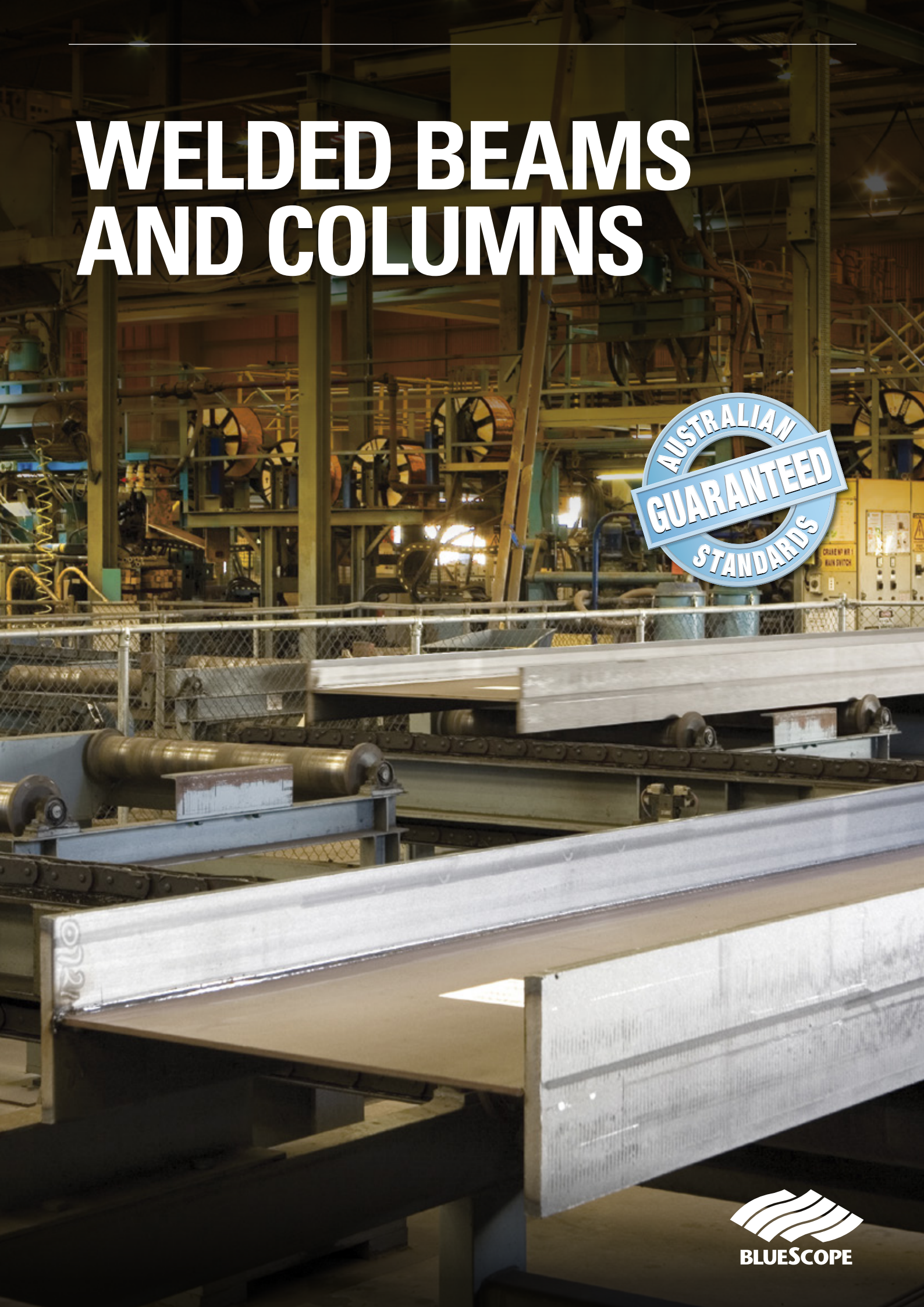
WELDED BEAMS AND COLUMNS



BLUESCOPE

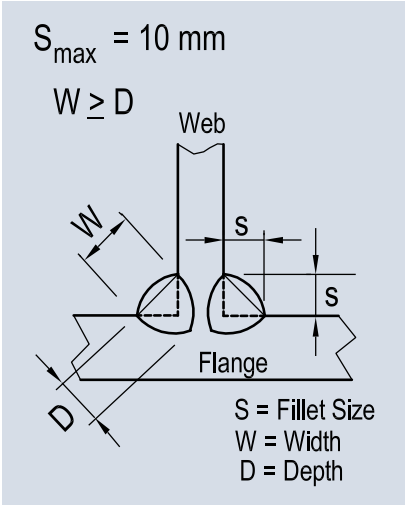
WELDED BEAMS AND COLUMNS

Welded beams and columns are available in a range of sizes typically for the heavier end of engineering construction, buildings, mining infrastructure and transport. Manufactured by BlueScope to Australian Standard AS/NZS 3679.2:2010 under a strict quality system to Australian Standard AS/NZS ISO 9002:1994.

WELDS

Welds are made using a fully automatic submerged arc welding process to AS/NZ1554.1 SP Category (deep penetration fillet weld). Welds are made simultaneously along both flange-web joints in the horizontal fillet position. A tandem are weld system is used to make each weld; fed into both arc areas are two relatively small diameter wires. The two wires are close enough together so that they operate under a common molten pool of flux, yet are far enough apart that the metal from the first arc has solidified before the metal from the second arc is deposited on top. This technique has several benefits including:

- The lead wire is designed to give deep penetration, while the second is designed to build up throat thickness and provide a consistent, uniform weld profile.
- Relatively thick joints are produced in a single pass without edge preparation and minimal heat distortion.
- Welds made under the protective layer of flux have good ductility, impact resistance and uniformity in appearance.
