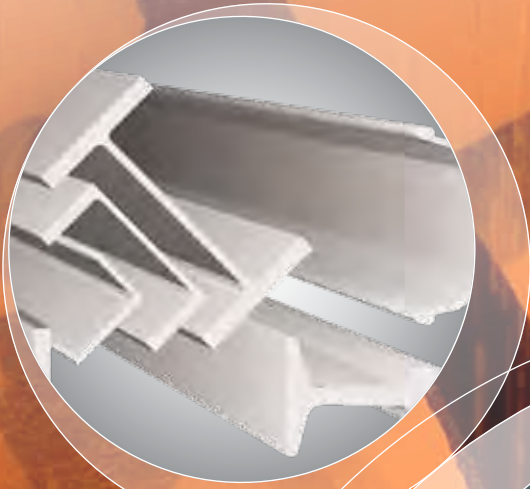




onesteel
manufacturing

HOT ROLLED AND STRUCTURAL STEEL PRODUCTS

SIXTH EDITION



HOT ROLLED AND STRUCTURAL STEEL PRODUCTS

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INTRODUCTION

OneSteel has a long and significant presence in the Australian steel industry as an integrated manufacturer of steel and finished steel products that dates back to the establishment of steelmaking in Newcastle in 1915 and continues to the present day.

OneSteel is Australia's premier manufacturer of steel long products. The company manufactures and distributes a wide range of steel products including structural sections, rail, rod, bar, wire and pipe and tube products.

OneSteel's major manufacturing facilities for hot rolled products are located in Whyalla, South Australia; Melbourne, Victoria and in Newcastle and Western Sydney, New South Wales.

As part of OneSteel's ongoing commitment to the Australian construction and manufacturing industry, this booklet is produced by OneSteel Manufacturing and is intended to provide general information on a range of hot rolled and structural steel products.

Furthermore, this booklet will give you guidance on how OneSteel supports the quality and reputation of its products through initiatives such as our Build With Standards website and our EzyCommerce service.

(N.B. for the sake of simplicity, the following text will refer to OneSteel Manufacturing as OneSteel.)

ONESTEEL COMMITMENT TO QUALITY AND SUSTAINABILITY

OneSteel supplies products that are compliant to the relevant Australian Standards or OneSteel's own high quality standards. OneSteel's aim is to supply a consistent high quality product which delivers benefits to our customers by minimising variation and reducing waste.

The quality of products is constantly checked in NATA endorsed testing laboratories, by skilled technical staff using proven equipment. Strict metallurgical control is maintained, from receipt of raw materials to despatch of the finished product.

Products are rigorously tested and certified, with Test Certificates and Certificates of Compliance providing assurance that OneSteel sections meet all required specifications and are made available free of charge via our EzyCommerce® website.

At its manufacturing sites OneSteel has third party accreditation to Quality Management System ISO 9001 and Environmental Management System ISO 14001.

Furthermore, through initiatives such as Build With Standards and ACRS, OneSteel is clearly committed to the ongoing supply of quality product to the Australian and New Zealand marketplace.

Test Certificates / Certificates of Compliance - EzyCommerce

NATA endorsed test certificates are available for all AS/NZS 3679.1 product, for welded product material supplied under AS/NZS 3679.2 certificates of compliance are available. The Steel Structures Design Standard - AS4100, acknowledges that these certificates provide designers and certifiers with sufficient evidence that they are acceptable steels for use in designs to AS4100.

Fabricators can ensure they receive a copy of the relevant certificate covering the steel ordered and delivered by requesting them at the time of order. The certificates can be provided manually, electronically or customers can access these via the OneSteel's EzyCommerce® website at <https://ezycommerce.onesteel.com>

All distributors of OneSteel AS/NZS 3679.1 & AS/NZS 3679.2 products have access to certificates via EzyCommerce® - this is a free service that offers the flexibility to access and retrieve this information at anytime of the day.

Access to EzyCommerce® Online is free to approved customers of OneSteel Manufacturing - all you need is a login name and password - please refer to: <http://ezycommerce.onesteel.com/about.aspx> for more information on obtaining access to the website.

Build With Standards

The Build With Standards campaign is an initiative undertaken by OneSteel, its aim is to improve compliance and generate increased confidence in structural steel quality in all end-use applications.

Changes to Australian Standards for structural steel have been introduced to address industry concerns regarding product quality, identification, certification and traceability.

These revised Australian/New Zealand Standards help ensure the quality of the structural steel specified and paid for is supplied.

With the revised Standards and mandatory requirements around markings and test certificates, industry stakeholders can readily check if the steel used was produced to Australian/ New Zealand Standards and the specifications called up in the design.

Visit OneSteel's Build With Standards website for more information on the initiative and how OneSteel meets the Standards (www.buildwithstandards.com.au). In addition you will find valuable information regarding the Green Star® Rating System as well as information regarding OneSteel's environmental management systems and membership of the WorldSteel Association Climate Action group.

ACRS - Third Party Certification

In addition to our quality systems and NATA endorsed laboratories, OneSteel's range of AS/NZS 3679.1 hot rolled products are all produced at mills with ACRS certification. ACRS is an expert, industry based, third party product certifier of reinforcing, prestressing and structural steels to Australian/New Zealand Standards. This certification gives designers and asset owners additional confidence that they are getting AS/NZS 3679.1 steels on which their structural design has been based.

Copies of our ACRS accreditation can be viewed at the ACRS website - www.steelcertification.com - or via the Build With Standards website.



For more information:

Build with Standards: www.buildwithstandards.com.au

Ezycommerce: <https://ezycommerce.onesteel.com>

ACRS: www.steelcertification.com

Structural Steel Sections

Hot Rolled Products

Hot Rolled Structural Steel sections produced by OneSteel are manufactured in accordance with the requirements of Australian Standard AS/NZS 3679.1:2010 Structural Steel - Hot Rolled Bars and Sections.

Grade Availability

300PLUS® Steel is the standard grade manufactured by OneSteel for hot rolled Structural Steel Sections for Australia.

300PLUS® Steel for hot rolled products is produced to exceed the minimum requirements of AS/NZS 3679.1:2010 grade 300.

In New Zealand, 300PLUS®SO is the standard grade for the range of universal beams and columns shown in Table 1.

Table 1
Standard 300PLUS®SO Grade sections in New Zealand

Universal Beams	Universal Columns
610UB125	310UC158
610UB113	310UC137
610UB101	310UC118
530UB92.4	310UC96.8
530UB82.0	250UC89.5
460UB82.1	250UC72.9
460UB74.6	200UC59.5
460UB67.1	200UC52.2
410UB59.7	200UC46.2
410UB53.7	
360UB56.7	
360UB50.7	
360UB44.7	

Other grades including 300PLUSLO, AS/NZS 3679.1-350 and AS/NZS 3679.1-350L0 may also be available depending on the section and quantity required.

For further information contact your nearest OneSteel Sales Office (contact details on page 28).

Length Availability

The majority of Structural Steel Sections produced by OneSteel are available in standard length and bundle configurations. We would recommend that attention be given to the standard lengths produced by OneSteel as they are more readily available than other lengths. Table 2 (page 4) indicates the standard lengths produced by OneSteel in Structural Steel Sections. For other lengths (including those in excess of 18 metres) please contact your nearest OneSteel Sales Office for further details (contact details on page 28).

Welded Products

OneSteel Manufacturing also markets a range of large Welded Product Structural Steel sections. These sections are welded from plate and are manufactured in accordance with Australian Standard AS/NZS 3679.2:2010 Structural Steel - Welded I Sections.

Grade Availability

300PLUS® Steel is the standard grade manufactured for Welded Products. 300PLUS® welded products are produced to exceed the minimum requirements of AS/NZS 3679.2:2010 grade 300.

A higher grade option of AS/NZS 3679.2:2010 grade 400 is also available.

Other grades are subject to enquiry and this should be directed to your nearest OneSteel Sales Office.

Length Availability

Lengths are available from a minimum of six metres to a maximum of 30 metres. Table 2 indicates the standard lengths produced.



Table 2 Standard Lengths

Section	Length (m)								
	7.5	9.0	10.5	12.0	13.5	15.0	16.5	18.0	20.0*
Welded Sections									
1200 WB, 1000 WB, 900 WB, 800 WB, 700 WB		●	●	●	●	●	●	●	
500 WC, 400 WC, 350 WC		●	●	●	●	●	●	●	
Universal Beams									
610 UB, 530 UB, 460 UB, 410 UB, 360 UB		●	●	●	●	●	●	●	●
310 UB 46.2, 40.4		●	●	●	●	●	●	●	●
310 UB 32.0		●	●	●	●	●		●	
250 UB		●	●	●	●	●	●	●	
200 UB 29.8, 25.4, 22.3		●	●	●	●	●	●	●	
200 UB 18.2		●	●	●	●	●			
180 UB, 150 UB		●	●	●	●	●	●		
Universal Columns									
310 UC 158, 137, 118		●	●	●	●	●	●	●	
310 UC 96.8		●	●	●	●	●	●	●	●
250 UC		●	●	●	●	●	●	●	●
200 UC, 150 UC		●	●	●	●	●	●	●	
100 UC		●		●		●			
Taper Flange Beams									
125 TFB, 100 TFB		●		●					
Parallel Flange Channels									
380 PFC, 300 PFC		●	●	●	●	●	●	●	
250 PFC		●	●	●	●	●	●	●	
230 PFC, 200 PFC, 180 PFC, 150 PFC		●	●	●	●	●	●	●	
125 PFC, 100 PFC, 75 PFC		●		●					
Universal Bearing Piles									
310 UBP 149, 110 [†]									
310 UBP 78.8			●	●	●	●	●	●	●
200 UBP 122		●			●				
Equal Angles									
200 EA, 150 EA, 125 EA		●	●	●	●	●			
100 EA, 90 EA, 75 EA			●	●					
65 EA, 55 EA, 50 EA, 45 EA, 40 EA **	●	●							
30 EA, 25 EA	●								
Unequal Angles									
150 x 100 UA, 150 x 90 UA		●	●	●	●	●			
125 x 75 UA, 100 x 75 UA			●	●					
75 x 50 UA	●	●							
65 x 50 UA		●							

● The Section/Length combination is available in Standard Bundle configurations

* By enquiry - delivery to capital cities only

** Certain thicknesses may not be available in both lengths. Confirm availability with a OneSteel Manufacturing Sales Office.

† By enquiry

Merchant Bar Sections

Rounds, Squares and Flats

Availability

Merchant bar rounds, squares and flats are available in a variety of steel grades and sizes.

Due to process limitations not all grades are available in all sizes. For new applications we recommend you confirm product availability with a OneSteel Sales Office at an early stage of design. Other specifications and sizes may also be available on enquiry.

Specifications

Merchant bar sections are available in the following standards:

- 300PLUS® and AS/NZS 3679.1 - Structural Steel - Hot Rolled Bars and Sections.
- AS 1442 - Carbon Steels and Carbon Manganese Steels - Hot Rolled Bars and Semifinished Products.
- AS 1444 - Wrought Alloy Steels Standard, Hardenability (H) Series and Hardened and Tempered to Designated Mechanical Properties.
- AS 1447 - Hot-Rolled Spring Steels.
- OneSteel grades (based on AISI-SAE nomenclature).

Table 3 Rounds - Size Availability and Mass

Diameter (mm)	Mass (kg/m)
10	0.616
12	0.887
13	1.04
14	1.21
15	1.39
16	1.58
17	1.78
18	1.99
19	2.23
20	2.46
22	2.98
24	3.55
27	4.49
30	5.55
33	6.71
36	7.99
39	9.38
42	10.9
45	12.5
48	14.2
50	15.4
56	19.3
60	22.2
65	26.0
75	34.7
90	49.9

Standard Length: 6 Metres

Table 4 Squares - Size Availability and Mass

Thickness (mm)	Mass (kg/m)
10*	0.790
12	1.13
16	2.01
20	3.14
25	4.91
40	12.5

Standard Length: 6 Metres

* Confirm availability with sales office.

AVAILABILITY

Table 5 Flats – Size Availability and Mass (kg/m)

Width (mm)	Thickness (mm)							
	5	6	8	10	12	16	20	25
20				1.57				
25	0.981	1.18	1.57	1.96	2.36			
32	1.26	1.51	2.01	2.51	3.01			
40	1.57	1.88	2.51	3.14	3.77	5.02	6.28	
50	1.96	2.36	3.14	3.93	4.71	6.28	7.85	9.81
65	2.55	3.06	4.08	5.10	6.12	8.16	10.2	
75	2.94	3.53	4.71	5.89	7.07	9.42	11.8	14.7
90		4.24	5.65	7.07	8.48			
100	3.93	4.71	6.28	7.85	9.42	12.6	15.7	19.6
110		5.18	6.91	8.64	10.4			
130	5.10	6.12	8.16	10.2	12.2	16.3	20.4	25.5
150	5.89	7.07	9.42	11.8	14.1	18.8	23.6	29.4
180		8.48		14.1	17.0			
200		9.42	12.6	15.7	18.8			
250		11.8	15.7	19.6	23.6			
300		14.1	18.8	23.6	28.3			

Standard Length: 6 Metres



AVAILABILITY

Table 6 Merchant Bar Sections - Regular Grades

Steel Type	Standard	Grades Available
Structural Steels	OneSteel	300PLUS
	AS/NZS 3679.1	350
Carbon and Carbon-Manganese Steels	AS 1442	1016
		1022
		1045
Spring Steels	AS 1447	XK5160S XK9258S XK9261S
OneSteel Grades	OneSteel	1015 X4K92M61S

Note

Grade availability can vary with section.

