Quality	**X5CrNiCuNb16-4**	**Precipitation hardening Stainless Steel**
Number	**1.4542**	

GRUPPO LUCEFIN Lovin' Steel

Chemical composition

C% max	**Si%** max	**Mn%** max	**P%** max	**S%** [a] max	**Cr%**	**Ni%**	**Cu%**	**Nb%**	
0,07	0,70	1,50	0,040	0,015	15,0-17,0	3,0-5,0	3,0-5,0	5 x C < 0,70	EN 10088-1: 2005
± 0.01	+ 0.05	± 0.04	+ 0.005	+ 0.003	± 0.2	± 0.07	± 0.10	± 0.05	

Product deviations are allowed

[a] 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**	**Solution annealing** (Solubilization) **+AT**	**Precipitation hardening +P**	
1440-1400	1170-950	1060-1030 oil, air	+P800 760 air + 620 air	
Stress-relieving +SR	**Mill annealing**		+P930 620 air	+P960 590 air
660-600 furnace	1050-1020 air, oil under Mf (HB max 229)		+P1070 550 air	+P1300 480 oil

MMA **welding –** AWS electrodes

pre-heating	*annealing after w.*
100-200	aging

oint with steel

carbon	CrMoalloyed	stainless
E308L	ER630	E630-16

cosmetic welding
E630-16

Transformation temperature during heating **Ac1** ~627, **Ac3** ~ 704 and during cooling **Ms** ~ 130, **Mf** ~ 30

Mechanical properties

Hot-formed EN 10088-3: 2005 in conditions 1C, 1E, 1D, 1X, 1G, 2D

size mm		Testing at room temperature							
		R	**Rp** 0.2	**A%** (L)	**A%** (T)	**Kv** +20 °C (L)	**Kv** +20 °C (T)	**HB** [a]	heat treatment
from	to	N/mm²	N/mm² min	min		J min	J min	max	condition
	100	1200 max						360	+AT
	100	800-950	520	18		75			+P800
	100	930-1100	720	16		40			+P930
	100	960-1160	790	12					+P960
	100	1070-1270	1000	10					+P1070

[a] for information only (L) = longitudinal (T) = transversal

Cold-processed EN 10088-3: 2005 in conditions 2H, 2B, 2G, 2P

size mm		Testing at room temperature						
		R	**Rp** 0.2	**A%** (L)	**A%** (T)	**Kv** +20 °C (L)	**Kv** +20 °C (T)	heat treatment
from	to	N/mm²	N/mm² min	min	min	J min	J min	condition
	10 [b]	900-1100	600	10				
10	16	900-1100	600	10				
16	40	800-1050	520	12		75		+P800
40	63	800-1000	520	18		75		
63	160	800-950	520	18		75		
	100	930-1100	720	12		40		+P930
	100	960-1160	790	10				+P960
	100	1070-1270	1000	10				+P1070

[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 (L) = longitudinal (T) = transversal

Forged EN 10250-4: 2001 solubilized and precipitation hardening material

size mm		Testing at room temperature						
		R	**Rp** 0.2	**A%**	**A%**	**Kv** +20 °C	**Kv** +20 °C	heat treatment
from	to	N/mm² min	N/mm² min	min (L)	min (T)	J min (L)	J min (T)	condition
	250	930	720	15	12	40	30	+P930
	250	1070	1000	12	10	20	15	+P1070
	250	1300	1150	8	6			+P1300

Precipitation hardening temperature °C / Hardness. Material solubilized at 1040 °C . Approximate values

HRC	34	34	38	43	47	42	36	33
HV 10	336	336	372	423	458	412	354	327
N/mm²	1050	1050	1180	1390	1700	1340	1110	1030
°C	**100**	**200**	**300**	**400**	**450**	**500**	**600**	**650**

X5CrNiCuNb16-4 **n° 1.4542** precipitation hardening PH

Effect of **cold-working** (hot-rolled, solution annealing and cold-drawn). Approximate values

R	N/mm²	880	960	1000	1020	1060	1100	1120	1160	1200	1260
Rp 0.2	N/mm²	700	820	860	900	980	1000	1000	1020	1050	1080
A	%	20	12	11	10	8	8	8	8	8	8
Reduction	**%**	**0**	**10**	**15**	**20**	**30**	**40**	**50**	**60**	**70**	**75**

Minimum yield stress and tensile strength values at high temperatures. heat treatment condition

Solubilized and precipitation hardening material EN 10088-3: 2005

Rp 0.2	N/mm²	500	490	480	470	460	+P800
Rp 0.2	N/mm²	680	660	640	620	600	+P930
Rp 0.2	N/mm²	730	710	690	670	650	+P960
Rp 0.2	N/mm²	880	830	800	770	750	+P1070
Prova a	**°C**	**100**	**150**	**200**	**250**	**300**	

Thermal expansion	10^{-6} • K^{-1}	►	10.8	11.0	11.3	11.6	12.0	
Modulus of elasticity	longitudinal GPa	200	193	186	180	175	170	
Poisson number	*v*	0.291						
Electrical resistivity	Ω • mm²/m	0.71						
Electrical conductivity	Siemens•m/mm²	1.41						
Specific heat	J/(Kg•K)	500						
Density	Kg/dm³	7,80						
Thermal conductivity	W/(m•K)	14.0	16	18.5	20.0	22.0	23.0	
Relative magnetic permeability	µr	max 135						
°C		**20**	**100**	**200**	**300**	**400**	**500**	**800**

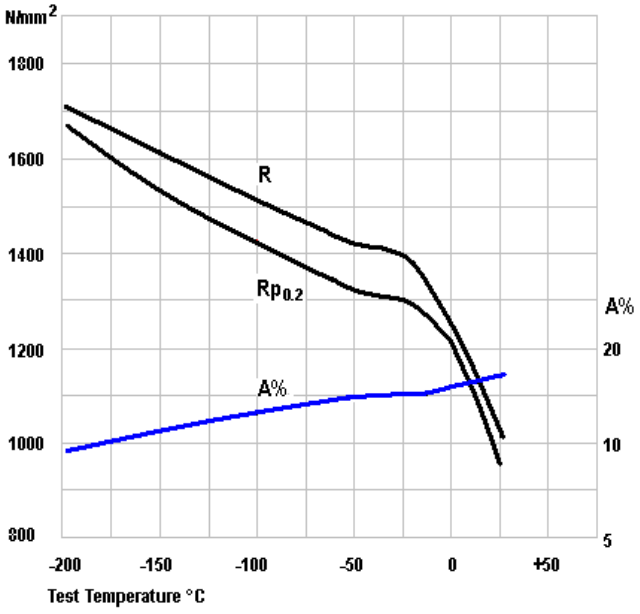
The symbol ► indicates between 20 °C and 100 °C, 20 °C and 200 °C .....

Corrosion resistance	Atmospheric		Chemical			**x** petrolchemical, stress corr. cracking, food processing
Fresh water	*industrial*	*marine*	*medium*	*oxidizing*	*reducing*	
x	**x**	**x**	**x**	**x**		

Magnetic	yes
Machinability	related to ist hardness
Hardening	precipitation hardening
Service temperature in air	do not use at temperatures higher than those of artificial aging (max 540 °C)

Europe EN	**USA** UNS	**USA** ASTM	**China** GB	**Russia** GOST	**Japan** JIS	**India** IS	**R. Corea** KS
X5CrNiCuNb16-4	S17400	**17-4 PH**	05Cr17Ni4Cu4Nb		SUS 630		STS 630

Mechanical properties at low temperature



Solution annealing 1040 °C
Precipitation hardening 600 °C

Toughness at low temperatures