0	1.912	3.73	6.367	0.336	79.582	9.353	12.1	0.0	57.7	13.3	1.132	0.377	41.66	11.8	1.363	4.8	6.4
C203x56x6.4x6.4	56	203	6.4	1.926	3.76	10.502	0.467	103.466	10.726	12.5	0.0	73.8	15.6	1.166	0.328	26.73	8.7	3.221	4.8	6.4
C203x56x9.5x9.5	56	203	9.5	2.804	5.33	14.796	0.646	145.777	15.243	13.6	0.0	72.6	15.2	1.717	0.495	85.68	14.1	4.308	4.8	6.4
C203x102x12.7x12.7	102	203	12.7	4.814	9.39	29.076	4.649	286.466	64.963	30.4	0.0	77.7	31.1	2.089	1.620	260.15	20.4	29.177	4.8	9.6
C254x70x12.7x12.7	70	250	12.7	4.649	9.07	38.014	1.660	299.320	31.543	17.4	0.0	90.4	18.9	2.858	0.818	251.18	19.3	17.146	4.8	9.6
C292x70x12.7x12.7	70	292	12.7	5.140	10.02	54.193	1.720	371.185	32.043	16.3	0.0	102.7	18.3	3.327	0.755	280.03	18.9	24.098	6.4	9.6
C305x76x12.7x12.7	76	305	12.7	5.457	10.64	63.783	2.220	418.252	38.010	17.6	0.0	108.1	20.2	3.473	0.835	297.00	18.6	34.055	6.4	9.6
C356x89x19x19	89	356	19.0	9.392	18.31	145.784	5.042	819.013	75.495	22.2	0.0	124.6	23.2	6.036	1.517	1152.12	27.0	101.717	9.6	12.7

3.2 EQUAL ANGLE



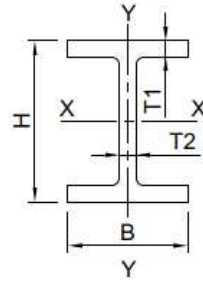
Product Number	H	B	T	A	Wt.	I _x / I _y	I _y	Z _x	Z _y	c _x	c _y	r _x	r _y	A _y	J (Torsion constant)	r (Torsion radius)	I _w (Warping constant)	I _{xp}	I _{yp}	Alpha	Internal radius	External radius
	mm	mm	mm	10 ³ mm ²	kg/m	10 ⁶ mm ⁴	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	mm	mm	mm	10 ³ mm ²	10 ³ mm ⁴	mm	10 ⁹ mm ⁴	10 ⁶ mm ⁴	10 ⁶ mm ⁴	degree	mm	mm
EA25x25x6.4	25	25	6.4	0.278	0.56	0.015	0.015	0.886	0.886	8.6	8.6	9.0	4.8	0.139	3.607	12.5	0.000	0.023	0.007	-45	1.0	2.5
EA30x30x5	30	30	5.0	0.274	0.57	0.022	0.022	1.069	1.069	9.4	9.4	11.3	5.8	0.127	2.216	8.6	0.000	0.035	0.009	-45	1.0	2.5
EA32x32x4	32	32	4.0	0.239	0.42	0.023	0.023	1.008	1.008	9.5	9.5	12.3	6.2	0.108	1.248	6.5	0.000	0.036	0.009	-45	1.0	2.5
EA38x38x5	38	38	5.0	0.355	0.68	0.047	0.047	1.769	1.769	11.4	11.4	14.5	7.4	0.163	2.955	7.2	0.000	0.075	0.019	-45	2.5	2.5
EA38x38x6.4	38	38	6.4	0.445	0.85	0.057	0.057	2.194	2.194	11.8	11.8	14.3	7.4	0.210	6.009	9.4	0.001	0.091	0.024	-45	2.5	2.5
EA50x50x3.2	50	50	3.2	0.310	0.61	0.076	0.076	2.087	2.087	13.7	13.7	19.8	9.9	0.135	1.055	4.6	0.000	0.121	0.030	-45	1.5	1.5
EA50x50x6.4	50	50	6.4	0.595	1.14	0.137	0.137	3.923	3.923	15.0	15.0	19.2	9.6	0.274	8.048	9.2	0.001	0.220	0.055	-45	5.0	3.0
EA76x76x6.4	76	76	6.4	0.930	1.77	0.516	0.516	9.457	9.457	21.4	21.4	29.8	14.9	0.410	12.609	9.7	0.006	0.825	0.208	-45	2.5	3.5
EA76x76x9.5	76	76	9.5	1.351	2.57	0.723	0.723	13.526	13.526	22.5	22.5	29.2	14.8	0.609	39.950	16.2	0.017	1.150	0.296	-45	2.5	4.0
EA102x102x6.4	102	102	6.4	1.257	2.50	1.284	1.284	17.359	17.359	28.0	28.0	40.5	20.1	0.548	17.001	8.5	0.014	2.060	0.508	-45	6.4	3.0
EA102x102x9.5	102	102	9.5	1.830	3.48	1.818	1.818	25.004	25.004	29.3	29.3	39.9	19.8	0.817	54.175	13.8	0.043	2.919	0.717	-45	9.5	4.0
EA102x102x12.7	102	102	12.7	2.430	4.57	2.332	2.332	32.514	32.514	30.3	30.3	39.1	19.7	1.133	133.005	17.3	0.096	3.721	0.944	-45	9.5	9.5
EA152x152x9.5	152	152	9.5	2.798	5.42	6.324	6.324	57.276	57.276	41.6	41.6	60.1	30.0	1.240	85.712	13.0	0.151	10.121	2.526	-45	9.5	9.5
EA152x152x12.7	152	152	12.7	3.700	7.01	8.186	8.186	74.984	74.984	42.8	42.8	59.5	29.7	1.679	203.936	17.5	0.346	13.105	3.268	-45	12.7	12.7

3.3 I-BEAM



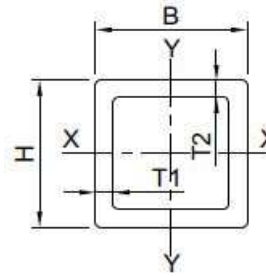
Product Number	H	B	T1	T2	A	Wt.	I _x	I _y	Z _x	Z _y	r _x	r _y	A _y	A _x	J (Torsion constant)	r (Torsion radius)	I _w (Warping constant)	Fillet radius
	mm	mm	mm	mm	10 ³ mm ²	kg/m	10 ⁶ mm ⁴	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	mm	10 ³ mm ²	10 ³ mm ²	10 ³ mm ⁴	mm	10 ⁶ mm ⁴	mm
IB32x15x6.4x4	32	15	6.4	4.0	0.273	0.53	0.035	0.004	2.174	0.497	11.3	3.7	0.122	0.185	2.99	9.5	0.001	2.0
IB38x30x3x3	38	30	3.0	3.0	0.280	0.54	0.064	0.014	3.387	0.906	15.2	7.0	0.103	0.164	0.94	4.9	0.004	2.0
IB102x50x6.4x6.4	102	50	6.4	6.4	1.249	2.42	1.914	0.136	37.538	5.448	39.1	10.4	0.616	0.635	20.95	10.5	0.294	6.4
IB102x50x8x8	102	50	8.0	8.0	1.548	3.00	2.297	0.173	45.043	6.903	38.5	10.6	0.772	0.833	42.55	13.6	0.349	8.0
IB140x70x6.35x6.35	140	70	6.4	6.4	1.749	3.39	5.247	0.370	74.959	10.559	54.8	14.5	0.845	0.842	27.73	10.1	1.60	6.4
IB152x76x6.4x6.4	152	76	6.4	6.4	1.902	3.69	6.776	0.472	89.156	12.426	59.7	15.8	0.917	0.904	29.83	10.2	2.44	6.4
IB152x76x9.5x9.5	152	76	9.5	9.5	2.792	5.42	9.554	0.709	125.711	18.658	58.5	15.9	1.363	1.426	102.91	15.4	3.41	9.5
IB152x127x9.5x9.5	152	127	9.5	9.5	3.761	7.30	14.481	3.257	190.533	51.295	62.0	29.4	1.322	2.203	131.96	15.3	16.07	9.5
IB152x127x12.7x12.7	152	127	12.7	12.7	4.985	9.67	18.391	4.372	241.989	68.844	60.7	29.6	1.780	3.043	328.49	20.8	20.13	12.7
IB180x45x9x12	180	45	9.0	12.0	2.788	5.41	10.392	0.162	115.471	7.197	61.1	7.6	1.975	1.101	129.44	16.7	1.010	6.0
IB203x102x9.5x9.5	203	102	9.5	9.5	3.771	7.32	23.770	1.698	234.185	33.291	79.4	21.2	1.818	1.825	132.19	16.5	15.42	9.5
IB203x102x12.7x12.7	203	102	12.7	12.7	4.998	9.70	30.535	2.291	300.836	44.917	78.2	21.4	2.433	2.555	329.00	20.6	19.65	12.7
IB254x127x9.5x9.5	254	127	9.5	9.5	4.730	9.18	47.480	3.265	373.861	51.410	100.2	26.3	2.275	2.213	160.86	15.1	47.85	9.5
IB254x127x12.7x12.7	254	127	12.7	12.7	6.280	12.18	61.519	4.389	484.401	69.118	99.0	26.4	3.042	3.068	397.68	20.3	61.71	12.7
IB305x152x9.5x9.5	305	152	9.5	9.5	5.215	10.12	72.893	3.268	477.985	51.467	118.2	25.0	2.745	2.218	174.32	15.1	70.11	9.5
IB305x152x12.7x12.7	305	152	12.7	12.7	6.928	13.44	94.913	4.398	622.382	69.255	117.0	25.2	3.666	3.080	432.35	20.4	91.05	12.7

3.4 WIDE FLANGE



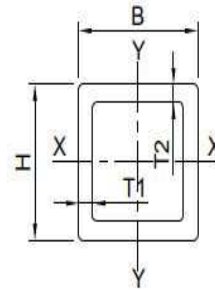
Product Number	B	H	T1	T2	A	Wt.	I _x	I _y	Z _x	Z _y	r _x	r _y	A _y	A _x	J (Torsion constant)	r (Torsion radius)	I _w (Warping constant)	Fillet radius
	mm	mm	mm	mm	10 ³ mm ²	kg/m	10 ⁸ mm ⁴	10 ⁸ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	mm	10 ³ mm ²	10 ³ mm ²	10 ³ mm ⁴	mm	10 ⁹ mm ⁴	mm
HB76x76x6.4x6.4	76	76	6.4	6.4	1.416	2.76	1.351	0.471	35.551	12.383	30.9	18.2	0.440	0.898	23.22	10.5	0.546	6.4
HB102x102x6.4x6.4	102	102	6.4	6.4	1.915	3.73	3.438	1.135	67.402	22.251	42.4	24.3	0.586	1.172	30.01	10.3	2.533	6.4
HB102x102x8.0x8.0	102	102	8.0	8.0	2.380	4.64	4.140	1.421	81.167	27.860	41.7	24.4	0.736	1.495	60.27	13.3	3.025	8.0
HB152x152x6.4x6.4	152	152	6.4	6.4	2.897	5.65	12.032	3.751	158.317	49.351	64.5	36.0	0.878	1.727	45.07	10.8	19.608	6.4
HB152x152x9.5x9.5	152	152	9.5	9.5	4.236	8.26	16.895	5.574	222.308	73.346	63.2	36.3	1.296	2.593	146.23	15.5	27.650	9.5
HB203x203x6.4x6.4	203	203	6.4	6.4	3.854	7.52	29.123	8.928	286.930	87.963	86.9	48.1	1.157	2.246	56.04	10.2	85.775	6.4
HB203x203x9.5x9.5	203	203	9.5	9.5	5.690	11.09	41.747	13.263	411.302	130.669	85.7	48.3	1.723	3.396	189.72	15.1	122.562	9.5
HB203x203x12.7x12.7	203	203	12.7	12.7	7.563	14.75	53.795	17.751	530.003	174.890	84.3	48.4	2.313	4.629	466.67	21.2	157.024	12.7
HB254x254x9.5x9.5	254	254	9.5	9.5	7.143	13.93	83.561	25.967	657.960	204.468	108.2	60.3	2.152	4.201	232.02	15.3	384.929	9.5
HB254x254x12.7x12.7	254	254	12.7	12.7	9.506	18.54	108.518	34.739	854.476	273.537	106.8	60.5	2.885	5.703	570.68	20.2	498.296	12.7
HB305x305x12.7x12.7	305	305	12.7	12.7	11.449	22.33	191.546	60.117	1,256.040	394.212	129.3	72.5	3.457	6.779	671.11	20.4	1,271.130	12.7

3.5 SQUARE HOLLOW



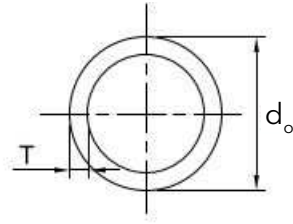
Product Number	H	B	T	A	Wt.	Ix/Iy	Zx /Zy	rx / ry	Ay	Ax	J (Torsion constant)	r (Torsion radius)	Iw (Warping constant)	Internal radius	External radius
	mm	mm	mm	10 ³ mm ²	kg/m	10 ⁶ mm ⁴	10 ³ mm ³	mm	10 ³ mm ²	10 ³ mm ²	10 ³ mm ⁴	mm	10 ⁶ mm ⁴	mm	mm
SHS25x25x3.2	25	25	3.2	0.273	0.53	0.022	1.741	8.9	0.126	0.126	35.76	14.8	0.000	0.5	2.5
SHS25x25x6.35	25	25	6.4	0.471	0.92	0.030	2.392	8.0	0.262	0.262	50.92	16.5	0.000	1.0	2.5
SHS32x32x6.4	32	32	6.4	0.650	1.27	0.075	4.672	10.7	0.328	0.328	124.30	20.4	0.000	1.0	2.5
SHS38x38x3.2	38	38	3.2	0.440	0.86	0.089	4.672	14.2	0.194	0.194	141.32	24.1	0.002	0.5	2.5
SHS38x38x5	38	38	5.0	0.655	1.28	0.121	6.354	13.6	0.303	0.303	195.46	22.6	0.001	1.0	2.5
SHS38x38x6.4	38	38	6.4	0.804	1.57	0.138	7.279	13.1	0.388	0.388	226.58	23.5	0.001	1.0	2.5
SHS50x50x3.2	50	50	3.2	0.594	1.16	0.217	8.665	19.1	0.259	0.259	340.59	29.7	0.017	1.0	2.5
SHS50x50x4	50	50	4.0	0.731	1.43	0.258	10.337	18.8	0.322	0.322	408.17	30.1	0.012	1.0	2.5
SHS50x50x5	50	50	5.0	0.895	1.75	0.304	12.175	18.4	0.400	0.400	483.87	30.8	0.008	1.0	2.5
SHS50x50x6.4	50	50	6.4	1.111	2.17	0.358	14.323	18.0	0.510	0.510	574.78	29.6	0.005	1.0	2.5
SHS76x76x3.2	76	76	3.2	0.927	1.81	0.818	21.516	29.7	0.397	0.397	1,264.38	45.3	0.386	1.0	2.5
SHS76x76x5	76	76	5.0	1.416	2.76	1.193	31.395	29.0	0.617	0.617	1,861.82	47.7	0.195	1.5	2.5
SHS76x76x6.4	76	76	6.4	1.778	3.47	1.445	38.014	28.5	0.784	0.784	2,269.29	48.0	0.130	1.5	2.5
SHS76x76x9.5	76	76	9.5	2.510	4.89	1.876	49.375	27.3	1.149	1.149	3,018.92	45.8	0.065	1.5	4.5
SHS89x89x6.4	89	89	6.4	2.111	4.12	2.411	54.172	33.8	0.921	0.921	3,761.62	57.2	0.440	1.5	2.5
SHS102x102x3.2	102	102	3.2	1.261	2.46	2.049	40.185	40.3	0.537	0.537	3,147.76	60.4	3.326	1.5	2.5
SHS102x102x5	102	102	5.0	1.936	3.78	3.040	59.604	39.6	0.832	0.832	4,694.71	77.8	1.805	1.5	2.5
SHS102x102x6.4	102	102	6.4	2.444	4.77	3.734	73.212	39.1	1.059	1.059	5,797.03	76.0	1.246	1.5	2.5
SHS102x102x8	102	102	8.0	2.991	5.83	4.418	86.633	38.4	1.312	1.312	6,947.89	64.5	0.869	1.5	4.5
SHS100x100x10	100	100	10.0	3.583	6.99	4.878	97.556	36.9	1.599	1.599	7,730.89	64.6	0.508	1.5	4.5
SHS125x125x8	125	125	8.0	3.733	7.28	8.535	136.553	47.8	1.627	1.627	13,340.20	71.7	3.977	3.0	4.5
SHS152x152x9.5	152	152	9.5	5.390	10.51	18.256	240.216	58.2	2.343	2.343	28,539.60	92.5	13.534	3.0	6.0
SHS152x152x12.7	152	152	12.7	7.051	13.75	22.921	301.593	57.0	3.110	3.110	36,082.10	96.5	8.450	3.0	6.0

3.6 RECTANGULAR HOLLOW



Product Number	H	B	T1	T2	A	Wt	I _x	I _y	Z _x	Z _y	r _x	r _y	A _y	A _x	J (Torsion constant)	r (Torsion radius)	I _w (Warping constant)	Internal radius	External radius
	mm	mm	mm	mm	10 ³ mm ²	kg/m	10 ⁸ mm ⁴	10 ⁸ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	mm	10 ³ mm ²	10 ³ mm ²	10 ³ mm ⁴	mm	10 ⁹ mm ⁴	mm	mm
RHS51x25x3	51	25	3.0	3.0	0.420	0.82	0.132	0.040	5.159	3.236	17.698	9.814	0.274	0.096	206.20	36.5	0.038	2.0	2.0
RHS51x25x6.4	51	25	6.4	6.4	0.809	1.58	0.218	0.060	8.551	4.798	16.418	8.610	0.569	0.202	160.15	20.8	0.018	2.5	2.5
RHS75x38x4	75	38	4.0	4.0	0.838	1.63	0.580	0.191	15.470	10.053	26.313	15.098	0.535	0.195	466.73	28.1	0.660	2.0	2.5
RHS80x60x5	80	60	5.0	5.0	1.300	2.54	1.129	0.709	28.217	23.642	29.465	23.358	0.689	0.453	1,376.00	38.2	0.582	2.5	2.5
RHS91x38x4	91	38	4.0	4.0	0.977	1.91	0.970	0.230	21.313	12.124	31.502	15.354	0.662	0.185	614.21	29.9	2.408	4.0	2.5
RHS112x91x6.4	112	91	6.4	6.4	2.444	4.77	4.310	3.090	76.966	67.916	41.997	35.560	1.228	0.909	5,634.03	55.6	3.885	4.0	2.5
RHS120x45x3	120	45	3.0	3.0	0.963	1.88	1.691	0.350	28.191	15.559	41.907	19.065	0.662	0.159	950.95	36.5	24.064	4.0	2.5
RHS175x50x9	175	50	9.0	9.0	3.722	7.26	11.959	1.387	136.678	55.468	56.685	19.302	2.806	0.399	4,288.31	43.5	73.614	4.0	4.5
RHS90x45x4x4	90	45	4.0	4.0	1.025	2.00	1.046	0.339	23.250	15.072	31.946	18.188	0.652	0.240	829.16	33.4	2.427	4.0	2.5
RHS100x75x5x5	100	75	5.0	5.0	1.646	3.21	2.285	1.446	45.698	38.551	37.258	29.636	0.868	0.573	2,809.65	47.2	2.897	4.0	4.5
RHS101x51x6.35x6.35	101	51	6.4	6.4	1.773	3.46	2.165	0.698	42.881	27.366	34.945	19.837	1.150	0.419	1,745.34	38.5	3.045	4.0	5.0
RHS120x45x4x6	120	45	4.0	6.0	1.396	2.72	2.557	0.449	42.616	19.970	42.805	17.943	0.881	0.270	1,296.13	38.6	11.670	4.0	5.0
RHS140x45x4x6	140	45	4.0	6.0	1.556	3.03	3.772	0.517	53.891	22.968	49.245	18.227	1.030	0.241	1,560.20	39.4	32.207	4.0	5.0
RHS150x100x6.35x6.35	150	100	6.4	6.4	3.028	5.90	9.299	4.890	123.983	97.809	55.419	40.190	1.687	0.934	10,123.00	66.7	50.294	4.0	5.0
RHS175x50x9x9	175	50	9.0	9.0	3.722	7.26	11.959	1.387	136.678	55.468	56.685	19.302	2.806	0.399	4,288.31	43.5	73.614	4.0	1.5
RHS200x50x8x5	200	50	5.0	8.0	3.04	5.62	14.08												

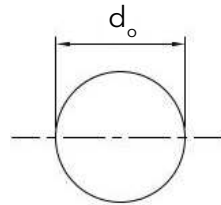
3.7 ROUND TUBE



Product Number	d_o	T	A	Wt	I _x /I _y	Z _x /Z _y	r _x /r _y	A _y	A _x	J (Torsion constant)	r (Torsion radius)	I _w (Warping constant)
	mm	mm	10 ³ mm ²	kg/m	10 ⁶ mm ⁴	10 ³ mm ³	mm	10 ³ mm ²	10 ³ mm ²	10 ³ mm ⁴	mm	10 ⁹ mm ⁴
RT25x3.2	25	3.2	0.219	0.81	0.013	1.065	7.8	0.093	0.093	26.60	12.5	0.0
RT32x5	32	5.0	0.424	0.81	0.040	2.502	9.7	0.173	0.173	79.95	16.0	0.0
RT32x6	32	6.0	0.490	0.96	0.044	2.730	9.4	0.188	0.188	87.24	16.0	0.0
RT38x3.2	38	3.2	0.350	0.65	0.053	2.815	12.3	0.159	0.159	106.82	19.0	0.0
RT38x4	38	4.0	0.427	0.81	0.063	3.299	12.1	0.188	0.188	125.19	19.0	0.0
RT38x5	38	5.0	0.518	1.00	0.072	3.804	11.8	0.220	0.220	144.36	19.0	0.0
RT38x6.4	38	6.4	0.635	1.18	0.083	4.351	11.4	0.253	0.253	165.12	19.0	0.0
RT42x3.2	42	3.2	0.390	0.70	0.074	3.524	13.7	0.179	0.179	147.80	21.0	0.0
RT42x5	42	5.0	0.581	1.11	0.101	4.829	13.2	0.251	0.251	202.55	21.0	0.0
RT42x6.4	42	6.4	0.716	1.45	0.117	5.581	12.7	0.294	0.294	234.12	21.0	0.0
RT48x6.4	48	6.4	0.836	1.58	0.185	7.727	14.8	0.354	0.354	370.43	24.0	0.0
RT50x5	50	5.0	0.707	1.34	0.181	7.255	16.0	0.314	0.314	362.27	25.0	0.0
RT50.8x6.4	51	6.4	0.893	1.70	0.225	8.852	15.8	0.382	0.382	449.11	25.4	0.0
RT60x5.5	60	5.5	0.942	1.85	0.353	11.788	19.3	0.423	0.423	706.39	30.0	0.0
RT60x6.5	60	6.5	1.092	2.10	0.397	13.238	19.0	0.480	0.480	793.28	30.0	0.0
RT70x8	70	8.0	1.558	3.20	0.761	21.776	22.0	0.679	0.679	1,522.39	35.0	0.0
RT76x6.4	76	6.4	1.399	2.64	0.855	22.516	24.6	0.635	0.635	1,709.05	38.0	0.0
RT100x5	100	5.0	1.492	2.84	1.688	33.806	33.5	0.707	0.707	3,376.23	50.0	0.0
RT101x6.4	101	6.4	1.902	3.62	2.137	42.380	33.4	0.887	0.887	4,274.91	50.5	0.0
RT150x5	150	5.0	2.278	4.35	5.993	80.010	51.1	1.100	1.100	11,986.20	75.0	0.0

