



Quality	X15CrNiSi25-21	Austenitic	<i>Technical card 2018</i>
Number	1.4841	Stainless Steel (refractory steel)	Lucefin Group

Chemical composition

C%	Si%	Mn%	P%	S%	Cr%	Ni%	N%	
max		max	max	max			max	
0,20	1,50-2,50	2,00	0,045	0,015	24,0-26,0	19,0-22,0	0,10	EN 10088-1: 2014
+ 0.01	+ 0.10	+ 0.10	+ 0.005	+ 0.003	± 0.25	± 0.15	+ 0.01	

Product deviations are allowed

Temperature °C

Melting range	Hot-forming	Solution annealing +AT	Soft annealing +A	Stabilizing	MMA welding – AWS electrodes
1430-1400	1190-1000	1150-1050 water	not suitable	not necessary	<i>pre-heating</i> <i>post weldin</i> not necessary solution annealing
Sensitization	Quenching +Q	Tempering +T	Stress relieving +SR		<i>joint with steel</i>
avoid slow heating in the range of 600 and 900	not suitable	not suitable	650 air		carbon CrMo stainless E309-E308 E309-E308 E310 <i>cosmetic welding</i> E312

Chemical treatment - Pickling (6 - 25% HNO₃) + (0.5 - 8% HF) hot or cold. Passivation 20 - 25% HNO₃ hot

Mechanical properties

Products obtained with plastic deformation EN 10095: 2001

bar size		Testing at room temperature						
mm		R ¹⁾	Rp 0.2	A% min for products			HBW ¹⁾	
from	to	N/mm ² min	N/mm ² min	long	flat			
				(l)	da 0,5 a < 3 (l) (tr)	≥ 3 (l) (tr)	max	
	160	550-750	230	30	28	30	223	
							+AT solution annealing	

¹⁾ The max HB values may be raised by 100 units or the max tensile strength value may be raised by 200 N/mm² and the min elongation value be lowered to 20% for section and bars of ≤ 35 mm thickness having a final cold deformation.

(l) = longitudinal (tr) = transversal

Forged +AT solubilized material ASTM A 473-99

ssize		Testing at room temperature						
mm		R	Rp 0.2	A%	Z%	Kv +20 °C	Kv +20 °C	Kv -196 °C
from	to	N/mm ² min	N/mm ² min	min (L)	min (L)	J min (L)	J min (T)	J min (T)
		515	205	40	50	-	-	-

Hard-drawn ASTM A 276-04 (+AT+C)

size		Testing at room temperature			
mm		R	Rp 0.2	A%	Z%
from	to	N/mm ² min	N/mm ² min	min	min
	12.7	620	310	30	40
12.7		515	205	30	40

Creep properties EN 10095 : 2001. Estimated average value of the strength for 1% (Rp_{1.0}) elongation and estimated average value of the strength for rupture (Rm) at elevated temperature for 1 000 h, 10 000 h and 100 000 h.

Test temperature °C	Strength elongation Rp 1.0 N/mm ²			Strength rupture R N/mm ²		
	1000 hours	10.000 hours	100.000 hours	1000 hours	10.000 hours	100.000 hours
600	105	95		170	130	80
700	50	35		90	40	18
800	23	10		45	20	7
900	10	4		20	10	3
1000	3	-		5	-	-

Transition-curve determined with Kv. Solubilized material at 1050 °C

Average J	60	70	85	100	120	150	170
Test at °C	-160	-120	-80	-40	0	40	80

Approximate values at high temperatures. Material +AT solubilized at 1050 °C

R	N/mm ²	630	610	580	560	520	460	400	300
Rp 0.2	N/mm ²	290	240	200	190	180	170	150	140
A	%	46	42	40	40	38	34	25	22
C	%	72	70	68	62	58	40	28	38
Test at °C		100	200	300	400	500	600	700	800

Thermal expansion	10 ⁻⁶ • K ⁻¹	▶	15.5	17.0	17.5	18.0	19.0
Modulus of elasticity	longitudinal GPa	200	184	167	150	135	
Poisson number	ν	0.30 ~					
Electrical resistivity	Ω • mm ² /m	0.90					
Electrical conductiv.	Siemens•m/mm ²	1.11					
Specific heat	J/(Kg•K)	500					
Density	Kg/dm ³	7.90					
Thermal conductivity	W/(m•K)	15					
Relative magnetic permeability	μr max	1.02					

°C 20 100 200 300 400 500 600 800 1000

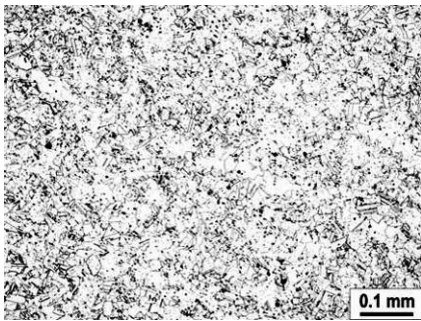
The symbol ▶ indicates temperature between 20 °C and 200 °C, 20 °C and 400 °C

Corrosion resistance	Atmospheric		Chemical			x radiant tubes, boiler, heat treating boxes
	Fresh water	industrial marine	medium oxidizing reducing			
x	x	x	x	x		

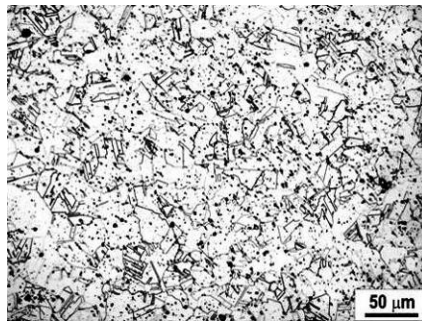
Magnetic	no
Machinability	mean
Hardening	by cold-drawn and and other cold plastic deformations
Service temperature	max 1125 °C

Europe	USA	USA	China	Russia	Japan	India	R. of Korea
EN	UNS	ASTM	GB	GOST	JIS	IS	KS
X15CrNiSi25-21	S31400	314	1Cr25Ni20Si2	20Ch25N20S2	SUH 310 ~	X20Cr25Ni20	STS 310 TB ~

Solubilized material at 1100 °C and cooled in air. Structure: carbides within austenite matrix



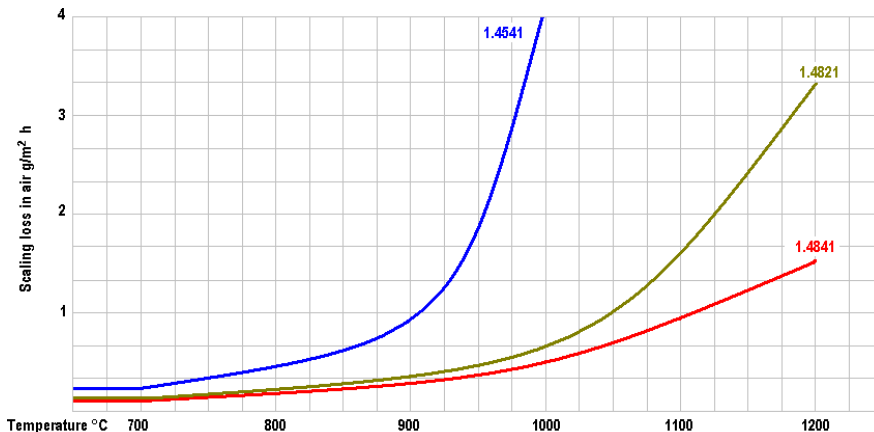
x100



x200



x500



Scaling loss in air