

MILD STEEL FOR COLD FORMING

We can also produce according to DIN 1624, NFA 37-501, ASTM A1 008

ACCORDING TO EN 10139 - tolerances according to EN 10140

SYMBOLIC & DESIGNATIONS OF STEEL GRADE	CHEMICAL COMPOSITION OF TAPPING %					DELIVERY CONDITION		MECHANICAL PROPERTIES** (LONG DIRECTION)				
	C maxi	P maxi	S maxi	Mn maxi	Ti maxi	Condition	Symbol	Thickness (Ep) (mm)	Elongation A 80 %	RE, Rel, Rp 0.2 Mpa	Rm Mpa	
DC01 (1.0330)	0,12	0,045	0,045	0,60	-	annealed	A	-	≥28	-	270 / 390	
						skin-passed	LC *	Ep ≤ 0,15	≥20	≤320	270 / 410	
								0,15 < Ep ≤ 0,25	≥22	≤320	270 / 410	
								0,25 < Ep ≤ 0,5	≥24	≤320	270 / 410	
								0,5 < Ep ≤ 0,7	≥26	≤300	270 / 410	
						hardened	C290	-	≥18	200 / 380	290 / 430	
								C340	-	-	≥250	340 / 490
								C390	-	-	≥310	390 / 540
								C440	-	-	≥360	440 / 590
								C490	-	-	≥420	490 / 640
C590	-	-	≥520	590 / 740								
DC03 (1.0347)	0,10	0,035	0,035	0,45	-	annealed	A	-	≥34	-	270 / 370	
						skin-passed	LC *	Ep ≤ 0,15	≥26	≤280	270 / 370	
								0,15 < Ep ≤ 0,25	≥28	≤280	270 / 370	
								0,25 < Ep ≤ 0,5	≥30	≤280	270 / 370	
								0,5 < Ep ≤ 0,7	≥32	≤260	270 / 370	
						hardened	C290	-	≥22	210 / 355	290 / 390	
								C340	-	-	≥240	340 / 440
								C390	-	-	≥330	390 / 490
								C440	-	-	≥380	440 / 540
								C490	-	-	≥440	490 / 590
C590	-	-	≥540	>590								
DC04 (1.0338)	0,08	0,030	0,030	0,40	-	annealed	A	-	≥38	-	270 / 350	
						skin-passed	LC *	Ep ≤ 0,15	≥30	≤250	270 / 350	
								0,15 < Ep ≤ 0,25	≥32	≤250	270 / 350	
								0,25 < Ep ≤ 0,5	≥34	≤250	270 / 350	
								0,5 < Ep ≤ 0,7	≥36	≤230	270 / 350	
						hardened	C290	-	≥24	220 / 325	290 / 390	
								C340	-	-	≥240	340 / 440
								C390	-	-	≥350	390 / 490
								C440	-	-	≥440	440 / 540
								C490	-	-	≥490	490 / 590
C590	-	-	≥590	590 / 690								
DC05 (1.0312)	0,06	0,025	0,025	0,35	-	skin-passed	LC *	Ep ≤ 0,15	≥32	≤220	270 / 330	
								0,15 < Ep ≤ 0,25	≥34	≤220	270 / 330	
								0,25 < Ep ≤ 0,5	≥36	≤220	270 / 330	
								0,5 < Ep ≤ 0,7	≥38	≤200	270 / 330	
								Ep > 0,7	≥40	≤180	270 / 330	
DC06 (1.0873)	0,02	0,020	0,020	0,25	0,3	skin-passed	LC *	Ep ≤ 0,15	≥30	≤210	270 / 330	
								0,15 < Ep ≤ 0,25	≥32	≤210	270 / 330	
								0,25 < Ep ≤ 0,5	≥34	≤210	270 / 330	
								0,5 < Ep ≤ 0,7	≥36	≤190	270 / 330	
								Ep > 0,7	≥38	≤170	270 / 330	

* For the LC condition with MB or MC finish : Re + 20 Mpa . Rm + 20 Mpa . Elongation - 2 points. ** Plastic anisotropy coefficient r available on request.

