



## 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/in<sup>3</sup>, 8.19 g/cm<sup>3</sup>

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):  $7.6 \times 10^{-6}$  (13.0)

Modulus of Elasticity: KSI (MPa)

$29.7 \times 10^3$  ( $204.9 \times 10^3$ ) 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 ( gauges: > 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

*Limitation of Liability and Disclaimer of Warranty: In no event will Ulbrich Stainless Steels and Special Metals, Inc., be liable for any damages arising from the use of the information included in this document or that it is suitable for the 'applications' noted. We believe the information and data provided to be accurate to the best of our knowledge but, all data is considered typical values only. It is intended for reference and general information and not recommended for specification, design or engineering purposes. Ulbrich assumes no implied or express warranty in regard to the creation or accuracy of the data provided in this document.*

Copyright© January 2014 Ulbrich Stainless Steels & Special Metals, Inc. – Revision 6.1.2015