

CWI Nickel Specialty Series: Inconel® Alloy 718 (UNS R30035)

Inconel® Alloy 718 is an austenitic nickel based super alloy designed primarily for strength in temperature extremes. Alloy 718 is also a precipitation hardening alloy, displaying exceptionally high yield, tensile and creep-rupture properties at temperatures well below freezing up to and beyond 1300°F (704°C). As a specialty alloy, 718 has improved mechanical short and long-term properties vs. other nickel alloys, and great fatigue strength in the age hardened conditions. Alloying material includes very specific mixtures of niobium, molybdenum, titanium, and aluminum to assist with performance properties, as well as precipitation hardening.

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Nominal Composition										
	Si	Cr	Cb (Nb)	Ni	Mo	Ti	Fe	Co	Al	Cu
Min		17	4.75	50	2.80	0.65			0.20	
Max	0.35	21	5.50	55	3.30	1.15	Balance	1.0	0.80	0.30

Physical Properties		
	At 70°F	At 20°C
Density	0.296 lb/in ³	8.19 g/cm ³
Modulus of Elasticity (E)	29 x 10 ³ ksi	200 GPa
Modulus of Rigidity (G)	11.6 x 10 ³ ksi	80 GPa
Coefficient of Expansion	7.7 microinches/in.-°F (70-600°F)	13.9 x μm/m°C (20-300°C)
Electrical Resistivity	47.5 μ ohm.in	121 μ ohm.cm
Thermal Conductivity	79 Btu-in./ft. ² hr.-°F	11.4 W/m-K

Applicable Specifications	
Wire & Bar	AMS 5662, AMS 5663, AMS 5664, AMS 5832, AMS 5962, ASME SB-637, ASTM B637, AWS A5.14, NACE MR0175 (ISO 15156-3).

Typical Mechanical Properties – Spring Applications			
Condition	Heat Treatment	Tensile Strength	Suggested Operating Conditions
Annealed	1800°F (980°C)	115 – 145 ksi (790 – 1000 MPa)	-330°F to 1200°F (-200°C to 650°C)
Spring Temper		190 – 200 ksi (1517 – 1931 MPa)	-330°F to 1200°F (-200°C to 650°C)
Spring Temper + Aged	After spring coiling Age: 1325°F (720°C) for 8 hours, furnace cool to 1150°F and hold for a total aging time of 18 hours.	220 ksi minimum (1515 MPa)	-330°F to 1200°F (-200°C to 650°C)

Available Forms	Packaging Options
<ul style="list-style-type: none"> Round wire (0.009" to 0.625") Bars Shaped wire Rope/Strand 	<ul style="list-style-type: none"> Coils Spools Bars Custom packaging

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