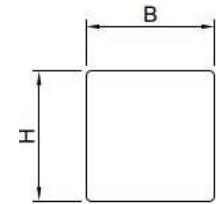
3.8 ROUND SOLID ROD

Product Number	d_o	A	Wt(kg/m)
	mm	mm ²	kg/m
RSR4.2	4.2	13.9	0.03
RSR6	6.0	28.3	0.08
RSR8	8.0	50.3	0.10
RSR9.5	9.5	70.9	0.14
RSR12.7	12.7	126.7	0.26
RSR16	16.0	201.1	0.41
RSR19	19.0	283.5	0.55
RSR20	20.0	314.2	0.62
RSR22	22.0	380.1	0.72
RSR25.4	25.4	506.7	1.00
RSR31.8	31.8	794.2	1.51
RSR38	38.0	1,134.1	2.15



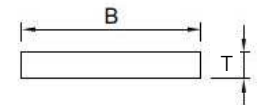
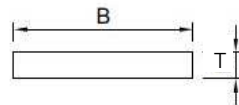
3.9 SQUARE SOLID ROD

Product Number	H & B	A	Wt (kg/m)
	mm	mm ²	kg/m
SSR25x25	25	625.0	1.23
SSR32x32	32	1,024.0	2.00
SSR38x38	38	1,444.0	2.80



3.11 FLAT STRIP

Product Number	B	T	A	Wt.
	mm	mm	10 ³ mm ²	kg/m
FS19x6.4	19.0	6.4	0.122	0.25
FS25.4x8	24.4	8.0	0.195	0.40
FS30x3	30.0	3.0	0.090	0.70
FS30x6.4	30.0	6.4	0.192	0.37
FS35x8	35.0	8.0	0.280	0.54
FS38x5	38.0	5.0	0.190	0.37
FS40x8	40.0	8.0	0.320	0.62
FS50x2	50.0	2.0	0.100	0.25
FS50x4	50.0	4.0	0.200	0.38
FS50x6	50.0	6.0	0.300	0.59
FS50x8	50.0	8.0	0.400	0.76
FS50x15	50.0	15.0	0.750	1.43
FS50x25	50.0	25.0	1.250	2.50
FS102x5	102.0	5.0	0.510	0.97
FS120x10	120.0	10.0	1.200	2.40
FS152x10	152.0	10.0	1.520	2.92
FS250x12	250.0	12.0	3.000	5.70



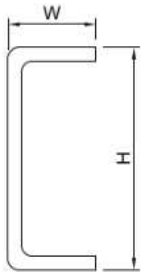
3.10 FLAT PLATE

Product Number	B	T	A	Wt.
	mm	mm	10 ³ mm ²	kg/m
FP1220x3.2	1,220	3.2	3.904	7.42
FP1220x6.4	1,220	6.4	7.808	14.84
FP1220x9.5	1,220	9.5	11.590	22.02
FP1220x12.7	1,220	12.7	15.494	29.44
FP1220x16	1,220	16.0	19.520	37.20
FP1220x19	1,220	19.0	23.180	44.10

3.12 GENERAL TOLERANCES

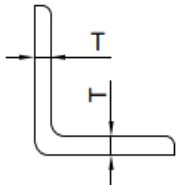
Profile Outer Dimension Tolerance

Nominal Dimension (mm)	Tolerance (mm)
0 - 20	±0.20
20 - 100	±0.30
100 - 300	±0.35



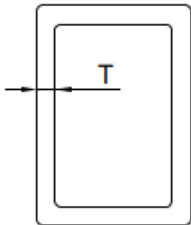
Profile Tolerance For Open Profiles

Nominal Dimension (mm)	Tolerance (mm)
0-2	±0.15
2-5	±0.20
5-10	±0.35
> 10	±0.40

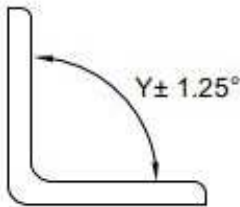


Profile Thickness Tolerance For Closed Profiles

Nominal Dimension (mm)	Tolerance (mm)
0-2	±0.30
2-5	±0.35
5-10	±0.45
> 10	±0.5



Profile Angular Tolerance



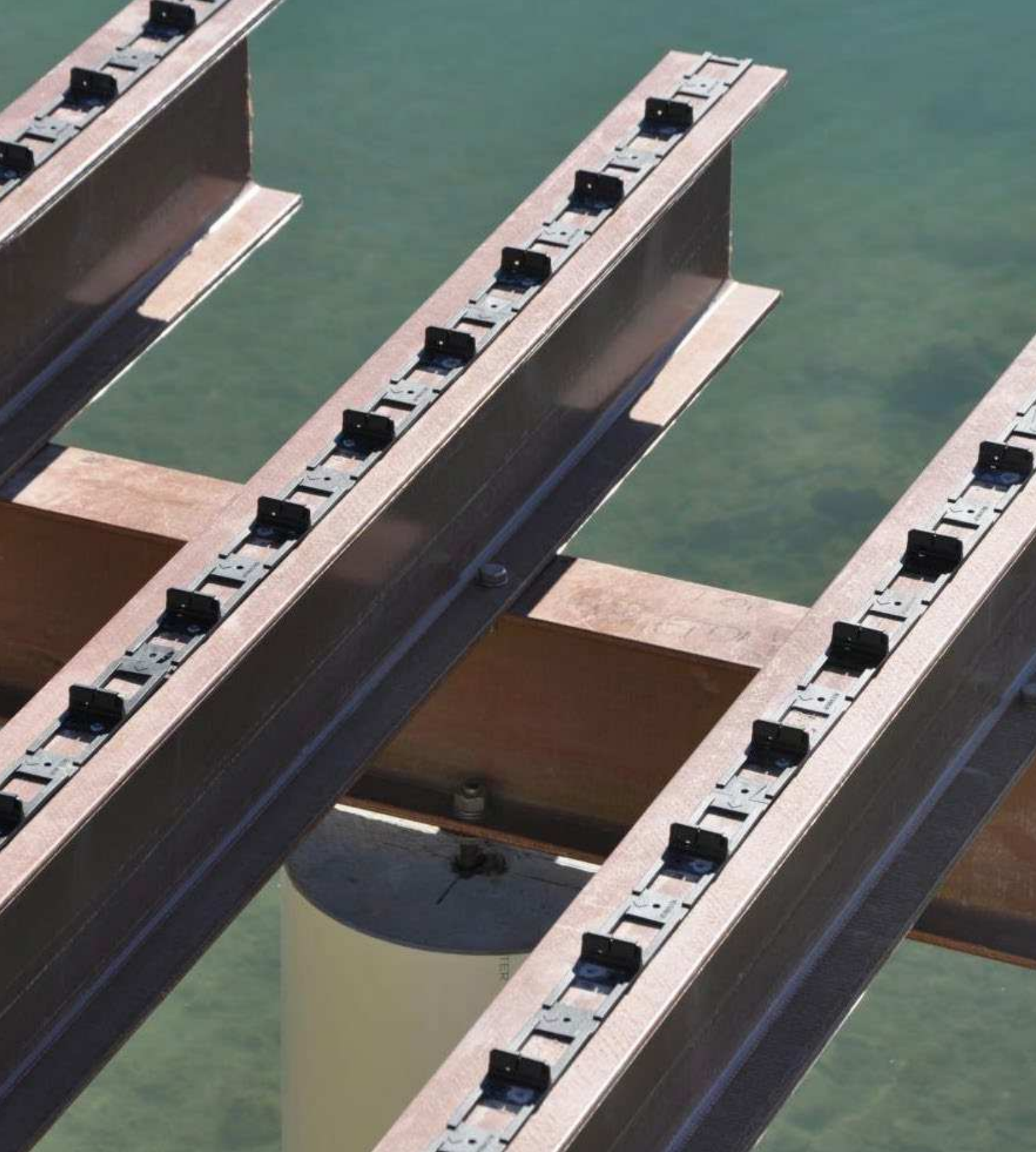


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DESIGN GUIDE

CAPACITY TABLES

GRP AUSTRALIA | 2024 | PART 2



DESIGN GUIDE

NOTATIONS

A	Section area (mm ²)
B	Section width (mm)
c	Coordinate of centroid
d_o	Section outer diameter (mm)
E	Modulus of Elasticity (GPa)
f_b	Flexural Strength (MPa)
f_c	Compressive Strength (MPa)
f_{cb}	Pin Bearing Strength (MPa)
f_t	Tensile Strength (MPa)
f_v	Shear Strength (MPa)
G	Shear Modulus of Elasticity (GPa)
H	Section height (mm)
I	Moment of inertia (mm ⁴)
L	Length of Span; or segment length (m)
L_e	Effective length of a compression member (m)
N_c	Nominal member capacity in compression
r	Radius of gyration (mm)
T	Section thickness (mm)
ν	Poisson's Ratio
$Wt.$	Section weight (kg/m)
W	Uniformly applied distributed load
Z	Elastic Section Modulus (mm ³)

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PART 2 - CAPACITY TABLES

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1.0 INTRODUCTION

1.1 GENERAL NOTES

The capacity tables for pultrusion members presented in this design guide are valid for GRP Australia pultruded sections only. The tables should not be used for similar products from other suppliers.

The capacity tables have been generated based on the requirements of the Eurocomp Design Code and show the flexural, shear, and compression (axial load) allowable capacities.

The material rupture, weak direction global buckling, and web and flange buckling have been considered for table generation, however the structural designer should consider any additional loads or failure modes which the structure may be subject to.

1.2 SAFETY FACTORS

The allowable loads in the design tables were generated for short-term loading using the Load and Resistance Design method (LRDM). The partial material safety factors (Partial coefficients) according to the Eurocomp Design Code are shown in Table 2.1 below.

Partial Coefficient	Partial Factor	Description	Reference
$\gamma(m,1)$	1.15	Production method - Pultrusion	Eurocomp Table 2.4
$\gamma(m,2)$	1.1	Production process - fully postcured at works	Eurocomp Table 2.4
$\gamma(m,3)$	1 (Short Term) 2.5 (Long Term)	Environmental affects and duration of loading - HDT >90	Eurocomp Table 2.5

Figure 2.1 Partial Material Safety Factors

The safety factor for material properties is then expressed by the equation below but shall not be less than 1.5 for building structures.

$$\gamma_m = \gamma_{m,1} \times \gamma_{m,2} \times \gamma_{m,3} \geq 1.5$$

Material Safety factor	Short term	Long term
γ_m	1.5	3.16

Table 2.2 - Pultrusion Material safety Factors

For permanent and imposed actions for ultimate limit state design under AS 1170.0 the load Combination = 1.2G + 1.5Q.

$$1.2G + 1.5Q = \frac{\text{Material Strength}}{\gamma_m}$$

For simplification and generation of the design tables the equation can be expressed as follows:

$$\text{Load combination} < \frac{\text{Material Strength}}{1.5 \times \gamma_m}$$

The design strengths in the design tables were generated using conservative safety factors (1.5 × γ_m) shown in table 2.3 below.

Safety factor	Short term	Long term
Flexural	3	5
Shear	2.5	5
Bolted connection	2.5	5

Table 2.3 - Design Table Safety Factors

1.3 MEMBERS SUBJECTED TO BENDING

Member flexural deflections have been generated for simply supported beams with uniform loading (kN/m) about the major axis only. The equation used for deflection calculations is shown below:

$$\text{deflection} = \frac{5W \times L^4}{384EI} + \frac{W \times L^2}{8GA_w}$$

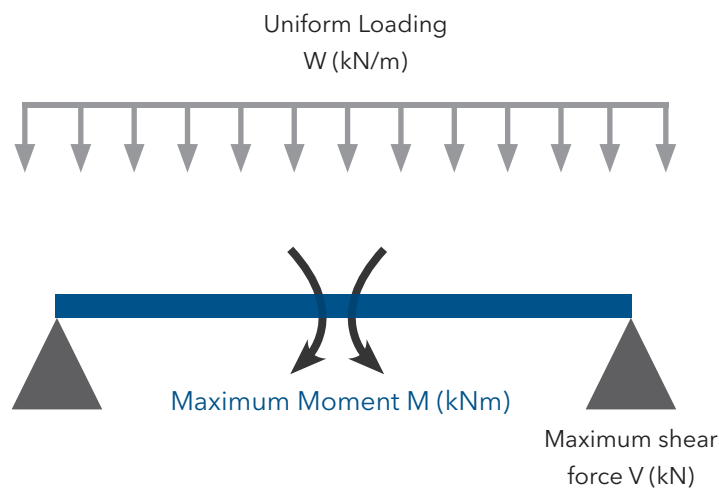
Flexural members have three primary failure modes due to bending:

- 1. Failure due to pure bending stress, i.e. compression flange crushing or tension flange breaking
- 2. Failure due to global buckling, i.e. lateral torsional buckling
- 3. Failure due to local buckling, i.e. Compression flange and web local buckling

Proper design of flexural members requires that all failure modes be investigated in the design process.

Lateral torsional buckling is a critical in determining the maximum allowable flexural stress and the allowable stress will be reduced significantly if the proper bracing scheme is not used. The use of intermediate beams at the appropriate spacing along the bending member can be used to eliminate buckling concerns. These failure modes must be analysed carefully when selecting a beam member.

For various beam lengths, the design tables show the flexural bending capacity (kN/m) assuming laterally supported, and laterally unsupported beam capacity (kN/m). The laterally unsupported beam capacity can be used to design the required intermediate beam spacing to achieve the required capacity.



1.4 MEMBERS SUBJECT TO AXIAL COMPRESSION

Column compression strength is the lower value of the following:

- Material global buckling in the weakest direction and,
- web and flange local buckling.

The column boundary condition was assumed pin/pin ($L_e = L$).

1.2 EXAMPLE CALCULATIONS

Beam selection

Are two C254x70x12.7x12.7 suitable for supporting the grating of 0.6m x 4m bridge ?
Design UDL = 2.5 kPa

Answer :

Maximum loading on each C254x70x12.7x12.7 is $0.6\text{m} \times 4\text{m} \times 2.5\text{ kPa} / 2 = 3\text{ kN/m}$
Allowable loads are shown according to the design table

Length	Strength (kN/m)		Deflection
(m)	Flexural	Shear	L/250
4	12.5	14.3	4

Hence: the beam maximum loading is less than allowable, therefore it can be used. Orthogonal bracing to be used too.



Column Calculation

Is SHS76x76x6.4 suitable to support walkway with 2m width and 3m spans? Column height is 2m and design loading is 5 kPa

Answer

Maximum column loading is $2\text{m} \times 3\text{m} \times 5\text{ kPa} / 2 = 15\text{ kN}$
Column compressive load strength is obtained from design table

Length	Strength
(m)	Compression (kN)
2	30.9

Hence : The maximum column loading is less than allowable, Therefore it can be used.



Connection strength:

What is the maximum laminate bearing strength?

Beam size: C254x70x12.7x12.7

Bolt size: 4 X M12

Answer :

The Laminate thickness is 12.7mm and bolts distances are according to the Eurocomp standard, Therefore the value of the table can be used

Bolt shear load strength can be calculated from design tables.

Laminate thickness (mm)	Laminate bearing strength for direction of 90 degree (kN)
12	4
13	4.5



Hence: The bearing strength considering one bolt is

$$= 4kN + \frac{12.7mm-12mm}{13mm-12mm} (4.5kN - 4kN) = 4.35kN$$

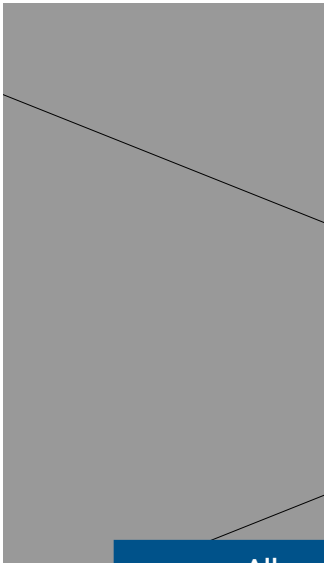
Therefore connection bearing strength

$$= 4 \times 4.35 kN = 17.4 kN$$

2.0 CAPACITY TABLES

2.1 C CHANNEL

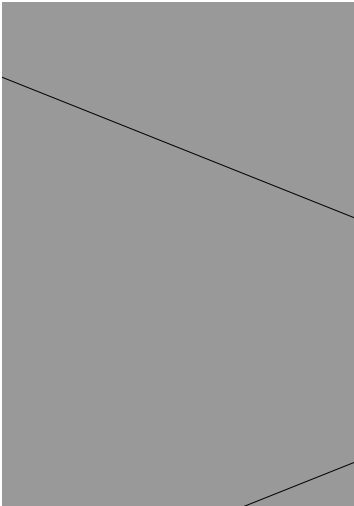




Product Name		C102x27x3.2x3.2	
Flexural Allowable Moment M		0.4	(kNm)
Shear Allowable Force V		3.0	(kN)
Weight		0.9	(kg/m)

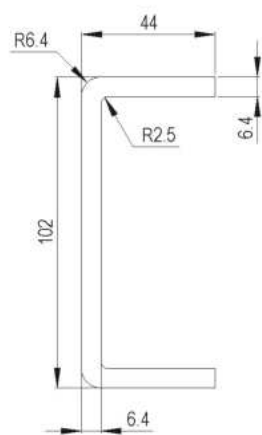
Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	1.4	3.9	0.9	2.7	2.1	1.6	1.3	1.1	0.9
2.0	0.8	3.0	0.5	1.2					

*Note: Shaded values indicate where the maximum loads are governed by In-Plane shear or flexural bending capacity allowable loads.



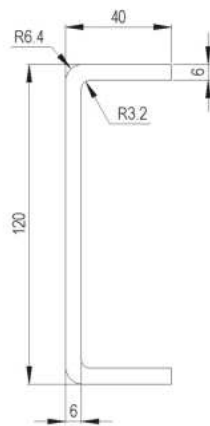
Product Name	C102x44x4.8x4.8	
Flexural Allowable Moment M	1.0	(kNm)
Shear Allowable Force V	4.2	(kN)
Weight	1.7	(kg/m)

	Allowable Loads Includes Allowance for Short Term Safety Factors			Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	3.4	5.6	5.1	5.2	4.1	3.1	2.5	2.1	1.7
2.0	1.9	4.2	2.9	2.3	1.8	1.4	1.1		
2.5	1.2	3.3	1.8	1.2	1.0				



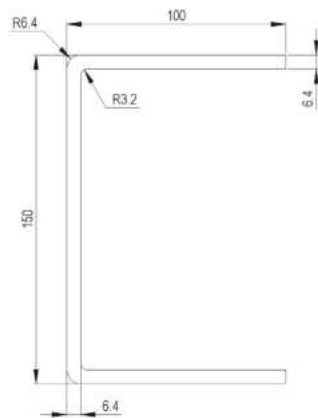
Product Name	C102x44x6.4x6.4	
Flexural Allowable Moment M	2.2	(kNm)
Shear Allowable Force V	5.4	(kN)
Weight	2.2	(kg/m)

Length	Allowable Loads			Simply Supported Beam					
	Includes Allowance for Short Term Safety Factors			Uniform Load Deflection Limits					
	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	7.9	7.2	6.4	6.5	5.2	3.9	3.1	2.6	2.2
2.0	4.4	5.4	3.6	2.8	2.3	1.7	1.4	1.1	
2.5	2.8	4.3	2.3	1.5	1.2				



Product Name	C120x40x6x6	
Flexural Allowable Moment M	2.4	(kNm)
Shear Allowable Force V	6.3	(kN)
Weight	2.2	(kg/m)

Length	Allowable Loads			Simply Supported Beam					
	Includes Allowance for Short Term Safety Factors			Uniform Load Deflection Limits					
	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	8.6	8.4	4.8	8.4	6.7	5.0	4.0	3.4	2.8
2.0	4.8	6.3	2.7	3.7	3.0	2.2	1.8	1.5	1.2
2.5	3.1	5.0	1.7	1.9	1.5	1.2			
3.0	2.1	4.2	1.2	1.1					



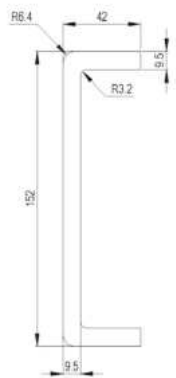
Product Name	C150x100x6.4x6.4	
Flexural Allowable Moment M	1.5	(kNm)
Shear Allowable Force V	7.3	(kN)
Weight	4.2	(kg/m)

Length	Allowable Loads Includes Allowance for Short Term Safety Factors			Simply Supported Beam Uniform Load Deflection Limits					
	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	5.3	9.7	73.9	25.4	20.3	15.3	12.2	10.2	8.5
2.0	3.0	7.3	41.5	12.1	9.7	7.3	5.8	4.8	4.0
2.5	1.9	5.8	26.6	6.6	5.3	4.0	3.2	2.6	2.2
3.0	1.3	4.8	18.5	4.0	3.2	2.4	1.9	1.6	1.3
3.5	1.0	4.2	13.6	2.5	2.0	1.5	1.2	1.0	
4.0	0.8	3.6	10.4	1.7	1.4	1.0			
4.5	0.6	3.2	8.2	1.2	1.0				



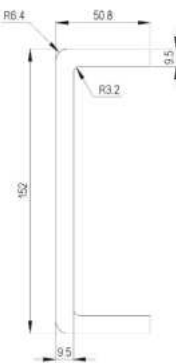
Product Name	C152x42x6.4x6.4	
Flexural Allowable Moment M	3.5	(kNm)
Shear Allowable Force V	8.6	(kN)
Weight	2.8	(kg/m)

