High-carbon steel: With rolling hardness (+CR)

Chemical Composition

Classification of symbols	Numerical classification	European Standard (EN)	Chemical Composition							
			C	Si	Mn	Max. P	Max. S	Cr	Mo	Ni
C45E	1.1191	EN 10132-3	0.42 - 0.50	max. 0.40	0.50 - 0.80	0.035	0.035	max. 0.40	max. 0.10	max. 0.40
C67S	1.1231	EN 10132-4	0.65 - 0.73	0.15 - 0.35	0.60 - 0.90	0.025	0.025	max. 0.40	max. 0.10	max. 0.40
C75S	1.1248	EN 10132-4	0.70 - 0.80	0.15 - 0.35	0.60 - 0.90	0.025	0.025	max. 0.40	max. 0.10	max. 0.40

Equivalents

Classification of symbols	Numerical classification	European Standard (EN)	Approximate international equivalents					
			US (AISI)		Japan (JIS)		China (GB)	
C45E	11191	EN 10132-3	1045	A682/684	S45C	G4051	45	GB 3522
C67S	11231	EN 10132-4	1065	A682/684	S65C-CSP	G4802	70	GB/T 1222
C75S	11248	EN 10132-4	1074	A682/684	-	-	-	-

Mechanical properties

Classification of symbols	Numerical classification	European Standard (EN)	Mechanical properties and hardness requirements	
			Cold rolling (+CR)	
			Rm N/mm² max	Max. HV
C45E	1.1191	EN 10132	1020	290
C67S	1.1231	EN 10132	1140	315
C75S	1.1248	EN 10132	1170	320

Note: it is possible to specify the hardness values or the tensile strength values, but not both. If neither of the two values is specified, the tensile strength value is calculated. The specification for tensile strength/hardness must fall within a range of 150 N/mm² or 50 HV, unless expressly stated otherwise in the commercial agreement.

Finishes

EN 10132-3:2000, EN 10132-4:2000

- The requirements regarding roughness can be agreed when requesting the quote or placing the order.
- Cold-rolled strips should have a bright surface finish, as obtained during rolling.

Tolerances

THICKNESS TOLERANCES

A) Specified thickness tolerances for cold rolled strip and strip obtained strapping wide precision rolling *w*.

According to the EN 10140:2006 Standard.

Nominal Thickness *t*		Thickness tolerances according to EN 10140 for nominal widths *w* of					
		<125			≥ 125 and <600		
>	≤	A normal	B fine	C precision	A normal	B fine	C precision
-	0.10	± 0.008	± 0.006	± 0.004	± 0.010	± 0.008	± 0.005
0.10	0.15	±0.010	± 0.008	± 0.005	± 0.015	± 0.012	± 0.010
0.15	0.25	±0.015	± 0.012	± 0.008	± 0.020	± 0.015	± 0.010
0.25	0.40	± 0.020	± 0.015	± 0.010	± 0.025	± 0.020	± 0.012
0.40	0.60	± 0.025	± 0.020	± 0.012	± 0.030	± 0.025	± 0.015
0.60	1.00	± 0.030	± 0.025	± 0.015	± 0.035	± 0.030	± 0.020
1.00	1.50	± 0.035	± 0.030	± 0.020	± 0.040	± 0.035	± 0.025
1.50	2.50	± 0.045	± 0.035	± 0.025	± 0.050	± 0.040	± 0.030
2.50	4.00	± 0.050	± 0.040	± 0.030	± 0.060	± 0.050	± 0.035

Nominal Thickness t		Thickness tolerances according to EN 10140 for nominal widths w of					
		<125			≥ 125 and <600		
>	≤	A normal	B fine	C precision	A normal	B fine	C precision
4.00	6.00	± 0.060	± 0.050	± 0.035	± 0.070	± 0.055	± 0.040

Sizes in mm.

WIDTH TOLERANCES

Width tolerances for strips with sheared edges		Standard slitting tolerances for Metalle Schmidt GmbH [1]				Width tolerances according to the EN 10140 Standard for nominal widths of:					
Nominal Thickness t		3-15	15-50	50-150	>150	<125		≥ 125 and <250		≥250 and <600	
>=	<					A	B	A	B	A	B
0.1	0.4	± 0.075 [2]	± 0.075 [2]	± 0.075 [2]	± 0,10 [2]	± 0.15	± 0.10	± 0.20	± 0.13	± 0.25	± 0.18
0.4	0.7	± 0,085	± 0,09	± 0,10	± 0,12	± 0.15	± 0.10	± 0.20	± 0.13	± 0.25	± 0.18
0.7	1.0	± 0.085 [3]	± 0.09 [3]	± 0.10 [3]	± 0.12 [3]	± 0.20	± 0.13	± 0.25	± 0.18	± 0.30	± 0.20
1.0	1.5	± 0.10 [4]	± 0.10 [4]	± 0.10 [4]	± 0.15 [4]	± 0.20	± 0.13	± 0.25	± 0.18	± 0.30	± 0.20
1.5	2.5	on request	± 0.13 [5]	± 0.15 [5]	± 0.16 [5]	± 0.25	± 0.18	± 0.30	± 0.20	± 0.35	± 0.20
2.5	2.6	on request	on request	± 0.16	± 0.175	± 0.25	± 0.18	± 0.30	± 0.20	± 0.35	± 0.25
2.6	4.1	on request	on request	± 0.16	± 0.175	± 0.30	± 0.20	± 0.35	± 0.25	± 0.40	± 0.30
4.1	6.1	on request	on request	± 0.16	± 0.175	± 0.35	± 0.25	± 0.40	± 0.30	± 0.45	± 0.35

1) Other, closer dimensional tolerances are possible under a commercial agreement

2) Including the value t= 0.4

3) Including the value t= 1

4) Including the value t= 1.5

5) Including the value t= 2.5

LENGTH TOLERANCES

Length tolerances	Closer tolerances are possible under a commercial agreement	Positive tolerance in relation to the nominal length, according to the EN 10140 Standard for the	
L ≤ 1000	+ 2	+ 10	+ 6
1000 < L ≤ 2500	+0,002L	+ 0.01 L	+ 6
L > 2500	+0,002L	+ 0.01 L	+ 0.003 L

Sizes in mm.

EDGE CAMBER TOLERANCES

Nominal width (w)	Closer edge curve tolerances possible under a commercial agreement		Edge curve tolerances according to the EN 10140 Standard	
	Maximum deviation 1000 mm			
	Thickness t		Class A (Normal) (maximum deviation)	Class B (FS) (Reduced) (maximum deviation)
	$t \leq 1.20$ mm	$t > 1.20$ mm		
3 ≤ W < 6	2.50	4.00	-	-
6 < W ≤ 10	2.00	3.00	-	-
10 < W ≤ 20	1.00	1.50	5.00	2.00
20 < W < 25	1.00	1.50	5.00	2.00
25 ≤ W < 40	1.00	1.50	3.50	1.50
40 ≤ W < 125	1.00	1.50	2.50	1.25
125 ≤ W ≤ 350	1.00	1.50	2.00	1.00
350 < W < 600	-	-	2.00	1.00

Sizes in mm.

The absolute value of the tolerance can be divided within that range.

RIPPLE - LONGITUDINAL FLATNESS

The flatness tolerance of the strips in cut lengths in the direction of rolling must be a maximum of 10 mm over 1000 mm. Any other flatness requirement must be agreed when placing the order.