



HOT ROLLED AND STRUCTURAL STEEL PRODUCTS





HOT ROLLED AND STRUCTURAL STEEL PRODUCTS

CONTENTS	
Introduction	1
Availability	
Structural Steel Sections	1
Merchant Bar Sections	3
Dimensions and Design Information	
Welded Beams	5
Welded Columns	7
Universal Beams	9
Universal Columns	11
Tapered Flange Beams	13
Parallel Flange Channels	14
Universal Bearing Piles	15
Equal Angles	16
Unequal Angles	19
Standard Specifications	
Structural Steel Sections	22
Merchant Bar Sections	24
Customer Technical Service	25

INTRODUCTION

OneSteel is a fully integrated, global manufacturer and distributor of steel and finished steel products, self-sufficient in both iron ore and scrap metal.

OneSteel's major manufacturing facilities are located in Whyalla, South Australia, Melbourne, Victoria, Western Sydney and Newcastle. New South Wales and Brisbane. Queensland. This booklet is produced by OneSteel Market Mills and is intended to provide general information on a range of hot rolled and structural steel products. The following text will refer to OneSteel Market Mills as OneSteel.

AVAILABILITY

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 3679.1:1996 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 3679.1:1996 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 3679.1-350LO may also be available depending on the section and quantity required. For further information contact your nearest OneSteel Sales Office (contact details on page 26).

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 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 26).

Welded Products

OneSteel Market Mills 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 3679.2:1996 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 3679.2:1996 grade 300.

A higher grade option of AS/NZS 3679.2:1996 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 6 metres to a maximum of 30 metres. Table 2 indicates the standard lengths produced.



				L	ength (n	n)			
Section	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 Market Mills 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

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
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
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
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
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
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
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
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
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
22 2.98 24 3.55 27 4.49 30 5.55 33 6.71 36 7.99 39 9.38 42 10.9
24 3.55 27 4.49 30 5.55 33 6.71 36 7.99 39 9.38 42 10.9
27 4.49 30 5.55 33 6.71 36 7.99 39 9.38 42 10.9
30 5.55 33 6.71 36 7.99 39 9.38 42 10.9
33 6.71 36 7.99 39 9.38 42 10.9
36 7.99 39 9.38 42 10.9
39 9.38 42 10.9
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
Ctandard Langth, (Matros	

Standard Length: 6 Metres

^{*} Confirm availability with sales office.

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

				Thickne	ss (mm)			
Width (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

Table 6 Merchant Bar Sections - Regular Grades

Steel Type	Standard	Grades Available
Charles Charles	OneSteel	300PLUS
Structural Steels	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

Diamete	er (m	ım)										
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	



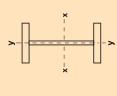
Welded Beams

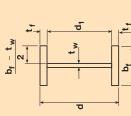
Table 9 Welded Beams - Dimensions and Properties

Section M d d High H														7		`
d b ₁ mm mm mm m 1200 500 1192 500 1184 500 1184 400 1170 275 1170 275 1010 350 1010 350 924 400 924 400 916 400 916 400 916 275 810 275 810 275 810 275 716 275	—— Ihickness ess	Between Flanges	þ	(b,-t_)	of Cross Section									Constant	Constant	
1200 500 1192 500 1184 500 1184 400 1176 400 1170 275 1000 300 275 276 276 275 276	+^*	ď	 	2t _r	Α	_*	Z _x	ν×	Ľ*	_>	Z	S [≻]	_>	\neg	×	
1200 500 1192 500 1184 500 1184 400 1176 400 1170 275 1101 350 1010 350 1010 350 916 400 916 400 916 400 916 275 810 275 800 275 800 275 716 275	mm	mm			mm ²	10 ⁶ mm⁴	10³mm³	10³mm³	шш	10 ⁶ m m ⁴	10³mm³	10³mm³	шш	10³mm⁴	109mm ⁶	
1192 500 1184 500 1184 400 1176 400 1170 275 1024 400 1016 400 1010 350 924 400 916 400 916 400 916 275 816 275 800 275 716 275 716 250 716 250 716 250	16	1120	70.0	6.05	27900	15300	25600	28200	515	834	3330	5070	120	22000	280000	1200 WB 455
1184 500 1184 400 1176 400 1170 275 1024 400 1016 400 1016 400 1010 350 924 400 916 400 916 400 917 350 816 300 810 275 800 275 716 275 716 275 716 250 710 250	5 16	1120	70.0	6.72	53900	13900	23300	25800	208	750	3000	4570	118	16500	251000	423
1184 400 1176 400 1170 350 1170 275 1014 400 1016 350 924 400 916 400 916 400 910 350 910 350 816 300 816 275 716 275 716 250 710 250	5 16	1120	70.0	7.56	49900	12500	21100	23400	200	199	2670	4070	116	12100	221000	392
1176 400 1170 350 1170 275 1024 400 1016 400 1010 350 924 400 916 400 916 400 917 350 816 300 810 275 800 275 716 275 716 275 716 250 710 250	2 16	1120	70.0	00.9	43500	10400	17500	19800	488	342	1710	2630	9.88	0966	113000	342
1170 350 1170 275 1024 400 1016 400 1010 350 924 400 916 400 916 400 917 350 816 300 810 275 800 275 716 275 716 250 710 250	3 16	1120	70.0	98.9	40300	9250	15700	17900	479	562	1500	2310	86.1	7230	98500	317
1170 275 1024 400 1016 400 1010 350 924 400 916 400 910 350 900 300 816 300 810 275 800 275 716 275 716 250 710 250	5 16	1120	70.0	89.9	35400	7610	13000	15000	464	179	1020	1600	71.1	2090	58700	278
1024 400 1016 400 1016 350 1010 350 924 400 916 400 910 350 910 350 816 300 816 275 800 275 792 250 716 250	5 16	1120	70.0	5.18	31700	6380	10900	12900	449	87.0	633	1020	52.4	4310	28500	249
1016 400 1010 350 1000 300 924 400 916 400 910 350 900 300 816 300 810 275 800 275 716 275	2 16	096	0.09	00.9	41000	7480	14600	16400	427	342	1710	2620	91.3	9740	84100	1000 WB 322
1010 350 1000 300 924 400 916 400 910 350 900 300 816 300 810 275 800 275 716 275 710 250	3 16	096	0.09	98.9	37800	0999	13100	14800	420	562	1490	2300	89.0	7010	73000	596
1000 300 924 400 916 400 910 350 900 300 816 300 810 275 800 275 792 250 716 275 710 250	5 16	096	0.09	89.9	32900	5430	10700	12300	406	179	1020	1590	73.8	4870	43400	258
924 400 916 400 910 350 900 300 816 300 810 275 800 275 792 250 716 275		096	0.09	7.10	27400	4060	8120	9570	385	90.3	602	196	57.5	2890	21700	212
916 400 910 350 816 300 810 275 800 275 792 250 716 275		098	7.1.7	90.9	35900	5730	12400	13600	399	341	1710	2590	97.5	8870	00629	900 WB 282
910 350 900 300 816 300 810 275 800 275 792 250 716 275		860	71.7	6.93	32700	2050	11000	12200	393	562	1490	2270	92.6	6150	28900	257
816 300 810 275 810 275 800 275 792 250 716 275		860	7.17	92.9	27800	4060	8930	0966	382	179	1020	1560	80.2	4020	35000	218
816 300 810 275 800 275 792 250 716 275) 12	860	71.7	7.20	22300	2960	6580	7500	364	90.1	601	931	63.5	2060	17400	175
810 275 800 275 792 250 716 275	3 10	160	76.0	5.18	24400	2970	7290	0908	349	126	840	1280	71.9	4420	19600	800 WB 192
800 275 792 250 716 275 710 250	5 10	160	76.0	5.30	21400	2480	6140	6840	341	86.7	631	964	63.7	2990	13400	168
792 250 716 275 710 250	01 10	160	76.0	6.63	18600	2040	2100	5730	331	69.4	202	775	61.1	1670	10600	146
716 275 710 250	5 10	160	16.0	7.50	15600	1570	3970	4550	317	41.7	334	519	21.7	921	6280	122
710 250	3 10	099	0.99	4.73	22000	2060	2160	6390	306	97.1	902	1080	66.4	4020	11500	700 WB 173
	5 10	099	0.99	4.80	19100	1710	4810	5370	562	65.2	521	798	58.4	7690	7640	150
700 250		099	0.99	00.9	16600	1400	3990	4490	290	52.1	417	642	26.0	1510	0809	130
115 692 250 16	5 10	099	0.99	7.50	14600	1150	3330	3790	281	41.7	334	216	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.



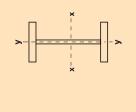














ŧ ÷ ٥ Table 10 Welded Be

Designation	Yield Stress	stress	Form Factor	About	About x-axis	About y-axis	y-axis	Yield Stress	tress	Form Factor	About	About x-axis	About y-axis	y-axis	Designation
	Flange	Web		Compactness		Compactness		Flange	Web		Compactness		Compactness		
	- >	ၞ ^	-₹-		Z_{ex}		Z _{ey}	↓ ^	_ ^	.		$Z_{\rm ex}$		$Z_{\rm ev}$	
	MPa	MPa			10³mm³		10³mm³	MPa	MPa			10³mm³		10³mm³	
			300PLUS®	*							AS/NZS	AS/NZS 3679.2-400			
1200 WB 455	280	300	0.837	၁	28200	J	2000	360	380	0.820	Z	28100	U	2000	1200 WB 455
423	280	300	0.825	ပ	25800	U	4500	360	380	0.806	Z	25700	z	4500	423
392	280	300	0.811	ပ	23400	z	4000	360	380	0.791	Z	23300	z	3900	392
342	280	300	0.783	ပ	19800	S	2560	360	380	092'0	Z	19600	U	2560	342
317	280	300	0.766	ပ	17900	J	2240	360	380	0.741	Z	17700	z	2230	317
278	280	300	0.733	ပ	15000	J	1530	360	380	0.705	Z	14900	z	1530	278
249	280	300	0.701	ပ	12900	J	946	360	380	0.670	Z	12800	O	949	249
1000 WB 322	280	300	0.832	J	16400	J	2560	360	380	0.807	J	16400	J	2560	1000 WB 322
596	280	300	0.817	ပ	14800	J	2240	360	380	0.791	ပ	14800	Z	2230	296
258	280	300	0.790	ပ	12300	ပ	1530	360	380	092'0	S	12300	z	1530	258
215	300	300	0.738	J	9570	C	903	380	380	0.704	J	9570	Z	887	215
900 WB 282	280	310	0.845	ပ	13600	ပ	2560	360	400	0.830	z	13500	O	2560	900 WB 282
257	280	310	0.830	ပ	12200	C	2240	360	400	0.813	Z	12000	Z	2220	257
218	280	310	0.800	ပ	0966	ပ	1530	360	400	0.780	z	9840	z	1530	218
175	300	310	0.744	C	7500	C	901	380	400	0.721	N	7320	N	882	175
800 WB 192	280	310	0.824	ပ	8060	O	1260	360	400	0.808	z	7850	O	1260	800 WB 192
168	280	310	0.799	ပ	6840	C	946	360	400	0.781	z	6640	O	946	168
146	300	310	0.763	Z	2710	O	757	380	400	0.744	z	5510	z	754	146
122	300	310	0.718	Z	4530	z	498	380	400	0.695	Z	4340	Z	486	122
700 WB 173	280	310	0.850	ပ	9380	ပ	1060	360	400	0.833	U	9380	O	1060	700 WB 173
150	280	310	0.828	၁	5370	C	782	360	400	0.807	J	5370	S	782	150
130	300	310	0.795	ပ	4490	ပ	979	380	400	0.773	U	4490	U	979	130
115	300	310	0.767	C	3790	Z	498	380	400	0.742	J	3790	Z	486	115

 $^{^{\}ast}$ 300PLUS $^{\circ}$ welded sections are produced to exceed the minimum requirements of AS/NZS 3679.2-300.

