



<b>Quality</b>	<b>X2CrNiMo18-14-3</b>	<b>Austenitic</b>	<i>Technical card 2018</i>
Number	<b>1.4435</b>	<b>Stainless Steel</b>	<i>Lucefina Group</i>

## Chemical composition

C%	Si%	Mn%	P%	S% <sup>a)</sup>	Cr%	Ni%	N%	Mo%	
max	max	max	max	max			max		
0,03	1,00	2,00	0,045	0,030	17,0-19,0	12,5-15,0	0,10	2,5-3,0	EN 10088-3: 2014
+ 0.005	+ 0.05	± 0.04	+ 0.005	± 0.005	± 0.2	± 0.15	+ 0.01	± 0.1	

Product deviations are allowed

<sup>a)</sup> 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	MMA welding – AWS electrodes
1450-1400	1150-980	1180-1120 water	not required	not suitable	pre-heating post welding not necessary slow cooling
Sensitization	Quenching +Q	Tempering +T	joint with steel		
not required	not suitable	not suitable	carbon	CrMo alloyed	stainless
			E309-E308	E309-E308	E308
			cosmetic welding		
			E 316L		

**Chemical treatment** - Pickling (6 - 25% HNO<sub>3</sub>) + (0.5 - 8% HF) hot - Passivation 20 - 50% HNO<sub>3</sub> 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 <sub>2</sub> +20 °C	Kv <sub>2</sub> +20 °C	HBW <sup>a)</sup>	
from	to	N/mm <sup>2</sup>	N/mm <sup>2</sup> 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	+AT solubilization
		660	320	55		210		200	Typical values

<sup>a)</sup> 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 <sub>2</sub> +20 °C	Kv <sub>2</sub> +20 °C	
from	to	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min (L)	min (T)	J min (L)	J min (T)	
	10 <sup>b)</sup>	600-950	400	25	-	-	-	
10	16	600-950	400	25	-	-	-	+AT solubilization
16	40	500-850	235	30	-	100	-	
40	63	500-850	235	30	-	100	-	
63	160	500-700	235	40	-	100	-	
160	250	500-700	235	-	30	-	60	

<sup>b)</sup> 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** UNI EN 10250-4: 2001

size		Testing at room temperature						
mm		R	Rp 0.2	A%	A%	Kv +20 °C	Kv +20 °C	
from	to	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min (L)	min (T)	J min (L)	J min (T)	
	250	500-700	200	-	30	100	60	+AT solubilization

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

Average	J	190	210	215	220	230	240	250
Test at	°C	-160	-120	-80	-40	0	+40	+80

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

<b>R</b>	N/mm <sup>2</sup>	640	780	900	1050	1180	1280	1350	1400
<b>Rp 0.2</b>	N/mm <sup>2</sup>	320	640	800	910	1000	1080	1120	1190
<b>A</b>	%	50	30	18	12	8	8	8	7
Reduction %		0	10	20	30	40	50	60	70

**Minimum values at high temperatures** on material +AT EN 10083-3:2014 / EN 10222-5:1999

<b>R<sub>p</sub> 0.2</b>	N/mm <sup>2</sup>	165	150	137	127	119	113	108	103	100	98
<b>R</b>	N/mm <sup>2</sup>	420	400	380	375	370	370	-	-	-	-
<b>Test at</b>	<b>°C</b>	<b>100</b>	<b>150</b>	<b>200</b>	<b>250</b>	<b>300</b>	<b>350</b>	<b>400</b>	<b>450</b>	<b>500</b>	<b>550</b>
<b>Thermal expansion</b>	10 <sup>-6</sup> • K <sup>-1</sup>	▶	16.0	16.5	17.0	17.5	18.0				
<b>Modulus of elasticity</b>	GPa	200	194	186	179	172	165				
<b>Poisson number</b>	ν	0.28									
<b>Electrical resistivity</b>	Ω • mm <sup>2</sup> /m	0.75									
<b>Electrical conductivity</b>	Siemens•m/mm <sup>2</sup>	1.33									
<b>Specific heat</b>	J/(Kg•K)	500									
<b>Density</b>	Kg/dm <sup>3</sup>	8.00									
<b>Thermal conductivity</b>	W/(m•K)	15.0									
<b>Relative magnetic permeability</b>	μ <sub>r</sub>	1.1 ~									
<b>°C</b>		<b>20</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>	<b>500</b>				

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

<b>Corrosion resistance</b>	Atmospheric			Chemical			x intergranular, food, acids (organic, sulfuric and phosphoric acids), oil
Fresh water	<i>industrial</i>	<i>marine</i>		<i>medium</i>	<i>oxidizing</i>	<i>reducing</i>	
x	x	x		x	x		
<b>Magnetic</b>	no						
<b>Machinability</b>	mean						
<b>Hardening</b>	cold-drawn and other cold plastic deformations						
<b>Service temperature in air</b>	continuous service up to 850 °C; intermittent service up to 800 °C						

Europe	USA	USA	China	Russia	Japan	India	R. Corea
EN	UNS	ASTM	GB	GOST	JIS	IS	KS
X2CrNiMo18-14-2	(S31603)	(316L)	00Cr18Ni15Mo3	03Ch17N14M3	(SUS 316L)	(X02Cr17Ni12Mo2)	(STS 316L)

### Marine sector