Rods and Light Billets

Rods and light billets are available in a wide range of OneSteel grades, and selected grades from AS 1442, AS 1444 and AS 1447 specifications.

These sections are not available in structural grades 300PLUS® or 350.

Due to process limitations not all grades are available in all sizes. Confirm product availability with a OneSteel Sales Office at an early stage of design.

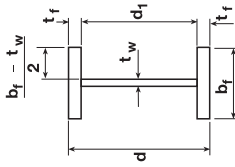
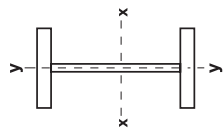
Table 7 Rods Size Availability

Diameter (mm)													
5.5	6.5	7.0	8.0	9.0	10.0	11.2	12.5	13.0	14.0	15.0	16.0	17.0	18.0

Table 8 Light Billets Size Availability

Sizes Available mm x mm	
45 x 45	
50 x 50	
63 x 63	
75 x 75	





Welded Beams

Table 9 Welded Beams – Dimensions and Properties

Designation	Depth of Section	Flange		Web Thickness	Depth Between Flanges	Gross Area of Cross Section		About x-axis				About y-axis				Torsion Constant	Warping Constant	Designation
		Width	Thickness			t_f	t_w	d_f	$(b_f t_f)$	A_g	I_x	Z_x	S_x	r_x	I_y			
kg/m	mm	mm	mm	mm	mm	mm ²	10 ⁶ mm ⁴	10 ⁶ mm ³	10 ⁶ mm ³	10 ⁶ mm ³	mm	10 ⁶ mm ⁴	10 ⁶ mm ³	10 ⁶ mm ³	mm	10 ⁶ mm ⁴	10 ⁶ mm ⁶	
1200 WB 455	1200	500	40	16	1120	57900	15300	25600	28200	515	834	3330	5070	120	22000	280000	1200 WB 455	
423	1192	500	36	16	1120	53900	13900	23300	25800	508	750	3000	4570	118	16500	251000	423	
392	1184	500	32	16	1120	49900	12500	2100	23400	500	667	2670	4070	116	12100	221000	392	
342	1184	400	32	16	1120	43500	10400	17500	19800	488	342	1710	2630	88.6	9960	113000	342	
317	1176	400	28	16	1120	40300	9250	15700	17900	479	299	1500	2310	86.1	7230	98500	317	
278	1170	350	25	16	1120	35400	7610	13000	15000	464	179	1020	1600	71.1	5090	58700	278	
249	1170	275	25	16	1120	31700	6380	10900	12900	449	87.0	633	1020	52.4	4310	28500	249	
1000 WB 322	1024	400	32	16	960	41000	7480	14600	16400	427	342	1710	2620	91.3	9740	84100	1000 WB 322	
296	1016	400	28	16	960	37800	6650	13100	14800	420	299	1490	2300	89.0	7010	73000	296	
258	1010	350	25	16	960	32900	5430	10700	12300	406	179	1020	1590	73.8	4870	43400	258	
215	1000	300	20	16	960	27400	4060	8120	9570	385	90.3	602	961	57.5	2890	21700	215	
900 WB 282	924	400	32	12	860	35900	5730	12400	13600	399	341	1710	2590	97.5	8870	67900	900 WB 282	
257	916	400	28	12	860	32700	5050	11000	12200	393	299	1490	2270	95.6	6150	58900	257	
218	910	350	25	12	860	27800	4060	8930	9960	382	179	1020	1560	80.2	4020	35000	218	
175	900	300	20	12	860	22300	2960	6580	7500	364	90.1	601	931	63.5	2060	17400	175	
800 WB 192	816	300	28	10	760	24400	2970	7290	8060	349	126	840	1280	71.9	4420	19600	800 WB 192	
168	810	275	25	10	760	21400	2480	6140	6840	341	86.7	631	964	63.7	2990	13400	168	
146	800	275	20	10	760	18600	2040	5100	5730	331	69.4	505	775	61.1	1670	10600	146	
122	792	250	16	10	760	15600	1570	3970	4550	317	41.7	334	519	51.7	921	6280	122	
700 WB 173	716	275	28	10	660	22000	2060	5760	6390	306	97.1	706	1080	66.4	4020	11500	700 WB 173	
150	710	250	25	10	660	19100	1710	4810	5370	299	65.2	521	798	58.4	2690	7640	150	
130	700	250	20	10	660	16600	1400	3990	4490	290	52.1	417	642	56.0	1510	6030	130	
115	692	250	16	10	660	14600	1150	3330	3790	281	41.7	334	516	53.5	888	4770	115	

Notes

1. All welds to AS/NZS 1554.1 Category SP (deep penetration).
2. Web to flange joints develop the minimum tensile strength of the web.
3. Flame cut surfaces not incorporated in welds have a minimum surface roughness of class 2, as defined in WTiA Technical Note 5.

Welded Beams

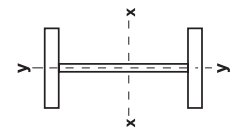
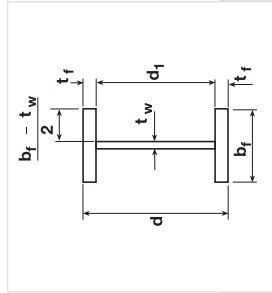
Table 10 Welded Beams – Properties for Assessing Section Capacity

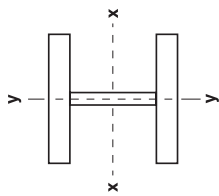
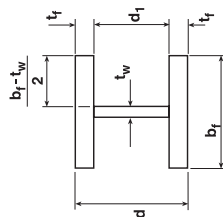
Designation	Yield Stress		Form Factor		About x-axis		About y-axis		Yield Stress		Form Factor		About x-axis		About y-axis		Designation
	Flange f_y MPa	Web f_y MPa	k_f	Compactness	Z_{ex} 10^3mm^3	Compactness	Z_{ey} 10^3mm^3	Compactness	Flange f_y MPa	Web f_y MPa	k_f	Compactness	Z_{ex} 10^3mm^3	Compactness	Z_{ey} 10^3mm^3	Compactness	
1200 WB 455	280	300	0.837	C	28200	C	5000	C	360	380	0.820	N	28000	C	5000	C	1200 WB 455
423	280	300	0.825	C	25800	C	4500	C	360	380	0.806	N	25700	N	4500	N	423
392	280	300	0.811	C	23400	N	4000	N	360	380	0.791	N	23300	N	3900	N	392
342	280	300	0.783	C	19800	C	2560	C	360	380	0.760	N	19600	C	2560	C	342
317	280	300	0.766	C	17900	C	2240	C	360	380	0.741	N	17700	N	2230	N	317
278	280	300	0.733	C	15000	C	1530	C	360	380	0.705	N	14900	N	1530	N	278
249	280	300	0.701	C	12900	C	949	C	360	380	0.670	N	12800	C	949	C	249
1000 WB 322	280	300	0.832	C	16400	C	2560	C	360	380	0.807	C	16400	C	2560	C	1000 WB 322
296	280	300	0.817	C	14800	C	2240	C	360	380	0.791	C	14800	C	2230	N	296
258	280	300	0.790	C	12300	C	1530	C	360	380	0.760	C	12300	C	1530	N	258
215	300	300	0.738	C	9570	C	903	C	380	380	0.704	C	9570	C	887	N	215
900 WB 282	280	310	0.845	C	13600	C	2560	C	360	400	0.830	N	13500	C	2560	C	900 WB 282
257	280	310	0.830	C	12200	C	2240	C	360	400	0.813	N	12000	N	2220	N	257
218	280	310	0.800	C	9960	C	1530	C	360	400	0.780	N	9840	N	1530	N	218
175	300	310	0.744	C	7500	C	901	C	380	400	0.721	N	7320	N	882	N	175
800 WB 192	280	310	0.824	C	8060	C	1260	C	360	400	0.808	N	7850	C	1260	C	800 WB 192
168	280	310	0.799	C	6840	C	946	C	360	400	0.781	N	6640	C	946	C	168
146	300	310	0.763	N	5710	C	757	C	380	400	0.744	N	5510	N	754	N	146
122	300	310	0.718	N	4530	N	498	N	380	400	0.695	N	4340	N	486	N	122
700 WB 173	280	310	0.850	C	6390	C	1060	C	360	400	0.833	C	6390	C	1060	C	700 WB 173
150	280	310	0.828	C	5370	C	782	C	360	400	0.807	C	5370	C	782	C	150
130	300	310	0.795	C	4490	C	626	C	380	400	0.773	C	4490	C	626	C	130
115	300	310	0.767	C	3790	C	498	N	380	400	0.742	C	3790	C	486	N	115

* 300PLUS® welded sections are produced to exceed the minimum requirements of AS/NZS 3679.2:300.

Notes

1. For 300PLUS® sections the tensile strength (f_t) is 430 MPa.
2. For Grade 400 sections the tensile strength (f_t) is 480 MPa.
3. C: Compact Section; N: Non-compact Section; S: Slender Section.





Welded Columns

Table 11 Welded Columns – Dimensions and Properties

Designation	Depth of Section	Flange		Web Thickness	Depth Between Flanges	Gross Area of Cross Section		About x-axis				About y-axis				Torsion Constant	Warping Constant	Designation		
		Width	Thickness			b_f	t_f	t_w	d_1	$(b_f - t_f)$	$2t_f$	A_g	I_x	Z_x	S_x				r_x	I_y
kg/m	mm	mm	mm	mm	mm	mm	mm	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	mm	mm	10 ³ mm ⁴	10 ⁹ mm ⁶	
500 WC 440	480	400	40	40	400	10.0	5.75	56000	2150	8980	10400	835	196	835	3340	122	30100	40400	500 WC 440	
414	480	400	32	32	400	12.5	5.85	52800	2110	8800	10100	834	200	834	3340	126	25400	40400	414	
383	472	500	36	32	400	12.5	6.50	48800	1890	7990	9130	751	197	751	3000	124	19900	35700	383	
340	514	500	32	25	450	18.0	7.42	43200	2050	7980	8980	667	218	667	2670	124	13100	38800	340	
290	506	500	28	20	450	22.5	8.57	37000	1750	6930	7700	584	218	584	2330	126	8420	33300	290	
267	500	500	25	20	450	22.5	9.60	34000	1560	6250	6950	521	214	521	2080	124	6370	29400	267	
228	490	500	20	20	450	22.5	12.0	29000	1260	5130	5710	417	208	417	1670	120	3880	23000	228	
400 WC 361	430	400	40	40	350	8.75	4.50	46000	1360	6340	7460	429	172	429	2140	96.5	24800	16300	400 WC 361	
328	430	400	40	28	350	12.5	4.65	41800	1320	6140	7100	427	178	427	2140	101	19200	16200	328	
303	422	400	36	28	350	12.5	5.17	38600	1180	5570	6420	385	175	385	1920	99.8	14800	14300	303	
270	414	400	32	25	350	14.0	5.86	34400	1030	4950	5660	342	173	342	1710	260	10400	12500	270	
212	400	400	25	20	350	17.5	7.60	27000	776	3880	4360	267	169	267	1330	2040	5060	9380	212	
181	390	400	20	20	350	17.5	9.50	23000	620	3180	3570	214	164	214	1070	1640	3080	7310	181	
144	382	400	16	16	350	21.9	12.0	18400	486	2550	2830	171	163	171	854	1300	1580	5720	144	
350 WC 280	355	350	40	28	275	9.82	4.03	35700	747	4210	4940	286	145	286	1640	2500	16500	7100	350 WC 280	
258	347	350	36	28	275	9.82	4.47	32900	661	3810	4450	258	142	258	1470	2260	12700	6230	258	
230	339	350	32	25	275	11.0	5.08	29300	573	3380	3910	229	140	229	1310	2000	8960	5400	230	
197	331	350	28	20	275	13.8	5.89	25100	486	2940	3350	200	139	200	1140	1740	5750	4600	197	

Notes

1. All welds to AS/NZS 1554.1 Category SP (deep penetration).
2. Web to flange joints develop the minimum tensile strength of a 16mm web only.
3. Flame cut surfaces not incorporated in welds have a minimum surface roughness of class 2, as defined in WTIA Technical Note 5.

