



Structural Steel Properties & Design Charts Book

March 2016

The Easysteel Way

Our Values



Safety - “Because we want to, not because we have to”

We want zero harm for our work mates, colleagues, customers and suppliers - ensuring that our actions or inactions never put a person’s health or safety at risk.

Steel is our business

We are passionate about steel and its benefits and take pride in each person making a positive difference to our customers and suppliers.

Achieve big results through daily actions

We are empowered to make decisions because we thrive on success and winning.

Great place to work... Great people to deal with

Work is FUN, REWARDING and CHALLENGING because of the colleagues, customers and suppliers we work with.

Customer success is our success

We will ensure that our customers see us as their steel merchant of choice and thereby ensure that their success is also ours.

One team... One result

We believe results are the true measure of our success. We work for outstanding results for our shareholders, our customers and for each other

We all have to contribute to ensure success - It’s “The Easysteel Way”

easysteel.
A FLETCHER BUILDING COMPANY

Introduction

Fletcher Easysteel is a division of Fletcher Building Limited. The company prides itself on its position as a leading steel distributor in New Zealand providing a comprehensive range of products and services to meet the needs of this market.

The Structural Steel Properties and Design Charts Catalogue is a directory of products and services available from Fletcher Easysteel and is provided as a guide to assist customers when determining their requirements.

It is by no means an exhaustive list of the company's service portfolio. For in this dynamic environment, operating within a more prevalent global economy, the range of products and services that Fletcher Easysteel offers is ever changing.

The Structural Steel Properties and Design Charts Catalogue is an indication of the company's commitment to informing customers of what is available from your steel supplier. Supplementary product catalogues are;

- The Special Steels Book
- Pipe and Pipe Fittings Catalogue
- The Steel Book



Every care has been taken by staff in producing this catalogue. Fletcher Easysteel has endeavoured to ensure accuracy of the information contained herein, however Fletcher Easysteel cannot and does not accept responsibility for any loss or damage sustained by any party through use of this information.

Quality

Fletcher Easysteel continues to maintain a strong commitment to the principles which have become total quality management. This results in minimum waste, improved efficiencies and a service promise which meets customer requirements. Fletcher Easysteel has a philosophy of continuous improvement in all areas of its business.

Technical Advice

Fletcher Easysteel provides technical expertise on all products and services it markets. Specialist advice is available on product properties, product selection and specific end use application. Any advice given should subsequently be authorised by a qualified engineer.

Information Systems

Fletcher Easysteel operates an ERP system across its business. This includes handling front-line customer enquiries and orders, to back-office automatic stock replenishment in line with customer forecasts.

Supporting this is a forecasting system which captures historic sales information, combining it with future market intelligence to provide the best possible forecast. This enables us to have the right product on hand at the right time to meet customer requirements and to ensure excellent service for our customers.

Fletcher Easysteel is continually researching the new opportunities information technology offers in making business easier with customers and suppliers alike.

Suppliers

Fletcher Easysteel has a centrally based supply chain which leverages its strong relationship with suppliers to provide highly competitive offers to its customers. These offers are sourced globally from quality steel mills and suppliers which enables its customers to compete in both domestic and export markets.

Health & Safety

At Fletcher Easysteel, our safety goal is zero harm. Health and Safety is our highest priority, not only for all employees, but also for our customers, suppliers, contractors and visitors. We take a pro-active approach in regards to Health & Safety and Environment, and we are continually developing and implementing systems to ensure our workplace is a safe one. At Fletcher Easysteel, everyone is responsible for ensuring that we are working in a safe manner -

Because we want to... not because we have to!

Introduction

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Universal & Taper Flange Beams



Dimensions and Properties

Universal & Taper Flange Beams

Designation		DIMENSIONS						RATIOS		PROPERTIES											
		Depth of Section d	Flange		Web Thickness t _w	Radius Root r	Depth between flanges d1	d/t	(b-t)/2t	Gross Section Area A	Profile Surface Area	About x-axis				About y-axis				Torsion Constant J	Warping Constant I _w
			Width b	Thickness t								I _x	Z _x	S _x	r _x	I _y	Z _y	S _y	r _y		
kg/m	mm	mm	mm	mm	mm	mm			mm ²	m ² /m	106mm ⁴	103mm ³	103mm ³	mm	106mm ⁴	103mm ³	103mm ³	mm	103mm ⁴	109mm ⁶	
760UB	220	776	270	28.3	17.4	16.5	719	41.3	4.46	28000	2.57	2710	6980	8050	311	93.2	690	1090	57.7	5580	13000
760UB	197	770	268	25.4	15.6	16.5	719	46.1	4.97	25100	2.55	2400	6240	7170	309	81.7	610	959	57.1	4040	11300
760UB	173	762	267	21.6	14.3	16.5	719	50.3	5.85	22000	2.54	2050	5390	6200	305	68.7	515	809	55.8	2670	9420
760UB	147	754	265	17.5	12.9	16.5	719	55.7	7.20	18800	2.51	1690	4480	5170	300	54.4	411	647	53.8	1600	7380
690UB	140	684	254	19.0	12.4	15.2	646	52.1	6.36	17900	2.33	1370	3990	4570	277	52.0	410	640	54.0	1690	5750
690UB	125	678	253	16.2	11.7	15.2	646	55.2	7.45	15900	2.32	1180	3480	3990	272	43.8	346	542	52.4	1160	4800
610UB	125	612	229	19.6	11.9	12.7	573	48.1	5.54	15900	2.09	985	3220	3670	249	39.3	343	535	49.7	1540	3450
610UB	113	607	228	17.3	11.2	12.7	572	51.1	6.27	14400	2.08	872	2870	3280	246	34.3	300	469	48.7	1120	2980
610UB	101	602	228	14.8	10.6	12.7	572	54.0	7.34	13000	2.07	759	2520	2890	242	29.3	257	402	47.6	777	2530
530UB	92.4	533	209	15.6	10.2	12.7	502	49.2	6.37	11800	1.86	552	2070	2360	217	23.8	228	355	44.9	762	1590
530UB	82.0	528	209	13.2	9.55	12.7	502	52.5	7.55	10400	1.85	475	1800	2060	213	20.1	193	301	43.9	513	1330
460UB	82.1	460	191	16.0	9.91	10.2	428	43.2	5.66	10400	1.65	370	1610	1830	188	18.6	195	303	42.2	692	918
460UB	74.6	457	190	14.5	9.09	10.2	428	47.1	6.24	9490	1.64	333	1460	1650	187	16.6	175	271	41.8	521	813
460UB	67.1	454	190	12.7	8.48	10.2	429	50.5	7.15	8550	1.63	295	1300	1470	186	14.5	153	238	41.2	371	708
410UB	59.7	406	178	12.8	7.80	10.2	380	48.8	6.65	7610	1.49	215	1060	1190	168	12.1	135	209	39.8	330	466
410UB	53.7	403	178	10.9	7.59	10.2	381	50.2	7.82	6860	1.49	187	930	1050	165	10.3	115	179	38.7	229	394
360UB	56.7	359	172	13.0	7.95	10.2	333	41.9	6.31	7210	1.37	161	896	1010	149	11.0	128	198	39.1	330	330
360UB	50.7	356	172	11.5	7.29	10.2	333	45.7	7.16	6470	1.37	142	799	898	148	9.77	114	175	38.8	236	290
360UB	44.7	352	171	9.73	6.86	10.2	333	48.5	8.43	5700	1.36	121	687	774	146	8.12	95.0	147	37.8	157	238
310UB	46.2	307	166	11.8	6.73	8.89	283	42.1	6.75	5890	1.25	99.5	648	723	130	9.01	108	166	39.1	223	196
310UB	40.4	304	165	10.2	6.10	8.89	284	46.5	7.79	5160	1.24	85.6	563	627	129	7.64	92.7	142	38.5	149	165
310UB	32.0	298	149	8.00	5.50	13.0	282	51.3	8.97	4080	1.16	63.2	424	475	124	4.42	59.3	91.8	32.9	86.5	92.9
250UB	37.3	256	146	10.9	6.40	7.62	234	36.6	6.40	4730	1.07	55.3	432	484	108	5.66	77.5	119	34.6	154	85.0
250UB	31.4	252	146	8.64	6.10	7.62	235	38.5	8.10	4000	1.06	44.6	354	397	106	4.49	61.5	94.5	33.5	87.4	66.4
250UB	25.7	248	124	8.00	5.00	12.0	232	46.4	7.44	3270	0.961	35.4	285	319	104	2.55	41.1	63.6	27.9	67.4	36.7
200UB	29.8	207	134	9.60	6.30	7.62	188	29.8	6.65	3810	0.924	29.0	280	314	87.3	3.85	57.5	88.3	31.8	102	37.6
200UB	25.4	203	133	7.82	5.84	7.62	187	32.1	8.13	3220	0.913	23.4	231	259	85.3	3.07	46.2	71.0	30.9	61.0	29.2
200UB	22.3	202	133	7.00	5.00	8.90	188	37.6	9.14	2870	0.911	21.1	208	232	85.6	2.75	41.3	63.4	30.9	45.0	26.1
200UB	18.2	198	99.0	7.00	4.50	11.0	184	40.9	6.75	2320	0.764	15.8	160	180	82.6	1.14	23.0	35.7	22.1	38.6	10.4
180UB	22.2	179	90.0	10.0	5.99	8.99	159	26.5	4.20	2820	0.691	15.3	171	195	73.6	1.22	27.1	42.3	20.8	81.8	8.71
180UB	18.1	175	90.0	8.00	5.00	8.99	159	31.8	5.31	2300	0.685	12.1	139	157	72.6	0.975	21.7	33.7	20.6	44.9	6.80
180UB	16.1	173	90.0	7.00	4.50	8.90	159	35.3	6.11	2040	0.682	10.6	123	138	72.0	0.853	19.0	29.4	20.4	31.5	5.88
150UB	18.0	155	75.0	9.50	5.99	8.00	136	22.7	3.63	2290	0.584	9.05	117	135	62.8	0.672	17.9	28.2	17.1	60.4	3.56
150UB	14.0	150	75.0	7.00	5.00	8.00	136	27.2	5.00	1780	0.576	6.66	88.8	102	61.1	0.495	13.2	20.8	16.6	28.1	2.53
125TFB	13.1	125	65.0	8.50	5.00	8.00	108	21.6	3.53	1670	0.470	4.34	69.4	80.3	50.9	0.337	10.4	17.2	14.2	40.2	1.14
100TFB	7.20	100	45.0	6.00	4.00	7.00	88.0	22.0	3.42	917	0.349	1.46	29.2	34.1	39.9	0.080	3.53	6.01	9.31	11.6	0.176

Properties for Fire and Section Capacities - to NZS 3404

Universal & Taper Flange Beams

Designation		GRADE 300 STEEL			GRADE 250 & 300 STEEL				GRADE 350 STEEL						FIRE				
		Yield Stress		Form	About x-axis		About y-axis		Yield Stress		Form Factor k_f	About x-axis		About y-axis		H/A Fully Exposed	H/A 3 sides Exposed	M/t Fully Exposed	M/t 3 sides Exposed
		Flange f_y	Web f_w	Factor k_f	Compactness (C,N,S)	Z_x	Compactness (C,N,S)	Z_y	Flange f_y	Web f_w		Compactness (C,N,S)	Z_x	Compactness (C,N,S)	Z_y				
kg/m					103mm ³		103mm ³	MPa	MPa			103mm ³	103mm ³	1/m	1/m	m ² /t	m ² /t		
610UB	125	280	300	0.950	C	3670	C	515	340	340	0.915	C	3670	C	515	132	117	16.8	14.9
610UB	113	280	300	0.925	C	3280	C	451	340	340	0.891	C	3280	C	451	145	129	18.4	16.4
610UB	101	300	320	0.888	C	2890	C	386	340	360	0.866	C	2890	C	386	160	142	20.5	18.3
530UB	92.4	300	320	0.928	C	2360	C	341	340	360	0.906	C	2360	C	341	158	140	20.1	17.9
530UB	82.0	300	320	0.900	C	2060	C	289	340	360	0.878	C	2060	C	289	178	158	22.6	20.0
460UB	82.1	300	320	0.980	C	1830	C	292	340	360	0.957	C	1830	C	292	158	140	20.1	17.7
460UB	74.6	300	320	0.948	C	1650	C	262	340	360	0.926	C	1650	C	262	173	153	22.0	19.4
460UB	67.1	300	320	0.920	C	1470	C	230	340	360	0.899	C	1470	C	230	191	169	24.3	21.5
410UB	59.7	300	320	0.939	C	1190	C	203	340	360	0.919	C	1190	C	203	196	173	25.0	22.0
410UB	53.7	320	320	0.912	C	1050	C	173	360	360	0.893	N	1050	N	172	217	191	27.7	24.3
360UB	56.7	300	320	0.993	C	1010	C	193	340	360	0.971	C	1010	C	193	190	167	24.2	21.2
360UB	50.7	300	320	0.962	C	898	C	170	340	360	0.942	C	898	C	170	211	185	27.0	23.6
360UB	44.7	320	320	0.928	C	774	C	142	360	360	0.909	N	760	N	139	238	208	30.4	26.5
310UB	46.2	300	320	0.992	C	723	C	163	340	360	0.973	C	723	C	163	212	184	27.0	23.4
310UB	40.4	320	320	0.952	C	627	C	139	360	360	0.935	N	623	N	138	240	208	30.7	26.6
310UB	32.0	320	320	0.915	N	474	N	88.7							284	248	36.2	31.6	
250UB	37.3	320	320	1.00	C	484	C	116	360	360	1.00	C	484	C	116	226	195	28.7	24.8
250UB	31.4	320	320	1.00	C	397	C	92.2	360	360	0.991	N	392	N	90.8	266	229	33.8	29.2
250UB	25.7	320	320	0.949	C	319	C	61.7							294	256	37.4	32.6	
200UB	29.8	320	320	1.00	C	314	C	86.3	360	360	1.00	C	314	C	86.3	243	207	31.0	26.5
200UB	25.4	320	320	1.00	C	259	C	69.3	360	360	1.00	N	256	N	68.2	284	242	36.0	30.7
200UB	22.3	320	320	1.00	N	231	N	61.6							317	271	40.8	34.9	
200UB	18.2	320	320	0.990	C	180	C	34.4							329	287	42.0	36.5	
180UB	22.2	320	320	1.00	C	195	C	40.7	360	360	1.00	C	195	C	40.7	245	213	31.1	27.1
180UB	18.1	320	320	1.00	C	157	C	32.5	360	360	1.00	C	157	C	32.5	298	259	37.8	32.8
180UB	16.1	320	320	1.00	C	138	C	28.4							334	290	42.3	36.8	
150UB	18.0	320	320	1.00	C	135	C	26.9	360	360	1.00	C	135	C	26.9	255	222	32.5	28.3
150UB	14.0	320	320	1.00	C	102	C	19.8	360	360	1.00	C	102	C	19.8	324	282	41.2	35.8
125TFB	13.1	320	320	1.00	C	80.3	C	15.6	360	360	1.00	C	80.3	C	15.6	281	242	35.8	30.9
100TFB	7.20	320	320	1.00	C	34.1	C	5.30	360	360	1.00	C	34.1	C	5.30	381	332	48.5	42.2

Design Load Capacities for Members with Full Lateral Restraint - Subject to Bending about X-axis

