

Abbreviation	EN Norm	ASTM / AISI	AFNOR	DIN Abbreviation	ISO	Other
X105CrMo17	1.4125	440C	Z100CD17	1.4125		

## 1.4125 Wire

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

C	Si	Mn	P	S	Cr	Mo	Fe
0.95-1.20	≤ 1.00	≤ 1.00	0.040	≤ 0.015	16.0-18.0	0.40-0.80	Remainder

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**Diameter** 0.02 – 4.00 mm

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### Use and Application

1.4125 is categorized as a stainless, martensitic chrome steel with a chrome content of approximately 17%. This steel has the highest carbon content in its material category. Therefore it reaches the highest hardness when hardened and tempered. Since the main focus of this material is achieving maximum hardness it is less well developed in other areas, like corrosion resistance or ease of machining. However, with the high hardness comes very high resistance to wear and cutting hardness. It is used for high quality blades and medicinal tools, ball bearings, valves and valve guides, as well as chisels and drill bits.

### Resistance to Corrosion

Since there is a chrome content of approximately 17%, the steel is resistant to corrosion caused by water, water vapor, and mild acids. 1.4125 has its highest level of corrosive resistivity when it has been hardened, annealed and tempered, with additional resistance if the surface is ground and polished.

### Thermal Treatment

Soft-annealing is performed at 780°C – 840°C followed by slow cooling in the oven down to 600°C. It is hardened at 1000°C to 1100°C with quenching in the air or either an oil or polymer bath. Annealing and tempering temperatures are between 200°C and 400°C and should not be higher as the material becomes brittle starting at 475°C.

### Weldability

1.4125 cannot be welded because the danger of hardening cracks forming is too great.

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### Surface Finish

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

## Delivery Condition

As a ring  
On assorted spools  
Straightened  
Axles

## Diameter Tolerances

Diameters (mm)	Tolerance (%)	Tolerance ( $\mu$ )
0.020 – 0.249		$\pm 1.0$
0.250 – 0.399		$\pm 1.5$
0.400 – 1.500		$\pm 2.0$
1.500 – 4.000		$\pm 2.5$

## Mechanical Properties

Condition at Delivery (mm)	Ultimate tensile strength at cold-twisted delivery (N/mm <sup>2</sup> )
0.005 – 0.019	800 - 1100 (Dependent 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 <sup>3</sup>
Coefficient of thermal expansion	20 °C – 200 °C	11.20 10 <sup>-6</sup> /K
Specific heat capacity	20 °C	430.00 J/kgK
Thermal conductivity	20 °C	15.00 W/mK
Specific electric resistance	20 °C	0.60 $\Omega$ mm <sup>2</sup> /m
Young's modulus	20 °C	215.00 GPa

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