

Docol Hardenable Steel - Boron Steel

Cold rolled hardenable sheet

PRODUCT

Docol boron steels are alloyed with a small percentage of boron to improve the hardenability. The steels can easily be hardened and can often be used without subsequent tempering.

The steels are comparable to the standard EN 10083-3.

APPLICATION

Docol boron steels are used for a variety of applications - as a wear material and as a high strength structural steel. Examples include punching tools, spades, knives, saw blades, safety beams in vehicles etc.

DIMENSION RANGE

Docol boron steels are delivered in the following dimensions in the cold rolled and annealed condition.

Thickness (mm)	Docol 20MnB5, 30MnB5, 27MnCrB5		Docol 33MnCrB5, 38MnB5, 39MnCrB6	
	Width (mm)	Width (mm)	Width (mm)	Width (mm)
0.70 - 0.79	600 - 625	800 - 1350	600 - 625	900 - 1100 900 - 1100 900 - 1250
0.80 - 0.89	600 - 700	800 - 1400		
0.90 - 0.99	600 - 750	800 - 1500		
1.00 - 2.00	600 - 750	800 - 1500		
2.01 - 3.00		800 - 1500		

CHEMICAL COMPOSITION

Steel grade	C (%) min - max	Si (%) max	Mn (%) min - max	P (%) max	S (%) max	Cr (%) min - max	B (%) min - max
Docol 20MnB5	0.17 - 0.23	0.40	1.10 - 1.40	0.030	0.015	0.10 - 0.30	0.0008 - 0.0050
Docol 30MnB5	0.27 - 0.33	0.40	1.15 - 1.45	0.030	0.015	0.10 - 0.30	0.0008 - 0.0050
Docol 38MnB5	0.36 - 0.42	0.40	1.15 - 1.45	0.030	0.015	0.10 - 0.30	0.0008 - 0.0050
Docol 27MnCrB5	0.24 - 0.30	0.40	1.10 - 1.40	0.030	0.015	0.30 - 0.60	0.0008 - 0.0050
Docol 33MnCrB5	0.30 - 0.36	0.40	1.20 - 1.50	0.030	0.015	0.30 - 0.60	0.0008 - 0.0050
Docol 39MnCrB6	0.36 - 0.42	0.40	1.40 - 1.70	0.030	0.015	0.30 - 0.60	0.0008 - 0.0050

MECHANICAL PROPERTIES
(Approximative values)

Steel grade	Condition	Yield strength $R_{p0,2}$ (Mpa)	Tensile strength R_m (Mpa)	Elongation A_{80} (%)	Hardness HRC	Quenching Temperature (°C)
Docol 20MnB5	Annealed	350	500	28		
	Water quenched		1480		46	860
	Oil quenched		1360		43	900
Docol 30MnB5	Annealed	350	500	28		
	Water quenched		1845		53	850
	Oil quenched		1675		50	900
Docol 38MnB5	Annealed	350	500	28		
	Water quenched		2050		56	840
	Oil quenched		1845		53	880
Docol 27MnCrB5	Annealed	400	550	25		
	Water quenched		1735		51	860
	Oil quenched		1575		48	900
Docol 33MnCrB5	Annealed	400	550	25		
	Water quenched		1845		53	840
	Oil quenched		1675		50	880
Docol 39MnCrB6	Annealed	400	550	25		
	Water quenched		1980		55	830
	Oil quenched		1795		52	870

BENDABILITY

	Nominal thickness, t $0.7 \text{ mm} \leq t \leq 3.0 \text{ mm}$
Min. recommended bending radius ($\leq 90^\circ$)	1.0 x t

WELDING

Recommended fusion welding methods for Docol boron steels include manual metal arc welding (MMA) and gas metal arc welding (GMAW). Docol 20MnB5, Docol 30MnB5, Docol 27MnCrB5 and Docol 33MnCrB5 can be welded without preheating. When welding Docol boron steels it is important to use filler metals of low hydrogen content and for MMA-welding basic electrodes are recommended.

If it is possible welding should be carried out before hardening. If welding is carried out after hardening it is recommended that filler metals of higher strength are used to reduce the difference in hardness between weldment and base metal.

If the welded joints are placed in areas of low stresses filler metals of lower strength than the ones listed in the table below can be used.

RECOMMENDED FILLER METALS

Steel grades		Manual metal arc welding (MMA)	Gas metal arc welding (GMAW)
Docol 20MnB5 Docol 30MnB5 Docol 27MnCrB5 Docol 33MnCrB5	Before hardening	AWS: A5.1 E7018	AWS: A5.28 ER 80S-X
	After hardening	AWS: A5.5 E 11018-G	AWS: A5.28 ER110S-X

For welding of the steels Docol 38MnB5 and Docol 39MnCrB6 please contact the customer service department at SSAB Tunnplåt.

The particulars in this data sheet are correct at the time of going to print and are intended to give general guidance for the use of the product. Subject to changes arising from continual product development. The information and data must not be regarded as guaranteed values, unless specially confirmed in writing.



SSAB Tunnpålat AB

781 84 Borlänge
Telephone +46 243 700 00
Telefax +46 243 720 00
www.ssabtunnplat.com
E-mail: office@ssabtunnplat.com

China**SSAB Swedish Steel**

Beijing
Telephone +86 10 6466 3441
Telefax +86 10 6466 3442

France**SSAB Swedish Steel SA**

Neuilly Sur Seine Cedex
Telephone +33 1 55 61 91 00
Telefax +33 1 55 61 91 09

Great Britain**SSAB Swedish Steel Ltd.**

Droitwich
Telephone +44 1905 79 57 94
Telefax +44 1905 79 47 36

Italy**SSAB Swedish Steel S.p.A.**

Ghedi
Telephone +39 030 905 88 11
Telefax +39 030 905 89 30

Japan**SSAB Swedish Steel Ltd**

Shiba
Telephone +81 33 456 3447
Telefax +81 33 456 3449

Korea**SSAB Tunnpålat Korea Branch**

Korea
Telephone +82 31 909 5700
Telefax +82 31 909 5702

Netherlands**SSAB Swedish Steel BV**

Beuningen
Telephone +31 24 679 05 50
Telefax +31 24 679 05 55

Poland**SSAB Swedish Steel Sp z.o.o**

Warszawa
Telephone +48 602725985
Telefax +48 22 7725171

Portugal**SSAB Swedish Steel**

Santa Maria da Feira
Telephone +351 256 371 610
Telefax +351 256 371 619

Spain**SSAB Swedish Steel, S.L.**

Madrid
Telephone +34 91 300 54 22
Telefax +34 91 388 96 97

South Africa**SSAB Swedish Steel (Pty) Ltd**

East Rand
Telephone +27 11 824 3917 / 8 / 9
Telefax +27 11 824 2169