

Abbreviated Name	EN Norm	ASTM / AISI	AFNOR	DIN Abbreviation	ISO	Other
X2CrNiMo18-15-3	1.4441	316 LVM	Z 2 CN 18.13.3	X2CrNiMo18-15-3	5832.1	UNS31673

1.4441 Wire

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

C	Si	Mn	P	S	Cr	Mo	Ni
≤ 0.030	≤ 0.75	≤ 2.00	0.025	≤ 0.01	17-19	2.5-3.0	13.5-15.5
Cu	N	Fe					
≤ 0.5	≤ 0.1	Rest					

Diameter 0.02 – 4.00 mm

Application

1.4441 is categorized as stainless, austenitic, chrome nickel molybdenum steel. By swaging the material, the ultimate tensile strength can be increased considerably. Like other steels in this category, 1.4441 has 17% Chrome, approx. 14% Nickel and a substantial quantity of Molybdenum. Due to the high proportion of Nickel, the material keeps its austenitic structure.

1.4441 is a variant of 1.4404 / 1.4435 steel, which is then melted in a vacuum, causing the 1.4441 to have an exceptionally high purity. As a consequence, it is usually used in the production of medicinal components. When considering materials for the manufacturing of implants, nails, plates or instruments, many corporations in medicinal branches designate 1.4441 as a first choice. Due to its surface finish, it is readily polished.

Resistance to Corrosion

1.4441 has an extremely high resistance to corrosion. The chrome, nickel, molybdenum alloy defies most acids and complies with the ISO 5832-1 and ASTM F-138 norms for implants and instruments. As a result of its low carbon content, 1.4441 doesn't form chromium carbide during welding and no further heat treatment is needed thereafter.

Thermal Treatment

1.4441 is annealed between 1050°C and 1120°C after which it is quenched in water, or in a cold air stream. It cannot be hardened in the classical sense.

Weldability

1.4441 can be welded with whatever method is desired, without requiring any extra processing later.

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	650 - 1800 (Depends on the Diameter)
0.020 – 0.199	
0.200 – 0.499	
0.500 – 0.999	
1.000 – 1.999	
2.000 – 4.000	

Physical Properties

Density		7.98 g/cm^3
Coefficient of Thermal Expansion	20 °C – 200 °C	16.50 $10^{-6}/\text{K}$
Specific Heat Capacity	20 °C	500.00 J/kgK
Thermal Conductivity	20 °C	15.00 W/mK
Specific Electric Resistance	20 °C	0.75 $\Omega \text{ mm}^2/\text{m}$
Young's Modulus	20 °C	200.00 GPa

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