



Abbreviation	EN Norm	ASTM / AISI	AFNOR	DIN Abreviation	ISO	Other
				2.4782		

## Nivaflex 45/18 Wire

Chemical analysis in mass percent

Co	Ni	Cr	Fe	W	Mo	Ti	Be
45	21	18	5	4	4	1	0

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**Diameter** 0.02 – 4.00 mm

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### Application

Nivaflex 45/18 is categorized as a multiphase cobalt alloy and possesses remarkable properties in terms of its mechanical strength, toughness, ductility and resistance to corrosion. The alloy is comprised of 45% cobalt, 21% nickel, and 18% chromium. Contrary to Nivaflex 45/5, 45/18 does not contain beryllium. This high performance material is put into use when material properties are pushed to the limit, and material fatigue must be all but eliminated. Typical fields of application include, but are not limited to: human and dental hygiene/medicine, the chemical industry, aerospace and the production of springs. Nivaflex is one of the most popular and widely used materials for spring production in the watch industry. Ultimate tensile strengths of up to 3000 N/mm<sup>2</sup> can be reached. Added to that are high bending fatigue strength, an immense heat resistance, and complete non-magnetism.

### Resistance to Corrosion

Starting at a medium hardness, Nivaflex is resistant to most mineral acids, hydrogen sulfide, sea water, salt spray and hydrogen embrittlement. Nivaflex is melted within a vacuum, which prevents it from containing anything more than negligible amounts of non-metallic inclusions, and keeps carbon as well as sulfur levels very low. Pitting corrosion, stress corrosion and corrosion at grain boundaries is virtually non-existent.

### Thermal Treatment

Nivaflex is soft annealed. It is warmed up to 1100°C, followed by slow cooling. The material's toughness can be increased if it is warmed up to 500°C and held for 2 hours.

### Weldability

Nivaflex is not to be welded.

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### 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 ( $\mu$ )
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 in cold twisted delivery condition (N/mm <sup>2</sup> )
0.005 – 0.019	1100 – 2500 (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		8.50 g/cm <sup>3</sup>
Coefficient of Thermal Expansion	20 °C – 200 °C	11.20 10 <sup>-6</sup> /K
Specific Electric Resistance	20 °C	0.10 $\Omega$ mm <sup>2</sup> /m
Young's Modulus	20 °C	220 GPa
Shear Modulus	20° C	90 GPa

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