Data sheet: E2.2

Channels (Parallel Flange)

Hot rolled, weldable structural steel sections

General description

ArcelorMittal Steel South Africa, Newcastle Steel[1] produces an extensive range of structural steel I-sections, channels and angles.

In order to enhance the cost-effectiveness of the usage of steel, ArcelorMittal Steel South Africa is continuously involved in new product evaluation and development. Parallel Flange Channels (PFCs) have been developed to replace the older taper flange channels, utilising modern rolling facilities and techniques. The evolution of PFCs from taper flange channels is identical to the development of parallel flange I- and H-sections from the old taper flange sections.

PFCs have parallel flanges instead of the tapered flanges of DIN 1026: 1963 channel sections. With PFCs, material is spread further from the principal axes, resulting in better utilization and accordingly, a reduction in linear mass. PFCs have the same external dimensions as the DIN 1026 channels and section properties about the x-x-axis are virtually identical to those of taper-flange channels. However, due to optimisation in section design, the linear mass of PFCs is lower than that of the old sections and considerably improved section properties are obtained about the y-y-axis. This offers an enhanced load-carrying capacity, as higher design stresses can be used.

Other advantages of PFC-sections include the use of standard instead of tapered washers for bolted connections, fixing of bracing elements to the inner flange surfaces for built-up columns and beams and simplified connection detail.

For section properties and design information consult the “South African Steel Construction Handbook” as published by the South African Institute of Steel Construction.

Steel grades

Steel for structural sections is normally produced to SANS 50025 grade S355 JR. Other SANS 50025/EN 10025 grades with impact test requirements as well as steel to other international standards such as BS 4360, DIN 17100 and ASTM A36 are available on enquiry.

For improved atmospheric corrosion resistance, COR-TEN® A or COR-TEN® B[2] should be used.
COR-TEN® A is used where flanges are up to and including 12,7mm thick, and COR-TEN® B where this thickness is exceeded.

1 See data sheet: COR-TEN® *(file reference E6.1).*

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

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. For guidance on welding these products consult the "South African Steel Construction Handbook" as published by the South African Institute of Steel Construction.

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.

Applications
PFC-sections can be used for all applications where taper flange channels are used, i.e. for beams and columns, purlins, chassis structures and other fabrications.

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%.

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

Available sections
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

Mechanical properties

	Grade	Tensile strength MPa		Yield strength (min) MPa				Elongation, (min) %		Charpy V-notch impact test (10mm x 10mm test piece)	
				Thickness *t* (mm)				Gauge length		Impact resistance (min) J[2]	Test temperature C
		<3mm	3 ≤ t ≤ 100	t ≤ 16	16 ≤ t ≤ 25	25 ≤ t ≤ 40	40 ≤ t ≤ 63	200 mm	$5{,}65\sqrt{S_o}$[1]		
⊗	COR-TEN® A[3]	480 (min)	480 (min)	345	-	-	-	18	-	-	-
	SANS 50025/EN 10025/ **2004** S275JR	064/002	410/560	275	265	265	255	15*	23	27	Room
	SANS 50025/EN 10025/ **2004** S235JR	016/001	360/510	235	225	225	215	17*	26	27	Room
	SANS 50025/EN 10025/ **2004** S355JR	078/678	470/630	355	345	345	335	14*	22	27	Room
	SANS 50025/EN 10025/ **2004** S355JO	101/008	470/630	355	345	345	335	14*	22	27	0

1 S_o *= original cross-sectional area.*
2 *Minimum average impact resistance.*
* $L_0 = 80mm$
⊗ *Non-standard quality. Available on enquiry only*

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

Chemical composition[1] % (ladle analysis)

	Grade	Code	C (max)	Mn	P	S (max)	Cu	Cr	Si	V[1] (max)	Nb[1] (max)	Aℓ[1] (max)	Ni (max)	Mo	N (Max)
⊗	COR-TEN® A[2]	124 001	0,12	0,20/0,50	0,07/0,15	0,05	0,25/0,55	0,50/1,25	0,25/0,75	-	-	-	0,65	-	-
	SANS 50025/EN 10025/ **2004** S275JR	064 002	0,21	1,50	0,040	0,040	0,55	-	-	-	-	-	-	-	0,012
	SANS 50025/EN 10025/ **2004** S235JR	016 001	0,17	1,40	0,040	0,040	0,55	-	-	-	-	-	-	-	0,012
	SANS 50025/EN 10025/ **2004** S355JR	078 678	0,24	1,60	0,040	0,040	0,55	-	0,55 max	-	-	-	-	-	0,012
	SANS 50025/EN 10025/ **2004** S355JO	101 008	0,20	1,60	0,035	0,035	0,55	-	0,55 max	-	-	-	-	-	0,012

