



Quality	(X20Cr13 ~)	Martensitic	<i>Technical card 2018</i>
Number	1.4021 Medical	Stainless Steel	Lucefin Group

Chemical composition

C%	Si%	Mn%	P%	S%	Cr%	
0,17-0,20	max 1,00	max 1,00	max 0,040	max 0,010	12,5-13,5	(EN 10088-3: 2014)
± 0.01	+ 0.05	+ 0.03	+ 0.005	+ 0.003	± 0.15	

Product deviations are allowed

Temperature °C

Melting range	Hot-forming	Subcritical annealing	Soft annealing +A	Full annealing	MMA welding – AWS electrodes
1510-1460	1100-830	770-720 air	825-745 air	900-840	pre-heating annealing after w. 250-200 750
Isothermal annealing +I	Quenching +Q	Tempering +T	Stress-relieving +SR		joint with steel
-	1050-950 oil / polymer air	750-650 air	200-180 air		carbon CrMo alloyed stainless E60 xx E8018-B 2 E309
					cosmetic welding E420 – E410

Chemical treatment - Pickling (10 - 15% HNO₃) + (0,5-1,5% HF) hot or cold

Mechanical properties

Heat-treated material (For reference 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	J min	max	
		760 max	-	-	-	230	+A annealed
	160	700-850	500	13	25	-	+QT700 quenched and tempered
	160	800-950	600	12	20	-	+QT800 quenched and tempered

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

size		Testing at room temperature					
mm		R	HBW ^{a)}	R	Rp 0.2	A%	Kv ₂ +20 °C
from	to	N/mm ² max	max	N/mm ²	N/mm ² min	min	J min
	10 ^{b)}	910	290	750-1000	600	8	-
10	16	910	290	750-1000	550	8	-
16	40	850	260	700-950	500	10	25
40	63	800	250	700-900	500	12	25
63	160	760	230	700-850	500	13	25
		+A annealed material		+QT700 quenched and tempered material			

^{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

Thermal expansion	10 ⁻⁶ • K ⁻¹	▶	10.3	10.8	11.7	12.2
Modulus of elasticity	longitudinale	GPa	200			
Electrical resistivity	Ω • mm ² /m		0.55			
Electrical conductiv.	Siemens•m/mm ²		1.80			
Specific heat	J/(Kg•K)		460			
Density	Kg/dm ³		7.75			
Thermal conductivity	W/(m•K)		25			
°C			20	100	200	300
					400	500
						600

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

Magnetic	yes
Machinability	good
Hardening	by quenching
Service temperature in air	up to 650 °C

Europe	USA	USA	China	Russia	Japan	India	Republic of
EN	UNS	ASTM	GB	GOST	JIS	IS	Korea
X20Cr13 ~							KS