

Designation	Ck60 (C60E)	EN 1.1221	UNS (ASTM) G10640	AISI -	LMSA C200
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Chemical composition

Fe	C	Mn	S	P	Si	Cu	Ni	Al	Cr	Mo
Bal.	0.58 - 0.63	0.35 - 0.50	≤ 0.005	≤ 0.02	≤ 0.10	≤ 0.12	≤ 0.12	≤ 0.02	0.05 - 0.15	≤ 0.05

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

Ck60 (C60E) steel is an unalloyed hypereutectoid structural steel containing about 0.60 % carbon. Thanks to its carbon content, this steel exhibits good hardenability, and can be hardened by conventional quenching and tempering treatment. This steel presents very good formability in the annealed condition, a high strength and toughness in the quenched and tempered condition. These characteristics make it the material of choice for stamped parts with high mechanical requirements.

Lamineries MATTHEY supplies thin strips of Ck60 steel with narrow dimensional tolerances, which allow the stamping of complex parts.

Typical uses

Ck60 steel is used for parts for the watch industry, jewelry applications, parts in machine construction, diaphragm spring, cutting tools for electronic industry.

Typical manufacturing range

	Thickness (mm)	Width (mm)	Length (mm)
Rolled products Strip in coils ^[1]	0.010 - 0.500	1.5 - 200.0	-
Strip as sheets ^[1]	0.015 - 0.500	10.0 - 200.0	100 - 3000

^[1] 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 _m (N/mm ²)	A _{50mm} (%)	Hardness HV
soft	380 - 480	-	110 - 135
¼ hard	480 - 570	-	135 - 170
½ hard	550 - 630	-	160 - 200
¾ hard	610 - 700	-	190 - 220
hard	680 - 800	-	210 - 250
extra hard	780 min.	-	240 min.

Physical properties

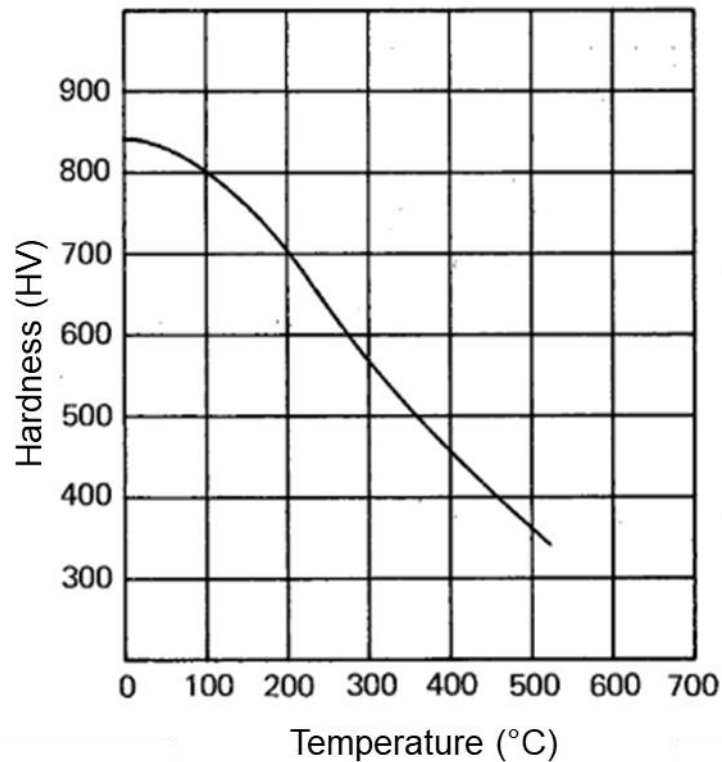
Modulus of elasticity	kN/mm ²	210
Poisson ratio		0.29
Density	g/cm ³	7.90
Melting point	°C	1400 - 1500
Linear dilatation coefficient	10 ⁻⁶ /°C	11 (20-100°C) / 12 (20-300°C)
Thermal conductivity at 20°C	W/m °K	52
Electrical resistivity at 20°C	μΩcm	18
Electrical conductivity at 20°C	% IACS	13
Specific heat at 20°C	J/(kg. K)	50.2

Heat treatment

Steel Ck60 can be heat treated by quenching in oil or water followed by a tempering.

Normalizing (°C)	Annealing (°C)	Quenching (°C)	Tempering ^[1] (°C) > 60min
820 - 880	680 - 710	810 - 850 (oil or water)	550 - 660

^[1] Function of time



Tolerances (strip and foil)

Thickness	Thickness (mm)		Lamineries MATTHEY			
	≥	<	LMSA Standard	LMSA Precision	LMSA Extreme	
<p>The table shown is an outline of our typical thickness tolerances available. They are tighter than industry standards.</p> <p>Our "LMSA Precision" and "LMSA Extreme" tolerances are available upon request.</p>	-	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		
Width	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	
Surface	Special surface qualities upon request					
Flatness	Special requirement on the longitudinal or transversal flatness upon request					

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