⊗ *Non-standard quality. Available on enquiry only*

1 *The use of grain refining elements such as Aℓ, V and Nb is optional. Furthermore, they may be used separately or in combination to achieve the desired properties.*

2 See data sheet: COR-TEN® *(File reference E6.1)*

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

Sizes

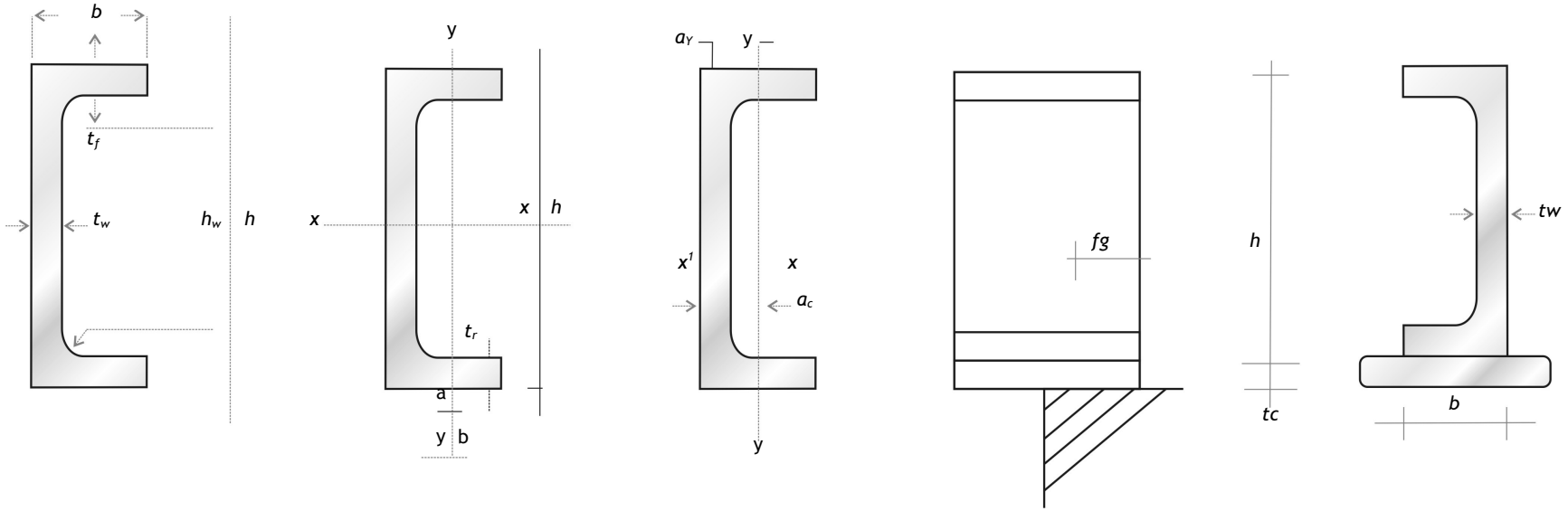
The following sections can be ordered in lengths from 6m up to 13 metres in increments of 100mm. The availability of lengths less than 6m will be considered on enquiry.

Dimensions and properties (PFC)

Designation	m	h	b	t_w	t_f	r_1	h_w	A	a_c	a_y	About x-x			About y-y			j	$\frac{h}{t_f}$
											I	Ze	r	I	Z	r		
mm x mm	kg/m	mm	mm	mm	mm	mm	mm	10^3mm^2	mm	mm	10^3mm^4	10^3mm^3	mm	10^3mm^4	10^3mm^3	mm	10^3mm^4	
PFC 100 x 50	10,097	100,0	50,0	5,0	8,4	8,4	66,4	1,286	33	17,3	2,055	41,10	39,9	0,320	9,79	15,7	23,57	11,9
PFC 180 x 70	21,072	180,0	70,0	7,0	10,9	10,9	136,4	2,684	42	21,5	13,53	150,3	71,0	1,272	26,22	21,7	79,76	16,5
PFC 200 x 75	24,294	200,0	75,0	7,5	11,4	11,4	154,4	3,095	45	22,5	19,11	191,1	78,5	1,668	31,74	23,2	100,6	17,5

Typical Tolerance

h ± 3mm (±3,5mm for 200x75)
b ± 2mm
t_w ± 0,5mm
t_f ± 0,6mm



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