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The
Preferred
Global Steel Standard
for
Welded Structures

Welded Beams and Columns



Gsteels Branded structures aims to be the Global Steel Standard for welded structures. Gayathri has recognized the need for custom made structures through its large and loyal customer base. Traditional hot rolled beams and columns do not provide the flexibility for some customers who desire flexibility in design, weight and delivery time frames.

Gsteels branded welded beams and columns provides several key advantages to customers.

Unlimited Variation in Design

GSteels branded welded structures are produced using steel plates to form a web and two flanges. Limitations on web and flange thicknesses are only limited to the availability of plate thicknesses in the market. This therefore, provides our customers with unlimited variations in design subject to application and fabrication limitations.

Weight and Cost Advantage.

GSteels branded welded structures also provides a weight advantage from hot rolled beams and columns as the plates used in welded structures can be picked to suit customer weight requirements and therefore translate into cost advantages.

Adherence to Globally Recognized Quality Standards.

Gsteels branded beams and columns are produced according to AS/NZS 3679.2:1996, which specifies requirements for welded I sections for general structural and engineering functions including functions that may require the handling of dynamic and other special loads.

Gayathri ensures that an initial batch of an order is tested for compliance using a reputable third party inspection service such as SGS prior to moving towards full production.

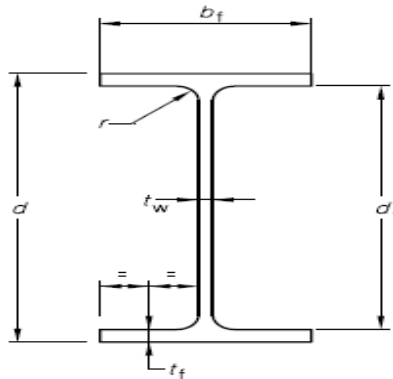
Shorter Delivery Time Frames.

One of the key advantages however, is Gayathris ability to deliver structures in a shorter time frame and smaller quantities than standard mill rolled sections.

Some Applications

- 1 Prefabricated Housing
- 2 Low Rise Warehouses
- 3 Trailer Chassis
- 4 Transmission Towers
- 5 Bridges

General Specifications



Fabrication Limits:Dimensions

Minimum Limits				Maximum Limits			
d	b_f	t_f	t_w	d	b_f	t_f	t_w
mm	mm	mm	mm	mm	mm	mm	mm
250	150	6	6	1200	600	40	40

Due to fabrication limitations and safety requirements, we can accept custom heights between 250mm to 1200mm, custom widths between 150mm to 600mm, web and flange thickness between 6mm to 40mm. Web and flange thicknesses are also further limited to the availability of plate sizes in the market.

Fabrication Limits:Lengths

t_f or t_w	t_f or t_w
<20mm	>=20mm
12M	11M

For web and flange thicknesses below 20mm, the maximum length will be 12 meters on a single run. For web and flange thicknesses equal to or above 20mm, the maximum length will be 11 meters on a single run. However, longer lengths can be accommodated by welding together required lengths.

Raw Material Specifications

TYPE	GRADES	TENSILE	YIELD
		MPA	MPA
PLATES	Q235B	375	235
PLATES	Q345B	470	345
PLATES	G250	410	230
PLATES	G350	450	340

If the customer requires different tensile and or yield requirements than shown above, the required grades can be sourced in the market subject to availability.

Production Sizes for Welded Beams- Example

1	2	3	4	5	6
Designation	Depth of section d	Flange		Web thickness t _w	Depth between flanges d ₁
		Width b _f	Thickness t _f		
kg/m	mm	mm	mm	mm	mm
1200 WB 455	1 200	500	40.0	16.0	1 120
423	1 192	500	36.0	16.0	1 120
392	1 184	500	32.0	16.0	1 120
342	1 184	400	32.0	16.0	1 120
317	1 176	400	28.0	16.0	1 120
278	1 170	350	25.0	16.0	1 120
249	1 170	275	25.0	16.0	1 120
1000 WB 322	1 024	400	32.0	16.0	960
296	1 016	400	28.0	16.0	960
258	1 010	350	25.0	16.0	960
215	1 000	300	20.0	16.0	960
900 WB 282	924	400	32.0	12.0	860
257	916	400	28.0	12.0	860
218	910	350	25.0	12.0	860
175	900	300	20.0	12.0	860
800 WB 192	816	300	28.0	10.0	760
168	810	275	25.0	10.0	760
146	800	275	20.0	10.0	760
122	792	250	16.0	10.0	760
700 WB 173	716	275	28.0	10.0	660
150	710	250	25.0	10.0	660
130	700	250	20.0	10.0	660
115	692	250	16.0	10.0	660

