

Domex Hardenable Steel - High Carbon Steel

Hot rolled sheet for quenching and tempering

PRODUCT

Domex high carbon steels are steels which, because of their chemical composition are suitable for hardening, and in the quenched and tempered condition have good toughness at a given strength. The steels are produced in accordance with the standard EN 10083-1.

APPLICATION

Domex high carbon steels are used for applications in which high strength, hardness and wear resistance are necessary, such as wear parts, knives, saw blades, springs, gear wheels, chains, brackets, washers etc.

The formability is improved if the material is annealed before forming.

DIMENSION RANGE

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

Thickness (mm)	Domex C22, C35, C45, C55, C60, C75 Width (mm)	Domex 51CrV4, 42CrMo4 Width (mm)
1.95 - 1.99	885 - 1100	
2.00 - 2.39	885 - 1150	
2.40 - 2.49	885 - 1150	885 - 1050
2.50 - 2.74	885 - 1300	885 - 1050
2.75 - 2.99	885 - 1300	885 - 1200
3.00 - 3.24	885 - 1400	885 - 1300
3.25 - 4.99	885 - 1600	885 - 1300
5.00 - 7.49	885 - 1600	885 - 1600
7.50 - 7.99	885 - 1500	885 - 1500
8.00 - 10.00	885 - 1300	885 - 1300

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

CHEMICAL COMPOSITION

Steel grade	C (%) min - max	Si (%) min -max	Mn (%) min -max	P (%) max	S (%) max	Cr (%) min - max	Other min - max
Domex C22	0.17 - 0.24	0.15 - 0.35	0.40 - 0.70	0.025	0.025	0.20 - 0.40	
Domex C35	0.32 - 0.39	0.15 - 0.35	0.50 - 0.80	0.025	0.025	0.20 - 0.40	
Domex C45	0.42 - 0.50	0.15 - 0.35	0.50 - 0.80	0.025	0.025	0.20 - 0.40	
Domex C55	0.52 - 0.60	0.15 - 0.35	0.60 - 0.90	0.025	0.025	0.20 - 0.40	
Domex C60	0.57 - 0.65	0.15 - 0.35	0.60 - 0.90	0.025	0.025	0.20 - 0.40	
Domex C67	0.65 - 0.73	0.15 - 0.35	0.60 - 0.90	0.025	0.025	0.20 - 0.40	
Domex C75	0.70 - 0.80	0.15 - 0.35	0.60 - 0.90	0.025	0.025	0.20 - 0.40	
Domex 42CrMo4	0.38 - 0.45	0.15 - 0.35	0.60 - 0.90	0.025	0.025	0.90 - 1.20	Mo 0.15 - 0.30
Domex 51CrV4	0.47 - 0.55	0.15 - 0.35	0.70 - 1.10	0.025	0.025	0.90 - 1.20	V 0.10 - 0.25

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 C22	Rolled	360	510	28		
	Annealed	280	420	30		
	Water quenched		-		-	
	Oil quenched		-		-	
Domex C35	Rolled	440	700	18		
	Annealed	310	480	30		
	Water quenched		1845		53	840
	Oil quenched		1690		50	880
Domex C45	Rolled	460	750	18		
	Annealed	330	540	30		
	Water quenched		2270		58	820
	Oil quenched		1980		55	860
Domex C55	Rolled	500	825	18		
	Annealed	350	550	30		
	Water quenched		2510		61	805
	Oil quenched		2120		57	845
Domex C60	Rolled	540	875	17		
	Annealed	370	580	29		
	Water quenched		2670		63	800
	Oil quenched		2430		60	840
Domex C67	Rolled	570	925	16		
	Annealed	370	580	29		
	Water quenched		2920		66	790
	Oil quenched		2670		63	830
Domex C75	Rolled	600	1000	15		
	Annealed	370	570	28		
	Water quenched		3000		67	785
	Oil quenched		2760		64	825
Domex 42CrMo4	Rolled	500	800	15		
	Annealed	380	590	30		
	Water quenched		2120		57	820
	Oil quenched		1910		54	860
Domex 51CrV4	Rolled	500	800	15		
	Annealed	380	590	30		
	Water quenched		2510		61	820
	Oil quenched		2270		58	860

BENDABILITY

Steel grade		Nominal thickness, t $1.95 \text{ mm} \leq t \leq 10.0 \text{ mm}$	
		Rolled	Annealed
Domex C22 Domex C35 Domex C45	Min. recommended bending radius ($\leq 90^\circ$)	$2.0 \times t$	$1.0 \times t$
Domex C55 Domex C60 Domex C67 Domex C75 Domex 42CrMo4 Domex 51CrV4	Min. recommended bending radius ($\leq 90^\circ$)	$3.0 \times t$	$1.0 \times t$

WELDING

Recommended fusion welding methods for Domex high carbon 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) $t_1 + t_2 + t_3$	5	10	15	20	25	30	35	40
Domex C22	A	A	A	A	A	A	A	A
Domex C35	A	A	A	50°C	75°C	100°C	125°C	150°C
Domex C45	A	50°C	125°C	150°C	175°C		200°C	

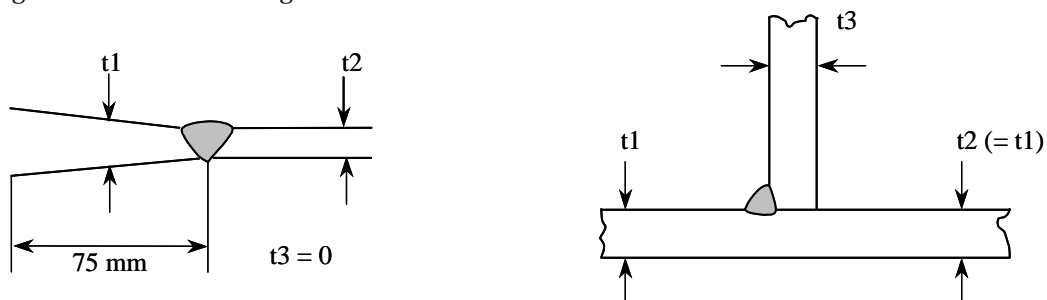
A = Ambient temperature

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 = $t_1 + t_2 + t_3$ according to EN 1011-2

t_1 = average thickness over a length of 75 mm



If it is possible welding should be carried out before hardening.

RECOMMENDED FILLER METALS

Manual metal arc welding (MMA)	Gas metal arc welding (GMAW)	Flux cored arc welding (FCAW)
AWS: A5.1 E7018	AWS: A5.18 ER 70S-X	AWS: A5.20 E71T-X

Welding of other Domex high carbon steels (Domex C55 – C75, Domex 42CrMo4, Domex 51CrV4) 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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