



Quality	X5CrNi18-10	Austenitic	<i>Technical card 2018</i>
Number	1.4301	Stainless Steel	<i>Lucefin Group</i>

Chemical composition

C%	Si%	Mn%	P%	S% ^{a)}	Cr%	Ni%	N%	
max	max	max	max	max			max	
0,07	1,00	2,00	0,045	0,030	17,5-19,5	8,0-10,5	0,10	EN 10088-3: 2014
± 0.01	+ 0.05	± 0.04	+ 0.005	± 0.005	± 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) +AT	Stabilizing	Soft annealing +A	MMA Welding - electrodes AWS
1460-1400	1800-950	1120-1000 water	not necessary	not suitable	<i>pre-heating</i> <i>post welding</i> not necessary slow cooling
Sensitization	Quenching +Q	Tempering +T	Stress-relieving +SR		joint with steel
not recommended	not suitable	not suitable	430-350 air		carbon CrMo alloyed stainless E309-E308 E309-E308 E308 <i>cosmetic welding</i> E308 – E308L

Chemical treatment - Pickling (6 - 25% HNO₃) + (0.5 - 8% HF) hot - Passivation 20 - 50% HNO₃ hot

Mechanical properties

Heat-treated material EN 10088-3: 2014 in conditions 1C, 1E, 1D, 1X, 1G, 2D

size		Testing at room temperature						
mm		R	Rp 0.2	A%	A%	Kv ₂ +20 °C	Kv ₂ +20 °C	HBW ^{a)}
from	to	N/mm ²	N/mm ² min	min (L)	min (T)	J min (L)	J min (T)	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

Bright bars of heat-treated material EN 10088-3: 2014 in conditions 2H, 2B, 2G, 2P

size		Testing at room temperature						
mm		R	Rp 0.2	A%	A%	Kv ₂ +20 °C	Kv ₂ +20 °C	
from	to	N/mm ²	N/mm ² min	min (L)	min (T)	J min (L)	J min (T)	
	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		Testing at room temperature						
mm		R	Rp 0.2	A%	A%	Kv +20 °C	Kv +20 °C	Kv -196 °C
over	to	N/mm ²	N/mm ² min	min (L)	min (T)	J min (L)	J min (T)	J min (T)
	250	500-700	190	-	35	100	60	- UNI EN 10250-4:01
	250	500-700	200	45	35	100	60	60 UNI EN 10222-5:01

Work-hardened by cold-drawing EN 10088-3: 2014 in condition 2H (ex. +AT+C)

size		Testing at room temperature				
mm		R	Rp 0.2	A%		
from	to	N/mm ²	N/mm ² 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	+AT material – approximate values				
Test at	°C	-160	-120	-80	-40	0	+40	+80	°C	R	Rp 0.2	A%	
										N/mm ²	N/mm ²	%	
									+24	520	210	45	
									-80	860	270	35	
									-196	1250	350	30	
									-254	1680	440	30	

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

R	N/mm ²	560	715	830	1000	1110	1240	1400	1500	1600
R _{p 0.2}	N/mm ²	300	490	600	860	1000	1100	1210	1350	1400
A	%	38	20	12	10	10	10	10	8	8
Reduction	%	0	10	20	30	40	50	60	70	75

Minimum yield stress and tensile strength values at high temperatures on +AT material, EN 10088-3: 2014 / EN 10269: 2001

R _{p 0.2}	N/mm ²	155	140	127	118	110	104	98	95	92	90
R	N/mm ²	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 • 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		127	
Poisson number	ν							0.24	0.256					
Electrical resistivity	Ω • mm ² /m	0.55					0.64	0.73		0.86		1.00	1.11	1.21
Electrical conductivity	Siemens•m/mm ²							1.37						
Specific heat	J/(Kg•K)							500		510		550	585	630
Density	Kg/dm ³							7.90						
Thermal conductivity	W/(m•K)							15.0	16.3	17.5	19.9	21.5		25.1
Relative magnetic permeability	μ _r							1.021						
°C				-196	-184	-128	-74	20	100	200	300	400	600	800

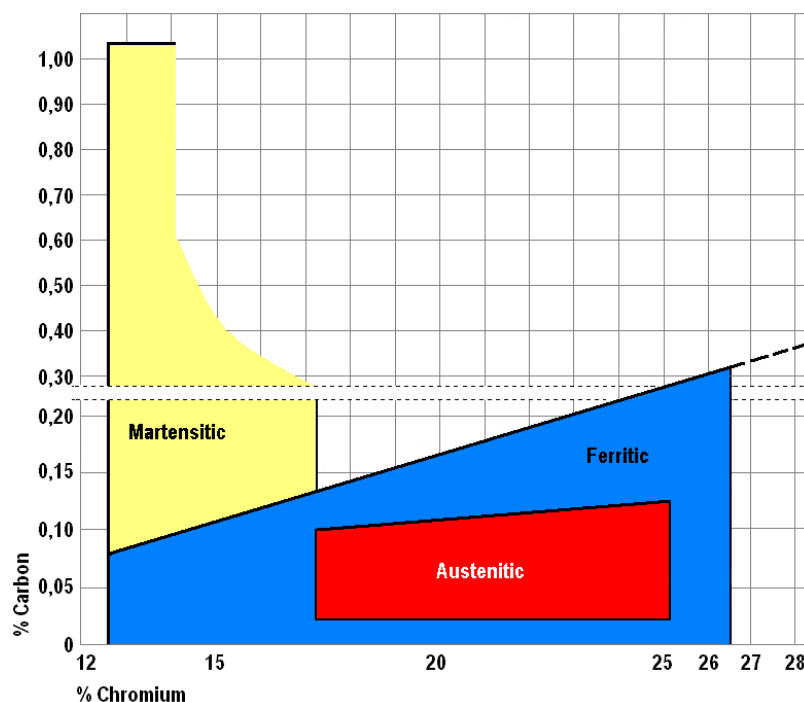
The symbol ► indicates between 20 °C and 100 °C, 20 °C and 200 °C

Corrosion resistance	Atmospheric		Chemical			x nitric acid, weak organic acids, rural and urban atmospheres
Fresh water	<i>industrial</i>	<i>marine</i>	<i>medium</i>	<i>oxidizing</i>	<i>reducing</i>	
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	USA	USA	China	Russia	Japan	India	Republic of Korea
EN	UNS	ASTM	GB	GOST	JIS	IS	KS
X5CrNi18-10	S30400	(304)	0Cr18Ni9	07Ch18N10		X04Cr19Ni9	

Carbon - Chromium correlation



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