

Data sheet: E1.1

I-sections (Taper Flange)

Hot rolled, weldable structural steel sections

General description

ArcelorMittal Steel South Africa, Newcastle Steel produces an extensive range of structural I-sections (taper and parallel flanges).

The geometry of I-sections complies with either DIN 1025/1965 or BS 4 Part 1: 1993 and the geometry of metric channel sections to DIN 1026: 1963. Sections not listed in any mentioned specifications, are supplied as ArcelorMittal Steel South Africa sections and rolled to SPE 230 tolerance. Steel for structural sections is normally produced to SANS 50025/EN10025 grade S 355 JR and BS 4360 grade 43A. Other grades, including the other grades in SANS 50025/EN 10025 and BS 4360, are available on enquiry.

For improved atmospheric corrosion resistance, COR-TEN[®] A² should be used.

"The South African Steel Construction Handbook", published by the South African Institute of Steel Construction, should be consulted for section properties.

1 See also data sheet: COR-TEN[®] (file reference E6.1)

Quality assurance

Quality assurance systems based on the requirements of SANS ISO 9001: 2000 are in operation.

Weldability

The above-mentioned structural steel grades may be welded using any of the standard metal arc and resistance welding processes, usually without any special precautions. However, when welding heavy sections, BS 5135: 1984 "Metal-arc welding of carbon and carbon manganese steels" should be consulted to determine preheat requirements at low heat inputs.

Protective coatings

When choosing a rust prevention method for a steel component or structure many technical factors including the environment, stress during transport, storage, fitting or erection must be considered. Adequate preparation of the substrate is of vital importance to the ultimate success of the coating, as is the method of application. Paint, hot-dip galvanizing or duplex coatings (zinc plus paint) can be specified for corrosion protection, depending on the aggressiveness of the environment. Choice of the protective mechanism is considered to be the responsibility of the specifier, fabricator or end user.

Surface quality

Surface defects up to a maximum depth of 3% of the nominal thickness shall not be considered as a reason for rejection.

Larger surface defects may be removed, providing the nominal thickness is not reduced by more than 7%.

Applications

I-sections and taper-flanged channel sections can be used for a wide range of structural elements, from lightweight purlins to columns and beams for industrial and multi-storey structures and bridges.

The sections listed may be ordered to conform to the mechanical requirements of any of the international specifications listed. Other sections, lengths, grades and tolerances may be available on enquiry.

For further information, contact:

ArcelorMittal South Africa Limited, Newcastle Works, PO Box 2, Newcastle 2940. Tel (034) 314-8629 Fax (034) 314-8211
e-mail address: enquiries.newcastle@arcelormittal.com

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Steel specifications (mechanical properties)

Specification	Code	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation	Impact Test
SANS 50025/EN 10025:1993 S355JO	101 008	490 - 630	355 min ≤ 16 mm 345 min >16 ≤63 mm	22% min on $5,65\sqrt{S_o}^1$	27J at 0° C
ASTM A36 - 93A	371 002	402 - 550	250 min	20% min	-
BS 4360 Gr 50B	475 002	490 - 640	355 min ≤ 16 mm 345 min >16 ≤30 mm	20% min on $5,65\sqrt{S_o}^1$	27J at 20° C
BS 4360 Gr 50C	859 008	490 - 630	355 min ≤ 16 mm 345 min >16 ≤63 mm	22% min on $5,65\sqrt{S_o}^1$	27J at 0° C
BS 4360 Gr 55C	155 001	550 - 700	450 min ≤ 16 mm 430 min > 16 mm	19% min on $5,65\sqrt{S_o}^1$	27J at 0° C
DIN17100 RST 37/2	171 001	340– 470>2,5mm 360– 510≤2,5mm	235 min ≤ 16 mm 225 min > 16≤40 mm	26% min on $L_o = 5D_o$	-
DIN17100 RST 44/2	554 002	410 - 540	275 min ≤ 16 mm 265min>16≤40mm 255min>40≤63mm	22% on 3-40mm 21% on 41-63mm	27J at 20° C
DIN17100 RRST 52/3	474 008	490 - 630	355 min ≤ 16 mm 345 min > 16≤63 mm	22% min on $L_o = 5D_o$	27J at 20° C
⊗ COR-TEN®A	124 001	480 min ≤ 12,7mm 460min >12,7≤38	345 min ≤ 12,7mm 315 min > 12,7≤38mm	22% min ≤ 12,7mm 21% min 12,8 ≤ 38mm	-
SANS 50025/EN 10025 S275JR	064 002	410-560 (3-100mm) 430-580 ≤ 2,5mm	275 min ≤ 16 mm 265min>16≤40mm 255min>40≤63mm 245min>63≤100mm	22% on 3-40mm 21% on 41-63mm 20% on 64-100mm	27J at 20° C
SANS 50025/EN 10025 S235JR (Thickness: ≤25 mm)	016 001	340 - 470	235 min ≤ 16 mm 225min>16mm≤40mm	26% min on $L_o = 5D_o$	27J at 20° C
SANS 50025/EN 10025 S355JR (Thickness: ≤ 30mm)	078 678	490 - 630	355 min ≤ 16 mm 345 min > 16≤30mm	22% min on $L_o = 5D_o$	27J at 20° C
Commercial Quality	250 555	C,30x	with CE = 0,51max CE=C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15		

