

INCONEL® X-750

UNS N07750 · W.Nr. 2.4669

Age-hardenable Ni–Cr alloy

Precipitation-hardenable alloy for high-strength springs, fasteners and turbine hardware to about 704°C.

01 PRODUCT INTRODUCTION

INCONEL alloy X-750 is a precipitation-hardenable nickel-chromium alloy strengthened primarily by gamma-prime precipitates formed from titanium and aluminum. It provides high tensile, creep and rupture strength, good oxidation and corrosion resistance, and useful stress-relaxation resistance. The grade is used from cryogenic temperatures through elevated-temperature aerospace, nuclear, power-generation and industrial applications. The final engineering choice should also consider product form, heat-treatment condition, joining method, design temperature, loading mode and the governing ASTM, AMS or ASME requirement.

02 ENGINEERING POSITION

Core advantage	High-strength, creep, stress-relaxation and oxidation service from cryogenic temperatures to about 704°C
Applications	Gas-turbine components · nuclear reactor hardware · springs · fasteners · rocket engines · pressure vessels · aircraft structures
Material class	Age-hardenable Ni–Cr alloy

SELECTION NOTE Confirm product form, heat treatment, design code, temperature and actual process chemistry before final specification.

03 SOURCE BASIS

Primary source	Special Metals INCONEL® alloy X-750 technical bulletin
Identity	UNS N07750 · W.Nr. 2.4669

Composition & Physical Data

Official limiting composition and typical physical constants.

04 CHEMICAL COMPOSITION

WEIGHT %

Ni	≥ 70.0%	Cr	14.0–17.0%
Fe	5.0–9.0%	Ti	2.25–2.75%
Al	0.40–1.00%	Nb	0.70–1.20%
Co	≤ 1.0%	C	≤ 0.08%

SOURCE CONTROL

Composition values are taken from the official Special Metals technical bulletin; use the governing ASTM/AMS specification for purchase acceptance.

05 TYPICAL PHYSICAL PROPERTIES

ROOM TEMPERATURE

Density	8.28 g/cm ³	Melting range	1393–1427°C
Specific heat	430 J/kg·°C	Magnetism	Low permeability
Condition	Annealed / treated	Data status	Typical, not acceptance

06 MATERIAL IDENTITY

Common name	INCONEL® alloy X-750
UNS / W.Nr.	N07750 / 2.4669
Alloy family	Age-hardenable Ni–Cr alloy
Product data	ASTM B637 · B805 · AMS 5542 · AMS 5598 · AMS 5667 · AMS 5671 · ASME SB-637

ACCEPTANCE RULE

Chemical and physical reference data do not replace the certified material test report or purchase specification.

Mechanical & Service Performance

Condition-dependent performance and service-selection guidance.

07 MECHANICAL PROPERTIES

Age-hardened tensile and creep properties depend on product form and treatment; typical room-temperature yield strength is specification dependent.

08 SERVICE PERFORMANCE

Primary service	High-strength, creep, stress-relaxation and oxidation service from cryogenic temperatures to about 704°C
Corrosion basis	Nickel supports corrosion resistance; chromium supports oxidation; Mo/Nb/Al contributions depend on grade.
Temperature	Use grade-specific code allowables, creep data and heat-treatment condition.
Welded service	Review filler metal, heat input, post-weld condition and service environment.

09 TYPICAL APPLICATIONS

Industries	Gas-turbine components · nuclear reactor hardware · springs · fasteners · rocket engines · pressure vessels · aircraft structures
Critical review	Verify chloride SCC, oxidation, carburization, sulfidation, fatigue and creep as relevant.

IMPORTANT

Official bulletin values are representative. Critical service requires code compliance, certified material data and, where appropriate, corrosion or qualification testing.

Fabrication, Welding & Heat Treatment

Process controls needed to preserve the intended alloy condition.

10 FORMING & MACHINING

Cold forming	Use nickel-alloy tooling practice and account for work hardening.
Hot working	Use the grade-specific hot-working window from the applicable technical bulletin.
Machining	Rigid setup, sharp tooling, positive feed and adequate coolant are recommended.

11 WELDING GUIDANCE

Processes	GTAW, GMAW and SMAW may be used with qualified procedures.
Filler metal	Select the matching grade-specific filler and verify service compatibility.
Heat input	Control interpass temperature, dilution and unnecessary reheating.
Cleanliness	Remove oil, grease, oxides and iron contamination before welding.

12 HEAT TREATMENT

Solution treatment followed by precipitation aging; select the cycle for the product form and required tensile or spring properties.

QUALITY CONTROL Confirm WPS/PQR, heat-treatment records, NDE, surface cleaning and full heat-number traceability.

Product Forms, Standards & Procurement

A practical specification and quotation checklist.

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REFERENCE STANDARDS

ASTM B637 · B805 · AMS 5542 · AMS 5598 · AMS 5667 · AMS 5671 · ASME SB-637

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COMMON PRODUCT FORMS

Forms	Plate · sheet · strip · bar · wire · pipe · tube · fittings · forgings
Condition	Annealed, solution treated or age hardened as required by grade and specification

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RFQ INFORMATION

Material	INCONEL® X-750 · UNS N07750 · governing ASTM/AMS/ASME specification
Dimensions	Form, OD/ID, wall or thickness, tolerances, length and quantity
Testing	Chemistry, tensile, hardness, PMI, NDE and customer-specific tests
Documents	EN 10204 3.1 MTR, heat traceability and compliance certificates

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TECHNICAL DISCLAIMER

Values shown are from the cited official technical bulletin or are clearly identified as condition-dependent guidance. They may vary by product form, thickness and heat treatment. The purchase specification, applicable design code and certified material test report control final acceptance.

Official source	Special Metals technical bulletin: INCONEL® alloy X-750
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