

<b>Quality</b>	<b>X153CrMoV12</b>	Supply conditions:	<i>Technical card</i>
According to standards	<b>UNI EN ISO 4957: 2002</b>	Annealed HB max 255	<b>Lucefin Group</b>
Number	<b>1.2379</b>		rev. 2018

### Chemical composition

C%	Si%	Mn%	P% max	S% max	Cr%	Mo%	V%
1,45-1,60	0,10-0,60	0,20-0,60	0,030	0,030	11,0-13,0	0,70-1,00	0,70-1,00
± 0.04	± 0.03	± 0.04	+ 0.005	+ 0.005	± 0.15	± 0.05	± 0.04

Product deviations are allowed

### Temperature °C

Hot-forming	Stress-relieving After machining and before quenching	Pre-heating	Quenching <sup>1)</sup>  <b>+Q</b>	Tempering <sup>1)</sup>  <b>+T</b>	Soft annealing <b>+A</b>
1050-900	650-700 furnace cooling to 320, then air	400, pause, then 800, pause, then ▲ <sup>1)</sup> or <sup>2)</sup>	▲ 1000-1040 oil, polymer or air	180-250 calm air minimum 2 cycles	800-840 calm air (HB max 255)
Quenching <sup>2)</sup> <b>+Q</b>	Tempering <sup>2)</sup> <b>+T</b>	Tempering <sup>2)</sup> <b>+T</b>	Isothermal annealing <b>+I</b>	Pre-heating welding	Stress-relieving after welding
▲ 1060-1090 oil or polymer	520 calm air	180-250 calm air	870 furnace cooling to 760, pause, furnace cooling to 720, air (HB max 250)	250-300	650 furnace cooling
				<b>Ac1</b> <b>Ac3</b> <b>Ms</b> <b>Mf</b>	
				800   840   200   -10 <sup>b)</sup>	

<sup>b)</sup> subcooling. The symbol ▲ indicates the temperature rise to ..... °C ▲

### Mechanical and physical properties

Table of tempering after quenching at 1020 °C in oil

HB	722	714	706	688	670	654	624	624	644	644	605	482	336
HRC	64	63.5	63	62	61	60	58.5	58.5	59.5	59.5	57.5	50	36
R N/mm <sup>2</sup>	-	-	-	-	-	-	2375	2375			2285	1760	1110
Tempering at °C	50	100	150	200	250	300	350	400	450	500	550	600	700

### Hardness at elevated temperatures

HRC	60	53	47	38
°C	20	315	425	540

Thermal expansion	10 <sup>-6</sup> • K <sup>-1</sup> ▶	8.6	9.9	10.1	10.7	11.3	11.8	12.2	12.5
Modulus of elasticity long.	GPa			215	211	204	198	191	182
Modulus of elasticity tang.	GPa			82	81	78	76	73	70
Specific heat capacity	J/(Kg•K)			439					
Thermal conductivity	W/(m•K)			31.9	31.5	30.9	29.7	28.6	27.6
Density	Kg/dm <sup>3</sup>			7.68					
Specific electric resist.	Ohm•mm <sup>2</sup> /m			0.453	0.515	0.596	0.695	0.798	0.908
Electrical conductivity	Ohm•mm <sup>2</sup> /m			2.20	1.94	1.68	1.44	1.25	1.10
°C		-100	0	20	100	200	300	400	500

The symbol ▶ indicates temperature between -100 °C and 0 °C, -100 °C and 20 °C ...

Europe	Germany	China	Japan	India	R. of Korea	Russia	USA
EN	DIN	GB	JIS	IS	KS	GOST	AISI/SAE
X153CrMoV12	X155CrVMo12-1	Cr12MoV	SK 10		STD 10	Ch12MF	A681 D 2

### Cold-work tool steels

- chromium-molybdenum-vanadium steel grade
- long working life
- good toughness
- limited deformations during treatment
- extremely suitable for engraving and surface hardening, nitriding and/or P.V.D. (Physical Vapour Deposition)
- applications: *thin blades up to a thickness of 6 mm, clipping tools, shearing machine, croppers, lower dies, broaches*