

Quality	X2CrNiMoCuWN25-7-4	Austenitic-Ferritic	<i>Technical card 2018</i>
Number	1.4501	Stainless Steel (Superduplex)	Lucifin Group

Chemical composition

C%	Si%	Mn%	P%	S%	Cr%	Ni%	N%	Mo%	Cu%	W%	EN
max	max	max	max	max							EN
0,03	1,00	1,00	0,035	0,015	24,0-26,0	6,0-8,0	0,20-0,30	3,0-4,0	0,5-1,0	0,5-1,0	10088-3: 2014
+ 0.005	+ 0.05	+ 0.03	+ 0.005	+ 0.003	± 0.25	± 0.10	± 0.02	± 0.10	+ 0.04	+ 0.05	

Product deviations are allowed.

PRE (Cr+3,3Mo+16N) > 40 (Pitting Resistance Equivalent)

Temperature °C

Melting range	Hot-forming	Solution annealing (Solubilization) +AT	Stabilizing	Soft annealing +A	MMA welding – AWS electrodes pre-heating post welding
1480-1440	1250-1100	1120-1050 water	not suitable	not suitable	not recommended
Embrittlement	Carbides precipitation	Sigma phase formation	Stress-relieving +SR	Recrystallizat. +RA	oint with steel carbon CrMo alloyed stainless
-50 +300	950-600	1000-600	not suitable	not suitable	cosmetic welding

Chemical treatment ▪ Pickling (52% HNO₃) + (65% HF) hot ▪ Passivation 20 - 45% HNO₃ 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%	A%	Kv ₂ +20 °C	Kv ₂ +20 °C	Kv ₂ -40 °C	HBW ^{a)}	
from to	N/mm ²	N/mm ² min	min (L)	min (T)	J min (L)	J min (T)	J min ^{b)} (L)	max	
160	730-930	530	25	-	100	-	40	290 +AT	
75 ^{c)}	730-930	530	25	25	100	60	-	- solubiliz.	

^{a)} for information only. ^{b)} EN 10272 : 2003. ^{c)} EN 10088-2 : 2014. (L) = longitudinal (T) = transversal

Cold-work

1.4501 steel can be adequately cold formed by various processes (cold-drawn, cold-reduced, deep-drawn). It is recommended that any cold work in excess of 10% - 20% is removed by solution annealing and water quenching. It should be noted that cold working above these limits can result in hardness levels above those specified in standards such as ISO 15156 / NACE MR0175.

Forged +AT solubilization UNI EN 10250-4: 2001

size	Testing at room temperature						
mm	R	Rp 0.2	A%	A%	Kv +20 °C	Kv +20 °C	
from to	N/mm ²	N/mm ² min	min (L)	min ((T)	J min (L)	J min (T)	
160	730-930	530	25	20	100	60	

Typical values at high temperature, hot-formed flats +AT (Rolled Alloys US data sheet)

Test	thickness up to 30 mm.				thickness 31 to 70 mm	
temperature	R	Rp 0.2			R	Rp 0.2
°C °F	N/mm ²	N/mm ²			N/mm ²	N/mm ²
20 68	780	580			750	550
50 122	725	500			700	470
100 212	700	470			670	430
150 302	680	450			620	400
200 392	670	430			610	380
250 482	650	400			600	370
300 572	635	385			590	360

X2CrNiMoCuWN25-7-4 n° **1.4501** Superduplex

Minimum yield stress and tensile strength values at high temperatures on material +AT EN 10028-7: 2007

