

Data sheet: S2

Profile & forged products

Steel grades & specifications

Introduction

This data sheet provides information about the many standard specifications and grades of steel produced by ArcelorMittal South Africa, Vereeniging Steel. Non-standard grades not included in this data sheet may, however, be considered upon enquiry.

The grades are used in the production of a wide variety of applications and have been classified according to the following types: carbon steel, spring steel, tool steel, micro-alloyed steel, alloy steel, free-cutting steel, ArcelorMittal South Africa seamless tube steels and hollow-drill rod steel.

The chemical analyses quoted refer to the specified pit or ladle analyses taken during steel making. Product analyses, i.e. those taken from the final product may vary in terms of internationally acceptable norms. Specified mechanical properties depend to a large extent upon factors such as the heat-treated condition of the steel and the mass or ruling section. Such information has been excluded from this data sheet due to the volume involved. For information relating to the specified mechanical properties of the listed steel grades, it is recommended that the relevant specification is consulted or the Quality Assurance Department at ArcelorMittal South Africa, Vereeniging Steel be contacted for assistance.

For specific information relating to the production facilities at ArcelorMittal South Africa, Vereeniging Steel refer to data sheet S1 and for specific information relating to the standard sizes, profiles and tolerances available refer to data sheet S3.

Carbon steel

ASTM A 105 1995 Forged and rolled

Grade	C %	Si %	Mn %	S % max	P % max
ASTM A105	0,18-0,22	0,15-0,35	1,05-1,25	0,025	0,025

ASTM A 350 Forged and rolled

Grade	C %	Si %	Mn %	S % max	P % max	Al %
LF 2	0,18-0,22	0,15-0,30	1,05-1,25	0,020	0,020	0,020-0,040

BS 970 Forged and rolled

Grade	C %	Si %	Mn %	S % max	P % max	Al %
070M20	0,16-0,24	0,10-0,40	0,50-0,90	0,050	0,050	-
070M55	0,50-0,60	0,10-0,40	0,50-0,90	0,050	0,050	-
080A27	0,25-0,30	0,10-0,40	0,70-0,90	0,050	0,050	-
080A42	0,40-0,45	0,10-0,40	0,70-0,90	0,050	0,050	-
080M15	0,12-0,10	0,10-0,40	0,60-1,00	0,050	0,050	0,02-0,04
080M40	0,36-0,44	0,10-0,40	0,60-1,00	0,050	0,050	-
080M50	0,45-0,55	0,10-0,40	0,60-1,00	0,050	0,050	-
150M19	0,15-0,23	0,10-0,40	1,30-1,70	0,050	0,050	-
* EN8 DM NC	0,42-0,47	0,25 max	1.30 – 1.45	0.08 – 0.13	0.060	-

For further information, contact:

ArcelorMittal South Africa Limited, Vereeniging Works, PO Box 48, Vereeniging 1930. Tel (016) 440 3691 Fax (016) 440 3743
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EN32 C (mod)	0,10-0,18	0,05-0,35	0,60-0,80	0,050	0,050	0,02-0,04
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BS 2772 Forged and rolled

Grade	C %	Si %	Mn %	S % max	P % max	Al %	N % max
150M19	0,15-0,23	0,10-0,40	1,30-1,70	0,040	0,040	0,020-0,040	0,012

BS 4360: 1986 Forged and rolled

Grade	C %	Si %	Mn % max	S % max	P % max
43A	0,25	0,50	1,60	0,050	0,050

DIN 17100 Rolled

Grade	C %	Si %	Mn % max	S % max	P % max	Al %
ST 52/3	0,22	0,55	1,60	0,040	0,040	0,02-0,04

Mittal Steel South Africa

Grade	C %	Si %	Mn %	S % max	P % max
SS 10/200	0,40-0,55	0,10-0,35	0,60-1,00	0,060	0,060
SS 10/25A	0,70-1,00	0,10-0,30	0,60-1,00	0,050	0,050
SS 10/83	0,65-0,75	0,10-0,35	0,50-0,70	0,050	0,050
SS 10/84	0,80-1,00	0,10-0,35	0,30-0,60	0,050	0,050

Mild steel

Grade	C % max	Si % max	Mn % max	S % max	P % max
Mild	0,35	0,50	1,60	0,050	0,050

SAE J403

Grade	C %	Si %	Mn %	S % max	P % max
SAE 1012	0,10-0,15	0,15-0,35	0,30-0,60	0,050	0,030
SAE 1018	0,15-0,20	0,15-0,35	0,60-0,90	0,050	0,040
SAE 1035	0,32-0,38	0,15-0,35	0,60-0,90	0,050	0,040
SAE 1038	0,35-0,42	0,15-0,35	0,60-0,90	0,050	0,040
SAE 1045	0,43-0,50	0,15-0,35	0,60-0,90	0,050	0,030
SAE 1541	0,36-0,44	0,15-0,35	1,35-1,65	0,020	0,020

