

Data sheet: S4.2

## Forged products

### Specifications, profiles, dimensions & tolerances

#### Introduction

ArcelorMittal South Africa, Long Products at Vereeniging works produce forged products. Forged bar is available in various sizes of round, square and flat bar.

The purpose of this data sheet is to list the standard specifications, dimensions and tolerances applicable to these products. Table 1 indicate the size range per profile.

Table 1

Round bar		$\geq 105\text{mm}$ $\leq 185\text{mm}$
Square bar		$\geq 100\text{mm}$ $\leq 185\text{mm}$
Flat bar	Width	$\geq 80\text{mm}$ $\leq 300\text{mm}$
	Thickness	$\geq 80\text{mm}$ $\leq 170\text{mm}$

**Note:** Flat and square bar is available in round and sharp corners

#### Standard Specifications

Carbon Specifications
BS970 Pt 1 (1983) - 080M15
BS970 Pt 1 (1983) - 080A42
C1018 MBB
C25 (BS EN 10250) - 070M20
C45 (BS EN 10250) - 080M40
C55 (BS EN 10250) - 070M55
S355JR (BS EN 10250) - 150M19
SAE 9260

Alloyed Specifications
BS970 Pt 1 (1983) - 655M13
BS970 Pt 1 (1983) - 709M40
BS970 Pt 1 (1983) - 817M40
BS970 Pt 1 (1983) - 826M40

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## Forged rounds

The following table represent available standard sizes. Sizes not included may, however, be available subject to enquiry.

Commercial tolerance:

- 90 to 165mm diameter =  $\pm 1.5\text{mm}$
- 170 to 185mm = - 0.0mm +3.0mm

Diameter	kg/m	Group 1a	Group 1b	Group 1c	Group 1d	Group 2a	Group 2b	Group 2c	Group 2d
90	50	4.9 - 7.0 m	5.9 - 8.4 m						
95	56	4.4 - 6.3 m	5.3 - 7.5 m						
100	62	3.9 - 5.7 m	4.7 - 6.8 m	5.9 - 8.5 m					
103	65	3.7 - 5.3 m	4.5 - 6.4 m	5.6 - 8.0 m		6.2 - 8.9 m			
105	68	3.6 - 5.1 m	4.3 - 6.2 m	5.4 - 7.7 m		6.0 - 8.6 m			
108	72	3.4 - 4.8 m	4.1 - 5.8 m	5.1 - 7.3 m		5.7 - 8.1 m			
110	75	3.3 - 4.7 m	3.9 - 5.6 m	4.9 - 7.0 m		5.5 - 7.8 m			
115	82		3.6 - 5.1 m	4.5 - 6.4 m	6.0 - 8.6 m	5.0 - 7.2 m			
120	89		3.3 - 4.7 m	4.1 - 5.9 m	5.5 - 7.9 m	4.6 - 6.6 m	5.7 - 8.2 m		
125	96					4.2 - 6.1 m	5.3 - 7.6 m		
130	104					3.9 - 5.6 m	4.9 - 7.0 m		
135	113					3.6 - 5.2 m	4.5 - 6.5 m	6.1 - 8.7 m	
140	121					3.4 - 4.8 m	4.2 - 6.0 m	5.6 - 8.1 m	
145	130						3.9 - 5.6 m	5.2 - 7.5 m	
150	139						3.7 - 5.2 m	4.9 - 7.0 m	
155	148						3.4 - 4.9 m	4.6 - 6.6 m	
160	158						3.2 - 4.6 m	4.3 - 6.2 m	
165	168							4.0 - 5.8 m	6.1 - 8.7 m
170	178							3.8 - 5.4 m	5.7 - 8.2 m
175	189							3.6 - 5.1 m	5.4 - 7.7 m
180	200							3.4 - 4.9 m	5.1 - 7.3 m
185	211							3.2 - 4.6 m	4.8 - 6.9 m

All variable lengths indicated in the table above are considered to be standard lengths.

All other lengths are non-standard and on enquiry only.

