

Inconel® X-750 (UNS N07750) — Material Data Sheet

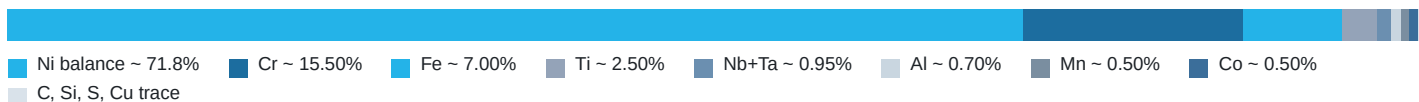
ASTM B637 · UNS N07750 · Alloy X-750

Precipitation-hardening nickel-chromium alloy with Ti, Al and Nb

The spring and fastener superalloy: age hardened to 170 ksi, holds its strength to 1300 °F and stays tough at cryogenic temperature — for turbine bolting, springs and nuclear and rocket hardware.

TENSILE, TYPE 2 (<2½ IN.)	170 ksi min	SERVICE	To about 1300 °F
YIELD, TYPE 2	115 ksi min	NICKEL	70 % min
HARDNESS, TYPE 2	302–363 HBW	MAGNETIC	No

Nominal composition



Midpoints of the specification ranges, for orientation only. Limits are in the table.

Chemical composition — Inconel® X-750 (UNS N07750)

Element	Symbol	Min %	Max %
Carbon	C	—	0.08
Manganese	Mn	—	1.00
Silicon	Si	—	0.50
Sulfur	S	—	0.01
Chromium	Cr	14.00	17.00
Cobalt	Co	—	1.00
Niobium + tantalum	Nb+Ta	0.70	1.20
Titanium	Ti	2.25	2.75
Aluminium	Al	0.40	1.00
Iron	Fe	5.00	9.00
Copper	Cu	—	0.50
Nickel	Ni	70.00	—

Values per ASTM B637-16 Tables 1 and 3 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Physical properties (typical)

DENSITY	0.298 lb/in³ (8.25 g/cm³)
MODULUS OF ELASTICITY	31.0 × 10 ⁶ psi (214 GPa)
THERMAL EXPANSION (68–212 °F)	7.0 µin/in·°F
MAGNETIC	No

Heat treatment

Type 1: solution treat at 2100 °F, stabilize at 1550 °F, age at 1300 °F for 20 hours, for creep-rupture service above 1100 °F. Type 2: solution treat at 1800 °F, age at 1350 °F for 8 hours and furnace cool to 1150 °F, holding until the total precipitation time reaches 18 hours, for maximum strength below 1100 °F; the usual fastener condition. Type 3: anneal at 2000 °F and age at 1300 °F, a controlled-strength condition for springs and bolting (B637 Table 2).

Mechanical properties — Inconel® X-750 (UNS N07750)

Condition and nominal diameter (in.)	Tensile strength, min (ksi)	Yield strength 0.2% offset, min (ksi)	Elongation, min (%)	Reduction of area, min (%)	Hardness
Type 1 — solution 2100 °F + stabilize + age	140	90	8	—	262 HBW min
Type 2 — solution 1800 °F + age, under 2½ in.	170	115	18	18	302–363 HBW
Type 2 — 2½ to 4 in.	170	115	15	15	302–363 HBW
Type 3 — anneal 2000 °F + age	160 (185 max)	100 (130 max)	20	20	267–363 HBW / 27–40 HRC

Values per ASTM B637-16 Tables 1 and 3 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

ASTM B637	Precipitation-hardening nickel alloy bars, forgings and forging stock
AMS 5667 / 5668 / 5671	Aerospace bar specifications for X-750
ASME SB-637	Boiler and pressure vessel code equivalent

Forms we supply in Inconel X-750

- Studs and stud bolts
- Hex and heavy hex bolts
- Nuts and washers
- Socket head cap screws
- Machined components from certified bar

Typical applications

- Gas and steam turbine bolting and springs
- Nuclear reactor internals and hold-down springs
- Rocket-engine and cryogenic fasteners
- Extrusion dies and hot-work tooling
- Pressure vessel bolting above 1000 °F