STAINLESS STEEL

EN 10088-2 / EN 10151

We can also produce according to DIN 17441, NFA 35-572, AISI

MAIN STEEL GRADE

EUROPEAN DESIGNATIONS		ASTM APPROACHING CORRESPONDENCES	CHEMICAL COMPOSITION %									
Symbolic	Numerical		C	Si maxi	Mn maxi	P maxi	S maxi	N maxi	Cr	Mo	Ni	Ti
X10CrNi18-8	1.4310	301	0,05 to 0,15	2,00	2,00	0,045	0,015	0,10	16,00 to 19,00	≤0,80	6,00 to 9,50	-
X5CrNi18-10	1.4301	304	≤0,07	1,00	2,00	0,045	0,015	0,10	17,50 to 19,50	-	8,00 to 10,50	-
X2CrNi18-9	1.4307	304 L	≤0,03	1,00	2,00	0,045	0,015	0,10	17,50 to 19,50	-	8,00 to 10,50	-
X4CrNi18-12	1.4303	305	≤0,06	1,00	2,00	0,045	0,015	0,10	17,00 to 19,00	-	11,00 to 13,00	-
X6CrNiTi18-10	1.4541	321	≤0,08	1,00	2,00	0,045	0,015	-	17,00 to 19,00	-	9,00 to 12,00	5 x C to 0,70
X6CrNiMoTi17-12-2	1.4571	316 Ti	≤0,08	1,00	2,00	0,045	0,015	-	16,50 to 18,50	2,00 to 2,50	10,50 to 13,50	5 x C to 0,70
X2CrNiMo17-12-2	1.4404	316 L	≤0,03	1,00	2,00	0,045	0,015	0,10	16,50 to 18,50	2,00 to 2,50	10,00 to 13,00	-
X2CrNiMo18-14-3	1.4435	-	≤0,03	1,00	2,00	0,045	0,015	0,10	17,00 to 19,00	2,50 to 3,00	12,50 to 15,00	-
X6Cr17	1.4016	430	≤0,08	1,00	1,00	0,040	0,015	-	16,00 to 18,00	-	-	-
X20Cr13	1.4021	-	0,16 to 0,25	1,00	1,50	0,040	0,015	-	12,00 to 14,00	-	-	-
X30Cr13	1.4028	420	0,26 to 0,35	1,00	1,50	0,040	0,015	-	12,00 to 14,00	-	-	-
X46Cr13	1.4034	-	0,43 to 0,50	1,00	1,00	0,040	0,015	-	12,50 to 14,50	-	-	-

MECHANICAL PROPERTIES (Measured in long direction)

AUSTENITIC EUROPEAN DESIGNATIONS		SOFTENED CONDITION (ANNEALED SKP) (+LC)				SPRING CONDITION (+ CR)							
Symbolic	Numerical	Rm Mpa	Rp. 0,2 Mpa	A80 % ép. < 3 mm	5,65√So % ép. ≥ 3 mm	C 700	C 850	C 1000	C 1150	C 1300	C 1500**	C 1700**	C 1900**
						Rm Mpa	Rm Mpa	Rm Mpa	Rm Mpa	Rm Mpa	Rm Mpa	Rm Mpa	Rm Mpa
X10CrNi18-8	1.4310	600 to 950	≥250	≥40	≥40	700 to 850	850 to 1000	1000 to 1150	1150 to 1300	1300 to 1500	1500 to 1700	1700 to 1900	1900 to 2200
						-	A80 > 25 %*	A80 > 20 %*	A80 > 15 %*	A80 > 10 %*	A80 > 5 %*	A80 > 2 %*	A80 > 1 %*
X5CrNi18-10	1.4301	540 to 750	≥230	≥45	≥45	700 to 850	850 to 1000	1000 to 1150	1150 to 1300	1300 to 1500	-	-	-
						A80 > 25 %*	A80 > 12 %*	A80 > 5 %*	A80 > 3 %*	A80 > 1 %*	-	-	-
X2CrNi18-9	1.4307	520 to 700	≥200	≥45	≥45								
X4CrNi18-12	1.4303	500 to 650	≥220	≥45	≥45								
X6CrNiTi18-10	1.4541	520 to 720	≥220	≥40	≥40								
X6CrNiMoTi17-12-2	1.4571	540 to 690	≥240	≥40	≥40								
X2CrNiMo17-12-2	1.4404	530 to 680	≥240	≥40	≥40								
X2CrNiMo18-14-3	1.4435	550 to 700	≥240	≥40	≥40								

