



<b>Quality</b>	<b>X90CrMoV18</b>	<b>Martensitic</b>	<i>Technical card 2018</i>
Number	<b>1.4112</b>	<b>Stainless Steel</b>	<i>Lucefin Group</i>

## Chemical composition

C%	Si% max	Mn% max	P% max	S% <sup>a)</sup> max	Cr%	Mo%	V%	
0,85-0,95	1,00	1,00	0,040	0,030	17,0-19,0	0,90-1,30	0,07-0,12	EN 10088-3: 2014
± 0.03	+ 0.05	+ 0.03	+ 0.005	± 0.005	± 0.2	+ 0.05	+ 0.03	

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	Full annealing	Soft annealing +A	MMA welding – AWS electrodes
1440-1420	1175-930	910-890 cooling 15 °C/h to 590, then air	840-780 slow cooling	<i>pre-heating</i> 200-150 <i>annealing after w.</i> 750-700
Isothermal annealing +I	Quenching +Q	Tempering +T	Stress-relieving +SR	<i>joint with steel</i>
900-840 controlled cooling to 690, then air	1050-1000 oil / polymer (HRC 58)	550-450 air	350-100 air	carbon E70 xx CrMo alloyed E8018-B 2 stainless E309 – E308 <i>cosmetic welding</i> E309 special

Transformation temperature during heating **Ac1** ~ 790, **Ac3** ~ 870 and during cooling **Ms** ~ 280, **Mf** ~ 130

**Chemical treatment** - *Pickling* (15 - 25% HNO<sub>3</sub>) + (1 - 8% HF) hot.

## Mechanical properties

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

size		Testing at room temperature						
mm		<b>R</b>	<b>Rp</b> 0.2	<b>A%</b>	<b>Kv<sub>2</sub></b> +20 °C	<b>HBW</b>	<sup>a)</sup> for information only	
from	to	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min	J min	max		
	100	-	-	-	-	265	+A annealed material	

Bars, typical values according to UNS S44003 steel 440B

size		Testing at room temperature										
mm		<b>R</b>	<b>Rp</b> 0.2	<b>A%</b>	<b>Z%</b>	<b>HB</b>	<b>R</b>	<b>Rp</b> 0.2	<b>A%</b>	<b>Z%</b>	<b>HB</b>	
from	to	N/mm <sup>2</sup>	N/mm <sup>2</sup>	min	min	max	N/mm <sup>2</sup>	N/mm <sup>2</sup>	min	min	max	
		738	427	18	35	269	827	655	9	20	285	
+A hot-rolled annealed							+A+C cold-drawn					

**Forged** (ASTM A 473-17a steel ASTM 440B)

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

<sup>a)</sup> Only for guidance

**Table of tempering** values at room temperature after quenching at 1020 °C in oil

<b>HB</b>	595	560	543	525	525	371	311	279
<b>HRC</b>	57	55	54	53	53	40	33	29
Tempering °C	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>	<b>500</b>	<b>600</b>	<b>650</b>	<b>700</b>

<b>Thermal expansion</b>	$10^{-6} \cdot K^{-1}$	►	10.4	10.8	11.2	11.6	11.9
<b>Modulus of elasticity</b>	longitudinal GPa		215	212	205	200	190
<b>Poisson number</b>	$\nu$		0,27-0,30 ~				
<b>Electrical resistivity</b>	$\Omega \cdot mm^2/m$		0.80				
<b>Electrical conductivity</b>	Siemens·m/mm <sup>2</sup>		1.25				
<b>Specific heat</b>	J/(Kg·K)		430				
<b>Density</b>	Kg/dm <sup>3</sup>		7.70				
<b>Thermal conductivity</b>	W/(m·K)		15.0				
<b>Relative magnetic permeability</b>	$\mu_r$		700-1000 ~				
<b>°C</b>			<b>20</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b> <b>600</b>

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

<b>Corrosion resistance</b>	Atmospheric		Chemical			x steam, petroleum, gasoline, alcohol, food, fruit juices
Fresh water	<i>industrial</i>	<i>marine</i>	<i>medium</i>	<i>oxidizing</i>	<i>reducing</i>	
x						

<b>Magnetic</b>	yes
<b>Machinability</b>	difficult
<b>Hardening</b>	by quenching
<b>Service temperature in air</b>	max 300 °C for cold plastic deformations and 760 °C for hot-formed products

<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
X90CrMoV18	S44003	<b>440B</b>	90Cr18MoV		SUS 440B		STS 440B

Knife

Dagger

