

# L. KLEIN SA

ACIERS FINS ET MÉTAUX

EDELSTÄHLE UND METALLE

FINE STEEL AND METALS



## CHRONIFER 455 KL martensitic Stainless Steel



Material No.	DIN Abbreviation	AFNOR	AISI/SAE/ASTM	ISO	Euro Standard EN	Others
1.4543	X3CrNiCuTiNb12-9 (former X 3 CrNiCuTi 12,9)	Z 3 CNUTNb 12,9	AISI XM16 ASTM F899	7153-1	X3CrNiCuTiNb12-9	

Distinctive feature & main attribute: a precipitation hardenable chromium-nickel-steel alloy, pre-viously refined by an electroslag remelting process (ESR), of favourable corrosion properties in normal air atmosphere or fresh water and slight risk of break-age after impact (notched impact strength). A single-step aging treatment develops exceptionally high yield strength with good ductility (after heat treatment) and toughness. A fine combination of strength, toughness and corrosion resistance.

Use & application range: this alloy is required for surgical instruments, hightech machines of the chemical and pharmaceutical industries such as cellulose, food and brewery branches.

CHEMICAL COMPOSITION IN VOLUME PERCENTAGE	C	Si	Mn	Cr	Mo	Ni	Cu	Ti	Nb	Fe
	max. 0.05	max. 0.50	max. 0.50	11.00 12.50	max. 0.50	7.50 9.50	1.50 2.50	0.80 1.40	0.10 0.50	balance

EXECUTION DELIVERY FORM STANDARD SIZES AVAILABILITY	<ul style="list-style-type: none"><li>• Execution in about 3 m round bars as well as in coils</li><li>• Standard size in stock: see <a href="#">Product range</a></li><li>• Other sizes on request</li></ul>
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TOLERANCES	<ul style="list-style-type: none"><li>• Ø 1.04 mm, coils: cold drawn; ISO <b>h8</b></li><li>• Ø 3.17 – 12.70 mm, bars: cold drawn, ground; ISO <b>h9</b></li><li>• Tighter tolerances on request</li></ul>
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MECHANICAL PROPERTIES	At delivery status (in solution annealed condition): <ul style="list-style-type: none"><li>• Tensile strength (<math>R_m</math>): <b>~ 850 MPa</b>, size depending</li></ul>
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HEAT TREATMENT	Solution annealing (at delivery status) before the age-hardening process (see chart & spreadsheet)
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CUTTING RATES	<b><math>v_c \sim 25 - 35</math> m/min</b> , value depending on the lubrication oil, cutting tools and shape of parts. <ul style="list-style-type: none"><li>• Cutting oil: e.g. INOX or ORTHO NFX of Motorex</li></ul>
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Modifications will not be adjusted automatically

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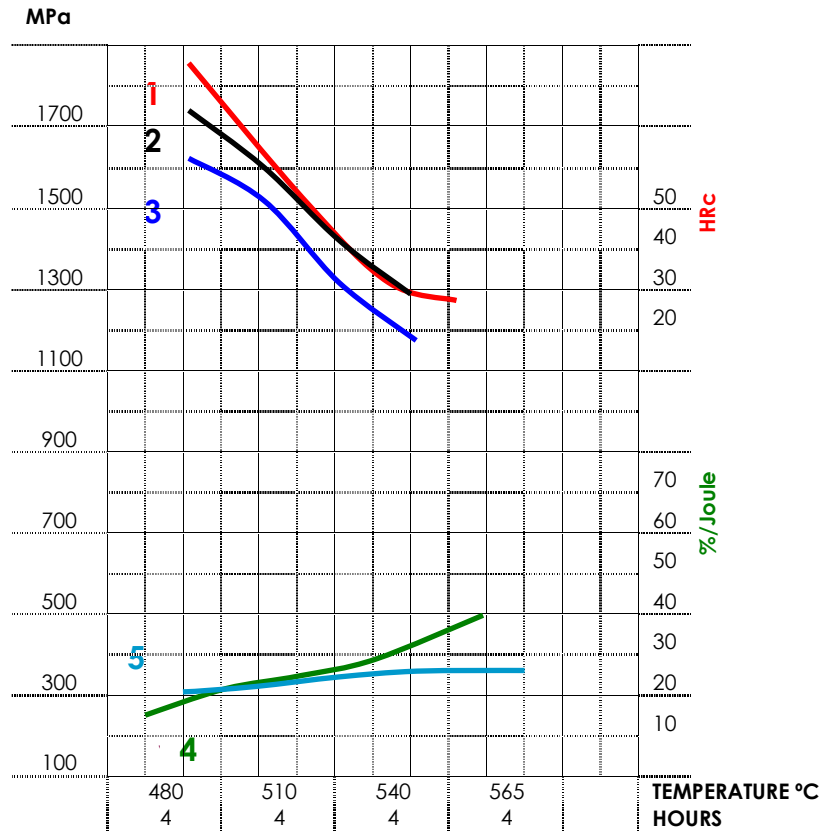
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# CHRONIFER 455 KL 1.4543

## CHART FOR PRECIPITATION HARDENING



- 1: Hardness Rockwell HRC
- 2: Tensile strength  $R_m$  (MPa)
- 3: Yield strength  $R_{e 0.2}$  (MPa)
- 4: Ductile yield  $A \epsilon$  (%)
- 5: Impact ductility KCV (J/cm<sup>2</sup>)

The above curves indicate the results of determinate section of a curtain size. The result after heat treatment can be slightly different than shown on this curve, depending on the shape and size of the part.

### SPREADSHEET

Standards	TTH	Rm (MPa)	Re 0,2 % (MPa)	A 4d %	Z %	HB	HRC	KCV (J/cm <sup>2</sup> )	Weldability	Corrosion
X3CrNiCuTiNb12.9	solution annealed	850				~ 255			good	***
	H900 (RV 480 °C)	1745	1670	10	45		49	9		
	H950 (RV 510 °C)	1600	1550	11.5	54		48	11		
	H1000 (RV 540 °C)	1410	1360	15	60		44	16		
	H1050 (RV 565 °C)	1300	1200	16	60		40	36		

Average value

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