

Inconel® Alloy 718 is a high-strength, corrosion-resistant nickel-chromium alloy that is commonly used in high-temperature applications. It exhibits excellent mechanical properties and resistance to oxidation, making it suitable for use in gas turbines, aerospace, and cryogenic systems. The alloy is age-hardenable, which enhances its mechanical strength without compromising its weldability.

CHEMICAL COMPOSITION:

Element	Min (%)	Max (%)
Nickel (Ni)	50.00	55.00
Chromium (Cr)	17.00	21.00
Iron (Fe)	Balance*	-
Niobium (Nb) + Tantalum (Ta)	4.75	5.50
Molybdenum (Mo)	2.80	3.30
Titanium (Ti)	0.65	1.15
Aluminum (Al)	0.20	0.80
Cobalt (Co)	-	1.00
Carbon (C)	-	0.08
Manganese (Mn)	-	0.35
Silicon (Si)	-	0.35
Phosphorus (P)	-	0.015
Sulfur (S)	-	0.015
Boron (B)	-	0.006
Copper (Cu)	-	0.30

*Balance means the remaining composition, predominantly iron.

PHYSICAL PROPERTIES:

Property	Value
Density	0.296 lb/in ³ (8.19 g/cm ³)
Melting Range	2300°F–2437°F (1260°C–1336°C)
Specific Heat (at 70°F)	0.104 Btu/lb·°F (435 J/kg·°C)
Curie Temperature (annealed)	<-320°F (-196°C)
Permeability (at 200 Oersted)	1.0013 (annealed)
Thermal Conductivity (at 70°F)	11.2 W/m·K

MECHANICAL PROPERTIES:

Temperature (°F)	Tensile Strength (ksi)	Yield Strength (ksi)	Elongation (%)
Room Temperature	180	180	12
1200°F	164.5	145.0	28
1300°F	145.5	133.0	22

Stress Rupture (at 1300°F, 75 ksi):

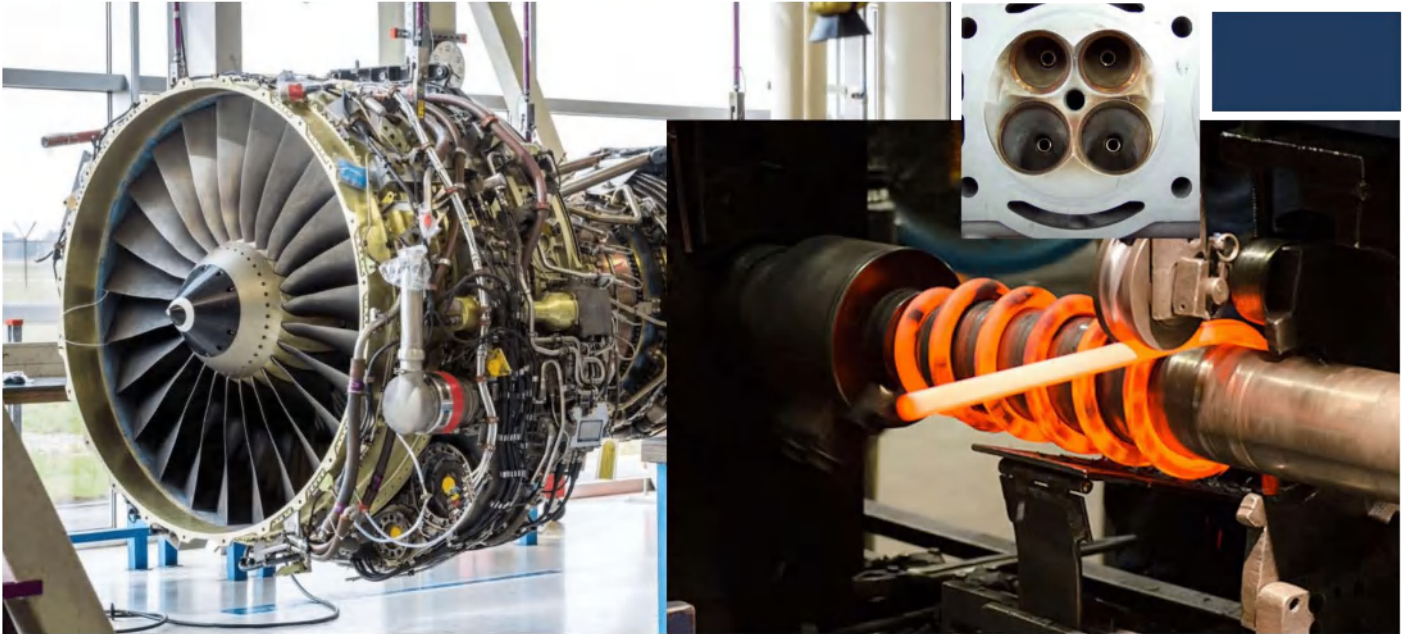
Stress (ksi)	Life (hr)	Life (hrs)	Elongation (%)
1300° F	75	68.2	10

