Data sheet: G1.1

Reinforcing steel bars

Hot rolled plain & deformed steel bars, mild & high-strength grades

General description

ArcelorMittal South Africa, Newcastle Steel produces steel for the reinforcement of concrete according to the requirements of SANS 920: 2011, BS 4449: 1997, BS 4449:2005 and ASTM A615 Grade 60. Two types are produced viz. mild steel plain bar and deformed high strength bar.

NOSTRA® is the registered trade name for the high strength deformed rebar produced by ArcelorMittal South Africa. The name was derived from the term "non stress-raising" emanating from the design of the transverse ribs to eliminate stress concentrations.

SANS specifications carry the SANS Mark of Quality.

Steel specifications

Profile	Specification[1]	Code	CE[2 & 3]
Mild steel smooth bar	BS 4449: 1997 250 MPa SANS 920: 2011 250 Mpa	365 001 640 001	0,42
Mesh smooth bar (4)	Mesh 8 Mesh 10 Mesh 12	551 180 552 140 553 210	- - -
NOSTRA® (weldable) - air-cooled	SANS 920: 2011 450 Mpa BS 4449: 1997 460B BS 4449: 2005 Gr B500B ASTM A615 Grade 60	604 003 366 003 488 008 545 009	0,51 0.50 0.51

1 *Only applicable to steel made by the basic oxygen process.*

2 *Weldability: If the actual carbon equivalent of a cast is less or equal than specified in the table for a specific cast, the steel may be regarded as being weldable provided the correct welding procedures are followed. If weldability is an essential requirement for high strength bars it should be specified in the order.*

3 *Carbon equivalent = %C+%Mn/6+(%Cr+%Mo+%V)/5+(%Ni+%Cu)/15*

4 Mesh not suitable for galvanising.

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Mechanical properties

Specification	Yield strength[1), 2)] (min) [MPa]	Tensile strength (min)[MPa]	Elongation[3)] (min) [%]	Mandrel diameter for 180° bend test[4)]
SANS 920: 2011 250 MPa	250 - 400	>1,15 x Actual yield strength	22 min	2D
SANS 920: 2011 450 MPa	450 min		14 min	3D and re-bend 5D
BS 4449: 1997 250 MPa	250 min	>1,10 x Actual yield strength UTS/YS>1.06	22 min	2D
BS 4449: 1997 460B BS 4449: 2005 Gr B500B (only availble in 8-20mm)	460 min 500 - 650		12 min Agt=5 min	3D and re-bend 5D re-bend </=16 4d re-bend >16 7d
ASTM A615 Grade 60	414 min	621 min	9 min	5D

1 *Also characteristic strength for Limit State Design.*
2 *Yield strength or 0,2% proof stress.*
3 *Gauge length = 5,65 x square root of A_o, where A_o = original cross section of the bar.*
4 *D = bar diameter*

Plain and deformed standard sizes

Nominal diameter	Nominal mass	Available as lengths (L) and/or coils (C)	Nominal cross-sectional area[2]	Circumference
mm	kg/m		Mm	mm
6	0,222	L[1] and C	28,27	18,85
8	0,395	L[1] and C	50,27	25,13
10	0,617	L and C	78,54	31,42
12	0,888	L and C	113,1	37,70
14		L		
14.5		L		
15.5		L		
16	1,578	L	201,1	50,27
20	2,466	L	314,2	62,83
25	3,853	L	490,9	78,53
32	6,313	L	804,2	100,5
40	9,865	L	1256,6	125,7

1. *Straightening may cause deviations from the* NOSTRA® *requirements.*
2. *Nominal cross-sectional area for deformed bar is the equivalent nominal cross sectional area of corresponding size plain bar.*

Dimensional tolerance

Size	Permissible variation in:	
	Diameter	Maximum ovality
6 - 12 mm in coils	± 0,40 mm	0,65 mm
6 - 8 mm in lengths	± 0,40 mm	0,65 mm
10 mm in lengths	± 0,40 mm	0,80 mm
12 - 40 mm in lengths	± 0,80 mm	1,60 mm

The above dimensional tolerances are applicable to SANS 920 and BS 4449 tolerances.