Universal & Taper Flange Beams

GRADE 300

Designation		W _{pl} (kN) / W _t (kN) Span in metres																		W _{pl}	FLR	
kg/m		1	1.5	2	2.5	3	3.5	4	5	6	7	8	9	10	12	14	16	18	20	22	kN	m
610UB	125	7400	4930	3700	2960	2470	2110	1850	1480	1230	1060	925	822	740	617	529	463	411	370	336	2360	1.88
		7210	4810	3610	2890	2400	2060	1800	1440	1200	1030	902	747	605	420	309	236	187	151	125		
610UB	113	6620	4410	3310	2650	2210	1890	1650	1320	1100	945	827	735	662	551	473	414	368	331	301	2200	1.84
		6430	4290	3210	2570	2140	1840	1610	1290	1070	918	804	661	536	372	273	209	165	134	111		
610UB	101	6240	4160	3120	2500	2080	1780	1560	1250	1040	891	780	693	624	520	446	390	347	312	284	2200	1.74
		6050	4030	3020	2420	2020	1730	1510	1210	1010	864	729	576	466	324	238	182	144	117	96.3		
530UB	92.4	5100	3400	2550	2040	1700	1460	1270	1020	849	728	637	566	510	425	364	319	283	255	232	1880	1.64
		4970	3310	2480	1990	1660	1420	1240	994	828	692	530	419	339	236	173	132	105	84.8	70.1		
530UB	82.0	4450	2970	2220	1780	1480	1270	1110	890	741	635	556	494	445	371	318	278	247	222	202	1740	1.60
		4320	2880	2160	1730	1440	1230	1080	864	720	596	456	360	292	203	149	114	90.1	73.0	60.3		
460UB	82.1	3950	2630	1980	1580	1320	1130	988	790	659	565	494	439	395	329	282	247	220	198	180	1580	1.54
		3860	2580	1930	1550	1290	1100	966	773	631	464	355	281	227	158	116	88.8	70.2	56.8	47.0		
460UB	74.6	3570	2380	1780	1430	1190	1020	892	714	595	510	446	396	357	297	255	223	198	178	162	1440	1.53
		3500	2340	1750	1400	1170	1000	876	701	568	418	320	253	205	142	104	79.9	63.1	51.1	42.3		
460UB	67.1	3180	2120	1590	1270	1060	907	794	635	529	454	397	353	318	265	227	199	176	159	144	1330	1.50
		3120	2080	1560	1250	1040	891	780	624	503	370	283	224	181	126	92.5	70.8	55.9	45.3	37.4		
410UB	59.7	2570	1710	1280	1030	856	734	642	514	428	367	321	285	257	214	183	161	143	128	117	1090	1.45
		2540	1700	1270	1020	848	727	636	509	367	270	206	163	132	91.7	67.4	51.6	40.8	33.0	27.3		
410UB	53.7	2420	1610	1210	966	805	690	604	483	403	345	302	268	242	201	173	151	134	121	110	1060	1.37
		2380	1590	1190	952	794	680	595	460	319	234	180	142	115	79.8	58.6	44.9	35.5	28.7	23.7		
360UB	56.7	2180	1460	1090	874	728	624	546	437	364	312	273	243	218	182	156	137	121	109	99.3	986	1.43
		2150	1430	1080	860	717	614	538	396	275	202	155	122	98.9	68.7	50.5	38.6	30.5	24.7	20.4		

Design Load Capacities for Members with Full Lateral Restraint - Subject to Bending about X-axis

Universal & Taper Flange Beams

GRADE 300

Designation		W _{xx} (kN) / W _y (kN) Span in metres																			W _{xx}	FLR	
	kg/m	0.5	0.75	1	1.25	1.5	2	2.5	3	3.5	4	4.5	5	6	7	8	9	10	12	14	16	kN	m
250UB	37.3	2220	1480	1110	890	741	556	445	371	318	278	247	222	185	159	139	124	111	92.7	79.4	69.5	566	1.22
		2210	1470	1110	885	737	553	442	369	277	212	168	136	94.4	69.3	53.1	41.9	34.0	23.6	17.3	13.3		
250UB	31.4	1820	1220	912	730	608	456	365	304	261	228	203	182	152	130	114	101	91.2	76.0	65.1	57.0	532	1.18
		1810	1210	906	725	604	453	362	302	224	171	135	110	76.1	55.9	42.8	33.8	27.4	19.0	14.0	10.7		
250UB	25.7	1470	980	735	588	490	368	294	245	210	184	163	147	123	105	91.9	81.7	73.5	61.3	52.5	46.0	428	0.986
		1460	973	730	584	486	365	292	242	178	136	107	87.0	60.4	44.4	34.0	26.9	21.7	15.1	11.1	8.50		
200UB	29.8	1450	964	723	579	482	362	289	241	207	181	161	145	121	103	90.4	80.4	72.3	60.3	51.7	45.2	450	1.12
		1430	956	717	573	478	358	285	198	145	111	88.0	71.3	49.5	36.4	27.8	22.0	17.8	12.4	9.09	6.96		
200UB	25.4	1190	793	594	476	396	297	238	198	170	149	132	119	99.1	84.9	74.3	66.0	59.4	49.5	42.5	37.2	410	1.09
		1180	788	591	473	394	296	230	160	117	89.9	71.0	57.5	39.9	29.3	22.5	17.7	14.4	9.98	7.34	5.62		
200UB	22.3	1050	698	523	419	349	262	209	174	149	131	116	105	87.2	74.7	65.4	58.1	52.3	43.6	37.4	32.7	350	1.09
		1060	710	532	426	355	266	207	144	106	81.0	64.0	51.9	36.0	26.5	20.3	16.0	13.0	9.00	6.61	5.06		
200UB	18.2	829	553	414	332	276	207	166	138	118	104	92.1	82.9	69.1	59.2	51.8	46.0	41.4	34.5	29.6	25.9	308	0.781
		819	546	410	328	273	205	155	108	79.2	60.7	47.9	38.8	27.0	19.8	15.2	12.0	9.71	6.74	4.95	3.79		
180UB	22.2	899	599	450	360	300	225	180	150	128	112	99.9	89.9	74.9	64.2	56.2	50.0	45.0	37.5	32.1	28.1	370	0.735
		876	584	438	350	292	219	150	104	76.7	58.8	46.4	37.6	26.1	19.2	14.7	11.6	9.40	6.53	4.80	3.67		
180UB	18.1	723	482	362	289	241	181	145	121	103	90.4	80.4	72.3	60.3	51.7	45.2	40.2	36.2	30.1	25.8	22.6	302	0.728
		712	474	356	285	237	178	119	82.6	60.7	46.5	36.7	29.7	20.7	15.2	11.6	9.18	7.43	5.16	3.79	2.90		
180UB	16.1	635	423	318	254	212	159	127	106	90.7	79.4	70.6	63.5	52.9	45.4	39.7	35.3	31.8	26.5	22.7	19.9	270	0.721
		630	420	315	252	210	157	104	72.4	53.2	40.7	32.2	26.1	18.1	13.3	10.2	8.04	6.51	4.52	3.32	2.54		
150UB	18.0	622	415	311	249	207	156	124	104	88.9	77.8	69.2	62.2	51.9	44.5	38.9	34.6	31.1	25.9	22.2	19.5	320	0.605
		599	399	300	240	200	139	89.0	61.8	45.4	34.8	27.5	22.2	15.4	11.3	8.69	6.86	5.56	3.86	2.84	2.17		
150UB	14.0	470	314	235	188	157	118	94.1	78.4	67.2	58.8	52.3	47.0	39.2	33.6	29.4	26.1	23.5	19.6	16.8	14.7	260	0.587
		455	303	227	182	152	102	65.5	45.5	33.4	25.6	20.2	16.4	11.4	8.35	6.39	5.05	4.09	2.84	2.09	1.60		
125TFB	13.1	370	246	185	148	123	92.4	73.9	61.6	52.8	46.2	41.1	37.0	30.8	26.4	23.1	20.5	18.5	15.4	13.2	11.6	216	0.502
		355	237	178	142	118	66.7	42.7	29.6	21.8	16.7	13.2	10.7	7.41	5.44	4.17	3.29	2.67	1.85	1.36	1.04		
100TFB	7.20	157	105	78.6	62.8	52.4	39.3	31.4	26.2	22.4	19.6	17.5	15.7	13.1	11.2	9.82	8.73	7.86	6.55	5.61	4.91	138	0.329
		150	99.7	74.8	57.4	39.9	22.4	14.4	9.97	7.32	5.61	4.43	3.59	2.49	1.83	1.40	1.11	0.897	0.623	0.458	0.350		

Design Load Capacities for Members with Full Lateral Restraint - Subject to Bending about X-axis

GRADE 350 - Universal & Taper Flange Beams

GRADE 350																							
Designation		W _{Lc1} (kN) / W _s (kN) Span in metres																			W _{Lc2}	FLR	
	kg/m	1	1.5	2	2.5	3	3.5	4	5	6	7	8	9	10	12	14	16	18	20	22	25	kN	m
610UB	125	8960	5970	4480	3580	2990	2560	2240	1790	1490	1280	1120	996	896	747	640	560	498	448	407	358	2680	1.70
		8760	5840	4380	3500	2920	2500	2190	1750	1460	1240	946	747	605	420	309	236	187	151	125	96.8		
610UB	113	8000	5330	4000	3200	2670	2290	2000	1600	1330	1140	1000	889	800	667	571	500	444	400	364	320	2500	1.67
		7810	5200	3900	3120	2600	2230	1950	1560	1300	1090	837	661	536	372	273	209	165	134	111	85.7		
610UB	101	7070	4710	3540	2830	2360	2020	1770	1410	1180	1010	884	786	707	589	505	442	393	354	321	283	2480	1.63
		6850	4570	3430	2740	2280	1960	1710	1370	1140	952	729	576	466	324	238	182	144	117	96.3	74.6		
530UB	92.4	5780	3850	2890	2310	1930	1650	1440	1160	963	825	722	642	578	481	413	361	321	289	263	231	2120	1.54
		5630	3750	2820	2250	1880	1610	1410	1130	938	692	530	419	339	236	173	132	105	84.8	70.1	54.3		
530UB	82.0	5040	3360	2520	2020	1680	1440	1260	1010	840	720	630	560	504	420	360	315	280	252	229	202	1960	1.51
		4900	3260	2450	1960	1630	1400	1220	979	811	596	456	360	292	203	149	114	90.1	73.0	60.3	46.7		
460UB	82.1	4480	2990	2240	1790	1490	1280	1120	896	747	640	560	498	448	373	320	280	249	224	204	179	1770	1.45
		4380	2920	2190	1750	1460	1250	1090	876	631	464	355	281	227	158	116	88.8	70.2	56.8	47.0	36.4		
460UB	74.6	4040	2690	2020	1620	1350	1150	1010	808	673	577	505	449	404	337	289	253	224	202	184	162	1620	1.43
		3970	2650	1990	1590	1320	1130	993	794	568	418	320	253	205	142	104	79.9	63.1	51.1	42.3	32.7		
460UB	67.1	3600	2400	1800	1440	1200	1030	900	720	600	514	450	400	360	300	257	225	200	180	164	144	1500	1.41
		3540	2360	1770	1410	1180	1010	884	707	503	370	283	224	181	126	92.5	70.8	55.9	45.3	37.4	29.0		
410UB	59.7	2910	1940	1460	1160	971	832	728	582	485	416	364	324	291	243	208	182	162	146	132	116	1230	1.37
		2880	1920	1440	1150	961	824	721	528	367	270	206	163	132	91.7	67.4	51.6	40.8	33.0	27.3	21.1		
410UB	53.7	2720	1810	1360	1090	907	777	680	544	453	389	340	302	272	227	194	170	151	136	124	109	1190	1.29
		2680	1790	1340	1070	893	765	670	460	319	234	180	142	115	79.8	58.6	44.9	35.5	28.7	23.7	18.4		
360UB	56.7	2470	1650	1240	989	824	706	618	494	412	353	309	275	247	206	177	155	137	124	112	98.9	1110	1.34
		2440	1620	1220	975	812	696	609	396	275	202	155	122	98.9	68.7	50.5	38.6	30.5	24.7	20.4	15.8		
360UB	50.7	2200	1470	1100	880	733	629	550	440	367	314	275	244	220	183	157	138	122	110	100	88.0	1010	1.33
		2170	1450	1090	869	724	621	543	349	242	178	136	108	87.2	60.6	44.5	34.1	26.9	21.8	18.0	14.0		
360UB	44.7	1970	1310	984	787	656	562	492	394	328	281	246	219	197	164	141	123	109	98.4	89.5	78.7	938	1.26
		1980	1320	989	791	660	565	465	297	207	152	116	91.8	74.3	51.6	37.9	29.0	22.9	18.6	15.4	11.9		

Design Load Capacities for Members with Full Lateral Restraint - Subject to Bending about X-axis

Universal & Taper Flange Beams

GRADE 350

Designation		W _{lx} (kN) / W _{ly} (kN) Span in metres																				W _{pl}	FLR
	kg/m	1	1.2	1.4	1.6	1.8	2	2.5	3	3.5	4	4.5	5	6	7	8	9	10	12	14	16	kN	m
310UB	46.2	1770	1470	1260	1110	982	884	707	589	505	442	393	354	295	253	221	196	177	147	126	111	804	1.34
		1760	1470	1260	1100	979	881	705	588	499	382	302	245	170	125	95.5	75.5	61.1	42.5	31.2	23.9		
310UB	40.4	1620	1350	1150	1010	898	808	646	539	462	404	359	323	269	231	202	180	162	135	115	101	720	1.28
		1620	1350	1160	1010	901	811	649	540	429	329	260	210	146	107	82.2	64.9	52.6	36.5	26.8	20.5		
250UB	37.3	1260	1050	897	785	698	628	502	419	359	314	279	251	209	179	157	140	126	105	89.7	78.5	638	1.15
		1240	1040	889	778	691	622	498	378	277	212	168	136	94.4	69.3	53.1	41.9	34.0	23.6	17.3	13.3		
250UB	31.4	1020	847	726	635	564	508	406	339	290	254	226	203	169	145	127	113	102	84.7	72.6	63.5	598	1.12
		1020	850	728	637	566	510	408	304	224	171	135	110	76.1	55.9	42.8	33.8	27.4	19.0	14.0	10.7		
200UB	29.8	816	680	583	510	453	408	326	272	233	204	181	163	136	117	102	90.7	81.6	68.0	58.3	51.0	508	1.06
		806	672	576	504	448	403	285	198	145	111	88.0	71.3	49.5	36.4	27.8	22.0	17.8	12.4	9.09	6.96		
200UB	25.4	663	553	474	415	368	332	265	221	189	166	147	133	111	94.7	82.9	73.7	66.3	55.3	47.4	41.5	460	1.03
		665	554	475	416	370	333	230	160	117	89.9	71.0	57.5	39.9	29.3	22.5	17.7	14.4	9.98	7.34	5.62		
180UB	22.2	506	421	361	316	281	253	202	169	144	126	112	101	84.3	72.2	63.2	56.2	50.6	42.1	36.1	31.6	416	0.693
		492	410	352	308	274	235	150	104	76.7	58.8	46.4	37.6	26.1	19.2	14.7	11.6	9.40	6.53	4.80	3.67		
180UB	18.1	407	339	291	255	226	204	163	136	116	102	90.5	81.4	67.9	58.2	50.9	45.2	40.7	33.9	29.1	25.5	340	0.687
		400	334	286	250	222	186	119	82.6	60.7	46.5	36.7	29.7	20.7	15.2	11.6	9.18	7.43	5.16	3.79	2.90		
150UB	18.0	350	291	250	219	194	175	140	117	99.9	87.4	77.7	69.9	58.3	49.9	43.7	38.8	35.0	29.1	25.0	21.9	360	0.570
		337	281	241	211	172	139	89.0	61.8	45.4	34.8	27.5	22.2	15.4	11.3	8.69	6.86	5.56	3.86	2.84	2.17		
150UB	14.0	264	220	189	165	147	132	106	88.0	75.4	66.0	58.7	52.8	44.0	37.7	33.0	29.3	26.4	22.0	18.9	16.5	292	0.553
		256	213	183	160	126	102	65.5	45.5	33.4	25.6	20.2	16.4	11.4	8.35	6.39	5.05	4.09	2.84	2.09	1.60		
125TFB	13.1	208	173	149	130	116	104	83.2	69.3	59.4	52.0	46.2	41.6	34.7	29.7	26.0	23.1	20.8	17.3	14.9	13.0	244	0.473
		200	167	136	104	82.3	66.7	42.7	29.6	21.8	16.7	13.2	10.7	7.41	5.44	4.17	3.29	2.67	1.85	1.36	1.04		
100TFB	7.20	88.0	73.3	62.9	55.0	48.9	44.0	35.2	29.3	25.1	22.0	19.6	17.6	14.7	12.6	11.0	9.78	8.80	7.33	6.29	5.50	156	0.310
		84.1	62.3	45.8	35.0	27.7	22.4	14.4	9.97	7.32	5.61	4.43	3.59	2.49	1.83	1.40	1.11	0.897	0.623	0.458	0.350		

