



<b>Quality</b>	<b>X14CrMoS17</b>	<b>Martensitic</b>	<i>Technical card 2018</i>
Number	<b>1.4104</b>	<b>Stainless Steel</b>	<i>Lucefina Group</i>

## Chemical composition

C%	Si%	Mn%	P%	S%	Cr%	Mo%	
0,10-0,17	1,00	1,50	0,040	0,15-0,35	15,5-17,5	0,20-0,60	EN 10088-3: 2014
± 0.01	+ 0.05	+ 0.04	+ 0.005	± 0.02	± 0.2	+ 0.03	

Product deviations are allowed

## Temperature °C

Melting range	Hot-forming	Recrystallization +RA	Soft annealing +A	MMA welding – AWS electrodes <i>pre-heating annealing after w.</i> difficult; address qualified electrodes producers <i>joint with steel</i>
1510-1430	1100-930	790-710 cooling to 300, then air	850-750 air	carbon CrMo alloyed stainless E309 E309 E309 – E308 <i>cosmetic welding</i> E309
Isothermal annealing +I	Quenching +Q	Tempering +T		
not suitable	1060-980 air/oil/ polymer	650-550 fast cooling in air		

Chemical treatment • Pickling (10 - 15% HNO<sub>3</sub>) + (0,5 - 1,5% HF) hot or 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%	Kv <sub>2</sub> +20 °C	HBW <sup>a)</sup>	a) for information only
from	to	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min	J min	max	
		730 max	-	-	-	220	+A annealed material
	60	650-850	500	12	-	-	+QT650 quenched and tempered
60	160	650-850	500	10	-	-	+QT650 quenched and tempered

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

size		Testing at room temperature					
mm		R	HBW <sup>a)</sup>	R	Rp 0.2	A%	Kv <sub>2</sub> +20 °C
from	to	N/mm <sup>2</sup>	max	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min	J min
	10 <sup>b)</sup>	880	280	700-980	580	7	-
10	16	880	280	700-980	530	7	-
16	40	800	250	650-930	500	9	-
40	63	760	230	650-880	500	10	-
63	100	730	220	650-850	500	10	-
		+A annealed material		+QT650 quenched and tempered			

a) for information only

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

Forged (ASTM A 473-17a steel ASTM 430F)

size		Testing at room temperature					
mm		R	Rp 0.2	A%	Z%	Kv +20 °C	HB <sup>a)</sup>
from	to	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min	min	J min	max
		485	275	20	45	-	223
		+A annealed material					

a) for information only

Cold-work hardened EN 10088-3: 2014 in conditions 2H (ex. +A+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	
	25	550-750	440	15	+C550 cold-drawn material

Table of tempering values at room temperature on rounds of Ø 20 mm after quenching at 1000°C in oil

R	N/mm <sup>2</sup>	880	860	860	900	920	910	880	820	660	600	580
Rp 0.2	N/mm <sup>2</sup>	710	690	680	690	700	700	670	610	470	420	380
A	%	12	13	13	13	13	13,5	14	14	15	16	17
Tempering °C		<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>600</b>	<b>650</b>	<b>700</b>

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

<b>R</b>	N/mm <sup>2</sup>	550	570	600	620	650	710	755	765	775
<b>Rp 0.2</b>	N/mm <sup>2</sup>	320	440	480	490	540	620	635	640	650
<b>A</b>	%	22	18	16	14	13	12	10	10	9
Reduction %		<b>0</b>	<b>5</b>	<b>8</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>25</b>	<b>26</b>	<b>29</b>

<b>Thermal expansion</b>	10 <sup>-6</sup> • K <sup>-1</sup>	▶	10.0	10.5	10.5	10.5
<b>Modulus of elasticity</b>	longitudinal GPa	215	212	205	200	190
<b>Poisson number</b>	ν	0,27-0,30				
<b>Electrical resistivity</b>	Ω • mm <sup>2</sup> /m	0.70				
<b>Electrical conductivity</b>	Siemens•m/mm <sup>2</sup>	1.43				
<b>Specific heat</b>	J/(Kg•K)	460				
<b>Density</b>	Kg/dm <sup>3</sup>	7.70				
<b>Thermal conductivity</b>	W/(m•K)	25				
<b>Relative magnetic permeability</b>	μ <sub>r</sub>	600-1100				
<b>°C</b>		<b>20</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>

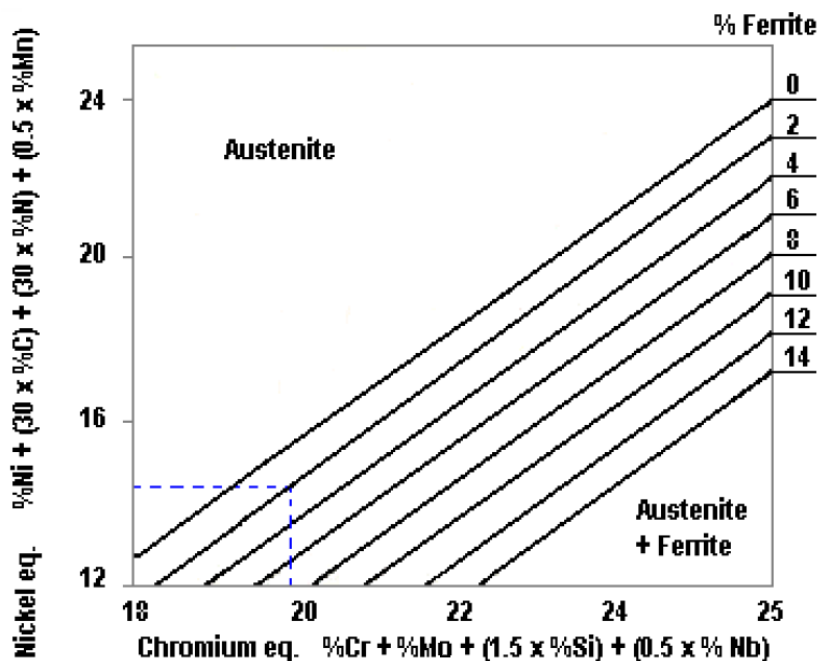
The symbol ▶ indicates temperature between 20 °C and 100 °C, 20 °C and 200 °C .....

<b>Corrosion resistance</b>	Atmospheric		Chemical			x petroleum, phenol, household cleaners, food
Fresh water	<i>industrial</i>	<i>marine</i>	<i>medium</i>	<i>oxidizing</i>	<i>reducing</i>	
<b>x</b>	<b>x</b>		<b>x</b>			

<b>Magnetic</b>	yes
<b>Machinability</b>	high
<b>Hardening</b>	by quenching, cold-drawn and and other cold plastic deformations
<b>Service temperature in air</b>	continuous service up to 740 °C; intermittent service up to 820 °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
X14CrMoS17			Y10Cr17		SUS 430F		STS 430F

Calculation of ferrite percentage - De Long diagram

A careful study of chemical analysis is the best way to prevent  $\delta$  (delta) ferrite presence in the finished product.

As from the graphic, some elements brought to the maximum or to the minimum of the analysis forks fixed for the chosen steel can modify equivalent Ni and equivalent Cr values. An accurate choice of targets during cast planning phase can prevent material brittleness caused by delta ferrite shaping.