Notes1. For 300PLUS* sections the tensile strength (‡,) is 430 MPa.
2. For Grade 400 sections the tensile strength (‡,) is 480 MPa.
3. C. Compact Section; N: Non-compact Section; S: Slender Section.

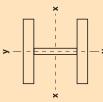
Welded Columns

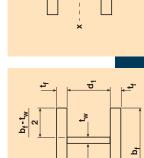
Table 11 Welded Columns - Dimensions and Properties

Designation	Denth of		lesignation Death of Flance Web Death	Mah	Denth			Gross Area		About x-axis	x-axis			Ahout	About v-axis		Torsion	Warning	Designation
	Section			Thickness	Between			of Cross							200		Constant	Constant	
		Width	Thickness		Flanges	ď	(b _r -t _w)	Section											
	þ	þ	ٽب	*	ď	[*] ل	2t,	Ą	_*	Z _x	ω×	<u>_</u> ×	>	Z_{γ}	s, S≻	∟>	7	_*	
kg/m	mm	mm	mm	mm	mm			mm²	10⁵mm⁴	10³mm³	10³mm³	mm	106mm⁴	10³mm³	10³mm³	mm	10³mm⁴	10°mm ⁶	
500 WC 440	480	200	40	40	400	10.0	5.75	26000	2150	8980	10400	196	835	3340	5160	122	30100	40400	500 WC 440
414	480	200	40	32	400	12.5	5.85	52800	2110	8800	10100	200	834	3340	2100	126	25400	40400	414
383	472	200	36	32	400	12.5	6.50	48800	1890	1990	9130	197	751	3000	4600	124	19900	35700	383
340	514	200	32	22	450	18.0	7.42	43200	2050	7980	0868	218	<i>L</i> 99	2670	4070	124	13100	38800	340
290	206	200	28	70	450	22.5	8.57	37000	1750	0669	7700	218	584	2330	3540	126	8420	33300	290
267	200	200	22	70	450	22.5	09.6	34000	1560	6250	0269	214	521	2080	3170	124	6370	29400	267
228	490	200	20	20	450	22.5	12.0	29000	1260	5130	5710	208	417	1670	2540	120	3880	23000	228
400 WC 361	430	400	40	40	350	8.75	4.50	46000	1360	6340	7460	172	459	2140	3340	96.5	24800	16300	400 WC 361
328	430	400	40	28	350	12.5	4.65	41800	1320	6140	7100	178	427	2140	3270	101	19200	16200	328
303	422	400	36	28	350	12.5	5.17	38600	1180	2220	6420	175	385	1920	2950	8.66	14800	14300	303
270	414	400	32	52	350	14.0	5.86	34400	1030	4950	2660	173	342	1710	2610	8.66	10400	12500	270
212	400	400	52	20	350	17.5	7.60	27000	977	3880	4360	169	267	1330	2040	99.4	2060	9380	212
181	390	400	20	20	350	17.5	9.50	23000	620	3180	3570	164	214	1070	1640	96.4	3080	7310	181
144	382	400	16	16	350	21.9	12.0	18400	486	2550	2830	163	171	854	1300	96.3	1580	5720	144
350 WC 280	355	320	40	28	275	9.82	4.03	35700	747	4210	4940	145	286	1640	2500	9.68	16500	7100	350 WC 280
258	347	320	36	28	275	9.82	4.47	32900	199	3810	4450	142	258	1470	2260	88.5	12700	6230	258
230	339	320	32	25	275	11.0	2.08	29300	573	3380	3910	140	529	1310	2000	88.4	0968	5400	230
197	331	320	28	50	275	13.8	5.89	25100	486	2940	3350	139	200	1140	1740	89.3	2750	4600	197



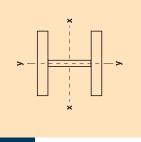
1. All welds to AS/N2S 1554.1 Category SP (deep penetration).
2. Web to flange joints develop the minimum tensile strength of a 16mm web only.
3. Flame cut surfaces not incorporated in welds have a minimum surface roughness of class 2, as defined in WTIA Technical Note 5.

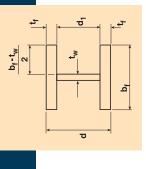












Welded Columns

Table 12 Welded Columns - Properties for Assessing Section Capacity

pesignation	Yield Stress	tress	Form Factor	About x-axis	ixis	About	About y-axis	Yield	Yield Stress	Form Factor	About x-axis	-axis	About y-axis	y-axis	Designation
	Flange	Web		Compactness		Compactness		Flange	Web		Compactness		Compactness		
	- ^	ၞ^	∵		$Z_{\rm ex}$		Zev	ၞ ^	_ ^	¥		Z_{ex}		$Z_{\rm ey}$	
	MPa	MPa			10³mm³		10³mm³	MPa	MPa			10³mm³		10³mm³	
			300PLUS® *	* %Si							AS/NZS 3	AS/NZS 3679.2-400			
500 WC 440	280	280	1.00	C	10400	၁	5010	360	360	1.00	U	10400	ပ	5010	500 WC 440
414	280	280	1.00	U	10100	ပ	5010	360	360	1.00	U	10100	ပ	5010	414
383	280	280	1.00	J	9130	ပ	4510	360	360	1.00	U	9130	ပ	4510	383
340	280	280	1.00	ပ	8980	ပ	4000	360	360	1.00	z	8830	Z	3920	340
290	280	300	1.00	z	7570	Z	3410	360	380	1.00	z	7410	Z	3310	290
267	280	300	1.00	z	0029	Z	2970	360	380	1.00	z	6540	Z	2860	267
228	300	300	1.00	z	5210	Z	2200	380	380	0.964	S	4860	Z	2100	228
400 WC 361	280	780	1.00	C	7470	J	3210	360	360	1.00	U	7470	ပ	3210	400 WC 361
328	280	280	1.00	J	7100	ပ	3200	360	360	1.00	U	7100	J	3200	328
303	280	280	1.00	U	6420	ပ	2880	360	360	1.00	U	6420	ပ	2880	303
270	280	280	1.00	J	2660	ပ	2560	360	360	1.00	U	2660	ပ	2560	270
212	280	300	1.00	z	4360	Z	2000	360	380	1.00	z	4270	Z	1950	212
181	300	300	1.00	z	3410	Z	1510	380	380	1.00	z	3330	Z	1460	181
144	300	300	1.00	Z	2590	Z	1120	380	380	0.964	S	2410	Z	1070	144
350 WC 280	280	280	1.00	J	4940	J	2450	360	360	1.00	J	4940	J	2450	350 WC 280
258	280	280	1.00	U	4450	ပ	2210	360	360	1.00	U	4450	U	2210	258
230	280	280	1.00	ပ	3910	J	1960	360	360	1.00	S	3910	ပ	1960	230
197	280	300	100	ر	3350	ر	1720	360	380	100	ر	3350	ر	17.20	107

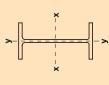
^{* 300}PLUS® welded sections are produced to exceed the minimum requirements of AS/NZS 3679.2-300.

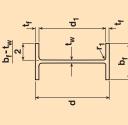
Notes 1. For 300PLUS® sections the tensile strength (f_u) is 430 MPa. 2. For Grade 400 sections the tensile strength (f_u) is 480 MPa. 3. C. Compact Section, N: Non-compact Section,

Universal Beams

Table 13 Universal Beams - Dimensions and Properties

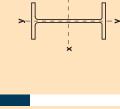
Designation	Depth of	Flar	Flange	Web	Root	Depth			Gross		About x-axis	k-axis			About y-axis	-axis		Torsion	Warping	Designation
	section	Width	Thickness	Inickness	Kadius	Between Flanges	þ_	(b _f -t _w)	Area or Cross Section									Constant	Constant	
	þ	þ	ţ	t _w	<u>-</u> -	ď	t,	2t _r	$A_{_{\scriptscriptstyle{Q}}}$	_*	Z_{x}	o,×	Ľ×	_^	$Z_{_{y}}$	S	_≻	7	×	
kg/m	шш	mm	mm	mm	mm	mm			mm^2	106mm⁴	10³mm³	10³mm³	mm	106mm⁴	10³mm³	10³mm³	mm	10³mm⁴	10ºmm ⁶	
610 UB 125	612	229	19.6	11.9	14.0	572	48.1	5.54	16000	986	3230	3680	249	39.3	343	536	49.6	1560	3450	610 UB 125
113	209	228	17.3	11.2	14.0	572	51.1	6.27	14500	875	2880	3290	246	34.3	300	469	48.7	1140	2980	113
101	602	228	14.8	10.6	14.0	572	54.0	7.34	13000	761	2530	2900	242	29.3	257	402	47.5	790	2530	101
530 UB 92.4	533	500	15.6	10.2	14.0	205	49.2	6.37	11800	554	2080	2370	217	23.8	228	355	44.9	775	1590	530 UB 92.4
82.0	528	509	13.2	9.6	14.0	205	52.3	7.55	10500	477	1810	2070	213	20.1	193	301	43.8	975	1330	82.0
460 UB 82.1	460	191	16.0	6.6	11.4	428	43.3	99'5	10500	372	1610	1840	188	18.6	195	303	42.2	701	919	460 UB 82.1
74.6	457	190	14.5	9.1	11.4	428	47.1	6.24	9520	335	1460	1660	188	16.6	175	271	41.8	530	815	74.6
67.1	454	190	12.7	8.5	11.4	428	50.4	7.15	8580	596	1300	1480	186	14.5	153	238	41.2	378	708	67.1
410 UB 59.7	406	178	12.8	7.8	11.4	381	48.8	9.65	7640	216	1060	1200	168	12.1	135	500	39.7	337	467	410 UB 59.7
53.7	403	178	10.9	9.7	11.4	381	50.1	7.82	0689	188	933	1060	165	10.3	115	179	38.6	234	394	53.7
360 UB 56.7	326	172	13.0	8.0	11.4	333	41.6	6.31	7240	161	668	1010	149	11.0	128	198	39.0	338	330	360 UB 56.7
50.7	356	171	11.5	7.3	11.4	333	45.6	7.12	6470	142	798	897	148	09.6	112	173	38.5	241	284	20.7
44.7	352	171	2.6	6.9	11.4	333	48.2	8.46	5720	121	689	777	146	8.10	94.7	146	37.6	191	237	44.7
310 UB 46.2	307	166	11.8	2.9	11.4	284	42.3	6.75	5930	100	654	729	130	9.01	109	166	39.0	233	197	310 UB 46.2
40.4	304	165	10.2	6.1	11.4	284	46.5	62.7	5210	86.4	269	633	129	7.65	92.7	142	38.3	157	165	40.4
32.0	298	149	8.0	5.5	13.0	282	51.3	8.97	4080	63.2	424	475	124	4.42	59.3	91.8	32.9	86.5	92.9	32.0
250 UB 37.3	526	146	10.9	6.4	8.9	234	36.6	6.40	4750	22.7	435	486	108	99.9	77.5	119	34.5	158	85.2	250 UB 37.3
31.4	252	146	9.8	6.1	8.9	234	38.4	8.13	4010	44.5	354	397	105	4.47	61.2	94.2	33.4	89.3	62.9	31.4
25.7	248	124	8.0	5.0	12.0	232	46.4	7.44	3270	35.4	285	319	104	2.55	41.1	63.6	27.9	67.4	36.7	25.7
200 UB 29.8	207	134	9.6	6.3	8.9	188	29.8	6.65	3820	29.1	281	316	87.3	3.86	57.5	88.4	31.8	105	37.6	200 UB 29.8
25.4	203	133	7.8	5.8	8.9	188	32.3	8.15	3230	23.6	232	260	85.4	3.06	46.1	6:02	30.8	62.7	29.2	25.4
22.3	202	133	7.0	2.0	8.9	188	37.5	9.14	2870	21.0	208	231	85.5	2.75	41.3	63.4	31.0	45.0	26.0	22.3
18.2	198	66	7.0	4.5	11.0	184	40.9	6.75	2320	15.8	160	180	97.6	1.14	23.0	35.7	22.1	38.6	10.4	18.2
180 UB 22.2	179	06	10.0	0.9	8.9	159	26.5	4.20	2820	15.3	171	195	73.6	1.22	27.1	42.3	20.8	91.6	8.71	180 UB 22.2
18.1	175	06	8.0	5.0	8.9	159	31.8	5.31	2300	12.1	139	157	72.6	0.975	21.7	33.7	50.6	44.8	08.9	18.1
16.1	173	06	7.0	4.5	8.9	159	35.3	6.11	2040	10.6	123	138	72.0	0.853	19.0	29.4	20.4	31.5	5.88	16.1
150 UB 18.0	155	75	9.5	0.9	8.0	136	22.7	3.63	2300	9.05	117	135	62.8	0.672	17.9	28.2	17.1	60.5	3.56	150 UB 18.0
14.0	150	75	7.0	2.0	8.0	136	27.2	2.00	1780	99.9	88.8	102	61.1	0.495	13.2	20.8	16.6	28.1	2.53	14.0