- Mechanical properties at least equal to those of the parent metal are consistently obtained.



GRADES

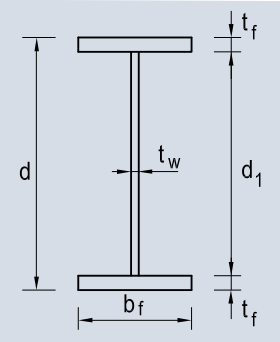
Welded Beams are available in standard grades:

- AS/NZS3679.2 300
- AS/NZS3679.2 400
- AS/NZS3679.2 300L15
- AS/NZS3679.2 400L15

Special Grades available by enquiry include:

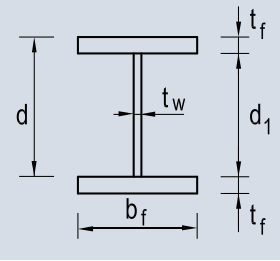
- AS/NZS3678 250
- AS/NZS3678 350
- Weathering Grades

DIMENSIONS



Welded Beams

Designation		Depth of Section	Flange		Web thickness	Depth between flanges	Weld size	Design Capacity of Joint	
			Width	Thickness				300PLUS	400 Grade
		d	b_f	t_f	t_w	d_1	S	Øvwj	Øvwj
	kg/m	mm	mm	mm	mm	mm	mm	kN/mm	kN/mm
1200WB	455	1200	500	40	16	1120	8	5.50	6.14
	423	1192	500	36	16	1120	8	5.50	6.14
	392	1184	500	32	16	1120	8	5.50	6.14
	342	1184	400	32	16	1120	8	5.50	6.14
	317	1176	400	28	16	1120	8	5.50	6.14
	278	1170	350	25	16	1120	8	5.50	6.14
	249	1170	275	25	16	1120	8	5.50	6.14
1000WB	322	1024	400	32	16	960	8	5.50	6.14
	296	1016	400	28	16	960	8	5.50	6.14
	258	1010	350	25	16	960	8	5.50	6.14
	215	1000	300	20	16	960	8	5.50	6.14
900WB	282	924	400	32	12	860	6	4.13	4.61
	257	916	400	28	12	860	6	4.13	4.61
	218	910	350	25	12	860	6	4.13	4.61
	175	900	300	20	12	860	6	4.13	4.61
800WB	192	816	300	28	10	760	6	3.44	3.84
	168	810	275	25	10	760	6	3.44	3.84
	146	800	275	20	10	760	6	3.44	3.84
	122	792	250	16	10	760	6	3.44	3.84
700WB	173	716	275	28	10	660	6	3.44	3.84
	150	710	250	25	10	660	6	3.44	3.84
	130	700	250	20	10	660	6	3.44	3.84
	115	692	250	16	10	660	6	3.44	3.84



