JACQUES ALLEMANN
NOTZ group advanced metal solutions

Nivaflex 45/5

Abbreviated Name	EN Norm	ASTM / AISI	AFNOR	DIN Abbreviation	ISO	Other

Nivaflex 45/5 Wire

Chemical analysis in mass percent.

Co	Ni	Cr	Fe	W	Mo	Ti	Be
45	21	18	5	4	4	1	0.2

Diameter 0.02 – 4.00 mm

Application
Nivaflex 45/5 is categorized as a multiphase cobalt alloy, and exhibits unique characteristics in terms of structural robustness, toughness, ductility, and resistance to corrosion. The alloy contains 45% cobalt, 21% nickel, and 18% chrome. This high performance material is used whenever there are high physical and mechanical demands, and ruling out mechanical fatigue is a necessity. Typical fields of application are: human and dental medicine, the chemical industry, air and space travel, and springs manufacturing. In the watchmaking industry, Nivaflex is one of the most popular and most commonly used materials for spring production. Ultimate tensile strengths over 3000N are feasible. With that comes a high reverse bending strength, extreme heat resistance and the fact that Nivaflex is wholly non-magnetic.

Resistance to Corrosion
After a medium hardness is achieved, Nivaflex is resistant to most mineral acids, hydrosulfuric acid, seawater, salt spray, and hydrogen embrittlement. On account of being melted in a vacuum, inclusions are almost nonexistent and the carbon and sulfur content are very sparse. Therefore, pitting, stress corrosion cracking, and grain border corrosion are virtually eliminated.

Thermal Treatment
Nivaflex is soft annealed by being warmed up to 1100°C and then cooled slowly. In order to achieve a higher structural robustness, Nivaflex can be kept at 500°C for 2h.

Weldability
Nivaflex is not welded.

Surface Finish

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

Nivaflex 45/5

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	
0.020 – 0.199	
0.200 – 0.499	1100 – 2500 (Depends on Diameter)
0.500 – 0.999	
1.000 – 1.999	
2.000 – 4.000	

Physical Properties

Density		8.50	g/cm^3
Coefficient of Thermal Expansion	20 ºC – 200 ºC	11.20	$10^{-6}/K$
Specific Electric Resistance	20 ºC	0.10	$\Omega\ mm^2/m$
Young's Modulus (E-Modulus)	20 ºC	220	GPa
Shear Modulus (G-Modulus)	20°C	90	GPa