Symbolic	SURFACE TYPES		SURFACE FINISHES
	Specifications	Application fields	
MA	Naked surfaces, without metallic defects Pores, little defects, light scratches admitted	All thicknesses All thermic treatments	RR (rough), RM (matt), RL (normal) (2)
MB	Naked surfaces, without metallic defects Pores, little defects, light scratches admitted if it doesn't affect the smooth and uniform surface's aspect visible with a naked eye	Thicknesses ≤ 2,0 mm (1) All thermic treatments. Except A	RM (matt), RL (normal) (2)
MC	Naked surfaces, without metallic defects Pores, little defects, light scratches admitted if it doesn't affect the mirror aspect of the surface	Thicknesses ≤ 1,0 mm (1) All thermic treatments. Except A	RL (normal) (2)

(1) products with higher thickness can be delivered by specific agreement - (2) symbolic doesn't have to be mentioned on designation
Surface finishings : RR (rough) : Ra 1,5 µm. RM (matt) : 0,6 µm < Ra 1,8 µm. RL (normal) : Ra 0,6 µm. RN (bright) : Ra 0,2 µm

DIMENSIONAL AND OTHER TOLERANCES (EXCLUDING STAINLESS STEEL)

EN 10140

We can also produce according to DIN 1544, NFA 47-501, ASTM

NOMINAL THICKNESS (e) (mm)		THICKNESS TOLERANCES (mm)					
		Width < 125 mm			≥ 125 mm and < 600 mm ^a		
>	≤	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
4,00	6,00	± 0,060	± 0,050	± 0,035	± 0,070	± 0,055	± 0,040
6,00	8,00	± 0,075	± 0,060	± 0,040	± 0,085	± 0,065	± 0,045
8,00	10,00	± 0,090	± 0,070	± 0,045	± 0,100	± 0,075	± 0,050

Note 1 : The thickness measurement is made at 10 mm from the edge (on th middle of the strip for the widths <= 20 mm)

Note 2 : Thickness >= 5 mm : on study

NOMINAL THICKNESS (e) (mm)	WIDTH TOLERANCES (mm)					
	Width < 125 mm		125 mm ≤ Width < 250 mm		250 mm ≤ Width < 600 mm	
	A Normal	B Precision	A Normal	B Precision	A Normal	B Precision
- e ≤ 0,60	± 0,15	± 0,10	± 0,20	± 0,13	± 0,25	± 0,18
0,60 < e ≤ 1,50	± 0,20	± 0,13	± 0,25	± 0,18	± 0,30	± 0,20
1,50 < e ≤ 2,50	± 0,25	± 0,18	± 0,30	± 0,20	± 0,35	± 0,25
2,50 < e ≤ 4,00	± 0,30	± 0,20	± 0,35	± 0,25	± 0,40	± 0,30
4,00 < e ≤ 6,00	± 0,35	± 0,25	± 0,40	± 0,30	± 0,45	± 0,35
6,00 < e ≤ 8,00	± 0,45	-	± 0,50	-	± 0,55	-
8,00 < e ≤ 10,00	± 0,50	-	± 0,55	-	± 0,60	-

Note 1 : For strip with mill edges see 7.2.3 of standard NF EN 10140.

Note 2 : Thickness >= 5 mm : on study

STRAIGHTNESS TOLERANCES (CAMBER, SABER, CAMBERING)		
Measurement length of 1000 mm		
Nominal width (L) (mm)	Division A Normal (mm/m)	Division B (FS) Precision (mm/m)
10 ≤ L < 25	≤ 5,00	≤ 2,00
25 ≤ L < 40	≤ 3,50	≤ 1,50
40 ≤ L < 125	≤ 2,50	≤ 1,25
125 ≤ L < 600	≤ 2,00	≤ 1,00

Note 1 : The above tolerances apply to strip whose width is at least 10 times the thickness.

Note 2 : For strips with width < 10 mm and for strips whose cross-section ratio is not standardised, special agreements are possible.

THICKNESS MEASUREMENT (mm)		
The thickness tolerances given only apply for measurements carried out according to the specifications below :		
Sheared edges	Nominal width (L) (mm)	Minimum distance of measuring points from edges
	L < 20	Middle of strip
	20 ≤ L < 600	10 mm

LENGTH AND FLATNESS TOLERANCES FOR LENGTH SECTION STRIPS		
Nominal length (L) (mm)	More tolerances in relation to the nominal length (mm)	
	Division A Normal	Division B Precision
L ≤ 1000	+ 10	+ 6
1000 ≤ L < 2500	+ 0,01 L	+ 6
L > 2500	+ 0,01 L	+ 0,003 L

The tolerance can be divided ± in relation to the nominal length. Reduced tolerance by mutual agreement

Flatness tolerances	
ANNEALED STATE : flatness tolerance in rolling direction, 10 mm maximum on 1000 mm.	
Cold-drawn state tolerance by mutual agreement.	
CROSS FLATNESS	
T ≤ 0,15 % of width	W ≤ 0,25 % of width