

Abbreviation	EN Norm	ASTM / AISI	AFNOR	DIN Abbreviation	ISO	Other
X46Cr13	1.4034	420	Z44C14	1.4034		

1.4034 Wire

Chemical analysis by European norm EN 10088-1, in mass percent.

C	Si	Mn	P	S	Cr
0.43-0.50	≤ 1.0	≤ 1.0	≤ 0.040	≤ 0.030	12.5 - 14.5

Diameter 0.02 – 4.00 mm

Application

1.4034 is categorized as martensitic stainless steel. It is used after quenching and tempering to manufacture cutting tools, measuring instruments, and a range of other uses in mechanical engineering. A further typical application for 1.4034 is in the manufacturing of surgical instruments; scissors, bone cutters, tweezers, shavers, and curettes. Since it is very hard, has high corrosive resistivity, and is easily polished, this material is used wherever a pure or smooth surface is required.

Resistance to Corrosion

This steel is predominantly processed in an annealed condition, in which case it is only conditionally resistant to corrosion. Only after hardening and tempering is its full corrosive resistivity achieved. For optimal resistance to corrosion from moderately aggressive, non-chloride mediums, a further high-gloss polish is required.

Thermal Treatment

Annealing is performed at 750 – 850°C with a hold time ranging from 15 minutes to several hours, depending on the diameter. It is then quenched in an oven under a protective gas blanket.

1.4034 is hardened at 980 – 1030°C and then quenched in oil. Tempering is performed at temperatures of 100 – 200°C and can lead to hardness levels from HRC 55 to 57. Higher temperatures during the tempering process should be avoided due to the embrittlement limit (starting at 475°C).

Weldability

1.4034 is not weldable.

Surface Finish

Drawn	Chemically purged	0.020 – 3.499 mm
Surface Ground	Chemically purged	3.500 – 4.000 mm

Delivery mode

As a ring
On assorted spools
Straightened
Axles

Diameter tolerances

Diameter (mm)	Tolerance (%)	Tolerance (μ)
0.020 – 0.249		± 1.0
0.250 – 0.399		± 1.5
0.400 – 1.500		± 2.0
1.500 – 4.000		± 2.5

Mechanical Properties

Condition at delivery (mm)	Ultimate Tensile Strength in cold-twisted delivery condition (N/mm ²)
0.005 – 0.019	800 - 1100 (depends on diameter)
0.020 – 0.199	
0.200 – 0.499	
0.500 – 0.999	
1.000 – 1.999	
2.000 – 4.000	

Physical Properties

Density		7.70 g/cm ³
Coefficient of Thermal Expansion	20 °C – 200 °C	11.50 10 ⁻⁶ /K
Specific Heat Capacity	20 °C	460.00 J/kgK
Thermal Conductivity	20 °C	30.00 W/mK
Specific Electric Resistance	20 °C	0.60 Ω mm ² /m
Young's Modulus	20 °C	216.00 GPa

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