

<b>Designation</b>	<b>Leaded Steel C100+Pb</b>	EN	UNS (ASTM)	AISI	LMSA
		-	-	-	<b>C320</b>

### Chemical composition

Fe	C	Mn	S	P	Si	Pb	Ni	Cr
Balance	0.90 - 1.05	0.20 - 0.50	≤ 0.10	≤ 0.10	0.15 - 0.25	0.15 - 0.30	≤ 0.10	≤ 0.10

Values (Weight %). In order to achieve maximum homogeneity and consistent quality, the actual manufacturing tolerances are tighter and more precisely than the composition indicated.

### Main technical properties and features

This unalloyed construction steel with lead addition (HT10 steel C100 + Pb ) is frequently used in the watch industry. Steel HT10 has an excellent ability for cold forming, cutting, milling and drilling. Its tensile strength can be significantly increased by quench hardening and tempering. With its fine microstructure, it is suitable for use in many applications where precision is required. Lamineries MATTHEY produces thin HT10 strip with tight tolerances allowing extremely complex parts stamping, before or after quenching and tempering, that include additional operations such as cutting, milling or drilling. HT10 presents an easy machining, however it has poor polishing due to the its Pb content.

### Typical uses

The excellent machinability and drawing properties of HT10 steel combined with its high hardness after quench hardening and tempering make it particularly suitable for manufacturing of watch components and other complex applications.

### Typical manufacturing range

	Thickness (mm)	Width (mm)	Length (mm)
<b>Rolled products</b> Strip in coils <sup>[1]</sup>	0.010 - 1.000	1.5 - 200.0	-
Strip as sheets <sup>[1]</sup>	0.015 - 1.000	10.0 - 200.0	100 - 3000

<sup>[1]</sup> Not all our production possibilities are presented here. Other dimensions or product forms available upon request. Some combinations of thicknesses and widths are not possible.

### Mechanical properties of strips

Temper	R <sub>m</sub> (N/mm <sup>2</sup> )	A <sub>50mm</sub> (%)	Hardness HV
soft	500 - 620	-	145 - 175
¼ hard	600 - 680	-	170 - 210
½ hard	660 - 750	-	210 - 240
¾ hard	730 - 850	-	220 - 270
hard	830 - 950	-	250 - 300
extra hard	930 - 1050	-	290 min.

## Physical properties

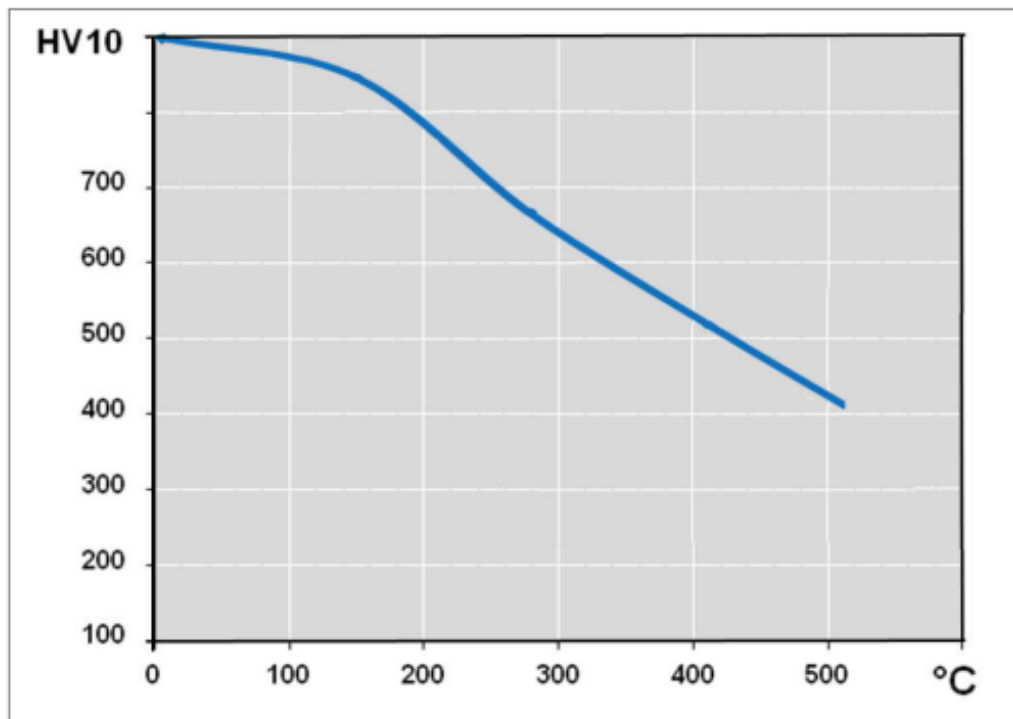
Modulus of elasticity	kN/mm <sup>2</sup>	200
Poisson ratio		0.28 - 0.30
Density	g/cm <sup>3</sup>	7.80
Melting point	°C	1430 - 1510
Linear dilatation coefficient	10 <sup>-6</sup> /°C	11.4
Thermal conductivity at 20°C	W/m °K	50
Electrical resistivity at 20°C	μΩcm	16
Electrical conductivity at 20°C	MS/m	6.3
Electrical conductivity	%IACS	11
Specific heat at 20°C	J/(kg. K)	500
Relative permeability ( $\mu_{r \max}$ )		700 - 1100

## Parts Heat treatment

Quenching and tempering heat treatment:

Quenching: 780 - 810°C / 20 to 30 min followed by quenching in oil.

Tempering: The tempering temperature between 150 - 500 °C / 3h allows to adjust the requested hardness.



800°/30min + oil quenching  
Hardness after 3h tempering at different temperatures.

### Tolerances (strip and foil)

Thickness	Thickness (mm)		Lamineries MATTHEY			
	≥	<	LMSA Standard	LMSA Precision	LMSA Extreme	
	-	0.025	-	-	± 0.001	
	0.025	0.050	± 0.003	± 0.002	± 0.0015	
	0.050	0.065	± 0.004	± 0.003	± 0.002	
	0.065	0.100	± 0.006	± 0.004	± 0.003	
	0.100	0.125	± 0.008	± 0.006	± 0.003	
	0.125	0.150	± 0.008	± 0.006	± 0.004	
	0.150	0.250	± 0.010	± 0.008	± 0.004	
	0.250	0.300	± 0.012	± 0.008	± 0.005	
	0.300	0.400	± 0.012	± 0.009	± 0.005	
	0.400	0.500	± 0.015	± 0.010	± 0.006	
	0.500	0.600	± 0.020	± 0.012	± 0.007	
	0.600	0.800	± 0.020	± 0.014	± 0.007	
	0.800	1.000	± 0.025	± 0.015	± 0.009	
	1.000	1.200	± 0.025	± 0.018	± 0.012	
	1.200	1.250	± 0.030	± 0.020	± 0.012	
	1.250	1.500	± 0.035	± 0.025	± 0.014	
<b>Width</b>	Our width tolerances "Standard" is +0.2, -0.0 (or ± 0.1 mm upon request). They are available for slit widths < 125 mm and thicknesses < 1.00 mm. Special tolerances upon request.					
Camber	Width (mm)		Camber max. (mm/m)			
	>	≤	LMSA standard		LMSA extreme	
			≤ 0.5 mm	> 0.5 mm	≤ 0.5 mm	> 0.5 mm
	3	6	12	-	6	-
	6	10	8	10	4	5
	10	20	4	6	2	3
	20	250	2	3	1	1.5
<b>Surface</b>	Special surface qualities upon request					
<b>Flatness</b>	Special requirement on the longitudinal or transversal flatness upon request					

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