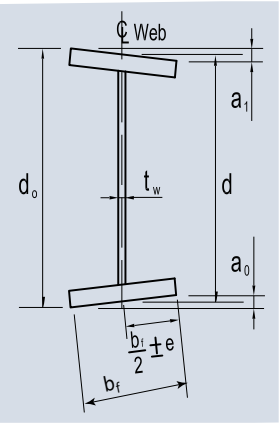
Welded Columns

Designation		Depth of Section	Flange		Web thickness	Depth between flanges	Weld size	Design Capacity of Joint	
			Width	Thickness				300PLUS	400 Grade
		d	b_f	t_f	t_w	d_1	S	Øvwj	Øvwj
	kg/m	mm	mm	mm	mm	mm	mm	kN/mm	kN/mm
500WC	440	480	500	40	40	400	8	5.50	6.14
	414	480	500	40	32	400	8	5.50	6.14
	383	472	500	36	32	400	8	5.50	6.14
	340	514	500	32	25	450	8	5.50	6.14
	290	506	500	28	20	450	8	5.50	6.14
	267	500	500	25	20	450	8	5.50	6.14
	228	490	500	20	20	450	8	5.50	6.14
400WC	361	430	400	40	40	350	8	5.50	6.14
	328	430	400	40	28	350	8	5.50	6.14
	303	422	400	36	28	350	8	5.50	6.14
	270	414	400	32	25	350	8	5.50	6.14
	212	400	400	25	20	350	8	5.5	6.14
	181	390	400	20	20	350	8	5.5	6.14
	144	382	400	16	16	350	8	5.5	6.14
300WC	280	355	350	40	28	275	8	5.50	6.14
	258	347	350	36	28	275	8	5.50	6.14
	230	339	350	32	25	275	8	5.50	6.14
	197	331	350	28	20	275	8	5.50	6.14

STANDARD LENGTHS

Standard Lengths (metres)									
Section	<9	9	10.5	12	13.5	15	16.5	18	>18
Welded Beams 700WB-1200WB	By enquiry	•	•	•	•	•	•	•	By enquiry
Welded Columns 350WC-500WC	By enquiry	•	•	•	•	•	•	•	By enquiry

Custom Lengths available in 10mm increments.

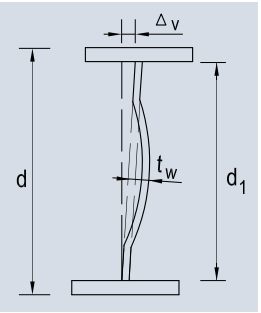


TOLERANCES

Dimensional Tolerances

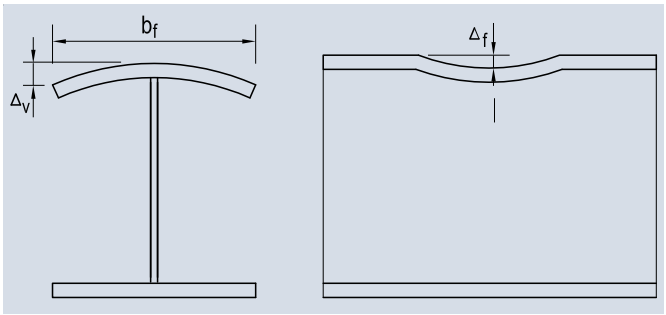
Designation	Permissible variation of depth d mm	Permissible variation of flange width b_f mm	Permissible out-of-square on each flange a_1 or a_0 mm	Permissible Total out-of-square a_1+a_0 mm	Permissible web off-centre e mm
Beams					
1200WB	±4.0	+6.0 to -5.0	±5.0	±8.0	±5.0
1000WB	±3.3				
900WB, 800WB, 700WB	±3.0				
Columns					
500WC, 400WC, 350WC	±3.0	+6.0 to -5.0	±5.0	±8.0	±5.0

1. Dimensions d_0, d, a_1 and a_0 are measured parallel with the centreline of the web. Dimensions b_f and $b_f/2 \pm e$ are measured parallel with the plane of the flange.
2. Dimension d is measured at the centreline of the web.



