

SOUTHERLY ALLOY

Hastelloy C-22 | UNS N06022 | Werkstoff Nr. 2.4602 / NiCr21Mo14W

ASTM B574 / B575 / B622 / B619 / B626 — Grade Data for Bar, Tubular and Flat Product

Product Description

Hastelloy C-22 is a nickel-chromium-molybdenum-tungsten alloy that carries more than 20% chromium in solid solution. Chromium at 20.0–22.5% resists oxidizing acids, wet chlorine, and oxidizing chloride salts, while molybdenum and tungsten hold the reducing-acid and pitting side of the envelope. Carbon at 0.015% max keeps welded joints corrosion-resistant in the as-welded condition. The grade is not age-hardenable.

Chemical Composition (ASTM B574 / B575 / B622)

Element	Content	Element	Content
Nickel (Ni)	Balance	Cobalt (Co), max.	2.50%
Chromium (Cr)	20.0–22.5%	Manganese (Mn), max.	0.50%
Molybdenum (Mo)	12.5–14.5%	Vanadium (V), max.	0.35%
Tungsten (W)	2.5–3.5%	Silicon (Si), max.	0.08%
Iron (Fe)	2.0–6.0%	Carbon (C), max.	0.015%
Phosphorus (P), max.	0.020%	Sulfur (S), max.	0.020%

Minimum Room-Temperature Mechanical Properties

Product Form	Std.	Condition	Tensile Strength	Yield Strength, 0.2% Offset	Elongation
Bar and rod	B574	Solution annealed	≥ 690 MPa (100 ksi)	≥ 310 MPa (45 ksi)	≥ 45%
Seamless pipe and tube	B622	Solution annealed	≥ 690 MPa (100 ksi)	≥ 310 MPa (45 ksi)	≥ 45%
Welded pipe	B619	Annealed after welding	≥ 690 MPa (100 ksi)	≥ 310 MPa (45 ksi)	≥ 45%
Welded tube	B626	Annealed after welding	≥ 690 MPa (100 ksi)	≥ 310 MPa (45 ksi)	≥ 45%
Plate, sheet, and strip	B575	Solution annealed	≥ 690 MPa (100 ksi)	≥ 310 MPa (45 ksi)	≥ 45%
Forgings and flanges	B564	Solution annealed	≥ 690 MPa (100 ksi)	≥ 310 MPa (45 ksi)	≥ 45%

Annealed product runs at or below 100 HRB on the B-scale, a figure B575 lists for guidance only. No aerospace AMS document covers this grade.

Physical Properties (typical values)

Property	Value	Property	Value
Density	Approx. 8.69 g/cm ³	Electrical resistivity, 20 °C	Approx. 1.14 μΩ·m
Melting range	Approx. 1357–1399 °C	Thermal expansion, 20–100 °C	Approx. 12.4 μm/m·K
Modulus of elasticity	Approx. 206 GPa	Strengthening	Solid solution and cold work
Thermal conductivity, 20 °C	Approx. 10.1 W/m·K	Magnetic behaviour	Practically non-magnetic
Specific heat	Approx. 414 J/kg·K	Service ceiling	1250 °F (677 °C) continuous

Applicable Standards

Standard / Designation	Product / Application
ASTM B574 / ASME SB574	Rod and bar, solution annealed
ASTM B575 / ASME SB575	Plate, sheet, and strip, solution annealed and descaled
ASTM B622 / ASME SB622	Seamless pipe and tube, outside diameter to 88.9 mm
ASTM B619 / ASME SB619	Welded pipe, solution annealed after welding
ASTM B626 / ASME SB626	Welded tube for heat exchangers, condensers, evaporators
ASTM B564 / B366	Forgings, flanges, and wrought fittings in the same grade
ASTM B829 / B775 / B751	General requirements for seamless and welded tubular product
ASTM B906	General requirements for flat-rolled nickel alloy product
NACE MR0175 / ISO 15156	Sour service in oil and gas production
DIN 17744 / 17750 / 17751 / 17752	Wrought nickel alloy bar, flat product, and tube
ISO 6207 / 6208 / 9723	Nickel alloy tube, flat product, and bar
UNS N06022 · W.Nr. 2.4602 · NiCr21Mo14W · NS334	Designations

Typical Supply Dimensions

Product Form	Typical Supply Range
Bar and rod	6–340 mm dia., by section and condition
Seamless pipe	NPS 1/8 to NPS 3, outside diameter to 88.9 mm
Seamless tube	OD 6–88.9 mm, wall 0.5–10 mm
Welded pipe and tube	OD 21.3–610 mm, wall 0.5–12.7 mm
Plate and sheet	0.5–100 mm thick, cut to length and width
Strip and coil	0.5–6.35 mm thick, slit to width

Solution annealing runs at 1121 °C (2050 °F) with a water quench. Filler metal for welding: ERNiCrMo-10 / ENiCrMo-10.

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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