FIGURE 1 WELDED BEAMS

The sizes shown above are based on sizes specified under AS NZS 3679.2-1996 Structural steel - Welded I sections. However Gayathri can produce any number of variations subject to fabrication limitations and the availability of the required plate sizes in the market.

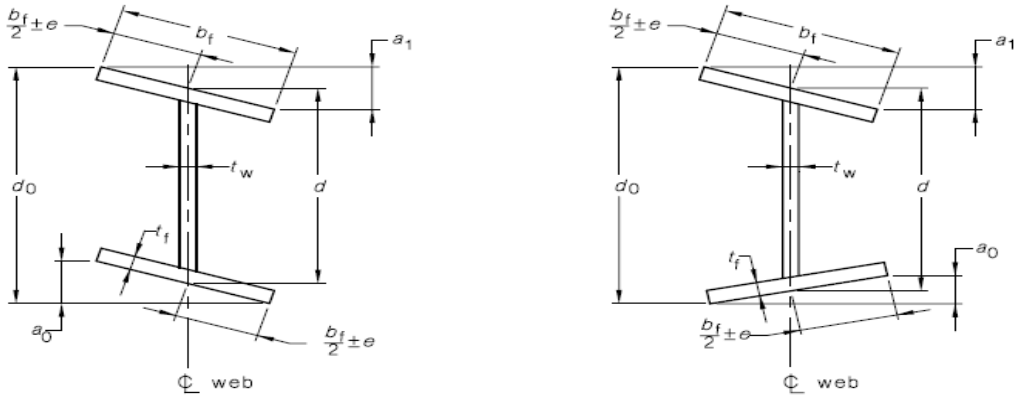
Production Sizes for Welded Columns- Example

1	2	3	4	5	6
Designation	Depth of section d	Flange		web thickness t _w	Depth between flanges d ₁
		Width b _f	Thickness t _f		
kg/m	mm	mm	mm	mm	mm
500 WC 440	480	500	40.0	40.0	400
414	480	500	40.0	32.0	400
383	472	500	36.0	32.0	400
340	514	500	32.0	25.0	450
290	506	500	28.0	20.0	450
267	500	500	25.0	20.0	450
228	490	500	20.0	20.0	450
400WC 361	430	400	40.0	40.0	350
328	430	400	40.0	28.0	350
303	422	400	36.0	28.0	350
270	414	400	32.0	25.0	350
212	400	400	25.0	20.0	350
181	390	400	20.0	20.0	350
144	382	400	16.0	16.0	350
350 WC 280	355	350	40.0	28.0	275
258	347	350	36.0	28.0	275
230	339	350	32.0	25.0	275
197	331	350	28.0	20.0	275

FIGURE 2 WELDED COLUMNS

The sizes shown above are based on sizes specified under AS NZS 3679.2-1996 Structural steel - Welded I sections. However Gayathri can produce any number of variations subject to fabrication limitations and the availability of the required plate sizes in the market.

Permissible Tolerances



- 2 Permissible Variation of Depth
- 3 Permissible Variation of Width
- 4 Permissible Variation of out of Square on each flange
- 5 Permissible Variation of out total out of Square
- 6 Permissible Variation of web off center

1	2	3	4	5	6
Designation	d	b _f	a ₁ or a ₀	a ₁ + a ₀	e
kg/m	mm	mm	mm	mm	mm
1200 WB 455	±4.0	+6.0 -5.0	±5.0	±8.0	±5.0
423					
392					
342					
317					
278					
249					
1000 WB 322	±3.3	+6.0 -5.0	±5.0	±8.0	±5.0
296					
258					
215					
900 WB 282	±3.0	+6.0 -5.0	±5.0	±8.0	±5.0
257					
218					
800WB 192	±3.0	+6.0 -5.0	±5.0	±8.0	±5.0
168					
146					
122					
700 WB 173	±3.0	+6.0 -5.0	±5.0	±8.0	±5.0
150					
130					
115	±3.0	+6.0 -5.0	±5.0	±8.0	±5.0
115					