We usually offer different strength ranges as well as guarenteed minimal elongation
*Guaranteed elongations only according to EN 10151
** Standard states only according to En 10151

FERRITIC EUROPEAN DESIGNATIONS		SOFTENED CONDITION (ANNEALED SKP) (+LC)			SPRING CONDITION (+CR)	
Symbolic	Numerical	Rm (Mpa)	Rp. 0,2 (Mpa)	A80 and A5,65√So %	C 700 Rm (Mpa)	C 850 Rm (Mpa)
X6Cr17	1.4016	430 to 600	≥260	≥20	700 to 850	850 to 1000

MARTENSITIC EUROPEAN DESIGNATIONS		ANNEALED CONDITION SKP (+LC)		ON OIL HARDENED PARTS
Symbolic	Numerical	Rm (Mpa)	A80 and A5,65√So %	Hardness obtained (indicative) HRC
X20Cr13	1.4021	≤700	≥15	44 to 50
X30Cr13	1.4028	≤740	≥15	45 to 51
X46Cr13	1.4034	≤780	≥12	49 to 55

SPECIAL PRODUCTION

1.4310	**SKP annealed state :** Mechanical strength 820 Mpa • Reduced strength ranges (80 Mpa). Special castings with high elongation for difficult parts (e.g. in C 1300, Elongation > 20%).
1.4301	**SKP annealed state :** Mechanical strength ≤ 690 MPa • Reduced strength ranges (80 MPa) **Spring condition :** T1→Mechanical strength = 800 to 950 Mpa T2→Mechanical strength = 950 to 1100 Mpa T3→Mechanical strength = 1100 to 1250 Mpa T4→Mechanical strength = 1250 to 1400 Mpa
1.4307	**Spring condition :** T1→Mechanical strength = 780 to 920 Mpa T2→Mechanical strength = 920 to 1050 Mpa T3→Mechanical strength = 1050 to 1200 Mpa T4→Mechanical strength = 1200 to 1350 Mpa Reduced strength ranges (100 Mpa) - All intermediate cold-drawn states.
1.4571 1.4404 1.4435	**AND OTHER ALLOY AUSTENITIC STAINLESS STEELS :** Cold-drawn states with strength by mutual agreement
1.4016	**Spring condition :** T1→Mechanical strength = 490 to 640 Mpa T2→Mechanical strength = 640 to 790 Mpa T3→Mechanical strength = 790 to 1000 Mpa
1.4021 1.4028 1.4034	**Special annealed state for deformation. Cold-drawn states by mutual agreement** **HARDENED STATE :** IN A2 = about 49 HRC - IN A3 = about 51 HRC - IN A4 = about 52 HRC

DIMENSIONAL AND OTHER TOLERANCES (STAINLESS STEEL)