Welded Columns

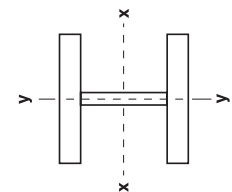
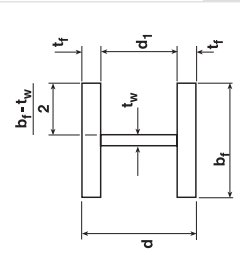
Table 12 Welded Columns – Properties for Assessing Section Capacity

Designation	Yield Stress		Form Factor		About x-axis		About y-axis		Yield Stress		Form Factor		About x-axis		About y-axis		Designation
	f_y MPa	f_y MPa	k_f	k_t	Compactness	Z_{ex} 10^3mm^3	Compactness	Z_{ey} 10^3mm^3	Flange f_y MPa	Web f_y MPa	k_f	k_t	Compactness	Z_{ex} 10^3mm^3	Compactness	Z_{ey} 10^3mm^3	
300PLUS® *																	
500 WC 440	280	280	1.00	1.00	C	10400	C	5010	360	360	1.00	1.00	C	10400	C	5010	500 WC 440
414	280	280	1.00	1.00	C	10100	C	5010	360	360	1.00	1.00	C	10100	C	5010	414
383	280	280	1.00	1.00	C	9130	C	4510	360	360	1.00	1.00	C	9130	C	4510	383
340	280	280	1.00	1.00	C	8980	C	4000	360	360	1.00	1.00	N	8830	N	3920	340
290	280	300	1.00	1.00	N	7570	N	3410	360	380	1.00	1.00	N	7410	N	3310	290
267	280	300	1.00	1.00	N	6700	N	2970	360	380	1.00	1.00	N	6540	N	2860	267
228	300	300	1.00	1.00	N	5210	N	2200	380	380	0.964	0.964	S	4860	N	2100	228
AS/NZS 3679.2-400																	
400 WC 361	280	280	1.00	1.00	C	7470	C	3210	360	360	1.00	1.00	C	7470	C	3210	400 WC 361
328	280	280	1.00	1.00	C	7100	C	3200	360	360	1.00	1.00	C	7100	C	3200	328
303	280	280	1.00	1.00	C	6420	C	2880	360	360	1.00	1.00	C	6420	C	2880	303
270	280	280	1.00	1.00	C	5660	C	2560	360	360	1.00	1.00	C	5660	C	2560	270
212	280	300	1.00	1.00	N	4360	N	2000	360	380	1.00	1.00	N	4270	N	1950	212
181	300	300	1.00	1.00	N	3410	N	1510	380	380	1.00	1.00	N	3330	N	1460	181
144	300	300	1.00	1.00	N	2590	N	1120	380	380	0.964	0.964	S	2410	N	1070	144
350 WC 280																	
258	280	280	1.00	1.00	C	4940	C	2450	360	360	1.00	1.00	C	4940	C	2450	350 WC 280
230	280	280	1.00	1.00	C	4450	C	2210	360	360	1.00	1.00	C	4450	C	2210	258
197	280	280	1.00	1.00	C	3910	C	1960	360	360	1.00	1.00	C	3910	C	1960	230
1720	280	300	1.00	1.00	C	3350	C	1720	360	380	1.00	1.00	C	3350	C	1720	197

* 300PLUS® welded sections are produced to exceed the minimum requirements of AS/NZS 3679.2:300.

Notes

1. For 300PLUS® sections the tensile strength (f_t) is 430 MPa.
2. For Grade 400 sections the tensile strength (f_t) is 480 MPa.
3. C: Compact Section; N: Non-compact Section; S: Slender Section.



Universal Beams

Table 14 Universal Beams - Properties for Assessing Section Capacity

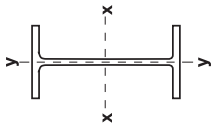
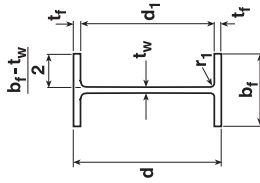
Designation	Yield Stress		Form Factor		About x-axis		About y-axis		Yield Stress		Form Factor		About x-axis		About y-axis		Designation
	f_y MPa	f_y MPa	k_f	k_f	Compactness	Z_{ex} 10^3mm^3	Compactness	Z_{ey} 10^3mm^3	Flange	Web	k_f	k_f	Compactness	Z_{ex} 10^3mm^3	Compactness	Z_{ey} 10^3mm^3	
300PLUS® *																	
610 UB 125	280	300	0.950	0.950	C	3680	C	515	340	340	0.916	0.916	C	3680	C	515	610 UB 125
113	280	300	0.926	0.926	C	3290	C	451	340	340	0.891	0.891	C	3290	C	451	113
101	300	320	0.888	0.888	C	2900	C	386	340	360	0.867	0.867	C	2900	C	386	101
530 UB 92.4	300	320	0.928	0.928	C	2370	C	342	340	360	0.907	0.907	C	2370	C	342	530 UB 92.4
82.0	300	320	0.902	0.902	C	2070	C	289	340	360	0.880	0.880	C	2070	C	289	82.0
460 UB 82.1	300	320	0.979	0.979	C	1840	C	292	340	360	0.956	0.956	C	1840	C	292	460 UB 82.1
74.6	300	320	0.948	0.948	C	1660	C	262	340	360	0.926	0.926	C	1660	C	262	74.6
67.1	300	320	0.922	0.922	C	1480	C	230	340	360	0.901	0.901	C	1480	C	230	67.1
410 UB 59.7	300	320	0.938	0.938	C	1200	C	203	340	360	0.918	0.918	C	1200	C	203	410 UB 59.7
53.7	320	320	0.913	0.913	C	1060	C	173	360	360	0.894	0.894	N	1050	N	172	53.7
360 UB 56.7	300	320	0.996	0.996	C	1010	C	193	340	360	0.974	0.974	C	1010	C	193	360 UB 56.7
50.7	300	320	0.963	0.963	C	897	C	168	340	360	0.943	0.943	C	897	C	168	50.7
44.7	320	320	0.930	0.930	N	770	N	140	360	360	0.911	0.911	N	762	N	139	44.7
310 UB 46.2	300	320	0.991	0.991	C	729	C	163	340	360	0.972	0.972	C	729	C	163	310 UB 46.2
40.4	320	320	0.952	0.952	C	633	C	139	360	360	0.936	0.936	N	629	N	138	40.4
32.0	320	320	0.915	0.915	N	467	N	86.9	360	360	0.898	0.898	N	462	N	85.7	32.0
250 UB 37.3	320	320	1.00	1.00	C	486	C	116	360	360	1.00	1.00	C	486	C	116	250 UB 37.3
31.4	320	320	1.00	1.00	N	395	N	91.4	360	360	0.991	0.991	N	392	N	90.3	31.4
25.7	320	320	0.949	0.949	C	319	C	61.7	360	360	0.932	0.932	C	319	C	61.7	25.7
200 UB 29.8	320	320	1.00	1.00	C	316	C	86.3	360	360	1.00	1.00	C	316	C	86.3	200 UB 29.8
25.4	320	320	1.00	1.00	N	259	N	68.8	360	360	1.00	1.00	N	257	N	68.0	25.4
22.3	320	320	1.00	1.00	N	227	N	60.3	360	360	1.00	1.00	N	225	N	59.4	22.3
18.2	320	320	0.990	0.990	C	180	C	34.4	360	360	0.970	0.970	C	180	C	34.4	18.2
180 UB 22.2	320	320	1.00	1.00	C	195	C	40.7	360	360	1.00	1.00	C	195	C	40.7	180 UB 22.2
18.1	320	320	1.00	1.00	C	157	C	32.5	360	360	1.00	1.00	C	157	C	32.5	18.1
16.1	320	320	1.00	1.00	C	138	C	28.4	360	360	1.00	1.00	C	138	C	28.4	16.1
150 UB 18.0	320	320	1.00	1.00	C	135	C	26.9	360	360	1.00	1.00	C	135	C	26.9	150 UB 18.0
14.0	320	320	1.00	1.00	C	102	C	19.8	360	360	1.00	1.00	C	102	C	19.8	14.0

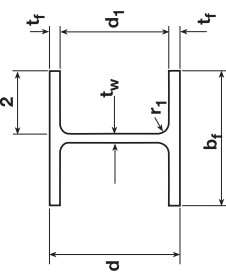
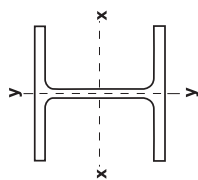
* 300PLUS® replaced Grade 250 as the base grade for these sections in 1994.

300PLUS® hot rolled sections are produced to exceed the minimum requirements of AS/NZS 36791-300.

Notes

1. For 300PLUS® sections the tensile strength (f_t) is 440 MPa.
2. For Grade 350 sections the tensile strength (f_t) is 480 MPa.
3. C: Compact Section; N: Non-compact Section; S: Slender Section.





Universal Columns

Table 15 Universal Columns – Dimensions and Properties

Designation	Depth of Section	Flange		Web Thickness	Root Radius	Depth Between Flanges	Depth Between Flanges		Gross Area of Cross Section	About x-axis			About y-axis			Torsion Constant	Warping Constant	Designation		
		Width	Thickness				d_1	$2t_f$		A_0	Z_x	Z_y	S_x	S_y	r_x				r_y	J
310 UC 158	327	311	25.0	15.7	16.5	277	17.7	5.91	20100	388	2370	2680	139	125	807	1230	78.9	3810	2860	310 UC 158
137	321	309	21.7	13.8	16.5	277	20.1	6.80	17500	329	2050	2300	137	107	691	1050	78.2	2520	2390	137
118	315	307	18.7	11.9	16.5	277	23.3	7.89	15000	277	1760	1960	136	90.2	588	893	77.5	1630	1980	118
96.8	308	305	15.4	9.9	16.5	277	28.0	9.58	12400	223	1450	1600	134	72.9	478	725	76.7	928	1560	96.8
250 UC 89.5	260	256	17.3	10.5	14.0	225	21.5	7.10	11400	143	1100	1230	112	48.4	378	575	65.2	1040	713	250 UC 89.5
72.9	254	254	14.2	8.6	14.0	225	26.2	8.64	9320	114	897	992	111	38.8	306	463	64.5	586	557	72.9
200 UC 59.5	210	205	14.2	9.3	11.4	181	19.5	6.89	7620	61.3	584	656	89.7	20.4	199	303	51.7	477	195	200 UC 59.5
52.2	206	204	12.5	8.0	11.4	181	22.7	7.84	6660	52.8	512	570	89.1	17.7	174	264	51.5	325	166	52.2
46.2	203	203	11.0	7.3	11.4	181	24.8	8.90	5900	45.9	451	500	88.2	15.3	151	230	51.0	228	142	46.2
150 UC 37.2	162	154	11.5	8.1	8.9	139	17.1	6.34	4730	22.2	274	310	68.4	7.01	91.0	139	38.5	197	39.6	150 UC 37.2
30.0	158	153	9.4	6.6	8.9	139	21.0	7.79	3860	17.6	223	250	67.5	5.62	73.4	112	38.1	109	30.8	30.0
23.4	152	152	6.8	6.1	8.9	139	22.8	10.7	2980	12.6	166	184	65.1	3.98	52.4	80.2	36.6	50.2	21.1	23.4
100 UC 14.8	97	99	7.0	5.0	10.0	83.0	16.6	6.71	1890	3.18	65.6	74.4	41.1	1.14	22.9	35.2	24.5	34.9	2.30	100 UC 14.8

Universal Columns

Table 16 Universal Columns - Properties for Assessing Section Capacity

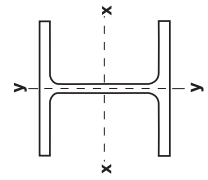
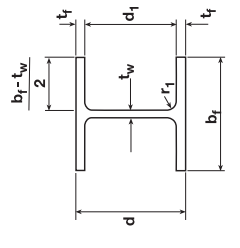
Designation	Yield Stress		Form Factor		About x-axis		About y-axis		Yield Stress		Form Factor		About x-axis		About y-axis		Designation
	Flange f_y MPa	Web f_y MPa	k_f	k_t	Compactness	Z_{ex} 10^3mm^3	Compactness	Z_{ey} 10^3mm^3	Flange f_y MPa	Web f_y MPa	k_f	k_t	Compactness	Z_{ex} 10^3mm^3	Compactness	Z_{ey} 10^3mm^3	
310 UC 158	280	300	1.00	1.00	C	2680	C	1210	340	340	1.00	1.00	C	2680	C	1210	310 UC 158
137	280	300	1.00	1.00	C	2300	C	1040	340	340	1.00	1.00	C	2300	C	1040	137
118	280	300	1.00	1.00	C	1960	C	882	340	340	1.00	1.00	N	1950	N	878	118
96.8	300	320	1.00	1.00	N	1560	N	694	340	360	1.00	1.00	N	1550	N	684	96.8
250 UC 89.5	280	320	1.00	1.00	C	1230	C	567	340	360	1.00	1.00	C	1230	C	567	250 UC 89.5
72.9	300	320	1.00	1.00	N	986	N	454	340	360	1.00	1.00	N	977	N	448	72.9
200 UC 59.5	300	320	1.00	1.00	C	656	C	299	340	360	1.00	1.00	C	656	C	299	200 UC 59.5
52.2	300	320	1.00	1.00	C	570	C	260	340	360	1.00	1.00	N	569	N	260	52.2
46.2	300	320	1.00	1.00	N	494	N	223	340	360	1.00	1.00	N	490	N	219	46.2
150 UC 37.2	300	320	1.00	1.00	C	310	C	137	340	360	1.00	1.00	C	310	C	137	150 UC 37.2
30.0	320	320	1.00	1.00	C	250	C	110	360	360	1.00	1.00	N	248	N	109	30.0
23.4	320	320	1.00	1.00	N	176	N	73.5	360	360	1.00	1.00	N	174	N	72.3	23.4
100 UC 14.8	320	320	1.00	1.00	C	74.4	C	34.4	360	360	1.00	1.00	C	74.4	C	34.4	100 UC 14.8

* 300PLUS[®] replaced Grade 250 as the base grade for these sections in 1994.

