Quality	**X50CrMoV15**	**Martensitic Stainless Steel**
Number	**1.4116**	

GRUPPO LUCEFIN Lovin' Steel

Chemical composition

C%	Si% max	Mn% max	P% max	S% a) max	Cr%	Mo%	V%	
0,45-0,55	1,00	1,00	0,040	0,015	14,0-15,0	0,50-0,80	0,10-0,20	EN 10088-1: 2014
± 0.02	+ 0.05	+ 0.03	+ 0.005	+ 0.003	± 0.15	± 0.05	± 0.03	

Product deviations are allowed

a) for improing 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**	**Full annealing**	**Soft annealing +A**
1480-1460	1100-930	930-870 furnace	850-750 slow cooling
Isothermal annealing +I	**Quenching +Q**	**Tempering +T**	**Stress-relieving +SR**
910-890 controlled cooling to 750, then air	1030-980 oil / polymer (HRC 55)	500-400 air	250-150 air

MMA **welding –** AWS electrodes

pre-heating	*annealing after w.*
260	760-740

joint with steel

carbon	CrMo alloyed	stainless
E70 xx	E8018-B 2	E309 – E308

cosmetic welding
E309

Transformation temperature during heating **Ac1** ~ 880, **Ac3** ~ 920 and during cooling **Ms** ~ 280, **Mf** ~ 120

Chemical treatment ▪ *Pickling* (20 - 50% HNO_3) hot. *Passivation* (20 - 25% HNO_3) + (2.5% $Na_2Cr_2O_7.2H_2O$) hot

Mechanical properties

Heat-treated material EN 10088-3: 2014 in conditions 1C, 1E, 1D, 1X, 1G, 2D

size mm		Testing at room temperature					a) for information only
		R	**Rp** 0.2	**A**%	**Kv** +20 °C	**HB** a)	
from	to	N/mm²	N/mm²	min	J min	max	
		900 max				280	+A annealed material

Table of tempering values at room temperature after quenching at 990 °C in oil

HB	543	518	512	518	512	525	496	381	301
HRC	54	52,5	52	52.5	52	53	51	41	32
Tempering **°C**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**

Thermal expansion	$10^{-6} \cdot K^{-1}$	►	10.5	11.0	11.0	11.5	
Modulus of elasticity	longitudinal GPa	215	212	205	200	190	
Poisson number	*v*	0,27-0,30					
Electrical resistivity	$\Omega \cdot mm^2/m$	0.65					
Electrical conductivity	Siemens•m/mm²	1.54					
Specific heat	J/(Kg•K)	460					
Density	Kg/dm³	7.70					
Thermal conductivity	W/(m•K)	30					
Relative magnetic permeability	μr	700 ~					
°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** steam, petroleum, gasoline, alcohol, ammonia, organic material
Fresh water	*industrial*	*marine*	*medium*	*oxidizing*	*reducing*	
x			**x**			

Magnetic	yes
Machinability	mean
Hardening	by quenching
Service temperature in air	up to 760 °C

Europe EN	**USA** UNS	**USA** ASTM	**China** GB	**Russia** GOST	**Japan** JIS	**India** IS	**Republic of Korea** KS
X50CrMoV15			(7Cr17)	50Ch14MF	(SUS 440A)		