Quality	**X6CrNiMoTi17-12-2**	**Austenitic Stainless Steel**	*Technical card 2018*
Number	**1.4571**		*Lucefin Group*

Chemical composition

C% max	**Si%** max	**Mn%** max	**P%** max	**S%** [a] max	**Cr%**	**Ni%**	**Mo%**	**Ti%** [b] max	
0,08	1,00	2,00	0,045	0,030	16,5-18,5	10,5-13,5	2,0-2,5	0,70	EN 10088-3: 2014
± 0.01	+ 0.05	± 0.04	+ 0.005	± 0.005	± 0.2	± 0.15	± 0.1	+ 0.05	

Product deviations are allowed. [b] Ti 5 x C < 0.70

[a] for improving 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**
1470-1450	1180-950	1120-1020 water	900-845 calm air	not suitable
Sensitization	**Quenching +Q**	**Tempering +T**	**Stress-relieving +SR**	
not suitable	not suitable	not suitable	420-240 air	

MMA **welding –** AWS electrodes

pre-heating	*after welding*
not necessary	slow cooling

joint with steel

carbon	CrMo alloyed	stainless
E309-E308	E309-E308	E316L

cosmetic welding
E 318

Chemical treatment ▪ *Pickling* (6 - 25% HNO_3) + (0.5 - 8% HF) hot or cold. *Passivation* 20 - 25% HNO_3 hot

Mechanical properties

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

size mm		Testing at room temperature **R**	**Rp** 0.2	**A%**	**A%**	**Kv₂** +20 °C	**Kv₂** +20 °C	**HBW** [a]	
from	to	N/mm²	N/mm² min	min (L)	min (T)	J min (L)	J min (T)	max	
	160	500-700	200	40	-	100	-	215	+AT solubilization
160	250	500-700	200	-	30	-	60	215	

[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 mm		Testing at room temperature **R**	**Rp** 0.2	**A%**	**A%**	**Kv₂** +20 °C	**Kv₂** +20 °C	
from	to	N/mm²	N/mm² min	min (L)	min (T)	J min (L)	J min (T)	
	10 [b]	600-950	400	25	-	-	-	
10	16	580-950	380	25	-	-	-	+AT solubilization
16	40	500-850	200	30	-	100	-	
40	63	500-850	200	30	-	100	-	
63	160	500-700	200	40	-	100	-	
160	250	500-700	200	-	30	-	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

size mm		Testing at room temperature **R**	**Rp** 0.2	**A%**	**Kv** +20 °C	**Kv** +20 °C	**Kv** -196 °C	
from	to	N/mm²	N/mm² min	min (T)	J min (L)	J min (T)	J min (T)	
	450	500-700	200	30	100	60	-	UNI EN 10250-4: 2001
	450	510-710	210	35	100	60	60	UNI EN 10222-5: 2001

(L) = longitudinal (T) = transversal

Work-hardned by cold-drawing EN 10088-3: 2014 in condition 2H (es. +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

Minimum values at high temperatures on material +AT, EN 10088-3: 2014

Rp 0.2	N/mm²	185	175	165	155	145	140	135	131	129	127
Test at	**°C**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**

X6CrNiMoTi17-12-2 n° **1.4571** austenitic stainless steel *Lucefin Group*

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

R	N/mm²	600	730	880	1040	1140	1280	1360	1600
Rp 0.2	N/mm²	230	590	780	920	1100	1220	1230	1420
Reduction **%**		**0**	**10**	**20**	**30**	**40**	**50**	**60**	**70**

Typical values at high temperature properties. For information only

R	N/mm²	518	455	443	433	423	375	261	155	78
Rp 0.2	N/mm²	208	179	159	146	145	146	146	112	55
Test temperature **°C**		**93**	**204**	**316**	**427**	**538**	**649**	**760**	**871**	**982**

Thermal expansion	$10^{-6} \bullet K^{-1}$	►	16.5	17.5	18.0	18.5	19.0	
Modulus of elasticity	longitudinal GPa	200	194	186	179	172	165	
Poisson number	*v*	0,30						
Electrical resistivity	Ω • mm²/m	0.75	0.79	0.87	0.94	0.98	0.102	
Electrical conductivity	Siemens•m/mm²	1.33						
Specific heat	J/(Kg•K)	500	500	520	530	540	540	
Density	Kg/dm³	8.00						
Thermal conductivity	W/(m•K)	15	16	17.5	19	20.5	22	
Relative magnetic permeability	μr	1.02						
°C		**20**	**100**	**200**	**300**	**400**	**500**	

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

Corrosion resistance	Atmospheric		Chemical			**x** salts, organic acids, food
Fresh water	*industrial*	*marine*	*medium*	*oxidizing*	*reducing*	
x	**x**	**x**	**x**			

Magnetic	no
Machinability	the presence of carbides and nitrides of titanium suggests to use carbide cutting inserts
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	**Korea** KS
X6CrNiMoTi17-12-2	S31635	Type 316Ti	06Cr17Ni12Mo2Ti	08Ch17N13M2T	SUS 316Ti	X04Cr17Ni12Mo2Ti	STS 316Ti

Behavior of yield strength as a function of the operative temperature