We can also produce according to DIN 10259, NFA 35-540, AISI

ACCORDING TO THE NORM ISO 9445 – Production widths < 600 mm

THICKNESS TOLERANCES (mm)									
NOMINAL THICKNESS (e) (mm)	Width < 125 mm			125 mm ≤ Width < 250 mm			250 mm ≤ Width < 600 mm		
	NORMAL	FINE (F)	PRECISION (P)	NORMAL	FINE (F)	PRECISION (P)	NORMAL	FINE (F)	PRECISION (P)
0,05[a] ≤ e < 0,10	± 0,10 e	± 0,06 e	± 0,04 e	± 0,12 e	± 0,10 e	± 0,08 e	± 0,15 e	± 0,10 e	± 0,08 e
0,10 ≤ e < 0,15	± 0,010	± 0,008	± 0,006	± 0,015	± 0,012	± 0,008	± 0,020	± 0,015	± 0,010
0,15 ≤ e < 0,20	± 0,015	± 0,010	± 0,008	± 0,020	± 0,012	± 0,010	± 0,025	± 0,015	± 0,012
0,20 ≤ e < 0,25	± 0,015	± 0,012	± 0,008	± 0,020	± 0,015	± 0,010	± 0,025	± 0,020	± 0,012
0,25 ≤ e < 0,30	± 0,017	± 0,012	± 0,009	± 0,025	± 0,015	± 0,012	± 0,030	± 0,020	± 0,015
0,30 ≤ e < 0,40	± 0,020	± 0,015	± 0,010	± 0,025	± 0,020	± 0,012	± 0,030	± 0,025	± 0,015
0,40 ≤ e < 0,50	± 0,025	± 0,020	± 0,012	± 0,030	± 0,020	± 0,015	± 0,035	± 0,025	± 0,018
0,50 ≤ e < 0,60	± 0,030	± 0,020	± 0,014	± 0,030	± 0,025	± 0,015	± 0,040	± 0,030	± 0,020
0,60 ≤ e < 0,80	± 0,030	± 0,025	± 0,015	± 0,035	± 0,030	± 0,018	± 0,040	± 0,035	± 0,025
0,80 ≤ e < 1,00	± 0,030	± 0,025	± 0,018	± 0,040	± 0,030	± 0,020	± 0,050	± 0,035	± 0,025
1,00 ≤ e < 1,20	± 0,035	± 0,030	± 0,020	± 0,045	± 0,035	± 0,025	± 0,050	± 0,040	± 0,030
1,20 ≤ e < 1,50	± 0,040	± 0,030	± 0,020	± 0,050	± 0,035	± 0,025	± 0,060	± 0,045	± 0,030
1,50 ≤ e < 2,00	± 0,050	± 0,035	± 0,025	± 0,060	± 0,040	± 0,030	± 0,070	± 0,050	± 0,035
2,00 ≤ e < 2,50	± 0,050	± 0,035	± 0,025	± 0,070	± 0,045	± 0,030	± 0,080	± 0,060	± 0,040
2,50 ≤ e ≤ 3,00	± 0,060	± 0,045	± 0,030	± 0,070	± 0,050	± 0,035	± 0,090	± 0,070	± 0,045

NOTE: By agreement, tolerances may alternelively be totally + or totally - or fully distributed. In any case, the tolerance interval must remain as shown in this table.
a For thicknesses below 0,05 mm, the values for the tolerances must be agreed on the inquiries and the purchase orders.

WIDTH TOLERANCES (mm)												
NOMINAL THICKNESS (e) (mm)	Width ≤ 40 mm			40 mm < Width ≤ 125 mm			125 mm < Width ≤ 250 mm			250 mm < Width < 600 mm		
	NORMAL	FINE (F)	PRECISION (P)	NORMAL	FINE (F)	PRECISION (P)	NORMAL	FINE (F)	PRECISION (P)	NORMAL	FINE (F)	PRECISION (P)
e < 0,25	± 0,085	± 0,065	± 0,050	± 0,100	± 0,075	± 0,060	± 0,125	± 0,100	± 0,075	± 0,25	± 0,25	± 0,20
0,25 ≤ e < 0,50	± 0,100	± 0,075	± 0,060	± 0,125	± 0,100	± 0,075	± 0,150	± 0,110	± 0,085	± 0,30	± 0,25	± 0,20
0,50 ≤ e < 1,00	± 0,125	± 0,100	± 0,075	± 0,125	± 0,110	± 0,085	± 0,200	± 0,125	± 0,100	± 0,35	± 0,30	± 0,25
1,00 ≤ e < 1,50	± 0,125	± 0,100	± 0,075	± 0,150	± 0,125	± 0,085	± 0,250	± 0,150	± 0,110	± 0,50	± 0,35	± 0,30
1,50 ≤ e < 2,50	-	-	-	± 0,200	± 0,125	± 0,100	± 0,300	± 0,200	± 0,125	± 0,50	± 0,40	± 0,30
2,50 ≤ e ≤ 3,00	-	-	-	± 0,250	± 0,150	± 0,125	± 0,300	± 0,200	± 0,125	± 0,60	± 0,50	± 0,40