Length	Allowable Loads Includes Allowance for Short Term Safety Factors			Simply Supported Beam Uniform Load Deflection Limits					
	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	12.3	11.5	6.3	15.8	12.7	9.5	7.6	6.3	5.3
2.0	6.9	8.6	3.5	7.1	5.7	4.3	3.4	2.8	2.4
2.5	4.4	6.9	2.3	3.7	3.0	2.2	1.8	1.5	1.2
3.0	3.1	5.8	1.6	2.2	1.8	1.3	1.1		
3.5	2.3	4.9	1.2	1.4	1.1				



Product Name	C152x42x9.5x9.5	
Flexural Allowable Moment M	6.4	(kNm)
Shear Allowable Force V	12.7	(kN)
Weight	4	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	22.7	17.0	8.5	22.1	17.7	13.3	10.6	8.8	7.4
2.0	12.8	12.7	4.8	9.9	7.9	5.9	4.8	4.0	3.3
2.5	8.2	10.2	3.1	5.2	4.2	3.1	2.5	2.1	1.7
3.0	5.7	8.5	2.1	3.1	2.5	1.8	1.5	1.2	1.0
3.5	4.2	7.3	1.6	1.9	1.6	1.2			
4.0	3.2	6.4	1.2	1.3	1.1				



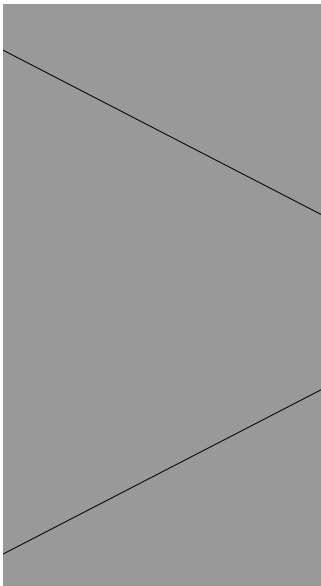
Product Name	C152X50.8X9.5X9.5	
Flexural Allowable Moment M	7.3	(kNm)
Shear Allowable Force V	12.5	(kN)
Weight	4.3	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	26.1	16.7	15.1	24.8	19.9	14.9	11.9	9.9	8.3
2.0	14.7	12.5	8.5	11.2	9.0	6.7	5.4	4.5	3.7
2.5	9.4	10.0	5.4	5.9	4.7	3.6	2.8	2.4	2.0
3.0	6.5	8.3	3.8	3.5	2.8	2.1	1.7	1.4	1.2
3.5	4.8	7.2	2.8	2.2	1.8	1.3	1.1		
4.0	3.7	6.3	2.1	1.5	1.2				
4.5	2.9	5.6	1.7	1.1					



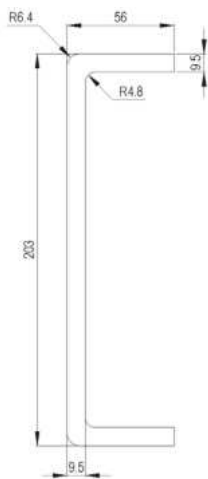
Product Name	C160x48x8x8	
Flexural Allowable Moment M	6.6	(kNm)
Shear Allowable Force V	11.3	(kN)
Weight	3.7	(kg/m)

Length	Allowable Loads			Simply Supported Beam					
	Includes Allowance for Short Term Safety Factors			Uniform Load Deflection Limits					
(m)	Flexural Bending Capacity (kN/m)	In-plane Shear (kN/m)	N _c (kN)	L/120 (kN/m)	L/150 (kN/m)	L/200 (kN/m)	L/250 (kN/m)	L/300 (kN/m)	L/360 (kN/m)
1.5	23.5	15.1	11.3	23.5	18.8	14.1	11.3	9.4	7.8
2.0	13.2	11.3	6.4	10.6	8.5	6.4	5.1	4.2	3.5
2.5	8.5	9.1	4.1	5.6	4.5	3.4	2.7	2.3	1.9
3.0	5.9	7.5	2.8	3.3	2.7	2.0	1.6	1.3	1.1
3.5	4.3	6.5	2.1	2.1	1.7	1.3	1.0		
4.0	3.3	5.7	1.6	1.4	1.1				
4.5	2.6	5.0	1.3	1.0					



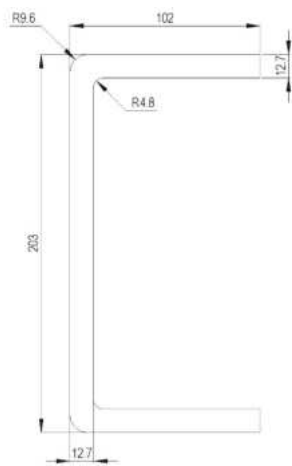
Product Name	C203x56x6.4x6.4	
Flexural Allowable Moment M	3.6	(kNm)
Shear Allowable Force V	11.7	(kN)
Weight	3.8	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	13.0	15.5	15.7	35.4	28.3	21.2	17.0	14.2	11.8
2.0	7.3	11.7	8.8	16.6	13.3	9.9	8.0	6.6	5.5
2.5	4.7	9.3	5.7	8.9	7.2	5.4	4.3	3.6	3.0
3.0	3.2	7.8	3.9	5.3	4.3	3.2	2.6	2.1	1.8
3.5	2.4	6.7	2.9	3.4	2.7	2.1	1.6	1.4	1.1
4.0	1.8	5.8	2.2	2.3	1.9	1.4	1.1		
4.5	1.4	5.2	1.7	1.6	1.3	1.0			
5.0	1.2	4.7	1.4	1.2	1.0				



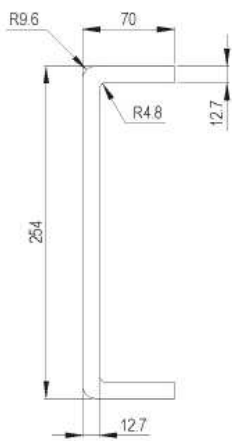
Product Name	C203x56x9.5x9.5	
Flexural Allowable Moment M	12.1	(kNm)
Shear Allowable Force V	17.2	(kN)
Weight	5.5	(kg/m)

Length	Allowable Loads Includes Allowance for Short Term Safety Factors			Simply Supported Beam Uniform Load Deflection Limits					
	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	43.2	22.9	21.7	50.3	40.3	30.2	24.2	20.1	16.8
2.0	24.3	17.2	12.2	23.5	18.8	14.1	11.3	9.4	7.8
2.5	15.5	13.7	7.8	12.7	10.1	7.6	6.1	5.1	4.2
3.0	10.8	11.4	5.4	7.5	6.0	4.5	3.6	3.0	2.5
3.5	7.9	9.8	4.0	4.8	3.9	2.9	2.3	1.9	1.6
4.0	6.1	8.6	3.1	3.3	2.6	2.0	1.6	1.3	1.1
4.5	4.8	7.6	2.4	2.3	1.9	1.4	1.1		
5.0	3.9	6.9	2.0	1.7	1.4	1.0			
5.5	3.2	6.2	1.6	1.3	1.0				
6.0	2.7	5.7	1.4	1.0					



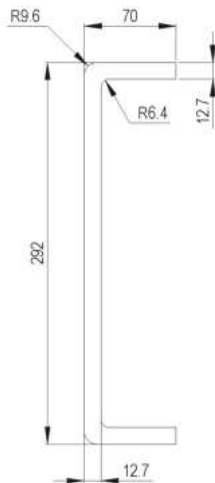
Product Name	C203x102x12.7x12.7	
Flexural Allowable Moment M	15.8	(kNm)
Shear Allowable Force V	20.9	(kN)
Weight	9.4	(kg/m)

Length	Allowable Loads Includes Allowance for Short Term Safety Factors			Simply Supported Beam Uniform Load Deflection Limits					
	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	56.1	27.9	156.3	87.1	69.7	52.3	41.8	34.9	29.0
2.0	31.6	20.9	87.9	42.6	34.1	25.6	20.4	17.0	14.2
2.5	20.2	16.7	56.3	23.5	18.8	14.1	11.3	9.4	7.8
3.0	14.0	13.9	39.1	14.2	11.4	8.5	6.8	5.7	4.7
3.5	10.3	11.9	28.7	9.2	7.4	5.5	4.4	3.7	3.1
4.0	7.9	10.4	22.0	6.3	5.0	3.8	3.0	2.5	2.1
4.5	6.2	9.3	17.4	4.5	3.6	2.7	2.1	1.8	1.5
5.0	5.0	8.4	14.1	3.3	2.6	2.0	1.6	1.3	1.1
5.5	4.2	7.6	11.6	2.5	2.0	1.5	1.2	1.0	
6.0	3.5	7.0	9.8	1.9	1.5	1.2			
6.5	3.0	6.4	8.3	1.5	1.2				
7.0	2.6	6.0	7.2	1.2	1.0				
7.5	2.2	5.6	6.3	1.0					



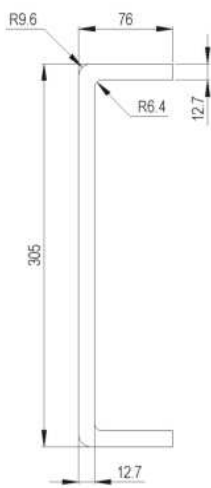
Product Name	C254x70x12.7x12.7	
Flexural Allowable Moment M	24.9	(kNm)
Shear Allowable Force V	28.6	(kN)
Weight	9.1	(kg/m)

Length	Allowable Loads Includes Allowance for Short Term Safety Factors			Simply Supported Beam Uniform Load Deflection Limits					
	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	88.7	38.1	55.8	115.5	92.4	69.3	55.5	46.2	38.5
2.0	49.9	28.6	31.4	56.2	45.0	33.7	27.0	22.5	18.7
2.5	31.9	22.9	20.1	31.0	24.8	18.6	14.9	12.4	10.3
3.0	22.2	19.1	14.0	18.7	15.0	11.2	9.0	7.5	6.2
3.5	16.3	16.3	10.3	12.1	9.7	7.3	5.8	4.8	4.0
4.0	12.5	14.3	7.9	8.2	6.6	4.9	4.0	3.3	2.7
4.5	9.9	12.7	6.2	5.9	4.7	3.5	2.8	2.3	2.0
5.0	8.0	11.4	5.0	4.3	3.4	2.6	2.1	1.7	1.4
5.5	6.6	10.4	4.2	3.3	2.6	2.0	1.6	1.3	1.1
6.0	5.5	9.5	3.5	2.5	2.0	1.5	1.2	1.0	
6.5	4.7	8.8	3.0	2.0	1.6	1.2	1.0		
7.0	4.1	8.2	2.6	1.6	1.3	1.0			
7.5	3.5	7.6	2.2	1.3	1.0				



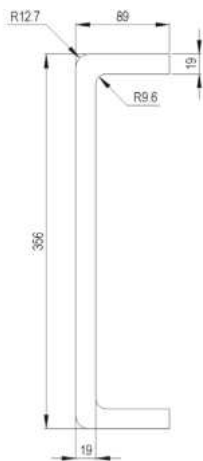
Product Name	C292x70x12.7x12.7	
Flexural Allowable Moment M	29.7	(kNm)
Shear Allowable Force V	33.3	(kN)
Weight	10.0	(kg/m)

Length	Allowable Loads Includes Allowance for Short Term Safety Factors			Simply Supported Beam Uniform Load Deflection Limits					
	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	105.7	44.4	57.8	154.2	123.4	92.5	74.0	61.7	51.4
2.0	59.5	33.3	32.5	76.7	61.4	46.0	36.8	30.7	25.6
2.5	38.1	26.6	20.8	42.8	34.3	25.7	20.6	17.1	14.3
3.0	26.4	22.2	14.5	26.1	20.9	15.6	12.5	10.4	8.7
3.5	19.4	19.0	10.6	16.9	13.6	10.2	8.1	6.8	5.6
4.0	14.9	16.6	8.1	11.6	9.3	7.0	5.6	4.6	3.9
4.5	11.7	14.8	6.4	8.3	6.6	5.0	4.0	3.3	2.8
5.0	9.5	13.3	5.2	6.1	4.9	3.7	2.9	2.4	2.0
5.5	7.9	12.1	4.3	4.6	3.7	2.8	2.2	1.8	1.5
6.0	6.6	11.1	3.6	3.6	2.9	2.1	1.7	1.4	1.2
6.5	5.6	10.2	3.1	2.8	2.3	1.7	1.4	1.1	
7.0	4.9	9.5	2.7	2.3	1.8	1.4	1.1		
7.5	4.2	8.9	2.3	1.9	1.5	1.1			



Product Name	C305x76x12.7x12.7	
Flexural Allowable Moment M	31.5	(kNm)
Shear Allowable Force V	34.7	(kN)
Weight	10.6	(kg/m)

Length	Allowable Loads Includes Allowance for Short Term Safety Factors			Simply Supported Beam Uniform Load Deflection Limits					
	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	111.9	46.3	74.6	173.8	139.0	104.3	83.4	69.5	57.9
2.0	62.9	34.7	42.0	87.7	70.2	52.6	42.1	35.1	29.2
2.5	40.3	27.8	26.9	49.4	39.5	29.6	23.7	19.8	16.5
3.0	28.0	23.2	18.7	30.2	24.2	18.1	14.5	12.1	10.1
3.5	20.5	19.8	13.7	19.7	15.8	11.8	9.5	7.9	6.6
4.0	15.7	17.4	10.5	13.5	10.8	8.1	6.5	5.4	4.5
4.5	12.4	15.4	8.3	9.7	7.7	5.8	4.6	3.9	3.2
5.0	10.1	13.9	6.7	7.1	5.7	4.3	3.4	2.9	2.4
5.5	8.3	12.6	5.6	5.4	4.3	3.2	2.6	2.2	1.8
6.0	7.0	11.6	4.7	4.2	3.4	2.5	2.0	1.7	1.4
6.5	6.0	10.7	4.0	3.3	2.7	2.0	1.6	1.3	1.1
7.0	5.1	9.9	3.4	2.7	2.1	1.6	1.3	1.1	
7.5	4.5	9.3	3.0	2.2	1.7	1.3	1.0		

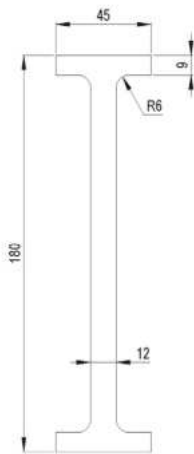


Product Name	C356x89x19x19	
Flexural Allowable Moment M	68.3	(kNm)
Shear Allowable Force V	60.4	(kN)
Weight	18.3	(kg/m)

Length	Allowable Loads Includes Allowance for Short Term Safety Factors			Simply Supported Beam Uniform Load Deflection Limits					
	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
(m)	(kN/m)	(kN/m)	(kN)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)	(kN/m)
1.5	242.7	80.5	169.6	355.2	284.2	213.1	170.5	142.1	118.4
2.0	136.5	60.4	95.4	185.7	148.6	111.4	89.1	74.3	61.9
2.5	87.4	48.3	61.0	106.9	85.5	64.2	51.3	42.8	35.6
3.0	60.7	40.2	42.4	66.4	53.1	39.8	31.9	26.5	22.1
3.5	44.6	34.5	31.1	43.7	35.0	26.2	21.0	17.5	14.6
4.0	34.1	30.2	23.8	30.2	24.1	18.1	14.5	12.1	10.1
4.5	27.0	26.8	18.8	21.6	17.3	13.0	10.4	8.7	7.2
5.0	21.8	24.1	15.3	16.0	12.8	9.6	7.7	6.4	5.3
5.5	18.0	21.9	12.6	12.2	9.7	7.3	5.8	4.9	4.1
6.0	15.2	20.1	10.6	9.5	7.6	5.7	4.5	3.8	3.2
6.5	12.9	18.6	9.0	7.5	6.0	4.5	3.6	3.0	2.5
7.0	11.1	17.2	7.8	6.0	4.8	3.6	2.9	2.4	2.0
7.5	9.7	16.1	6.8	4.9	3.9	3.0	2.4	2.0	

2.2 I BEAM



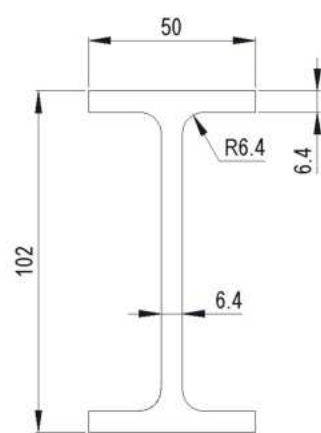


Product Name	IB45x9x180x12	
Flexural Allowable Moment M	9.6	(kNm)
Shear Allowable Force V	15.2	(kN)
Weight	5.4	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	1.1	3.8	34.2	20.3	5.4	34.6	27.7	20.8	16.6	13.9	11.5
2.0	0.8	1.5	19.2	15.2	3.1	16.3	13.0	9.8	7.8	6.5	5.4
2.5	0.6	0.8	12.3	12.2	2.0	8.8	7.0	5.3	4.2	3.5	2.9
3.0	0.5	0.4	8.6	10.1	1.4	5.3	4.2	3.2	2.5	2.1	1.8
3.5	0.4	0.3	6.3	8.7	1.0	3.4	2.7	2.0	1.6	1.4	1.1
4.0	0.4	0.2	4.8	7.6	0.8	2.3	1.8	1.4	1.1		
4.5	0.3	0.1	3.8	6.8	0.6	1.6	1.3	1.0			
5.0	0.3	0.1	3.1	6.1	0.5	1.2	1.0				

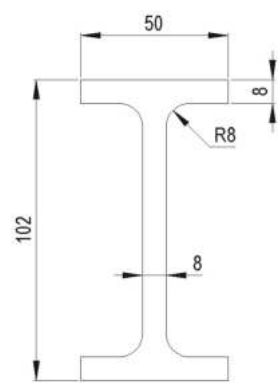
*Note: Lateral restraint is to be provided for beams where the allowable load for laterally unsupported beam is less than design load.

*Note: Shaded values indicate where the maximum loads are governed by In-Plane shear or flexural bending capacity allowable loads.



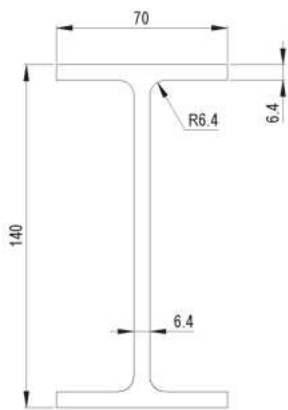
Product Name	IB50x102x6.4x6.4	
Flexural Allowable Moment M	3.1	(kNm)
Shear Allowable Force V	6.2	(kN)
Weight	2.4	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	0.4	1.5	11.1	8.2	4.6	7.6	6.1	4.6	3.6	3.0	2.5
2.0	0.3	0.6	6.3	6.2	2.6	3.3	2.7	2.0	1.6	1.3	1.1
2.5	0.2	0.3	4.0	4.9	1.6	1.7	1.4	1.0			
3.0	0.2	0.2	2.8	4.1	1.1	1.0					



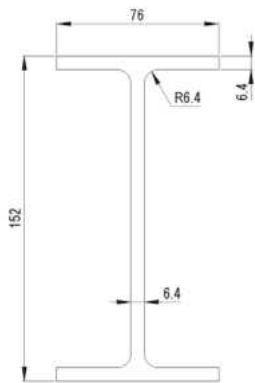
Product Name	IB50x102x8x8	
Flexural Allowable Moment M	3.8	(kNm)
Shear Allowable Force V	7.7	(kN)
Weight	3	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	0.6	2.3	13.3	10.3	5.8	9.2	7.4	5.5	4.4	3.7	3.1
2.0	0.5	0.9	7.5	7.7	3.3	4.0	3.2	2.4	1.9	1.6	1.3
2.5	0.4	0.5	4.8	6.2	2.1	2.1	1.7	1.3	1.0		
3.0	0.3	0.3	3.3	5.1	1.5	1.2	1.0				



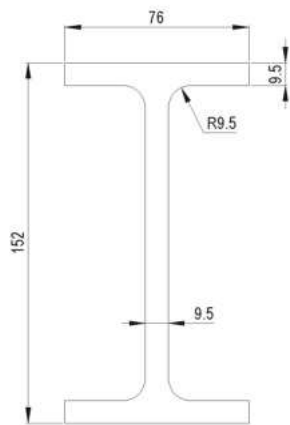
Product Name	IB70x140x6.35x6.35	
Flexural Allowable Moment M	6.2	(kNm)
Shear Allowable Force V	8.4	(kN)
Weight	3.4	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	1.1	4.1	22.2	11.2	12.4	19.0	15.2	11.4	9.1	7.6	6.3
2.0	0.7	1.5	12.5	8.4	7.0	8.7	6.9	5.2	4.2	3.5	2.9
2.5	0.5	0.7	8.0	6.7	4.5	4.6	3.7	2.8	2.2	1.8	1.5
3.0	0.4	0.4	5.6	5.6	3.1	2.7	2.2	1.6	1.3	1.1	
3.5	0.3	0.2	4.1	4.8	2.3	1.7	1.4	1.0			
4.0	0.3	0.1	3.1	4.2	1.7	1.2					



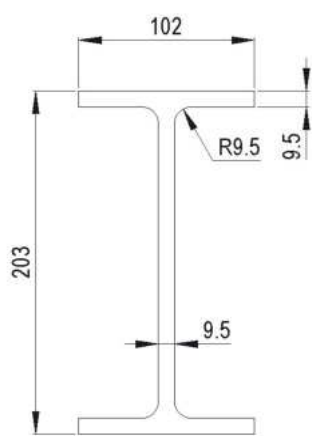
Product Name	IB76x152x6.4x6.4	
Flexural Allowable Moment M	7.4	(kNm)
Shear Allowable Force V	8.8	(kN)
Weight	3.7	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	1.5	5.4	26.4	11.7	15.9	23.7	19.0	14.2	11.4	9.5	7.9
2.0	0.9	1.9	14.9	8.8	8.9	11.0	8.8	6.6	5.3	4.4	3.7
2.5	0.7	0.9	9.5	7.0	5.7	5.9	4.7	3.5	2.8	2.3	2.0
3.0	0.5	0.5	6.6	5.8	4.0	3.5	2.8	2.1	1.7	1.4	1.2
3.5	0.4	0.3	4.9	5.0	2.9	2.2	1.8	1.3	1.1		
4.0	0.3	0.2	3.7	4.4	2.2	1.5	1.2				
4.5	0.3	0.1	2.9	3.9	1.8	1.1					



