

Data sheet: F2.1

Wire rod

Hot rolled steel rod in coils

General description

ArcelorMittal Steel South Africa, Newcastle Steel supplies wire rod, defined as material in coils with nominal diameters ranging from 5,5 mm and is available in diameters of up to 14.5 mm at 0,5 mm intervals. They are used for applications such as manufacturing of wire for pre-stressing concrete, galvanised strand for cables, spring wire, welding rods and fence wire.

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

Steel making and rolling

The steel is made in a basic oxygen furnace and then continuously cast into blooms before being rolled into billets

The rod is rolled from billets into control-cooled coils, yielding a suitable microstructure for direct drawing. The rod is 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.

Decarburisation

Medium to high carbon rod is supplied to an average maximum spot partial decarburisation depth of 1,5% of the nominal diameter. The average is normally less than 1,0% of the diameter.

Surface condition

The rod is supplied to a maximum individual surface defect depth not exceeding 2% of nominal diameter. Typical results show that in more than 90% of the material the defect depth is less than 1% of the diameter.

Certification

Ladle analysis certificates are supplied with each consignment. 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.

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

Steel specifications for general wire drawing (wire rod)

Specification	Code	%C	%Mn	%P	%S	%Si	%Al (aim)	Other	Typical UTS ¹ (MPa)
Steelwool (Si-killed)	348 011	0,07/0,10	0,75/0,90	0,025/0,04	0,02x	0.15x	-	N,007/0,010	470
Steelwool (Si & V-killed)	348 300	0,07/0,11	0,70/0,90	0,040/0,080	0,030x	0,07/0,15	0.010x	V0,02/0,04 & N0,003/0,010	480
SW 1004	547 254	0,05x	0,40x	0,025x	0,025x	0,05x	0,01x	-	360
SAE 1004	274 254	0,05x	0,40x	0,025x	0,025x	0,05x	0,01x	-	360
SAE 1005	069 003	0,05x	0,40x	0,025x	0,025x	0,03x	0,01x	-	
SAE 1006	285 140	0,07x	0,30/0,50	0,025x	0,025x	0,12/0,20	-	-	380
SAE 1008	098 180	0,10x	0,30/0,50	0,03x	0,03x	0,35x	-	-	400
SAE 1010	758 140	0,08/0,13	0,40/0,60	0,03x	0,03x	0,15/0,25	-	N 0,008x	435
SAE 1012	357 210	0,10/0,15	0,40/0,60	0,03x	0,03x	0,35x	-	N 0,008x	430
⊗ SAE 1015	112 101	0,13/0,18	0,40/0,60	0,03x	0,03x	0,15/0,35	-	N 0,008x	470
SAE 1018	747 219	0,15/0,20	0,60/0,90	0,03x	0,03x	0,15/0,35	-	N 0,008x	480
SAE 1020	916 160	0,18/0,23	0,30/0,60	0,03x	0,03x	0,15/0,35	-	N 0,008x	520
SAE 1030	526 434	0,30/0,35	0,60/0,80	0,03x	0,03x	0,15/0,25	-	-	439
SAE 1040	925 683	0,37/0,44	0,60/0,90	0,04x	0,05x	0,15/0,35	-	-	740
SAE 1045	521 500	0,43/0,50	0,60/0,90	0,03x	0,03x	0,35x	-	-	770

1 Typical average of average tensile strength (UTS) per cast for 5,5 mm as-rolled rod and for guidance/ information only.

⊗ Non-standard quality - available on enquiry only

Steel specifications for welding rod applications

Specification	Code	%C	%Mn	%P	%S	%Si	Typical UTS ¹ (MPa)
JIS G3503 SWRY 11	568 001	0,05/0,09	0,40/0,60	0,025x	0,025x	0,10x	395
AWS ER70S-6 (low Manganese)	746 737	0,06/0,08	1,40/1,55	0,020x	0,020x	0,80/0,90	510

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Steel specifications for rope wire rod