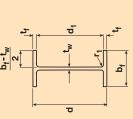












Universal Beams

Table 14 Universal Beams - Properties for Assessing Section Capacity

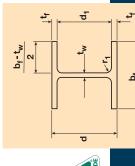
	nge Web f y Fa MPa 80 300											-		
			Compactness	S	Compactness		Flange	Web		Compactness		Compactness		
		-¥-		$Z_{\rm ex}$		Z _{ey}	,	ڻ م	ઝ ⁻		$Z_{\rm ex}$		$Z_{\rm ey}$	
				10³mm³		10³mm³	MPa	MPa			10³mm³		10³mm³	
		300PLUS®	* ⊗S							AS/NZS 3	AS/NZS 3679.1-350			
		0.950	J	3680	O	515	340	340	0.916	O	3680	J	515	610 UB 125
	300	0.926	S	3290	O	451	340	340	0.891	O	3290	U	451	113
	320	0.888	S	2900	O	386	340	360	0.867	O	2900	O	386	101
		0.928	J	2370	O	342	340	360	0.907	O	2370	O	342	530 UB 92.4
	320	0.902	C	2070	C	588	340	360	0880	C	2070	C	589	82.0
	320	0.979	J	1840	J	262	340	360	0.956	J	1840	U	292	460 UB 82.1
74.6 300	300 320	0.948	ပ	1660	O	297	340	360	0.926	C	1660	U	262	74.6
67.1 300	10 320	0.922	C	1480	C	230	340	360	0.901	C	1480	C	230	67.1
410 UB 59.7 300	10 320	0.938	J	1200	J	203	340	360	0.918	J	1200	O	203	410 UB 59.7
53.7 320	320	0.913	C	1060	C	173	360	360	0.894	Z	1050	Z	172	53.7
360 UB 56.7 300	320	966'0	J	1010	J	193	340	360	0.974	J	1010	J	193	360 UB 56.7
50.7 300	00 320	0.963	U	897	C	168	340	360	0.943	ပ	268	U	168	20.7
44.7 320	320	0.930	Z	770	Z	140	360	360	0.911	Z	762	Z	139	44.7
310 UB 46.2 300	10 320	0.991	ပ	729	C	163	340	360	0.972	ပ	729	ပ	163	310 UB 46.2
40.4 320	320	0.952	J	633	C	139	360	360	0.936	z	659	Z	138	40.4
32.0 320	320	0.915	Z	467	Z	86.9	360	360	0.898	Z	462	Z	85.7	32.0
250 UB 37.3 320	320	1.00	J	486	J	116	360	360	1.00	C	486	U	116	250 UB 37.3
31.4 320	10 320	1.00	z	395	z	91.4	360	360	0.991	z	392	z	90.3	31.4
25.7 320	10 320	0.949	C	319	C	2.19	360	360	0.932	C	319	C	61.7	25.7
200 UB 29.8 320	10 320	1.00	J	316	C	86.3	360	360	1.00	J	316	J	86.3	200 UB 29.8
25.4 320	10 320	1.00	z	259	z	8.89	360	360	1.00	z	257	z	0.89	25.4
22.3 320	320	1.00	z	227	z	60.3	360	360	1.00	z	225	z	59.4	22.3
18.2 320	320	0.660	ပ	180	C	34.4	360	360	0.970	ပ	180	၁	34.4	18.2
180 UB 22.2 320	320	1.00	ပ	195	O	40.7	360	360	1.00	၁	195	ပ	40.7	180 UB 22.2
18.1 320	320	1.00	ပ	157	C	32.5	360	360	1.00	ပ	157	ပ	32.5	18.1
16.1 320	320	1.00	C	138	C	28.4	360	360	1.00	C	138	C	28.4	16.1
150 UB 18.0 320	320	1.00	ပ	135	C	56.9	360	360	1.00	ပ	135	ပ	56.9	150 UB 18.0
14.0 320	20 320	1.00	S	102	O	19.8	360	360	1.00	ပ	102	U	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 ($f_{\rm e}$) is 440 MPa. 2. For Grade 350 sections the tensile strength ($f_{\rm e}$) is 480 MPa. 3. C. Compact Section; N: Non-compact Section; S: Slender Section.





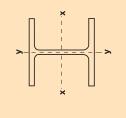


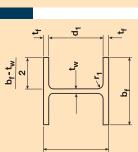


Designation	Depth of	Fla	Flange	Web	Root	Depth			Gross		About	About x-axis			About	About y-axis		Torsion	Warping	Designation
	Section	Width	Thickness	Thickness	Radius	Between Flanges	р 	(b _r -t _w)	Area of Cross Section									Constant	Constant	
	Ъ	þ	- بـ	ţ	ŗ.	ď	پر پ	2t,	A	_*	Z _x	ω [×]	Ľ×	_>	$Z_{\rm v}$	ω [×]	∟>	7	_*	
kg/m	шш	mm	mm	шш	mm	шш			mm ²	106mm⁴	10³mm³	10³mm³	шш	10°mm⁴	10³mm³	10³mm³	шш	10³mm⁴	109mm ⁶	
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	08.9	17500	329	2050	2300	137	107	169	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
8.96	308	305	15.4	6.6	16.5	277	28.0	9.58	12400	223	1450	1600	134	72.9	478	725	7.92	928	1560	8.96
250 UC 89.5	260	526	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	9.8	14.0	225	26.2	8.64	9320	114	897	366	E	38.8	306	463	64.5	286	222	72.9
200 UC 59.5	210	205	14.2	9.3	11.4	181	19.5	68.9	7620	61.3	584	929	89.7	20.4	199	303	51.7	477	195	200 UC 59.5
52.2	506	204	12.5	8.0	11.4	181	22.7	7.84	0999	52.8	215	220	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	2800	45.9	451	200	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	9:9	8.9	139	21.0	7.79	3860	17.6	223	250	67.5	29.5	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	50.5	21.1	23.4
100 UC 14.8	26	66	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







Universal Columns

Table 16 Universal Columns - Properties for Assessing Section Capacity

	Yield Stress	tress	Form Factor	About x-axis	axis	About y-axis	/-axis	Yield Stress	tress	Form Factor	About x-axis	-axis	About	About y-axis	Designation
	Flange	Web	0	Compactness		Compactness		Flange	Web	. –	Compactness		Compactness		
	- ^	↓ ^	~		$Z_{\rm ex}$		Z _{ey}	_ ^	- ^	- ∑-		$Z_{\rm ex}$		Z _{ey}	
	MPa	MPa			10³mm³		10³mm³	MPa	MPa			10³mm³		10³mm³	
			300PLUS® *	*							AS/NZS:	AS/NZS 3679.1-350			
310 UC 158	280	300	1.00	J	2680	ပ	1210	340	340	1.00	ပ	2680	ပ	1210	310 UC 158
137	280	300	1.00	J	2300	ပ	1040	340	340	1.00	ပ	2300	ပ	1040	137
118	280	300	1.00	J	1960	ပ	882	340	340	1.00	Z	1950	Z	878	118
8.96	300	320	1.00	Z	1560	Z	694	340	360	1.00	Z	1550	z	684	8.96
250 UC 89.5	280	320	1.00	J	1230	ပ	292	340	360	1.00	ပ	1230	ပ	299	250 UC 89.5
72.9	300	320	1.00	Z	986	Z	454	340	360	1.00	Z	716	z	448	72.9
200 UC 59.5	300	320	1.00	J	959	ပ	562	340	360	1.00	J	929	ပ	566	200 UC 59.5
52.2	300	320	1.00	J	220	ပ	760	340	360	1.00	Z	269	Z	260	52.2
46.2	300	320	1.00	z	494	z	223	340	360	1.00	z	490	z	219	46.2
150 UC 37.2	300	320	1.00	J	310	S	137	340	360	1.00	J	310	ပ	137	150 UC 37.2
30.0	320	320	1.00	J	250	ပ	110	360	360	1.00	Z	248	Z	109	30.0
23.4	320	320	1.00	Z	176	Z	73.5	360	360	1.00	Z	174	Z	72.3	23.4
100 UC 14.8	320	320	1.00	J	74.4	J	34.4	360	360	1.00	J	74.4	J	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.) is 440 MPa.
2. For Grade 350 sections the tensile strength (f.) is 480 MPa.
3. C. Compact Section; N: Non-compact Section; S: Slender Section.

