

<b>Quality</b>	<b>X2CrNi18-9</b>	<b>Austenitic</b>	<i>Technical card 2018</i>
Number	<b>1.4307</b>	<b>Stainless Steel</b>	<i>Lucefin Group</i>

### Chemical composition

C%	Si%	Mn%	P%	S% <sup>a)</sup>	Cr%	Ni%	N%	
max	max	max	max	max			max	
0,03	1,00	2,00	0,045	0,030	17,5-19,5	8,0-10,5	0,10	EN 10088-3: 2014
+ 0.005	+ 0.05	± 0.04	+ 0.005	± 0.003	± 0.2	± 0.1	+ 0.01	

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
1460-1400	1200-930	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
sensitization test at 700-450	not suitable	not suitable	450-200 furnace		carbon      CrMo alloyed      stainless
					E309-E308      E309-E308      E308
					<i>cosmetic welding</i> E308 L

**Chemical treatment** - *Pickling* (10% HNO<sub>3</sub>) + (2% HF) at 60° or cold - *Passivation* 20 - 50% HNO<sub>3</sub> cold

### 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	175	45	-	100	-	215	+AT solubilization
160	250	500-700	175	-	35	-	60	215	+AT solubilization

<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>	600-930	400	25	-	-	-		
10	16	600-930	380	25	-	-	-	+AT solubilization	
16	40	500-830	175	30	-	100	-		
40	63	500-830	175	30	-	100	-		
63	160	500-700	175	45	-	100	-		
160	250	500-700	175	-	35	-	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 +AT solubilization

size		Testing at room temperature							
mm		R	Rp 0.2	A%	A%	Kv +20 °C	Kv +20 °C	Kv -196 °C	
from	to	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min (L)	min (T)	J min (L)	J min (T)	J min (T)	
	250	460-680	180	-	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 condition 2H (es. +AT+C)

size		Testing at room temperature				
mm		R	Rp 0.2	A%		
from	to	N/mm <sup>2</sup>	N/mm <sup>2</sup> 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

									+AT material - approximate values			
Average	J	230	230	232	236	245	268	290	°C	R	Rp 0.2	A%
Test at	°C	-160	-120	-80	-40	0	+40	+80		N/mm <sup>2</sup>	N/mm <sup>2</sup>	%
									+24	550	200	45
									-80	830	220	35
									-196	1200	300	30

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

<b>R</b>	N/mm <sup>2</sup>	650	850	1000	1100	1190	1280	1380	1500	1570
<b>Rp 0.2</b>	N/mm <sup>2</sup>	300	400	650	790	950	1120	1270	1370	1420
<b>A</b>	%	45	38	32	25	20	18	12	10	8
Reduction	%	<b>0</b>	<b>10</b>	<b>20</b>	<b>30</b>	<b>40</b>	<b>50</b>	<b>60</b>	<b>70</b>	<b>75</b>

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

<b>Rp 0.2</b>	N/mm <sup>2</sup>	145	130	118	108	100	94	89	85	81	80
<b>R</b>	N/mm <sup>2</sup>	410	380	360	350	340	340	330	-	-	-
Test at	°C	<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	18.0	18.0			
<b>Modulus of elasticity</b>	long. GPa		200	194	186	179	172			127
<b>Poisson number</b>	$\nu$		0.28							
<b>Electrical resistivity</b>	$\Omega \cdot \text{mm}^2/\text{m}$		0.72		0.86		1.00	1.11	1.21	
<b>Electrical conductivity</b>	Siemens•m/mm <sup>2</sup>		1.37							
<b>Specific heat</b>	J/(Kg•K)		500		503		520	541	559	
<b>Density</b>	Kg/dm <sup>3</sup>		7.90							
<b>Thermal conductivity</b>	W/(m•K)		15.0	16.3	17.2	18.7	20.2			25.8
<b>Relative magnetic permeability</b>	$\mu_{r \text{ max}}$		1.021							
°C			<b>20</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>	<b>600</b>	<b>800</b>	

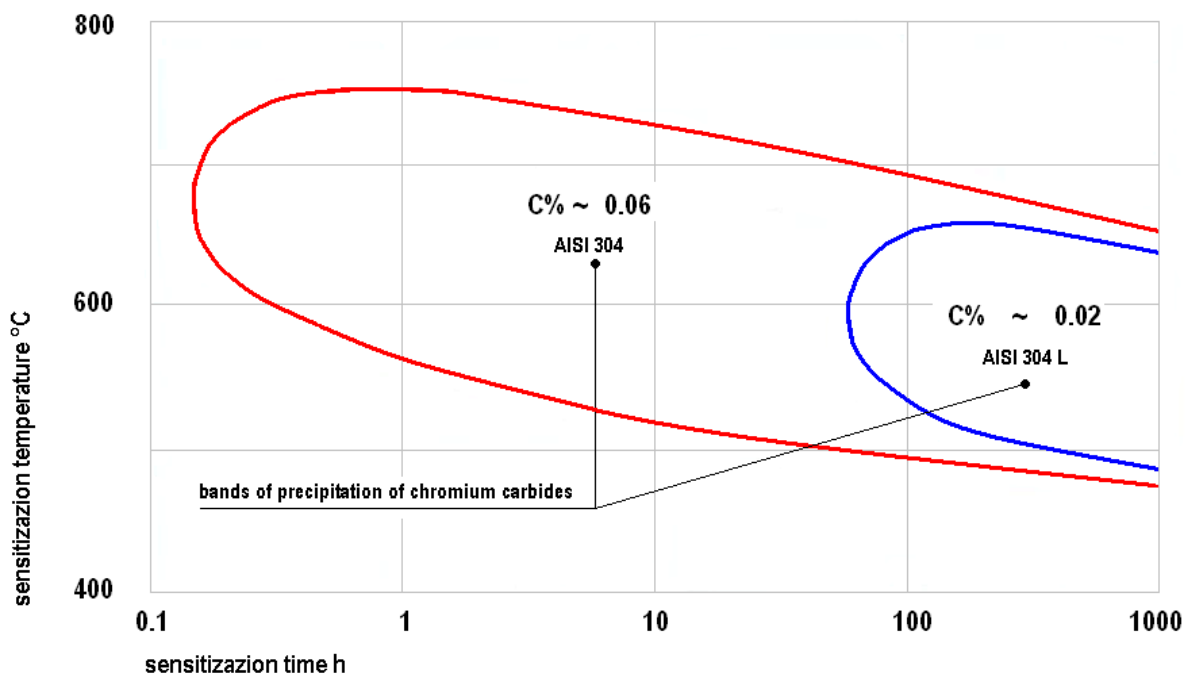
The symbol ▶ indicates temperature between 20 °C and 100 °C, 20 °C and 200 °C .....

<b>Corrosion resistance</b>	Atmospheric		Chemical			x intercrystalline corrosion, rural and urban atmospheres
Fresh water	<i>industrial</i>	<i>marine</i>	<i>mild</i>	<i>oxidizing</i>	<i>reducing</i>	
<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	

<b>Magnetic</b>	no
<b>Machinability</b>	high
<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

<b>Europe</b>	<b>USA</b>	<b>USA</b>	<b>China</b>	<b>Russia</b>	<b>Japan</b>	<b>India</b>	<b>Republic of Korea</b>
EN	UNS	ASTM	GB	GOST	JIS	IS	KS
X2CrNi18-9	S30403	(304L)	00Cr19Ni10	03Ch18N11		X02Cr18Ni11	

Sensitization diagram



Flow of the chrome carbides precipitation as a function of the percentage of carbon