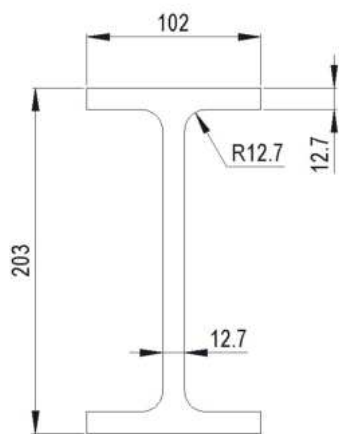
Product Name	IB76x152x9.5x9.5	
Flexural Allowable Moment M	10.5	(kNm)
Shear Allowable Force V	13.6	(kN)
Weight	5.4	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	2.6	9.2	37.2	18.2	23.8	34.2	27.3	20.5	16.4	13.7	11.4
2.0	1.7	3.4	21.0	13.6	13.4	15.6	12.5	9.4	7.5	6.3	5.2
2.5	1.3	1.6	13.4	10.9	8.6	8.3	6.7	5.0	4.0	3.3	2.8
3.0	1.0	0.9	9.3	9.1	6.0	4.9	4.0	3.0	2.4	2.0	1.6
3.5	0.8	0.5	6.8	7.8	4.4	3.2	2.5	1.9	1.5	1.3	1.1
4.0	0.7	0.4	5.2	6.8	3.4	2.1	1.7	1.3	1.0		
4.5	0.6	0.2	4.1	6.1	2.6	1.5	1.2				
5.0	0.6	0.2	3.4	5.5	2.1	1.1					



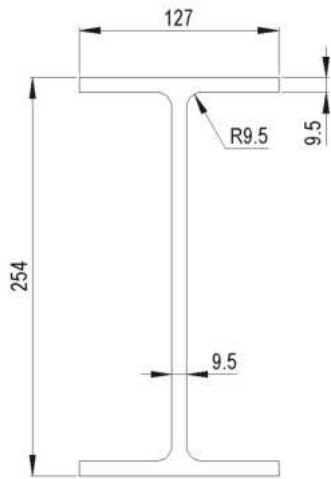
Product Name	IB102x203x9.5x9.5	
Flexural Allowable Moment M	19.5	(kNm)
Shear Allowable Force V	18.2	(kN)
Weight	7.4	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	6.9	24.7	69.4	24.2	57.1	72.7	58.2	43.6	34.9	29.1	24.2
2.0	4.2	8.4	39.0	18.2	32.1	35.3	28.2	21.2	16.9	14.1	11.8
2.5	2.9	3.7	25.0	14.5	20.6	19.4	15.5	11.6	9.3	7.8	6.5
3.0	2.2	2.0	17.3	12.1	14.3	11.7	9.4	7.0	5.6	4.7	3.9
3.5	1.8	1.1	12.7	10.4	10.5	7.6	6.1	4.5	3.6	3.0	2.5
4.0	1.5	0.7	9.8	9.1	8.0	5.2	4.1	3.1	2.5	2.1	1.7
4.5	1.3	0.5	7.7	8.1	6.3	3.7	2.9	2.2	1.8	1.5	1.2
5.0	1.1	0.3	6.2	7.3	5.1	2.7	2.2	1.6	1.3	1.1	
5.5	1.0	0.3	5.2	6.6	4.2	2.0	1.6	1.2	1.0		
6.0	0.9	0.2	4.3	6.1	3.6	1.6	1.3				
6.5	0.8	0.2	3.7	5.6	3.0	1.2	1.0				
7.0	0.7	0.1	3.2	5.2	2.6	1.0					



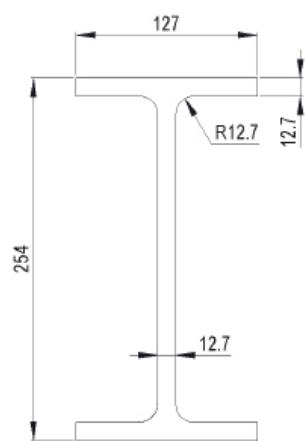
Product Name	IB102x203x12.7x12.7	
Flexural Allowable Moment M	25.1	(kNm)
Shear Allowable Force V	24.3	(kN)
Weight	9.7	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	10.0	35.4	89.1	32.4	77.0	95.8	76.6	57.5	46.0	38.3	31.9
2.0	6.3	12.6	50.1	24.3	43.3	46.1	36.8	27.6	22.1	18.4	15.4
2.5	4.5	5.8	32.1	19.5	27.7	25.2	20.2	15.1	12.1	10.1	8.4
3.0	3.5	3.1	22.3	16.2	19.3	15.2	12.1	9.1	7.3	6.1	5.1
3.5	2.9	1.9	16.4	13.9	14.1	9.8	7.8	5.9	4.7	3.9	3.3
4.0	2.4	1.2	12.5	12.2	10.8	6.7	5.3	4.0	3.2	2.7	2.2
4.5	2.1	0.8	9.9	10.8	8.6	4.7	3.8	2.8	2.3	1.9	1.6
5.0	1.9	0.6	8.0	9.7	6.9	3.5	2.8	2.1	1.7	1.4	1.2
5.5	1.7	0.4	6.6	8.8	5.7	2.6	2.1	1.6	1.3	1.1	
6.0	1.5	0.3	5.6	8.1	4.8	2.0	1.6	1.2	1.0		
6.5	1.4	0.3	4.7	7.5	4.1	1.6	1.3	1.0			
7.0	1.3	0.2	4.1	7.0	3.5	1.3	1.0				
7.5	1.2	0.2	3.6	6.5	3.1	1.0					



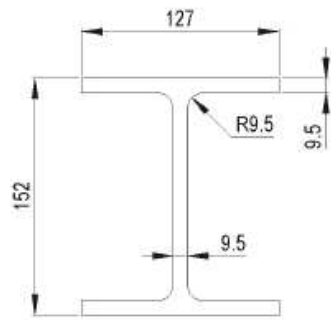
Product Name	IB127x254x9.5x9.5	
Flexural Allowable Moment M	29.1	(kNm)
Shear Allowable Force V	22.7	(kN)
Weight	9.2	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	15.9	56.5	103.6	30.3	81.5	121.7	97.4	73.0	58.4	48.7	40.6
2.0	9.2	18.5	58.3	22.7	61.8	62.6	50.1	37.6	30.1	25.1	20.9
2.5	6.2	7.9	37.3	18.2	39.5	35.7	28.6	21.4	17.1	14.3	11.9
3.0	4.5	4.0	25.9	15.2	27.4	22.0	17.6	13.2	10.6	8.8	7.3
3.5	3.5	2.3	19.0	13.0	20.2	14.4	11.6	8.7	6.9	5.8	4.8
4.0	2.8	1.4	14.6	11.4	15.4	9.9	8.0	6.0	4.8	4.0	3.3
4.5	2.3	0.9	11.5	10.1	12.2	7.1	5.7	4.3	3.4	2.8	2.4
5.0	2.0	0.6	9.3	9.1	9.9	5.3	4.2	3.2	2.5	2.1	1.8
5.5	1.7	0.5	7.7	8.3	8.2	4.0	3.2	2.4	1.9	1.6	1.3
6.0	1.5	0.3	6.5	7.6	6.9	3.1	2.5	1.9	1.5	1.2	1.0
6.5	1.4	0.3	5.5	7.0	5.8	2.5	2.0	1.5	1.2	1.0	
7.0	1.2	0.2	4.8	6.5	5.0	2.0	1.6	1.2			
7.5	1.1	0.2	4.1	6.1	4.4	1.6	1.3	1.0			



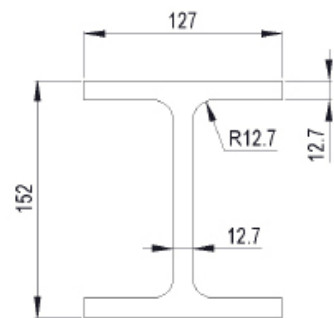
Product Name	IB127x254x12.7x12.7	
Flexural Allowable Moment M	40.4	(kNm)
Shear Allowable Force V	30.4	(kN)
Weight	12.2	(kg/m)

Length	Allowable Loads Includes Allowance for Short Term Safety Factors					Simply Supported Beam Uniform Load Deflection Limits					
	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	21.8	77.4	143.5	40.6	147.6	162.0	129.6	97.2	77.8	64.8	54.0
2.0	13.0	26.0	80.7	30.4	83.0	82.7	66.1	49.6	39.7	33.1	27.6
2.5	8.9	11.4	51.7	24.3	53.1	46.9	37.5	28.1	22.5	18.8	15.6
3.0	6.6	5.9	35.9	20.3	36.9	28.8	23.1	17.3	13.8	11.5	9.6
3.5	5.2	3.4	26.4	17.4	27.1	18.8	15.1	11.3	9.0	7.5	6.3
4.0	4.3	2.2	20.2	15.2	20.8	13.0	10.4	7.8	6.2	5.2	4.3
4.5	3.7	1.4	15.9	13.5	16.4	9.3	7.4	5.6	4.4	3.7	3.1
5.0	3.2	1.0	12.9	12.2	13.3	6.8	5.5	4.1	3.3	2.7	2.3
5.5	2.8	0.7	10.7	11.1	11.0	5.2	4.2	3.1	2.5	2.1	1.7
6.0	2.5	0.6	9.0	10.1	9.2	4.0	3.2	2.4	1.9	1.6	1.3
6.5	2.3	0.4	7.6	9.4	7.9	3.2	2.5	1.9	1.5	1.3	1.1
7.0	2.1	0.3	6.6	8.7	6.8	2.6	2.1	1.5	1.2	1.0	
7.5	1.9	0.3	5.7	8.1	5.9	2.1	1.7	1.3	1.0		



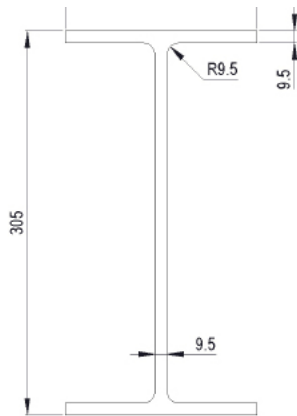
Product Name	IB127x152x9.5x9.5	
Flexural Allowable Moment M	14.4	(kNm)
Shear Allowable Force V	13.2	(kN)
Weight	7.3	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	9.8	34.8	51.2	17.6	84.2	52.0	41.6	31.2	24.9	20.8	17.3
2.0	5.9	11.8	28.8	13.2	61.6	23.8	19.0	14.3	11.4	9.5	7.9
2.5	4.1	5.2	18.4	10.6	39.4	12.7	10.1	7.6	6.1	5.1	4.2
3.0	3.1	2.7	12.8	8.8	27.4	7.5	6.0	4.5	3.6	3.0	2.5
3.5	2.5	1.6	9.4	7.6	20.1	4.8	3.8	2.9	2.3	1.9	1.6
4.0	2.0	1.0	7.2	6.6	15.4	3.2	2.6	1.9	1.6	1.3	1.1
4.5	1.7	0.7	5.7	5.9	12.2	2.3	1.8	1.4	1.1		
5.0	1.5	0.5	4.6	5.3	9.9	1.7	1.3	1.0			
5.5	1.4	0.4	3.8	4.8	8.1	1.3	1.0				
6.0	1.2	0.3	3.2	4.4	6.8	1.0					



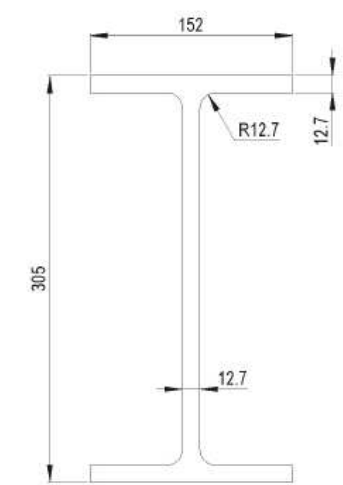
Product Name	IB127x152x12.7x12.7	
Flexural Allowable Moment M	20.2	(kNm)
Shear Allowable Force V	17.8	(kN)
Weight	9.7	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	19.0	67.6	92.5	36.6	62.3	153.2	122.6	91.9	73.5	61.3	51.1
2.0	11.0	22.0	52.0	27.4	61.8	83.6	66.9	50.2	40.1	33.4	27.9
2.5	7.3	9.3	33.3	22.0	39.6	49.5	39.6	29.7	23.8	19.8	16.5
3.0	5.2	4.6	23.1	18.3	27.5	31.3	25.1	18.8	15.0	12.5	10.4
3.5	4.0	2.6	17.0	15.7	20.2	20.9	16.7	12.5	10.0	8.4	7.0
4.0	3.2	1.6	13.0	13.7	15.5	14.6	11.7	8.7	7.0	5.8	4.9
4.5	2.6	1.0	10.3	12.2	12.2	10.5	8.4	6.3	5.0	4.2	3.5
5.0	2.2	0.7	8.3	11.0	9.9	7.8	6.3	4.7	3.8	3.1	2.6
5.5	1.9	0.5	6.9	10.0	8.2	6.0	4.8	3.6	2.9	2.4	2.0
6.0	1.7	0.4	5.8	9.1	6.9	4.7	3.7	2.8	2.2	1.9	1.6
6.5	1.5	0.3	4.9	8.4	5.9	3.7	3.0	2.2	1.8	1.5	1.2
7.0	1.4	0.2	4.2	7.8	5.0	3.0	2.4	1.8	1.4	1.2	1.0
7.5	1.2	0.2	3.7	7.3	4.4	2.4	2.0	1.5	1.2	1.0	



Product Name	IB152x305x9.5x9.5	
Flexural Allowable Moment M	26.0	(kNm)
Shear Allowable Force V	27.4	(kN)
Weight	10.2	(kg/m)

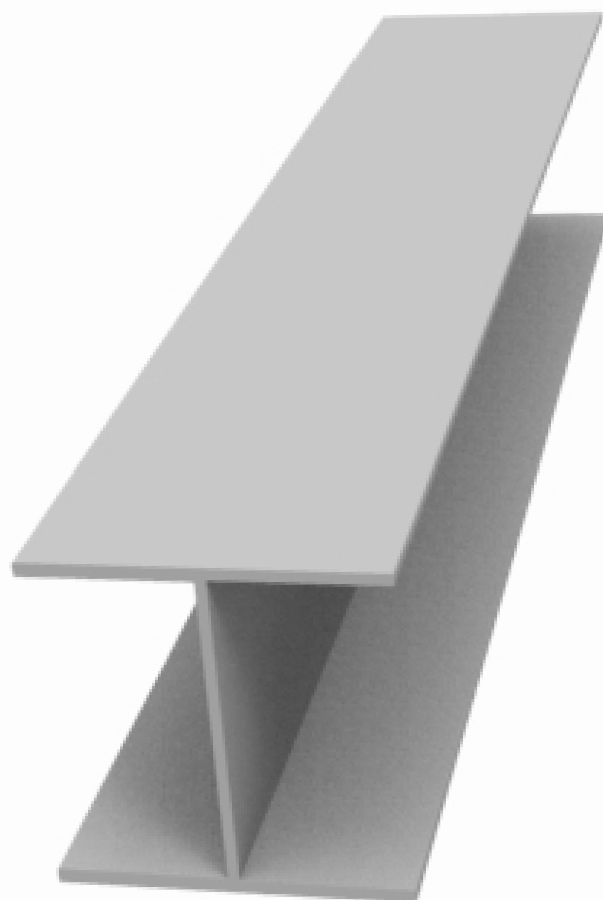
Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	19.0	67.6	92.5	36.6	62.3	153.2	122.6	91.9	73.5	61.3	51.1
2.0	11.0	22.0	52.0	27.4	61.8	83.6	66.9	50.2	40.1	33.4	27.9
2.5	7.3	9.3	33.3	22.0	39.6	49.5	39.6	29.7	23.8	19.8	16.5
3.0	5.2	4.6	23.1	18.3	27.5	31.3	25.1	18.8	15.0	12.5	10.4
3.5	4.0	2.6	17.0	15.7	20.2	20.9	16.7	12.5	10.0	8.4	7.0
4.0	3.2	1.6	13.0	13.7	15.5	14.6	11.7	8.7	7.0	5.8	4.9
4.5	2.6	1.0	10.3	12.2	12.2	10.5	8.4	6.3	5.0	4.2	3.5
5.0	2.2	0.7	8.3	11.0	9.9	7.8	6.3	4.7	3.8	3.1	2.6
5.5	1.9	0.5	6.9	10.0	8.2	6.0	4.8	3.6	2.9	2.4	2.0
6.0	1.7	0.4	5.8	9.1	6.9	4.7	3.7	2.8	2.2	1.9	1.6
6.5	1.5	0.3	4.9	8.4	5.9	3.7	3.0	2.2	1.8	1.5	1.2
7.0	1.4	0.2	4.2	7.8	5.0	3.0	2.4	1.8	1.4	1.2	1.0
7.5	1.2	0.2	3.7	7.3	4.4	2.4	2.0	1.5	1.2	1.0	

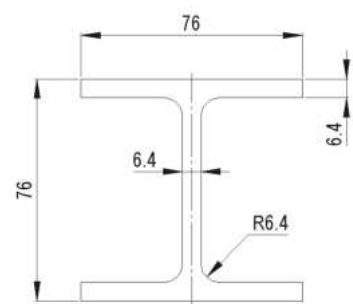


Product Name	IB152x305x12.7x12.7	
Flexural Allowable Moment M	51.9	(kNm)
Shear Allowable Force V	36.7	(kN)
Weight	13.5	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	25.9	92.1	184.4	48.9	147.9	206.2	164.9	123.7	99.0	82.5	68.7
2.0	15.3	30.5	103.7	36.7	83.2	111.5	89.2	66.9	53.5	44.6	37.2
2.5	10.3	13.2	66.4	29.3	53.2	65.6	52.5	39.4	31.5	26.2	21.9
3.0	7.6	6.7	46.1	24.4	37.0	41.3	33.1	24.8	19.8	16.5	13.8
3.5	5.9	3.9	33.9	20.9	27.2	27.5	22.0	16.5	13.2	11.0	9.2
4.0	4.8	2.4	25.9	18.3	20.8	19.1	15.3	11.5	9.2	7.6	6.4
4.5	4.1	1.6	20.5	16.3	16.4	13.8	11.0	8.3	6.6	5.5	4.6
5.0	3.5	1.1	16.6	14.7	13.3	10.2	8.2	6.1	4.9	4.1	3.4
5.5	3.1	0.8	13.7	13.3	11.0	7.8	6.2	4.7	3.7	3.1	2.6
6.0	2.7	0.6	11.5	12.2	9.2	6.1	4.9	3.7	2.9	2.4	2.0
6.5	2.5	0.5	9.8	11.3	7.9	4.8	3.9	2.9	2.3	1.9	1.6
7.0	2.2	0.4	8.5	10.5	6.8	3.9	3.1	2.3	1.9	1.6	1.3
7.5	2.1	0.3	7.4	9.8	5.9	3.2	2.5	1.9	1.5	1.3	1.1

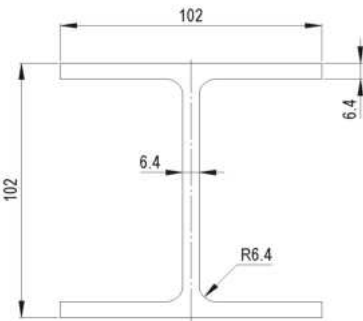
2.3 H BEAM





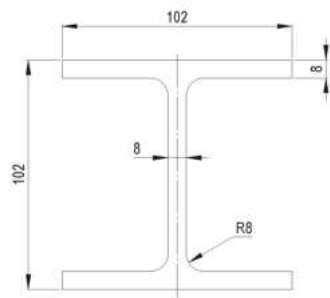
Product Name	HB76x76x6.4x6.4	
Flexural Allowable Moment M	3.0	(kNm)
Shear Allowable Force V	4.4	(kN)
Weight	2.8	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	0.9	3.3	10.5	5.9	15.8	5.6	4.5	3.4	2.7	2.2	1.9
2.0	0.6	1.2	5.9	4.4	8.9	2.4	1.9	1.5	1.2	1.0	
2.5	0.5	0.6	3.8	3.5	5.7	1.3	1.0				



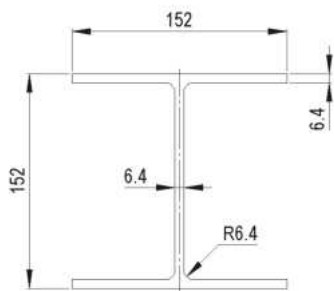
Product Name	HB102x102x6.4x6.4	
Flexural Allowable Moment M	3.4	(kNm)
Shear Allowable Force V	5.9	(kN)
Weight	3.7	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	2.4	8.5	11.9	7.8	30.2	13.7	10.9	8.2	6.6	5.5	4.6
2.0	1.5	2.9	6.7	5.9	21.5	6.0	4.8	3.6	2.9	2.4	2.0
2.5	1.0	1.3	4.3	4.7	13.7	3.1	2.5	1.9	1.5	1.3	1.0
3.0	0.8	0.7	3.0	3.9	9.5	1.8	1.5	1.1			
3.5	0.6	0.4	2.2	3.3	7.0	1.2					



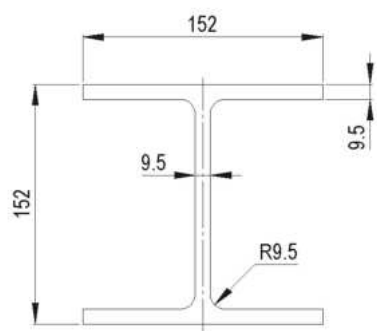
Product Name	HB102x102x8.0x8.0	
Flexural Allowable Moment M	6.5	(kNm)
Shear Allowable Force V	7.4	(kN)
Weight	4.6	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	3.2	11.3	23.1	9.8	47.8	16.6	13.2	9.9	7.9	6.6	5.5
2.0	2.0	4.1	13.0	7.4	26.9	7.2	5.8	4.3	3.5	2.9	2.4
2.5	1.5	1.9	8.3	5.9	17.2	3.8	3.0	2.3	1.8	1.5	1.3
3.0	1.2	1.0	5.8	4.9	11.9	2.2	1.8	1.3	1.1		
3.5	0.9	0.6	4.2	4.2	8.8	1.4	1.1				



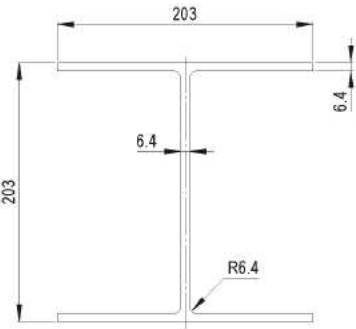
Product Name	HB152x152x6.4x6.4	
Flexural Allowable Moment M	3.5	(kNm)
Shear Allowable Force V	8.8	(kN)
Weight	5.6	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	10.7	38.2	12.6	11.7	20.5	42.7	34.2	25.6	20.5	17.1	14.2
2.0	6.2	12.4	7.1	8.8	20.5	19.6	15.7	11.8	9.4	7.8	6.5
2.5	4.1	5.2	4.5	7.0	20.5	10.5	8.4	6.3	5.0	4.2	3.5
3.0	2.9	2.6	3.2	5.9	20.5	6.2	5.0	3.7	3.0	2.5	2.1
3.5	2.2	1.5	2.3	5.0	20.5	4.0	3.2	2.4	1.9	1.6	1.3
4.0	1.8	0.9	1.8	4.4	17.7	2.7	2.1	1.6	1.3	1.1	
4.5	1.5	0.6	1.4	3.9	14.0	1.9	1.5	1.1			
5.0	1.2	0.4	1.1	3.5	11.4	1.4	1.1				
5.5	1.1	0.3	0.9	3.2	9.4	1.0					



