

SOUTHERLY ALLOY

Inconel X-750 Plate and Sheet | UNS N07750 | Werkstoff Nr. 2.4669 | NiCr15Fe7TiAl | GH4145

AMS 5542 / AMS 5598 (with ASTM B906) — Rolled Plate, Sheet, and Strip

Product Description

Inconel X-750 plate, sheet, and strip carries UNS N07750 to AMS 5542, with AMS 5598 covering remelted stock. Plate starts at 4.76 mm thick and runs past 250 mm wide, while sheet and strip sit under that line. The annealed condition stays soft enough to form and blank, and aging at 704 °C for 20 h develops the strength: sheet reaches 1138 MPa and plate 1069 MPa. Aging shrinks flat product slightly, roughly 0.00026 to 0.00052, so a close tolerance part is best cut after the cycle. Grain size and ultrasonic inspection are available on request.

Chemical Composition

Element	Content (UNS N07750)	Element	Content (UNS N07750)
Nickel plus Cobalt (Ni + Co)	70.00% min.	Silicon (Si)	0.50% max.
Chromium (Cr)	14.00–17.00%	Copper (Cu)	0.50% max.
Iron (Fe)	5.00–9.00%	Cobalt (Co)	1.00% max.
Titanium (Ti)	2.25–2.75%	Carbon (C)	0.08% max.
Aluminum (Al)	0.40–1.00%	Tantalum (Ta)	0.05% max.
Niobium + Tantalum (Nb + Ta)	0.70–1.20%	Sulfur (S)	0.010% max.
Manganese (Mn)	1.00% max.		

ASTM B637, AMS 5542, AMS 5582, and AMS 5698 print one composition table for UNS N07750, and titanium, aluminum, and niobium together drive the precipitation reaction.

Minimum Room-Temperature Mechanical Properties

Product Form	Condition	Tensile Strength	Yield Strength (0.2%)	Elongation, min.	Hardness
Strip, AMS 5542	Annealed, 0.25–0.64 mm	≤130 ksi (896 MPa)	—	20%	—
Sheet, AMS 5542	Annealed, 0.61–3.18 mm	≤130 ksi (896 MPa)	≤60 ksi (414 MPa)	30%	—
Sheet, AMS 5542	Annealed, 3.18–4.76 mm	≤130 ksi (896 MPa)	≤65 ksi (448 MPa)	30%	—
Sheet, AMS 5542	Aged at 704 °C for 20 h	≥165 ksi (1138 MPa)	≥105 ksi (724 MPa)	20%	Rc 32 min.
Plate, AMS 5542	Aged at 704 °C for 20 h	≥155 ksi (1069 MPa)	≥100 ksi (689 MPa)	20%	Rc 30 min.
Strip, AMS 5542	Aged at 704 °C for 20 h	≥155 ksi (1069 MPa)	—	15%	Rc 30 min.
Sheet, AMS 5598	Remelted, aged at 704 °C	≥170 ksi (1172 MPa)	≥115 ksi (793 MPa)	18%	Rc 32 min.
Plate, AMS 5598	Remelted, aged at 704 °C	≥160 ksi (1103 MPa)	≥105 ksi (724 MPa)	18%	Rc 30 min.

The annealed rows are inert strength ceilings rather than acceptance minima, and they keep the flat product formable before aging. AMS 5542 fixes the annealed bands by thickness, so strip under 0.64 mm and sheet above it carry different ceilings. A dash means the document sets no requirement for that cell.

Physical Properties (typical values)

Property	Value
Density	Approx. 8.28 g/cm ³
Melting range	Approx. 1393–1427 °C
Curie temperature	Approx. –143 °C hot rolled; –125 °C fully heat treated
Modulus of elasticity / rigidity at 20 °C	Approx. 214 / 76 GPa; Poisson's ratio 0.29
Thermal conductivity at 20 °C	Approx. 12.0 W/m-K
Specific heat at 20 °C	Approx. 431 J/kg-K
Electrical resistivity at 20 °C	Approx. 1.22 μΩ-m
Thermal expansion, 20–100 °C	Approx. 12.6 μm/m-K
Contraction during precipitation treatment	Approx. 0.00026 to 0.00052
Strengthening route	Precipitation hardening only

Values are typical for the annealed condition at room temperature. The Curie point sits far below zero, so the alloy stays essentially non-magnetic in service.

Applicable Standards

Standard / Designation	Scope
AMS 5542	Plate, sheet, and strip, annealed
AMS 5598	Plate, sheet, and strip, consumable electrode remelted or vacuum induction melted
ASTM B906	General requirements for flat-rolled nickel alloys, and the form definitions
ASTM E112	Average grain size determination
ASTM B637 / ASME SB637	Bars, forgings, and forging stock in the same grade
NACE MR0175 / ISO 15156-3	Sour service qualification where the order requires it
UNS N07750 · W.Nr. 2.4669 · NiCr15Fe7TiAl; GB/T 14992 GH4145 · JIS NCF 750	Material and national designations
ASTM B168	This document does not list UNS N07750 in its scope

The grade is welded with matching fillers under an inert gas shield, and the joint takes the same aging treatment as the parent metal.

Typical Supply Dimensions

Product Form	Thickness	Width
Plate	4.76–101.6 mm	Over 250 mm
Sheet	Under 4.76 mm	600 mm and over
Strip and coil	Under 4.76 mm	Under 600 mm
Cut blank or circle	To drawing	To drawing
Formed plate	To drawing	To drawing

ASTM B906 draws the lines between plate, sheet, and strip, and thickness and width together fix the product name. Coil delivery is a packaging choice and does not change the defined form.

Surface Finishes

Surface Condition	Typical Use
Annealed and pickled	Standard delivery for high-temperature service
Bright annealed	Scale-free face for clean and instrument duty
Hot rolled, descaled	Plate for parts that will be machined or rolled
Cold rolled	Smoother sheet for lining and forming
Polished	Reduced roughness for product-contact panels

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Document Control · Inconel X-750 Plate and Sheet Data Sheet · Rev. 1.0 · Issued 18 September 2026