Thermal Properties:

Temperature (°F)	Coefficient of Linear Expansion ($10^{-6}/^{\circ}\text{F}$)	Thermal Conductivity (W/m·K)
70°F	6.0	11.2
1200°F	7.4	16.0
1300°F	8.2	16.5

APPLICATIONS:

- > **Aerospace:** Aircraft turbine components, high-temperature springs, combustion chambers.
- > **Gas Turbines:** Used in turbine blades, rings, and casings.
- > **Cryogenic Systems:** Tanks and valves for cryogenic applications.
- > **Oil & Gas Industry:** Fasteners, oil field applications (under NACE Mr0175).



Heat Treatment:

Inconel® Alloy 718 undergoes solution annealing followed by precipitation hardening to enhance strength and mechanical properties.

- > Solution Annealing: 1700°F–1850°F (927°C–1010°C) followed by rapid cooling (usually water quenching).
- > **Aging (Precipitation Hardening):**
 - 1325°F for 8 hours, furnace cool to 1150°F, hold at 1150°F for 18 hours.
 - 1400°F for 10 hours, furnace cool to 1200°F, hold at 1200°F for 20 hours.

Welding:

- > Alloy 718 can be welded using common processes like TIG, MIG, and electron beam welding.
- > It demonstrates good weldability and is resistant to post-weld cracking.

Machining:

- > Best fabricated in its annealed condition. The material can be machined in either the solution-annealed or aged condition depending on the specific requirements.
- > Typical machining techniques include turning, drilling, and grinding.

Corrosion Resistance:

Inconel® Alloy 718 exhibits excellent resistance to oxidation and corrosion in a variety of environments, including in both high-temperature and cryogenic conditions. It is particularly resistant to sulfur compounds, reducing atmospheres, and oxidation at elevated temperatures.

BILLET AND BAR PRODUCTS

Billet and Bar

Diameters 0.5 in. to 15 in. (12.7 mm to 381 mm) and weights up to ca. 22,000 lb. (10,000 kg)

Round Cornered Squares

4 in. to 14 in. (102 mm to 356 mm) across flats and weights up to approx. 20,000 lb. (9,000 kg)

Hot Rolled Rod

Diameters 0.5 in. to 2.36 in. (13 mm to 60 mm) and lengths up to ca. 20 ft. (6 m). Longer lengths on application

Hot Rolled Wire Rod

Diameters 0.217 in. to 0.59 in. (5.51 mm to 15 mm) in coil form

Cold Drawn Rounds

Diameters 0.5 in. to 4 in. (13 mm to 102 mm) and lengths up to approx. 32 ft. (10 m)

Cold Drawn Hexagons

0.5 in. to 4 in. (13 mm to 101.6 mm) across flats and lengths up to ca. 20 ft. (6 m)

Cold Drawn Wire

Diameters from 0.004 in. to 0.2 in. (0.2 mm to 5 mm) available in coil, on reels and in "pay-off packs"

Ingot

Diameter up to 44 in.

TUBULAR PRODUCTS

Cold Worked Seamless Pipe and Tube

0.75 in. to 26 in. (19.1 mm to 660 mm) O.D. range

Hot Worked (Extruded) Seamless Pipe and Tube

3.5 in. to 8.625 in. (88.9 mm to 219.1 mm) O.D. range

FLAT PRODUCTS

Hot Rolled Plate

Thickness from 0.187 in. to 4 in. (4.76 mm to 102 mm) and widths from 48 in. to 98 in. (1,220 mm to 2,500 mm)

Cold Rolled Sheet

Thickness from 0.008 in. to 0.25 in. (0.20 mm to 6.4 mm) and widths to 48 in. (1,219 mm)

Cold Rolled Strip

Thickness from 0.008 in. to 0.125 in. (0.20 mm to 3.2 mm) and widths down to 12.6 in. (320 mm)

Minimum Mill Quantities

Small batch quantities, 300 or 500 kg, can be offered for most bar & tube sizes, for flat products, the minimum order quantity is 2 metric tons.

Size Ranges



Ever Nickel Alloy Co., Ltd.

Tel: +86 0731 82250427

E-mail: sales@evernickel.com

Phone: +86 15308477503

Web: <https://www.evernickel.com>

Address: No.1 North, West Side of Xingda Avenue, Dainan Town, Xinghua City, Jiangsu, China

