

SOUTHERLY ALLOY

Inconel 601 | UNS N06601 | Werkstoff Nr. 2.4851 / NiCr23Fe

ASTM B166 / B167 / B163 / B516 / B168 — Alumina-Forming Grade Data Across Bar, Pipe, Tube, and Plate

Product Description

Inconel 601 is a nickel-chromium grade with 1.0–1.7% aluminium, which builds an alumina sub-scale beneath the chromia layer so the oxide resists spalling through repeated furnace cycling. This sheet consolidates composition, minimum mechanical values, and standards for UNS N06601 across the bar and rod, pipe and tube, and plate and sheet families.

Chemical Composition (ASTM B166 / B167 / B163 / B516 / B168)

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 carries the narrow band that drives scale formation; the purchase specification and mill test certificate decide final acceptance.

Minimum Room-Temperature Mechanical Properties

Product Form	Standard	Condition	Tensile Strength	Yield Strength, 0.2% Offset	Elongation
Bar and rod	B166	Annealed, cold-worked or hot-worked	≥ 655 MPa (95 ksi)	≥ 240 MPa (35 ksi)	≥ 30%
Bar and rod	B166	Hot-finished, as-worked	≥ 585 MPa (85 ksi)	≥ 240 MPa (35 ksi)	≥ 15%
Seamless pipe and tube	B167	Cold- or hot-worked annealed, all sizes	≥ 550 MPa (80 ksi)	≥ 205 MPa (30 ksi)	≥ 30%
Heat-exchanger tube	B163	Annealed	≥ 552 MPa (80 ksi)	≥ 207 MPa (30 ksi)	≥ 30%
Welded tube	B516	Cold-worked and annealed	≥ 550 MPa (80 ksi)	≥ 205 MPa (30 ksi)	≥ 30%
Plate, sheet, and strip	B168	Annealed	≥ 550 MPa (80 ksi)	≥ 205 MPa (30 ksi)	≥ 30%

Aerospace deliveries to AMS 5715 (bar) and AMS 5870 (flat product) add condition-specific minimums and further process controls.

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
Curie temperature	Below –196 °C
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	Product / Application
ASTM B166 / ASME SB166	Rod, bar, and wire in annealed and as-worked conditions
ASTM B167 / ASME SB167	Seamless pipe and tube, hot-worked and cold-worked
ASTM B163 / ASME SB163	Seamless condenser and heat-exchanger tube
ASTM B516 / ASME SB516	Welded tube, cold-worked and annealed
ASTM B168 / ASME SB168	Plate, sheet, and strip
ASTM B906 / B829 / B775 / B751	General requirements for flat-rolled and tubular product
SAE AMS 5715	Bars, forgings, and rings
SAE AMS 5870	Sheet, strip, and plate
DIN 17742 / 17750 / 17751	Wrought nickel alloy, flat product, and tube
ISO 6207 / 6208 / 9723	Nickel alloy tube, flat product, and bar
UNS N06601 · W.Nr. 2.4851 · NiCr23Fe · JIS NCF 601 · BS NA 49	Designations

ASME SB editions govern once equipment falls under pressure-code jurisdiction; AMS scope is confirmed against form and size.

Typical Supply Dimensions

Product Form	Typical Supply Range	Length
Bar and rod	3–500 mm dia. by section and condition	Cut to length or random
Seamless pipe	NPS 1/8 to NPS 24, SCH 10 to SCH 160	Single or double random, custom
Seamless tube	OD 6–101.6 mm, wall 0.5–10 mm	Up to 12 m or custom cut lengths
Welded tube	OD 3.18–127 mm, wall 0.38–12.7 mm	Coil or fixed length
Plate and sheet	0.5–100 mm thick, cut to length and width	To customer drawing

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.

Document Control · Inconel 601 Technical Data Sheet · Rev. 1.0 · Issued 16 September 2026