

## Inconel® alloy X750

**UNS N07750**  
**W. Nr 2.4669**

Inconel® X750 is a precipitation hardenable Nickel-Chromium alloy with high strength at temperatures up to 1300°F (704°C) and oxidation resistance up to 1800°F (982°C). Inconel® X750 offers excellent resistance to relaxation and as a result it is widely used for springs operating at elevated temperatures.

Applications include: springs operating from cryogenic temperatures up to 1300°F (704°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	Fe	Ti	Al	Cb (Nb)	Mn	Si	C	S	Cu
min	70.0	14.0	5.0	2.25	0.40	0.70	1.0				
max		17.0	9.0	2.75	1.0	1.20		0.50	0.08	0.01	0.5

### Physical Properties

	At 70°F	At 1000°F	At 20°C	At 538°C
<b>Density</b>	0.299 lb/in <sup>3</sup>		8.28 g/cm <sup>3</sup>	
<b>Modulus of Elasticity (E)</b>	31.0 x 10 <sup>6</sup> psi	26.7 x 10 <sup>6</sup> psi	214 GPa	184 GPa
<b>Modulus of Rigidity (G)</b>	12.0 x 10 <sup>6</sup> psi		82.7 GPa	
<b>Coefficient of Expansion</b>	7.8 µin/in.-°F (70°F to 1000°F)		14.5 µm/m-°C (20°C to 538°C)	
<b>Electrical Resistivity</b>	20.1 µ ohm.in		122 µΩ.cm	
<b>Thermal Conductivity</b>	83 Btu-in/ft <sup>2</sup> hr-°F		12.0 W/m-K	

### Applicable Specifications

Wire & Bar | AMS 5698, AMS 5699, AMS 5778, NACE MR0175 (ISO 15156-3), ASTM B637, AMS 5667, AMS 5668, AMS 5670

### Typical Mechanical Properties – Spring Applications

Condition	Heat Treatment	Tensile Strength	Suggested Operating Conditions
<b>Annealed</b>	2000 – 2200°F (1093 – 1204°C)	130 ksi max (896 MPa) max	
<b>No.1 Temper</b>	As supplied condition.	130 – 165 ksi (896 – 1138 MPa)	
<b>No.1 Temper + Aged</b>	After spring coiling. Age: 1350°F (732°C) for 16 hours.	165 – 220 ksi (1138 – 1517 MPa)	Optimum resistance to relaxation at temperatures up to 1000°F (538°C) with moderate or low stresses.
<b>Spring Temper</b>	As supplied condition.	160 – 220 ksi (1103 – 1517 MPa)	
<b>Spring Temper + Aged</b>	After spring coiling. Age: 1200°F (649°C) for 4 hours.	180 – 250 ksi (1241 – 1793 MPa)	Optimum stress and low relaxation at temperatures up to 700°F (371°C)
<b>Spring Temper + Solution + Aged (3 Step Heat treatment)</b>	After spring coiling. Solution Heat Treat: 2100°F (1149°C) for 2 hours and air cool. Age Harden at 1550°F (843°C) for 24 hours and air cool. Reheat to 1300°F (704°C) for 20 hours and air cool.	145 - 190 ksi (1000 – 1310 MPa)	Optimum resistance to relaxation at temperatures in the range 1000 – 1300°F (538 – 704°C).

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**Phone: 1 847 695 1900**

Elgiloy Specialty Metals - Wire Products  
356 N.Cross Street  
Sycamore, IL 60178 USA

[WWW.ELGILOY.COM](http://WWW.ELGILOY.COM)

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