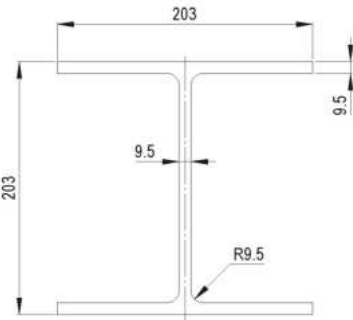
Product Name	HB152x152x9.5x9.5	
Flexural Allowable Moment M	11.5	(kNm)
Shear Allowable Force V	13.0	(kN)
Weight	8.3	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	16.2	57.6	41.0	17.3	66.2	60.7	48.6	36.4	29.2	24.3	20.2
2.0	9.6	19.2	23.1	13.0	66.2	27.8	22.2	16.7	13.3	11.1	9.3
2.5	6.5	8.3	14.8	10.4	66.2	14.8	11.8	8.9	7.1	5.9	4.9
3.0	4.8	4.3	10.2	8.6	46.9	8.7	7.0	5.2	4.2	3.5	2.9
3.5	3.8	2.5	7.5	7.4	34.4	5.6	4.5	3.3	2.7	2.2	1.9
4.0	3.1	1.5	5.8	6.5	26.4	3.8	3.0	2.3	1.8	1.5	1.3
4.5	2.6	1.0	4.6	5.8	20.8	2.7	2.1	1.6	1.3	1.1	
5.0	2.2	0.7	3.7	5.2	16.9	2.0	1.6	1.2			
5.5	2.0	0.5	3.0	4.7	13.9	1.5	1.2				
6.0	1.8	0.4	2.6	4.3	11.7	1.1					



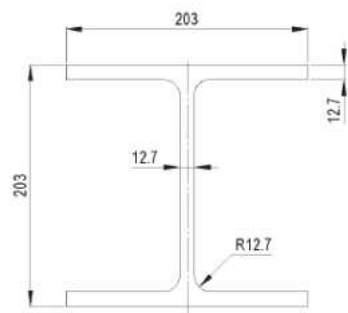
Product Name	HB203x203x6.4x6.4	
Flexural Allowable Moment M	3.6	(kNm)
Shear Allowable Force V	11.6	(kN)
Weight	7.5	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	33.9	120.4	12.8	15.4	15.3	89.2	71.4	53.5	42.8	35.7	29.7
2.0	19.2	38.4	7.2	11.6	15.3	43.3	34.6	26.0	20.8	17.3	14.4
2.5	12.4	15.9	4.6	9.3	15.3	23.8	19.0	14.3	11.4	9.5	7.9
3.0	8.7	7.7	3.2	7.7	15.3	14.4	11.5	8.6	6.9	5.7	4.8
3.5	6.5	4.2	2.4	6.6	15.3	9.3	7.4	5.6	4.5	3.7	3.1
4.0	5.0	2.5	1.8	5.8	15.3	6.3	5.1	3.8	3.0	2.5	2.1
4.5	4.0	1.6	1.4	5.1	15.3	4.5	3.6	2.7	2.2	1.8	1.5
5.0	3.3	1.1	1.2	4.6	15.3	3.3	2.6	2.0	1.6	1.3	1.1
5.5	2.8	0.7	1.0	4.2	15.3	2.5	2.0	1.5	1.2	1.0	
6.0	2.4	0.5	0.8	3.9	15.3	1.9	1.5	1.2			
6.5	2.1	0.4	0.7	3.6	15.3	1.5	1.2				
7.0	1.8	0.3	0.6	3.3	13.8	1.2	1.0				
7.5	1.6	0.2	0.5	3.1	12.0	1.0					



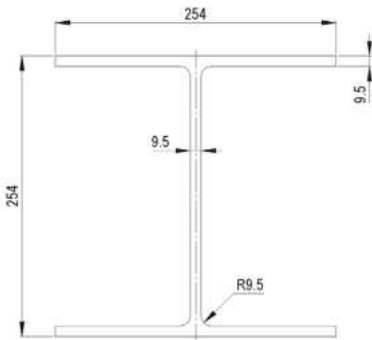
Product Name	HB203x203x9.5x9.5	
Flexural Allowable Moment M	12.0	(kNm)
Shear Allowable Force V	17.2	(kN)
Weight	11.1	(kg/m)

Length	Allowable Loads Includes Allowance for Short Term Safety Factors					Simply Supported Beam Uniform Load Deflection Limits					
	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	50.0	177.7	42.5	23.0	49.8	129.9	103.9	77.9	62.3	51.9	43.3
2.0	28.6	57.2	23.9	17.2	49.8	62.6	50.1	37.6	30.1	25.1	20.9
2.5	18.7	23.9	15.3	13.8	49.8	34.4	27.5	20.6	16.5	13.7	11.5
3.0	13.3	11.8	10.6	11.5	49.8	20.7	16.5	12.4	9.9	8.3	6.9
3.5	10.0	6.6	7.8	9.8	49.8	13.3	10.7	8.0	6.4	5.3	4.4
4.0	7.9	4.0	6.0	8.6	49.8	9.1	7.3	5.5	4.4	3.6	3.0
4.5	6.5	2.6	4.7	7.7	49.6	6.5	5.2	3.9	3.1	2.6	2.2
5.0	5.4	1.7	3.8	6.9	40.1	4.7	3.8	2.8	2.3	1.9	1.6
5.5	4.6	1.2	3.2	6.3	33.2	3.6	2.9	2.2	1.7	1.4	1.2
6.0	4.0	0.9	2.7	5.7	27.9	2.8	2.2	1.7	1.3	1.1	
6.5	3.6	0.7	2.3	5.3	23.8	2.2	1.8	1.3	1.1		
7.0	3.2	0.5	2.0	4.9	20.5	1.8	1.4	1.1			
7.5	2.9	0.4	1.7	4.6	17.8	1.4	1.1				



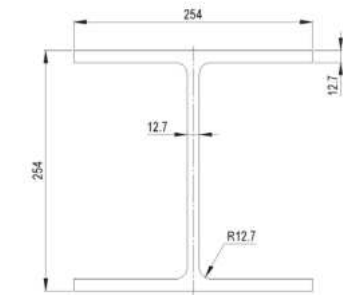
Product Name	HB203x203.x12.7x12.7	
Flexural Allowable Moment M	28.4	(kNm)
Shear Allowable Force V	23.1	(kN)
Weight	14.7	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	66.8	237.4	100.8	30.8	118.4	170.0	136.0	102.0	81.6	68.0	56.7
2.0	38.7	77.5	56.7	23.1	118.4	81.5	65.2	48.9	39.1	32.6	27.2
2.5	25.7	32.9	36.3	18.5	118.4	44.6	35.7	26.7	21.4	17.8	14.9
3.0	18.6	16.5	25.2	15.4	118.4	26.8	21.4	16.1	12.9	10.7	8.9
3.5	14.3	9.3	18.5	13.2	109.6	17.3	13.8	10.4	8.3	6.9	5.8
4.0	11.5	5.7	14.2	11.6	83.9	11.7	9.4	7.0	5.6	4.7	3.9
4.5	9.5	3.8	11.2	10.3	66.3	8.3	6.7	5.0	4.0	3.3	2.8
5.0	8.1	2.6	9.1	9.3	53.7	6.1	4.9	3.7	2.9	2.5	2.0
5.5	7.0	1.9	7.5	8.4	44.4	4.6	3.7	2.8	2.2	1.9	1.5
6.0	6.2	1.4	6.3	7.7	37.3	3.6	2.9	2.1	1.7	1.4	1.2
6.5	5.6	1.1	5.4	7.1	31.8	2.8	2.3	1.7	1.4	1.1	0.9
7.0	5.0	0.8	4.6	6.6	27.4	2.3	1.8	1.4	1.1		
7.5	4.6	0.7	4.0	6.2	23.9	1.8	1.5	1.1			



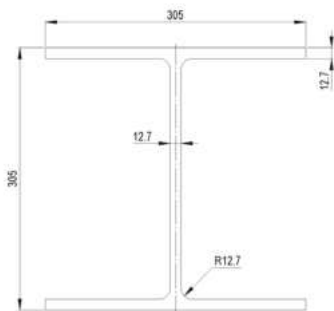
Product Name	HB254x254x9.5x9.5	
Flexural Allowable Moment M	12.2	(kNm)
Shear Allowable Force V	21.5	(kN)
Weight	13.9	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	122.3	434.8	43.5	28.7	40.0	220.8	176.6	132.5	106.0	88.3	73.6
2.0	69.3	138.5	24.4	21.5	40.0	112.6	90.0	67.5	54.0	45.0	37.5
2.5	44.7	57.2	15.6	17.2	40.0	63.8	51.0	38.3	30.6	25.5	21.3
3.0	31.4	27.9	10.9	14.3	40.0	39.2	31.3	23.5	18.8	15.7	13.1
3.5	23.3	15.2	8.0	12.3	40.0	25.6	20.5	15.4	12.3	10.3	8.5
4.0	18.1	9.0	6.1	10.8	40.0	17.6	14.1	10.6	8.5	7.0	5.9
4.5	14.5	5.7	4.8	9.6	40.0	12.6	10.1	7.6	6.0	5.0	4.2
5.0	11.9	3.8	3.9	8.6	40.0	9.3	7.4	5.6	4.5	3.7	3.1
5.5	10.0	2.7	3.2	7.8	40.0	7.1	5.6	4.2	3.4	2.8	2.4
6.0	8.6	1.9	2.7	7.2	40.0	5.5	4.4	3.3	2.6	2.2	1.8
6.5	7.5	1.4	2.3	6.6	40.0	4.3	3.5	2.6	2.1	1.7	1.4
7.0	6.6	1.1	2.0	6.1	40.0	3.5	2.8	2.1	1.7	1.4	1.2
7.5	5.8	0.8	1.7	5.7	34.9	2.8	2.3	1.7	1.4	1.1	



Product Name	HB254x254x12.7x12.7	
Flexural Allowable Moment M	29.2	(kNm)
Shear Allowable Force V	28.8	(kN)
Weight	18.5	(kg/m)

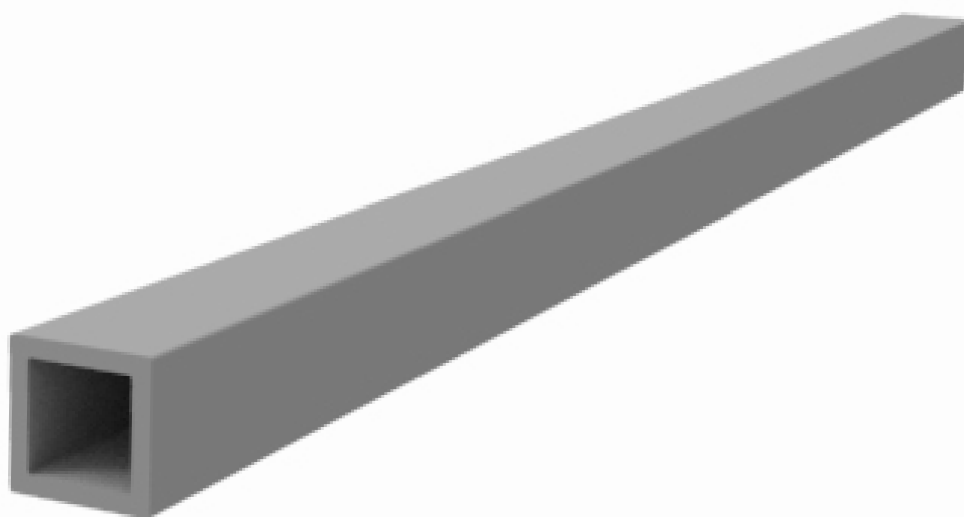
Length	Allowable Loads Includes Allowance for Short Term Safety Factors					Simply Supported Beam Uniform Load Deflection Limits					
	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	162.2	576.7	103.8	38.5	95.1	291.7	233.4	175.0	140.0	116.7	97.2
2.0	92.4	184.8	58.4	28.8	95.1	147.9	118.3	88.7	71.0	59.2	49.3
2.5	60.1	76.9	37.4	23.1	95.1	83.5	66.8	50.1	40.1	33.4	27.8
3.0	42.5	37.8	26.0	19.2	95.1	51.2	41.0	30.7	24.6	20.5	17.1
3.5	31.9	20.8	19.1	16.5	95.1	33.4	26.7	20.1	16.0	13.4	11.1
4.0	25.0	12.5	14.6	14.4	95.1	23.0	18.4	13.8	11.0	9.2	7.7
4.5	20.3	8.0	11.5	12.8	95.1	16.4	13.1	9.8	7.9	6.6	5.5
5.0	16.9	5.4	9.3	11.5	95.1	12.1	9.7	7.3	5.8	4.8	4.0
5.5	14.3	3.8	7.7	10.5	86.9	9.2	7.3	5.5	4.4	3.7	3.1
6.0	12.4	2.8	6.5	9.6	73.0	7.1	5.7	4.3	3.4	2.8	2.4
6.5	10.9	2.1	5.5	8.9	62.2	5.6	4.5	3.4	2.7	2.3	1.9
7.0	9.7	1.6	4.8	8.2	53.6	4.5	3.6	2.7	2.2	1.8	1.5
7.5	8.7	1.2	4.2	7.7	46.7	3.7	3.0	2.2	1.8	1.5	1.2

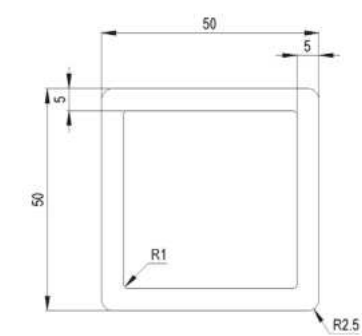


Product Name	HB305x305x12.7x12.7	
Flexural Allowable Moment M	29.8	(kNm)
Shear Allowable Force V	34.6	(kN)
Weight	22.3	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	337.8	1200.9	105.8	46.1	79.4	434.1	347.3	260.5	208.4	173.7	144.7
2.0	191.1	382.3	59.5	34.6	79.4	231.9	185.5	139.1	111.3	92.8	77.3
2.5	123.3	157.8	38.1	27.7	79.4	135.4	108.3	81.2	65.0	54.2	45.1
3.0	86.4	76.8	26.5	23.0	79.4	84.8	67.9	50.9	40.7	33.9	28.3
3.5	64.1	41.9	19.4	19.8	79.4	56.2	45.0	33.7	27.0	22.5	18.7
4.0	49.7	24.8	14.9	17.3	79.4	39.0	31.2	23.4	18.7	15.6	13.0
4.5	39.8	15.7	11.8	15.4	79.4	28.1	22.4	16.8	13.5	11.2	9.4
5.0	32.7	10.5	9.5	13.8	79.4	20.8	16.7	12.5	10.0	8.3	6.9
5.5	27.4	7.3	7.9	12.6	79.4	15.9	12.7	9.5	7.6	6.3	5.3
6.0	23.4	5.2	6.6	11.5	79.4	12.3	9.9	7.4	5.9	4.9	4.1
6.5	20.3	3.8	5.6	10.6	79.4	9.8	7.8	5.9	4.7	3.9	3.3
7.0	17.8	2.9	4.9	9.9	79.4	7.9	6.3	4.7	3.8	3.2	2.6
7.5	15.8	2.2	4.2	9.2	79.4	6.4	5.2	3.9	3.1	2.6	2.1

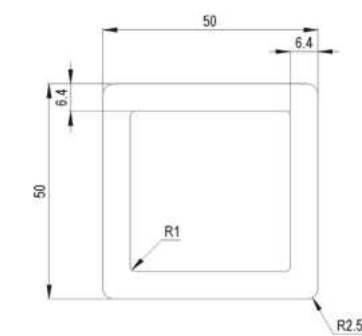
2.4 SQUARE PROFILE





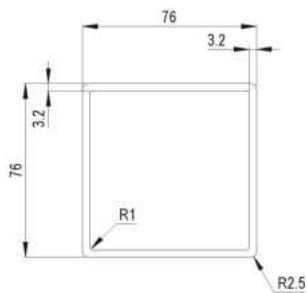
Product Name	SHS50x50x5	
Flexural Allowable Moment M	1.0	(kNm)
Shear Allowable Force V	4.0	(kN)
Weight	1.7	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	2.7	9.6	3.6	5.3	11.6	1.5	1.2				



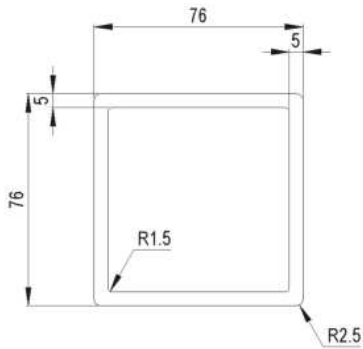
Product Name	SHS50x50x6.4	
Flexural Allowable Moment M	1.2	(kNm)
Shear Allowable Force V	5.1	(kN)
Weight	2.2	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	3.2	11.3	4.2	6.8	13.6	1.7	1.4	1.0			



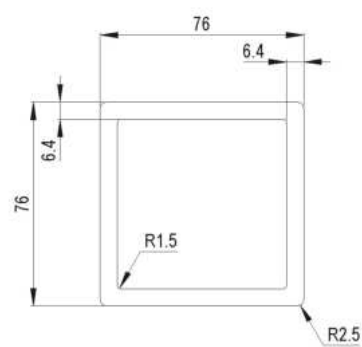
Product Name	SHS76x76x3.2	
Flexural Allowable Moment M	1.8	(kNm)
Shear Allowable Force V	4.0	(kN)
Weight	1.8	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	7.1	25.4	6.4	5.3	21.1	3.7	3.0	2.2	1.8	1.5	1.2
2.0	5.4	10.7	3.6	4.0	17.5	1.6	1.3	1.0			



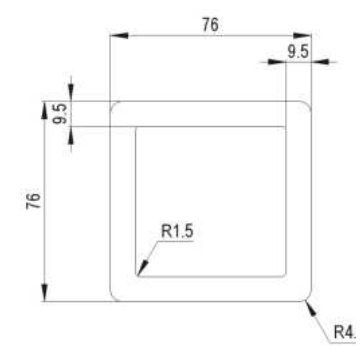
Product Name	SHS76x76x5	
Flexural Allowable Moment M	2.6	(kNm)
Shear Allowable Force V	6.2	(kN)
Weight	2.8	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	10.5	37.2	9.3	8.2	45.4	5.5	4.4	3.3	2.6	2.2	1.8
2.0	7.9	15.7	5.2	6.2	25.5	2.4	1.9	1.4	1.1	1.0	
2.5	6.3	8.0	3.3	4.9	16.3	1.2	1.0				



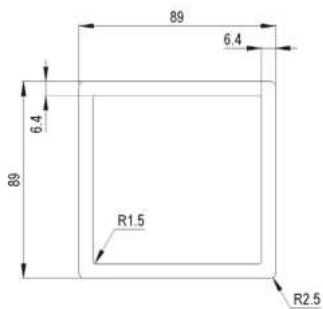
Product Name	SHS76x76x6.4	
Flexural Allowable Moment M	3.2	(kNm)
Shear Allowable Force V	7.8	(kN)
Weight	3.5	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	12.7	45.2	11.3	10.5	54.9	6.7	5.3	4.0	3.2	2.7	2.2
2.0	9.5	19.1	6.3	7.8	30.9	2.9	2.3	1.7	1.4	1.2	1.0
2.5	7.6	9.8	4.1	6.3	19.8	1.5	1.2				



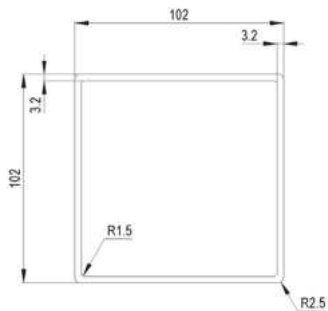
Product Name	SHS76x76x9.5	
Flexural Allowable Moment M	4.1	(kNm)
Shear Allowable Force V	11.5	(kN)
Weight	4.9	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	16.7	59.5	14.6	15.3	71.3	8.7	7.0	5.2	4.2	3.5	2.9
2.0	12.5	25.1	8.2	11.5	40.1	3.8	3.0	2.3	1.8	1.5	1.3
2.5	10.0	12.8	5.3	9.2	25.7	2.0	1.6	1.2			
3.0	8.4	7.4	3.7	7.7	17.8	1.1					



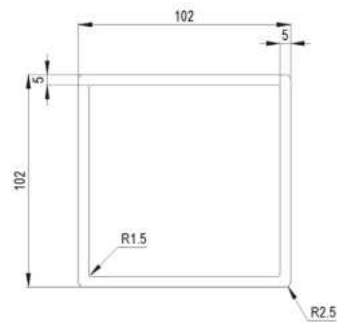
Product Name	SHS89x89x6.4	
Flexural Allowable Moment M	4.5	(kNm)
Shear Allowable Force V	9.2	(kN)
Weight	4.1	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	21.2	75.3	16.1	12.3	91.6	10.8	8.7	6.5	5.2	4.3	3.6
2.0	15.9	31.7	9.0	9.2	51.5	4.8	3.8	2.9	2.3	1.9	1.6
2.5	12.7	16.3	5.8	7.4	33.0	2.5	2.0	1.5	1.2	1.0	
3.0	10.6	9.4	4.0	6.1	22.9	1.5	1.2				



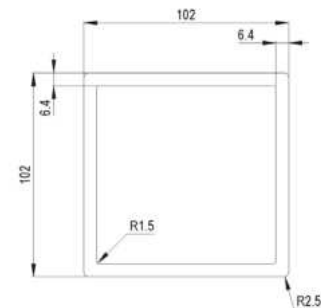
Product Name	SHS102x102x3.2	
Flexural Allowable Moment M	2.6	(kNm)
Shear Allowable Force V	5.4	(kN)
Weight	2.5	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	17.9	63.5	9.3	7.2	15.9	8.9	7.1	5.3	4.3	3.5	3.0
2.0	13.4	26.8	5.2	5.4	15.9	3.9	3.2	2.4	1.9	1.6	1.3
2.5	10.7	13.7	3.4	4.3	15.9	2.1	1.7	1.2	1.0		
3.0	8.9	7.9	2.3	3.6	15.9	1.2	1.0				