300PLUS[®] hot rolled sections are produced to exceed the minimum requirements of AS/NZS 3679:1-300.

Notes

1. For 300PLUS[®] sections the tensile strength (f_t) is 440 MPa.
2. For Grade 350 sections the tensile strength (f_t) is 480 MPa.
3. C: Compact Section; N: Non-compact Section; S: Slender Section.



Tapered Flange Beams

Table 17 Tapered Flange Beams - Dimensions and Properties

Designation	Mass per metre	Depth of Section	Flange		Web Thickness	Radii		Depth Between Flanges	Gross Area of Cross Section		About x-axis		About y-axis		Torsion Constant	Warping Constant	Designation	
			Width	Thickness		Root	Toe		A_0	I_x	I_y	S_x	S_y	r_x				r_y
	kg/m	mm	mm	mm	mm	mm	mm	mm	mm ²	10 ⁶ mm ⁴	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	mm	10 ³ mm ⁴	10 ⁹ mm ⁶	
125 TFB	13.1	125	65.0	8.5	5.0	8.0	4.0	108	1670	4.34	69.4	80.3	10.4	17.2	14.2	40.2	1.14	125 TFB
100 TFB	7.20	100	45.0	6.0	4.0	7.0	3.0	88	917	1.46	29.2	34.1	3.53	6.00	9.31	11.6	0.176	100 TFB

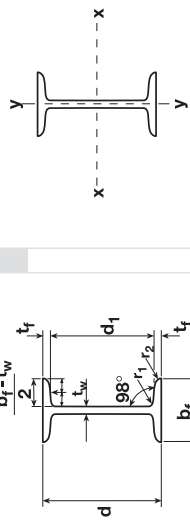


Table 18 Tapered Flange Beams - Properties for Assessing Section Capacity

Designation	Yield Stress			Form Factor			About x-axis			About y-axis			Designation		
	Flange	Web	f_y	k_f	Compactness	Z_{ex}	Compactness	Z_{ey}	Compactness	Z_{ex}	Compactness	Z_{ey}	Compactness	Designation	
	MPa	MPa	MPa			10 ³ mm ³		10 ³ mm ³		10 ³ mm ³		10 ³ mm ³			
125 TFB	320	320	320	1.00	C	80.3	C	15.6	C	80.3	C	15.6	C	125 TFB	
100 TFB	320	320	320	1.00	C	34.1	C	5.30	C	34.1	C	5.30	C	100 TFB	
300PLUS® *															
AS/NZS 3679.1-350															

* 300PLUS® replaced Grade 250 as the base grade for these sections in 1997. 300PLUS® hot rolled sections are produced to exceed the minimum requirements of AS/NZS 3679.1:300.

Notes

1. For 300PLUS® sections the tensile strength (f_t) is 430 MPa.
2. For Grade 350 sections the tensile strength (f_t) is 480 MPa.
3. C: Compact Section; N: Non-compact Section; S: Slender Section.

Parallel Flange Channels

Table 19 Parallel Flange Channels – Dimensions and Properties

Designation	Mass per metre	Depth of Section	Flange		Web Thickness	Root Radius	Depth Between Flanges		Gross Area of Cross Section	Coordinate of Centroid	About x-axis				About y-axis				Torsion Constant	Warping Constant	Designation			
			b _f	t _f			t _w	r _f			d ₁	d ₂	d ₁	t _w	t _f	(b _f -t _f)	A _g	X _L				X ₀	I _x	Z _x
380 PFC	55.2	380	100	17.5	10.0	14.0	345	34.5	5.14	7030	27.5	56.7	152	798	946	147	6.48	89.4	236	161	30.4	472	151	380 PFC
300 PFC	40.1	300	90	16.0	8.0	14.0	268	33.5	5.13	5110	27.2	56.1	72.4	483	564	119	4.04	64.4	148	117	28.1	290	58.2	300 PFC
250 PFC	35.5	250	90	15.0	8.0	12.0	220	27.5	5.47	4520	28.6	58.5	45.1	361	421	99.9	3.64	59.3	127	107	28.4	238	35.9	250 PFC
230 PFC	25.1	230	75	12.0	6.5	12.0	206	31.7	5.71	3200	22.6	46.7	26.8	233	271	91.4	1.76	33.6	77.8	61.0	23.5	108	15.0	230 PFC
200 PFC	22.9	200	75	12.0	6.0	12.0	176	29.3	5.75	2920	24.4	50.5	19.1	191	221	80.9	1.65	32.7	67.8	58.9	23.8	101	10.6	200 PFC
180 PFC	20.9	180	75	11.0	6.0	12.0	158	26.3	6.27	2660	24.5	50.3	14.1	157	182	72.9	1.51	29.9	61.5	53.8	23.8	81.4	7.82	180 PFC
150 PFC	17.7	150	75	9.5	6.0	10.0	131	21.8	7.26	2250	24.9	51.0	8.34	111	129	60.8	1.29	25.7	51.6	46.0	23.9	54.9	4.59	150 PFC
125 PFC	11.9	125	65	7.5	4.7	8.0	110	23.4	8.04	1520	21.8	45.0	3.97	63.5	73.0	51.1	0.658	15.2	30.2	27.2	20.8	23.1	1.64	125 PFC
100 PFC	8.33	100	50	6.7	4.2	8.0	86.6	20.6	6.84	1060	16.7	33.9	1.74	34.7	40.3	40.4	0.267	8.01	16.0	14.4	15.9	13.2	0.424	100 PFC

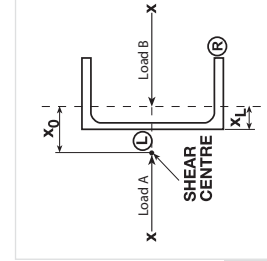
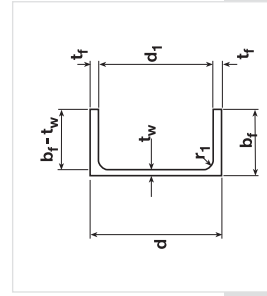
Table 20 Parallel Flange Channels – Properties for Assessing Section Capacity

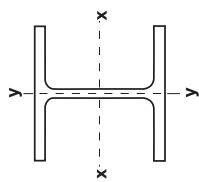
Designation	Yield Stress		Form Factor		About x-axis		About y-axis		Yield Stress		Form Factor		About x-axis		About y-axis		Designation
	Flange	Web	f _y	k _f	Z _{ex}	Z _{ey}	Load A	Load B	Flange	Web	f _y	k _f	Z _{ex}	Z _{ey}	Load A	Load B	
380 PFC	280	320	340	1.00	946	115	134	360	360	340	1.00	946	104	134	360	360	380 PFC
300 PFC	300	320	340	1.00	564	82.3	96.6	360	360	340	1.00	564	77.2	96.6	360	360	300 PFC
250 PFC	300	320	340	1.00	421	88.7	89.0	360	360	340	1.00	421	84.9	89.0	360	360	250 PFC
230 PFC	300	320	340	1.00	271	45.1	50.4	360	360	340	1.00	271	42.6	50.4	360	360	230 PFC
200 PFC	300	320	340	1.00	221	46.7	49.1	360	360	340	1.00	221	44.5	49.1	360	360	200 PFC
180 PFC	300	320	340	1.00	182	44.9	44.8	360	360	340	1.00	182	44.1	44.8	360	360	180 PFC
150 PFC	320	320	360	1.00	129	38.5	38.5	360	360	360	1.00	129	38.5	38.5	360	360	150 PFC
125 PFC	320	320	360	1.00	72.8	22.8	22.8	360	360	360	1.00	72.0	22.5	22.8	360	360	125 PFC
100 PFC	320	320	360	1.00	40.3	12.0	12.0	360	360	360	1.00	40.3	12.0	12.0	360	360	100 PFC
75 PFC	320	320	360	1.00	21.4	6.84	6.84	360	360	360	1.00	21.4	6.84	6.84	360	360	75 PFC

* 300PLUS[®] replaced Grade 250 as the base grade for these sections in 1994.
300PLUS[®] hot rolled sections are produced to exceed the minimum requirements of AS/NZS 3679:300.

Notes

1. For 300PLUS[®] sections the tensile strength (f_t) is 440 MPa.
2. For Grade 350 sections the tensile strength (f_t) is 480 MPa.
3. C: Compact Section; N: Non-compact Section; S: Slender Section.





Universal Bearing Piles (refer Note 4)

Table 21 Universal Bearing Piles – Dimensions and Properties

Designation	Depth of Section	Flange		Web Thickness	Root Radius	Depth Between Flanges	Gross Area of Cross Section		About x-axis			About y-axis			Torsion Constant	Warping Constant	Designation	
		Width	Thickness				d_1	$(b_f \cdot t_f)$	A_g	A_w	Z_x	S_x	r_x	I_x				Z_y
kg/m	d	b_f	t_f	t_w	r_1	d_1	$2t_f$	A_g	Z_x	S_x	r_x	I_x	Z_y	S_y	r_y	J	I_w	
	mm	mm	mm	mm	mm	mm	mm	mm ²	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	
310 UBP 149	318	316	20.6	20.5	16.5	277	7.14	19000	2080	2370	132	330	691	1070	75.8	2970	2410	310 UBP 149
110	308	311	15.4	15.3	16.5	277	9.57	14000	1530	1720	130	236	494	759	73.9	1240	1640	110
78.8	299	306	11.1	11.1	16.5	277	13.3	10100	1100	1220	128	165	347	530	72.5	484	1100	78.8
200 UBP 122	230	220	25.0	25.0	11.4	180	3.90	15600	1120	1340	91.0	129	406	635	53.5	3540	469	200 UBP 122

Table 22 Universal Bearing Piles – Properties for Assessing Section Capacity

Designation	Yield Stress		Form Factor		About x-axis		About y-axis		Yield Stress		Form Factor		About x-axis		About y-axis		Designation
	Flange f_y	Web f_y	k_f	Compactness	Z_{ex}	Compactness	Z_{ey}	Compactness	Flange f_y	Web f_y	k_f	Compactness	Z_{ex}	Compactness	Z_{ey}		
	MPa	MPa			10 ³ mm ³		10 ³ mm ³		MPa	MPa			10 ³ mm ³		10 ³ mm ³		
310 UBP 149	280	280	1.00	C	2370	C	1040	C	340	340	1.00	C	2370	C	1040	C	310 UBP 149
110	300	300	1.00	N	1680	N	718	N	340	340	1.00	N	1660	N	708	N	110
78.8	300	300	1.00	N	1130	N	460	N	340	340	1.00	N	1110	N	450	N	78.8
200 UBP 122	280	280	1.00	C	1340	C	609	C	340	340	1.00	C	1340	C	609	C	200 UBP 122

* 300PLUS® hot rolled sections are produced to exceed the minimum requirements of AS/NZS 3679:1:300.

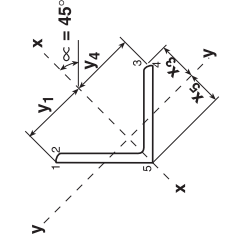
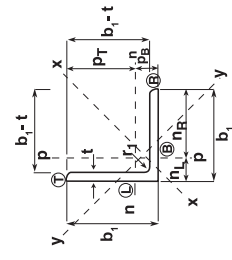
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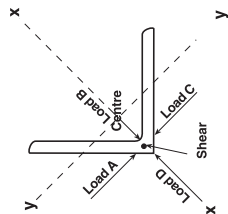
1. For 300PLUS® sections the tensile strength (f_t) is 440 MPa.
2. For Grade 350 sections the tensile strength (f_t) is 480 MPa.
3. C: Compact Section; N: Non-compact Section; S: Slender Section.
4. These sections are generally not stocked and are available for project orders only subject to enquiry from your nearest OneSteel Sales Office.