Design Moment Capacities for Members without Lateral Restraint ($a_m=1.0$) - Subject to Bending about X-axis

Universal & Taper Flange Beams

GRADE 300

Designation	kg/m	Section Moment Capacity (kNm)		Design Moment Capacities ϕM_x (kNm) for Effective Length in metres																				
		ϕM_{sx}	ϕM_{sy}	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	6	7	8	9	10	12	14	16	18	20	22
610UB	125	925	130	925	925	908	870	825	776	725	673	623	576	491	422	366	321	285	231	194	167	147	131	118
610UB	113	827	114	827	827	810	775	734	688	640	592	545	501	423	360	309	269	237	191	159	136	119	106	95.4
610UB	101	780	104	780	780	759	723	680	632	583	534	487	443	366	306	259	223	194	154	127	108	94.0	83.3	74.7
530UB	92.4	637	92.1	637	637	615	582	543	502	461	420	382	347	289	243	208	180	159	128	107	92.1	80.8	72.0	64.9
530UB	82.0	556	78.0	556	556	535	505	470	432	394	357	322	291	238	198	167	144	126	100	83.3	71.1	62.1	55.2	49.6
460UB	82.1	494	78.8	494	494	472	444	412	378	346	315	286	261	218	185	160	141	125	102	86.6	75.0	66.2	59.3	53.6
460UB	74.6	446	70.7	446	446	425	399	369	338	308	279	252	228	189	159	137	119	106	85.8	72.2	62.3	54.8	49.0	44.3
460UB	67.1	397	62.1	397	396	378	354	326	298	269	243	218	196	160	134	114	98.4	86.6	69.6	58.2	50.0	43.9	39.1	35.3
410UB	59.7	321	54.8	321	319	303	283	260	236	213	192	173	156	128	108	92.3	80.5	71.3	57.9	48.8	42.2	37.1	33.2	30.0
410UB	53.7	302	49.8	302	299	282	261	237	213	190	168	149	133	107	88.8	75.1	64.9	57.1	45.9	38.4	33.0	29.0	25.8	23.3
360UB	56.7	273	52.1	273	271	257	239	219	200	181	163	148	134	112	95.3	82.6	72.7	64.9	53.4	45.3	39.4	34.8	31.2	28.3
360UB	50.7	242	45.9	242	240	227	211	193	175	158	142	128	115	94.8	79.9	68.6	60.0	53.3	43.5	36.7	31.8	28.0	25.1	22.7
360UB	44.7	221	40.6	221	218	205	189	171	153	136	120	107	95.1	76.8	63.6	54.0	46.8	41.2	33.3	27.9	24.1	21.1	18.9	17.1
310UB	46.2	195	44.0	195	193	183	170	156	142	129	117	106	96.5	80.9	69.2	60.2	53.2	47.6	39.3	33.4	29.1	25.8	23.1	21.0
310UB	40.4	181	40.0	181	179	168	155	141	126	113	101	90.1	81.0	66.4	55.8	47.9	41.9	37.2	30.4	25.7	22.3	19.7	17.6	15.9
310UB	32.0	134	25.0	134	130	120	108	95.9	83.9	73.2	64.0	56.2	49.8	40.1	33.3	28.4	24.7	21.8	17.8	15.0	13.0	11.4	10.2	9.25
250UB	37.3	139	33.4	139	136	126	115	104	93.0	83.3	74.8	67.5	61.3	51.4	44.0	38.4	34.1	30.6	25.4	21.7	18.9	16.8	15.1	13.7
250UB	31.4	114	26.5	114	111	103	92.8	82.7	73.1	64.5	57.1	50.8	45.5	37.3	31.5	27.2	23.9	21.3	17.5	14.8	12.9	11.4	10.2	9.28
250UB	25.7	91.9	17.8	91.9	86.9	78.0	68.2	58.8	50.6	43.7	38.1	33.5	29.9	24.4	20.5	17.7	15.6	13.9	11.5	9.75	8.49	7.52	6.75	6.12
200UB	29.8	90.4	24.9	90.4	87.3	80.5	72.8	65.3	58.4	52.4	47.2	42.8	39.0	33.0	28.5	25.0	22.3	20.1	16.8	14.4	12.6	11.2	10.1	9.17
200UB	25.4	74.3	19.9	74.3	71.5	65.4	58.6	51.9	45.8	40.5	36.0	32.2	29.0	24.1	20.6	17.9	15.9	14.2	11.8	10.1	8.79	7.80	7.01	6.36
200UB	22.3	65.4	17.4	65.4	63.0	57.6	51.5	45.4	39.9	35.0	30.9	27.5	24.7	20.3	17.2	14.9	13.1	11.7	9.69	8.25	7.19	6.37	5.72	5.19
200UB	18.2	51.8	9.91	51.8	46.6	40.0	33.6	28.2	23.9	20.5	17.9	15.8	14.1	11.7	9.93	8.64	7.65	6.86	5.69	4.86	4.25	3.77	3.39	3.08
180UB	22.2	56.2	11.7	56.0	50.3	43.8	37.9	33.0	29.0	25.8	23.1	20.9	19.1	16.2	14.0	12.4	11.1	10.0	8.37	7.20	6.31	5.62	5.06	4.61
180UB	18.1	45.2	9.36	45.0	40.0	34.3	29.0	24.7	21.2	18.6	16.4	14.7	13.3	11.1	9.57	8.38	7.46	6.72	5.60	4.81	4.21	3.74	3.37	3.06
180UB	16.1	39.7	8.18	39.5	35.0	29.7	24.8	20.8	17.7	15.3	13.4	11.9	10.7	8.90	7.62	6.65	5.90	5.31	4.42	3.78	3.31	2.94	2.64	2.40
150UB	18.0	38.9	7.75	38.1	33.2	28.3	24.2	21.0	18.4	16.4	14.7	13.3	12.1	10.3	8.94	7.89	7.05	6.37	5.34	4.59	4.02	3.58	3.23	2.94
150UB	14.0	29.4	5.70	28.7	24.5	20.2	16.6	14.0	12.0	10.4	9.21	8.24	7.45	6.25	5.37	4.71	4.19	3.78	3.15	2.71	2.37	2.11	1.90	1.72
125TFB	13.1	23.1	4.49	22.1	18.8	16.0	13.7	11.9	10.5	9.34	8.40	7.62	6.96	5.92	5.14	4.54	4.06	3.67	3.08	2.65	2.32	2.07	1.86	1.70
100TFB	7.20	9.82	1.53	8.66	6.63	5.21	4.23	3.54	3.03	2.64	2.34	2.10	1.90	1.60	1.38	1.21	1.08	0.970	0.810	0.696	0.609	0.542	0.488	0.444

Design Load Capacities for Members Subject to Axial Compression Buckling about Y-axis

Universal & Taper Flange Beams

GRADE 300

Designation		ø N	Design Load Capacities for Axial Compression ø N (kN) Effective Length (L) in metres																		Percent holes to affect net Area, A _n	
	kg/m	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24	26		28
610UB	125	3810	3710	3420	3030	2510	1960	1510	1180	937	759	627	446	334	258	206	168	140	118	101	87.3	25%
610UB	113	3360	3270	3010	2660	2200	1720	1320	1030	816	661	545	388	290	225	179	146	122	103	87.8	76.0	25%
610UB	101	3120	3030	2780	2430	1970	1520	1160	896	710	574	473	336	251	195	155	126	105	88.7	75.9	65.6	20%
530UB	92.4	2960	2860	2590	2200	1720	1280	963	740	583	470	386	274	204	158	126	103	85.2	71.9	61.5	53.2	20%
530UB	82.0	2530	2440	2210	1870	1460	1090	813	624	492	396	326	231	172	133	106	86.5	71.8	60.6	51.8	44.8	20%
460UB	82.1	2750	2640	2350	1930	1440	1040	770	587	461	371	304	215	160	124	98.5	80.2	66.6	56.2	48.0	41.5	20%
460UB	74.6	2430	2330	2080	1710	1280	930	688	525	412	332	272	193	143	111	88.2	71.8	59.6	50.3	43.0	37.2	20%
460UB	67.1	2120	2040	1820	1500	1120	814	602	460	361	290	238	169	125	97.0	77.2	62.9	52.2	44.0	37.6	32.5	20%
410UB	59.7	1930	1840	1630	1310	960	688	506	385	302	242	199	141	105	80.8	64.3	52.3	43.4	36.6	31.3	27.1	20%
410UB	53.7	1800	1710	1500	1180	842	597	437	331	259	208	170	120	89.4	69.0	54.9	44.7	37.1	31.3	26.7	23.1	14%
360UB	56.7	1930	1840	1610	1260	903	640	468	355	278	223	183	129	95.9	74.1	58.9	48.0	39.8	33.6	28.7	24.8	20%
360UB	50.7	1680	1600	1400	1110	794	564	413	313	245	197	161	114	84.7	65.4	52.0	42.4	35.2	29.6	25.3	21.9	20%
360UB	44.7	1520	1440	1250	967	680	478	349	264	206	165	135	95.6	71.0	54.8	43.6	35.5	29.4	24.8	21.2	18.3	14%
310UB	46.2	1580	1500	1310	1030	738	523	383	290	227	182	149	105	78.3	60.5	48.1	39.2	32.5	27.4	23.4	20.3	20%
310UB	40.4	1410	1340	1160	903	636	448	327	248	194	155	127	89.7	66.7	51.5	40.9	33.3	27.6	23.3	19.9	17.2	14%
310UB	32.0	1080	1000	833	591	392	269	194	146	114	90.9	74.3	52.3	38.8	29.9	23.8	19.3	16.0	13.5	11.6	9.98	14%
250UB	37.3	1360	1270	1060	754	501	344	249	187	146	117	95.3	67.1	49.8	38.4	30.5	24.8	20.6	17.3	14.8	12.8	14%
250UB	31.4	1150	1070	880	613	402	275	198	149	116	92.6	75.7	53.3	39.5	30.5	24.2	19.7	16.3	13.8	11.8	10.2	14%
250UB	25.7	894	810	615	383	240	161	115	86.0	66.7	53.2	43.4	30.5	22.6	17.4	13.8	11.2	9.30	7.84	6.69	5.78	14%
200UB	29.8	1100	1010	813	546	352	239	171	129	100	79.9	65.3	45.9	34.0	26.2	20.8	16.9	14.0	11.8	10.1	8.73	14%
200UB	25.4	927	852	674	443	283	192	137	103	80.0	63.9	52.2	36.7	27.2	20.9	16.6	13.5	11.2	9.45	8.07	6.97	14%
200UB	22.3	827	759	601	395	253	171	123	91.8	71.3	57.0	46.5	32.7	24.2	18.7	14.8	12.1	9.99	8.42	7.19	6.21	14%
200UB	18.2	661	566	350	188	113	74.4	52.6	39.2	30.3	24.1	19.6	13.7	10.2	7.81	6.20	5.03	4.17	3.51	3.00	2.59	14%
180UB	22.2	812	681	394	206	123	80.7	57.0	42.4	32.7	26.0	21.2	14.8	11.0	8.43	6.68	5.43	4.50	3.78	3.23	2.79	14%
180UB	18.1	662	554	317	165	98.2	64.6	45.6	33.9	26.2	20.8	17.0	11.9	8.78	6.75	5.35	4.34	3.60	3.03	2.58	2.23	14%
180UB	16.1	588	490	277	144	85.5	56.3	39.7	29.5	22.8	18.1	14.8	10.3	7.64	5.87	4.65	3.78	3.13	2.63	2.25	1.94	14%
150UB	18.0	660	509	238	118	69.0	45.1	31.8	23.6	18.2	14.4	11.7	8.20	6.05	4.65	3.69	2.99	2.48	2.08	1.78	1.53	14%
150UB	14.0	513	390	177	86.7	50.7	33.1	23.3	17.3	13.3	10.6	8.61	6.01	4.44	3.41	2.70	2.19	1.82	1.53	1.30	1.12	14%
125TFB	13.1	481	328	127	60.9	35.3	23.0	16.2	12.0	9.21	7.31	5.94	4.15	3.06	2.35	1.86	1.51	1.25	1.05	0.896	0.774	14%
100TFB	7.20	264	109	32.4	15.0	8.58	5.55	3.88	2.87	2.20	1.75	1.42	0.988	0.728	0.558	0.442	0.358	0.296	0.249	0.213	0.183	14%

Design Load Capacities for Members Subject to Axial Compression Buckling about Y-axis