STRAIGHTNESS TOLERANCES (*) IN ANNEALED STATE (+A)		
Width (L) (mm)	NORMAL (mm/m)	REDUCED (mm/m)
L < 10 (*)	≤ 10	≤ 5
10 ≤ L < 25	≤ 4	≤ 1,5
25 ≤ L < 40	≤ 3	≤ 1,25
40 ≤ L < 125	≤ 2	≤ 1
125 ≤ L < 600	≤ 1,5	≤ 0,75

* 5 < L < 10 : values ACIERS COSTE on straightened coils

LENGTH TOLERANCES FOR CUT-TO-LENGTH STRIPS (MM)		
Nominal length (L) (mm)	NORMAL (mm/m)	REDUCED (mm/m)
L ≤ 2 000	+ 3	+ 1,5
	- 0	- 0
2 000 < L ≤ 4 000	+ 5	+ 2
	- 0	- 0

The tolerance can be shared in + or in - around nominal value

TOLERANCES FOR FLATNESS AND EDGE WAVINESS FOR CUT-TO-LENGTH STRIPS IN ANNEALED STATE (+A)
Standard flatness tolerance ≤ 6 mm
Special flatness tolerance ≤ 4 mm
In cold-drawn state (+ CR), tolerance by mutual agreement

ACCORDING TO PRODUCTION*

THICKNESS TOLERANCES FOR WIDTH 2,5 TO 600 MM							
THICKNESS (e) (mm)	Tolerance (mm)			ÉPAISSEUR (e) (mm)	Tolerance (mm)		
	NORMAL	FINE (F)	PRECISION (P)		NORMAL	FINE (F)	PRECISION (P)
0,10 ≤ e < 0,15	± 0,020	± 0,015	± 0,010	0,60 ≤ e < 0,80	± 0,040	± 0,035	± 0,025
0,15 ≤ e < 0,20	± 0,025	± 0,015	± 0,012	0,80 ≤ e < 1,00	± 0,050	± 0,035	± 0,025
0,20 ≤ e < 0,25	± 0,025	± 0,020	± 0,012	1,00 ≤ e < 1,20	± 0,050	± 0,040	± 0,030
0,25 ≤ e < 0,30	± 0,030	± 0,020	± 0,015	1,20 ≤ e < 1,50	± 0,060	± 0,045	± 0,030
0,30 ≤ e < 0,40	± 0,030	± 0,025	± 0,015	1,50 ≤ e < 2,00	± 0,070	± 0,050	± 0,035
0,40 ≤ e < 0,50	± 0,035	± 0,025	± 0,018	2,00 ≤ e < 2,50	± 0,080	± 0,060	± 0,040
0,50 ≤ e < 0,60	± 0,040	± 0,030	± 0,020	2,50 ≤ e ≤ 3,00	± 0,090	± 0,070	± 0,045

UNLESS SPECIFIED WITH ORDER

- Width tolerances according to NF EN 10258 above.
- Strength according to NF EN 10088 (page 2).
- Annealed states with widths 30 mm are usually delivered with interleaving paper. (except for regularised thicknesses).
  - Bright or flat appearance according to stock.
- Cold-drawn states are usually delivered without interleaving paper.
  - Semi-bright to bright appearance, according to steel grade.

* Products defined before 31 March 1999, whose repeatability is automatic, are not concerned.