Equal Angles

Table 23 Equal Angles - x-axis and y-axis - Dimensions and Properties

Designation	Nominal Thickness	Mass per metre	Actual Thickness	Radii			Coordinate of Centroid			About x-axis				About y-axis				Torsion Constant	Designation				
				Root	Toe	Section	Area of Section	n_x	n_y	r_k	I_x	I_y	I_{xy}	Z_{x1}	Z_{x2}	Z_{y1}	Z_{y2}			S_x	S_y	r_x	r_y
$b_1 \times b_2$	t	kg/m	mm	r_1	r_2	t	A_g	p_B	p_T	I_x	I_y	I_{xy}	Z_{x1}	Z_{x2}	Z_{y1}	Z_{y2}	S_x	S_y	r_x	r_y	J		
200 x 200 x 26 EA	26.0	76.8	26.0	18.0	5.0	6.69	9780	59.3	141	56.8	141	402	643	76.2	14.9	73.9	202	83.8	178	329	390	2250	200 x 200 x 26 EA
20 EA	20.0	60.1	20.0	18.0	5.0	9.00	7660	57.0	143	45.7	141	323	511	77.2	11.8	72.9	162	80.6	147	260	39.3	1060	20 EA
18 EA	18.0	54.4	18.0	18.0	5.0	10.1	6930	56.2	144	41.7	141	295	464	77.6	10.8	72.6	149	79.5	136	236	39.4	778	18 EA
16 EA	16.0	48.7	16.0	18.0	5.0	11.5	6200	55.4	145	37.6	141	266	417	77.9	9.72	72.3	135	78.4	124	212	39.6	554	16 EA
13 EA	13.0	40.0	13.0	18.0	5.0	14.4	5090	54.2	146	31.2	141	221	344	78.3	8.08	71.9	112	76.6	105	176	39.8	304	13 EA
150 x 150 x 19 EA	19.0	42.1	19.0	13.0	5.0	6.89	5360	44.2	106	17.6	106	166	265	57.2	4.60	54.9	83.8	62.6	73.5	135	29.3	657	150 x 150 x 19 EA
16 EA	15.8	35.4	15.8	13.0	5.0	8.49	4520	43.0	107	15.1	106	142	225	57.8	3.91	54.3	71.9	60.8	64.2	115	29.4	386	16 EA
12 EA	12.0	27.3	12.0	13.0	5.0	11.5	3480	41.5	108	11.9	106	112	175	58.4	3.06	53.7	56.9	58.7	52.1	89.3	29.6	174	12 EA
10 EA	9.5	21.9	9.5	13.0	5.0	14.8	2790	40.5	109	9.61	106	90.6	141	58.7	2.48	53.4	46.4	57.3	43.3	72.0	29.8	88.9	10 EA
125 x 125 x 16 EA	29.1	15.8	15.8	10.0	5.0	6.91	3710	36.8	88.2	8.43	88.4	95.4	153	47.7	2.20	45.4	48.5	52.1	42.3	77.8	24.4	313	125 x 125 x 16 EA
12 EA	22.5	12.0	12.0	10.0	5.0	9.42	2870	35.4	89.6	6.69	88.4	75.7	120	48.3	1.73	44.7	38.6	50.1	34.5	60.8	24.5	141	12 EA
10 EA	18.0	9.5	10.0	10.0	5.0	12.2	2300	34.4	90.6	5.44	88.4	61.6	96.5	48.7	1.40	44.4	31.5	48.7	28.8	49.0	24.7	71.9	10 EA
8 EA	14.9	7.8	10.0	10.0	5.0	15.0	1900	33.7	91.3	4.55	88.4	31.7	80.2	48.9	1.17	44.2	26.5	47.7	24.5	40.8	24.8	40.6	8 EA
100 x 100 x 12 EA	17.7	12.0	12.0	8.0	5.0	7.33	2260	29.2	70.8	3.29	70.7	46.6	74.5	38.2	0.857	35.8	23.9	41.3	20.8	37.9	19.5	110	100 x 100 x 12 EA
10 EA	14.2	9.5	10.0	8.0	5.0	9.53	1810	28.2	71.8	2.70	70.7	38.2	60.4	38.6	0.695	35.4	19.6	39.9	17.4	30.7	19.6	56.2	10 EA
8 EA	11.8	7.8	8.0	8.0	5.0	11.8	1500	27.5	72.5	2.27	70.7	32.0	50.3	38.8	0.582	35.2	16.5	38.9	14.9	25.6	19.7	31.7	8 EA
6 EA	6.0	6.0	6.0	8.0	5.0	15.7	1170	26.8	73.2	1.78	70.7	25.2	39.3	39.1	0.458	35.0	13.1	37.9	12.1	20.0	19.8	14.8	6 EA
90 x 90 x 10 EA	12.7	9.5	9.5	8.0	5.0	8.47	1620	25.7	64.3	1.93	63.6	30.4	48.3	34.5	0.500	31.9	15.7	36.4	13.8	24.6	17.6	50.5	90 x 90 x 10 EA
8 EA	10.6	7.8	8.0	8.0	5.0	10.5	1350	25.0	65.0	1.63	63.6	25.6	40.4	34.8	0.419	31.7	13.2	35.4	11.8	20.5	17.6	28.6	8 EA
6 EA	8.22	6.0	6.0	8.0	5.0	14.0	1050	24.3	65.7	1.28	63.6	20.1	31.6	35.0	0.330	31.5	10.5	34.3	9.62	16.1	17.8	13.4	6 EA
75 x 75 x 10 EA	9.5	8.0	8.0	8.0	5.0	6.89	1340	22.0	53.0	1.08	53.0	20.4	32.8	28.4	0.282	26.6	9.1	31.1	9.09	16.8	14.5	41.9	75 x 75 x 10 EA
8 EA	8.73	7.8	8.0	8.0	5.0	8.62	1110	21.3	53.7	0.913	53.0	17.2	27.5	28.7	0.237	26.4	8.99	30.1	7.87	14.0	14.6	23.8	8 EA
6 EA	6.81	6.0	6.0	8.0	5.0	11.5	867	20.5	54.5	0.722	53.0	13.6	21.6	28.9	0.187	26.2	7.15	29.0	6.44	11.0	14.7	11.2	6 EA
5 EA	5.2	4.6	4.6	8.0	5.0	15.3	672	19.9	55.1	0.563	53.0	10.6	16.7	29.0	0.147	26.1	5.62	28.1	5.22	8.61	14.8	5.28	5 EA
65 x 65 x 10 EA	9.02	9.5	9.5	6.0	3.0	5.84	1150	19.6	45.4	0.691	46.0	15.0	24.3	24.5	0.183	23.7	7.71	27.7	6.60	12.5	12.6	35.1	65 x 65 x 10 EA
8 EA	7.51	7.8	8.0	6.0	3.0	7.33	957	19.0	46.0	0.589	46.0	12.8	20.5	24.8	0.154	23.4	6.56	26.8	5.73	10.5	12.7	20.0	8 EA
6 EA	5.87	6.0	6.0	6.0	3.0	9.83	748	18.3	46.7	0.471	46.0	10.2	16.2	25.1	0.122	23.1	5.26	25.8	4.71	8.25	12.8	9.37	6 EA
5 EA	4.56	4.6	4.6	6.0	3.0	13.1	581	17.7	47.3	0.371	46.0	8.08	12.7	25.3	0.0959	23.0	4.18	25.0	3.83	6.46	12.9	4.36	5 EA
55 x 55 x 6 EA	4.93	6.0	6.0	6.0	3.0	8.17	628	15.8	39.2	0.278	38.9	7.14	11.4	21.0	0.0723	19.6	3.69	22.3	3.24	5.82	10.7	7.93	55 x 55 x 6 EA
5 EA	3.84	4.6	4.6	6.0	3.0	11.0	489	15.2	39.8	0.220	38.9	5.66	8.93	21.2	0.0571	19.4	2.94	21.5	2.66	4.57	10.8	3.71	5 EA
50 x 50 x 8 EA	5.68	7.8	8.0	6.0	3.0	5.41	723	15.2	34.8	0.253	35.4	7.16	11.7	18.7	0.0675	18.1	3.73	21.5	3.14	6.00	9.66	15.2	50 x 50 x 8 EA
6 EA	4.46	6.0	6.0	6.0	3.0	7.33	568	14.5	35.5	0.205	35.4	5.79	9.30	19.0	0.0536	17.8	3.01	20.5	2.61	4.76	9.71	7.21	6 EA
5 EA	3.48	4.6	4.6	6.0	3.0	9.87	443	13.9	36.1	0.163	35.4	4.61	7.32	19.2	0.0424	17.6	2.40	19.7	2.15	3.75	9.78	3.38	5 EA
3 EA	2.31	3.0	3.0	6.0	3.0	15.7	295	13.2	36.8	0.110	35.4	3.11	4.90	19.3	0.0289	17.6	1.65	18.7	1.55	2.53	9.90	1.01	3 EA
45 x 45 x 6 EA	3.97	6.0	6.0	5.0	3.0	6.50	506	13.3	31.7	0.146	31.8	4.59	7.41	17.0	0.0383	16.0	2.39	18.8	2.04	3.79	8.71	6.32	45 x 45 x 6 EA
5 EA	3.10	4.6	4.6	5.0	3.0	8.78	394	12.7	32.3	0.117	31.8	3.66	5.84	17.2	0.0303	15.8	1.91	18.0	1.68	2.99	8.76	2.96	5 EA
3 EA	2.06	3.0	3.0	5.0	3.0	14.0	263	12.0	33.0	0.0790	31.8	2.48	3.92	17.3	0.0206	15.7	1.31	17.0	1.21	2.02	8.85	0.875	3 EA
40 x 40 x 6 EA	3.50	6.0	6.0	5.0	3.0	5.67	446	12.0	28.0	0.0997	28.3	3.53	5.75	15.0	0.0265	14.3	1.86	17.0	1.55	2.95	7.71	5.60	40 x 40 x 6 EA
5 EA	2.73	4.6	4.6	5.0	3.0	7.70	348	11.5	28.5	0.0801	28.3	2.83	4.55	15.2	0.0209	14.0	1.49	16.2	1.29	2.33	7.75	2.63	5 EA
3 EA	1.83	3.0	3.0	5.0	3.0	12.3	233	10.8	29.2	0.0545	28.3	1.93	3.06	15.3	0.0142	13.9	1.02	15.3	0.950	1.58	7.82	0.785	3 EA
30 x 30 x 6 EA	2.56	6.0	6.0	3.0	3.0	4.00	326	9.53	20.5	0.0387	21.2	1.83	3.06	10.9	0.0107	10.7	0.993	13.5	0.790	1.59	5.72	4.16	30 x 30 x 6 EA
5 EA	2.01	4.6	4.6	5.0	3.0	5.52	256	8.99	21.0	0.0316	21.2	1.49	2.45	11.1	0.00839	10.5	0.799	12.7	0.660	1.26	5.72	1.98	5 EA
3 EA	1.35	3.0	3.0	5.0	3.0	9.00	173	8.30	21.7	0.0218	21.2	1.03	1.67	11.2	0.00573	10.3	0.554	11.7	0.488	0.862	5.76	0.605	3 EA
25 x 25 x 6 EA	2.08	6.0	6.0	3.0	3.0	3.17	266	8.28	16.7	0.0210	17.7	1.19	2.03	8.89	0.00600	8.97	0.669	11.7	0.513	1.07	4.75	3.44	25 x 25 x 6 EA
5 EA	1.65	4.6	4.6	5.0	3.0	4.43	210	7.75	17.3	0.0173	17.7	0.980	1.65	9.07	0.00469	8.73	0.537	11.0	0.428	0.849	4.72	1.66	5 EA
3 EA	1.12	3.0	3.0	5.0	3.0	7.33	143	7.07	17.9	0.0121	17.7	0.685	1.13	9.22	0.00319	8.56	0.373	9.99	0.319	0.583	4.73	0.515	3 EA





Equal Angles

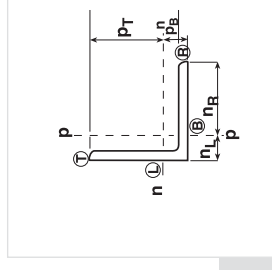
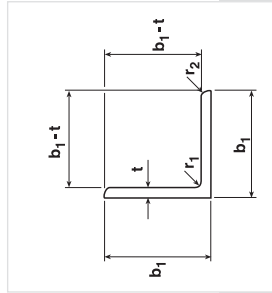
Table 24 Equal Angles – x-axis and y-axis - Properties for Assessing Section Capacity