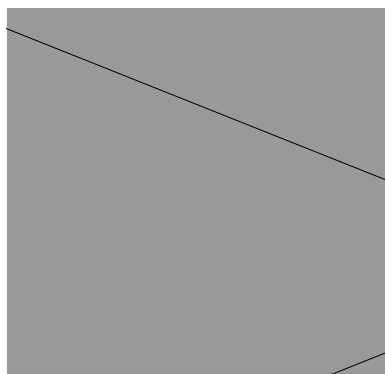
Product Name	SHS102x102x5	
Flexural Allowable Moment M	5.0	(kNm)
Shear Allowable Force V	8.3	(kN)
Weight	3.8	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	26.6	94.4	17.7	11.1	59.6	13.2	10.6	7.9	6.3	5.3	4.4
2.0	19.9	39.8	9.9	8.3	59.6	5.9	4.7	3.5	2.8	2.4	2.0
2.5	15.9	20.4	6.4	6.7	41.6	3.1	2.5	1.9	1.5	1.2	1.0
3.0	13.3	11.8	4.4	5.5	28.9	1.8	1.4	1.1			
3.5	11.4	7.4	3.2	4.8	21.2	1.2					



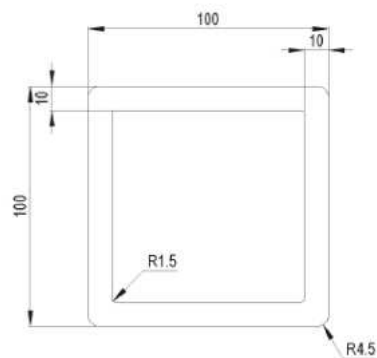
Product Name	SHS102x102x6.4	
Flexural Allowable Moment M	6.1	(kNm)
Shear Allowable Force V	10.6	(kN)
Weight	4.8	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	32.7	116.3	21.7	14.1	123.3	16.3	13.0	9.8	7.8	6.5	5.4
2.0	24.5	49.1	12.2	10.6	79.8	7.2	5.8	4.3	3.5	2.9	2.4
2.5	19.6	25.1	7.8	8.5	51.1	3.8	3.0	2.3	1.8	1.5	1.3
3.0	16.4	14.5	5.4	7.1	35.5	2.2	1.8	1.3	1.1		
3.5	14.0	9.2	4.0	6.1	26.1	1.4	1.1				



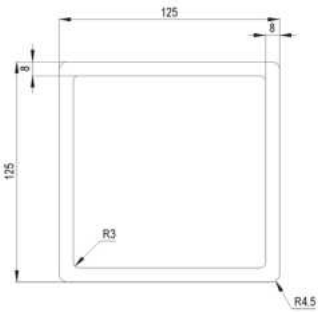
Product Name	SHS102x102x8	
Flexural Allowable Moment M	7.2	(kNm)
Shear Allowable Force V	13.1	(kN)
Weight	5.8	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	38.9	138.5	25.7	17.5	168.0	19.4	15.5	11.6	9.3	7.7	6.5
2.0	29.2	58.4	14.4	13.1	94.5	8.6	6.9	5.2	4.1	3.4	2.9
2.5	23.4	29.9	9.2	10.5	60.5	4.5	3.6	2.7	2.2	1.8	1.5
3.0	19.5	17.3	6.4	8.7	42.0	2.6	2.1	1.6	1.3	1.1	
3.5	16.7	10.9	4.7	7.5	30.9	1.7	1.3	1.0			
4.0	14.6	7.3	3.6	6.6	23.6	1.1					



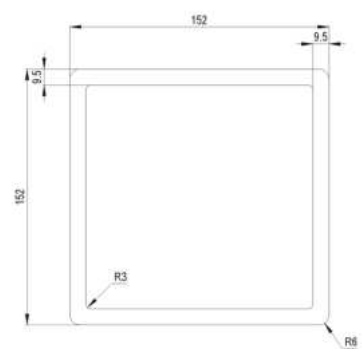
Product Name	SHS100x100x10	
Flexural Allowable Moment M	8.1	(kNm)
Shear Allowable Force V	16.0	(kN)
Weight	7.0	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	43.2	153.5	28.9	21.3	185.4	21.6	17.3	13.0	10.4	8.6	7.2
2.0	32.4	64.7	16.3	16.0	104.3	9.5	7.6	5.7	4.6	3.8	3.2
2.5	25.9	33.1	10.4	12.8	66.8	5.0	4.0	3.0	2.4	2.0	1.7
3.0	21.6	19.2	7.2	10.7	46.4	2.9	2.3	1.8	1.4	1.2	1.0
3.5	18.5	12.1	5.3	9.1	34.1	1.9	1.5	1.1			
4.0	16.2	8.1	4.1	8.0	26.1	1.2	1.0				



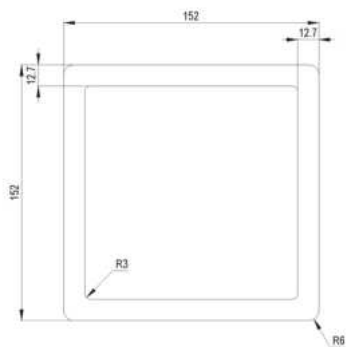
Product Name	SHS125x125x8	
Flexural Allowable Moment M	11.4	(kNm)
Shear Allowable Force V	16.3	(kN)
Weight	7.3	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	75.0	266.7	40.5	21.7	195.9	35.2	28.2	21.1	16.9	14.1	11.7
2.0	56.2	112.5	22.8	16.3	182.5	16.0	12.8	9.6	7.7	6.4	5.3
2.5	45.0	57.6	14.6	13.0	116.8	8.5	6.8	5.1	4.1	3.4	2.8
3.0	37.5	33.3	10.1	10.8	81.1	5.0	4.0	3.0	2.4	2.0	1.7
3.5	32.1	21.0	7.4	9.3	59.6	3.2	2.6	1.9	1.5	1.3	1.1
4.0	28.1	14.1	5.7	8.1	45.6	2.2	1.7	1.3	1.0		
4.5	25.0	9.9	4.5	7.2	36.1	1.5	1.2				
5.0	22.5	7.2	3.6	6.5	29.2	1.1					



Product Name	SHS152x152x9.5	
Flexural Allowable Moment M	20.0	(kNm)
Shear Allowable Force V	23.4	(kN)
Weight	10.5	(kg/m)

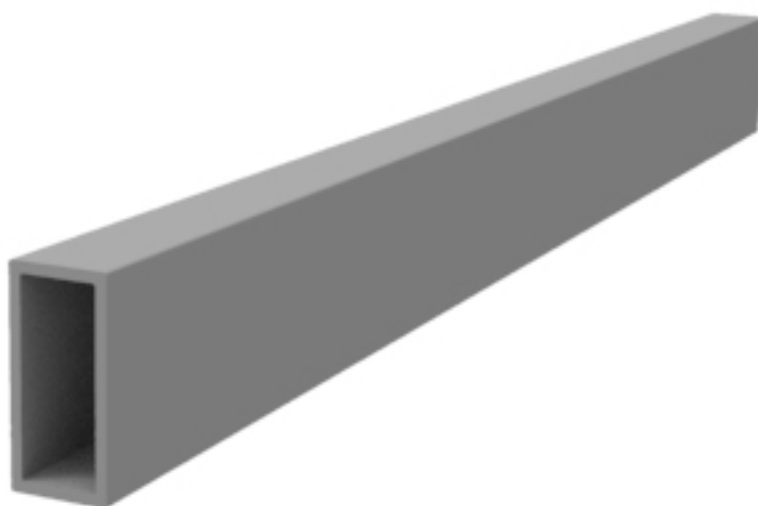
Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	160.4	570.5	71.2	31.2	269.7	69.9	55.9	41.9	33.5	28.0	23.3
2.0	120.3	240.7	40.0	23.4	269.7	32.7	26.1	19.6	15.7	13.1	10.9
2.5	96.3	123.2	25.6	18.7	249.9	17.6	14.1	10.6	8.5	7.0	5.9
3.0	80.2	71.3	17.8	15.6	173.5	10.5	8.4	6.3	5.0	4.2	3.5
3.5	68.8	44.9	13.1	13.4	127.5	6.7	5.4	4.0	3.2	2.7	2.2
4.0	60.2	30.1	10.0	11.7	97.6	4.6	3.6	2.7	2.2	1.8	1.5
4.5	53.5	21.1	7.9	10.4	77.1	3.2	2.6	1.9	1.6	1.3	1.1
5.0	48.1	15.4	6.4	9.4	62.5	2.4	1.9	1.4	1.1		
5.5	43.8	11.6	5.3	8.5	51.6	1.8	1.4	1.1			
6.0	40.1	8.9	4.4	7.8	43.4	1.4	1.1				
6.5	37.0	7.0	3.8	7.2	37.0	1.1					

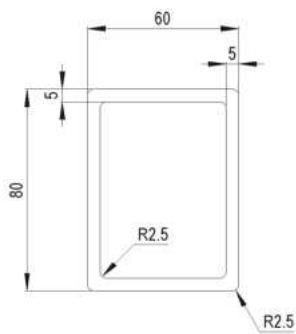


Product Name	SHS152x152x12.7	
Flexural Allowable Moment M	25.1	(kNm)
Shear Allowable Force V	31.1	(kN)
Weight	13.7	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	202.1	718.7	89.4	41.5	630.7	88.8	71.0	53.3	42.6	35.5	29.6
2.0	151.6	303.2	50.3	31.1	490.1	41.3	33.1	24.8	19.8	16.5	13.8
2.5	121.3	155.2	32.2	24.9	313.7	22.2	17.8	13.3	10.7	8.9	7.4
3.0	101.1	89.8	22.3	20.7	217.8	13.2	10.6	7.9	6.3	5.3	4.4
3.5	86.6	56.6	16.4	17.8	160.0	8.5	6.8	5.1	4.1	3.4	2.8
4.0	75.8	37.9	12.6	15.5	122.5	5.7	4.6	3.4	2.8	2.3	1.9
4.5	67.4	26.6	9.9	13.8	96.8	4.1	3.3	2.4	2.0	1.6	1.4
5.0	60.6	19.4	8.0	12.4	78.4	3.0	2.4	1.8	1.4	1.2	1.0
5.5	55.1	14.6	6.6	11.3	64.8	2.2	1.8	1.3	1.1		
6.0	50.5	11.2	5.6	10.4	54.5	1.7	1.4	1.0			
6.5	46.6	8.8	4.8	9.6	46.4	1.4	1.1				
7.0	43.3	7.1	4.1	8.9	40.0	1.1					

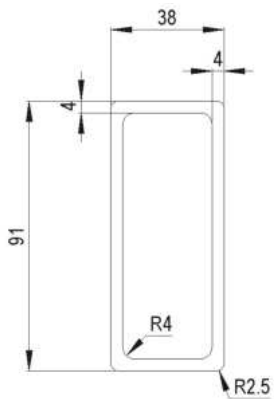
2.5 RECTANGULAR PROFILE





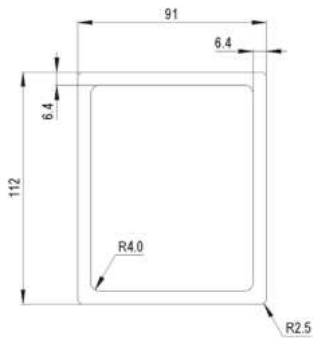
Product Name	RHS80x60x5	
Flexural Allowable Moment M	2.4	(kNm)
Shear Allowable Force V	6.9	(kN)
Weight	2.5	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	6.9	24.7	8.4	9.2	27.0	5.1	4.1	3.1	2.4	2.0	1.7
2.0	5.2	10.4	4.7	6.9	15.2	2.2	1.8	1.3	1.1		
2.5	4.2	5.3	3.0	5.5	9.7	1.2					



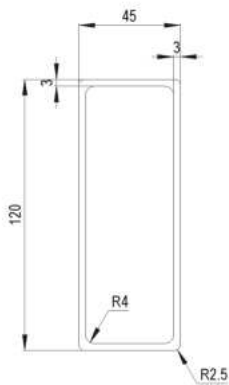
Product Name	RHS91x38x4	
Flexural Allowable Moment M	1.8	(kNm)
Shear Allowable Force V	6.6	(kN)
Weight	1.9	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	2.6	9.4	6.3	8.8	8.8	4.0	3.2	2.4	1.9	1.6	1.3
2.0	2.0	4.0	3.6	6.6	4.9	1.8	1.5	1.1			



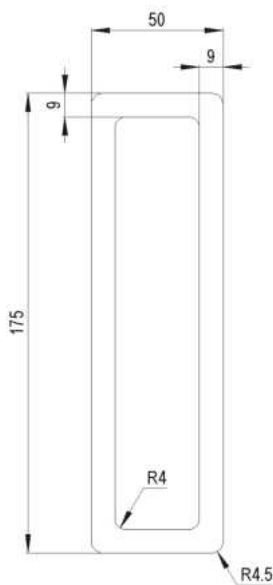
Product Name	RHS112x91x6.4	
Flexural Allowable Moment M	6.4	(kNm)
Shear Allowable Force V	12.3	(kN)
Weight	4.8	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	29.3	104.3	22.8	16.4	102.2	18.1	14.5	10.8	8.7	7.2	6.0
2.0	22.0	44.0	12.8	12.3	66.1	8.2	6.5	4.9	3.9	3.3	2.7
2.5	17.6	22.5	8.2	9.8	42.3	4.3	3.5	2.6	2.1	1.7	1.4
3.0	14.7	13.0	5.7	8.2	29.4	2.5	2.0	1.5	1.2	1.0	
3.5	12.6	8.2	4.2	7.0	21.6	1.6	1.3	1.0			
4.0	11.0	5.5	3.2	6.1	16.5	1.1					



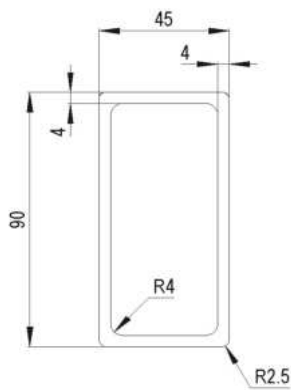
Product Name	RHS120x45x3	
Flexural Allowable Moment M	1.2	(kNm)
Shear Allowable Force V	6.6	(kN)
Weight	1.9	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	4.1	14.4	4.2	8.8	7.7	6.0	4.8	3.6	2.9	2.4	2.0
2.0	3.0	6.1	2.4	6.6	7.5	2.9	2.3	1.7	1.4	1.2	1.0
2.5	2.4	3.1	1.5	5.3	4.8	1.6	1.3				



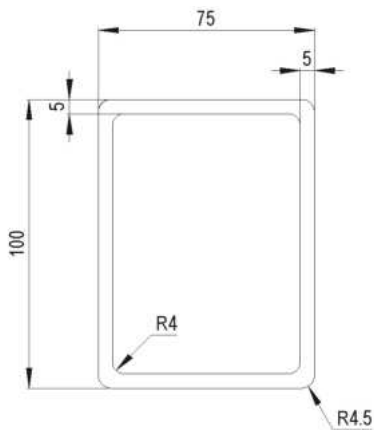
Product Name	RHS175x50x9	
Flexural Allowable Moment M	11.4	(kNm)
Shear Allowable Force V	28.1	(kN)
Weight	7.3	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	17.1	60.9	40.5	37.4	52.7	28.0	22.4	16.8	13.4	11.2	9.3
2.0	12.9	25.7	22.8	28.1	29.7	15.3	12.3	9.2	7.4	6.1	5.1
2.5	10.3	13.2	14.6	22.4	19.0	9.1	7.3	5.5	4.4	3.6	3.0
3.0	8.6	7.6	10.1	18.7	13.2	5.8	4.6	3.5	2.8	2.3	1.9
3.5	7.3	4.8	7.4	16.0	9.7	3.9	3.1	2.3	1.9	1.5	1.3
4.0	6.4	3.2	5.7	14.0	7.4	2.7	2.2	1.6	1.3	1.1	
4.5	5.7	2.3	4.5	12.5	5.9	1.9	1.6	1.2			
5.0	5.1	1.6	3.6	11.2	4.7	1.4	1.2				
5.5	4.7	1.2	3.0	10.2	3.9	1.1					



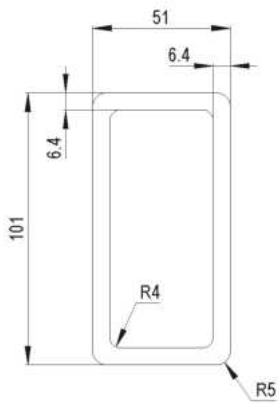
Product Name	RHS90x45x4x4	
Flexural Allowable Moment M	1.9	(kNm)
Shear Allowable Force V	6.5	(kN)
Weight	2.0	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	3.7	13.3	6.9	8.7	12.9	4.4	3.6	2.7	2.1	1.8	1.5
2.0	2.8	5.6	3.9	6.5	7.3	2.0	1.6	1.2	1.0		
2.5	2.2	2.9	2.5	5.2	4.6	1.1					



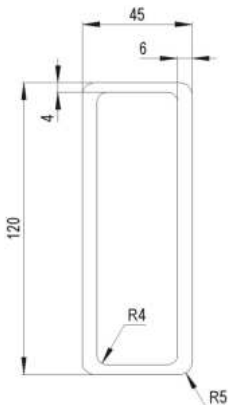
Product Name	RHS100x75x5x5	
Flexural Allowable Moment M	3.8	(kNm)
Shear Allowable Force V	8.7	(kN)
Weight	3.2	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	14.2	50.4	13.5	11.6	52.7	9.8	7.9	5.9	4.7	3.9	3.3
2.0	10.6	21.2	7.6	8.7	30.9	4.4	3.5	2.6	2.1	1.8	1.5
2.5	8.5	10.9	4.9	6.9	19.8	2.3	1.8	1.4	1.1		
3.0	7.1	6.3	3.4	5.8	13.7	1.4	1.1				



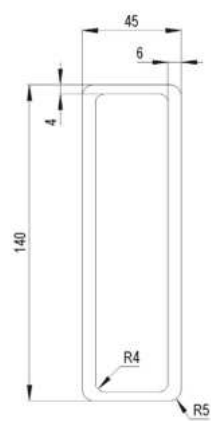
Product Name	RHS101x51x6.35x6.35	
Flexural Allowable Moment M	3.6	(kNm)
Shear Allowable Force V	11.5	(kN)
Weight	3.5	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	7.8	27.6	12.7	15.3	26.5	9.0	7.2	5.4	4.3	3.6	3.0
2.0	5.8	11.6	7.1	11.5	14.9	4.1	3.3	2.4	2.0	1.6	1.4
2.5	4.7	6.0	4.6	9.2	9.6	2.2	1.7	1.3	1.0		
3.0	3.9	3.4	3.2	7.7	6.6	1.3	1.0				



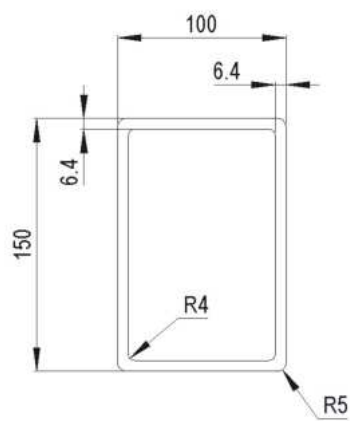
Product Name	RHS120x45x4x6	
Flexural Allowable Moment M	3.2	(kNm)
Shear Allowable Force V	8.8	(kN)
Weight	2.7	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	5.4	19.1	11.4	11.7	17.1	9.3	7.5	5.6	4.5	3.7	3.1
2.0	4.0	8.0	6.4	8.8	9.6	4.4	3.6	2.7	2.1	1.8	1.5
2.5	3.2	4.1	4.1	7.0	6.1	2.4	1.9	1.5	1.2	1.0	
3.0	2.7	2.4	2.9	5.9	4.3	1.4	1.2				



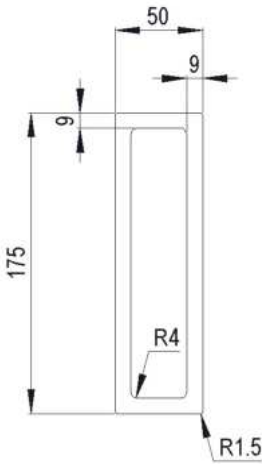
Product Name	RHS140x45x4x6	
Flexural Allowable Moment M	3.0	(kNm)
Shear Allowable Force V	10.3	(kN)
Weight	3	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	6.3	22.4	10.6	13.7	16.3	11.8	9.4	7.1	5.7	4.7	3.9
2.0	4.7	9.5	6.0	10.3	11.1	5.9	4.7	3.6	2.8	2.4	2.0
2.5	3.8	4.8	3.8	8.2	7.1	3.3	2.7	2.0	1.6	1.3	1.1
3.0	3.2	2.8	2.7	6.9	4.9	2.0	1.6	1.2	1.0		
3.5	2.7	1.8	1.9	5.9	3.6	1.3	1.1				



Product Name	RHS150x100x6.35x6.35	
Flexural Allowable Moment M	10.3	(kNm)
Shear Allowable Force V	16.9	(kN)
Weight	5.9	(kg/m)

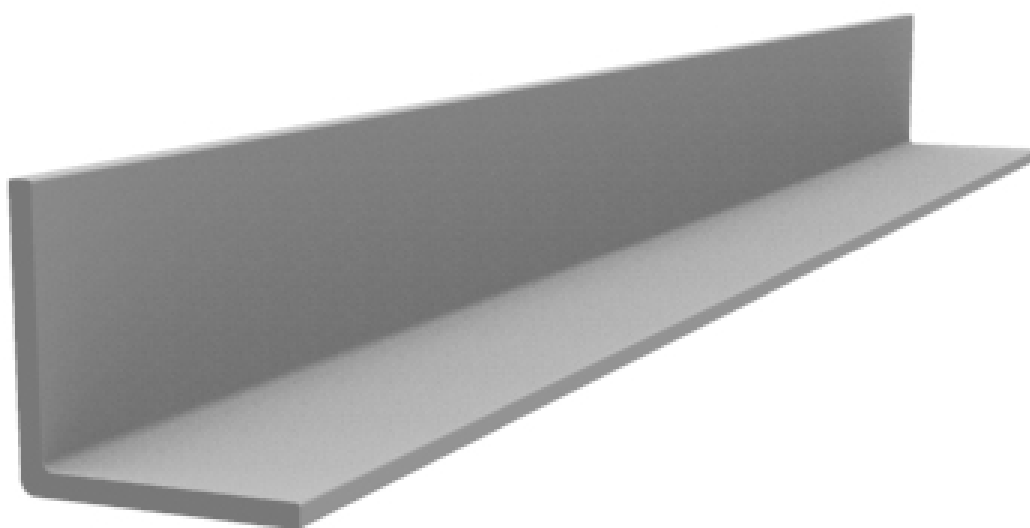
Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	49.5	175.8	36.7	22.5	69.5	33.5	26.8	20.1	16.1	13.4	11.2
2.0	37.1	74.2	20.7	16.9	69.5	16.0	12.8	9.6	7.7	6.4	5.3
2.5	29.7	38.0	13.2	13.5	66.9	8.7	7.0	5.2	4.2	3.5	2.9
3.0	24.7	22.0	9.2	11.2	46.5	5.2	4.2	3.1	2.5	2.1	1.7
3.5	21.2	13.8	6.7	9.6	34.1	3.4	2.7	2.0	1.6	1.4	1.1
4.0	18.5	9.3	5.2	8.4	26.1	2.3	1.8	1.4	1.1	0.9	0.8
4.5	16.5	6.5	4.1	7.5	20.7	1.6	1.3	1.0			
5.0	14.8	4.7	3.3	6.7	16.7	1.2	1.0				