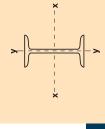
Tapered Flange Beams

Table 17 Tapered Flange Beams - Dimensions and Properties

Warping Designation				125 TFB	100 TFB
		_*	109mm ⁶	1.14	0.176
Torsion	constant	7	10³mm⁴ 109mm ⁶	40.2	11.6
		_≻	mm	14.2	9.31
About y-axis		S>	10³mm³	17.2	00'9
About		ζ,	10°mm ⁴ 10³mm ³ 10³mm ³	10.4	3.53
		_>		0.337	0.0795
		Ľ×	mm	50.9	39.9
About x-axis		o,×	10³mm³	80.3	34.1
About		Z_{x}	10 ⁶ mm ⁴ 10 ³ mm ³	69.4	29.5
		_*	106mm⁴	4.34	1.46
Gross	Area or Cross Section	A ₀	mm ²	1670	716
	(b _r -t _w)	2t,		3.53	3.42
	d ₁	*ب		21.6	22.0
Depth	Between Flanges	ď	mm	108	88
 	Toe	Γ ₂	mm	4.0	3.0
Radii	Root	<u>-</u> -	mm	8.0	7.0
Web	ınıckness	~ر	mm	5.0	4.0
Flange	Thickness	-رب	mm	8.5	0.9
Flai	Width	þ	mm	65.0	45.0
Depth of	section	р	mm	125	100
Mass per	metre		kg/m	13.1	7.20
Designation Mass per Depth of				125 TFB	100 TFB

Table 18 Tanered Flance Beams - Properties for Assessing Section Canacity

Designation	Yield Stress	tress	Form Factor	About x-axis	is	About y-axis	-axis	Yield Stress	tress	Form Factor	About x-axis	kis	About y-axis	-axis	Designation
	Flange	Web		Compactness		Compactness		Flange	Web		Compactness		Compactness		
	- ^	 >	-₹-		Z_{ex}		Z _{ey}	_ ^	_ >	¥		$Z_{\rm ex}$		$Z_{\rm ev}$	
	MPa	MPa			10³mm³		10³mm³	MPa	MPa			10³mm³		10³mm³	
			300PLUS® *	1S® *							AS/NZS 3679.1-350	79.1-350			
125 TFB	320	320	1.00	U	80.3	U	15.6	360	360	1.00	U	80.3	ပ	15.6	125 TFB
100 TFB	320	320	1.00	U	34.1	U	5.30	360	360	1.00	U	34.1	U	5.30	100 TFB





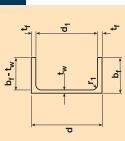
^{* 300}PUJS* replaced Grade 250 as the base grade for these sections in 1997.
300PUJS* hot rolled sections are produced to exceed the minimum requirements of AS/NZS 3679.1-300.

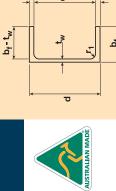
Notes
1. For 300PLUS* sections the tensile strength (f,) is 430 MPa.
2. For Grade 350 sections the tensile strength (f,) is 480 MPa.
3. C. Compact Section; N: Non-compact Section; S: Slender Section.











Parallel Flange Channels

Table 19 Parallel Flance Channels - Dimensions and Properties

	Designation					380 PFC	300 PFC	250 PFC	230 PFC	200 PFC	180 PFC	150 PFC	125 PFC	100 PFC	75 PFC
		Constant		×	109mm ⁶	151	58.2	35.9	15.0	10.6	7.82	4.59	1.64	0.424	0.106
	Torsion	Constant		7	10³mm⁴	472	290	238	108	101	81.4	54.9	23.1	13.2	8.13
				ا ^	шш	30.4	28.1	28.4	23.5	23.8	23.8	23.9	20.8	15.9	12.6
	S			S>	10³mm³	161	111	107	61.0	58.9	53.8	46.0	27.2	14.4	8.20
	About y-axis			Z_{yL}	10³mm³	236	148	127	77.8	8.79	61.5	91.6	30.2	16.0	8.71
	AF			Z_{yR}	10³mm³	89.4	64.4	59.3	33.6	32.7	59.6	25.7	15.2	8.01	4.56
				_>	10 ⁶ mm⁴	6.48	4.04	3.64	1.76	1.65	1.51	1.29	0.658	0.267	0.120
				Ľ×	шш	147	119	6.66	91.4	80.9	72.9	8.09	51.1	40.4	30.1
	k-axis			o,×	10³mm³	946	564	421	172	221	182	159	73.0	40.3	21.4
	About x-axis			۲ [×]	10³mm³	862	483	361	233	191	157	≡	63.5	34.7	18.2
				_×	10 ⁶ mm⁴	152	72.4	45.1	26.8	19.1	14.1	8.34	3.97	1.74	0.683
	Coordinate	of Shear Centre		×°	шш	29.7	56.1	58.5	46.7	50.5	50.3	21.0	45.0	33.9	27.2
	Coordinate Coordinate	of Centroid		×	шш	27.5	27.2	28.6	22.6	24.4	24.5	24.9	21.8	16.7	13.7
	Gross	Area of Cross	Section	A	mm ²	7030	5110	4520	3200	2920	2660	2250	1520	1060	754
			(b _f -t _w)	ţ		5.14	5.13	5.47	5.71	5.75	6.27	7.26	8.04	6.84	5.94
			d ₁	ţ,		34.5	33.5	27.5	31.7	29.3	26.3	21.8	23.4	50.6	16.5
perties	Depth	Between Flanges		ď	mm	345	268	220	506	176	158	131	110	9.98	62.8
na Pro	Root	Radius			шш	14.0	14.0	12.0	12.0	12.0	12.0	10.0	8.0	8.0	8.0
nsions a	Web	Thickness		t,	шш	10.0	8.0	8.0	6.5	0.9	0.9	0.9	4.7	4.2	3.8
IS - DIME	ıge		Thickness	ţ	mm	17.5	16.0	15.0	12.0	12.0	11.0	6.5	7.5	6.7	6.1
Cuanne	Flange		Width	þ	mm	100	06	06	75	75	75	75	9	20	40
ırıange	Depth of	Section		р	mm	380	300	250	230	200	180	150	125	100	75
Jaralle	Mass	per metre			kg/m	55.2	40.1	35.5	25.1	22.9	20.9	17.7	11.9	8.33	5.92
Table 19 Parallel Flange Channels - Dimensions and Properties	Designation					380 PFC	300 PFC	250 PFC	230 PFC	200 PFC	180 PFC	150 PFC	125 PFC	100 PFC	75 PFC

Table 20 Parallel Flange Channels - Properties for Assessing Section Capacity

Designation	Yield Stress	tress	Form Factor	About x-axis	About	t y-axis	Yield Stress	SSi	Form Factor	About x-axis	About	About y-axis	Designation
	Flange	Web			Load A	Load B	Flange	Web			Load A	Load B	
	ၞ^	ၞ∽	~ _	$Z_{\rm ex}$	Z _{ey}	Z _{ey}	_ ^	- ^	- 2€	$Z_{\rm ex}$	Z _{ey}	$Z_{\rm ey}$	
	MPa	MPa		10³mm³	10³mm³	10³mm³	MPa	MPa		10³mm³	10³mm³	10³mm³	
			300PLUS® *							AS/NZS 3679.1-350	150		
380 PFC	280	320	1.00	946	115	134	340	360	1.00	946	104	134	380 PFC
300 PFC	300	320	1.00	564	82.3	9.96	340	360	1.00	564	77.2	9.96	300 PFC
250 PFC	300	320	1.00	421	88.7	89.0	340	360	1.00	421	84.9	89.0	250 PFC
230 PFC	300	320	1.00	271	45.1	50.4	340	360	1.00	271	42.6	50.4	230 PFC
200 PFC	300	320	1.00	221	46.7	49.1	340	360	1.00	221	44.5	49.1	200 PFC
180 PFC	300	320	1.00	182	44.9	44.8	340	360	1.00	182	44.1	44.8	180 PFC
150 PFC	320	320	1.00	129	38.5	38.5	360	360	1.00	129	38.5	38.5	150 PFC
125 PFC	320	320	1.00	72.8	22.8	22.8	360	360	1.00	72.0	22.5	22.8	125 PFC
100 PFC	320	320	1.00	40.3	12.0	12.0	360	360	1.00	40.3	12.0	12.0	100 PFC
75 PFC	320	320	1.00	21.4	6.84	6.84	360	360	1.00	21.4	6.84	6.84	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 3679.1-300.

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

Universal Bearing Piles (refer Note 4)

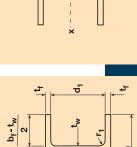
Table 21 Universal Bearing Piles - Dimensions and Properties

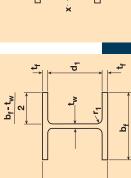
Designation	_	Flĉ	Flange	Web	Root	Depth			Gross		About x-axis	x-axis			About y-axis	y-axis		Torsion	Warping	Designation
	Section	Width	Thickness	Thickness	Radius	Between Flanges	ď	(b _f -t _w)	Area of Cross Section									Constant	Constant	
	р	þ	Ť.	*	<u>_</u>	ď	~ب	2t,	A	_*	Z _x	ω×	Ľ×	_>	Ζ,	ς,	∟>	7	_*	
kg/m	mm	mm	шш	mm	mm	mm			mm ²	106mm⁴	10³mm³	10³mm³	шш	10 ⁶ mm⁴	10³mm³	10³mm³	шш	10³mm⁴	109mm ⁶	
310 UBP 149	318	316	20.6	20.5	16.5	277	13.5	7.14	19000	330	2080	2370	132	109	169	1070	75.8	2970	2410	310 UBP 149
110	308	311	15.4	15.3	16.5	27.7	18.1	9.57	14000	236	1530	1720	130	9.9/	464	759	73.9	1240	1640	110
78.8	599	306	1:1	===	16.5	277	24.9	13.3	10100	165	1100	1220	128	53.1	347	530	72.5	484	1100	78.8
200 UBP 122	230	220	25.0	25.0	11.4	180	7.20	3.90	15600	129	1120	1340	91.0	44.6	406	635	53.5	3540	469	200 UBP 122

Designation	Yield Stress	tress	Form Factor	About x-axis	-axis	About y-axis	axis	Yield Stress	tress	Form Factor	About x-axis	x-axis	About y-axis	axis	Designation
	Flange f,	Web f,	₹.	Compactness	Zex	Compactness	Z _{ey}	Flange f _y	Web f,	ઝ ~	Compactness	Z _{ex}	Compactness	Zey	
	MPa	MPa			10³mm³		10³mm³	MPa	MPa			10³mm³		10³mm³	
			300PLUS® *	* *							AS/NZS	AS/NZS 3679.1-350			
310 UBP 149	280	280	1.00	O	2370	O	1040	340	340	1.00	ပ	2370	U	1040	310 UBP 149
110	300	300	1.00	z	1680	z	718	340	340	1.00	z	1660	z	208	110
78.8	300	300	1.00	z	1130	z	460	340	340	1.00	z	1110	z	450	78.8
200 UBP 122	280	280	1.00	U	1340	J	609	340	340	1.00	ن	1340	ن	609	200 UBP 122

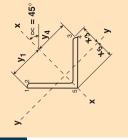
 $^{^{}st}$ 300PLUS® hot rolled sections are produced to exceed the minimum requirements of AS/NZS 3679.1-300.

- Notes
 1. For 300PLUS® sections the tensile strength (t₀) is 440 MPa.
 2. For Grade 350 sections the tensile strength (t₁) 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.











