# ASTM B637 Inconel X-750 Round Bar,UNS N07750 Round bar

Alloy X-750 is a nickel chromium alloy similar to Alloy 600. The addition of aluminum and titanium allow X-750 to be precipitation hardened. It has good resistance to corrosion and oxidation, as well as high tensile and creep-rupture properties at temperatures to 1300°F (700°C). Its excellent relaxation resistance is useful for high temperature springs and bolts. This alloy is used in gas turbines, rocket engines, nuclear reactors, pressure vessels, tooling, and aircraft structures.

## Specifications

**UNS:** N07750 **W. Nr./EN:** 2.4669 **ASTM:** B 637 **ASME:** SB-637 **AMS:** 5598

## Chemical Composition, %

| | Ni | Cr | Mn | Cu | Si | C | S | Co | Nb | Ti | Al | Fe |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MIN | 70.0 | 14.0 | – | – | – | – | – | – | 0.7 | 2.25 | 0.4 | 5.0 |
| MAX | – | 17.0 | 1.0 | 0.5 | 0.5 | 0.08 | 0.01 | 1.0 | 1.2 | 2.75 | 1.0 | 9.0 |

## Features

- Good mechanical properties at high temperatures
- Good formability
- Good oxidation resistance

## Applications

- Gas Turbine Engines
- Airframe Applications
- Pressure Vessels
- Heat Treat Fixtures
- Springs and Fasteners
- Nuclear Engineering

## Physical Properties

**Density:** 0.298 lb/in$^3$ **Melting Range:** 2540-2600°F

| Temperature, °F | 70 | 1000 | 1200 | 1400 | 1600 | 1800 |
|---|---|---|---|---|---|---|
| Coefficient of Thermal Expansion* in/in°F x $10^{-6}$ | 7.8 | 8 | 8.4 | 8.9 | 9.4 | 9.8 |
| Thermal Conductivity Btu • ft/ft$^2$ • hr • °F | 8.2 | 10.9 | 11.9 | 12.8 | 13.7 | – |
| Modulus of Elasticity, psi x $10^6$ | 31 | 26.7 | 25.5 | 24 | 22.1 | 20 |

** 70°F to indicated temperature.*

## Mechanical Properties

**Typical High Temperature Tensile Properties of Cold Rolled, Annealed Sheet (16 Gauge)**

| Temperature, °F | 70 | 900 | 1000 | 1200 | 1350 | 1500 | 1600 |
|---|---|---|---|---|---|---|---|
| Yield Strength (ksi) | 46.5 | 35 | 35 | 54.5 | 67.5 | 32 | 27.5 |
| Tensile Strength (ksi) | 110 | 100.5 | 91 | 83 | 77 | 57 | 35 |
| Elongation (%) | 51 | 55 | 55 | 23 | 6 | 11 | 45 |

**Typical High Temperature Tensile Properties of Cold Rolled, Annealed Sheet and Precipitation Hardened Sheet per AMS 5598**

| Temperature, °F | 70 | 1000 | 1200 | 1400 | 1600 | 1800 |
|---|---|---|---|---|---|---|
| Yield Strength (ksi) | 141 | 125 | 121 | 92 | 43 | 9 |
| Tensile Strength (ksi) | 192 | 162 | 144 | 94 | 52 | 16 |
| Elongation (ksi) | 24 | 22 | 6 | 3 | 8 | 46 |