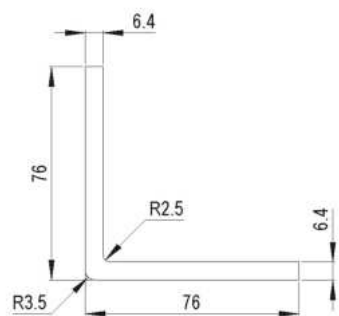


Product Name	RHS175x50x9x9	
Flexural Allowable Moment M	11.4	(kNm)
Shear Allowable Force V	28.1	(kN)
Weight	7.3	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	17.1	60.9	40.5	37.4	52.7	28.0	22.4	16.8	13.4	11.2	9.3
2.0	12.9	25.7	22.8	28.1	29.7	15.3	12.3	9.2	7.4	6.1	5.1
2.5	10.3	13.2	14.6	22.4	19.0	9.1	7.3	5.5	4.4	3.6	3.0
3.0	8.6	7.6	10.1	18.7	13.2	5.8	4.6	3.5	2.8	2.3	1.9
3.5	7.3	4.8	7.4	16.0	9.7	3.9	3.1	2.3	1.9	1.5	1.3
4.0	6.4	3.2	5.7	14.0	7.4	2.7	2.2	1.6	1.3	1.1	0.9
4.5	5.7	2.3	4.5	12.5	5.9	1.9	1.6	1.2			
5.0	5.1	1.6	3.6	11.2	4.7	1.4	1.2				
5.5	4.7	1.2	3.0	10.2	3.9	1.1					

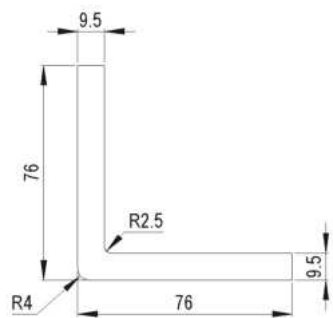
2.6 EQUAL ANGLE





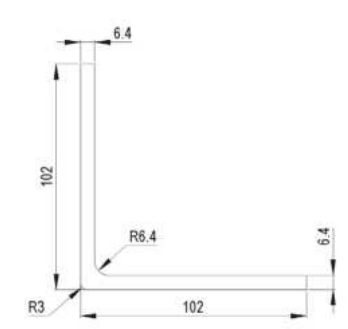
Product Name	EA76x76x6.4	
Flexural Allowable Moment M	0.8	(kNm)
Shear Allowable Force V	4.1	(kN)
Weight	1.8	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	0.5	1.9	2.8	5.5	6.6	2.2	1.7	1.3	1.0		



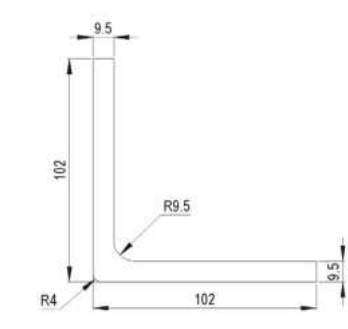
Product Name	EA76x76x9.5	
Flexural Allowable Moment M	1.1	(kNm)
Shear Allowable Force V	6.1	(kN)
Weight	2.6	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	1.1	4.0	4.0	8.1	10.0	3.0	2.4	1.8	1.5	1.2	1.0
2.0	0.8	1.7	2.3	6.1	5.6	1.3	1.0				



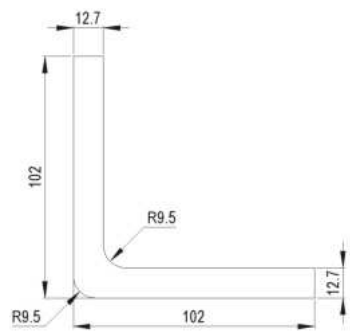
Product Name	EA102x102x6.4	
Flexural Allowable Moment M	1.4	(kNm)
Shear Allowable Force V	5.5	(kN)
Weight	2.5	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	1.0	3.5	5.1	7.3	4.9	5.2	4.2	3.1	2.5	2.1	1.7
2.0	0.7	1.5	2.9	5.5	4.9	2.3	1.8	1.4	1.1		
2.5	0.6	0.8	1.9	4.4	4.9	1.2					



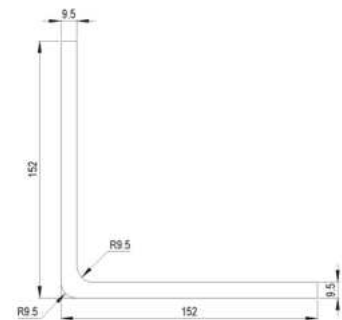
Product Name	EA102x102x9.5	
Flexural Allowable Moment M	2.1	(kNm)
Shear Allowable Force V	8.2	(kN)
Weight	3.5	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	2.1	7.5	7.4	10.9	15.9	7.4	5.9	4.4	3.5	3.0	2.5
2.0	1.6	3.1	4.2	8.2	13.6	3.2	2.6	1.9	1.5	1.3	1.1
2.5	1.3	1.6	2.7	6.5	8.7	1.7	1.3				
3.0	1.0	0.9	1.9	5.4	6.0	1.0					



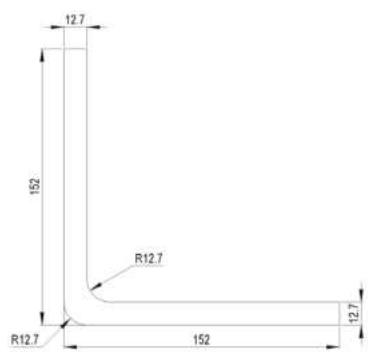
Product Name	EA102x102x12.7	
Flexural Allowable Moment M	2.7	(kNm)
Shear Allowable Force V	11.3	(kN)
Weight	4.6	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	3.7	13.2	9.6	15.1	31.7	9.5	7.6	5.7	4.6	3.8	3.2
2.0	2.8	5.6	5.4	11.3	17.9	4.1	3.3	2.5	2.0	1.7	1.4
2.5	2.2	2.8	3.5	9.1	11.4	2.1	1.7	1.3			
3.0	1.8	1.6	2.4	7.6	7.9	1.3	1.0				



Product Name	EA152x152x9.5	
Flexural Allowable Moment M	4.8	(kNm)
Shear Allowable Force V	12.4	(kN)
Weight	5.4	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	5.0	17.8	17.0	16.5	10.9	23.6	18.9	14.2	11.3	9.5	7.9
2.0	3.7	7.4	9.5	12.4	10.9	10.6	8.5	6.4	5.1	4.3	3.5
2.5	3.0	3.8	6.1	9.9	10.9	5.6	4.5	3.4	2.7	2.2	1.9
3.0	2.5	2.2	4.2	8.3	10.9	3.3	2.6	2.0	1.6	1.3	1.1
3.5	2.1	1.4	3.1	7.1	10.9	2.1	1.7	1.3	1.0		
4.0	1.8	0.9	2.4	6.2	10.9	1.4	1.1				
4.5	1.6	0.6	1.9	5.5	9.4	1.0					



Product Name	EA152x152x12.7	
Flexural Allowable Moment M	6.2	(kNm)
Shear Allowable Force V	16.8	(kN)
Weight	7.0	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors						Simply Supported Beam Uniform Load Deflection Limits					
Length	Torsional Moment	Laterally unsupported Beam	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	(kNm)	(kN/m)	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	8.8	31.2	22.2	22.4	25.8	30.8	24.6	18.5	14.8	12.3	10.3
2.0	6.5	13.0	12.5	16.8	25.8	13.8	11.1	8.3	6.6	5.5	4.6
2.5	5.2	6.6	8.0	13.4	25.8	7.3	5.8	4.4	3.5	2.9	2.4
3.0	4.3	3.8	5.6	11.2	25.8	4.3	3.4	2.6	2.1	1.7	1.4
3.5	3.7	2.4	4.1	9.6	20.2	2.7	2.2	1.6	1.3	1.1	
4.0	3.2	1.6	3.1	8.4	15.5	1.8	1.5	1.1			
4.5	2.9	1.1	2.5	7.5	12.2	1.3	1.0				
5.0	2.6	0.8	2.0	6.7	9.9	1.0					

2.7 ROUND TUBE

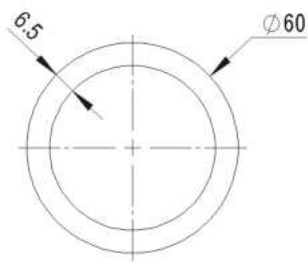


Product Name	RT50.8x6.4	
Flexural Allowable Moment M	0.7	(kNm)
Shear Allowable Force V	3.8	(kN)
Weight	1.7	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	2.6	5.1	7.5	1.0	1.2				

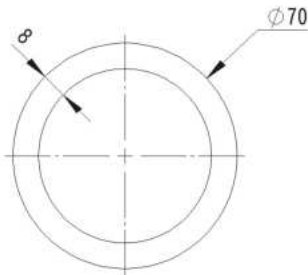
Product Name	RT60x5.5	
Flexural Allowable Moment M	1.0	(kNm)
Shear Allowable Force V	4.2	(kN)
Weight	1.9	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	3.5	5.6	11.8	1.5	1.2				



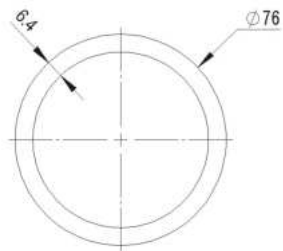
Product Name	RT60x6.5	
Flexural Allowable Moment M	1.1	(kNm)
Shear Allowable Force V	4.8	(kN)
Weight	2.1	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	3.9	6.4	13.2	1.7	1.3	1.0			



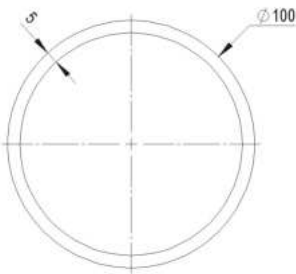
Product Name	RT70x8	
Flexural Allowable Moment M	1.8	(kNm)
Shear Allowable Force V	6.8	(kN)
Weight	3.2	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	6.5	9.0	25.4	3.2	2.6	1.9	1.5	1.3	1.1
2.0	3.6	6.8	14.3	1.4	1.1				



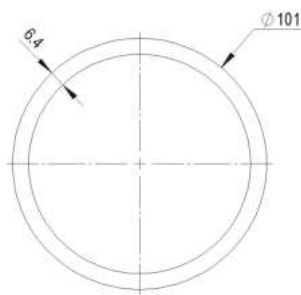
Product Name	RT76x6.4	
Flexural Allowable Moment M	1.9	(kNm)
Shear Allowable Force V	6.4	(kN)
Weight	2.6	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	6.5	9.0	25.4	3.2	2.6	1.9	1.5	1.3	1.1
2.0	3.6	6.8	14.3	1.4	1.1				



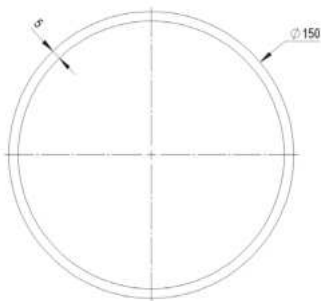
Product Name	RT100x5	
Flexural Allowable Moment M	2.8	(kNm)
Shear Allowable Force V	6.7	(kN)
Weight	2.8	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	10.0	9.0	56.4	6.8	5.5	4.1	3.3	2.7	2.3
2.0	5.6	6.7	31.7	3.0	2.4	1.8	1.4	1.2	1.0
2.5	3.6	5.4	20.3	1.5	1.2				



Product Name	RT101x6.4	
Flexural Allowable Moment M	3.5	(kNm)
Shear Allowable Force V	8.9	(kN)
Weight	3.6	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	12.6	11.8	71.4	8.6	6.9	5.2	4.1	3.5	2.9
2.0	7.1	8.9	40.2	3.8	3.0	2.3	1.8	1.5	1.3
2.5	4.5	7.1	25.7	2.0	1.6	1.2			
3.0	3.1	5.9	17.8	1.1					



Product Name	RT150x5	
Flexural Allowable Moment M	6.7	(kNm)
Shear Allowable Force V	8.3	(kN)
Weight	4.4	(kg/m)

Allowable Loads Includes Allowance for Short Term Safety Factors				Simply Supported Beam Uniform Load Deflection Limits					
Length	Flexural Bending Capacity	In-plane Shear	N _c	L/120	L/150	L/200	L/250	L/300	L/360
m	kN/m	kN/m	(kN)	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
1.5	23.7	11.0	200.2	22.2	17.7	13.3	10.6	8.9	7.4
2.0	13.3	8.3	112.6	10.0	8.0	6.0	4.8	4.0	3.3
2.5	8.5	6.6	72.1	5.3	4.2	3.2	2.5	2.1	1.8
3.0	5.9	5.5	50.0	3.1	2.5	1.9	1.5	1.3	1.0
3.5	4.4	4.7	36.8	2.0	1.6	1.2	1.0		
4.0	3.3	4.1	28.1	1.3	1.1				

2.8 PLATES AND RODS

FLAT PLATE				
Product Number	B	T	A	Wt.
	mm	mm	10 ³ mm ²	kg/m
FP1220x3.2	1,220.0	3.2	3.90	7.4
FP1220x6.4	1,220.0	6.4	7.81	14.8
FP1220x9.5	1,220.0	9.5	11.59	22.0
FP1220x12.7	1,220.0	12.7	15.49	29.4
FP1220x16	1,220.0	16.0	19.52	37.2
FP1220x19	1,220.0	19.0	23.18	44.1

FLAT STRIP				
Product Number	B	T	A	Wt.
	mm	mm	10 ³ mm ²	kg/m
FS19x6.4	19.0	6.4	0.122	0.3
FS25.4x8	24.4	8.0	0.195	0.4
FS30x3	30.0	3.0	0.090	0.7
FS30x6.4	30.0	6.4	0.192	0.4
FS35x8	35.0	8.0	0.280	0.5
FS38x5	38.0	5.0	0.190	0.37
FS40x8	40.0	8.0	0.320	0.6
FS50x2	50.0	2.0	0.100	0.3
FS50x4	50.0	4.0	0.200	0.4
FS50x6	50.0	6.0	0.300	0.6
FS50x8	50.0	8.0	0.400	0.8
FS50x15	50.0	15.0	0.750	1.4
FS50x25	50.0	25.0	1.250	2.5
FS102x5	102.0	5.0	0.510	1.0
FS120x10	120.0	10.0	1.200	2.4
FS152x10	152.0	10.0	1.520	2.9
FS250x12	250.0	12.0	3.000	5.7

ROUND SOLID ROD			
Product Number	D _o	A	Weight (kg/m)
	mm	mm ²	kg/m
RSR4.2	4.2	13.9	0.03
RSR6	6.0	28.3	0.08
RSR8	8.0	50.3	0.10
RSR9.5	9.5	70.9	0.14
RSR12.7	12.7	126.7	0.26
RSR16	16.0	201.1	0.41
RSR19	19.0	283.5	0.55
RSR20	20.0	314.2	0.62
RSR22	22.0	380.1	0.72
RSR25.4	25.4	506.7	1.00
RSR31.8	31.8	794.2	1.51
RSR38	38.0	1,134.1	2.15

SQUARE SOLID ROD			
Product Number	B	A	Weight (kg/m)
	mm	mm ²	kg/m
SSR25x25	25.0	625.0	1.23
SSR32x32	32.0	1,024.0	2.00
SSR38x38	38.0	1,444.0	2.80



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DESIGN GUIDE

TYPICAL CONNECTIONS

GRP AUSTRALIA | 2024 | PART 3

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DESIGN GUIDE

NOTATIONS

A	Section area (mm ²)
B	Section width (mm)
c	Coordinate of centroid
d_o	Section outer diameter (mm)
E	Modulus of Elasticity (GPa)
f_b	Flexural Strength (MPa)
f_c	Compressive Strength (MPa)
f_{cb}	Pin Bearing Strength (MPa)
f_t	Tensile Strength (MPa)
f_v	Shear Strength (MPa)
G	Shear Modulus of Elasticity (GPa)
H	Section height (mm)
I	Moment of inertia (mm ⁴)
L	Length of Span; or segment length (m)
L_e	Effective length of a compression member (m)
r	Radius of gyration (mm)
T	Section thickness (mm)
ν	Poisson's Ratio
$Wt.$	Section weight (kg/m)
W	Uniformly applied distributed load
Z	Elastic Section Modulus (mm ³)

INDEX

PART 3 - CONNECTIONS

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1.0 INTRODUCTION

Structural connections between pultruded FRP members can be accomplished by several methods depending on the application and member types.

Bolted joints are perhaps the most common form of structural connections however there is increasing use of structural rivets and adhesive joints particularly for thin-walled sections. The following sections provide some guidance on the use and design of various structural joints.

2.0 BOLTED JOINTS

In static calculations for bolted joints, it is necessary to ensure that the FRP profile and the bolts can withstand the shear forces and local compression around the bolts.

Pin bearing and net tension strength of the bolted connection are shown in the tables below for both the longitudinal and transverse pultruded loading directions. A safety factor of 2.5 has been used and tables also assume that the bolt spacings satisfy the requirements as outlined in the Eurocomp design guide Figure 2.1, shown below. Hole diameters in the GRP material should be limited to 1mm greater than the bolt or pin diameter.

The design engineer shall take into account any additional loading which the connection may be subject to.

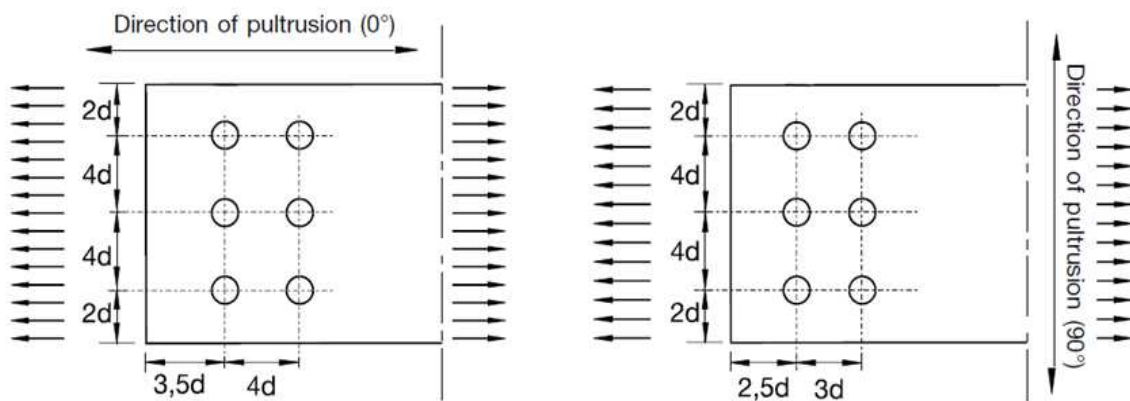


Figure 2.1 Minimum Bolt Spacing Requirements

3.0 LOAD BEARING CAPACITY OF BOLTS SUBJECTED TO SHEAR IN kN

Safety Factor: 2.5 (Suitable for Unfactored Load Combinations)
Washers under bolt head and nut
Hole Spacing according to Figure 2.1
Hole size in laminate: $D=D_{\text{bolt}} + 1\text{mm}$

Laminate strength for longitudinal (0°) direction of force (kN)																
Bolt Diameter (mm)	Thickness of laminate (mm)															
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
6	1.8	2.2	2.5	2.9	3.2	3.6	4.0	4.3	4.7	4.8	4.8	4.8	4.8	4.8	4.8	4.8
8	2.4	2.9	3.4	3.8	4.3	4.8	5.3	5.8	6.2	6.7	7.2	7.7	8.2	8.6	8.8	8.8
10	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	9.6	10.2	10.8	11.4	12.0
12	3.6	4.3	5.0	5.8	6.5	7.2	7.9	8.6	9.4	10.1	10.8	11.5	12.2	13.0	13.7	14.4
14	4.2	5.0	5.9	6.7	7.6	8.4	9.2	10.1	10.9	11.8	12.6	13.4	14.3	15.1	16.0	16.8
16	4.8	5.8	6.7	7.7	8.6	9.6	10.6	11.5	12.5	13.4	14.4	15.4	16.3	17.3	18.2	19.2
20	6.0	7.2	8.4	9.6	10.8	12.0	13.2	14.4	15.6	16.8	18.0	19.2	20.4	21.6	22.8	24.0
22	6.6	7.9	9.2	10.6	11.9	13.2	14.5	15.8	17.2	18.5	19.8	21.1	22.4	23.8	25.1	26.4
24	7.2	8.6	10.1	11.5	13.0	14.4	15.8	17.3	18.7	20.2	21.6	23.0	24.5	25.9	27.4	28.8
27	8.1	9.7	11.3	13.0	14.6	16.2	17.8	19.4	21.1	22.7	24.3	25.9	27.5	29.2	30.8	32.4
30	9.0	10.8	12.6	14.4	16.2	18.0	19.8	21.6	23.4	25.2	27.0	28.8	30.6	32.4	34.2	36.0

Laminate strength for transverse (90°) direction of force (kN)																
Bolt Diameter (mm)	Thickness of laminate (mm)															
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
6			1.2	1.3	1.5	1.7	1.8	2.0	2.2	2.4	2.5	2.7	2.9	3.0	3.2	3.4
8	1.1	1.3	1.6	1.8	2.0	2.2	2.5	2.7	2.9	3.1	3.4	3.6	3.8	4.0	4.3	4.5
10	1.4	1.7	2.0	2.2	2.5	2.8	3.1	3.4	3.6	3.9	4.2	4.5	4.8	5.0	5.3	5.6
12	1.7	2.0	2.4	2.7	3.0	3.4	3.7	4.0	4.5	4.7	5.0	5.4	5.7	6.0	6.4	6.7
14	2.0	2.4	2.7	3.1	3.5	3.9	4.3	4.7	5.1	5.5	5.9	6.3	6.7	7.1	7.4	7.8
16	2.2	2.7	3.1	3.6	4.0	4.5	4.9	5.4	5.8	6.3	6.7	7.2	7.6	8.1	8.5	9.0
20	2.8	3.4	3.9	4.5	5.0	5.6	6.2	6.7	7.3	7.8	8.4	9.0	9.5	10.1	10.6	11.2
22	3.1	3.7	4.3	4.9	5.5	6.2	6.8	7.4	8.0	8.6	9.2	9.9	10.5	11.1	11.7	12.3
24	3.4	4.0	4.7	5.4	6.0	6.7	7.4	8.1	8.7	9.4	10.1	10.8	11.4	12.1	12.8	13.4
27	3.8	4.5	5.3	6.0	6.8	7.6	8.3	9.1	9.8	10.6	11.3	12.1	12.9	13.6	14.4	15.1
30	4.2	5.0	5.9	6.7	7.6	8.4	9.2	10.1	10.9	11.8	12.6	13.4	14.3	15.1	16.0	16.8

4.0 RIVETS

Structural rivets can be used for joining handrails, ladders and similar components and can also be used for structural connections. Stainless steel dome head structural rivets are recommended. If considering rivets for structural joints it is recommended that mechanical testing be undertaken on a joint sample first.

