Inconel® 718 (Alloy 718), UNS N07718

Shaped, Flat, Square, Round, Fine Wire, Plated and Un-plated
ASTM B637, ASTM B670, AMS 5596, AMS 5597, AMS 5662,
AMS 5662, AMS 5664, GE B50TF14, GE B50TF15, PWA
1009, PWA 1010, PWA 1033, WESTINGHOUSE
NFD310021(NUCLEAR), UNE N07718

Alloy 718 Description

Alloy 718 is an age hardenable nickel-chromium alloy having
high creep-rupture strength at high temperatures to about
1300°F (700°C). The age-hardenable alloy can be readily fabricated into complex parts. Its
welding characteristics, especially its resistance to postweld cracking, are outstanding.

Applications

Nuclear hold down spring and other components
Gas turbine components
Springs
Seal rings

Chemistry Typical

Nickel + Cobalt: 50.00 – 55.00
Chromium: 17.00 – 21.00
Molybdenum: 2.80 – 3.30
Columbium + Tantalum: 4.75 – 5.50
Titanium: 0.65 – 1.15
Aluminum: 0.20 – 0.80
Cobalt: 1.00 max
Carbon: 0.80 max
Manganese: 0.35 max
Silicon: 0.35 max
Phosphorus: 0.015 max
Sulfur: 0.015 max
Boron: 0.006 max
Copper: 0.30 max
Iron: Balance

Physical Properties
Density: 0.296 lbs/in³, 8.19 g/cm³

Specific Heat: Btu/lb °F (J/kg °C):
At 70°F (21°C): 0.104 (435)

Mean Coefficient of Thermal Expansion: in/in/° (mm/m/°C)
70-212°F (20-100°C): 7.6 x 10⁻⁶ (13.0)

Modulus of Elasticity: KSI (MPa)
29.7 x 10³ (204.9 x 10³) in tension

Magnetic Permeability, H = 200 Oersteds:
Annealed: 1.013
Annealed and Aged: 1.011

Melting Range: 2300-2437°F (1260-1336°C)

Mechanical Properties at Room Temperature
Annealed Typical
Ultimate Tensile Strength: 120 KSI min (827 MPa min)
Yield Strength: (0.2% offset) 60 KSI min (414 MPa min)
Elongation: 30% min (gages: > 0.040 inches)
Properties: Tempered
Alloy 718 can be cold rolled to achieve the temper properties required by specific customers and/or manufacturing requirements. Contact Ulbrich Wire for details.

Heat Treat Capabilities
Two heat treatments are generally utilized for Alloy 718:

- Solution anneal at 1700-1850°F followed by rapid cooling, usually in water, plus precipitation hardening at 1325°F for 8 hours, furnace cool to 1150°F, hold at 1150°F for a total aging time of 18 hours, followed by air cooling.
- Solution anneal at 1900-1950°F followed by rapid cooling, usually in water, plus precipitation hardening at 1400°F for 10 hours, furnace cool to 1200°F, hold at 1200°F for a total aging time of 20 hours, followed by air cooling.

*Contact Ulbrich Wire for additional information

Additional Properties

Corrosion Resistance
Refer to NACE (National Association of Corrosion Engineers) for recommendations.

Standard Wire Finishes

Extra Clean: (XC) Extra clean is also referred to as “bright annealed” or “bright annealed and cold rolled”

Grease (round wire only): Drawn in a heavy grease produces an “Ultra bright” finish for decorative applications

Soap (round wire only): Soap is used as a lubricant in the drawing process and is not removed. It acts as a lubricant during customer part forming operation. A soap finish is available in tempered products.

Plated: Many plating options are available.

*Special finishes are available: Contact Ulbrich Wire Sales with special finish and plating requests.

Forms
Continuous Coils
Cut to lengths
Precision cutting

**Heat Treatment**
Alloy 718 can be hardened by:
Cold Working
Age Hardening
Cold Working **followed by Age Hardening**

Welding
For best results refer to: SSINA’s “Welding of Stainless Steels and Other Joining Methods”

*Inconel® 718 is a registered trademark of Haynes Alloys

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