	Specification	Code	%C	%Mn	%P	%S	%Si	Other	Typical UTS ¹ (MPa)
⊗	DIN 17140: D40-2	329 771	0,40/0,44	0,60/0,80	0,03x	0,030x	0,15/0,35	N ₂ 0,008x	750
⊗	DIN 17140: D45-2	245 385	0,44/0,48	0,60/0,80	0,025x	0,025x	0,15/0,30	N ₂ 0,008x	770
	DIN 17140: D53-2	226 608	0,50/0,54	0,60/0,80	0,025x	0,025x	0,15/0,30	N ₂ 0,008x	880
⊗	DIN 17140: D58-2	227 609	0,55/0,59	0,60/0,80	0,025x	0,025x	0,15/0,30	N ₂ 0,008x	910
	DIN 17140: D63-2 ²	229 613	0,60/0,64	0,60/0,80	0,02x	0,020x	0,15/0,30	N ₂ 0,008x	1000
	DIN 17140: D68-2	232 624	0,65/0,69	0,60/0,80	0,02x	0,020x	0,15/0,30	N ₂ 0,007x	1030
	DIN 17140: D73-2	239 550	0,70/0,74	0,60/0,80	0,02x	0,020x	0,15/0,30	N ₂ 0,007x	1080
	DIN 17140: D78-2	243 628	0,75/0,79	0,60/0,80	0,025x	0,025x	0,15/0,30	N ₂ 0,007x	1125
	DIN 17140: D83-2	244 777	0,80/0,84	0,60/0,80	0,025x	0,025x	0,15/0,35	N ₂ 0,007x	1180
	DIN 17140: D83-2 (Cr/V)	119 001	0,80/0,84	0,60/0,80	0,02x	0,020x	0,15/0,30	N ₂ 0,008x CrO, 15/0,30 VO, 02/0,04	1210 ³
	SAE 1050	392 608	0,50/0,54	0,60/0,80	0,025x	0,025x	0,15/0,30	N ₂ 0,008x	880
⊗	SAE 1055	924 001	0,54/0,58	0,65/0,80	0,025x	0,025x	0,15/0,30	N ₂ 0,008x	910
	SAE 1063	166 613	0,60/0,64	0,60/0,80	0,02x	0,020x	0,15/0,30	N ₂ 0,008x	1000
	SAE 1070	591 550	0,70/0,74	0,60/0,80	0,02x	0,020x	0,15/0,30	N ₂ 0,007x	1080
	SAE 1075	540 628	0,71/0,75	0,40/0,60	0,025x	0,025x	0,15/0,30	-	1125
	SAE 1083	135 777	0,80/0,84	0,60/0,80	0,025x	0,025x	0,15/0,35	N ₂ 0,008x	-
	JIS G3506 SWRH 62B	027 613	0,60/0,64	0,60/0,80	0,02x	0,020x	0,15/0,30	N ₂ 0,008x	980
	JIS G3506 SWRH 67B	232 624	0,65/0,69	0,60/0,80	0,02x	0,020x	0,15/0,30	N ₂ 0,007x	1030
⊗	JIS G3506 SWRH 72A	053 002	0,70/0,74	0,40/0,60	0,025x	0,025x	0,15/0,30	N ₂ 0,007x	1050
	JIS G3506 SWRH 72B	022 550	0,70/0,74	0,60/0,80	0,025x	0,025x	0,15/0,30	N ₂ 0,007x	1120
	JIS G3506 SWRH 82B	413 777	0,80/0,84	0,60/0,80	0,025x	0,025x	0,15/0,35	N ₂ 0,007x	1180

1 Typical average of average tensile strength (UTS) per cast for 5,5 mm as-rolled rod and for guidance / information only.

2 Also applicable for bedding wire rod.

3 Typical average of average tensile strength (UTS) per cast for 9,0 mm as-rolled rod and for guidance / information only.

⊗ Non-standard quality - available on enquiry only

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High carbon and rope wire rod

The grades listed conform to the requirements of the specifications shown.

Depending on the size of the order, the analysis may be modified to suit specific customer requirements.

Americas	European community	Pacific Rim
SAE 1055	-	-
SAE 1058	-	-
-	-	JIS G 3506 SWRH 62A
SAE 1063	DIN 17140 D 63-2	JIS G 3506 SWRH 62B
SAE 1069	DIN 17140 D 68-2	JIS G 3506 SWRH 67B
SAE 1075	-	JIS G 3506 SWRH 72A
-	-	JIS G 3506 SWRH 72B
SAE 1083	DIN 17140 D 83-2	JIS G 3506 SWRH 82B
-	DIN 17140 D 83-2 Cr/V	

Limitations: rod sizes vs carbon content

The orders of all steel grades (standard and non-standard) are subject to the limitations in the table below due to the design of the Rod Mill.

Maximum diameter	Carbon content (%)
9.0 mm	C ≤ 0,70
12.0 mm	0,70 < C ≤ 0,75
14.5mm	C > 0,75

Note: Material that falls outside the conditions in the table is not suitable for direct drawing and should be ordered as "Wire rod for Patenting"

Rod sizes, linear mass and dimensional tolerances

Rod diameters available commence at 5,5 mm and proceed at intervals of 0,5 mm up to and including 14.5 mm.

	5,5 - 10 mm	10,5 - 14.5 mm
Diameter tolerance	± 0,15 mm	± 0,20 mm
Maximum ovality	0,25 mm	0,30 mm

Ovality is the difference between the minimum and maximum diameters at the same position along the rod.

Diameter mm	Mass kg/m	Diameter mm	Mass kg/m
5,5	0,187	10,5	0,680
6	0,222	11	0,746
6,5	0,260	11,5	0,815
7	0,302	12	0,888
7,5	0,347	12,5	0,963
8	0,395	13	1,042
8,5	0,445	13,5	1,124
9	0,499	14,0	1,208
9,5	0,556	14.5	1.296

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

Coil mass and dimensions

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: Coil mass tolerance is ± 10% from nominal

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Bundling

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.

Labels and marking

Labels

One polyester label on a metal backing will be tied to each end of the coil/bundle by means of a wire tie, clips or laced to 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 specification and rod/bar diameter
- Coil/bundle mass
- Coil/bundle number
- Coil/bundle numbers are also printed in a bar code.

Supply conditions

Wire rod is supplied in terms of ArcelorMittal Steel South Africa's Price List for Wire Rod Number 231 series and General Conditions of Sale.

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