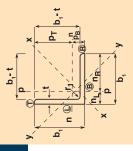




Table 23 Equal Angles - x-axis and y-axis - Dimensions and Properties

ומפור בם בלממו עוופור	- 1	1	awa i awa																		
Designation Nominal	Mass per	Actual	Kadii	_		Gross	Coordinate of Centro	Centroid		Abon	About x-axis				A	About y-axis	IS			lorsion	Designation
IIIICKIIESS Leg-size	a IIIaIII	IIICKIIESS	Root	Toe	(b ₁ -t)	Cross	= ¹ u	n ""		γ ₁ =	Z _{x1} =									Constant	
b, x b,		+	<u>_</u> -	7	+	A A	РВ	μ	_*	y4	Z _{x4} S _x	∟*	_>	×°	Z _{v3}	ײ²	Z _{v5}	ss ^{>}	_>	7	
mm mm	kg/m	mm	mm	mm		mm ²	mm	mm	106mm⁴	mm 10	0³mm³ 10³mr	n3	106mm⁴	mm	10³mm³	mm	10³mm³	10³mm³	mm	10³mm⁴	
200 x 200 x 26 EA	76.8	26.0	18.0	2.0	69.9	9780	59.3	141	56.8			_	14.9	73.9	202	83.8	178	329	39.0	2250	200 x 200 x 26 EA
20 EA	60.1	20.0	18.0	2.0	9.00	2660	57.0	143	45.7				11.8	72.9	162	9.08	147	260	39.3	1060	20 EA
18 EA	54.4	18.0	18.0	5.0	10.1	6930	56.2	144	41.7				10.8	72.6	149	79.5	136	236	39.4	778	18 EA
13 EA	40.7	13.0	0.01	0.0	14.4	5090	54.2	145	31.0				808	719	112	76.6	105	717 176	39.8	304	10 EA
150 x 150 x 19 EA	42.1	19.0	13.0	5.0	6.89	5360	44.2	106	17.6				4.60	54.9	83.8	62.6	73.5	135	29.3	657	150 x 150 x 19 EA
16 EA	35.4	15.8	13.0	5.0	8.49	4520	43.0	107	12:1				3.91	54.3	71.9	8.09	64.2	112	29.4	386	16 EA
12 EA	27.3	12.0	13.0	5.0	11.5	3480	41.5	108	11.9				3.06	53.7	56.9	58.7	52.1	89.3	29.6	174	12 EA
10 EA	21.9	9.5	13.0	5.0	14.8	2790	40.5	901	9.61				2.48	53.4	46.4	57.3	43.3	77.0	29.8	88.9	10 EA
123 X 123 X 10 EA	22.5	12.0	10.0	0.0	0.91	2870	35.4	7.00 89.6	6.43				173	42.4	38.6	50.1	34.5	60.8	24.4	213	12 5 X 123 X 16 EA 12 EA
10 FA	18.0	9.7 7	10.0	2.0	17.7	2300	34.4	90.6	5.44				140	44.4	31.5	48.7	2000	49.0	24.7	719	10 FA
8 EA	14.9	7.8	10.0	5.0	15.0	1900	33.7	91.3	4.55				117	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	8.0	5.0	7.33	2260	29.2	70.8	3.29				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	8.0	2.0	9.53	1810	28.2	71.8	2.70				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	2.0	11.8	1500	27.5	72.5	2.27				0.582	35.2	16.5	38.9	14.9	25.6	19.7	31.7	8 E A
6 EA	9.16	0.9	8.0	2.0	15.7	1170	26.8	73.2	1.78				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	8.0	2.0	8.47	1620	25.7	64.3	1.93				0.500	31.9	15.7	36.4	13.8	24.6	17.6	50.5	90 x 90 x 10 EA
8 EA	9.01	7.8	8.0	5.0	10.5	1350	25.0	65.0	1.63				0.419	31.7	13.2	35.4	11.8	20.5	17.6	28.6	8 EA
- 18	8.22	6.0	8.0	5.0	14.0	1050	24.3	65.7	1.28				0.330	31.5	10.5	34.3	29.6	16.1	17.8	13.4	6 EA
75 X 75 X 10 EA	10.5	7.5	0.0	5.0	6.89	1340	27.0	53.0	1.08				787.0	76.6	10.6	30.1	9.09	16.8	14.5	41.9	75 X 75 X 10 EA
0 EA	6.81	0.7	0.0	0.0	0.02	0111 867	20.5	50.7 5.4 5	0.913				0.237	26.2	0.99 7.15	20.1	10.1	1.0	0.47	11.2	O EA
S C EA	5.27	4.6	8:0	5.0	15.3	672	19.9	55.1	0,563				0.147	26.1	5.62	28.1	5.22	8.61	14.8	5.28	5 EA
65 x 65 x 10 EA	9.05	9.5	0.9	3.0	5.84	1150	19.6	45.4	0.691				0.183	23.7	7.71	27.7	09.9	12.5	12.6	35.1	65 x 65 x 10 EA
8 EA	7.51	7.8	0.9	3.0	7.33	957	19.0	46.0	0.589				0.154	23.4	92'9	26.8	5.73	10.5	12.7	20.0	8 EA
6 EA	2.87	0.9	0.9	3.0	9.83	748	18.3	46.7	0.471				0.122	23.1	5.26	25.8	4.71	8.25	12.8	9.37	6 EA
	4.56	4.6	0.9	3.0	13.1	281	17.7	47.3	0.371				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	0.9	0.0	3.0	8.17	628	5.8	39.2	0.278				0.0723	19.6	3.69	22.3	3.24	5.82	10.7	7.93	55 x 55 x 6 EA
	5.69	4.0	0.0	2.0	0.11	409	7.01	24.0	0.220				0.0371	19.4	2.74	21.5	214	4.37	0.0	3.71	50 v 50 v 9 E A
3	4.46	0.9	0.0	3.0	7.33	268	14.5	35.5	0.205				0.0536	17.8	3.01	20.5	2.61	4.76	97.1	7.21	30 × 30 × 0 EA
5 EA	3.48	4.6	6.0	3.0	9.87	443	13.9	36.1	0.163				0.0424	17.6	2.40	19.7	2.15	3.75	978	3.38	5 EA
3 EA	2.31	3.0	0.9	3.0	15.7	295	13.2	36.8	0.110				0.0289	17.6	1.65	18.7	1.55	2.53	9.30	1.01	3 EA
45 x 45 x 6 EA	3.97	6.0	2.0	3.0	6.50	206	13.3	31.7	0.146				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	2.0	3.0	8.78	394	12.7	32.3	0.117				0.0303	15.8	1.91	18.0	1.68	5.99	8.76	2.96	5 EA
m \	2.06	3.0	5.0	3.0	14.0	263	12.0	33.0	0.0790				0.0206	14.7	1.31	17.0	1.21	2.02	8.85	0.875	3 EA
40 X 40 X 0 EA	2.50	0.0	0.0	3.0	720	378	11.5	78 E	0.0997				0.0203	5.4.5	1.00	16.0	1.33	2.33	7.75	5.60	40 X 40 X 6 EA
3 EA	1.83	3.0	5.0	3.0	12.3	233	10.8	29.2	0.0545				0.0142	13.9	1.02	15.3	0.930	1.58	7.82	0.785	3 EA
30 x 30 x 6 EA	2.56	0.9	2.0	3.0	4.00	326	9.53	20.5	0.0387				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	2.0	3.0	5.52	526	8.99	21.0	0.0316				0.00839	10.5	0.799	12.7	0.660	1.26	5.72	1.98	5 EA
3 EA	1.35	3.0	2.0	3.0	9.00	173	8.30	21.7	0.0218				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	2.0	3.0	3.17	266	8.28	16.7	0.0210	Ì			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 1.12	3.0	5.0 5.0	3.0	7.33	210 143	7.07	17.9	0.0173	17.7	3.980 1.65 3.685 1.13	9.07	0.00469	8.56	0.537	0.II 9.99	0.428	0.583	4.73	0.515	3 EA

Equal Angles



Equal Angles

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

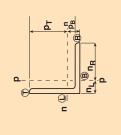
			Sign was a sign of the sign of	3000	2		000				
			Load A or C	Load B	Load D			Load A or C	Load B	Load D	
	"	-يحد	Z _{ex}	Z _{ey}	Z _{ey}	<u></u> -^	¥.	Z _{ex}	Z_{ev}	Zey	
mm mm	MPa		10³mm³	10³mm³	10³mm³	MPa		10³mm³	10³mm³	10³mm³	
	300PLUS®	FNS® *							AS/NZS 3679.1-3!	20	
200 x 200 x 26 EA	280	1.00	602	267	267	340	1.00	602	267	267	200 x 200 x 26 EA
20 EA	280	1.00	479	218	220	340	1:00	469	214	220	20 EA
18 EA	280	1.00	427	196	204	340	1.00	417	192	204	18 EA
16 EA	300	1.00	369	172	186	340	1:00	362	169	186	16 EA
	300	1.00	285	136	158	340	0.956	278	132	158	13 EA
150 x 150 x 19 EA	280	1.00	248	110	110	340	1:00	248	110	19	150 x 150 x 19 EA
16 EA	300	1.00	212	95.7	96.3	340	1.00	500	94.5	96.3	16 EA
12 EA	300	1.00	155	72.3	78.1	340	1:00	152	70.9	78.1	12 EA
	320	0.958	114	54.5	64.9	360	906:0	E	53.1	64.9	
125 x 125 x 16 EA	300	1:00	143	63.4	63.4	340	1:00	143	63.4	63.4	125 x 125 x 16 EA
12 EA	300	1.00	110	50.3	51.7	340	1.00	109	49.6	51.7	12 EA
10 EA	320	1:00	83.2	38.9	43.1	360	1:00	91.6	38.1	43.1	10 EA
8 EA	320	0.943	64.3	30.7	36.8	360	0.892	62.7	29.9	36.8	8 EA
100 x 100 x 12 EA	300	1.00	6.69	31.1	31.1	340	1:00	6.69	31.1	31.1	100 x 100 x 12 EA
10 EA	320	1:00	55.1	25.2	26.1	360	1.00	54.4	24.8	26.1	10 EA
8 EA	320	1:00	43.7	20.4	22.4	360	1:00	45.9	20.0	22.4	8 EA
	320	906.0	30.9	14.8	18.1	360	0.856	30.0	14.4	18.1	6 EA
90 x 90 x 10 EA	320	1:00	45.0	20.4	50.6	360	1:00	44.5	20.1	50.6	90 x 90 x 10 EA
8 EA	320	1:00	36.0	16.7	17.8	360	1:00	35.4	16.4	17.8	8 EA
- 1	320	1:00	25.9	12.4	14.4	360	0.954	25.3	12.1	14.4	6 EA
75 x 75 x 10 EA	320	1.00	30.5	13.6	13.6	360	1.00	30.5	13.6	13.6	75 x 75 x 10 EA
8 EA	320	00:1	25.4	11.6	J.8	360	00:1	25.1	11.5	JI:8	8 EA
6 EA	320	1.00	18.7	8.85	9.66	360	1.00	18.4	8.70	9.66	6 EA
į	320	1260	13.2	6.47	78.7	360	0.876	8.71	6.30	78.7	5 EA
65 x 65 x 10 EA	320	00:1	22.5	9.90	9.90	360	00:1	22.5	9.90	9.90	65 x 65 x 10 EA
8 EA	320	1:00	19.2	8.59	8.59	360	00:1	19.2	8.59	8.59	8 EA
6 EA	320	1:00	14.7	97.9	7.07	360	1.00	14.5	99.9	7.07	6 EA
	320	1:00	9.01	5.05	5.75	360	1.00	10.4	4.94	5.75	5 EA
55 x 55 x 6 EA	320	1.00	10.7	4.84	4.86	360	1:00	10.5	4.78	4.86	55 x 55 x 6 EA
	320	1.00	7.88	3.70	3.98	360	1:00	7.75	3.64	3.98	5 EA
50 x 50 x 8 EA	320	1.00	10.7	4.71	4.71	360	1.00	10.7	4.71	4.71	50 x 50 x 8 EA
6 EA	320	1.00	8.69	3.92	3.92	360	1:00	8.69	3.92	3.92	6 EA
5 EA	320	1.00	09.9	3.08	3.22	360	1:00	6.50	3.03	3.22	5 EA
3 EA	320	0.907	3.82	1.90	2.32	360	0.858	3.71	1.85	2.32	3 EA
45 x 45 x 6 EA	320	1.00	6.88	3.06	3.06	360	1.00	98.9	3.06	3.06	45 x 45 x 6 EA
5 EA	320	1.00	5.39	2.47	2.52	360	1.00	5.32	2.44	2.52	5 EA
3 EA	320	1.00	3.19	1.55	1.81	360	0.954	3.12	1.52	1.81	3 EA
40 x 40 x 6 EA	320	1:00	5.29	2.33	2.33	360	1:00	5.29	2.33	2.33	40 x 40 x 6 EA
5 EA	320	1.00	4.25	1.93	1.93	360	1:00	4.22	1.92	1.93	5 EA
	320	1:00	2.59	1.25	1.40	360	1:00	2.54	1.23	1.40	3 EA
30 x 30 x 6 EA	320	1:00	2.74	1.19	1.19	360	1:00	2.74	1.19	119	30 x 30 x 6 EA
5 EA	320	1.00	2.23	0.660	0.660	360	1.00	2.23	0.690	0.66.0	5 EA
	320	1.00	1.50	0.714	0.732	360	1.00	1.48	0.705	0.732	3 EA
25 x 25 x 6 EA	320	1.00	1.78	692'0	692'0	098	1.00	1.78	692'0	692'0	25 x 25 x 6 EA
5 EA	320	100	1 47	0.642	0 / 40	0,20	100	1.47	0770	0770	< L
	210	20:	7.	0.042	0.042	360	00:1	14.1	0.642	0.642	3 EA

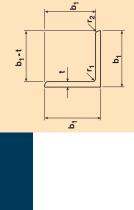
* 300PLUS* replaced Grade 250 as the base grade for 125 x 125 x 8 equal angles and larger in 1994.
300PLUS* replaced Grade 250 as the base grade for 100 x 100 x 12 equal angles and smaller in 1997.
300PLUS* hot rolled sections are produced to exceed the minimum requirements of AS/NZS 36791-300.

