

INCONEL® 617

UNS N06617 · W.Nr. 2.4663

Ni–Cr–Co–Mo alloy

Solid-solution strengthened alloy for high-temperature oxidation, creep and carburization resistance.

01 PRODUCT INTRODUCTION

INCONEL alloy 617 is a solid-solution strengthened nickel-chromium-cobalt-molybdenum alloy for severe high-temperature service. Chromium and aluminum form protective oxide scales, while cobalt and molybdenum provide matrix strengthening. The alloy combines oxidation resistance, carburization resistance, weldability and creep-rupture strength above 980°C and is used in gas turbines, chemical processing and advanced heat systems. 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	Oxidation, carburization, hot gases and creep-rupture service above 980°C
Applications	Gas-turbine combustors · transition ducts · heat exchangers · chemical processing · advanced reactors · furnace components
Material class	Ni–Cr–Co–Mo 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 617 technical bulletin
Identity	UNS N06617 · W.Nr. 2.4663

Composition & Physical Data

Official limiting composition and typical physical constants.

04 CHEMICAL COMPOSITION

WEIGHT %

Ni	≥ 44.5%	Cr	20.0–24.0%
Co	10.0–15.0%	Mo	8.0–10.0%
Al	0.8–1.5%	Ti	≤ 0.6%
Fe	≤ 3.0%	C	0.05–0.15%

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	8.36 g/cm ³	Melting range	1330–1377°C
Specific heat	420 J/kg·°C	Magnetism	Low permeability
Condition	Annealed / treated	Data status	Typical, not acceptance

06 MATERIAL IDENTITY

Common name	INCONEL® alloy 617
UNS / W.Nr.	N06617 / 2.4663
Alloy family	Ni–Cr–Co–Mo alloy
Product data	ASTM B166 · B168 · B462 · B564 · B637 · ASME SB-166 / SB-168

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

High-temperature strength and creep rupture depend on product form, grain size, exposure and applicable code; use certified minimums for design.

08 SERVICE PERFORMANCE

Primary service	Oxidation, carburization, hot gases and creep-rupture service above 980°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 combustors · transition ducts · heat exchangers · chemical processing · advanced reactors · furnace components
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

Normally supplied solution annealed; avoid conditions that cause detrimental carbide precipitation or grain-boundary embrittlement.

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.

13 REFERENCE STANDARDS

ASTM B166 · B168 · B462 · B564 · B637 · ASME SB-166 / SB-168

14 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

15 RFQ INFORMATION

Material	INCONEL® 617 · UNS N06617 · 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

16 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 617
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