Universal & Taper Flange Beams

GRADE 350

Designation	kg/m	ø N	Design Load Capacities for Axial Compression ø N (kN) for Effective Length (L) in metres																				Percent holes to affect net Area, A _n	
			0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24	26	28		30
610UB	125	4450	4320	3940	3410	2720	2070	1560	1210	953	770	634	450	336	260	207	169	140	118	101	87.6	76.5	56.5	17%
610UB	113	3930	3810	3470	2990	2380	1800	1360	1050	830	670	552	392	292	226	180	147	122	103	88.1	76.2	66.6	49.2	17%
610UB	101	3440	3340	3030	2610	2070	1560	1180	909	717	579	477	338	252	195	156	127	105	88.9	76.0	65.8	57.4	42.4	17%
530UB	92.4	3270	3150	2820	2360	1790	1320	978	748	588	474	389	276	205	159	126	103	85.4	72.1	61.6	53.3	46.5	34.3	17%
530UB	82.0	2790	2690	2410	2000	1520	1110	826	631	496	399	328	232	173	134	106	86.7	72.0	60.7	51.9	44.9	39.2	28.9	17%
460UB	82.1	3050	2910	2560	2050	1490	1060	781	593	465	373	306	216	161	124	98.8	80.5	66.8	56.3	48.1	41.6	36.3	26.8	17%
460UB	74.6	2690	2570	2270	1820	1330	949	698	531	416	334	274	193	144	111	88.4	72.0	59.8	50.4	43.1	37.2	32.5	24.0	17%
460UB	67.1	2350	2250	1980	1590	1160	831	611	464	364	292	240	169	126	97.3	77.4	63.0	52.3	44.1	37.7	32.6	28.5	21.0	17%
410UB	59.7	2140	2030	1780	1390	991	701	513	389	304	244	200	141	105	81.0	64.4	52.5	43.5	36.7	31.4	27.1	23.7	17.5	17%
410UB	53.7	1980	1880	1620	1240	865	606	441	334	261	209	171	121	89.7	69.2	55.0	44.8	37.2	31.3	26.8	23.1	20.2	14.9	12%
360UB	56.7	2140	2030	1750	1330	929	651	474	358	280	224	184	130	96.2	74.3	59.0	48.1	39.9	33.6	28.7	24.8	21.7	16.0	17%
360UB	50.7	1860	1760	1530	1170	818	574	418	316	247	198	162	114	85.0	65.6	52.2	42.5	35.2	29.7	25.4	21.9	19.1	14.1	17%
360UB	44.7	1680	1580	1350	1010	697	485	352	266	208	166	136	96.0	71.2	55.0	43.7	35.6	29.5	24.9	21.2	18.4	16.0	11.8	12%
310UB	46.2	1750	1660	1430	1090	760	532	387	293	229	183	150	106	78.6	60.7	48.2	39.3	32.6	27.5	23.5	20.3	17.7	13.1	17%
310UB	40.4	1560	1470	1260	949	653	455	331	250	195	156	128	90.1	66.9	51.6	41.0	33.4	27.7	23.4	20.0	17.2	15.1	11.1	12%
250UB	37.3	1530	1420	1150	788	513	349	251	189	147	117	95.7	67.3	49.9	38.5	30.6	24.9	20.6	17.4	14.8	12.8	11.2	8.25	12%
250UB	31.4	1280	1180	950	637	410	279	200	150	117	93.1	76.1	53.5	39.6	30.5	24.3	19.7	16.4	13.8	11.8	10.2	8.87	6.54	12%
200UB	29.8	1230	1130	879	566	358	242	173	130	101	80.3	65.5	46.1	34.1	26.3	20.9	17.0	14.1	11.8	10.1	8.74	7.63	5.62	12%
200UB	25.4	1040	949	727	459	288	194	139	104	80.5	64.2	52.4	36.8	27.3	21.0	16.7	13.5	11.2	9.46	8.08	6.98	6.09	4.49	12%
180UB	22.2	914	750	407	209	124	81.2	57.3	42.6	32.9	26.1	21.3	14.9	11.0	8.45	6.69	5.44	4.50	3.79	3.23	2.79	2.43	1.79	12%
180UB	18.1	745	610	328	168	99.0	65.0	45.9	34.1	26.3	20.9	17.0	11.9	8.79	6.76	5.36	4.35	3.60	3.03	2.59	2.23	1.95	1.43	12%
150UB	18.0	742	554	243	119	69.4	45.3	31.9	23.6	18.2	14.5	11.8	8.22	6.06	4.66	3.69	2.99	2.48	2.09	1.78	1.54	1.34	0.986	12%
150UB	14.0	577	423	180	87.5	51.0	33.3	23.4	17.3	13.4	10.6	8.63	6.03	4.45	3.41	2.70	2.19	1.82	1.53	1.30	1.13	0.981	0.722	12%
125TFB	13.1	541	351	129	61.4	35.5	23.1	16.2	12.0	9.23	7.32	5.95	4.15	3.06	2.35	1.86	1.51	1.25	1.05	0.897	0.774	0.675	0.497	12%
100TFB	7.20	297	112	32.7	15.1	8.61	5.57	3.89	2.87	2.21	1.75	1.42	0.989	0.728	0.559	0.442	0.358	0.297	0.249	0.213	0.183	0.160	0.118	12%

Universal Columns



Dimensions and Properties

Universal Columns

Designation	DIMENSIONS							RATIOS		PROPERTIES											
	Depth of Section d	Flange		Web Thickness t _w	Radius Root r	Depth between flanges d _f	d _f t _w	(b-t _w) 2t _w	Gross Section Area A	Profile Surface Area	About x-axis				About y-axis				Torsion Constant J	Warping Constant I _w	
		Width b	Thickness t _f								I _x	Z _x	S _x	r _x	I _y	Z _y	S _y	r _y			
kg/m	mm	mm	mm	mm	mm	mm		mm ²	m ² /m	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ⁹ mm ⁶		
310UC	283	365	322	44.1	26.9	16.5	277	10.3	3.35	36100	1.94	788	4320	5100	148	246	1530	2340	82.6	20500	6330
310UC	198	340	314	31.4	19.2	16.5	277	14.4	4.69	25300	1.87	509	3000	3440	142	162	1030	1580	80.1	7400	3860
310UC	137	320	309	21.7	13.8	16.5	277	20.0	6.80	17500	1.82	327	2050	2300	137	107	691	1050	78.2	2520	2380
310UC	96.8	308	305	15.4	9.91	15.2	277	28.0	9.58	12300	1.79	222	1440	1590	134	72.9	478	725	76.8	912	1560
250UC	89.5	260	256	17.3	10.5	12.7	225	21.5	7.10	11400	1.50	142	1090	1220	112	48.4	378	574	65.3	1030	713
250UC	72.9	254	254	14.2	8.64	12.7	226	26.1	8.64	9300	1.48	114	896	990	111	38.8	306	463	64.6	576	558
200UC	59.5	210	205	14.2	9.27	12.7	182	19.6	6.89	7640	1.20	61.6	587	659	89.8	20.4	199	303	51.7	486	196
200UC	52.2	206	204	12.5	8.00	12.7	181	22.6	7.84	6690	1.19	52.8	513	571	88.9	17.7	174	264	51.5	333	166
200UC	46.2	203	203	11.0	7.32	12.7	181	24.7	8.89	5930	1.18	45.9	452	501	88.0	15.3	151	230	50.9	235	141
150UC	37.2	162	154	11.5	8.13	10.2	139	17.1	6.34	4760	0.906	22.3	276	312	68.5	7.01	91.0	139	38.4	203	39.7
150UC	30.0	158	153	9.37	6.55	10.2	139	21.3	7.81	3870	0.897	17.7	224	251	67.7	5.60	73.2	112	38.0	112	30.9
150UC	23.4	152	152	6.83	6.10	10.2	138	22.7	10.7	3010	0.882	12.7	167	186	64.9	4.00	52.7	80.7	36.5	53.3	21.1
100UC	14.8	97.0	99.0	7.01	5.00	10.2	83.0	16.6	6.70	1890	0.562	3.19	65.8	74.6	41.1	1.14	23.0	35.3	24.5	35.4	2.30

NOTES:

Universal Columns

Designation		GRADE 300 STEEL							GRADE 350 STEEL							FIRE	
		Yield Stress Form		Factor kf	About x-axis		About y-axis		Yield Stress Form		Factor kf	About x-axis		About y-axis		Hp/A Fully Exposed	M/t Fully Exposed
		Flange fyf	Web fyw		Compact ness (C,N,S)	Zex	Compact ness (C,N,S)	Zey	Flange fyf	Web fyw		Compact ness (C,N,S)	Zex	Compact ness (C,N,S)	Zey		
kg/m	MPa	MPa			103mm3		103mm3	MPa	MPa			103mm3		103mm3	1/m	m2/t	
310UC	283	280	280	1.00	C	5100	C	2290	330	340	1.00	C	5100	C	2290	53.6	6.84
310UC	198	280	280	1.00	C	3440	C	1550	340	340	1.00	C	3440	C	1550	73.9	9.44
310UC	137	280	300	1.00	C	2300	C	1040	340	340	1.00	C	2300	C	1040	104	13.3
310UC	96.8	300	320	1.00	N	1560	N	694	340	360	1.00	N	1550	N	684	146	18.5
250UC	89.5	280	320	1.00	C	1220	C	567	340	360	1.00	C	1220	C	567	132	16.8
250UC	72.9	300	320	1.00	N	984	N	454	340	360	1.00	N	976	N	448	160	20.4
200UC	59.5	300	320	1.00	C	659	C	299	340	360	1.00	C	659	C	299	157	20.2
200UC	52.2	300	320	1.00	C	571	C	260	340	360	1.00	N	570	N	260	178	22.8
200UC	46.2	300	320	1.00	N	496	N	223	360	360	1.00	N	489	N	219	199	25.6
150UC	37.2	300	320	1.00	C	312	C	137	340	360	1.00	C	312	C	137	190	24.4
150UC	30.0	320	320	1.00	C	251	C	110	360	360	1.00	N	249	N	109	232	29.9
150UC	23.4	320	320	1.00	N	178	N	73.9	360	360	1.00	N	176	N	72.7	293	37.7
100UC	14.8	320	320	1.00	C	74.6	C	34.5	360	360	1.00	C	74.6	C	34.5	298	38.0

NOTES:

Design Load Capacities for Members - Subject to Axial Compression Buckling about Y-Axis

Universal Columns

GRADE 300 STEEL

Designation	kg/m	ø N	Design Load Capacities for Axial Compression ø N _c (kN) for Effective Length (L) in metres																				Percent holes to affect net Area, A _n		
			0	0.5	1	1.5	2	2.25	2.5	2.75	3	3.25	3.5	3.75	4	4.25	4.5	4.75	5	6	7	8		9	10
310UC	137	4410	4410	4410	4410	4310	4210	4150	4100	4040	3980	3920	3850	3780	3700	3630	3540	3460	3370	2960	2540	2150	1810	1540	25%
310UC	96.8	3320	3320	3310	3230	3150	3110	3060	3020	2970	2910	2860	2800	2740	2670	2600	2530	2460	2130	1800	1500	1260	1060	20%	
250UC	89.5	2870	2870	2850	2770	2680	2640	2590	2540	2490	2430	2370	2310	2240	2170	2090	2020	1930	1610	1310	1070	884	738	25%	
250UC	72.9	2510	2510	2480	2410	2330	2290	2250	2200	2150	2100	2040	1980	1910	1840	1770	1700	1620	1330	1070	871	715	595	20%	
200UC	59.5	2060	2060	2010	1930	1850	1800	1750	1690	1630	1560	1490	1410	1330	1260	1180	1110	1040	794	617	489	396	327	20%	
200UC	52.2	1810	1810	1760	1690	1620	1570	1530	1480	1420	1360	1300	1230	1160	1100	1030	965	903	691	537	426	345	284	20%	
200UC	46.2	1600	1600	1560	1500	1430	1390	1350	1300	1250	1200	1140	1080	1020	960	900	842	787	601	466	370	299	246	20%	
150UC	37.2	1290	1280	1220	1150	1060	1010	951	889	824	759	696	637	582	532	487	447	411	300	227	177	142	117	20%	
150UC	30.0	1110	1110	1050	986	904	855	801	744	685	627	572	521	474	432	395	361	331	241	182	142	114	93.2	14%	
150UC	23.4	867	861	815	760	691	650	605	558	511	465	422	382	347	315	287	263	241	174	131	102	82.1	67.2	14%	
100UC	14.8	544	527	478	410	323	280	242	210	182	160	140	124	111	99.3	89.4	80.9	73.5	52.2	38.9	30.1	24.0	19.6	14%	

GRADE 350 STEEL

Designation	kg/m	ø N	Design Load Capacities for Axial Compression ø N _c (kN) for Effective Length (L) in metres																				Percent holes to affect net Area, A _n	
			0	0.5	1	1.5	2	2.25	2.5	2.75	3	3.25	3.5	3.75	4	4.25	4.5	4.75	5	6	7	8		9
310UC	283	10700	10700	10700	10500	10200	10100	9920	9780	9620	9460	9290	9110	8920	8720	8510	8290	8050	7040	5990	5030	4230	3570	19%
310UC	198	7740	7740	7710	7520	7330	7220	7120	7000	6880	6760	6630	6490	6340	6180	6010	5830	5650	4870	4090	3400	2840	2390	17%
310UC	137	5360	5350	5330	5200	5050	4980	4900	4820	4740	4650	4550	4450	4340	4230	4100	3980	3850	3290	2740	2270	1890	1590	17%
310UC	96.8	3760	3760	3740	3650	3550	3490	3440	3380	3320	3250	3180	3110	3030	2940	2860	2760	2670	2270	1880	1550	1290	1080	17%
250UC	89.5	3490	3490	3440	3330	3220	3150	3090	3020	2940	2860	2770	2680	2580	2470	2370	2260	2150	1730	1380	1110	909	754	17%
250UC	72.9	2850	2850	2800	2710	2620	2570	2510	2450	2390	2320	2250	2170	2090	2000	1910	1820	1730	1390	1110	890	728	604	17%
200UC	59.5	2340	2340	2270	2170	2060	2000	1940	1860	1780	1700	1610	1520	1420	1330	1240	1160	1080	814	628	496	401	330	17%
200UC	52.2	2050	2050	1980	1900	1810	1750	1690	1630	1560	1480	1400	1320	1240	1160	1080	1010	938	709	546	432	348	287	17%
200UC	46.2	1920	1920	1860	1770	1680	1620	1570	1500	1430	1350	1270	1190	1110	1040	963	894	830	622	478	377	304	250	12%
150UC	37.2	1460	1450	1370	1280	1170	1110	1030	955	877	801	728	662	602	548	499	457	419	304	229	179	143	117	17%
150UC	30.0	1250	1240	1180	1090	991	930	863	793	723	656	594	538	488	443	403	368	337	244	184	143	115	93.7	12%
150UC	23.4	975	966	910	842	756	704	649	592	536	484	437	394	356	322	293	267	244	176	133	103	82.5	67.5	12%
100UC	14.8	612	590	530	444	340	291	250	215	186	162	142	126	112	100	90.2	81.6	74.1	52.5	39.1	30.2	24.1	19.6	12%

Design Moment Capacities for Members without Lateral Restraint - Subject to Bending about X-Axis

Universal Columns

GRADE 300 STEEL

Designation		Section Moment Capacity (kNm)		Design Moment Capacities ϕM_x (kNm) for Effective Length (L) in metres																				FLR	
	kg/m	ϕM_{x1}	ϕM_{x2}	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24	26	28	30	35	m
310UC	283	1290	577	1290	1290	1260	1220	1180	1140	1110	1080	1040	1010	958	905	857	813	772	734	698	666	636	608	546	2.34
310UC	198	867	391	867	866	834	799	765	733	702	674	647	621	575	534	497	464	434	408	384	363	343	325	287	2.27
310UC	137	580	262	580	577	551	521	492	463	436	412	389	368	331	300	274	251	232	215	200	187	175	165	144	2.22
310UC	96.8	421	187	421	417	394	368	340	314	289	266	246	228	198	174	155	139	126	116	107	98.7	92.0	86.1	74.1	2.10
250UC	89.5	307	143	307	300	282	263	244	227	211	197	185	173	154	138	124	113	104	95.7	88.7	82.6	77.2	72.5	62.8	1.85
250UC	72.9	266	123	266	258	240	220	201	183	168	154	142	131	114	100	89.1	80.2	72.9	66.7	61.5	57.0	53.1	49.7	42.8	1.77
200UC	59.5	178	80.7	178	168	153	139	127	116	106	98.0	90.7	84.2	73.5	65.0	58.2	52.6	47.9	43.9	40.5	37.6	35.1	32.9	28.4	1.42
200UC	52.2	154	70.2	154	145	131	118	106	96.3	87.5	80.0	73.5	67.9	58.7	51.6	45.9	41.3	37.5	34.3	31.6	29.3	27.3	25.6	22.0	1.41
200UC	46.2	134	60.2	134	125	113	101	89.9	80.5	72.5	65.8	60.0	55.1	47.3	41.2	36.5	32.8	29.7	27.1	24.9	23.1	21.5	20.1	17.3	1.39
150UC	37.2	84.2	37.0	83.5	75.1	66.6	59.3	53.0	47.8	43.4	39.6	36.3	33.5	29.0	25.4	22.6	20.3	18.5	16.9	15.6	14.4	13.4	12.6	10.8	1.05
150UC	30.0	72.3	31.7	71.3	62.9	54.1	46.7	40.7	35.8	31.9	28.6	26.0	23.7	20.2	17.5	15.5	13.8	12.5	11.4	10.5	9.69	9.01	8.42	7.24	1.01
150UC	23.4	51.3	21.3	50.5	44.0	37.0	31.1	26.4	22.8	20.0	17.7	15.9	14.4	12.1	10.5	9.18	8.18	7.38	6.72	6.16	5.69	5.29	4.94	4.24	0.968
100UC	14.8	21.5	9.94	20.1	16.8	14.1	12.0	10.4	9.16	8.14	7.31	6.62	6.04	5.13	4.45	3.93	3.51	3.17	2.89	2.66	2.46	2.29	2.14	1.84	0.650