Notes1. For 300PLUS® sections the tensile strength (fu) is 440 MPa.
2. For Grade 350 sections the tensile strength (tu) is 480 MPa.









Equal Angles

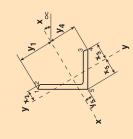
Table 25 Equal Angles - n-axis and p-axis - Properties

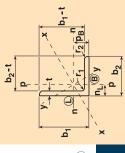
Designation

								Moment of Area	
	- -	$n_{\rm L} = p_{\rm B}$	$Z_{nB} = Z_{pL}$	$n_{\rm R}$ = $p_{\rm T}$	$Z_{nT} = Z_{pR}$	S _n =S _p	r = r	In the	
	10 ⁶ mm⁴	mm	10³mm³	mm	10³mm³	10³mm³	шш	10⁵m m⁴	
200 x 200 x 26 EA	35.8	59.3	605	141	255	460	60.5	-20.9	200 x 200 x 26 EA
20 EA 18 FΔ	26.8	56.2	505 467	143	183	393	61.3 51.5		20 EA 18 EA
16 EA	23.7	55.4 55.4	427	145	164	286	2.13	0.41-	16 FA
13 EA	19.7	54.2	363	146	135	243	62.2	-11.6 5.11-	13 EA
150 x 150 x 19 EA	111	44.2	250	106	105	189	42.4	-6.48	150 x 150 x 19 EA
16 EA	9.48	43.0	220	107	88.7	160	45.8	-5.58	16 EA
12 EA	7.46	41.5	180	108	68.8	124	46.3	-4.40	12 EA
10 EA	6.04	40.5	149	109	55.2	6.66	46.6	-3.56	10 EA
125 x 125 x 16 EA	5.32	36.8	144	88.2	60.3	109	37.9	-3.11	125 x 125 x 16 EA
12 EA	4.21	35.4	119	9.68	47.0	85.0	38.3	-2.48	12 EA
10 EA	3.42	34.4	99.4	90.6	37.8	68.4	38.6	-2.02	10 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	2.08	29.2	71.1	70.8	29.3	53.2	30.3	-1.22	100 x 100 x 12 EA
10 EA	1.70	28.2	60.1	71.8	23.6	42.9	30.6	-1.00	10 EA
8 EA	1.42	27.5	51.7	72.5	19.6	35.7	30.8	-0.842	8 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	1.22	25.7	47.3	64.3	18.9	34.4	27.4	-0.716	90 x 90 x 10 EA
8 EA	1.02	25.0	40.9	65.0	15.7	28.7	27.6	-0.604	8 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	0.681	22.0	31.0	53.0	12.8	23.4	22.6	-0.399	75 x 75 x 10 EA
8 EA	0.575	21.3	27.0	53.7	10.7	19.6	22.7	-0.338	8 EA
6 EA	0.455	20.5	22.1	54.5	8.35	15.3	22.9	-0.268	6 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	0.437	19.6	22.3	45.4	9.62	17.4	19.5	-0.254	65 x 65 x 10 EA
8 EA	0.371	19.0	19.6	46.0	8.07	14.6	19.7	-0.218	8 EA
6 EA	0.296	18.3	16.2	46.7	6.34	11.5	19.9	-0.175	6 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	0.175	15.8	III	39.2	4.46	8.11	16.7	-0.103	55 x 55 x 6 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	0.160	15.2	10.5	34.8	4.61	8.38	14.9	-0.0928	50 x 50 x 8 EA
6 EA	0.129	14.5	8.90	35.5	3.64	6.63	15.1	-0.0756	6 EA
5 EA	0.103	13.9	7.36	36.1	2.85	5.19	15.2	-0.0602	5 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	0.0922	13.3	6.93	31.7	2.91	5.30	13.5	-0.0538	45 x 45 x 6 EA
5 EA	0.0734	12.7	5.76	32.3	2.28	4.16	13.6	-0.0432	5 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	0.0631	12.0	5.24	28.0	2.26	4.12	11.9	-0.0366	40 x 40 x 6 EA
5 EA	0.0505	11.5	4.39	28.5	1.77	3.24	12.0	-0.0296	5 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	0.0247	9.53	2.59	20.5	1.21	2.22	8.71	-0.0140	30 x 30 x 6 EA
5 EA	0.0200	8.99	2.22	21.0	0.951	1.76	8.83	-0.0116	5 EA
3 EA	0.0138	8.30	1.66	21.7	0.635	1.18	8.93	-0.00804	3 EA
25 x 25 x 6 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	0.0110	7.75	1.42	17.3	0.638	1.19	7.23	-0.00632	5 EA
	1111000	101	00,						



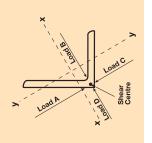
Projection Name Ashed Redit Constitution Constitution	6		: 170	Sing t		5	2		4	1.0								Ahaiit					L.	l	1000
Designation Nominal Thickness	mass per T	Actual hickness	Kadii	Gross Area of	Gross Coordinate Area of of Centroid				AE	About X-axis	s							About	About y-axis				Constant	lorsion lan Constant Alpha	Designation
	metre			Cross																					
Leg-size			Root Toe (b ₁ -	Root Toe $(b_1^-t)(b_2^-t)$ Section	_																				
$b_1 \times b_2$		t.	Γ_1 Γ_2 t	t A _g	p _B n _L	_*	γ'	Z_{x1}	٧ 4	Z_{x4}	V ₅	Z_{x5}	ر م	Ľ×	_>	x ₂ Z	Z _{y2} >	x ₃ Z ₃	Z _{y3} x	x_5 Z_{y5}	S _×	_>	Г		
mm mm	kg/m	mm	mm mm	mm ²	mm mm	10°mm⁴	mm	103mm ³	mm	10 ³ mm ³	шш	10 ³ mm ³ 10	10 ³ mm ³	mm 10°	10 ⁶ mm⁴ r	mm 10³r	10³mm³ m	mm 10³n	10³mm³ mm	-	03mm3 103mm3	ım³ mm	10³mm⁴	m⁴	
150 x 100 x 12 UA	22.5	12.0	10.0 5.0 11.	11.5 7.33 2870	49.1 24.3	7.51	102	73.5	75.3	7.66	35.2	213	127	51.2	1.35	27.6 48	48.8 52	52.9 25	25.5 42.0		32.1 51.7	7.12	141		0.438 150 x 100 x 12 UA
10 UA	18.0	9.5	10.0 5.0 14.	14.8 9.53 2300	48.1 23.3	6.11	103	59.5	74.9	81.5	34.6	177	102	51.6	1.09	26.9	40.7 53	53.0 20	20.6 40.7		26.9 41.8	.8 21.8	3 71.9	0.441	10 UA
150 x 90 x 16 UA	67.2	15.8	10.0 5.0 8.4	8.49 4.70 3550	52.5 22.7	8.80	99.5	88.4	71.9	122	41.9	210	154	49.8	1.32	24.6 5.	53.8 49	49.9 26	26.5 38	38.9 34.0	.0 55.9	.9 19.3	300	0.353	150 x 90 x 16 UA
12 UA	21.6	12.0	10.0 5.0 11.	11.5 6.50 2750	51.0 21.2	6.97	100	69.4	71.3	8.76	40.8	171	120	50.4	1.04	23.4 4.	44.5 50	50.1 20	20.8 37	37.2 28.0	.0 43.8	.8 19.5	136	0.360	12 UA
10 UA	17.3	9.5	10.0 5.0 14.	14.8 8.47 2200	50.0 20.2	5.66	101	56.1	7.07	80.1	40.1	141	9.96	50.7	0.847 2	22.6 3	37.4 50	50.4 16	16.8 36	36.1 23.	23.5 35.4	.4 19.6	9.69	0.363	10 UA
8 UA	14.3	7.8	10.0 5.0 18.	18.2 10.5 1820	49.2 19.6	4.73	101	46.7	70.3	67.3	39.5	120	80.1	51.0	0.710	22.1 3;	32.2 50	50.6 14	14.0 35	35.2 20.2	.2 29.5	.5 19.7	7 39.0	0.364	8 UA
125 x 75 x 12 UA	17.7	12.0	8.0 5.0 9.42	42 5.25 2260	43.3 18.4	3.91	83.2	47.0	59.7	65.5	34.6	113	81.4	41.6	0.585	19.9	29.3 41	41.4 14	14.1 31	31.9 18.	18.4 29.7	7. 16.1	110	0.356	125 x 75 x 12 UA
10 UA	14.2	9.5	8.0 5.0 12.	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	42.0	0.476	19.2	24.9 41	41.6 11	11.4 30.7		15.5 24.1	1.1 16.2	2 56.2	0.360	10 UA
8 UA	11.8	7.8	8.0 5.0 15.	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	42.2	0.399	18.6 2	21.5 41	41.8 9.5	9.55 29	29.9 13	13.3 20.1	16.3	31.7	, 0.363	8 UA
V 9	9.16	0.9	8.0 5.0 19.	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	42.5	0.315	18.0	17.5 4;	42.1 7.4	7.47 29.0		10.8 15.7	7. 16.4	14.8	3 0.364	6 UA
100 x 75 x 10 UA	12.4	9.5	8.0 5.0 9.53	53 6.89 1580	31.8 19.4	1.89	69.2	27.3	54.5	34.6	18.6	101	46.5	34.6	0.401 2	22.3 18	18.0 36	36.4 11	11.0 32.2		12.5 21.2	.2 16.0	164	0.546	100 x 75 x 10 UA
8 UA	10.3	7.8	8.0 5.0 11.	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	34.8	0.337	21.8	15.4 36	36.4 9.2	9.26 31	31.3 10	10.7 17.8	.8 16.0	27.8	0.549	8 UA
6 UA	7.98	0.9	8.0 5.0 15.	15.7 11.5 1020	30.3 17.9	1.25	2.69	17.9	54.0	23.1	17.9	70.0	30.1	35.1	0.265	21.4 12	12.4 36	36.5 7.2	7.27 30.3	3 8.75	75 13.9	.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	62 5.41 921	25.2 12.8	0.586	50.8	11.5	37.8	15.5	18.0	32.5	20.0	25.2	0.106	14.2 7.	7.46 26	26.4 4.1	4.01 21	21.7 4.88	88 8.19	10.7	7 19.5	0.430	75 x 50 x 8 UA
6 UA	5.66	0.9	7.0 3.0 11.	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	25.5 (0.0842	13.6 6	6.17 26	26.5 3.	3.18 20.8	1.8 4.04	94 6.48	.8 10.8	3 9.21	0.435	6 UA
5 UA	4.40	4.6	7.0 3.0 15.	15.3 9.87 560	23.8 11.5	0.370	51.5	71.7	37.2	9.93	17.2	21.5	12.3	25.7 0	0.0666	13.2 5.	5.03 26	26.6 2.5	2.50 20	20.1 3.32	32 5.09	9 10.9	4.32	0.437	5 UA
65 x 50 x 8 UA	6:29	7.8	6.0 3.0 7.33	33 5.41 840	21.1 13.6	0.421	44.9	9.37	36.3	11.6	11.6	36.4	16.1	22.4 (0.0936	15.6 6.	6.00 23	23.9 3.	3.91 22.3	3 4.20	20 7.49	9.01 6.	17.6	0.570	65 x 50 x 8 UA
6 UA	5.16	0.9	6.0 3.0 9.83	83 7.33 658	20.4 12.9	0.338	45.2	7.48	36.1	9.35	11.2	30.2	12.7	22.7	0.0743	15.1 4	4.91 23	23.9 3	3.11 21.	21.4 3.48	18 5.93	10.6	8.29	0.575	6 UA
5 UA	4.02	4.6	6.0 3.0 13	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	22.8	0.0587	14.8 3.	3.97 23	23.9 2.4	2.46 20.6	1.6 2.85	35 4.66	6 10.7	3.87	7.20	5 UA











