

Designation	X46Cr13	EN 1.4034	UNS (ASTM) S42000	AISI AISI 420C	LMSA D200
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Chemical composition

Fe	C	Cr	Si	Mn	P	S
Balance	0.43 - 0.50	12.50 - 14.50	≤ 1.00	≤ 1.00	≤ 0.04	≤ 0.015

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

Stainless steel 1.4034 belongs to the martensitic steel grade with intermediate carbon content, it has a carbon content of 0.46 % and 13 % chromium. This stainless steel grade is a good compromise between corrosion resistance and hardness, which can reach up to 54 HRC. The corrosion resistance is low in the annealed condition. Stainless steel X46Cr13 has good corrosion resistance in moderately corrosive environments free from chlorides, such as soaps, detergents and organic acids. The corrosion resistance is optimal after quenching followed by tempering, and after final surface polishing. This stainless steel grade is not weldable.

Typical uses

Cutting tools, surgical instruments, dental instruments, valves, bearings, cutlery (knives, scissors). In the electronic and microtechnical industry, in the watch industry and in general engineering.

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)	R _{p0.2} (N/mm ²)	A _{50mm} (%)	Hardness HV
soft	550 - 750	250 - 450	20 min	160 - 230
½ hard	700 - 950	580 - 900	3 - 15	225 - 310
hard	900 min.	750 min.	-	270 min.

Physical properties

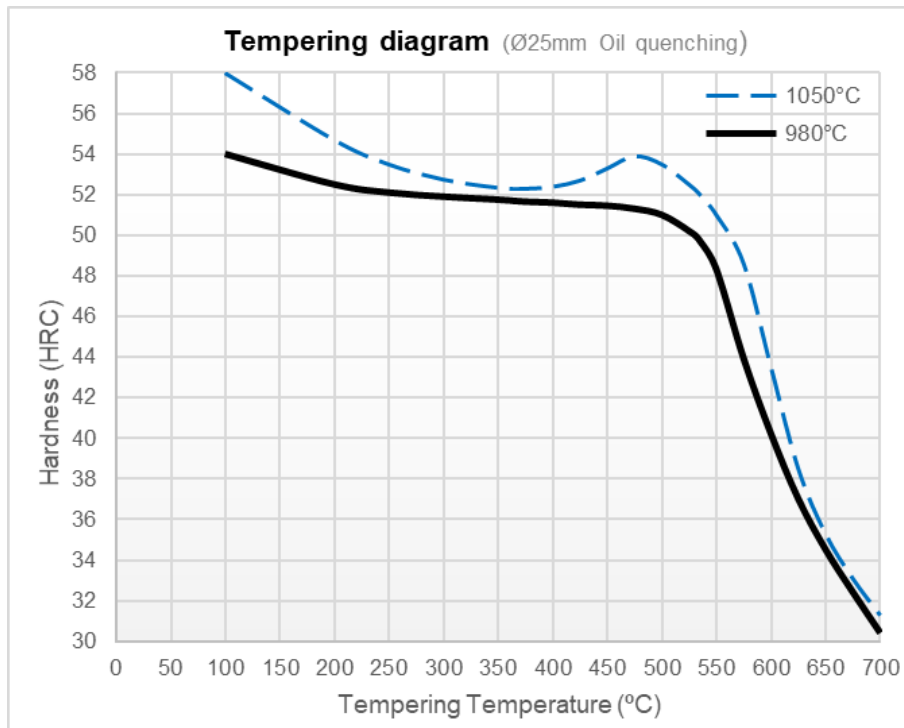
Modulus of elasticity	kN/mm ²	215
Poisson ratio		0.235
Density	g/cm ³	7.70
Melting point	°C	1430 - 1500
Linear dilatation coefficient	10 ⁻⁶ /°C	10.5 (0 - 100°C), 11.0 (20 - 200°C), 11.5 (20 - 300°C), 12.0 (20 - 400°C),
Thermal conductivity at 20°C	W/m °K	30
Electrical resistivity at 20°C	μΩcm	460
Specific heat at 20°C	J/(kg. K)	55
Magnetic properties		ferromagnetic

Heat treatment

Stainless steel 1.4034 can be heat treated by quenching (oil or water) followed by tempering.

Annealing (°C)	Stress releasing (°C)	Quenching (°C)	Tempering ^[1]
750 - 850 cooling in oven to 600°C, then air cooling.	600 - 650 heating to the center, then air cooling.	980 - 1050°C (Oil or air)	150 - 250°C (air), good compromise between hardness and corrosion resistance. 520 - 600°C, improve toughness. Maximal hardness 54HRC

^[1] Function of require hardness.



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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