

Nimonic® alloy 90

UNS N07090
W.Nr 2.4632, 2.4969

Nimonic® 90 is a precipitation hardenable Nickel-Chromium-Cobalt alloy with high strength at temperatures up to 1300°F (704°C) and creep and oxidation resistance up to 1688°F (920°C).

Applications include springs operating from ambient temperatures up to 1112°F (600°C), fasteners and components requiring resistance to high temperature and corrosive environments.

Industries supplied include: Oil & Gas Extraction and Processing, Nuclear, Aerospace, Power Generation and Automotive.

Nominal Composition

	Ni	Cr	Co	Fe	Ti	Al	Mn	Si	C
min		18.0	15.0		1.8	0.8			
max	Balance	21.0	21.0	3.0	3.0	2.0	1.0	1.5	0.13

Physical Properties

	At 70°F	At 1000°F	At 20°C	At 538°C
Density	0.296 lb/in ³		8.18 g/cm ³	
Modulus of Elasticity (E)	32.0 x 10 ⁶ psi	27.0 x 10 ⁶ psi	220 GPa	185 GPa
Modulus of Rigidity (G)	11.9 x 10 ³ psi		82.0 GPa	
Coefficient of Expansion	8.2 µ in/in-°F (70°F to 1000°F)		14.8 µm/m-°C (20°C to 538°C)	
Electrical Resistivity	46.5 µ ohm.in		118 µ ohm.cm	
Thermal Conductivity	80 Btu-in/ft ² hr-°F		11.5 W/m-K	

Applicable Specifications

Wire	AMS 5829, BS HR 501, BS HR 502, BS HR 503, BS 3075- NA19, NACE MR0175 / ISO 15156-3, NACE MR0103
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Typical Mechanical Properties – Spring Applications

Condition	Heat Treatment	Tensile Strength	Suggested Operating Conditions
Solution Treated	1922 – 2012°F (1050 – 1100°C) + WQ	157 ksi max (1080 MPa) max	
Spring Temper	As supplied condition.	189 – 223 ksi (1300 - 1540 MPa)	
Spring Temper + Aged	After spring coiling. Age: 1202°F (650°C) for 4 hours. Alternatively, Age at 1112°F (600°C) for 16 hours and air cool.	189 – 260 ksi (1300 - 1800 MPa)	Optimum stress and low relaxation at temperatures up to 700°F (371°C)
Solution Treated + Aged	After Spring Coiling: Solution Heat Treat: 1976°F (1080°C) followed by rapid cooling + Age at 1382°F (750°C) for 4 hours and air cool. Alternatively, Age at 1292°F (700°C) for 16 hours and air cool.	145 - 203 ksi (1080 – 1400 MPa)	Optimum resistance to relaxation at temperatures up to 1112°F (600°C)

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