Fixed lengths are also considered to be non-standard and on enquiry only.

Cutting tolerance: -0mm + 50 mm.

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## Conditions for standard lengths

Length extras are charged if the customer does not accept one of the following conditions as part of the order:

- *5% Shorts acceptable (carbon steel)*

Up to 5% of the ordered mass can be supplied in random short lengths from 3 metres up to the ordered length. Orders to be endorsed "5% shorts acceptable".

- *2. 10% Shorts acceptable (alloy steel)*

Up to 10% of the ordered mass can be supplied in random short lengths from 3 metres up to the ordered length. Orders to be endorsed "10% shorts acceptable".

- *3. Multiples.*

The shortest specified length that can be ordered is 4 metres. Orders must be endorsed "Multiples" quoting the multiple lengths. Final lengths consisting of several multiples will be supplied within a cutting tolerance of -0,0mm - +50mm overall. Customer must be prepared to accept up to 10% of the bars shorter than 4 metres but these will be supplied in multiples as requested.

## Notes

1. Notwithstanding any lengths quoted in the table for length limitations, the maximum length that can be supplied:
  - Normalised or full annealed condition is 6 metres
  - Hardened and tempered condition is 2,5 to 6,0 metres
  - Sub critical annealed condition is 9m
2. The maximum length that can be tested for surface cracks by magnetic crack detection is 7 metres.
3. Stricter cutting tolerances are available on request.

## Ultrasonic inspection standards

### ACCEPTANCE STANDARD

Provision is made for three (3) acceptance standards, namely ArcelorMittal Commercial, ArcelorMittal Special AND ArcelorMittal Critical.

#### ArcelorMittal COMMERCIAL

The acceptable Equivalent Flat Bottom Hole (EFBH) is determined as follows:

Test thickness x 0.03 with a minimum of a 2 mm EFBH. The calculation is done to the nearest 0.5 mm.

For defect indication between 50 % and 100 % of the acceptance level, the following shall apply: maximum single defect length shall be test thickness x 0.15.

#### ArcelorMittal SPECIAL

The acceptable Equivalent Flat Bottom Hole (EFBH) is determined as follows:

Test thickness x 0.02 with a minimum of a 1.5 mm EFBH. The calculation is done to the nearest 0.5 mm.

For defect indication between 50 % and 100 % of the acceptance level, the following shall apply : maximum single defect length shall be test thickness x 0.10.

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## ArcelorMittal CRITICAL

The acceptable Equivalent Flat Bottom Hole (EFBH) is determined as follows :

Test thickness x 0.01 with a minimum of a 1 mm EFBH. The calculation is done to the nearest 0.5 mm.

For defect indication between 50 % and 100 % of the acceptance level, the following shall apply :  
maximum single defect length shall be test thickness x 0.05.

Total defect indication per one meter bar length shall not exceed 4 times the acceptance standard for defect length. The defect length shall only be determined when the defect indication exceeds 50 % of the acceptance level.

### TEST METHOD.

The method used is the contact pulse-echo method, employing straight and angle beam techniques and evaluating defects with the D.G.S. method.

### SINGLE DEFECTS.

Indications are considered as single when the distance between the indications are greater than 0.15 x test thickness.

### GROUPS OF DEFECTS.

Indications are considered as a group when the distance between 2 or more defects occur at a distance less than 0.15 x test thickness.

### TESTING ZONES.

For applications where customers remove the centre portion of the forging, different acceptance levels for the various zones may be specified by the customer.

Zone A : Critical – Surface to 1/3 radius.

Zone B : Special – 1/3 radius to 2/3 radius.

Zone C : Commercial – 2/3 radius to centre.

### Surface condition

ArcelorMittal Critical application can only be done in the rough machined condition.

Allow for 4% surface removal for  $\leq 185\text{mm}$

### CERTIFICATION

Ultrasonic test certificates shall be supplied if required by the customer and requested at time of order placement.

## Accreditation

SANS ISO 9001: 2008 accreditation was achieved in December 2002 and re-certified in November 2009.

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