Quality	**X5CrNi18-10**	**Austenitic Stainless Steel**	*Technical card*
Number	**1.4301**		*Lucefin Group*

Chemical composition

C% max	**Si%** max	**Mn%** max	**P%** max	**S%** [a] max	**Cr%**	**Ni%**	**N%** max	
0,07	1,00	2,00	0,045	0,015	17,5-19,5	8,0-10,5	0,11	EN 10088-1: 2005
± 0.01	+ 0.05	± 0.04	+ 0.005	+ 0.003	± 0.2	± 0.1	± 0.01	

Product deviations are allowed

[a] for machinability, it is allowed a controlled sulphur content of 0,015 % - 0,030 %; for polishability, it is suggested a controlled sulphur content of max 0,015 %

Temperature °C

Melting range	**Hot-forming**	**Solution annealing** (Solubilization)	**Stabilizing**	**Soft annealing**
1460-1400	1180-950	1120-1000 water	not necessary	not suitable
Sensitization	**Quenching**	**Tempering**	**Stress-relieving**	
not recommended	not suitable	not suitable	430-350 air	

MMA **Welding -** electrodes AWS

pre-heating not necessary — *post welding* slow cooling

joint with steel

carbon	CrMo alloyed	stainless
E309-E308	E309-E308	E308

cosmetic welding E308 – E308L

Mechanical properties

Hot-formed EN 10088-3: 2005 in conditions 1C, 1E, 1D, 1X, 1G, 2D

size mm		Testing at room temperature							
		R	**Rp** 0.2	**A%** (L)	**A%** (T)	**Kv** +20 °C (L)	**Kv** +20 °C (T)	**HB** [a]	
from	to	N/mm²	N/mm² min	min		J min	J min	max	
	160	500-700	190	45		100		215	+AT solubilization
160	250	500-700	190		35		60	215	+AT solubilization

[a] for information only (L) = longitudinal (T) = transversal

Cold-processed EN 10088-3: 2005 in conditions 2H, 2B, 2G, 2P

size mm		Testing at room temperature						
		R	**Rp** 0.2	**A%** (L)	**A%** (T)	**Kv** +20 °C (L)	**Kv** +20 °C (T)	
from	to	N/mm²	N/mm² min	min	min	J min	J min	
	10 [b]	600-950	400	25				
10	16	600-950	400	25				+AT solubilization
16	40	600-850	190	30		100		
40	63	580-850	190	30		100		
63	160	500-700	190	45		100		
160	250	500-700	190		35		60	

[b] in the range of 1 mm ≤ d < 5 mm, values are valid only for rounds – the mechanical properties of non round bars of < 5 mm of thickness have to be agreed at the time of request and order

(L) = longitudinal (T) = transversal

Forged +AT solubilization EN 10250-4: 2001

size mm		Testing at room temperature							
		R	**Rp** 0.2	**A%**	**A%**	**Kv** +20 °C	**Kv** +20 °C	**Kv** -196 °C	
over	to	N/mm²	N/mm² min	min (L)	min (T)	J min (L)	J min (T)	J min (T)	
	250	500-700	190		35	100	60		EN 10250-4: 2001
	250	500-700	200	45	35	100	60	60	EN 10222-5: 2001

Work-hardened by cold-drawing EN 10088-3: 2005 in condition 2H (ex. +AT+C)

size mm		Testing at room temperature			
		R	**Rp** 0.2	**A%**	
from	to	N/mm²	N/mm² min	min	
	35	700-850	350	20	+AT+C700 cold-drawn material
	25	800-1000	500	12	+AT+C800 cold-drawn material

Transition curve determined by Kv impacts. Material solubilized at 1050 °C

Average	J	210	210	210	212	218	228	244
Test at	**°C**	**-160**	**-120**	**-80**	**-40**	**0**	**+40**	**+80**

+AT material – approximate values

°C	R	Rp 0.2	A%
	N/mm²	N/mm²	%
+24	520	210	45
-80	860	270	35
-196	1250	350	30
-254	1680	440	30

X5CrNi18-10 **n° 1.4301** austenitic stainless steel *Lucefin Group*

Effect of **cold-working** (hot-rolled +AT+C). Approximate values

R	N/mm²	560	660	670	700	715	720	765	770	785	830	850
Rp 0.2	N/mm²	300	430	450	470	490	500	530	560	580	600	700
A	%	55	46	42	38	38	36	36	36	34	34	32
Reduction	**%**	**0**	**5**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**24**

