

Alloy 20 Round Bar (UNS N08020 / W.Nr. 2.4660 / NiCr20CuMo) — Technical Data Sheet

Round bar supplied to ASTM B473 and ASME SB473, the document that gathers bar, rod and wire for UNS N08020 into one text — its size clauses open hot finished rounds at 6.35 mm (0.25 in) and cold finished rounds above 12.7 mm (0.5 in), its mechanical table prints four columns and no hardness ceiling, and sections past the bar window move to the ASTM B462 forging route.

Chemical Composition — ASTM B473 limits, UNS N08020

Element	Content
Nickel (Ni)	32.0–38.0%
Chromium (Cr)	19.0–21.0%
Copper (Cu)	3.0–4.0%
Molybdenum (Mo)	2.0–3.0%
Niobium + Tantalum (Nb+Ta)	8 × C min., 1.00% max.
Manganese (Mn)	2.00% max.
Silicon (Si)	1.00% max.
Carbon (C)	0.07% max.
Phosphorus (P)	0.045% max.
Sulfur (S)	0.035% max.
Iron (Fe)	Balance

Minimum Mechanical Properties (ASTM B473, stabilised annealed)

Condition	Tensile Strength, min.	Yield Strength (0.2%), min.	Elongation, min.	Reduction of Area, min.
Stabilised Annealed — UNS N08020	≥551 MPa (80 ksi)	≥241 MPa (35 ksi)	30%	50%
Strain Hardened, up to 2 in (50.8 mm)	≥620 MPa (90 ksi)	≥415 MPa (60 ksi)	15%	40%

Physical Properties (Approx.)

Property	Value
Density	Approx. 8.08 g/cm³
Melting range	Approx. 1385–1443 °C
Modulus of elasticity	Approx. 193 GPa
Shear modulus	Approx. 76 GPa
Thermal conductivity at 20 °C	Approx. 12.3 W/m·K
Electrical resistivity at 20 °C	Approx. 1.08 µΩ·m
Specific heat at 20 °C	Approx. 500 J/kg·K
Thermal expansion, 25–100 °C	Approx. 14.7 µm/m·K
Magnetic response	Essentially non-magnetic
Strengthening route	Cold work only

Standards and Designations

Standard	Product or Application
ASTM B473 / ASME SB473	Bar, rod and wire, stabilised annealed
ASTM B462 / ASME SB462	Forged bar, forging stock, flanges and fittings
NACE MR0175 / ISO 15156-3	Sour service, at the condition that document sets

Heat Treatment (stabilising anneal and release)

Condition	Typical Treatment
Stabilised Annealed	Held between 927 °C and 1010 °C, then water quenched, so the niobium carbide returns to solution
Hot-Worked	Forged between 1150 °C and 1230 °C, finishing above 925 °C because the section risks incipient melting near 1200 °C
Slow-Cool Caution	Passing slowly through 600–900 °C precipitates carbide and sigma phases, so the quench follows the anneal without delay
Strain Hardened	Cold drawn after the anneal, with the strength taken from the reduction rather than from a furnace
Cold-Forming Limit	Heavy cold forming sends the section back through the stabilising anneal before it enters service
Stress-Relief Caution	A relief pass inside the sensitising band costs corrosion resistance, so the alternative is settled before it is booked
Post-Weld Anneal	Most joints enter service as welded, because niobium at eight times the carbon content keeps the weld zone stable

Surface Finishes (Round Bar)

Surface Condition	Typical Use
Stabilised Annealed and Pickled	The stabilising anneal followed by acid descaling leaves this round bar scale-free for acid plant work.
Cold Drawn	Drawing brings this round bar to a close diameter while the pass lifts proof stress into the strain-hardened band.
Peeled	A machined skin takes the scale off this round bar and leaves an even diameter behind it.

Typical Supply Dimensions — Round Bar

Product Form	Typical Supply	Length
Round Bar	6.35-250 mm dia., stabilised annealed to ASTM B473	Cut to length or random
Hot-Finished Round Bar	6.35 mm dia. and up, hot finished and descaled	Cut to length or random
Cold-Finished Round Bar	Above 12.7 mm dia., cold finished band	Cut to length
Peeled Round Bar	20-250 mm dia., turned skin	Cut to length
Cold-Drawn Round Bar	6.35-88.9 mm dia., strain hardened on request	Cut to length
Custom Round Bar	To drawing	Custom

ASTM B473 prints four mechanical columns for UNS N08020 and no hardness column, so release rests on chemistry and tensile results rather than on an indenter reading. The 217 HB and 95 HRB figures that circulate for this grade belong to ASTM B463, which covers plate, sheet and strip, and they do not apply to bar. Values are for reference; the mill test certificate prevails for final acceptance.

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 · Alloy 20 Round Bar Data Sheet · Rev. 1.0 · Issued 6 October 2026