GRADE 350 STEEL

Designation		Section Moment Capacity (kNm)		Design Moment Capacities ϕM_x (kNm) for Effective Length (L) in metres																				FLR	
	kg/m	ϕM_{x1}	ϕM_{x2}	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24	26	28	30	35	m
310UC	283	1510	680	1510	1510	1450	1400	1350	1300	1260	1210	1170	1130	1060	995	935	880	831	785	743	705	671	638	569	2.16
310UC	198	1050	474	1050	1040	993	944	896	850	808	769	732	699	638	585	539	499	464	433	405	380	358	338	296	2.06
310UC	137	704	318	704	694	656	614	572	532	496	463	433	406	360	322	291	264	242	223	207	192	180	169	146	2.01
310UC	96.8	474	209	474	466	438	405	371	339	310	283	260	239	205	179	159	142	129	117	108	100	92.8	86.7	74.5	1.98
250UC	89.5	373	174	373	360	334	306	281	257	237	218	202	188	164	145	130	118	107	98.3	90.8	84.3	78.7	73.7	63.6	1.68
250UC	72.9	299	137	299	288	265	241	217	196	178	162	148	137	117	103	90.9	81.6	73.9	67.5	62.1	57.5	53.5	50.1	43.1	1.66
200UC	59.5	202	91.5	202	188	170	152	137	124	113	103	94.9	87.7	75.9	66.7	59.4	53.5	48.6	44.5	41.0	38.0	35.4	33.1	28.5	1.33
200UC	52.2	174	79.6	174	161	145	129	114	102	92.3	83.8	76.5	70.3	60.3	52.7	46.7	41.9	37.9	34.6	31.9	29.5	27.5	25.7	22.1	1.32
200UC	46.2	158	71.0	158	145	128	112	98.5	87.0	77.4	69.5	62.9	57.4	48.7	42.2	37.2	33.3	30.0	27.4	25.2	23.3	21.6	20.2	17.3	1.27
150UC	37.2	96	41.9	94.1	83.5	72.9	64.0	56.6	50.5	45.4	41.2	37.6	34.5	29.6	25.9	22.9	20.6	18.6	17.0	15.7	14.5	13.5	12.6	10.9	0.988
150UC	30.0	80.7	35.3	79.1	68.7	58.3	49.5	42.6	37.2	32.9	29.4	26.5	24.2	20.4	17.7	15.6	13.9	12.6	11.5	10.5	9.72	9.04	8.44	7.25	0.950
150UC	23.4	57.0	23.6	55.7	47.9	39.6	32.7	27.5	23.5	20.5	18.1	16.2	14.6	12.3	10.5	9.23	8.22	7.40	6.74	6.18	5.70	5.30	4.95	4.24	0.913
100UC	14.8	24.2	11.2	22.3	18.2	15.0	12.7	10.9	9.46	8.35	7.46	6.74	6.13	5.19	4.49	3.95	3.53	3.19	2.90	2.67	2.47	2.29	2.14	1.84	0.613

Standard Welded Columns & Beams



Standard Welded Columns

Designation	DIMENSIONS					RATIOS		Gross Section Area A_g	PROPERTIES									
	Depth of Section d	Flange		Web Thickness t_w	Depth between flanges d_f	$\frac{d}{t_w}$	$\frac{(b - t_w)}{2 t_f}$		About x-axis				About y-axis				Torsion Constant J	Warping Constant I_w
		Width b_f	Thickness t_f						I_x	Z_x	S_x	r_x	I_y	Z_y	S_y	r_y		
mm	mm	mm	mm	mm			mm ²	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ³ mm ⁴	10 ⁶ mm ⁶	
370SC185	370	370	25.0	16.0	320	20.0	7.08	23600	595	3220	3600	159	211	1140	1730	94.6	4210	6280
370SC147	370	370	20.0	12.0	330	27.5	8.95	18800	490	2650	2920	162	169	913	1380	94.9	2130	5170
370SC125	370	370	16.0	12.0	338	28.2	11.2	15900	410	2220	2440	161	135	730	1110	92.2	1200	4230
295SC139	295	295	25.0	12.0	245	20.4	5.66	17700	284	1930	2170	127	107	725	1100	77.8	3100	1950
295SC117	295	295	20.0	12.0	255	21.3	7.08	14900	240	1630	1820	127	85.6	580	879	75.9	1680	1620
295SC95	295	295	16.0	10.0	263	26.3	8.91	12100	199	1350	1490	128	68.5	464	703	75.3	879	1330
245SC104	245	245	22.0	12.0	201	16.8	5.30	13200	143	1160	1320	104	54.0	440	668	64.0	1790	671
245SC89	245	245	18.0	12.0	209	17.4	6.47	11300	123	1000	1130	104	44.1	360	548	62.4	1050	569

NOTES:

Standard Welded Beams

Designation (See Note 4)	DIMENSIONS					RATIOS		Gross Section Area A	PROPERTIES									
	Depth of Section d	Flange		Web Thickness t _w	Depth between Flanges d _f	d _f t _w	(d _f - t _w) 2 t _f		About x-axis				About y-axis				Torsion Constant J	Warping Constant I _w
		Width b _f	Thickness t _f						I _x	Z _x	S _x	r _x	I _y	Z _y	S _y	r _y		
mm	mm	mm	mm	mm	mm	mm	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ⁶ mm ⁶	
900SB208	900	370	22.0	12.0	856	71.3	8.14	26600	3770	8370	9350	377	186	1000	1540	83.7	3060	35800
850SB169	850	295	20.0	12.0	810	67.5	7.08	21500	2560	6030	6870	345	85.7	581	899	63.1	2000	14800
800SB152	800	295	20.0	10.0	760	76.0	7.13	19400	2160	5400	6050	334	85.6	581	889	66.4	1780	13000
775SB120	775	245	16.0	10.0	743	74.3	7.34	15300	1470	3800	4360	310	39.3	321	499	50.7	902	5660
750SB118	750	245	16.0	10.0	718	71.8	7.34	15000	1360	3640	4170	301	39.3	321	498	51.1	894	5290
725SB116	725	245	16.0	10.0	693	69.3	7.34	14800	1260	3480	3980	292	39.3	321	498	51.6	885	4940
700SB114	700	245	16.0	10.0	668	66.8	7.34	14500	1170	3330	3800	283	39.3	321	497	52.0	877	4590
675SB112	675	245	16.0	10.0	643	64.3	7.34	14300	1070	3180	3620	274	39.3	321	496	52.5	869	4260
650SB100	650	245	16.0	8.00	618	77.3	7.41	12800	945	2910	3250	272	39.2	320	490	55.4	755	3940
625SB84	625	210	14.0	8.00	597	74.6	7.21	10700	691	2210	2510	255	21.6	206	318	45.1	476	2020
600SB82	600	210	14.0	8.00	572	71.5	7.21	10500	630	2100	2380	245	21.6	206	318	45.5	472	1860
575SB81	575	210	14.0	8.00	547	68.4	7.21	10300	572	1990	2250	236	21.6	206	317	45.9	468	1700
550SB79	550	210	14.0	8.00	522	65.3	7.21	10100	517	1880	2120	227	21.6	206	317	46.4	463	1550
525SB77	525	210	14.0	8.00	497	62.1	7.21	9860	466	1770	2000	217	21.6	206	317	46.8	459	1410
500SB68	500	210	14.0	6.00	472	78.7	7.29	8710	400	1600	1760	214	21.6	206	313	49.8	406	1280
475SB56	475	183	12.0	6.00	451	75.2	7.38	7100	281	1180	1320	199	12.3	134	205	41.6	237	657
450SB55	450	183	12.0	6.00	426	71.0	7.38	6950	249	1110	1230	189	12.3	134	205	42.0	235	588
425SB53	425	183	12.0	6.00	401	66.8	7.38	6800	220	1030	1150	180	12.3	134	205	42.5	234	523
400SB49	400	183	12.0	5.00	376	75.2	7.42	6270	187	937	1030	173	12.3	134	203	44.2	220	461
375SB39	375	162	10.0	5.00	355	71.0	7.85	5020	127	675	749	159	7.09	87.5	133	37.6	120	236
350SB38	350	162	10.0	5.00	330	66.0	7.85	4890	109	621	687	149	7.09	87.5	133	38.1	119	205
325SB35	325	145	10.0	5.00	305	61.0	7.00	4430	83.8	516	573	138	5.08	70.1	107	33.9	106	126

Standard Welded Beams

Designation	PROPERTIES FOR ASSESSING SECTION CAPACITY								FIRE ENGINEERING DESIGN PARAMETERS						FILLET WELD
	Yield Stress		Form Factor k	About x-axis			About y-axis		4 sided			3 sided			(See note 2)
	Flange	Web		Compactness	Z_x	M_x	Compactness	Z_y	K_x	H/A	r_x	K_y	H/A	r_y	v^*
MPa	MPa			10 ³ mm ³	kNm		10 ³ mm ³	m ² /T	m ⁻¹	(15 min)	m ² /T	m ⁻¹	(15 min)	kN/mm	
900SB208	340	360	0.776	N	9100	3090	N	1450	15.7	122		13.9	109		1.93
850SB169	350	360	0.746	N	6810	2380	N	864	16.9	133		15.2	119		2.01
800SB152	350	360	0.761	N	6000	2100	N	862	18.2	142		16.2	127		1.41
775SB120	350	360	0.707	N	4290	1500	N	473	20.9	164		18.9	148		1.37
750SB118	350	360	0.719	N	4110	1440	N	473	20.8	164		18.8	148		1.49
725SB116	350	360	0.731	N	3920	1370	N	473	20.8	163		18.7	146		1.61
700SB114	350	360	0.744	N	3740	1310	N	473	20.7	163		18.6	146		1.65
675SB112	350	360	0.757	N	3570	1250	N	473	20.6	162		18.4	144		1.68
650SB100	350	360	0.761	N	3210	1120	N	472	22.6	177		20.2	158		1.01
625SB84	350	360	0.729	N	2480	868	N	305	24.7	194		22.2	174		1.12
600SB82	350	360	0.743	N	2350	823	N	305	24.7	193		22.1	173		1.23
575SB81	350	360	0.758	N	2220	777	N	305	24.4	192		21.8	171		1.36
550SB79	350	360	0.773	N	2100	735	N	305	24.4	191		21.7	170		1.37
525SB77	350	360	0.789	N	1980	693	N	305	24.3	190		21.6	169		1.38
500SB68	350	360	0.797	N	1750	613	N	304	26.9	210		23.8	186		0.82
475SB56	360	360	0.767	N	1300	468	N	197	29.8	235		26.6	209		0.87
450SB55	360	360	0.783	N	1220	439	N	197	29.5	233		26.1	207		0.99
425SB53	360	360	0.801	N	1130	407	N	197	29.6	231		26.2	204		1.07
400SB49	360	360	0.817	N	1020	367	N	197	31.1	243		27.3	214		0.76
375SB39	360	360	0.791	N	731	263	N	127	35.6	277		31.4	244		0.83
350SB38	360	360	0.812	N	671	242	N	127	35.2	274		30.9	241		0.90
325SB35	360	360	0.820	N	569	205	N	104	34.9	275		30.7	243		0.90

Parallel & Taper Flange Channels



Parallel & Taper Flange Channels

Designation		DIMENSIONS						RATIOS		PROPERTIES														
		Depth of Section d	Flange		Web Thick- ness t _w	Radius Root r	Depth between flanges d ₁	d ₁ t _w	(b-t) t _w	Gross Section Area A	Profile Surface Area	Coordinate of Centroid x _c	Coordinate of Shear Centre x _s	About x-axis				About y-axis					Torsion Constant J	Warping Constant I _w
			Width b _f	Thick- ness t _f										I _x	Z _x	S _x	r _x	I _y	Z _y	Z _{xy}	S _y	r _y		
	kg/m	mm	mm	mm	mm	mm			mm ²	m ² /m	mm	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ⁶ mm ⁴	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ⁶ mm ⁴	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	
380PFC	55.2	380	100	17.5	10.0	14.0	345	34.5	5.14	7030	1.13	27.5	56.7	152	798	946	147	6.48	89.4	236	161	30.4	472	151
300PFC	40.1	300	90	16.0	8.00	14.0	268	33.5	5.13	5110	0.932	27.2	56.1	72.4	483	564	119	4.04	64.4	149	117	28.1	290	58.2
250PFC	35.5	250	90	15.0	8.00	12.0	220	27.5	5.47	4520	0.834	28.6	58.5	45.1	361	421	100	3.64	59.3	128	107	28.4	238	35.8
230PFC	25.1	230	75	12.0	6.50	12.0	206	31.7	5.71	3200	0.737	22.6	46.7	26.8	233	271	91.4	1.76	33.6	77.8	60.9	23.5	108	15.0
200PFC	22.9	200	75	12.0	6.00	12.0	176	29.3	5.75	2920	0.678	24.4	50.1	19.1	191	221	80.9	1.66	32.7	67.8	58.9	23.8	101.0	10.6
180PFC	20.9	180	75	11.0	6.00	12.0	158	26.3	6.27	2660	0.638	24.5	50.3	14.1	157	182	72.9	1.51	29.9	61.5	53.8	23.8	81.4	7.81
150PFC	17.7	150	75	9.50	6.00	10.0	131	21.8	7.26	2250	0.579	24.9	51.0	8.34	111	129	60.8	1.29	25.7	51.6	46.1	23.9	54.9	4.58
125TFC	13.4	125	65	8.00	6.00	8.00	109	18.2	7.38	1710	0.491	19.0	40.8	4.24	67.8	79.3	49.8	0.618	13.4	32.5	27.4	19.0	35.2	1.74
100TFC	9.34	100	50	7.50	5.00	8.00	85.0	17.0	6.00	1190	0.383	15.4	32.1	1.88	37.6	44.3	39.7	0.260	7.51	16.9	15.1	14.8	20.2	0.449

NOTES:

Parallel & Taper Flange Channels

		GRADE 300 STEEL			GRADE 350 STEEL			ALL GRADES				FIRE			
Designation		Flange f_t	Web f_t	Form Factor k_f	Flange f_t	Web f_t	Form Factor k_f	About x-axis		About y-axis		H/A Fully Exposed	H/A 3 sides Exposed	M/t Fully Exposed	M/t 3 sides Exposed
								Compactness (C,N,S)	Z_x	Compactness (C,N,S)	Z_y				
	kg/m	MPa	MPa		MPa	MPa			10 ³ mm ³		10 ³ mm ³	1/m	1/m	m ² /t	m ² /t
380PFC	55.2	280	320	1.00	340	360	1.00	C	946	C	134	161	146	20.4	18.6
300PFC	40.1	300	320	1.00	340	360	1.00	C	564	C	96.6	182	165	23.2	21.0
250PFC	35.5	300	320	1.00	340	360	1.00	C	421	C	89.0	184	165	23.5	20.9
230PFC	25.1	300	320	1.00	340	360	1.00	C	271	C	50.4	230	207	29.4	26.4
200PFC	22.9	300	320	1.00	340	360	1.00	C	221	C	49.1	232	206	29.6	26.3
180PFC	20.9	300	320	1.00	360	360	1.00	C	182	C	44.9	240	212	30.5	26.9
150PFC	17.7	320	320	1.00	360	360	1.00	C	129	C	38.5	258	224	32.7	28.5
125TFC	13.4	320	320	1.00	360	360	1.00	C	79.3	C	20.1	281	243	35.8	31.0
100TFC	9.34	320	320	1.00	360	360	1.00	C	44.3	C	11.3	314	272	40.0	34.7

