

Data sheet: F3.1

Bolt & nut, chain steel & black bar for bright steel

Hot rolled round steel rod/bar, carbon & low alloy grades in lengths and coils

General description

Round bars and rod in nominal diameters ranging from 5,5 up to 106 mm are supplied for bolt and nut, chain making and bright bar applications.

This data sheet contains only the standard manufactured specifications. Other steel specifications, surface specifications, rolling tolerances, sizes and lengths may be considered on an enquiry basis.

Steel making and rolling

The steel is made in a basic oxygen furnace route followed by continuous casting into blooms prior to rolling. Ladle furnace and/or vacuum degassing of steel may be applied, depending on end application or requirements. Ladle furnace treatment may include calcium treatment, sulphur wire injection, inclusion control and slag manipulation. Electromagnetic stirring is normally applied to the casting of high carbon and/or high alloy specifications to minimise segregation.

a Rod from 5,5 to 14.5mm in diameter is rolled from billets into control-cooled coils.

b Bars from 10 to 106mm in diameter are rolled from cast blooms or rolled from billets to lengths and still air cooled on a cooling bed. Bars from 14,5 to 33,5mm in diameter, required as coils, may be finished by coiling in a pouring reel.

** Export coils restricted to 30mm maximum – larger sizes subject to enquiry.*

The rod or bars are normally produced with a thin scale that is suitable for acid de-scaling, but not guaranteed for mechanical de-scaling.

Quality assurance

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

Certification

Ladle analysis certificates will be supplied and mechanical properties may be listed for information, provided the orders are endorsed accordingly. Mechanical tests to be done additional – refer to price list.

The mechanical and chemical laboratories of ArcelorMittal Steel South Africa, Newcastle Steel are SANAS accredited facilities.

Surface quality

Rod and bar is supplied to a maximum surface defect depth not exceeding 2%, however better surface guarantees can be considered on enquiry.

Decarburisation

Rod and bar is supplied to an average maximum partial decarburisation depth of 1,5% of the nominal diameter. The average partial decarburisation is normally less than 1,0% of the diameter. More stringent specifications may be considered on an enquiry basis.

For further information, contact:

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

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Formability

Steel specifications with a carbon content above 0,25% and all alloy grades must be spheroidised prior to cold forming.

Standard lengths and length tolerances

- a** Bars from 10 to 50mm in diameter are supplied in cold sheared standard lengths from 5 to 18m in increments of 100mm with a cutting tolerance of -0 +50 mm.
- b** Bars from > 50 to 106mm in diameter are supplied in cold sawn standard lengths from 6 to 18m in increments of 100mm with a cutting tolerance of -0 +50 mm.

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Rolling tolerances (coils and lengths)

Round bar is produced to the dimensional tolerances laid down in the following table.

Coils sizes range from 5,5 – 33,5mm and lengths are available from 10 to 106mm

Nominal diameter (mm)	SPE 231		SPE 231 (bolt & nut only)		SPE 231 Kocks		DIN 1013 (lengths only)		DIN 59110 (coils only)		ASTM A29 (%: of nom. diameter)	
	diameter	ovality ¹⁾	diameter	ovality ¹⁾	diameter	ovality ¹⁾	diameter	ovality ¹⁾	diameter	ovality ¹⁾	diameter	ovality ¹⁾
5,5 - 6,5 (coils)	± 0,15	0,25	± 0,15	0,25					± 0,30	0,48	± 0,13	0,20
7 (coils)	± 0,15	0,25	± 0,15	0,25					± 0,30	0,48	± 0,13	0,20
7,5 - 10 (coils)	± 0,15	0,25	± 0,15	0,25					± 0,40	0,64	± 0,15	0,22
11,5 – 14,5 (coils)	± 0,20	0,30	± 0,20	0,30					± 0,40	0,64	± 0,18	0,27
⊗ 10 - 14 (lengths)	± 0,40	0,64	± 0,35	0,60			± 0,40	0,64	± 0,40	0,64		
14,5 - 15	± 0,40	0,64	± 0,35	0,60	± 0,20	0,26	± 0,40	0,64	± 0,40	0,64	± 0,18	0,27
16 - 19	± 0,50	0,80	± 0,35	0,60	± 0,20	0,26	± 0,50	0,80	± 0,50	0,80	± 0,20	0,30
19,5 - 21,5	± 0,50	0,80	± 0,35	0,60	± 0,20	0,26	± 0,50	0,80	± 0,50	0,80	± 1,00 %	1,50 %
22 - 24	± 0,50	0,80	± 0,50	0,60	± 0,20	0,26	± 0,50	0,80	± 0,50	0,80	± 1,00 %	1,50 %
24,5 - 25	± 0,50	0,80	± 0,50	0,80	± 0,20	0,26	± 0,50	0,80	± 0,50	0,80	± 1,00 %	1,50 %
25,5 - 30	± 0,60	0,96	± 0,50	0,80	± 0,20	0,26	± 0,60	0,96	± 0,60	0,96	± 1,00 %	1,50 %
30,5 – 35	± 0,60	0,96	± 0,50	0,80	± 0,20	0,26	± 0,60	0,96			± 1,00 %	1,50 %
36 - 43,5	± 0,80	1,28	± 0,50	0,80	± 0,24	0,31	± 0,80	1,28			± 1,00 %	1,50 %
44	± 0,80	1,28	± 0,50	0,80	± 0,24	0,31	± 0,80	1,28			± 1,00 %	1,50 %
45 – 50	± 0,80	1,28	± 0,80	1,28			± 0,80	1,28			± 1,00 %	1,50 %
50,5 – 80	± 1,00	1,60	± 1,00	1,60			± 1,00	1,60			± 1,00 %	1,50 %
80,5 – 100	± 1,30	2,00	± 1,30	2,00			± 1,30	2,08			± 1,00 %	1,50 %
100,5 - 106	± 1,50	2,00	± 1,50	2,00			± 1,50	2,40			± 1,00 %	1,50 %

Note:

1 Ovality is the difference between maximum and minimum diameters measured in the same plane.

2 The table contains typical rolling tolerances. Other tolerances can be supplied on enquiry.

3 Lengths and coils from 14,5 to 44,5 mm in diameter are processed in a Kocks block to obtain a product with superior dimensional tolerances.