1 S_o = original cross-sectional area.

⊗ Non-standard quality - available on enquiry only.

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Steel specifications to chemical analysis (mechanical properties as per international specifications)

Specification	Code	C	Mn	P	S	Si	Al
Commercial Quality *	250 555	0,30	-	-	-	-	-
SANS 50025/EN 10025/ 1993 S275JR	064 002	0,21	1,50	0,03	0,045-	-	-
SANS 50025/EN 10025/ 1993 S235JR	016 001	0,17	1,40	0,03	0,045-	-	-
SANS 50025/EN 10025/ 1993 S235JRG2	090 001	0,17	1,40	0,03	0,045-	-	-
SANS 50025/EN 10025/ 1993 S355JR	078 678	0,20	1,50	0,04	0,045	0,4	-
DIN 17100/1980 RST 37/2	171 001	0,17	1,40	0,03	0,045-	-	-
DIN 17100/1980 RST 44/2	554 002	0,21	1,50	0,03	0,045-	-	-
DIN 17100/1980 RRST 52/3	474 008	0,18	1,50	0,035	0,035	0,50	0,02/ 0,06#
ASTM A36-93A	371 002	0,22	1,50	0,03	0,04	0,35	-
ASTM A572-93 Gr50	772 002	0,20	1,50	0,04	0,045	0,4	-

All values maximum unless otherwise stated

** Supplied to chemical analyses only.*

Nb = 0,003/0,10

Steel grades

Note: The tables of steel grades are not intended to be lists of equivalent grades. They are merely lists of generically similar steel grades available in each geographic region.

Certification:

Test and analysis certificates are supplied for all steel ordered to international specifications. The mechanical and chemical laboratories of ArcelorMittal Steel South Africa, Newcastle Steel are SANAS accredited facilities.

Americas	European Community	Pacific Rim
3.1 structural steel		
3.1.1 Standard grades Lower strength (for workability and weldability)		
	EN 10 025 S235JR	
	DIN 17100 RST 37-2	
Normal strength (for general use)		
ASTM A 36 - 93A	EN 10 025 S275JR	JIS G 3101 SS400
	DIN 17100 RST 44-2	
Higher strength micro-alloyed steel		
ASTM A 572 Gr 50	EN 10 025 S355JR/JO	
	DIN 17100 RRSt 52-3	
	BS 4360: 1986 Gr 50B/C	
3.1.2 Weathering steel - for improved atmospheric corrosion resistance		
Available on enquiry		

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Sizes and tolerances

The following sections can be ordered in lengths from 6m up to 13 metres in increments of 100 mm. The availability of lengths less than 6m will be considered on enquiry.

I-Sections taper flanged to BS 4 Part 1: 1993

Designation	Dimensions and tolerances (mm)							
	kg/m	Depth		Width #	Web #	Flange #	Root # radius	Toe # radius
		nom.	var.	nom.	nom.	nom.		
102 x 44	7,457	101,6	-0,8 +3,2	44,5	4,3	6,1	6,9	3,3
⊗ 127 x 76	16,548	127	-0,8 +3,2	76,2	5,6	9,6	9,4	4,6

⊗ *Non-standard profile - available on enquiry only.*

Typical values

I-Sections taper flanged to SPE 230

Designation	Dimensions and tolerances (mm)							
	kg/m	Depth		Width #	Web #	Flange #	Root # radius	Toe # radius
		nom.	var.	nom.	nom.	nom.		
102 x 57	6,081	101,6	-0,8 +3,2	57,15	3,5	3,61	6,9	2,0
⊗ 127 x 76	16,548	127	-0,8 +3,2	76,2	4,5	7,6	7,9	2,4
⊗ 152 x 89	17,119	152,4	-0,8 +3,2	88,9	4,9	8,3	7,9	2,4
⊗ 178 x 102	21,433	177,8	-0,8 +3,2	101,6	5,3	9,0	9,4	3,2
⊗ 203 x 102	25,322	203,2	-0,8 +3,2	101,6	5,8	10,4	9,4	3,2

⊗ *Non-standard profile - available on enquiry only.*

Typical values

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