NOTES:

Parallel & Taper Flange Channels

GRADE 300

Designation		Section Moment Capacity		W _{ux} (kN) / Ws (kN) - Span in metres																	W _{ux}	FLR
	kg/m	øM _x	øM _y	1	1.5	2	2.5	3	4	5	6	7	8	9	10	12	14	16	18	20	kN	m
380PFC	55.2	238	29.0	1900	1270	952	762	635	476	381	317	272	238	212	190	159	136	119	106	95.2	1310	0.804
				1790	1190	894	715	596	447	358	259	191	146	115	93.4	64.9	47.6	36.5	28.8	23.3		
300PFC	40.1	152	22.2	1220	811	608	486	405	304	243	203	174	152	135	122	101	86.9	76.0	67.6	60.8	830	0.718
				1160	773	580	464	386	278	178	124	90.8	69.5	54.9	44.5	30.9	22.7	17.4	13.7	11.1		
250PFC	35.5	114	23.9	912	608	456	365	304	228	182	152	130	114	101	91.2	76.0	65.1	57.0	50.7	45.6	692	0.726
				866	578	433	347	289	173	111	77.0	56.5	43.3	34.2	27.7	19.2	14.1	10.8	8.55	6.93		
230PFC	25.1	73.2	12.2	586	390	293	234	195	146	117	97.6	83.7	73.2	65.1	58.6	48.8	41.8	36.6	32.5	29.3	516	0.601
				559	373	280	224	183	103	65.9	45.7	33.6	25.7	20.3	16.5	11.4	8.40	6.43	5.08	4.12		
200PFC	22.9	59.7	12.6	478	318	239	191	159	119	95.5	79.6	68.2	59.7	53.1	47.8	39.8	34.1	29.9	26.5	23.9	414	0.608
				458	306	229	183	130	73.3	46.9	32.6	23.9	18.3	14.5	11.7	8.15	5.99	4.58	3.62	2.93		
180PFC	20.9	49.1	12.1	393	262	196	157	131	98.2	78.6	65.5	56.1	49.1	43.6	39.3	32.7	28.1	24.6	21.8	19.6	374	0.608
				377	251	188	139	96.3	54.1	34.7	24.1	17.7	13.5	10.7	8.66	6.02	4.42	3.38	2.67	2.17		
150PFC	17.7	37.2	11.1	298	198	149	119	99.2	74.4	59.5	49.6	42.5	37.2	33.1	29.8	24.8	21.3	18.6	16.5	14.9	312	0.591
				284	189	128	82.0	56.9	32.0	20.5	14.2	10.5	8.01	6.33	5.12	3.56	2.61	2.00	1.58	1.28		
125TFC	13.4	22.8	6.57	182	122	91.2	73.0	60.8	45.6	36.5	30.4	26.1	22.8	20.3	18.2	15.2	13.0	11.4	10.1	9.12	260	0.470
				174	116	65.1	41.7	28.9	16.3	10.4	7.24	5.32	4.07	3.22	2.61	1.81	1.33	1.02	0.804	0.651		
100TFC	9.34	12.8	3.46	102	68.3	51.2	41.0	34.1	25.6	20.5	17.1	14.6	12.8	11.4	10.2	8.53	7.31	6.40	5.69	5.12	173	0.366
				96.3	51.3	28.9	18.5	12.8	7.22	4.62	3.21	2.36	1.80	1.43	1.16	0.802	0.589	0.451	0.357	0.289		

Parallel & Taper Flange Channels

GRADE 350

Designation	Section Moment Capacity			W _x (kN) / W _s (kN) - Span in metres																	W _x kN	FLR m
	kg/m	øM _x	øM _y	1	1.5	2	2.5	3	4	5	6	7	8	9	10	12	14	16	18	20		
380PFC	55.2	289	31.8	2310	1540	1160	925	771	578	462	385	330	289	257	231	193	165	145	128	116	1480	0.730
				2170	1450	1090	868	724	543	374	259	191	146	115	93.4	64.9	47.6	36.5	28.8	23.3		
300PFC	40.1	173	23.6	1380	923	692	554	461	346	277	231	198	173	154	138	115	98.9	86.5	76.9	69.2	934	0.675
				1310	876	657	526	438	278	178	124	90.8	69.5	54.9	44.5	30.9	22.7	17.4	13.7	11.1		
250PFC	35.5	129	26.0	1030	688	516	413	344	258	206	172	147	129	115	103	86.0	73.7	64.5	57.3	51.6	778	0.682
				982	655	491	393	308	173	111	77.0	56.5	43.3	34.2	27.7	19.2	14.1	10.8	8.55	6.93		
230PFC	25.1	82.9	13.0	663	442	332	265	221	166	133	111	95	82.9	73.7	66.3	55.3	47.4	41.5	36.8	33.2	582	0.564
				634	423	317	254	183	103	65.9	45.7	33.6	25.7	20.3	16.5	11.4	8.40	6.43	5.08	4.12		
200PFC	22.9	67.6	13.6	541	361	270	216	180	135	108	90.1	77.3	67.6	60.1	54.1	45.1	38.6	33.8	30.0	27.0	466	0.571
				520	346	260	188	130	73.3	46.9	32.6	23.9	18.3	14.5	11.7	8.15	5.99	4.58	3.62	2.93		
180PFC	20.9	59.0	14.0	472	315	236	189	157	118	94.4	78.7	67.4	59.0	52.4	47.2	39.3	33.7	29.5	26.2	23.6	420	0.555
				452	301	217	139	96.3	54.1	34.7	24.1	17.7	13.5	10.7	8.66	6.02	4.42	3.38	2.67	2.17		
150PFC	17.7	41.8	12.5	334	223	167	134	111	83.6	66.9	55.7	47.8	41.8	37.2	33.4	27.9	23.9	20.9	18.6	16.7	350	0.558
				320	213	128	82.0	56.9	32.0	20.5	14.2	10.5	8.01	6.33	5.12	3.56	2.61	2.00	1.58	1.28		
125TFC	13.4	25.7	7.39	206	137	103	82.2	68.5	51.4	41.1	34.3	29.4	25.7	22.8	20.6	17.1	14.7	12.9	11.4	10.3	292	0.443
				195	116	65.1	41.7	28.9	16.3	10.4	7.24	5.32	4.07	3.22	2.61	1.81	1.33	1.02	0.804	0.651		
100TFC	9.34	14.4	3.89	115	76.8	57.6	46.1	38.4	28.8	23.0	19.2	16.5	14.4	12.8	11.5	9.60	8.23	7.20	6.40	5.76	194	0.345
				108	51.3	28.9	18.5	12.8	7.22	4.62	3.21	2.36	1.80	1.43	1.16	0.802	0.589	0.451	0.357	0.289		

Hollow Sections



Circular Hollow Sections - ASTM106

GRADE B OR API 5L GRADE B

DIMENSIONS				RATIO	SECTION PROPERTIES							ASTM 106, Grade B or API 5L, Grade B				FIRE		
Designation			Mass per metre		d/t	Gross Section Area	Profile Surface Area	About any axis				Torsion Constant	Yield Stress f_y	Form Factor k_f	About any axis		Hp/A Fully Exposed	M/t Fully Exposed
d	x	t		l				Z	S	r	Compactness (C,N,S)				Z _x			
mm		mm		kg/m		mm ²	m ² /m	10 ⁶ mm ⁴	10 ⁶ mm ³	10 ⁶ mm ³	mm	10 ⁶ mm ⁴	MPa			10 ⁶ mm ³	1/m	m ² /t
406.4	x	9.53	CHS	93.4	42.6	11900	1.28	234	1150	1500	140	468	241	1.00	C	1500	108	13.7
355.6	x	9.53	CHS	81.6	37.3	10400	1.12	155	873	1140	122	311	241	1.00	C	1140	108	13.7
323.9	x	9.53	CHS	73.9	34.0	9410	1.02	116	719	942	111	233	241	1.00	C	942	108	13.8
323.9	x	6.35	CHS	49.7	51.0	6330	1.02	79.9	493	640	112	160	241	1.00	C	640	161	20.5
273.1	x	15.1	CHS	95.8	18.1	12200	0.858	102	748	1010	91.5	204	241	1.00	C	1010	70.1	9.0
273.1	x	9.27	CHS	60.3	29.5	7680	0.858	66.9	490	646	93.4	134	241	1.00	C	646	112	14.2
273.1	x	6.35	CHS	41.8	43.0	5320	0.858	47.4	347	452	94.3	94.7	241	1.00	C	452	161	20.5
219.1	x	12.7	CHS	64.6	17.3	8230	0.688	44.0	402	542	73.1	88.0	241	1.00	C	542	83.6	10.7
219.1	x	8.18	CHS	42.5	26.8	5420	0.688	30.2	276	364	74.6	60.4	241	1.00	C	364	127	16.2
219.1	x	6.35	CHS	33.3	34.5	4240	0.688	24.0	219	288	75.3	48.1	241	1.00	C	288	162	20.7
168.3	x	11.0	CHS	42.5	15.3	5420	0.529	16.9	200	272	55.8	33.7	241	1.00	C	272	97.5	12.4
168.3	x	7.11	CHS	28.3	23.7	3600	0.529	11.7	139	185	57.1	23.4	241	1.00	C	185	147	18.7
141.3	x	9.53	CHS	31.0	14.8	3950	0.444	8.61	122	166	46.7	17.2	241	1.00	C	166	113	14.3
141.3	x	6.55	CHS	21.7	21.6	2770	0.444	6.31	89.3	119	47.7	12.6	241	1.00	C	119	160	20.4
88.9	x	7.62	CHS	15.3	11.7	1950	0.279	1.62	36.5	50.5	28.8	3.24	241	1.00	C	50.5	144	18.2
88.9	x	5.49	CHS	11.3	16.2	1440	0.279	1.26	28.3	38.3	29.5	2.51	241	1.00	C	38.3	194	24.7
73.0	x	7.01	CHS	11.4	10.4	1450	0.229	0.800	21.9	30.6	23.5	1.60	241	1.00	C	30.6	158	20.1
73.0	x	5.16	CHS	8.64	14.1	1100	0.229	0.636	17.4	23.8	24.1	1.27	241	1.00	C	23.8	209	26.6
60.3	x	5.54	CHS	7.48	10.9	953	0.189	0.361	12.0	16.7	19.5	0.722	241	1.00	C	16.7	199	25.3
60.3	x	3.91	CHS	5.44	15.4	693	0.189	0.277	9.18	12.5	20.0	0.553	241	1.00	C	12.5	274	34.8

Circular Hollow Sections - ASTM106

GRADE B OR API 5L GRADE B

Designation				øN	Design Load Capacities for Axial Compression øN (kN) Effective length (L) in metres																			
d	x	t			0	0.5	1	1.5	2	2.25	2.5	2.75	3	3.25	3.5	3.75	4	4.5	5	6	7	8	9	10
mm		mm																						
406	x	9.53	CHS	2570	2580	2580	2580	2580	2570	2560	2550	2540	2540	2530	2520	2510	2480	2460	2410	2340	2270	2180	2090	
356	x	9.53	CHS	2240	2250	2250	2250	2240	2230	2220	2210	2200	2200	2190	2170	2160	2140	2110	2050	1980	1890	1790	1670	
324	x	9.53	CHS	2040	2040	2040	2040	2030	2020	2010	2000	1990	1980	1970	1960	1950	1920	1890	1820	1740	1640	1530	1400	
324	x	6.35	CHS	1380	1370	1370	1370	1360	1360	1350	1350	1340	1330	1330	1320	1310	1290	1280	1230	1180	1110	1040	953	
273	x	15.1	CHS	2660	2650	2650	2640	2620	2600	2590	2570	2550	2530	2510	2490	2470	2420	2360	2230	2060	1870	1660	1450	
273	x	9.27	CHS	1670	1670	1670	1660	1640	1640	1630	1620	1610	1600	1580	1570	1560	1530	1490	1410	1310	1200	1070	937	
273	x	6.35	CHS	1150	1150	1150	1150	1140	1130	1130	1120	1110	1110	1100	1090	1080	1060	1040	981	914	835	747	658	
219	x	12.7	CHS	1790	1790	1790	1770	1740	1730	1710	1700	1680	1660	1640	1610	1590	1540	1470	1330	1150	976	818	687	
219	x	8.18	CHS	1180	1180	1180	1160	1150	1140	1130	1120	1110	1090	1080	1070	1050	1020	979	885	775	661	556	468	
219	x	6.35	CHS	921	921	921	911	899	892	885	877	868	858	848	837	825	799	769	697	612	523	441	372	
168	x	11.0	CHS	1180	1180	1170	1150	1120	1110	1090	1070	1050	1030	1000	978	949	883	811	658	522	416	336	276	
168	x	7.11	CHS	781	781	776	763	747	737	727	715	702	688	672	655	637	596	549	450	359	287	233	192	
141	x	9.53	CHS	855	856	845	825	799	783	766	746	725	701	674	645	614	548	482	366	280	219	176	144	
141	x	6.55	CHS	602	601	594	581	563	553	541	528	513	497	479	460	439	394	348	266	204	160	128	105	
88.9	x	7.62	CHS	421	420	404	380	346	325	300	274	247	221	198	177	159	129	106	74.9	55.7	43.0	34.2	27.8	
88.9	x	5.49	CHS	312	310	299	283	259	244	226	207	188	169	152	136	122	99.2	81.8	58.0	43.1	33.3	26.5	21.6	
73.0	x	7.01	CHS	316	311	295	267	227	203	179	156	136	119	104	91.7	81.4	65.2	53.4	37.5	27.8	21.5	17.0	13.9	
73.0	x	5.16	CHS	238	236	224	204	175	158	140	122	107	93.6	82.3	72.7	64.5	51.8	42.3	29.8	22.1	17.0	13.5	11.0	
60.3	x	5.54	CHS	207	202	187	160	123	104	88.3	75.1	64.3	55.5	48.3	42.4	37.5	29.9	24.4	17.1	12.7	9.76	7.75	6.30	
60.3	x	3.91	CHS	150	147	137	118	92.1	78.8	67.1	57.1	49.0	42.4	36.9	32.4	28.7	22.9	18.7	13.1	9.70	7.47	5.93	4.82	