SAE J1268

Grade	C %	Si %	Mn %	S % max	P % max
SAE 1045 H	0,42-0,51	0,15-0,35	0,50-1,00	0,025	0,025
SAE 1541 H	0,35-0,45	0,15-0,35	1,25-1,45	0,025	0,025

Spring steel

BS 970

Grade	C %	Si %	Mn %	S % max	P % max	Cr %	V %
250A53	0,50-0,57	1,70-2,10	0,70-1,00	0,050	0,050	0,30 max	-
250A61	0,58-0,65	1,70-2,10	0,70-1,00	0,050	0,050	0,30 max	-
735A50	0,46-0,54	0,10-0,35	0,60-0,90	0,040	0,040	0,80-1,10	0,15 min
735A54	0,52-0,57	0,20-0,35	0,90-1,15	0,035	0,035	1,05-1,20	0,12-0,20

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JIS G 4801

Grade	C %	Si %	Mn %	S %	P %	Cr %	Ni %	Mo %	Cu %	Sn	V %
SUP 9	0,52	0,15	0,65	0,035	0,035	0,65	-	-	0,30	-	-
	0,60	0,35	0,95	max	max	0,95			max		
SUP 9A	0,56	0,15	0,70	0,035	0,035	0,70	-	-	0,30	-	-
	0,64	0,35	1,00	max	max	1,00			max		

SAE J404

Grade	C %	Si %	Mn %	S %	P %	Cr %	Ni %	Mo %	Cu %
SAE 5160	0,56	0,15	0,75	0,040	0,035	0,70	0,25	0,06	0,35
	0,64	0,35	1,00	max	max	0,90	max	max	max

SAE J1268

Grade	C %	Si %	Mn %	S %	P %	Cr %	Ni %	Mo %	Cu %
SAE 5160H	0,55	0,15	0,65	0,025	0,025	0,60	0,25	0,06	0,35
	0,65	0,35	1,10	max	max	1,00	max	max	max

Micro-alloy steel**Rolled**

Grade	C %	Si %	Mn %	S %	P %	Cr %	Ni %	Mo %	Cu %	V %	Al %	N %
*38MnSi	0.35	0.50	1.35	0.045		0.10	0.03	0.01		0.080	0.010	0.013
VS5(PB43904)	0.39	0.65	1.50	0.060	0.025	0.20	0.15	0.05	0.18	0.120	0.030	0.017
38MnVS6 (QV33029)	0.38	0.50	1.30	0.030		0.10				0.080	0.010	0.010
	0.42	0.70	1.45	0.045	0.035	0.20	0.20	0.10	0.25	0.130	0.030	0.020

Alloy steel**ASTM A 193****Forged and rolled**

Grade	C %	Si %	Mn %	S %	P %	Cr %	Mo %	V %	Al %
B16	0,36	0,15	0,45	0,040	0,035	0,80	0,50	0,25	-
	0,47	0,35	0,70	max	max	1,15	0,65	0,35	
B7	0,37	0,15	0,65	0,040	0,035	0,75	0,15	-	0,020
	0,49	0,35	1,10	max	max	1,20	0,25		0,040

ASTM A 320

Grade	C %	Si %	Mn %	S % max	P % max	Cr %	Ni %	Mo %	V % max	Al %
L7	0,38	0,15	0,75			0,80	0,60	0,15		0,02
	0,48	0,35	1,00	0,040	0,035	1,10	0,70	0,25	0,010	0,04

BS 970**Forged and rolled**

Grade	C %	Si %	Mn %	S % max	P % max	Cr %	Ni %	Mo %	Al %
530A40	0,38-0,43	0,10-0,35	0,60-0,80	0,040	0,035	0,90-1,20	-	-	-
655M13	0,10-0,16	0,10-0,35	0,35-0,60	0,040	0,035	0,70-1,00	3,00-3,75	0,15 max	0,02-0,04
708A42	0,40-0,45	0,10-0,35	0,75-1,00	0,040	0,035	0,90-1,20	0,40 max	0,15-0,25	-
708M40	0,36-0,44	0,10-0,35	0,70-1,00	0,040	0,035	0,90-1,20	-	0,15-0,25	-

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709M40	0,36-0,44	0,10-0,35	0,70-1,00	0,040	0,035	0,90-1,20	0,40 max	0,25-0,35	-
817M40	0,36-0,44	0,10-0,35	0,45-0,70	0,025	0,025	1,00-1,40	1,30-1,70	0,20-0,35	-
826M40	0,36-0,44	0,10-0,35	0,45/0,70	0,025	0,025	0,50-0,80	2,30-2,80	0,45-0,65	0,02-0,04
835M15	0,12-0,18	0,10-0,35	0,25-0,50	0,025	0,025	1,00-1,40	3,90-4,30	0,15-0,30	0,02-0,04
835M30	0,26-0,34	0,10-0,35	0,45-0,70	0,025	0,025	1,10-1,40	3,90-4,30	0,20-0,35	0,02-0,04

DIN 17200

Rolled

Grade	C %	Si % max	Mn %	S % max	P % max	Cr %	V %
50CrV4	0,47-0,55	0,15-0,40	0,70-1,10	0,030	0,035	0,90-1,20	0,10-0,20