Rp 0.2	N/mm ²	500 ^{a)}	450	420	400	380
R	N/mm ²	711 ^{a)}	680	660	640	630
Prova a	°C	50	100	150	200	250

a) determined by linear interpolation

Thermal expansion	10 ⁻⁶ • K ⁻¹	▶	13.0	13.5	14.0	14.5
Modulus of elasticity	longitudinal GPa		200	194	186	180
Poisson number	ν		0.32			
Electrical resistivity	Ω • mm ² /m		0.80	0.89	0.95	1.01
Electrical conductiv.	Siemens•m/mm ²		1.25			
Specific heat	J/(Kg•K)		500		523	547
Density	Kg/dm ³		7.80			
Thermal conductivity	W/(m•K)		15.0		16.3	18.2
Relative magnetic permeability	μr		29			
°C			20	100	200	300
					400	

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

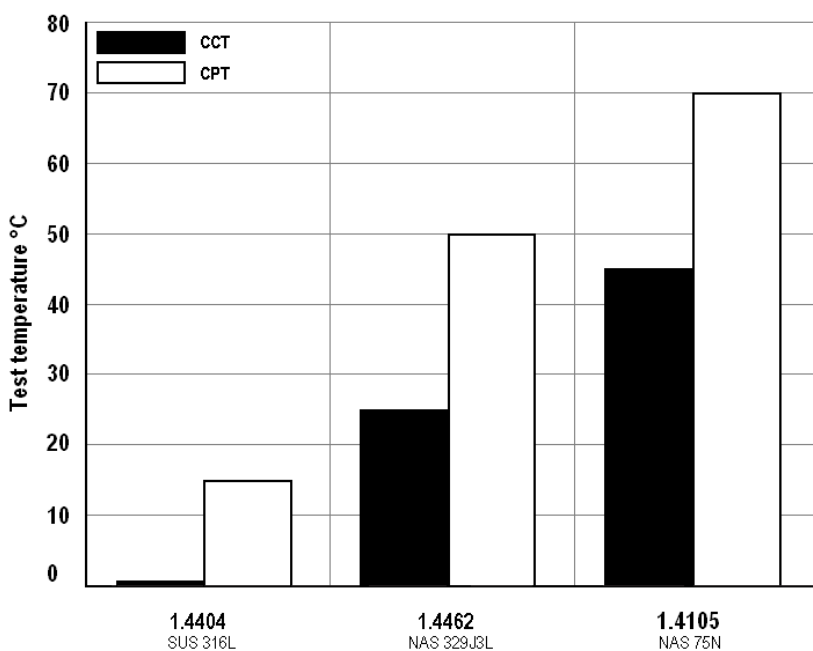
Corrosion resistance	Atmospheric		Chemical			x erosion, pitting, crevice, organic and inorganic a. stress corrosion cracking
Brackish water	<i>industrial</i>	<i>marine</i>	<i>medium</i>	<i>oxidizing</i>	<i>reducing</i>	
x	x	x	x			

Magnetic	yes
Machinability	a higher wear rate of the tools than that of austenitic steels
Hardening	cold-drawn and other cold plastic deformations
Service temperature	not recommended for uses to temperatures greater than +300 °C and lower -50 °C

Europe	USA	USA	China	Russia	Japan	India	R. Corea
EN	UNS	ASTM	GB	GOST	JIS	IS	KS
X2CrNiMoCuWN25-7-4	S32760	Type F 55	022Cr25Ni7Mo3WCuN		SM25Cr		

Corrosion resistance in various acids (test time: 24 h)

acid formula	name	concentration %	temperature °C	1.4105 superduplex	1.4462 duplex	1.4404 austenitic
H ₂ SO ₄	sulphuric	10	boiling	1.45	3.70	19.70
HCl	hydrochloric	1	boiling	0.01	5.41	6.94
HNO ₃	nitric	60	boiling	0.06	0.11	0.17
H ₃ PO ₄	phosphoric	80	boiling	3.90	5.52	25.00
CH ₃ COOH	acetic	80	boiling	< 0.01	< 0.01	< 0.01



Pitting corrosion and Crevice corrosion resistance

CCT = critical crevice corrosion temperature

CPT = critical pitting corrosion temperature

Nippon Yakin literature
method ASTM G48 C/D