Square Hollow Sections

GRADE 350

GRADE 350																					
DIMENSIONS						RATIOS			PROPERTIES						DESIGN				FIRE		
Designation						Mass per m	h-2t t	d-2t t	Gross Section Area A	Profile Surface Area	About x-axis or y-axis				Torsion Constant J	Yield Stress f _y	Form Factor k	About x-axis or y-axis		Hp/A Fully Exposed	M/t Fully Exposed
d	x	b	x	t							I	Z	S	r				Compactness (C,N,S)	Z _p		
mm		mm		mm		10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	MPa		10 ³ mm ³	1/m	m ² /t						
250	x	250	x	9.0	SHS	65.9	25.8	25.8	8400	0.961	79.8	639	750	97.5	129	350	1.00	N	744	114	14.6
250	x	250	x	6.0	SHS	45.0	39.7	39.7	5730	0.974	56.2	450	521	99.1	88.7	350	0.853	S	409	170	21.7
200	x	200	x	9.0	SHS	51.8	20.2	20.2	6600	0.761	39.2	392	465	77.1	64.5	350	1.00	C	465	115	14.7
200	x	200	x	6.0	SHS	35.6	31.3	31.3	4530	0.774	28.0	280	327	78.6	44.8	350	1.00	N	294	171	21.8
150	x	150	x	9.0	SHS	37.7	14.7	14.7	4800	0.561	15.4	205	248	56.6	26.1	350	1.00	C	248	117	14.9
150	x	150	x	6.0	SHS	26.1	23.0	23.0	3330	0.574	11.3	151	178	58.2	18.4	350	1.00	C	178	172	22.0
150	x	150	x	5.0	SHS	22.1	28.0	28.0	2810	0.579	9.70	129	151	58.8	15.6	350	1.00	N	145	206	26.2
125	x	125	x	9.0	SHS	30.6	11.9	11.9	3900	0.461	8.38	134	165	46.3	14.5	350	1.00	C	165	118	15.1
125	x	125	x	6.0	SHS	21.4	18.8	18.8	2730	0.474	6.29	101	120	48.0	10.4	350	1.00	C	120	174	22.1
125	x	125	x	5.0	SHS	18.1	23.0	23.0	2310	0.479	5.44	87.1	103	48.5	8.87	350	1.00	C	103	207	26.4
100	x	100	x	9.0	SHS	23.6	9.11	9.11	3000	0.361	3.91	78.1	98.6	36.1	7.00	350	1.00	C	98.6	121	15.3
100	x	100	x	6.0	SHS	16.7	14.7	14.7	2130	0.374	3.04	60.7	73.5	37.8	5.15	350	1.00	C	73.5	176	22.4
100	x	100	x	5.0	SHS	14.2	18.0	18.0	1810	0.379	2.66	53.1	63.5	38.3	4.42	350	1.00	C	63.5	209	26.6
89	x	89	x	6.0	SHS	14.7	12.8	12.8	1870	0.330	2.06	46.4	56.7	33.2	3.55	350	1.00	C	56.7	177	22.5
89	x	89	x	4.9	SHS	12.3	16.2	16.2	1570	0.335	1.79	40.3	48.4	33.8	3.00	350	1.00	C	48.4	213	27.2
89	x	89	x	3.6	SHS	9.34	22.7	22.7	1190	0.341	1.41	31.7	37.4	34.4	2.30	350	1.00	C	37.4	286	36.5
75	x	75	x	6.0	SHS	12.0	10.5	10.5	1530	0.274	1.16	30.9	38.4	27.5	2.04	350	1.00	C	38.4	179	22.8
76	x	76	x	4.9	SHS	10.3	13.5	13.5	1310	0.283	1.06	28.0	34.1	28.5	1.82	350	1.00	C	34.1	216	27.5
76	x	76	x	4.0	SHS	8.64	17.0	17.0	1100	0.287	0.921	24.2	29.1	28.9	1.54	350	1.00	C	29.1	261	33.2
76	x	76	x	3.2	SHS	7.04	21.8	21.8	897	0.290	0.775	20.4	24.1	29.4	1.27	350	1.00	C	24.1	324	41.2
65	x	65	x	6.0	SHS	10.1	8.83	8.83	1290	0.234	0.706	21.7	27.5	23.4	1.27	350	1.00	C	27.5	182	23.1
64	x	64	x	4.9	SHS	8.48	11.1	11.1	1080	0.235	0.598	18.7	23.1	23.5	1.05	350	1.00	C	23.1	218	27.7
64	x	64	x	4.0	SHS	7.10	14.0	14.0	905	0.239	0.524	16.4	19.9	24.1	0.894	350	1.00	C	19.9	264	33.6
64	x	64	x	3.2	SHS	5.83	18.0	18.0	743	0.242	0.446	13.9	16.6	24.5	0.742	350	1.00	C	16.6	326	41.5
50	x	50	x	6.0	SHS	7.32	6.33	6.33	932	0.174	0.275	11.0	14.5	17.2	0.518	350	1.00	C	14.5	187	23.8
51	x	51	x	4.9	SHS	6.44	8.41	8.41	821	0.183	0.273	10.7	13.6	18.2	0.495	350	1.00	C	13.6	223	28.4
51	x	51	x	4.0	SHS	5.47	10.8	10.8	697	0.187	0.245	9.60	11.9	18.7	0.430	350	1.00	C	11.9	268	34.1
51	x	51	x	3.2	SHS	4.53	13.9	13.9	577	0.190	0.212	8.31	10.1	19.2	0.361	350	1.00	C	10.1	330	42.0

Square Hollow Sections

GRADE 450

GRADE 450																					
DIMENSIONS						RATIOS			PROPERTIES							DESIGN				FIRE	
Designation						Mass per m	$\frac{b-2t}{t}$	$\frac{d-2t}{t}$	Gross Section Area A	Profile Surface Area	About x-axis or y-axis				Torsion Constant J	Yield Stress f_y	Form Factor k	About x-axis or y-axis		Hp/A Fully Exposed	M/t Fully Exposed
d	x	b	x	t							I	Z	S	r				Compactness (C,N,S)	Z _x		
mm		mm		mm		10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm			10 ⁶ mm ⁴	MPa			10 ³ mm ³	1/m	m ² /t			
250	x	250	x	9.0	SHS	65.9	25.8	25.8	8400	0.961	79.8	639	750	97.5	129	450	1.00	N	699	114	14.6
250	x	250	x	6.0	SHS	45.0	39.7	39.7	5730	0.974	56.2	450	521	99.1	88.7	450	0.752	S	380	170	21.7
200	x	200	x	9.0	SHS	51.8	20.2	20.2	6600	0.761	39.2	392	465	77.1	64.5	450	1.00	C	465	115	14.7
200	x	200	x	6.0	SHS	35.6	31.3	31.3	4530	0.774	28.0	280	327	78.6	44.8	450	0.952	S	272	171	21.8
150	x	150	x	9.0	SHS	37.7	14.7	14.7	4800	0.561	15.4	205	248	56.6	26.1	450	1.00	C	248	117	14.9
150	x	150	x	6.0	SHS	26.1	23.0	23.0	3330	0.574	11.3	151	178	58.2	18.4	450	1.00	N	175	172	22.0
150	x	150	x	5.0	SHS	22.1	28.0	28.0	2810	0.579	9.70	129	151	58.8	15.6	450	1.00	N	135	206	26.2
125	x	125	x	9.0	SHS	30.6	11.9	11.9	3900	0.461	8.38	134	165	46.3	14.5	450	1.00	C	165	118	15.1
125	x	125	x	6.0	SHS	21.4	18.8	18.8	2730	0.474	6.29	101	120	48.0	10.4	450	1.00	C	120	174	22.1
125	x	125	x	5.0	SHS	18.1	23.0	23.0	2310	0.479	5.44	87.1	103	48.5	8.87	450	1.00	N	101	207	26.4
100	x	100	x	9.0	SHS	23.6	9.11	9.11	3000	0.361	3.91	78.1	98.6	36.1	7.00	450	1.00	C	98.6	121	15.3
100	x	100	x	6.0	SHS	16.7	14.7	14.7	2130	0.374	3.04	60.7	73.5	37.8	5.15	450	1.00	C	73.5	176	22.4
100	x	100	x	5.0	SHS	14.2	18.0	18.0	1810	0.379	2.66	53.1	63.5	38.3	4.42	450	1.00	C	63.5	209	26.6
89	x	89	x	6.0	SHS	14.7	12.8	12.8	1870	0.330	2.06	46.4	56.7	33.2	3.55	450	1.00	C	56.7	177	22.5
89	x	89	x	4.9	SHS	12.3	16.2	16.2	1570	0.335	1.79	40.3	48.4	33.8	3.00	450	1.00	C	48.4	213	27.2
89	x	89	x	3.6	SHS	9.34	22.7	22.7	1190	0.341	1.41	31.7	37.4	34.4	2.30	450	1.00	N	37.2	286	36.5
75	x	75	x	6.0	SHS	12.0	10.5	10.5	1530	0.274	1.16	30.9	38.4	27.5	2.04	450	1.00	C	38.4	179	22.8
76	x	76	x	4.9	SHS	10.3	13.5	13.5	1310	0.283	1.06	28.0	34.1	28.5	1.82	450	1.00	C	34.1	216	27.5
76	x	76	x	4.0	SHS	8.64	17.0	17.0	1100	0.287	0.921	24.2	29.1	28.9	1.54	450	1.00	C	29.1	261	33.2
76	x	76	x	3.2	SHS	7.04	21.8	21.8	897	0.290	0.775	20.4	24.1	29.4	1.27	450	1.00	C	24.1	324	41.2
65	x	65	x	6.0	SHS	10.1	8.83	8.83	1290	0.234	0.706	21.7	27.5	23.4	1.27	450	1.00	C	27.5	182	23.1
64	x	64	x	4.9	SHS	8.48	11.1	11.1	1080	0.235	0.598	18.7	23.1	23.5	1.05	450	1.00	C	23.1	218	27.7
64	x	64	x	4.0	SHS	7.10	14.0	14.0	905	0.239	0.524	16.4	19.9	24.1	0.894	450	1.00	C	19.9	264	33.6
64	x	64	x	3.2	SHS	5.83	18.0	18.0	743	0.242	0.446	13.9	16.6	24.5	0.742	450	1.00	C	16.6	326	41.5
50	x	50	x	6.0	SHS	7.32	6.33	6.33	932	0.174	0.275	11.0	14.5	17.2	0.518	450	1.00	C	14.5	187	23.8
51	x	51	x	4.9	SHS	6.44	8.41	8.41	821	0.183	0.273	10.7	13.6	18.2	0.495	450	1.00	C	13.6	223	28.4
51	x	51	x	4.0	SHS	5.47	10.8	10.8	697	0.187	0.245	9.60	11.9	18.7	0.430	450	1.00	C	11.9	268	34.1
51	x	51	x	3.2	SHS	4.53	13.9	13.9	577	0.190	0.212	8.31	10.1	19.2	0.361	450	1.00	C	10.1	330	42.0

Design Load Capacities for Members - Subject to Axial Compression Buckling about either axis

Square Hollow Sections

GRADE 350																																	
Designation						ØN ₁	Design Load Capacities for Axial Compression ØN ₁ (kN) Effective length (L) in metres																										Percent holes to affect net Area, A _n
d	x	b	x	t			0	0.5	1	1.5	2	2.25	2.5	2.75	3	3.25	3.5	3.75	4	4.5	5	6	7	8	9	10							
250	x	250	x	9.0	SHS	2650	2650	2650	2630	2590	2580	2560	2540	2520	2490	2470	2440	2410	2350	2270	2100	1880	1650	1410	1200	4.2%							
250	x	250	x	6.0	SHS	1540	1540	1540	1530	1520	1510	1500	1490	1480	1470	1450	1440	1430	1400	1360	1280	1180	1060	932	810	4.2%							
200	x	200	x	9.0	SHS	2080	2080	2070	2040	2010	1990	1970	1940	1910	1880	1850	1820	1780	1690	1600	1370	1140	928	760	630	4.2%							
200	x	200	x	6.0	SHS	1430	1430	1420	1400	1380	1370	1350	1340	1320	1300	1280	1250	1230	1170	1110	960	801	658	541	448	4.2%							
150	x	150	x	9.0	SHS	1510	1510	1490	1460	1410	1390	1360	1320	1280	1240	1190	1140	1090	974	857	652	500	391	313	256	4.2%							
150	x	150	x	6.0	SHS	1050	1050	1040	1010	984	966	946	924	899	872	842	809	773	696	617	474	364	286	229	188	4.2%							
150	x	150	x	5.0	SHS	885	885	875	856	831	817	800	782	761	739	714	686	657	593	527	406	313	245	197	161	4.2%							
125	x	125	x	9.0	SHS	1230	1230	1200	1160	1110	1070	1040	993	944	891	835	777	718	609	515	374	281	218	174	142	4.2%							
125	x	125	x	6.0	SHS	860	860	843	816	781	759	734	707	675	641	604	565	525	449	382	279	210	163	130	106	4.2%							
125	x	125	x	5.0	SHS	728	728	713	692	662	644	624	601	575	547	516	483	450	386	329	241	181	141	112	91.8	4.2%							
100	x	100	x	9.0	SHS	945	941	908	858	788	743	692	636	579	522	469	421	378	308	254	180	134	103	82.2	67.0	4.2%							
100	x	100	x	6.0	SHS	671	669	647	615	570	541	508	472	433	394	356	321	290	237	196	139	104	80.1	63.8	51.9	4.2%							
100	x	100	x	5.0	SHS	570	568	551	524	487	463	436	406	374	341	309	279	252	206	171	122	90.6	70.1	55.7	45.4	4.2%							
89	x	89	x	6.0	SHS	589	585	561	525	472	439	402	363	324	289	257	228	204	165	135	95.7	71.1	54.9	43.6	35.5	4.2%							
89	x	89	x	4.9	SHS	495	491	472	443	400	373	343	310	278	248	221	197	177	143	117	83.0	61.7	47.6	37.8	30.8	4.2%							
89	x	89	x	3.6	SHS	375	373	359	337	306	286	264	240	217	194	173	155	138	112	92.2	65.3	48.5	37.5	29.8	24.2	4.2%							
75	x	75	x	6.0	SHS	482	475	448	405	339	301	263	228	198	173	151	133	118	94.7	77.4	54.4	40.3	31.1	24.7	20.1	4.2%							
76	x	76	x	4.9	SHS	413	408	386	351	299	268	236	207	180	157	138	122	108	86.8	71.0	49.9	37.0	28.5	22.7	18.4	4.2%							
76	x	76	x	4.0	SHS	347	342	325	296	254	229	202	177	155	136	119	105	93.5	74.9	61.3	43.2	32.0	24.7	19.6	16.0	4.2%							
76	x	76	x	3.2	SHS	283	279	265	243	210	189	168	148	130	114	100	88.3	78.4	62.9	51.5	36.3	26.9	20.7	16.5	13.4	4.2%							
65	x	65	x	6.0	SHS	406	398	367	314	241	204	173	147	126	109	94.6	83.0	73.4	58.5	47.7	33.5	24.8	19.1	15.2	12.3	4.2%							
64	x	64	x	4.9	SHS	340	333	308	264	203	173	146	124	106	91.9	80.0	70.2	62.1	49.5	40.4	28.4	21.0	16.2	12.8	10.4	4.2%							
64	x	64	x	4.0	SHS	285	279	259	224	175	149	127	108	92.9	80.3	69.9	61.4	54.3	43.4	35.4	24.8	18.4	14.2	11.2	9.14	4.2%							
64	x	64	x	3.2	SHS	234	230	213	186	146	126	107	91.6	78.7	68.1	59.3	52.1	46.1	36.8	30.0	21.1	15.6	12.0	9.55	7.77	4.2%							
50	x	50	x	6.0	SHS	294	281	239	169	108	87.5	72.0	60.1	50.9	43.7	37.9	33.1	29.2	23.2	18.9	13.2	9.79	7.53	5.97	4.85	4.2%							
51	x	51	x	4.9	SHS	259	249	217	160	105	85.8	70.8	59.3	50.3	43.1	37.4	32.7	28.9	23.0	18.7	13.1	9.69	7.45	5.91	4.80	4.2%							
51	x	51	x	4.0	SHS	220	212	186	140	93.6	76.5	63.2	52.9	44.9	38.6	33.4	29.3	25.8	20.6	16.7	11.7	8.67	6.67	5.29	4.30	4.2%							
51	x	51	x	3.2	SHS	182	176	155	119	80.4	65.9	54.5	45.7	38.8	33.3	28.9	25.3	22.4	17.8	14.5	10.2	7.51	5.78	4.58	3.72	4.2%							