DIN 17210: 1986

Rolled

Grade	C %	Si % max	Mn %	S % max	P % max	Cr %	V % max	Al %
16MnCr5	0,14-0,19	0,40	1,00-1,30	0,035	0,035	0,80-1,10	0,010	0,020-0,040

DIN 17221

Rolled

Grade	C %	Si %	Mn %	S % max	P % max	Cr %	V %
50CrV4	0,47-0,55	0,15-0,40	0,70-1,10	0,030	0,035	0,90-1,20	0,10-0,20
55Cr3	0,52-0,59	0,25-0,50	0,70-1,10	0,030	0,030	0,70-1,00	-

DIN 17350

Grade	C %	Si %	Mn %	S % max	P % max	Cr %	V %
31CrV3	0,28-0,35	0,25-0,40	0,40-0,60	0,030	0,030	0,40-0,70	0,070-0,120

Mittal Steel South Africa

Grade	C %	Si %	Mn %	S %	P %	Cr %	Ni %	Mo %	V %
K0006	0,45	0,15	0,60	0,010	0,015	0,90	0,40	0,90	0,080
	0,50	0,30	0,90	0,022	max	1,20	0,70	1,10	0,150

SAE J404

Grade	C %	Si %	Mn %	S %	P %	Cr %	Ni %	Mo %	Cu %	Al %	Ti %
SAE 4140	0,38	0,15	0,75	0,025	0,025	0,80	0,025	0,15	0,35	-	-
	0,43	0,35	1,00	max	max	1,10	max	0,25	max		
SAE 4320	0,17	0,15	0,45	0,025	0,025	0,40	1,65	0,20	-	0,020	0,010
	0,22	0,35	0,65	max	max	0,60	2,00	0,30		0,040	max
SAE 8620	0,18	0,15	0,70	0,040	0,035	0,40	0,40	0,15	0,35	0,020	-
	0,23	0,35	0,90	max	max	0,60	0,70	0,25	max	0,040	

SAE J1268

Grade	C %	Si %	Mn %	S %	P %	Cr %	Ni %	Mo %	Cu %	Al %
SAE 8637H	0,34	0,15	0,70	0,025	0,025	0,35	0,35	0,15	0,22	0,020
	0,41	0,35	1,05	max	max	0,65	0,75	0,25	max	0,040

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Free cutting steel

BS 970

Grade	C % max	Si % max	Mn %	S %	P % max
*220M07	0,15	0,10	0,90-1,30	0,20-0,30	0,070
*230M07	0,15	0,10	0,90-1,30	0,25-0,35	0,070

Hollow drill rod steel

ArcelorMittal South Africa

Grade	C %	Si %	Mn %	S %	P %	Cr %	Ni %	Mo %	V %	Al %
*K0036	0,90	0,10	0,30	0,030	0,030	0,95	0,25	0,15	0,025	0,020
	0,98	0,25	0,45	max	max	1,20	max	0,30	max	0,040
*NCM24/01	0,18	0,15	0,55	0,010		1,20	2,50	0,20		0,010
	0,22	0,35	0,75	0,025	0,020	1,40	3,00	0,30	0,030	0,030
*CMNS40/01	0,39	1,40	0,80	0,010		0,60	0,40	0,18		0,015
	0,43	1,60	0,95	0,030	0,025	0,80	0,50	0,28	0,010	0,040

Legend * = billets / blooms manufactured at Newcastle plant

ArcelorMittal South Africa seamless tube steels

See data sheet S5.

Tool steels – forged

The following standard tool steels are available in forged products:

- RCC SUPRA® / D2 1.2379
- RDC 2 V / H13
- RGS 4 / L6
- RUS 3 / 01
- RTW 2 H / S1

All tool steels are supplied in the annealed and machined condition. RDC 2 V and RCC SUPRA® can also be supplied via the ESR process. The chemical analyses of these standard qualities are given in the table below:

Quality/ Element	RCC Supra/ D2	RDC 2V/ H13	RGS 4/ L6	RUS 3/ 01	RTW 2H/ S1
C	1,50-1,60	0,37-0,42	0,53-0,58	0,87-1,02	0,43-0,48
Si	0,25-0,45	0,90-1,20	0,20-0,40	0,15-0,35	0,80-1,10
Mn	0,25-0,45	0,25-0,45	0,65-0,85	1,05-1,25	0,20-0,40
S	0,030 max	0,015 max	0,010 max	0,030 max	0,020 max
P	0,030 max	0,025 max	0,020 max	0,030 max	0,025 max
Cr	11,0-12,0	4,80-5,30	1,00-1,20	0,40-0,60	1,00-1,20
Ni			1,50-1,80		
Mo	0,70-0,90	1,20-1,50	0,42-0,52		
V	0,80-1,00	0,90-1,10	0,15-0,20	0,05-0,15	0,15-0,20
W				0,40-0,60	1,80-2,10

Accreditation

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

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