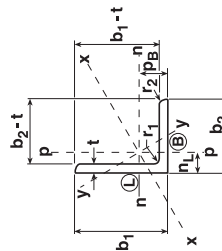
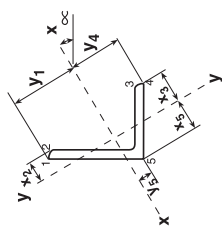
Designation	Yield Stress			Form Factor			About x-axis			About y-axis			Yield Stress			Form Factor			About x-axis			About y-axis			Designation						
	mm	mm	mm	f_y	MPa	k_f	Z_{xx}	Z_{yy}	Load A or C	Load B	Z_{yy}	Load D	f_y	MPa	k_f	Z_{xx}	Z_{yy}	Load A or C	Load B	Z_{yy}	Load D	f_y	MPa	k_f		Z_{xx}	Z_{yy}	Load A or C	Load B	Z_{yy}	Load D
300PLUS® *																															
200 x 200 x 26 EA	280	280	280	1.00	280	1.00	602	267	267	267	267	267	340	1.00	602	267	267	267	267	267	267	267	340	1.00	602	267	267	267	267	267	200 x 200 x 26 EA
20 EA	280	280	280	1.00	280	1.00	479	218	220	220	220	220	340	1.00	479	218	220	220	220	220	220	220	340	1.00	479	218	220	220	220	220	20 EA
18 EA	280	280	280	1.00	280	1.00	427	196	204	204	204	204	340	1.00	427	196	204	204	204	204	204	204	340	1.00	427	196	204	204	204	204	18 EA
16 EA	300	300	300	1.00	300	1.00	369	172	186	186	186	186	340	1.00	369	172	186	186	186	186	186	186	340	1.00	369	172	186	186	186	186	16 EA
13 EA	300	300	300	1.00	300	1.00	285	136	158	158	158	158	340	0.956	278	132	158	158	158	158	158	158	340	0.956	278	132	158	158	158	158	13 EA
150 x 150 x 19 EA	280	280	280	1.00	280	1.00	248	110	110	110	110	110	340	1.00	248	110	110	110	110	110	110	110	340	1.00	248	110	110	110	110	110	150 x 150 x 19 EA
16 EA	300	300	300	1.00	300	1.00	212	95.7	96.3	96.3	96.3	96.3	340	1.00	209	94.5	96.3	96.3	96.3	96.3	96.3	96.3	340	1.00	209	94.5	96.3	96.3	96.3	96.3	16 EA
12 EA	300	300	300	1.00	300	1.00	155	72.3	78.1	78.1	78.1	78.1	340	1.00	152	70.9	78.1	78.1	78.1	78.1	78.1	78.1	340	1.00	152	70.9	78.1	78.1	78.1	78.1	12 EA
10 EA	320	320	320	0.958	320	0.958	114	54.5	64.9	64.9	64.9	64.9	360	0.906	111	53.1	64.9	64.9	64.9	64.9	64.9	64.9	360	0.906	111	53.1	64.9	64.9	64.9	64.9	10 EA
125 x 125 x 16 EA	300	300	300	1.00	300	1.00	143	63.4	63.4	63.4	63.4	63.4	340	1.00	143	63.4	63.4	63.4	63.4	63.4	63.4	63.4	340	1.00	143	63.4	63.4	63.4	63.4	63.4	125 x 125 x 16 EA
12 EA	300	300	300	1.00	300	1.00	110	50.3	51.7	51.7	51.7	51.7	340	1.00	109	49.6	51.7	51.7	51.7	51.7	51.7	51.7	340	1.00	109	49.6	51.7	51.7	51.7	51.7	12 EA
10 EA	320	320	320	1.00	320	1.00	83.2	38.9	43.1	43.1	43.1	43.1	360	1.00	81.6	38.1	43.1	43.1	43.1	43.1	43.1	43.1	360	1.00	81.6	38.1	43.1	43.1	43.1	43.1	10 EA
8 EA	320	320	320	0.943	320	0.943	64.3	30.7	36.8	36.8	36.8	36.8	360	0.892	62.7	29.9	36.8	36.8	36.8	36.8	36.8	36.8	360	0.892	62.7	29.9	36.8	36.8	36.8	36.8	8 EA
100 x 100 x 12 EA	300	300	300	1.00	300	1.00	69.9	31.1	31.1	31.1	31.1	31.1	340	1.00	69.9	31.1	31.1	31.1	31.1	31.1	31.1	31.1	340	1.00	69.9	31.1	31.1	31.1	31.1	31.1	100 x 100 x 12 EA
10 EA	320	320	320	1.00	320	1.00	55.1	25.2	26.1	26.1	26.1	26.1	360	1.00	54.4	24.8	26.1	26.1	26.1	26.1	26.1	26.1	360	1.00	54.4	24.8	26.1	26.1	26.1	26.1	10 EA
8 EA	320	320	320	1.00	320	1.00	43.7	20.4	22.4	22.4	22.4	22.4	360	1.00	42.9	20.0	22.4	22.4	22.4	22.4	22.4	22.4	360	1.00	42.9	20.0	22.4	22.4	22.4	22.4	8 EA
6 EA	320	320	320	0.906	320	0.906	30.9	14.8	18.1	18.1	18.1	18.1	360	0.856	30.0	14.4	18.1	18.1	18.1	18.1	18.1	18.1	360	0.856	30.0	14.4	18.1	18.1	18.1	18.1	6 EA
90 x 90 x 10 EA	320	320	320	1.00	320	1.00	45.0	20.4	20.6	20.6	20.6	20.6	360	1.00	44.5	20.1	20.6	20.6	20.6	20.6	20.6	20.6	360	1.00	44.5	20.1	20.6	20.6	20.6	20.6	90 x 90 x 10 EA
8 EA	320	320	320	1.00	320	1.00	36.0	16.7	17.8	17.8	17.8	17.8	360	1.00	35.4	16.4	17.8	17.8	17.8	17.8	17.8	17.8	360	1.00	35.4	16.4	17.8	17.8	17.8	17.8	8 EA
6 EA	320	320	320	1.00	320	1.00	25.9	12.4	14.4	14.4	14.4	14.4	360	0.954	25.3	12.1	14.4	14.4	14.4	14.4	14.4	14.4	360	0.954	25.3	12.1	14.4	14.4	14.4	14.4	6 EA
75 x 75 x 10 EA	320	320	320	1.00	320	1.00	30.5	13.6	13.6	13.6	13.6	13.6	360	1.00	30.5	13.6	13.6	13.6	13.6	13.6	13.6	13.6	360	1.00	30.5	13.6	13.6	13.6	13.6	13.6	75 x 75 x 10 EA
8 EA	320	320	320	1.00	320	1.00	25.4	11.6	11.8	11.8	11.8	11.8	360	1.00	25.1	11.5	11.8	11.8	11.8	11.8	11.8	11.8	360	1.00	25.1	11.5	11.8	11.8	11.8	11.8	8 EA
6 EA	320	320	320	1.00	320	1.00	18.7	8.85	9.66	9.66	9.66	9.66	360	1.00	18.4	8.70	9.66	9.66	9.66	9.66	9.66	9.66	360	1.00	18.4	8.70	9.66	9.66	9.66	9.66	6 EA
5 EA	320	320	320	0.927	320	0.927	13.2	6.47	7.82	7.82	7.82	7.82	360	0.876	12.8	6.30	7.82	7.82	7.82	7.82	7.82	7.82	360	0.876	12.8	6.30	7.82	7.82	7.82	7.82	5 EA
65 x 65 x 10 EA	320	320	320	1.00	320	1.00	22.5	9.90	9.90	9.90	9.90	9.90	360	1.00	22.5	9.90	9.90	9.90	9.90	9.90	9.90	9.90	360	1.00	22.5	9.90	9.90	9.90	9.90	9.90	65 x 65 x 10 EA
8 EA	320	320	320	1.00	320	1.00	19.2	8.59	8.59	8.59	8.59	8.59	360	1.00	19.2	8.59	8.59	8.59	8.59	8.59	8.59	8.59	360	1.00	19.2	8.59	8.59	8.59	8.59	8.59	8 EA
6 EA	320	320	320	1.00	320	1.00	14.7	6.76	7.07	7.07	7.07	7.07	360	1.00	14.5	6.66	7.07	7.07	7.07	7.07	7.07	7.07	360	1.00	14.5	6.66	7.07	7.07	7.07	7.07	6 EA
5 EA	320	320	320	1.00	320	1.00	10.6	5.05	5.75	5.75	5.75	5.75	360	1.00	10.4	4.94	5.75	5.75	5.75	5.75	5.75	5.75	360	1.00	10.4	4.94	5.75	5.75	5.75	5.75	5 EA
55 x 55 x 6 EA	320	320	320	1.00	320	1.00	10.7	4.84	4.86	4.86	4.86	4.86	360	1.00	10.5	4.78	4.86	4.86	4.86	4.86	4.86	4.86	360	1.00	10.5	4.78	4.86	4.86	4.86	4.86	55 x 55 x 6 EA
5 EA	320	320	320	1.00	320	1.00	7.88	3.70	3.98	3.98	3.98	3.98	360	1.00	7.75	3.64	3.98	3.98	3.98	3.98	3.98	3.98	360	1.00	7.75	3.64	3.98	3.98	3.98	3.98	5 EA
50 x 50 x 8 EA	320	320	320	1.00	320	1.00	10.7	4.71	4.71	4.71	4.71	4.71	360	1.00	10.7	4.71	4.71	4.71	4.71	4.71	4.71	4.71	360	1.00	10.7	4.71	4.71	4.71	4.71	4.71	50 x 50 x 8 EA
6 EA	320	320	320	1.00	320	1.00	8.69	3.92	3.92	3.92	3.92	3.92	360	1.00	8.69	3.92	3.92	3.92	3.92	3.92	3.92	3.92	360	1.00	8.69	3.92	3.92	3.92	3.92	3.92	6 EA
5 EA	320	320	320	1.00	320	1.00	6.60	3.22	3.22	3.22	3.22	3.22	360	1.00	6.50	3.03	3.22	3.22	3.22	3.22	3.22	3.22	360	1.00	6.50	3.03	3.22	3.22	3.22	3.22	5 EA
3 EA	320	320	320	0.907	320	0.907	3.82	1.90	2.32	2.32	2.32	2.32	360	0.858	3.71	1.85	2.32	2.32	2.32	2.32	2.32	2.32	360	0.858	3.71	1.85	2.32	2.32	2.32	2.32	3 EA
45 x 45 x 6 EA	320	320	320	1.00	320	1.00	6.88	3.06	3.06	3.06	3.06	3.06	360	1.00	6.88	3.06	3.06	3.06	3.06	3.06	3.06	3.06	360	1.00	6.88	3.06	3.06	3.06	3.06	3.06	45 x 45 x 6 EA
5 EA	320	320	320	1.00	320	1.00	5.39	2.47	2.52	2.52	2.52	2.52	360	1.00	5.32	2.44	2.52	2.52	2.52	2.52	2.52	2.52	360	1.00	5.32	2.44	2.52	2.52	2.52	2.52	5 EA
3 EA	320	320	320	1.00	320	1.00	3.19</																								

Equal Angles

Table 25 Equal Angles – n-axis and p-axis - Properties

Designation		About n-axis and p-axis						Product of 2nd Moment of Area		Designation
mm	mm	$I_n = I_p$ 10^6mm^4	$I_n = P_B$ mm	$Z_{nb} = Z_{pa}$ 10^3mm^3	$r_n = P_r$ mm	$Z_{in} = Z_{pr}$ 10^3mm^3	$S_n = S_p$ 10^3mm^3	$r_n = r_p$ mm	I_{np} 10^6mm^4	
200 x 200 x 26 EA	20 EA	35.8	59.3	605	141	255	460	60.5	-20.9	200 x 200 x 26 EA
20 EA	20 EA	28.8	57.0	505	143	201	363	61.3	-16.9	20 EA
18 EA	18 EA	26.3	56.2	467	144	183	330	61.5	-15.5	18 EA
16 EA	16 EA	23.7	55.4	427	145	164	296	61.8	-14.0	16 EA
13 EA	13 EA	19.7	54.2	363	146	135	243	62.2	-11.6	13 EA
150 x 150 x 19 EA	15 EA	11.1	44.2	250	106	105	189	45.4	-6.48	150 x 150 x 19 EA
16 EA	16 EA	9.48	43.0	220	107	88.7	160	45.8	-5.58	16 EA
12 EA	12 EA	7.46	41.5	180	108	68.8	124	46.3	-4.40	12 EA
10 EA	10 EA	6.04	40.5	149	109	55.2	99.9	46.6	-3.56	10 EA
125 x 125 x 16 EA	12 EA	5.32	36.8	144	88.2	60.3	109	37.9	-3.11	125 x 125 x 16 EA
12 EA	12 EA	4.21	35.4	119	89.6	47.0	85.0	38.3	-2.48	12 EA
10 EA	10 EA	3.42	34.4	99.4	90.6	37.8	68.4	38.6	-2.02	10 EA
8 EA	8 EA	2.86	33.7	84.9	91.3	31.3	56.8	38.8	-1.69	8 EA
100 x 100 x 12 EA	10 EA	2.08	29.2	71.1	70.8	29.3	53.2	30.3	-1.22	100 x 100 x 12 EA
10 EA	10 EA	1.70	28.2	60.1	71.8	23.6	42.9	30.6	-1.00	10 EA
8 EA	8 EA	1.42	27.5	51.7	72.5	19.6	35.7	30.8	-0.842	8 EA
6 EA	6 EA	1.12	26.8	41.8	73.2	15.3	27.8	31.0	-0.661	6 EA
90 x 90 x 10 EA	8 EA	1.22	25.7	47.3	64.3	18.9	34.4	27.4	-0.716	90 x 90 x 10 EA
8 EA	8 EA	1.02	25.0	40.9	65.0	15.7	28.7	27.6	-0.604	8 EA
6 EA	6 EA	0.805	24.3	33.2	65.7	12.3	22.4	27.7	-0.475	6 EA
75 x 75 x 10 EA	8 EA	0.681	22.0	31.0	53.0	12.8	23.4	22.6	-0.399	75 x 75 x 10 EA
8 EA	8 EA	0.575	21.3	27.0	53.7	10.7	19.6	22.7	-0.338	8 EA
6 EA	6 EA	0.455	20.5	22.1	54.5	8.35	15.3	22.9	-0.268	6 EA
5 EA	5 EA	0.355	19.9	17.9	55.1	6.44	11.8	23.0	-0.208	5 EA
65 x 65 x 10 EA	8 EA	0.437	19.6	22.3	45.4	9.62	17.4	19.5	-0.254	65 x 65 x 10 EA
8 EA	8 EA	0.371	19.0	19.6	46.0	8.07	14.6	19.7	-0.218	8 EA
6 EA	6 EA	0.296	18.3	16.2	46.7	6.34	11.5	19.9	-0.175	6 EA
5 EA	5 EA	0.234	17.7	13.2	47.3	4.94	8.97	20.1	-0.138	5 EA
55 x 55 x 6 EA	5 EA	0.175	15.8	11.1	39.2	4.46	8.11	16.7	-0.103	55 x 55 x 6 EA
5 EA	5 EA	0.139	15.2	9.12	39.8	3.48	6.34	16.8	-0.0814	5 EA
50 x 50 x 8 EA	6 EA	0.160	15.2	10.5	34.8	4.61	8.38	14.9	-0.0928	50 x 50 x 8 EA
6 EA	6 EA	0.129	14.5	8.90	35.5	3.64	6.63	15.1	-0.0756	6 EA
5 EA	5 EA	0.103	13.9	7.36	36.1	2.85	5.19	15.2	-0.0602	5 EA
3 EA	3 EA	0.0694	13.2	5.25	36.8	1.89	3.46	15.3	-0.0405	3 EA
45 x 45 x 6 EA	5 EA	0.0922	13.3	6.93	31.7	2.91	5.30	13.5	-0.0538	45 x 45 x 6 EA
5 EA	5 EA	0.0734	12.7	5.76	32.3	2.28	4.16	13.6	-0.0432	5 EA
3 EA	3 EA	0.0498	12.0	4.14	33.0	1.51	2.77	13.8	-0.0292	3 EA
40 x 40 x 6 EA	5 EA	0.0631	12.0	5.24	28.0	2.26	4.12	11.9	-0.0366	40 x 40 x 6 EA
5 EA	5 EA	0.0505	11.5	4.39	28.5	1.77	3.24	12.0	-0.0296	5 EA
3 EA	3 EA	0.0344	10.8	3.19	29.2	1.18	2.17	12.2	-0.0201	3 EA
30 x 30 x 6 EA	5 EA	0.0247	9.53	2.59	20.5	1.21	2.22	8.71	-0.0140	30 x 30 x 6 EA
5 EA	5 EA	0.0200	8.99	2.22	21.0	0.951	1.76	8.83	-0.0116	5 EA
3 EA	3 EA	0.0138	8.28	1.66	21.7	0.635	1.18	8.93	-0.00804	3 EA
25 x 25 x 6 EA	5 EA	0.0135	8.28	1.63	16.7	0.807	1.49	7.13	-0.00750	25 x 25 x 6 EA
5 EA	5 EA	0.0110	7.75	1.42	17.3	0.638	1.19	7.23	-0.00632	5 EA
3 EA	3 EA	0.00765	7.07	1.08	17.9	0.426	0.802	7.33	-0.00446	3 EA