Coil mass and dimensions

Coils are produced in the following sizes:

Characteristics	For rod diameters 5,5 to 14 mm	
	Small coils	Large coils
Nominal mass	1680 kg	2140 kg
Minimum inside diameter	800 mm	
Maximum outside diameter	1250 mm	
Maximum height	1300 mm	1650 mm

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

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Bundle mass
Bundle mass with a maximum of 2 tons must be specified by the customer.

Lengths
Bar Mill - 6m to 18m in increments of 1 meter
Rod Mill - 5m to 13m in increments of 1meter

Other lengths subject to enquiry

Mass and length tolerances

	Bar diameter (mm)	Tolerance
Batch mass (applicable to lengths only)	All diameters	+6,0 - 4,0%
Linear mass (individual bars)	All diameters	+8,0 - 8,0%
Length	All diameters	- 0 + 50 mm

Rolled-in marking
SANS 920: 2011 - In the case of hot-rolled high yield steel bars, NOSTRA® bars, each bar shall bear a pair of longitudinal stripes rolled into the bar at intervals not exceeding 1,5 m.

BS 4449: 1997 - The NOSTRA® reinforcing steel bars to BS 4449 shall be identified by four rolled-on longitudinal legible marks on the surface at intervals not greater than 1,5 m to indicate that the origin is from ArcelorMittal South Africa, Newcastle Steel.

Corrosion
Tightly adherent light corrosion products should not adversely affect the bond strength of reinforcing bars. Loose corrosion products should be removed by wire brushing.

Straightening
Note that not all straightening machines are suitable for the straightening of coiled NOSTRA® rebar.
The straightness of cold straightened material is not guaranteed to the normal 4mm/m guarantee. The material will not contain any kinks or sharp bends and will be fit for purpose for reinforcing and general use.

Certification
Test and analysis certificates are supplied with all material.
The mechanical and chemical laboratories of ArcelorMittal Steel South Africa, Newcastle Steel are SANAS accredited facilities

Applications
ArcelorMittal Steel South Africa's reinforcing steel is used for the full range of concrete reinforcement applications such as foundations, columns, beams and slabs as well as bridge and water-retention structures. A specially adapted ribbed bar is also widely used as roof bolting for the mining industry.

Bundling
Coils (5,5 – 14mm): Individual coils are strapped with four straps evenly spaced around the periphery. Coils for the export market are further secured with a lateral rod tie at each strap position. A radial or belly wire is attached to the lateral ties in the middle of the coil.

Lengths: Lengths are securely tied in bundles normally containing a standard number of bars per size and length. Bundles are secured with wire ties or steel straps depending on bar diameter, two adjacent straps approximately 150 - 250 mm from each end and intermediate straps at approximately 1,5 meter intervals. (A list of standard bundles is available on request)

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Labels and marking

Labels

One polyester label on a metal backing will be tied to each end of the coil/bundle by means of wire ties or laced to coil/bundle straps at works' option.

Coloured metal backings are available in: white, blue, green, purple, grey, brown, orange, pink, black, beige, light green, light blue and red.

Where no metal backing colour is specified on orders, white labels will normally be used at the works' discretion.

Labels will bear information on a maximum of four lines with a maximum of forty-five characters per line.

The following standard information will normally be stated:

- ArcelorMittal Steel South Africa's order confirmation number
- Port of destination (export)
- Cast number
- Steel grade and bar diameter
- Coil/bundle mass
- Number of bars per bundle (if specifically requested)
- Coil/bundle number
- Coil/bundle numbers are also printed on a bar code.

Colour marking

Water based paint marking is available in single colours or up to three stripes in two colours or up to three stripes in three colour combinations, for customer's identification purposes.

Colours available: red, green, blue, pink and white

Coloured lines/bands are approximately 50 or 100mm wide and are applied through approximately 180 degrees. Colour splashes are approximately 100mm in diameter.

Note: Paint marking is not available on products produced at the Rod Mill.

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