

Quality	X29CrS13	Martensitic	<i>Technical card 2018</i>
Number	1.4029	Stainless Steel	<i>Lucefin Group</i>

Chemical composition

C%	Si% max	Mn% max	P% max	S%	Cr%	Mo% max	
0,25-0,32	1,00	1,50	0,040	0,15-0,25	12,0-13,5	0,60	EN 10088-3: 2014
± 0.02	+ 0.05	+ 0.04	+ 0.005	+ 0.02	± 0.15	+ 0.03	

Product deviations are allowed

Temperature °C

Melting range	Hot-forming	Subcritical annealing	Soft annealing +A	Full annealing	MMA welding – AWS electrodes pre-heating annealing after w. not recommended
1500-1450	1100-900	820-740 aria	820-740 aria	900-815	
Isothermal annealing +I	Quenching +Q	Tempering +T	Stress-relieving +SR		joint with steel carbon CrMo alloyed stainless cosmetic welding
910-890 cooling at 740 pause after air	1050-950 oil / air	675-625 air	250-180 air		

Chemical treatment - Pickling (10-15% HNO₃) + (0,5-1,5% 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		R	Rp 0.2	A%	Kv ₂ +20 °C	HBW ^{a)}	a) for information only
from	to	N/mm ²	N/mm ² min	min (L)	J min (L)	max	
		800 max	-	-	-	245	+A annealed material
	160	850-1000	650	9	-	-	+QT850 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 ^{a)}				
from	to	N/mm ² max	max				
	10 ^{b)}	950	305			900-1100	750 8 -
10	16	950	305			900-1100	700 8 -
16	40	900	280			850-1100	650 10 -
40	63	840	260			850-1050	650 10 -
63	160	800	245			850-1000	650 12 -

+A annealed material +QT850 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

size		Testing at room temperature				
mm		R	Rp 0.2	A%	Kv +20 °C	HB
from	to	N/mm ²	N/mm ² min	min (L)	J min (L)	max
-	-	-	-	-	-	-

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

		1740	1640	1640	1640	1650	1620	1300	1000	850	800
R	N/mm ²										
Rp 0.2	N/mm ²	1400	1380	1370	1360	1360	1300	1100	780	660	600
A	%	9	10	10	9	9	10	11	13	16	20
Kv	J	18	20	18	16	14	14	16	26	32	42
Tempering °C		200	300	350	400	450	500	550	600	650	700

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

		700	780	840	900	950	1000	-	-
R	N/mm ²								
Rp 0.2	N/mm ²	450	630	680	710	750	790	820	900
A	%	20	13	10	10	10	10	9	8
Reduction %		0	10	20	30	40	50	60	70

Thermal expansion	$10^{-6} \cdot K^{-1}$	►	10.5	11.5			
Modulus of elasticity	longitudinal GPa		215	212	205	200	190
Poisson number	ν		0.230				
Electrical resistivity	$\Omega \cdot mm^2/m$		0.55				
Electrical conductivity	Siemens $\cdot m/mm^2$		1.80				
Specific heat	J/(Kg \cdot K)		460				
Density	Kg/dm ³		7.70				
Thermal conductivity	W/(m \cdot K)		30				
Relative magnetic permeability	μ_r		950 max for annealed material				
°C			20	100	200	300	400 600

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

Corrosion resistance	Atmospheric		Chemical			x water, steam, ammonia, oil
Fresh water	<i>industrial</i>	<i>marine</i>	<i>medium</i>	<i>oxidizing</i>	<i>reducing</i>	
x						

Magnetic	yes
Machinability	excellent
Hardening	by quenching
Service temperature in air	resistance to oxidation and scaling up to 650 °C

Europe	USA	USA	China	Russia	Japane	India	Republic of Korea
EN	UNS	ASTM	GB	GOST	JIS	IS	KS
X29CrS13	S42020	Tp. 420F			SUS 420F		