Square Hollow Sections

GRADE 450

Designation						øN	Design Load Capacities for Axial Compression øN _k (kN) Effective length (L) in metres																									
d	x	b	x	t			0	0.5	1	1.5	2	2.25	2.5	2.75	3	3.25	3.5	3.75	4	4.5	5	6	7	8	9	10						
mm		mm		mm																												
250	x	250	x	9.0	SHS	3400	3400	3400	3360	3310	3280	3250	3220	3180	3150	3100	3060	3010	2900	2780	2480	2140	1800	1500	1250							
250	x	250	x	6.0	SHS	1750	1750	1750	1730	1720	1700	1690	1680	1670	1650	1640	1620	1600	1560	1520	1410	1280	1130	975	836							
200	x	200	x	9.0	SHS	2670	2670	2660	2610	2550	2520	2480	2440	2400	2350	2290	2230	2170	2020	1860	1520	1210	964	780	641							
200	x	200	x	6.0	SHS	1750	1750	1740	1710	1680	1660	1630	1610	1580	1550	1520	1480	1450	1360	1260	1050	847	681	553	456							
150	x	150	x	9.0	SHS	1940	1940	1910	1850	1780	1730	1680	1620	1560	1490	1410	1330	1240	1070	918	676	510	397	317	259							
150	x	150	x	6.0	SHS	1350	1350	1330	1290	1240	1210	1180	1140	1100	1050	1000	945	888	773	665	493	373	291	232	190							
150	x	150	x	5.0	SHS	1140	1140	1120	1090	1050	1020	996	965	931	892	850	804	757	660	569	422	320	249	199	163							
125	x	125	x	9.0	SHS	1580	1580	1530	1470	1380	1320	1260	1180	1100	1020	933	851	774	640	532	381	284	220	175	143							
125	x	125	x	6.0	SHS	1110	1100	1080	1030	974	937	895	848	795	739	681	625	570	474	396	284	213	165	131	107							
125	x	125	x	5.0	SHS	936	935	911	875	827	796	762	723	679	632	584	537	491	409	342	246	184	142	113	92.5							
100	x	100	x	9.0	SHS	1220	1200	1150	1070	951	876	793	709	629	557	493	437	390	314	258	182	135	104	82.7	67.3							
100	x	100	x	6.0	SHS	863	857	822	770	693	644	590	533	476	424	377	336	300	243	199	141	105	80.7	64.2	52.3							
100	x	100	x	5.0	SHS	733	728	700	656	593	553	508	460	413	369	328	293	262	212	174	123	91.5	70.6	56.1	45.7							
89	x	89	x	6.0	SHS	757	749	711	651	561	506	449	395	345	303	266	235	209	168	137	96.6	71.6	55.2	43.9	35.7							
89	x	89	x	4.9	SHS	636	629	598	549	477	432	385	339	298	261	230	204	181	145	119	83.8	62.1	47.9	38.1	31.0							
89	x	89	x	3.6	SHS	482	477	455	419	366	333	299	264	233	205	180	160	142	114	93.5	65.9	48.9	37.7	30.0	24.4							
75	x	75	x	6.0	SHS	620	608	564	490	383	329	280	239	205	177	154	136	120	95.7	78.1	54.8	40.6	31.3	24.8	20.2							
76	x	76	x	4.9	SHS	531	521	486	427	342	296	254	217	187	162	141	124	110	87.8	71.6	50.3	37.3	28.7	22.8	18.5							
76	x	76	x	4.0	SHS	446	438	409	362	292	253	218	187	161	140	122	107	94.9	75.8	61.9	43.5	32.2	24.8	19.7	16.0							
76	x	76	x	3.2	SHS	363	357	335	297	242	211	182	156	135	117	102	90.0	79.7	63.7	52.0	36.6	27.1	20.9	16.6	13.5							
65	x	65	x	6.0	SHS	522	507	457	368	260	215	179	151	128	110	95.8	83.9	74.1	59.0	48.1	33.7	24.9	19.2	15.2	12.4							
64	x	64	x	4.9	SHS	437	425	383	309	219	182	151	128	109	93.3	81.1	71.0	62.7	50.0	40.7	28.5	21.1	16.3	12.9	10.5							
64	x	64	x	4.0	SHS	367	357	323	264	190	158	132	111	94.8	81.6	70.9	62.1	54.9	43.7	35.6	25.0	18.5	14.2	11.3	9.18							
64	x	64	x	3.2	SHS	301	293	267	220	160	134	112	94.4	80.4	69.3	60.2	52.8	46.6	37.1	30.3	21.2	15.7	12.1	9.60	7.80							
50	x	50	x	6.0	SHS	377	356	286	182	111	89.1	73.0	60.8	51.4	44.1	38.2	33.4	29.4	23.4	19.0	13.3	9.83	7.56	6.00	4.87							
51	x	51	x	4.9	SHS	333	316	262	175	109	87.7	71.9	60.0	50.8	43.5	37.7	33.0	29.1	23.1	18.8	13.2	9.73	7.48	5.93	4.82							
51	x	51	x	4.0	SHS	282	269	226	154	96.9	78.3	64.3	53.7	45.4	38.9	33.7	29.5	26.0	20.7	16.8	11.8	8.71	6.70	5.32	4.32							
51	x	51	x	3.2	SHS	234	223	189	132	83.5	67.6	55.5	46.4	39.3	33.7	29.2	25.5	22.5	17.9	14.6	10.2	7.54	5.80	4.60	3.74							

Service Centres

COMPANY ORGANISATION					
	Sales Centre	Distribution Centre	Coil Processing	Plate Processing	Guillotining
Northern Region	Whangarei Auckland	Auckland	Auckland	Auckland	Auckland
Central Region	Hamilton Tauranga Rotorua New Plymouth Hawkes Bay Palmerston North Wellington	Auckland	Auckland	Auckland	Auckland Wellington
Southern Region	Nelson Christchurch Dunedin Invercargill	Christchurch	Christchurch	Christchurch	Christchurch

Service Centres

Plate Processing

Fletcher Easysteel's 'Easycut Profiling' operations provide the largest and most efficient plate cutting facilities in New Zealand. Whether your requirements are for mild steel, boiler quality or high strength plate we can cut plate to meet your requirements. A list of services are offered below:

- Numerically controlled profile cutting machines and guillotines in Auckland and Christchurch give customers a fast and accurate cutting service.
- The Dycon 300 tonne numerically controlled press brake at our Auckland facility has a computer controlled automatic backstop and can press up to nine different folds per plate, all with repetitive folds.
- The Mynuc 5000 CNC profile cutting machine has a 24 metre long bed and six oxy fuel cutting heads with an effective cutting width of 4 metres.
- The 200 amp high speed Kinetic plasma cutters in Auckland and Christchurch can cut plate up to 20mm thick.
- Our Punch and Shear machine can cut a range of sections and punch holes up to 40mm diameter in material up to 20mm thick.
- An integral part of the plate processing is the latest in software in our CAD department to quickly and efficiently nest your designs and shapes at minimal cost and waste. Drawings can be accepted on disc or via e-mail in DXF Format. All drawings are held in memory allowing repeat orders to be recalled immediately.

Machining Capabilities		
AUCKLAND		
	Length	Thickness
Plasma Cutting	12m	3mm – 20mm
Gas Cutting	18m	10mm – 260mm
Guillotining	3.6m	2.5mm – 12mm
300T Pressbrake	3.6m	12mm
Punch & Shear		Maximum 40mm dia through 20mm plate Maximum Shear Flat 350mm x 20mm
WELLINGTON		
Guillotining	3.6m	3.0mm – 12mm Thick
CHRISTCHURCH		
Plasma Cutting	12m	3mm – 20mm Thick
Gas Cutting	6m	10mm – 260mm Thick



Metal Processing

Sheet and Coil Processing:

In order to cater for specialist requirements of the New Zealand manufacturing industry and expand services available, Fletcher Steel offers a Service Centre operation with some of the latest metal processing technology and equipment available in New Zealand.

With Coil processing equipment in Auckland, Wellington and Christchurch the facilities are available to slit, sheet, blank and guillotine, both ferrous and non-ferrous metals to exacting standards.

Machine Capabilities:

	AUCKLAND	CHRISTCHURCH
Slitting		
Maximum Width	1525mm	1350mm
Minimum Width	16mm	25mm
Thickness Range	0.35 - 3.5mm STD	0.4 - 2.3mm
Sheeting & Blanking		
Maximum Width	1828mm	1250mm
Minimum Width	51mm	200mm
Thickness Range	0.5 - 3.2mm M.S.	0.4 - 1.6mm M.S.
	0.5 - 2.0mm S.S.	–
	0.5 - 3.2mm A.L.	–
Guillotines		
Minimum Width	28mm	
Maximum Length	2400mm	
Thickness Range	0.4 - 3.2mm	

Services

Indent Sourcing

For the products and quantities outside our stocking policy, Fletcher Easysteel has many years of experience in sourcing a comprehensive range of steel and related products for our customers for the products and quantities outside our stocked range. The resulting well established channels, relationships with suppliers, and collective purchasing leverage means Fletcher Easysteel is well positioned to cater for your indent requirements.

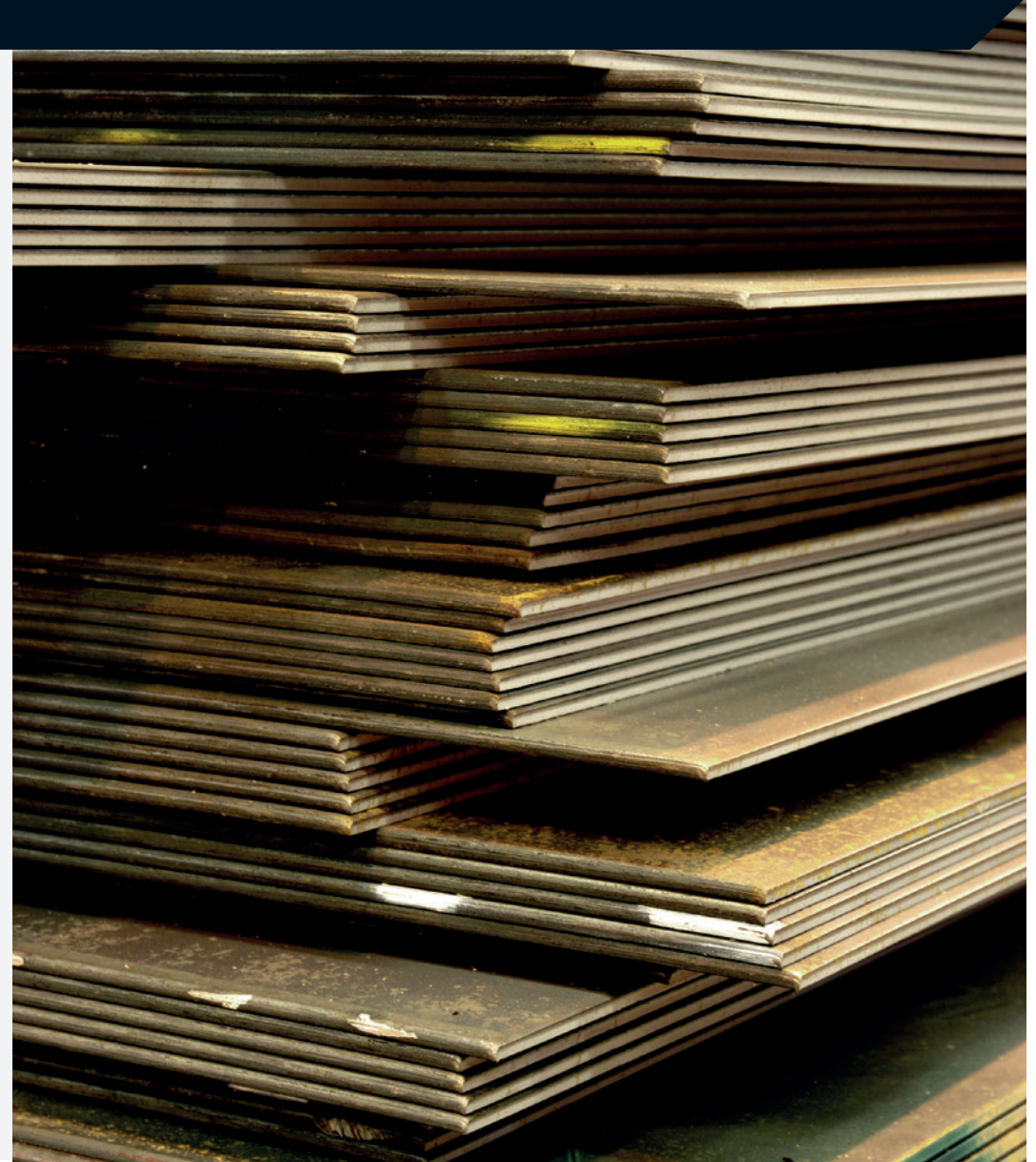
Further, our ability to co-ordinate indent orders in a centralised operation ensures excellent service at all times.

In addition to our normal ex-stock range which can also be sourced through indent, Fletcher Easysteel has indent channels for an extensive range of products which include the following:

Flat Rolled Steel Products:

- Tin Plate and Tin Free Steel
- Terne Sheet
- Electrical Steels
- Electrogalv Steel
- Hot Dip Galvanised Steel
- Galfan
- Zincalume
- Cold Rolled Sheet and Coil (all grades)
- Prepainted Sheet and Coil
- Enamelling Sheet and Coil
- Aluminised Sheet and Coil
- High Carbon Steel and Coil
- Steel Sheet Piling
- 7 Wire Strand and Wire
- Steel Rails
- Spring Steels
- Boiler Tubes
- Head Plates (Dished Ends)
- Tool Steels
- Forgings
- Titanium
- Hollow Bar
- Inconel - Nickel Alloys
- Elmedur - Copper Alloys

Please contact your local Easysteel Sales Centre with your enquiry.



NORTH ISLAND

WHANGAREI

33 Rewarewa Road
PO Box 292, Whangarei 0140
Ph: 09 470 2510
Fax: 09 438 4589

HAMILTON

Ellis Street, Frankton
PO Box 828, Hamilton 3240
Ph: 07 846 2700
Fax: 07 846 2708

ROTORUA

Tallyho Street
PO Box 331, Rotorua 3040
Ph: 07 348 3039
Fax: 07 347 7353

HAWKES BAY

1100 Omaha Road
RD 5, Hastings 4175
Ph: 06 873 9036
Fax: 06 879 6880

WELLINGTON

Burnham Street
PO Box 33-254
Petone, Wellington 5046
Ph: 04 570 8472
Fax: 04 570 8473

AUCKLAND

575 Great South Road
Private Bag 92803
Penrose, Auckland 1642
Ph: 09 525 9400
Fax: 09 525 9401

TAURANGA

99 Aviation Avenue
Mt Maunganui
PO Box 450, Tauranga 3140
Ph: 07 572 9700
Fax: 07 572 9707

NEW PLYMOUTH

50 Corbett Road
Bell Block
New Plymouth 4342
Ph: 06 755 9039
Fax: 06 755 2099

PALMERSTON NORTH

118-120 Kaimanawa Street
Kelvin Grove
Palmerston North 4414
Ph: 06 354 2622
Fax: 06 354 2623

SOUTH ISLAND

NELSON

40-42 Beach Road,
Richmond, Nelson 7050
Ph: 03 543 8215
Fax: 0800 432 793

CHRISTCHURCH

5 Brydone Road
Hornby South, Christchurch 8042
Ph: 03 348 8479
Fax: 03 343 0320

DUNEDIN

26 Orari Street
South Dunedin, Dunedin 9012
Ph: 0800 327 978
Fax: 0800 432 793

INVERCARGILL

54 Tweed Street
PO Box 957, Invercargill 9840
Ph: 03 211 0696
Fax: 03 218 2318

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