Unequal Angles

1 Table 27 IIn

Designation	Yield Stress	Form Factor	About	About x-axis	About y-axis	y-axis	Yield Stress	Form Factor	About x-axis	x-axis	About y-axis	y-axis	Designation
			Load A	Load C	Load B	Load D			Load A	Load C	Load B	Load D	
	,_ >	¥.	Z _{ex}	Z _{ex}	$Z_{e_{y}}$	Z _{ey}	↓ ^	ΣĽ	Z _{ex}	$Z_{\rm ex}$	Z _{ey}	Z _{ey}	
mm mm mm	MPa		10³mm³	10³mm³	10³mm³	10³mm³	MPa		10³mm³	10³mm³	10³mm³	10³mm³	
		300PLUS® *	NS® *							AS/NZS 3679.1-350	20		
150 x 100 x 12 UA	300	1.00	102	110	35.3	38.2	340	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	360	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	340	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	340	1.00	94.6	104	28.3	31.1	12 UA
10 UA	320	0.973	70.6	81.8	21.2	25.2	360	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	360	0.836	51.2	67.5	15.4	21.0	8 UA
125 x 75 x 12 UA	300	1.00	68.6	70.5	20.6	21.2	340	1.00	9.79	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	360	1.00	9.09	57.2	15.2	17.2	10 UA
8 UA	320	0.964	39.8	46.0	11.9	14.3	360	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	360	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	360	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	360	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	360	716:0	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	360	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	360	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	360	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	360	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	360	1.00	10.6	11.2	4.40	4.67	6 UA
5 UA	320	100	776	707	3 23	3,68	360	100	7 59	764	3.17	3,68	A II A

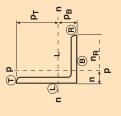
 ³⁰⁰PLUS" replaced Grade 250 as the base grade for 150 x 90 x 8 unequal angles and larger in 1994.
 300PLUS" replaced Grade 250 as the base grade for 125 x 75 x 12 unequal angles and smaller in 1997.
 300PLUS" hot rolled sections are produced to exceed the minimum requirements of AS/NZS 3679.1-300.

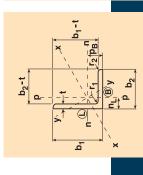
Notes 1. For 300PLUS* sections the tensile strength (fu) is 440 MPa. 2. For Grade 350 sections the tensile strength (fu) is 480 MPa.



מ

	Product of 2nd Designation	de 	106mm⁴	-2.27 150 x 10 0 x 12 UA	-1.85 10 UA		-1.89 12 UA				-1.05 x 75 x	-1.05 125 x 75 x -0.867	-1.05 x 75 x 75 x -0.867 -0.731 -0.731	1.05 × 75 × 75 × -0.867	1.05 125 x 75 x -0.867 -0.731 -0.575 -0.625 100 x 75 x	1.05 1.25 x 75 x -0.867	-1.05 125 x 75 x -0.867 -0.731 -0.575 -0.625 100 x 75 x -0.416	-1.05 125 x 75 x -0.867	-1.05 125 x 75 x -0.867	-1.05 125 x 75 x -0.867 -0.731 -0.575 -0.625 -0.528 -0.416 -0.174 75 x 50 x -0.140 -0.111	-1.05 125 x 75 x -0.867	-1.05 125 x 75 x -0.867
		<u>_</u> ª	n³ mm	0 28.6				5 25.3														
		ഗ്	m³ 10³mm³	9 56.0																		
	axis	Z_{pR}	10³mm³	30.9	24.9	32.0	25.0	20.2	16.8		16.9	16.9	16.9 13.7 11.4	16.9 13.7 11.4 8.89	16.9 13.7 11.4 8.89 13.4	16.9 13.7 11.4 8.89 13.4	16.9 13.7 11.4 8.89 13.4 11.1 11.1	16.9 13.7 11.4 13.8 13.4 11.1 11.1 4.86	16.9 13.7 11.4 8.89 13.4 11.1 11.1 14.86 3.84 3.84	16.9 13.7 11.4 11.4 13.4 11.1 11.1 11.1 11.1 3.84 3.84 3.84 3.84 3.00	16.9 13.7 11.4 11.4 13.4 11.1 11.1 11.1 11.1 12.0 13.00 3.00 4.78 4.78	16.9 13.7 11.4 11.4 13.4 11.1 11.1 11.1 11.1 12.0 13.00 3.00 4.78 4.78 3.74 4.78
	About p-axis	n "	mm	75.7	7.97	67.3	68.8	8.69	70.4	ì	9.96	56.6 57.5	56.6 57.5 58.2	56.6 57.5 58.2 59.0	56.6 57.5 58.2 59.0 55.6	56.6 57.5 58.2 59.0 55.6 56.3	56.6 57.5 58.2 59.0 55.6 56.3 57.1	56.6 57.5 58.2 59.0 55.6 56.3 56.3 37.2	56.6 57.5 58.2 59.0 55.6 56.3 57.1 37.2 37.9	56.6 57.5 58.2 59.0 55.6 56.3 56.3 37.2 37.2 37.9	56.6 57.5 58.2 59.0 55.6 56.3 57.1 37.2 37.2 37.2 37.2 37.2 38.5 36.4	56.6 57.5 58.2 59.0 55.6 56.3 57.1 37.2 38.5 36.4 36.4 37.1
		Z _{pL}	10³mm³	96.2	81.9	94.9	81.0	69.5	60.4	52.0	05.0	45.2	45.2	35.2 39.6 32.7	39.6 32.7 38.3	45.2 39.6 32.7 38.3 33.5	45.2 39.6 32.7 38.3 33.5 27.5	45.2 39.6 32.7 38.3 33.5 27.5 14.1	32.7 32.7 32.7 38.3 33.5 27.5 14.1 12.0	25.2 45.2 39.6 38.3 33.5 27.5 14.1 12.0	45.2 39.6 38.3 38.3 33.5 77.5 14.1 12.0	45.2 39.6 38.3 38.3 33.5 77.5 14.1 12.0 10.0
		น	шш	24.3	23.3	22.7	21.2	20.2	19.6	18.4		17.5	17.5	17.5 16.8 16.0	17.5 16.8 16.0	17.5 16.8 16.0 19.4 18.7	17.5 16.8 16.0 19.4 18.7	17.5 16.8 16.0 19.4 18.7 17.9	17.5 16.8 16.0 19.4 18.7 17.9 12.8	17.5 16.0 19.4 18.7 17.9 12.8 12.1	17.5 16.8 16.0 19.4 17.9 17.9 12.8 12.1 11.5	17.5 16.8 16.0 19.4 17.9 17.9 12.8 12.1 11.5 13.6
		_°	106mm⁴	2.34	1.91	2.15	1.72	1.41	1.18	0.958		0.789	0.789	0.789 0.664 0.524	0.789 0.664 0.524 0.743	0.789 0.664 0.524 0.743	0.789 0.664 0.524 0.743 0.626 0.494	0.789 0.664 0.524 0.743 0.626 0.494 0.181	0.789 0.664 0.524 0.743 0.626 0.494 0.181	0.789 0.664 0.524 0.743 0.626 0.494 0.181 0.115	0.789 0.664 0.524 0.743 0.626 0.494 0.181 0.181 0.115	0.789 0.664 0.524 0.743 0.626 0.494 0.181 0.185 0.115 0.115
		Ľ	mm	47.7	48.0	47.4	47.8	48.2	48.4	39.6		39.9	39.9	39.9 40.1 40.3	39.9 40.3 31.3	39.9 40.1 40.3 31.3 31.5	39.9 40.1 40.3 31.3 31.5 31.7	39.9 40.1 40.3 31.3 31.5 31.7 23.6	39.9 40.1 40.3 31.3 31.5 31.7 23.6 23.8	39.9 40.1 40.3 31.3 31.5 31.7 23.6 23.8 23.9	39.9 40.1 40.3 31.3 31.5 31.7 23.6 23.8 23.9 20.1	39.9 40.1 40.3 31.3 31.5 31.7 23.6 23.8 23.9 20.1
-		∾ ₋	10³mm³	117	94.0	145	114	91.5	76.0	77.3		62.5	62.5 52.0	62.5 52.0 40.6	62.5 52.0 40.6 41.3	62.5 52.0 40.6 41.3 34.4	62.5 52.0 40.6 41.3 34.4 26.9	62.5 52.0 40.6 41.3 34.4 26.9 18.5	62.5 52.0 40.6 41.3 34.4 26.9 18.5	62.5 52.0 40.6 41.3 34.4 26.9 18.5 14.6	62.5 52.0 40.6 41.3 34.4 26.9 18.5 14.6 11.4	62.5 52.0 40.6 41.3 34.4 26.9 18.5 14.6 11.1
		Z_{nT}	10³mm³	64.6	51.9	81.7	63.5	51.0	42.3	43.3		34.9	34.9	34.9 28.9 22.5	34.9 28.9 22.5 22.6	34.9 28.9 22.5 22.6 18.8	34.9 28.9 22.5 22.6 18.8 14.6	34.9 28.9 22.5 22.6 18.8 14.6	34.9 28.9 22.5 22.6 18.8 14.6 10.3	34.9 28.9 22.5 22.6 18.8 14.6 10.3 8.05 6.27	34.9 28.9 22.5 22.6 14.6 10.3 8.05 6.27 7.75	34.9 28.9 22.5 22.6 14.6 10.3 8.05 6.27 7.75
	About n-axis	$p_{_{\!\scriptscriptstyle T}}$	шш	101	102	97.5	0.66	100	101	81.7	1	82.7	82.7 83.5	82.7 83.5 84.3	82.7 83.5 84.3 68.2	82.7 83.5 84.3 68.2 68.9	82.7 83.5 84.3 68.2 68.9 69.7	82.7 83.5 84.3 68.2 68.9 69.7 49.8	82.7 83.5 84.3 68.2 68.9 69.7 49.8	82.7 83.5 84.3 68.2 68.9 69.7 49.8 50.6	82.7 83.5 84.3 68.2 68.9 69.7 49.8 50.6 51.2 43.9	82.7 83.5 84.3 68.2 68.9 69.7 49.8 50.6 51.2 43.9 44.6
		Z _{nB}	10³mm³	133	110	152	123	102	9.98	81.8		68.2	68.2 58.1	68.2 58.1 46.5	68.2 58.1 46.5 48.6	68.2 58.1 46.5 48.6 41.8	68.2 58.1 46.5 48.6 41.8 33.7	682 58.1 46.5 48.6 41.8 33.7 20.3	68.2 58.1 46.5 48.6 41.8 33.7 20.3	68.2 58.1 46.5 48.6 41.8 33.7 20.3 16.7	682 58.1 46.5 48.6 41.8 33.7 20.3 16.7 16.7	682 58.1 46.5 48.6 41.8 33.7 20.3 16.7 16.7 16.2
		Ъ	mm	49.1	48.1	52.5	51.0	50.0	49.2	43.3		42.3	42.3 41.5	42.3 41.5 40.7	42.3 41.5 40.7 31.8	42.3 41.5 40.7 31.8 31.1	42.3 41.5 40.7 31.8 31.1 30.3	42.3 41.5 40.7 31.8 31.1 30.3 25.2	42.3 41.5 40.7 31.8 31.1 30.3 25.2 24.4	42.3 41.5 40.7 31.8 31.1 30.3 25.2 24.4 23.8	42.3 41.5 31.8 31.8 31.1 30.3 25.2 24.4 24.4 23.8 21.1	42.3 41.5 40.7 31.8 31.1 30.3 25.2 24.4 23.8 21.1 20.4
,		<u>_</u> -c	106mm⁴	6.52	5.29	76.7	6.29	5.10	4.26	3.54	2 88	7.00	2.41	2.41 1.89	2.41	2.80 2.41 1.89 1.55	2.80 2.41 1.89 1.55 1.30	2.40 2.41 1.89 1.55 1.30 1.02	2.40 2.41 1.89 1.55 1.30 1.02 0.511 0.407	2.40 2.41 1.89 1.30 1.02 0.511 0.407 0.321	2.40 2.41 1.89 1.55 1.30 1.02 0.511 0.407 0.321 0.341	2.40 2.41 1.89 1.55 1.30 1.02 0.511 0.407 0.321 0.341 0.272
	Designation		mm mm mm	150 x 100 x 12 UA	10 UA	150 x 90 x 16 UA	12 UA	10 UA	8 UA	125 x 75 x 12 UA	ALI OI	5	8 UA	8 UA 6 UA	8 UA 8 UA 6 UA 100 x 75 x 10 UA	6 UA 6 UA 6 UA 100 × 75 × 10 UA 8 UA	8 UA 6 UA 100 × 75 × 10 UA 8 UA 6 UA	8 UA 8 UA 6 UA 100 × 75 × 10 UA 8 UA 6 UA 75 × 50 × 8 UA	8 UA 8 UA 100 × 75 × 10 UA 8 UA 6 UA 75 × 50 × 8 UA 6 UA	8 UA 6 UA 6 UA 100 × 75 × 10 UA 8 UA 6 UA 6 UA 6 UA	8 UA 8 UA 6 UA 100 × 75 × 10 UA 8 UA 6 UA 75 × 50 × 8 UA 6 UA 5 UA 5 UA	8 UA 8 UA 6 UA 100 × 75 × 10 UA 8 UA 6 UA 75 × 50 × 8 UA 6 UA 5 UA 6 UA 6 UA 6 UA 6 UA 6 UA