Unequal Angles

Table 26 Unequal Angles – x-axis and y-axis – Dimensions and Properties

Designation	Nominal Thickness per metre	Mass kg/m	Actual Thickness mm	Radii mm	Gross Area of Centroid mm ²	About x-axis										About y-axis										Torsion Constant	Tan Alpha	Designation					
						Z_{x5}	Z_{x4}	Z_{x3}	Z_{x2}	Z_{x1}	Z_{x0}	S_x	r_x	I_x	x_2	Z_{y2}	x_3	Z_{y3}	x_4	Z_{y4}	S_y	r_y	J										
Leg-size	$b_1 \times b_2$	t	r_1	r_2	t	A_g	p_B	p_A	η_x	η_y	l_x	l_y	Y_1	Z_{x1}	Y_4	Z_{x4}	Y_5	Z_{x5}	S_x	r_x	I_x	x_2	Z_{y2}	x_3	Z_{y3}	x_4	Z_{y4}	S_y	r_y	J			
150 x 100 x 12 UA	22.5	12.0	10.0	5.0	11.5	7.33	2870	49.1	24.3	7.51	102	73.5	75.3	99.7	81.5	34.6	177	102	127	213	51.2	1.35	27.6	48.8	52.9	25.5	42.0	32.1	51.7	21.7	141	0.488	150 x 100 x 12 UA
10 UA	18.0	9.5	10.0	5.0	14.8	9.53	2300	48.1	23.3	6.11	103	59.5	74.9	81.5	34.6	177	102	127	213	51.2	1.09	26.9	40.7	53.0	20.6	40.7	26.9	41.8	21.8	71.9	0.441	10 UA	
150 x 90 x 16 UA	27.9	15.8	10.0	5.0	8.49	4.70	3550	52.5	22.7	8.80	99.5	88.4	71.9	122	41.9	210	154	210	154	210	49.8	1.32	24.6	53.8	49.9	26.5	38.9	34.0	55.9	19.3	300	0.353	150 x 90 x 16 UA
12 UA	21.6	12.0	10.0	5.0	11.5	6.50	2750	51.0	21.2	6.97	100	69.4	71.3	97.8	40.8	171	120	141	120	141	50.4	1.04	23.4	44.5	50.1	20.8	37.2	28.0	43.8	19.5	136	0.360	12 UA
10 UA	17.3	9.5	10.0	5.0	14.8	8.47	2200	50.0	20.2	5.66	101	56.1	70.7	80.1	40.1	141	96.6	141	96.6	141	50.7	0.847	22.6	37.4	50.4	16.8	36.1	23.5	35.4	19.6	69.0	0.363	10 UA
8 UA	14.3	7.8	10.0	5.0	18.2	10.5	1820	49.2	19.6	4.73	101	46.7	70.3	67.3	39.5	120	80.1	120	80.1	120	51.0	0.710	22.1	32.2	50.6	14.0	35.2	20.2	29.5	19.7	39.0	0.364	8 UA
125 x 75 x 12 UA	17.7	12.0	8.0	5.0	9.42	5.25	2260	43.3	18.4	3.91	83.2	47.0	59.7	65.5	34.6	113	81.4	113	81.4	113	41.6	0.585	19.9	29.3	41.4	14.1	31.9	18.4	29.7	16.1	110	0.356	125 x 75 x 12 UA
10 UA	14.2	9.5	8.0	5.0	12.2	6.89	1810	42.3	17.5	3.20	83.8	38.2	59.3	53.9	33.9	94.4	65.8	94.4	65.8	94.4	42.0	0.476	19.2	24.9	41.6	11.4	30.7	15.5	24.1	16.2	56.2	0.360	10 UA
8 UA	11.8	7.8	8.0	5.0	15.0	8.62	1500	41.5	16.8	2.68	84.2	31.8	58.9	45.5	33.3	80.4	54.6	80.4	54.6	80.4	42.2	0.399	18.6	21.5	41.8	9.55	29.9	13.3	20.1	16.3	31.7	0.363	8 UA
6 UA	9.16	6.0	8.0	5.0	19.8	11.5	1170	40.7	16.0	2.10	84.7	24.8	58.5	36.0	32.8	64.1	42.4	64.1	42.4	64.1	42.5	0.315	18.0	17.5	42.1	7.47	29.0	10.8	15.7	16.4	14.8	0.364	6 UA
100 x 75 x 10 UA	12.4	9.5	8.0	5.0	9.53	6.89	1580	31.8	19.4	1.89	69.2	27.3	54.5	34.6	18.6	101	46.5	101	46.5	101	34.6	0.401	22.3	18.0	36.4	11.0	32.2	12.5	21.2	16.0	49.1	0.546	100 x 75 x 10 UA
8 UA	10.3	7.8	8.0	5.0	11.8	8.62	1310	31.1	18.7	1.59	69.4	22.9	54.3	29.2	18.2	87.0	38.7	87.0	38.7	87.0	34.8	0.337	21.8	15.4	36.4	9.26	31.3	10.7	17.8	16.0	27.8	0.549	8 UA
6 UA	7.98	6.0	8.0	5.0	15.7	11.5	1020	30.3	17.9	1.25	69.7	17.9	54.0	23.1	17.9	70.0	30.1	70.0	30.1	70.0	35.1	0.265	21.4	12.4	36.5	7.27	30.3	8.75	13.9	16.2	13.0	0.551	6 UA
75 x 50 x 8 UA	7.23	7.8	7.0	3.0	8.62	5.41	921	25.2	12.8	0.586	50.8	11.5	37.8	15.5	18.0	32.5	20.0	32.5	20.0	32.5	25.2	0.106	14.2	7.46	26.4	4.01	21.7	4.88	8.19	10.7	19.5	0.430	75 x 50 x 8 UA
6 UA	5.66	6.0	7.0	3.0	11.5	7.33	721	24.4	12.1	0.468	51.2	9.15	37.5	12.5	17.6	26.7	15.8	26.7	15.8	26.7	25.5	0.0842	13.6	6.17	26.5	3.18	20.8	4.04	6.48	10.8	9.21	0.435	6 UA
5 UA	4.40	4.6	7.0	3.0	15.3	9.87	560	23.8	11.5	0.370	51.5	7.17	37.2	9.93	17.2	21.5	12.3	21.5	12.3	21.5	25.7	0.0666	13.2	5.03	26.6	2.50	20.1	3.32	5.09	10.9	4.32	0.437	5 UA
65 x 50 x 8 UA	6.59	7.8	6.0	3.0	7.33	5.41	840	21.1	13.6	0.421	44.9	9.37	36.3	11.6	11.6	36.4	16.1	36.4	16.1	36.4	22.4	0.0936	15.6	6.00	23.9	3.91	22.3	4.20	7.49	10.6	17.6	0.570	65 x 50 x 8 UA
6 UA	5.16	6.0	6.0	3.0	9.83	7.33	658	20.4	12.9	0.338	45.2	7.48	36.1	9.35	11.2	30.2	12.7	30.2	12.7	30.2	22.7	0.0743	15.1	4.91	23.9	3.11	21.4	3.48	5.93	10.6	8.29	0.575	6 UA
5 UA	4.02	4.6	6.0	3.0	13.1	9.87	512	19.8	12.4	0.267	45.4	5.89	35.9	7.43	10.9	24.5	9.92	24.5	9.92	22.8	0.0587	14.8	3.97	23.9	2.46	20.6	2.85	4.66	10.7	3.87	0.577	5 UA	

Unequal Angles

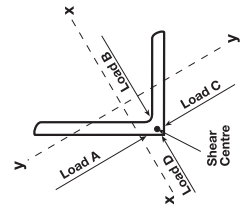
Table 27 Unequal Angles – x-axis and y-axis – Properties for Assessing Section Capacity

Designation	Yield Stress		Form Factor		About x-axis		About y-axis		Yield Stress		Form Factor		About x-axis		About y-axis		Designation
	f_y	MPa	k_f		Load A	Load C	Load B	Load D	f_y	MPa	k_f		Load A	Load C	Load B	Load D	
mm mm mm					Z_{xx}	Z_{yy}	Z_{xx}	Z_{yy}	Z_{xx}	Z_{yy}	k_f		Z_{xx}	Z_{yy}	Z_{xx}	Z_{yy}	
300PLUS® *																	
150 x 100 x 12 UA	300		1.00		102	110	35.3	38.2	100	110	1.00		100	110	34.7	38.2	150 x 100 x 12 UA
10 UA	320		0.975		74.8	81.7	26.0	30.9	73.0	78.9	0.943		73.0	78.9	25.3	30.9	10 UA
150 x 90 x 16 UA	300		1.00		132	133	39.5	39.8	130	133	1.00		130	133	39.0	39.8	150 x 90 x 16 UA
12 UA	300		1.00		96.3	104	28.8	31.1	94.6	104	1.00		94.6	104	28.3	31.1	12 UA
10 UA	320		0.973		70.6	81.8	21.2	25.2	68.8	79.5	0.940		68.8	79.5	20.6	25.2	10 UA
8 UA	320		0.863		53.1	60.3	15.9	21.0	51.2	57.9	0.836		51.2	57.9	15.4	21.0	8 UA
125 x 75 x 12 UA	300		1.00		68.6	70.5	20.6	21.2	67.6	70.5	1.00		67.6	70.5	20.3	21.2	125 x 75 x 12 UA
10 UA	320		1.00		51.6	57.2	15.5	17.2	50.6	57.2	1.00		50.6	57.2	15.2	17.2	10 UA
8 UA	320		0.964		39.8	46.0	11.9	14.3	38.8	44.7	0.931		38.8	44.7	11.6	14.3	8 UA
6 UA	320		0.824		26.8	30.1	8.07	11.2	25.8	28.7	0.799		25.8	28.7	7.75	11.2	6 UA
100 x 75 x 10 UA	320		1.00		39.4	40.9	15.9	16.6	38.8	40.9	1.00		38.8	40.9	15.7	16.6	100 x 75 x 10 UA
8 UA	320		1.00		31.2	33.1	12.6	13.9	30.6	32.1	1.00		30.6	32.1	12.4	13.9	8 UA
6 UA	320		0.946		22.0	21.8	8.93	10.9	21.4	20.7	0.917		21.4	20.7	8.68	10.9	6 UA
75 x 50 x 8 UA	320		1.00		17.0	17.3	5.93	6.02	16.8	17.3	1.00		16.8	17.3	5.85	6.02	75 x 50 x 8 UA
6 UA	320		1.00		12.6	13.7	4.37	4.77	12.4	13.7	1.00		12.4	13.7	4.30	4.77	6 UA
5 UA	320		0.956		8.89	9.65	3.10	3.75	8.66	9.30	0.926		8.66	9.30	3.02	3.75	5 UA
65 x 50 x 8 UA	320		1.00		14.1	14.1	5.86	5.86	14.1	14.1	1.00		14.1	14.1	5.86	5.86	65 x 50 x 8 UA
6 UA	320		1.00		10.7	11.2	4.46	4.67	10.6	11.2	1.00		10.6	11.2	4.40	4.67	6 UA
5 UA	320		1.00		7.76	7.92	3.23	3.68	7.59	7.64	1.00		7.59	7.64	3.17	3.68	5 UA

* 300PLUS® replaced Grade 250 as the base grade for 150 x 90 x 8 unequal angles and larger in 1994.
 300PLUS® replaced Grade 250 as the base grade for 125 x 75 x 12 unequal angles and smaller in 1997.
 300PLUS® hot rolled sections are produced to exceed the minimum requirements of AS/NZS 3679:1-300.

