

Abbreviation	EN Norm	ASTM / AISI	AFNOR	DIN Abbreviation	ISO	Other
X90CrMoV18	1.4112	440B	X90CrMoV18	1.4112	7153-1 (R)	

1.4112 Wire

Chemical analysis by European Norm EN 10088-1 in mass percent

C	Si	Mn	P	S	Cr	Mo	V
0.85-0.95	≤ 1.00	≤ 1.00	0.040	≤ 0.015	17.0-19.0	0.90-1.30	0.07-0.12

Fe
Remainder

Diameter 0.02 – 4.00 mm

Application

1.4112 is categorized as martensitic, stainless, chrome steel with a chrome content of approximately 18%. After soft annealing, it has an average mechanical strength of 800 N/mm² and after tempering its vanadium content makes the material strongly resistant to wear. Therefore 1.4112 is favoured in the production of knives, surgical instruments, atomization nozzles, as well as hardened valve components and bearings. The steel's surface lends itself well to polishing.

Resistance to Corrosion

Since the chrome content is high, approximately 18%, 1.4112 is protected against corrosion by water and diverse chemical products once it is tempered. If only soft annealed, the resistance to corrosion is considerably lower as the carbon content binds the majority of the chrome in carbides.

Thermal Treatment

Soft annealing is performed by heating 1.4112 to 800°C, followed by slow cooling. Hardening takes place between 950°C and 1050°C, after which it is quenched either in air or an oil or polymer bath. Tempering temperatures lie between 200°C and 400°C. Embrittlement begins at 475°C, thus higher tempering temperatures should be avoided.

Weldability

1.4112 should not be welded as the formation of hardening cracks is very likely to occur.

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 - 1050 (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	11.20	10 ⁻⁶ /K
Specific Heat Capacity	20 °C	430.00	J/kgK
Thermal Conductivity	20 °C	15.00	W/mK
Specific Electric Resistance	20 °C	0.70	Ω mm ² /m
Young's Modulus	20 °C	215.00	GPa

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