Structural Steel Sections

Structural Steel - Welded Sections - Standard: AS/NZS 3679.2:1996

Table 29 Chemical Composition - Welded Sections Base Plate

					Cast or	Product	Analysis	Percent					
Grade (1)	С	Si	Mn	Р	S	Cr (2)	Ni (2)	Cu (2)	Mo (2)	AI (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

1. The use of sulphide modification steelmaking techniques for listed grades is permitted.

2. Cr + Ni + Cu + Mo = 1.00% maximum apply.

3. Limits specified are for both acid soluble and total aluminium.

4. Carbon equivalent (CE) is calculated from the equation based on actual cast or product analysis:

 $CE = C + Mn + Cr + Mo + V + Ni + Cu \over 6 5 15$

5. Niobium plus vanadium: 0.030% maximum.

6. Vanadium: 0.10% maximum. Niobium plus vanadium plus titanium: 0.15% maximum.

Table 30 Tensile Properties - Welded Sections Base Plate

Property	Grade - AS	S/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 $5.65 \sqrt{\rm S_0}$	21	18

Note

1. $\,{\rm S_0}$ 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				orbed Energy, J Test Piece		
AS/NZS 3678		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	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 3679.1:1996

Table 32 Chemical Composition - Bars and Sections

Grade (see Note 1)			Cá	ast analys	is (max.) %	(See Notes 2 and 3)	
	С	Si	Mn	Р	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, 350L0	0.22	0.50	1.60	0.040	0.040	(see Note 7)	0.45

Notes

- 1. The use of sulfide modification steel making techniques for these grades is permitted.
- 2. 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.
- 3. 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%

4. For grade 300PLUS, the following are not considered as micro-alloying elements:

5. Carbon equivalent (CE) is calculated from the following equation:

CE = C + Mn + Cr + Mo + V + Ni + Cu6
5
15

- Micro-alloying elements are not permitted in grade 300 except for thicknesses greater than or equal to 15mm, where the following apply:
- (a) the maximum combined micro-alloying element content is 0.15%
- (b) 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	N	linimum yield stress, M	1Pa	Minimum tensile strength, MPa	Minimum elongation on a gauge length of 5.65√S ₀
	T	hickness, mm (see Not	e 1)	-	(see Note 2) %
	< 11	≥ 11 to ≤ 17	> 17 to < 40		
300PLUS®, 300PLUSL0	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, MP	a	Minimum tensile strength	Minimum elongation on a gauge length of
		Thickness, mm		•	5.65√S ₀
	≤ 50	> 50 to < 100	≥100	MPa	%
300PLUS®	300	290	280	440	22
350	340	330	320	480	20

Notes (apply to tables 33 and 34)

- 1. For a section, the term 'thickness' refers to the nominal thickness of the part from which the sample is taken.
- 2. So is the cross-sectional area of the test piece before testing.
- 3. For precise details of properties reference should be made to the latest edition of AS/NZS 3679.1:1996 or the latest OneSteel specification.
- 4. 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		Minimu	m Absorbed Ene	rgy, J Size of T	est Piece	
		10mm x	10mm	10mm x	7.5mm	10mm)	c 5mm
	°C	Average of 3 Tests	Individual Test	Average of 3 Tests	Individual Test	Average of 3 Tests	Individual Test
300PLUSL0, 350L0*	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	С		Si		Mn		Р		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		С	(Si	M	1n		Р		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 3679.1:1996 specification. See Tables 32 to 35. Other grades may be available on enquiry.

Table 38 OneSteel Grades

Steel Type	Grade	(С	(Si	M	ln		Р		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

Maximum Recommended Cross Section*									
Grade	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.

OneSteel Direct - free call 1800 1 78335

All customer service enquiries for OneSteel Market Mills products described in this publication should be directed to the OneSteel Direct free call service on 1800 1 STEEL (1800 1 78335).

OneSteel Direct provides a 'one stop shop' service for customers and users of steel requiring information on OneSteel Market Mills and its products. It is staffed by a centralised team of experienced personnel specialising in Technical, Sales, Marketing and Public Affairs knowledge.

OneSteel Direct's services include the following:

- Product and application technical support incorporating a network of expert OneSteel metallurgists, engineers and scientists located throughout Australia.
- Fast brochure and technical information mailout and facsimile services.
- Immediate referral service to approved OneSteel Market Mills distributors and service providers in your area.

OneSteel Direct's services are available Mon-Fri from 8.30am to 5.30pm (AEST)

- Freecall 1800 1 STEEL (1800 1 78335)
- Freefax 1800 101 141
- · E-mail onesteeldirect@onesteel.com
- International Telephone +61 2 4222 3456
- International Facsimile +61 2 4222 3434



Head Office

OneSteel Market Mills

PO Box 245C Newcastle NSW 2300 Telephone: (02) 4935 5555 Facsimile: (02) 4935 5490

OneSteel Market Mills Sales Offices

New South Wales

Cnr Milperra & Mons Roads, Revesby NSW 2212 PO Box 4664, Milperra NSW 1891 Tel: 1800 1 78335 Fax: (02) 9792 9094

Queensland

240 Bradman Street, Acacia Ridge QLD 4110 PO Box 300, Acacia Ridge QLD 4110 Tel: 1800 178335 Fax: (07) 3845 5609

South Australia & Northern Territory

519 Cross Keys Road, Cavan SA 5094 PO Box 21, Dry Creek SA 5094 Tel: 1800 1 78335 Fax: (08) 8260 9355

Victoria & Tasmania

219-229 St Albans Road, Sunshine VIC 3020 PO Box 5059, Sunshine VIC 3020 Tel: 1800 1 78335 Fax: (03) 8312 2650

Western Australia

53 Harrison Road, Forrestfield WA 6058 PO Box 611, Welshpool WA 6986 Tel: 1800 1 78335 Fax: (08) 6332 3132

New Zealand

Ground Floor, 485B Rosebank Road, Avondale, Auckland 1026 NZ PO Box 19335, Avondale, Auckland 1746 NZ Tel: (09) 820 4048 Fax: (09) 820 4292

Rail Sales & Marketing Office

OneSteel Whyalla Steelworks

38 Heath Street, Lonsdale SA 5160 PO Box 951 Morphett Vale SA 5162 Tel: (08) 8326 4601 Fax: (08) 8326 3461





ONESTEEL DIRECT

Freecall 1800 178 335
Website www.onesteel.com
Freefax 1800 101 141
Email onesteeldirect@onesteel.com



This publication has been prepared by OneSteel Market Mills, an operating business group of which OneSteel Manufacturing Pty Limited ABN 42 004 651 325 is a part. Please note that any specifications or technical data referred to in this publication are subject to change and/or variation or improvement without notice and no warranty as to their suitability for any use is made. Users of this publication, to ensure accuracy and adequacy for their purposes, are requested to check the information provided in this publication to satisfy themselves as to its appropriateness and not to rely on the information without first doing so. Unless required by law, the company cannot accept any responsibility for any loss, damage or consequence resulting from the use of this publication. Photographs shown are representative only of typical applications, current at January 2010. This brochure is not an offer to trade and shall not form any part of the trading torms in a nutrangeating.

trade and shall not form any part of the trading terms in any transaction.

© Copyright 2003-2010 OneSteel Manufacturing Pty Limited. 300PLUS® is a registered trademark of OneSteel Manufacturing Pty Limited. LiteSteel™ is trademark of LiteSteel Technologies Pty Ltd ABN 65 113 101 054. Issue 5, February 2010 BS0184

DISTRIBUTED BY