5.0 ADHESIVE (GLUED) JOINTS

Pultruded profiles can be joined using an adhesive such as a two pack epoxy or polyurethane adhesive.

Advantages of glues joints:

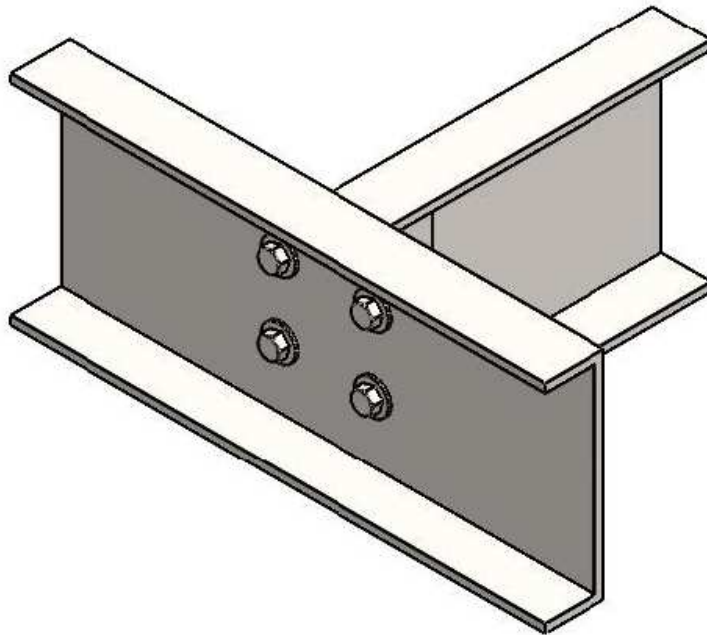
- Can be made aesthetically pleasing,
- Typically more ridged than bolted joints,
- Can be very strong depending on adhesive and preparation used,

One of the main disadvantages of glued joints is that failure can occur suddenly and without warning and hence it is recommended that glued joints in load bearing structures be also secured with bolts.

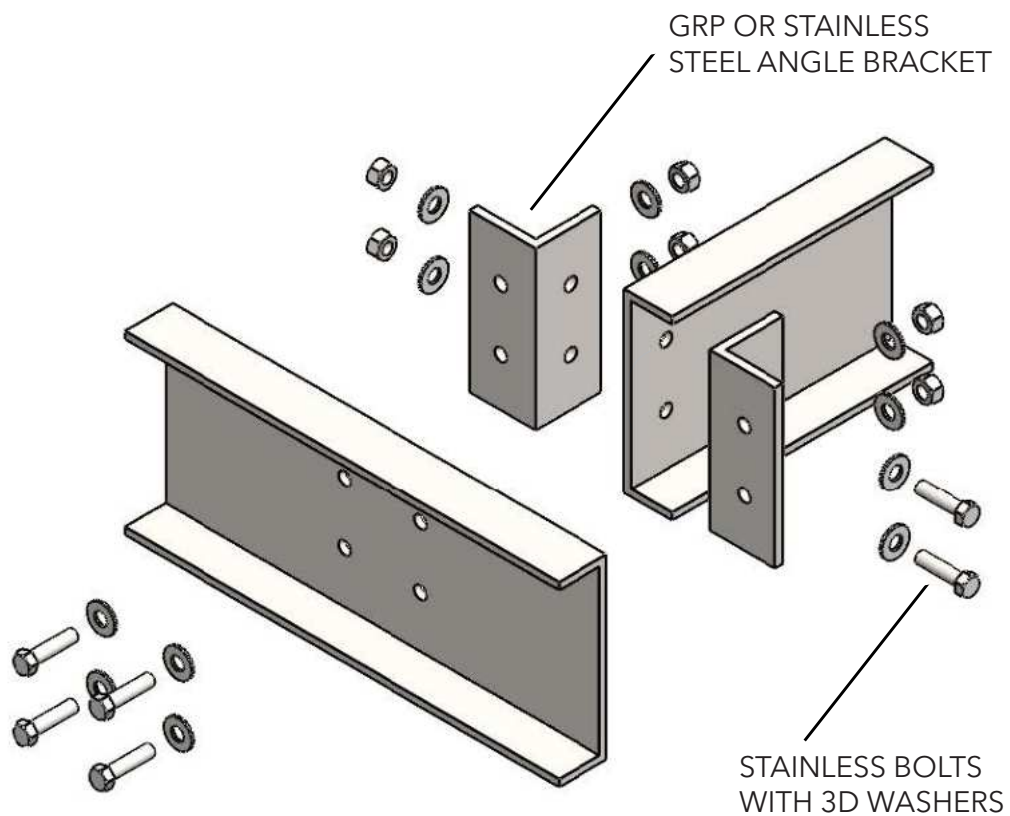
Prior to the application of the adhesive the surfaces should be sanded and cleaned with acetone or similar.

6.0 TYPICAL CONNECTION EXAMPLES

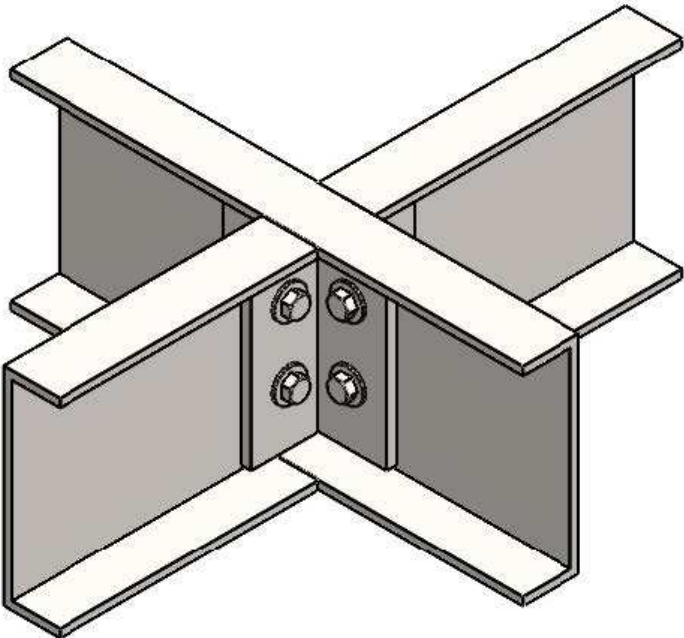
6.1 CHANNEL TO CHANNEL CONNECTION A



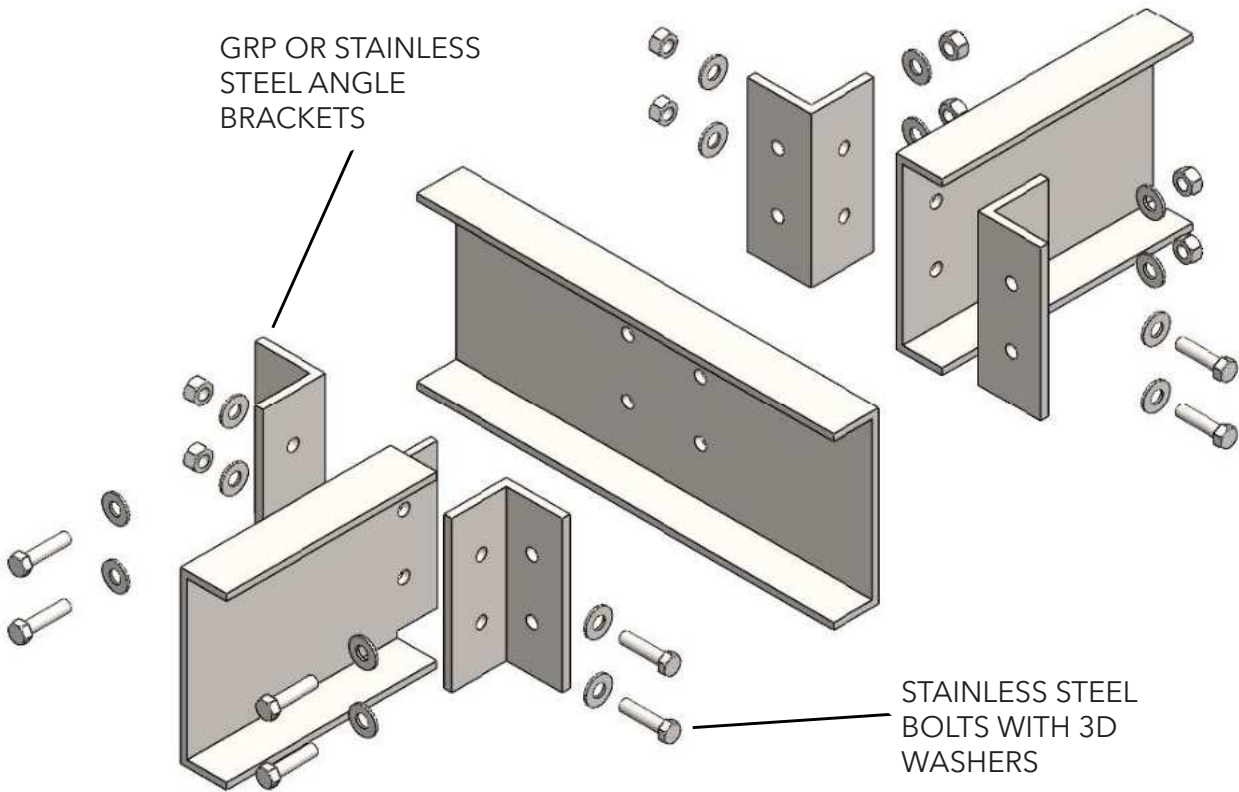
Detail View



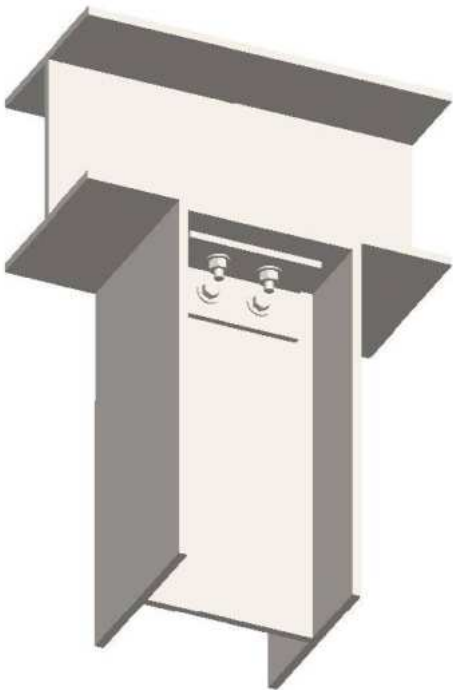
6.2 CHANNEL TO CHANNEL CONNECTION B



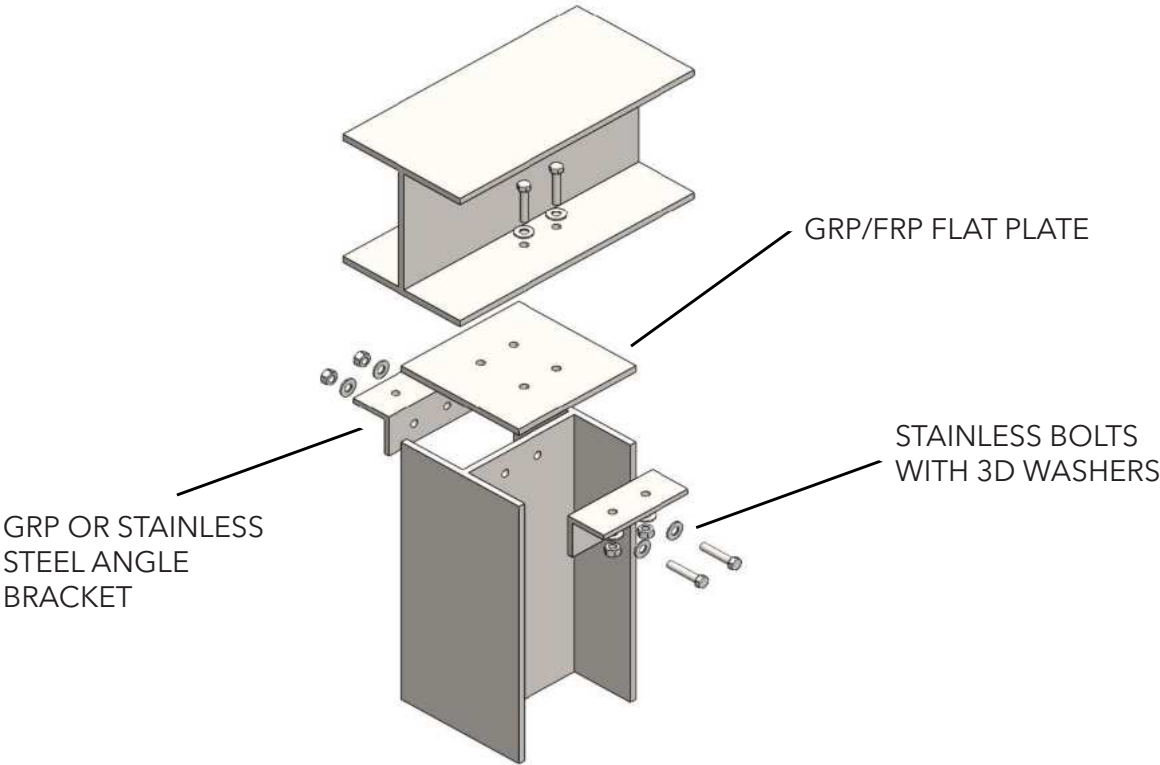
Detail View



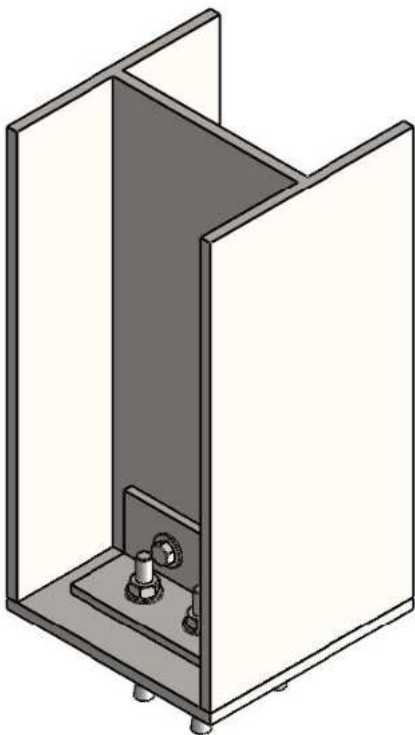
6.3 TOP PLATE CONNECTION



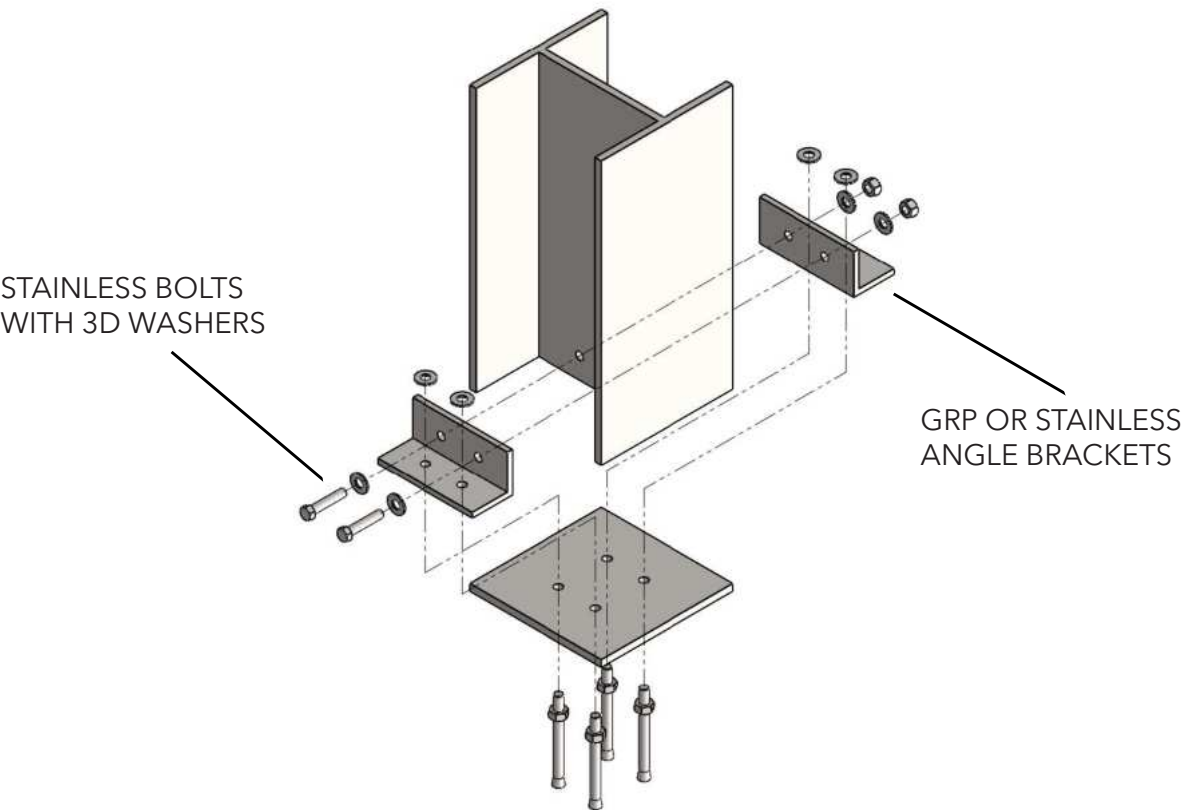
Detail View



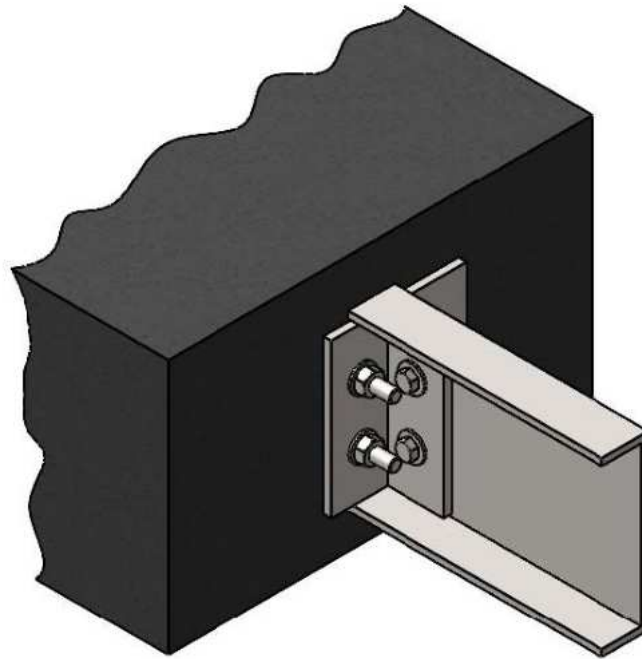
6.4 BOTTOM PLATE CONNECTION



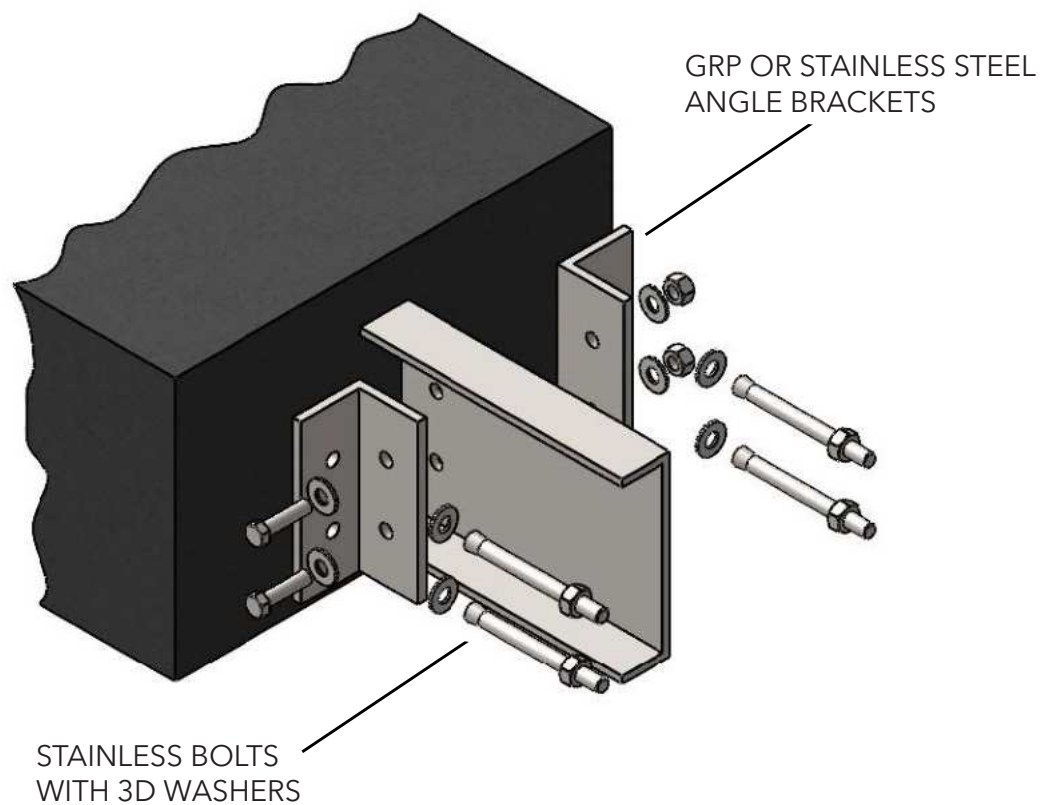
Detail View



6.5 CHANNEL TO WALL CONNECTION



Detail View



7.0 CONNECTION GALLERY



7.0 CONNECTION CONTEXT EXAMPLES





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