Notes

1. For 300PLUS® sections the tensile strength (fu) is 440 MPa.
2. For Grade 350 sections the tensile strength (fu) is 480 MPa.

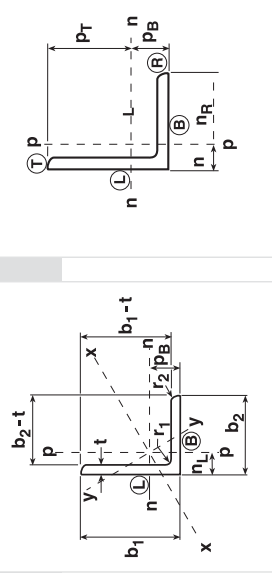




Unequal Angles

Table 28 Unequal Angles - n-axis and p-axis - Dimensions and Properties

Designation	About n-axis										About p-axis						Product of 2nd Moment of Area	Designation
	I_n 10^6mm^4	P_b mm	Z_{nb} 10^3mm^3	P_T mm	Z_{nT} 10^3mm^3	S_n 10^3mm^3	r_n mm	I_p 10^6mm^4	n_L mm	Z_{nL} 10^3mm^3	n_R mm	Z_{nR} 10^3mm^3	S_p 10^3mm^3	r_p mm	I_{no} 10^6mm^4			
150 x 100 x 12 UA	6.52	49.1	133	101	64.6	117	47.7	2.34	24.3	96.2	75.7	30.9	56.0	28.6	-2.27	150 x 100 x 12 UA		
10 UA	5.29	48.1	110	102	51.9	94.0	48.0	1.91	23.3	81.9	76.7	24.9	44.7	28.8	-1.85	10 UA		
150 x 90 x 16 UA	7.97	52.5	152	97.5	81.7	145	47.4	2.15	22.7	94.9	67.3	32.0	59.5	24.6	-2.35	150 x 90 x 16 UA		
12 UA	6.29	51.0	123	99.0	63.5	114	47.8	1.72	21.2	81.0	68.8	25.0	45.7	25.0	-1.89	12 UA		
10 UA	5.10	50.0	102	100	51.0	91.5	48.2	1.41	20.2	69.5	69.8	20.2	36.5	25.3	-1.54	10 UA		
8 UA	4.26	49.2	86.6	101	42.3	76.0	48.4	1.18	19.6	60.4	70.4	16.8	30.1	25.5	-1.29	8 UA		
125 x 75 x 12 UA	3.54	43.3	81.8	81.7	43.3	77.3	39.6	0.958	18.4	52.0	56.6	16.9	31.4	20.6	-1.05	125 x 75 x 12 UA		
10 UA	2.88	42.3	68.2	82.7	34.9	62.5	39.9	0.789	17.5	45.2	57.5	13.7	25.1	20.9	-0.867	10 UA		
8 UA	2.41	41.5	58.1	83.5	28.9	52.0	40.1	0.664	16.8	39.6	58.2	11.4	20.7	21.0	-0.731	8 UA		
6 UA	1.89	40.7	46.5	84.3	22.5	40.6	40.3	0.524	16.0	32.7	59.0	8.89	16.0	21.2	-0.575	6 UA		
100 x 75 x 10 UA	1.55	31.8	48.6	68.2	22.6	41.3	31.3	0.743	19.4	38.3	55.6	13.4	24.3	21.7	-0.625	100 x 75 x 10 UA		
8 UA	1.30	31.1	41.8	68.9	18.8	34.4	31.5	0.626	18.7	33.5	56.3	11.1	20.2	21.9	-0.528	8 UA		
6 UA	1.02	30.3	33.7	69.7	14.6	26.9	31.7	0.494	17.9	27.5	57.1	8.67	15.7	22.0	-0.416	6 UA		
75 x 50 x 8 UA	0.511	25.2	20.3	49.8	10.3	18.5	23.6	0.181	12.8	14.1	37.2	4.86	8.96	14.0	-0.174	75 x 50 x 8 UA		
6 UA	0.407	24.4	16.7	50.6	8.05	14.6	23.8	0.145	12.1	12.0	37.9	3.84	6.98	14.2	-0.140	6 UA		
5 UA	0.321	23.8	13.5	51.2	6.27	11.4	23.9	0.115	11.5	10.0	38.5	3.00	5.41	14.3	-0.111	5 UA		
65 x 50 x 8 UA	0.341	21.1	16.2	43.9	7.75	14.1	20.1	0.174	13.6	12.7	36.4	4.78	8.74	14.4	-0.141	65 x 50 x 8 UA		
6 UA	0.272	20.4	13.4	44.6	6.10	11.1	20.3	0.140	12.9	10.8	37.1	3.77	6.85	14.6	-0.114	6 UA		
5 UA	0.215	19.8	10.9	45.2	4.75	8.70	20.5	0.111	12.4	8.96	37.6	2.95	5.32	14.7	-0.0903	5 UA		



Structural Steel Sections

Structural Steel - Welded Sections - Standard: AS/NZS 3679.2:2010

Table 29 Chemical Composition - Welded Sections Base Plate

Grade (1)	Cast or Product Analysis, Percent												
	C	Si	Mn	P	S	Cr (2)	Ni (2)	Cu (2)	Mo (2)	Al (3)	Ti	Micro-alloying Elements	CE (4)
AS/NZS 3678	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	Max.
300 & 300L15	0.22	0.55	1.70	0.040	0.030	0.30	0.50	0.40	0.10	0.100	0.040	(see Note 5)	0.44
400 & 400L15	0.22	0.55	1.70	0.040	0.030	0.30	0.50	0.40	0.35	0.100	0.040	(see Note 6)	0.48

Notes

- The use of sulphide modification steelmaking techniques for listed grades is permitted.
- Cr + Ni + Cu + Mo = 1.00% maximum apply.
- Limits specified are for both acid soluble and total aluminium.
- Carbon equivalent (CE) is calculated from the equation based on actual cast or product analysis:

$$CE = C + \frac{Mn}{6} + \frac{Cr}{5} + \frac{Mo}{15} + V + \frac{Ni}{15} + Cu$$
- Niobium plus vanadium: 0.030% maximum.
- Vanadium: 0.10% maximum. Niobium plus vanadium plus titanium: 0.15% maximum.

Table 30 Tensile Properties - Welded Sections Base Plate

Property	Grade - AS/NZS 3678	
	300, 300L15	400, 400L15
Minimum Yield Strength - MPa for thickness of:		
> 8 ≤ 12	310	400
> 12 ≤ 20	300	380
> 20 ≤ 50	280	360
Minimum Tensile Strength - MPa	430	480
Minimum Elongation % of Gauge Length of $5.65\sqrt{S_0}$	21	18

Note

- S_0 is the cross-sectional area of the test piece before testing.

Table 31 Charpy V-Notch Impact Test Requirements - Welded Sections Base Plate

Grade	Test Temperature	Minimum Absorbed Energy, J					
		10mm x 10mm		10mm x 7.5mm		10mm x 5mm	
AS/NZS 3678	°C	Average of 3 Tests	Individual Test	Average of 3 Tests	Individual Test	Average of 3 Tests	Individual Test
300L15	-15	27	20	22	16	18	13
400L15	-15	27	20	22	16	18	13

Structural Steel - Hot Rolled Bars and Sections - Standard: AS/NZS 3679.1:2010

Table 32 Chemical Composition - Bars and Sections

Grade (see Note 1)	Cast analysis (max.) (See Notes 2 and 3)						
	%						
	C	Si	Mn	P	S	Micro-alloying elements (see Note 4)	CE (see Note 5)
300PLUS®, 300PLUSLO, 300PLUS®S0	0.25	0.50	1.60	0.040	0.040	(see Note 6)	0.44
350, 350LO	0.22	0.50	1.60	0.040	0.040	(see Note 7)	0.45

Notes

- The use of sulfide modification steel making techniques for these grades is permitted.
- Grain refining elements, i.e. aluminium and titanium, may be added, provided that the total content does not exceed 0.15%. Limits are for total or soluble aluminium.
- The following elements may be present to the limits stated, subject to a maximum total of 1.00%:

(a) Copper	0.50%
(b) Nickel	0.50%
(c) Chromium	0.30%
(d) Molybdenum	0.10%
- For grade 300PLUS, the following are not considered as micro-alloying elements:

(a) Titanium	0.040% maximum
(b) Niobium	0.020% maximum
(c) Vanadium	0.030% maximum
(d) Niobium plus vanadium	0.030% maximum
- Carbon equivalent (CE) is calculated from the following equation:

$$CE = C + \frac{Mn}{6} + \frac{Cr}{5} + \frac{Mo}{5} + \frac{V}{15} + \frac{Ni}{15} + \frac{Cu}{15}$$
- Micro-alloying elements are not permitted in grade 300 except for thicknesses greater than or equal to 15mm, where the following apply:
 - the maximum combined micro-alloying element content is 0.15%
 - where micro-alloying elements are used, the percentage of each element is to be shown on certificates.
- For grade 350, micro-alloying elements niobium, vanadium and titanium may be added, provided that their total combined content does not exceed 0.15%.

Table 33 Tensile Properties - Flat Bars and Sections

Grade	Minimum yield stress, MPa			Minimum tensile strength, MPa	Minimum elongation on a gauge length of $5.65\sqrt{S_0}$ (see Note 2) %
	Thickness, mm (see Note 1)				
	< 11	≥ 11 to ≤ 17	> 17 to < 40		
300PLUS®, 300PLUSLO	320	300	280	440	22
300PLUS®S0	NA	300	280	440	25
350	360	340	340	480	20

Table 34 Tensile Properties - Round and Square Bars

Grade	Minimum yield stress, MPa			Minimum tensile strength, MPa	Minimum elongation on a gauge length of $5.65\sqrt{S_0}$ %
	Thickness, mm				
	≤ 50	> 50 to < 100	≥ 100		
300PLUS®	300	290	280	440	22
350	340	330	320	480	20

Notes (apply to tables 33 and 34)

- For a section, the term 'thickness' refers to the nominal thickness of the part from which the sample is taken.
- S_0 is the cross-sectional area of the test piece before testing.
- For precise details of properties reference should be made to the latest edition of AS/NZS 3679.1:2010 or the latest OneSteel specification.
- 300PLUS® steel is produced to exceed the latest requirements for grade 300 in AS/NZS 3679.1.

Table 35 Charpy V-Notch Impact Test Requirements - Bars and Sections

Grade	Test Temperature	Minimum Absorbed Energy, J Size of Test Piece					
		10mm x 10mm		10mm x 7.5mm		10mm x 5mm	
		°C	Average of 3 Tests	Individual Test	Average of 3 Tests	Individual Test	Average of 3 Tests
300PLUSLO, 350LO*	0	27	20	22	16	18	13
300PLUS®S0	0	70	50	NA	NA	NA	NA

Notes

- This does not cover impact tested grades for thickness less than 8mm.
 *Impact testing is not available for bars and is only available for some sections by enquiry.

Merchant Bar Sections

Table 36 Chemical Composition - For OneSteel Merchant Bar Sections - Regular Grades - AS 1442

Steel Type	Grade	C		Si		Mn		P		S	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Carbon and Carbon Manganese Steels	1016	0.13	0.18	0.10	0.35	0.60	0.90	*	0.040	*	0.040
	1022	0.18	0.23	0.10	0.35	0.70	1.00	*	0.040	*	0.040
	1045	0.43	0.50	0.10	0.35	0.60	0.90	*	0.040	*	0.040

Table 37 Chemical Composition - For OneSteel Merchant Bar Sections - Regular Grades - AS 1447

Steel Type	Grade	C		Si		Mn		P		S		Cr	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Spring Steels	5160	0.55	0.65	0.10	0.35	0.70	1.00	*	0.040	*	0.040	0.70	0.90
	9258	0.50	0.65	1.60	2.20	0.70	1.05	*	0.040	*	0.040	*	*
	9261	0.55	0.65	1.80	2.20	0.70	1.00	*	0.040	*	0.040	0.10	0.25

Note

1. Merchant Bar Sections are also available in AS/NZS 3679.1:2010 specification. See Tables 32 to 35. Other grades may be available on enquiry.

Table 38 OneSteel Grades

Steel Type	Grade	C		Si		Mn		P		S		Cr		V	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
OneSteel	1015	0.13	0.18	0.10	0.35	0.30	0.60	*	0.040	*	0.050	*	*	*	*
	X4K92M61S*	0.55	0.65	1.60	1.90	0.70	1.00	*	0.040	*	0.040	0.10	0.25	0.15	0.25

Table 39 Heat Treatment Limitations

Grade	Maximum Recommended Cross Section*		
	Rounds	Squares	Flats
5160	40mm	36mm	28mm
9261	27mm	25mm	19mm
9258			16mm

* The recommendations are based on the criterion that, at the maximum dimensions, a hardness of 50 HRC can be achieved in the centre of the quenched section.

The actual properties obtained are dependent on both grade and heat treatment process control. As OneSteel has no control over the springmakers' heat treatment process, the above recommendations cannot be guaranteed. However, springmakers with efficient heat treatment facilities will be able to achieve a hardness value of 50 HRC as recommended.

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