◀ Tolerances on a Web

Tolerances on a Flange ▶



Tolerances on a Web

Out-of Flatness (Δw)	Deviation from verticality of a Web (Δv)	
$\frac{d_1}{150}$	d ≤ 900mm	±3mm
	d > 900mm	$\pm\left(\frac{d}{300}\right)$ mm

Tolerances on a Flange

Out-of Flatness (Δf)	
$b_f \leq 450$mm	$\pm\left(\frac{b_f}{150}\right)$ mm
$b_f > 450$mm	±3mm

Straightness Tolerances

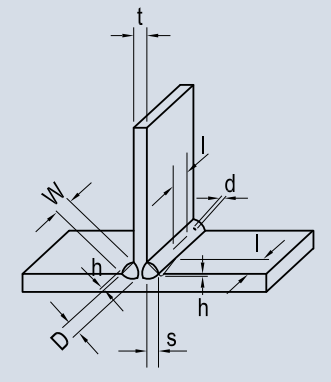
Nominal size	Sweep*/Camber
Beams	$\frac{\text{Length}}{1000}$ mm
Columns	
≤14m	$\frac{\text{Length}}{1000}$ mm, but not more than 10mm
>14m	10mm + $\frac{\text{Length (mm)} - 1400}{1000}$

Length Tolerance

Out-of Flatness (Δf)		
Specified Length	Permissible variation from specified length (mm)	
Metres	Under	Over
All Sections	Nil	50

* Owing to the extreme variation in the elastic flexibility of welded sections about the y-axis, difficulty may be experienced in obtaining reproducible sweep measurements.

WELD TOLERANCES



l = Length or maximum dimension of individual imperfection measured parallel to axis of weld

Σ_l = sum of lengths of imperfections in stated weld length

h = height (depth) of imperfection

t = thickness of (thinner) parent material

d = size of pore

S = size of fillet weld

Imperfection			Maximum allowable dimension or number of imperfections
Type	Parameter	Symbol	SP
Cracks	Length	l	No cracks allowed
	Cumulative length	Σ_l	
Lack of Fusion or incomplete penetration	Length	l	Where located more than 3t from end of weld, 2t/3 but not greater than 20mm. Where located within 3t of end of weld, 3mm
		Σ_l	t in 6t length but proportionally less for shorter length
Undercut-continuous *(see note 1)*	Depth	h	t/20 but not greater than 1mm
Undercut-intermittent *(see note 1)*	Depth	h	t/10 but not greater than 1.5mm
Shrinkage Groves Root Concavity	–	–	As for undercut
Overlap	Length	l	t, but not greater than 10mm
	Cumulative length	Σ_l	30mm in 300mm but not proportionally less for shorter lengths
Toe Shape (other than above)	–	–	Suitable to permit required NDE
Porosity surface pores	Size of pore	d	t/3, but not greater than 5mm
	No. of Pores	–	2 per 12t length
Loss of cross sectional area *(see note 2)*	Loss of area	–	≤ 5%
Reinforcement	Height	h	For S ≤ 12mm...2mm
Undersized intermittent *(see note 3)*	Leg Length	S	S/10, but not greater than 3mm

Notes:
1. Undercut less than 0.5mm in depth should be disregarded.
2. For calculation of the loss of cross-sectional area, internal imperfections are estimated from the macro test specimen.
3. The cumulative length of intermittent undersize fillet welds shall not exceed 10% of the length of the weld.

PRE CAMBER

Pre camber sections are available by enquiry in 5mm increments from 10mm up to the maximums listed below. Pre camber is achieved by cutting the required camber into the web prior to welding and eliminates the potential for increased stresses as a result of cambering post the welding process. The tolerances achieved are ±10mm.

Section	Maximum Camber (mm)		
	12–15m	15.1–18m	18.1 – 30m
700WB, 800WB, 900WB175, 218	60	60	70
900WB257	60	60	60
900WB282, 1000WB215, 258, 269	50	60	60
1000WB322	40	50	50
1200WB249, 278, 317	40	40	50
1200WB342, 392	30	40	50
1200WB423, 455	30	40	40
350WC197, 230	50	60	60
350WC258, 280	40	40	40
400WC144, 181, 212, 270	50	60	60
400WC303, 328, 361	40	40	40
500WC228, 267, 290, 340	50	60	60
500WC383, 414, 540	40	40	40

For more information and support

1800 800 789

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