

<b>Description</b>	<b>Nivaflex 45/18 Wire</b>	EN-Norm	AFNOR	DIN
		-	-	2.4782

## Chemical composition

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

Values (Weight %). In order to achieve maximum homogeneity and consistent quality, the actual manufacturing tolerances are tighter and more precisely than the composition indicated.

## Diameter

Ø 0.02 – 4.00 mm

## Main technical properties and features

### 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.

## Surface finish

Finish	Cleaning	Diameter		
Drawn	Chemically purged	Ø 0.020	-	3.499 mm
Surface ground	Chemically purged	Ø 3.500	-	4.000 mm

Delivery type:

- In rings
- 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
0.005 - 0.019	
0.020 - 0.199	
0.200 - 0.499	1100 - 2500 (Depends on the diameter)
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	220.00	GPa
Shear Modulus	20 °C	90.	GPa

## Note

All information provided in this data sheet is based on best knowledge and the latest state of technology, but without guarantee. The use of materials should always be discussed with [our sales specialists](#) or [materials laboratory](#) on a product- and application-specific basis.

