

# Domex Hardenable Steel - Boron Steel

## Hot rolled hardenable sheet

### PRODUCT

Domex 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 produced in accordance with the standard EN 10083-3.

### APPLICATION

Domex boron steels are used for a variety of applications - as a wear material and as a high strength structural steel. Examples include wear plate, screen plate, punching tools, spades, knives, saw blades, caterpillar tracks, safety beams in vehicles and wear parts and structural parts for agricultural machinery.

### DIMENSION RANGE

Domex boron steels are delivered in the following dimensions in the as rolled, pickled or annealed condition with mill edge.

Thickness (mm)	Domex 20MnB5 Width (mm)	Domex 27MnCrB5, Width (mm)	Domex 30MnB5, 33MnCrB5, 38MnB5, 39MnCrB6 Width (mm)
1.80 - 1.99	800 - 1050		
2.00 - 2.24	800 - 1100	885 - 1050	885 - 1150
2.25 - 2.49	800 - 1150	885 - 1100	885 - 1150
2.50 - 2.74	800 - 1300	885 - 1150	885 - 1300
2.75 - 2.99	800 - 1400	885 - 1200	885 - 1300
3.00 - 3.24	800 - 1540	885 - 1300	885 - 1400
3.25 - 3.49	800 - 1600	885 - 1300	885 - 1600
3.50 - 3.74	800 - 1600	885 - 1350	885 - 1600
3.75 - 3.99	800 - 1600	885 - 1500	885 - 1600
4.00 - 7.49	800 - 1600	885 - 1600	885 - 1600
7.50 - 7.99	800 - 1600	885 - 1600	885 - 1500
8.00 - 10.00	800 - 1600	885 - 1600	885 - 1300
10.01 - 12.00	800 - 1600	885 - 1400	

The sheet can be supplied in lengths of 1500 - 13000 mm.

## CHEMICAL COMPOSITION

Steel grade	C (%) min - max	Si (%) max	Mn (%) min -max	P (%) max	S (%) max	Cr (%) min - max	B (%) min - max
Domex 20MnB5	0.17 - 0.23	0.40	1.10 - 1.40	0.030	0.015	0.10 - 0.30	0.0008 - 0.0050
Domex 30MnB5	0.27 - 0.33	0.40	1.15 - 1.45	0.030	0.015	0.10 - 0.30	0.0008 - 0.0050
Domex 38MnB5	0.36 - 0.42	0.40	1.15 - 1.45	0.030	0.015	0.10 - 0.30	0.0008 - 0.0050
Domex 27MnCrB5	0.24 - 0.30	0.40	1.10 - 1.40	0.030	0.015	0.30 - 0.60	0.0008 - 0.0050
Domex 33MnCrB5	0.30 - 0.36	0.40	1.20 - 1.50	0.030	0.015	0.30 - 0.60	0.0008 - 0.0050
Domex 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 $R_e$ (Mpa)	Tensile strength $R_m$ (Mpa)	Elongation $A_5$ (%)	Hardness HRC	Quenching Temperature (°C)
Domex 20MnB5	Rolled	400	600	23	46 43	860 900
	Annealed	230	450	33		
	Water quenched		1480			
	Oil quenched		1360			
Domex 30MnB5	Rolled	400	600	20	53 50	850 900
	Annealed	280	500	27		
	Water quenched		1845			
	Oil quenched		1675			
Domex 38MnB5	Rolled	400	600	19	56 53	840 880
	Annealed	320	560	26		
	Water quenched		2050			
	Oil quenched		1845			
Domex 27MnCrB5	Rolled	400	600	20	51 48	860 900
	Annealed	330	500	30		
	Water quenched		1735			
	Oil quenched		1575			
Domex 33MnCrB5	Rolled	400	600	19	53 50	840 880
	Annealed	340	560	29		
	Water quenched		1845			
	Oil quenched		1675			
Domex 39MnCrB6	Rolled	400	600	18	55 52	830 870
	Annealed	340	620	27		
	Water quenched		1980			
	Oil quenched		1795			

## BENDABILITY

	Nominal thickness, t 1.8 mm ≤ t ≤ 12.0 mm	
	Rolled	Annealed
Min. recommended bending radius (≤90°)	2.0 x t	1.0 x t

## WELDING

Recommended fusion welding methods for Domex boron steels include manual metal arc welding (MMA), gas metal arc welding (GMAW) and flux cored arc welding (FCAW). To avoid problems with hydrogen cracking preheating should be used according to the recommendations in the table below.

### Recommended preheating temperature according to EN 1011-2

Combined thickness (mm) $t1 + t2 + t3$	5	10	15	20	25	30	35	40
Domex 20MnB5	A	A	A	A	A	A	A	50°C
Domex 30MnB5	A	A	A	100°C	125°C			
Domex 38MnB5	A	50°C	125°C	150°C	175°C		200°C	
Domex 27MnCrB5	A	A	75°C	125°C	150°C			
Domex 33MnCrB5	A	50°C	125°C	150°C	175°C		200°C	

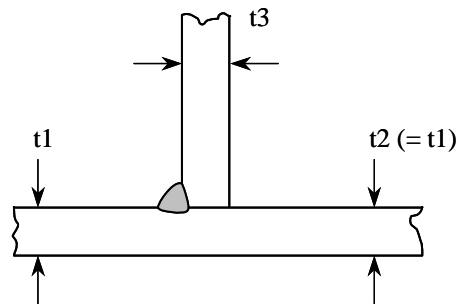
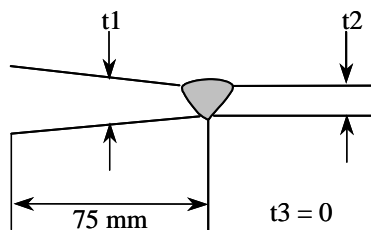
A = Ambient temperature

The recommended preheating temperature is valid when:

- the hydrogen content of deposited metal is max. 5 ml/100g.
- the heat input is not below 0.5 kJ/mm.

### Combined thickness = $t1 + t2 + t3$ according to EN 1011-2

$t1$  = average thickness over a length of 75 mm



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 is used to reduce the difference in hardness between weldment and base metal. If the welded joints are placed in areas of low stresses and wearing is not a problem filler metals of lower strength than the ones listed in the table below can be used.

## RECOMMENDED FILLER METALS

	Manual metal arc welding (MMA)	Gas metal arc welding (GMAW)	Flux cored arc welding (FCAW)
Before hardening	AWS: A5.1 E7018	AWS: A5.28 ER 80S-X	AWS: A5.29 E8XT-X
After hardening	AWS: A5.5 E 11018-G	AWS: A5.28 ER110S-X	AWS: A5.29 E11XT-X

Welding of the Domex 39MnCrB6 is not recommended due to the high risk of hydrogen cracks.

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.



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