⊗ Non-standard quality - available on enquiry only

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Standard bar sizes (lengths^L and coils)

Diameter (mm)	Mass ¹ kg/m	Diameter (mm)	Mass ¹ kg/m	Diameter (mm)	Mass ¹ kg/m
6 ^L	0,222	27	4,495	60 ^L	22,195
8 ^L	0,395	28	4,834	63 ^L	24,470
10 ^L	0,617	28,5	5,008	64 ^L	25,253
12 ^L	0,888	30	5,549	65 ^L	26,049
14,0 ^L	1,208	31	5,925	66 ^L	26,856
14,5	1,296	32	6,313	68 ^L	28,509
16	1,578	33	6,714	70 ^L	30,210
16,5	1,679	33,5	6,919	73 ^L	32,855
17	1,782	34 ^L	7,127	75 ^L	34,680
17,5	1,888	35 ^L	7,553	76 ^L	35,611
18	1,998	36 ^L	7,990	76,5 ^L	36,081
18,5	2,110	36,5 ^L	8,214	78 ^L	37,510
19	2,226	38 ^L	8,903	80 ^L	39,458
19,5	2,344	40 ^L	9,865	83 ^L	42,473
20	2,466	42 ^L	10,876	89 ^L	48,836
20,5	2,591	43,5 ^L	11,666	90 ^L	49,940
21	2,719	45 ^L	12,485	92,0 ^L	52,184
22	2,984	46,5 ^L	13,331	95 ^L	55,643
23	3,261	48 ^L	14,205	100 ^L	61,654
23,5	3,405	50 ^L	15,413	102 ^L	64,145
24	3,551	51 ^L	16,036	103 ^L	65,408
24,5	3,701	52 ^L	16,671	105 ^L	67,973
25	3,853	53 ^L	17,319		
25,5	4,009	55 ^L	18,650		
26,5	4,330	57,15 ^L	20,137		

^L Diameters available in lengths only

¹ Nominal mass: calculated from a density factor of 7,85 tons/m³

Non standard sizes - available on enquiry only

Diameter (mm)	Mass ¹ kg/m	Diameter (mm)	Mass ¹ kg/m	Diameter (mm)	Mass ¹ kg/m
10,5	0,680	37,0 ^L	8,440	63,5 ^L	24,860
11,0	0,746	38,5 ^L	9,139	67,0 ^L	27,676
13,0	1,042	39,0 ^L	9,378	72,0 ^L	31,961
15	1,387	41,0 ^L	10,364	82,0 ^L	41,456
21,5	2,850	44 ^L	11,936	85 ^L	44,545
22,5	3,121	44,5 ^L	12,209	88,0 ^L	47,745
26	4,168	46,0 ^L	13,046	93,0 ^L	53,324
26,5	4,330	47,0 ^L	13,619	101,0 ^L	62,893
29,0	5,185	56,0 ^L	19,335	106 ^L	69,274
29,5	5,365	57,0 ^L	20,031		
30,5	5,735	58 ^L	20,740		
31,5	6,118	62,0 ^L	23,700		

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Note: < 14mm only lengths – non-standard
>14 mm lengths and coils – non-standard

Standard rod sizes (coils)

Diameter (mm)	Mass (kg/m)	Diameter (mm)	Mass (kg/m)	Diameter (mm)	Mass (kg/m)
5,5	0,187	8,5	0,445	11,5	0,815
6	0,222	9	0,500	12	0,888
6,5	0,261	9,5	0,557	12,5	0,963
7	0,302	10	0,617	13	1,042
7,5	0,347	10,5	0,680	13,5	1,124
8	0,395	11	0,746	14	1,208

Calculated from a density factor of 7,85 tons/m³

Bundle mass

Mill	Minimum	Maximum	Deviation from gross mass
Medium Mill	3 ton	5 ton	-10% on ordered bundle mass
Bar Mill	1,5 ton	2,5 ton	-10% on ordered bundle mass

- a** Bars from 6 to 50 mm in diameter can be supplied in bundles ranging from 1,5 to 2,5 tons within a tolerance according to the mass of individual bar lengths.
- b** Bars from > 51 to 106 mm can be supplied in bundles ranging from 3 to 5 tons within a tolerance according to the mass of individual rod lengths.

Coil mass and dimensions

Coils are formed in an anti-clockwise direction, which means that coils must be unwound for processing from the top downwards in a clockwise direction.

Bar Mill material can be supplied in coils in diameters from 14,5 up to 33,5mm.

Coils are supplied as compacted individual coils to the mass and dimensions given in the table below:

Characteristics	Bar mill 14,5mm to 33,5mm diameter	
	14,5 - 29,5 mm	30,0 - 33,5 mm
Average mass (kg)	1850	1850
Tolerance on mass	Within 10% from nominal mass	
Min inside diameter (mm)	1100	1100
Max outside diameter	1400	1400
Maximum height (mm)	1300	1300

Note: All coils will be within 10% of the nominal mass.

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