

Hastelloy C-22 Bar and Rod — Technical Data Sheet

UNS N06022 | W.Nr. 2.4602 (NiCr21Mo14W) | ASTM B574 / ASME SB574 | Nickel-Chromium-Molybdenum-Tungsten Alloy

Chemical Composition (wt.%, per ASTM B574 for UNS N06022)

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

Mechanical Properties (solution-annealed)

Condition	Tensile Strength	Yield Strength (0.2%)	Elongation	Hardness
Annealed — ASTM B574 minimum	≥100 ksi (690 MPa)	≥45 ksi (310 MPa)	≥45%	≤241 HB
Annealed bar — typical values	116 ksi (800 MPa)	53.7 ksi (370 MPa)	62%	Approx. 100 HRB

C-22 is not age-hardenable; strength above the annealed minimum comes from cold work. Cold-drawn bar is quoted to its as-drawn condition when higher yield is needed.

Physical Properties (typical, room temperature)

Property	Value
Density	Approx. 8.69 g/cm³
Melting range	Approx. 1357–1399 °C
Modulus of elasticity	Approx. 206 GPa
Thermal conductivity at 20 °C	Approx. 10.1 W/m·K
Specific heat at 20 °C	Approx. 414 J/kg·K
Electrical resistivity at 20 °C	Approx. 1.14 µΩ·m
Thermal expansion, 20–100 °C	Approx. 12.4 µm/m·K
Magnetic behaviour	Practically non-magnetic at ambient temperature

Standards and Designations

Standard / Designation	Scope
ASTM B574	Nickel-chromium-molybdenum-tungsten alloy rod and bar — UNS N06022
ASME SB574	ASME edition for rod and bar
ASTM B564 / ASME SB564	Nickel alloy forgings — UNS N06022
ASTM B575 / ASME SB575	Plate, sheet, and strip in the same grade
ASTM B622 / ASME SB622	Seamless pipe and tube in the same grade
ASTM B366 / ASME SB366	Factory-made wrought fittings — UNS N06022
AMS 5759	Aerospace specification for C-22 bar and forgings
ISO 6208	Nickel-alloy bar and rod — international standard
NACE MR0175 / ISO 15156	Sour service in oil and gas production
UNS N06022	Material designation for Hastelloy C-22
W.Nr. 2.4602 / NiCr21Mo14W	European designation for Alloy C-22
DIN 17744 / VdTÜV 479	German material data and pressure-vessel sheet

Dimensions (typical supply)

Product Form	Typical Supply	Length
Round Bar	6–340 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	100–340 mm dia. or forged section	Cut to length
Precision-Ground Rod	3–100 mm dia., tight tolerance	Cut to length

Surface Finishes

Surface Condition	Typical Use
Solution annealed and pickled	Standard delivery for acid and seawater service
Hot-worked (as-rolled or forged)	Parts that will be machined to size
Cold drawn	Close diameter control with a brighter surface
Peeled	Uniform diameter with a machined skin for further turning
Centreless ground	Tight diameter and straightness for shafting
Polished	Reduced roughness for product-contact and visible parts
Rough turned	Machining allowance held on large or forged bar

Values are for reference; the mill test certificate prevails for final acceptance. Dimensions, conditions, and surface finishes are confirmed at quotation.