

SOUTHERLY ALLOY

Inconel 601 Bar and Rod | UNS N06601 | Werkstoff Nr. 2.4851 / NiCr23Fe

ASTM B166 / ASME SB166 — High-Temperature Oxidation-Resistant Nickel Alloy Bar and Rod

Product Description

Inconel 601 is a nickel-chromium alloy with an aluminium addition that forms a tightly adherent oxide scale, giving far better high-temperature oxidation and carburization resistance than Alloy 600. Southerly Alloy supplies UNS N06601 bar and rod to ASTM B166 in annealed, hot-finished and cold-drawn conditions, with cut lengths, surface finishes and mill test documentation.

Chemical Composition (ASTM B166)

Element	Content
Nickel (Ni)	58.0–63.0%
Chromium (Cr)	21.0–25.0%
Aluminium (Al)	1.0–1.7%
Iron (Fe)	Balance
Carbon (C), max.	0.10%
Manganese (Mn), max.	1.00%
Silicon (Si), max.	0.50%
Copper (Cu), max.	1.00%
Sulphur (S), max.	0.015%

Aluminium is the addition that separates 601 from Alloy 600; the purchase specification and mill test certificate decide final acceptance.

Mechanical Properties (minimum values, per ASTM B166)

Condition	Tensile Strength, min.	Yield Strength (0.2%), min.	Elongation, min.
Annealed (cold-worked or hot-worked)	≥95 ksi (655 MPa)	≥35 ksi (240 MPa)	30%
Hot-finished, as-worked	≥85 ksi (585 MPa)	≥35 ksi (240 MPa)	15%

Some datasheets quote 80 ksi (550 MPa) and 30 ksi (205 MPa) as the annealed minimum; the applicable ASTM B166 edition and ordered condition decide final acceptance.

Physical Properties (typical room-temperature values)

Property	Value
Density	Approx. 8.11 g/cm ³
Melting range	Approx. 1360–1411 °C
Modulus of elasticity	Approx. 206 GPa
Thermal conductivity at 20 °C	Approx. 11.2 W/m·K
Specific heat at 20 °C	Approx. 450 J/kg·K
Electrical resistivity at 20 °C	Approx. 1.19 µΩ·m
Thermal expansion, 20–100 °C	Approx. 13.8 µm/m·K
Magnetic behaviour	Non-magnetic at ambient temperature
Service ceiling in air	Up to 1250 °C, duty dependent

Values support design calculations rather than acceptance testing.

Applicable Standards

Standard / Designation	Scope
ASTM B166	Nickel-chromium-iron and related alloy rod, bar and wire
ASME SB166	ASME edition for rod, bar and wire
SAE AMS 5715	Nickel alloy 601 bars, forgings and rings
UNS N06601	Material designation for Inconel 601
W.Nr. 2.4851 / NiCr23Fe	European designation for Alloy 601
JIS NCF 601	Japanese designation
EN 10095	Heat-resistant steels and nickel alloys
DIN 17742 / DIN 17752	Wrought nickel alloys — chemistry and bar
ISO 9723 / ISO 9724	Nickel and nickel alloy bar and rod
BS NA 49	British nickel-chromium bar designation

AMS 5715 covers a defined range of forms and sizes; scope is confirmed before it is applied to an order.

Available Dimensions & Forms

Product Form	Typical Supply	Length
Round Bar	6–500 mm dia.	Cut to length or random
Round Rod	3–50 mm dia.	Cut to length
Bright Bar	6–150 mm dia.	Cut to length or random
Square Bar	10–150 mm	Cut to length or random
Hex Bar	10–150 mm A/F	Cut to length or random
Flat Bar	3–100 mm thick × 10–300 mm wide	Cut to length
Forged Bar	100–500 mm dia. or forged section	Cut to length
Precision-Ground Rod	3–100 mm dia., tight tolerance	Cut to length

Availability depends on delivery condition, surface finish and order quantity; tolerances follow ASTM B166 for the ordered condition.

Surface Finishes

Surface Condition	Typical Use
Hot-worked (as-rolled or forged)	Parts that will be machined to size
Annealed and pickled	Scale-free surface for welding and furnace service
Solution annealed	Condition set for high-temperature duty and forming
Cold drawn	Close diameter control with a bright surface
Peeled	Uniform diameter with machined skin for further turning
Centreless ground	Tight diameter and straightness for spindles and pins
Polished	Reduced roughness for visible or product-contact parts
Rough turned	Controlled machining allowance on large or forged bar

Southerly Alloy — nickel alloy bar, rod, pipe, tube, plate and fittings · www.southerly-alloy.com · Values are for reference; the mill test certificate prevails for final acceptance.

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