Minimum yield stress and tensile strength values at high temperatures on +AT material, EN 10088-3: 2005 / EN 10269: 2001

Rp 0.2	N/mm²	155	140	127	118	110	104	98	95	92	90
R	N/mm²	450	420	400	390	380	380	375	360	335	300
Test at	**°C**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**

Thermal expansion	$10^{-6} \cdot K^{-1}$			13.4	13.8	14.8	►	16.0	16.5	17.0	17.5	18.8	20.2
Modulus of elasticity	longitudinal GPa	180					200	194	186	179	172		127
Modulus of elasticity	tangential GPa						78						
Poisson number	*v*						0.240	0.256					
Electrical resistivity	Ω • mm²/m	0.55				0.64	0.73		0.86		1.00	1.11	1.21
Electrical conductivity	Siemens•m/mm²						1.37						
Specific heat	J/(Kg•K)						500		510		550	585	630
Density	Kg/dm³						7.93						
Thermal conductivity	W/(m•K)						15.0	16.3	17.5	19.9	21.5		25.1
Relative magnetic permeability	μr						1.021						
Temperature	**°C**	**-196**	**-184**	**-128**	**-74**		**20**	**100**	**200**	**300**	**400**	**600**	**800**

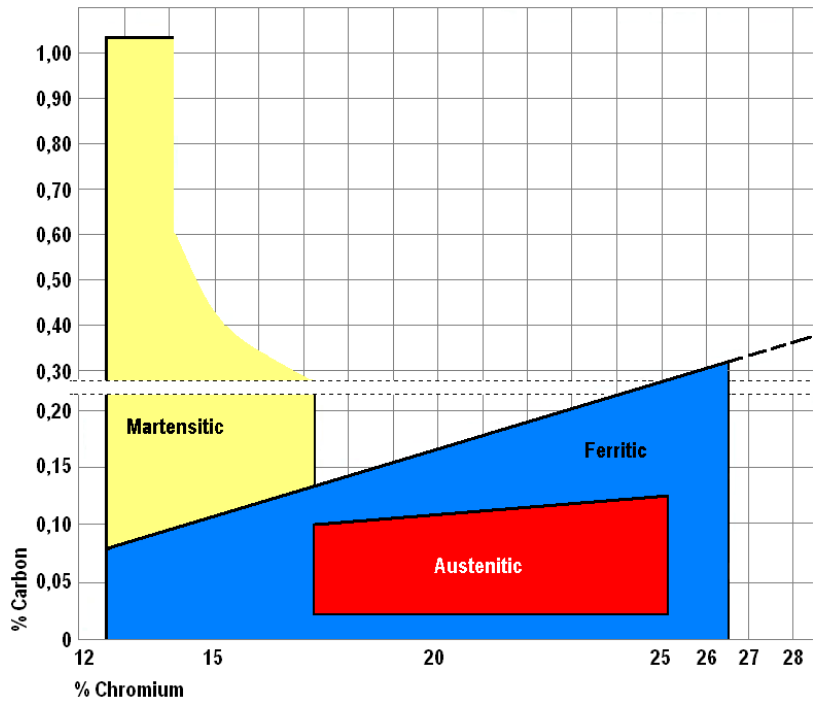
The symbol ► indicates between 20 °C and 100 °C, 20 °C and 200 °C .....

Corrosion resistance	Atmospheric		Chemical			**x** nitric acid, weak organic acids, rural and urban atmospheres
Fresh water	*industrial*	*marine*	*medium*	*oxidizing*	*reducing*	
x	**x**		**x**	**x**		

Magnetic	not
Machinability	high
Hardening	cold-drawn and other cold plastic deformations
Service temperature in air	continuous service up to 850 °C; intermittent service up to 800 °C

Europe EN	**USA** UNS	**USA** ASTM	**China** GB	**Russia** GOST	**Japan** JIS	**India** IS	**Republic of Korea** KS
X5CrNi18-10		(304)	0Cr18Ni9	07Ch18N10		X04Cr19Ni9	

Carbon - Chromium correlation



Position of some stainless steel families, according to their Cr/C content (Hoepli, "Stainless steels")