FIGURE 3 PERMISSIBLE VARIATIONS IN CROSS - SECTIONAL DIMENSIONS FOR WELDED BEAMS

1	2	3	4	5	6
Designation	d	b _f	a ₁ or a ₀	a ₁ + a ₀	e
kg/m	mm	mm	mm	mm	mm
500 WC 400	±3.0	+6.0 to -5.0	±5.0	±8.0	±5.0
414					
383					
340					
290					
267					
228					
440 WC 361					
328					
303					
270					
212					
181					
144					
350 WC 280					
258					
230					
197					

FIGURE 4 PERMISSIBLE VARIATIONS IN CROSS - SECTIONAL DIMENSIONS FOR WELDED COLUMNS

The Tolerances specified for dimensions above are based on the tolerances specified under AS NZS 3679.2-1996 Structural steel - Welded I sections. If the customer requires sizes different from the sizes specified in the standard, the tolerances will follow the closest size shown in standard.

FIGURE 4 PERMISSIBLE VARIATIONS IN CROSS - SECTIONAL DIMENSIONS FOR WELDED COLUMNS

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

FIGURE 5 TOLERANCE ON A WEB

Out - of - flatness (Δf)	
mm	
b _f ≤ 450	$\pm \left[\frac{b_f}{150} \right]$
b _f > 450	±3

FIGURE 6 TOLERANCE ON A FLANGE

The Web and flange thicknesses tolerances will follow AS NZS 1365-1996 - which specifies Tolerances for flat-rolled steel products where G250 and G350 plates are used. The tolerances are shown below.

		millimetres
Specified thickness		Thickness tolerance, plus or minus
	≤1.60	0.16
>1.60	≤2.00	0.18
>2.00	≤2.50	0.19
>2.50	≤3.00	0.21
>3.00	≤4.00	0.23
>4.00	≤5.00	0.25
>5.00	≤6.00	0.27
>6.00	≤8.00	0.29
>8.00	≤10.00	0.32
>10.00	≤13.00	0.36

NOTE: Thickness is measured at a distance of not less than 10 mm from a trimmed edge or not less than 25 mm from an untrimmed edge.

Where other grade plates are used, the tolerances will be specified at the time of offer.

Welding Information

The beams and columns will be welded using complete penetration submerged automatic arc double sided welding.

As part of Gayathris focus on quality , the following test reports shall be provided to our customers.

- 1 Non Destructive Testing Report
- 2 Radiographic Testing Report
- 3 Magnetic Particle Testing Report
- 4 Hardness Test Report
- 5 Metallographic Test Report
- 6 Mechanical Testing Report
 - 6.1 Tensile Test
 - 6.2 Impact Test
 - 6.3 Bend Test
 - 6.4 Hardness test
- 7 Mill Test Certificates for the plates used in the welded structures.

Inquiry Requirements

In order to provide an accurate quote, inquiries should contain the following information.

- 1 HEIGHT IN MM- (FLANGE)
- 2 WIDTH IN MM (WEB)
- 3 THICKNESS OF WEB IN MM
- 4 THICKNESS OF FLANGE IN MM
- 5 KG PER PIECE OR METER REQUIRED
- 6 MIN YIELD AND OR TENSILE STRENGTHS REQUIRED.
- 7 USAGE OF WELDED STRUCTURE.
- 8 QTY IN PIECES
- 9 DELIVERY TIME FRAME
- 10 ANY SPECIAL TESTING REQUIREMENTS IF ANY.
- 11 VALUE ADDITIONS SUCH AS
 - 11.1 BLASTING AND PRIMING REQUIREMENTS
 - 11.2 GALVANIZING REQUIREMENTS.
 - 11.3 DRAWINGS FOR CUT OUTS ETC