

SOUTHERLY ALLOY

Alloy 20 Pipe and Tube | UNS N08020 | Werkstoff Nr. 2.4660 | NiCr20CuMo | NS1403

ASTM B729 / B464 / B468 — Seamless and Welded Tubular Product

Product Description

Alloy 20 pipe and tube carries UNS N08020 in seamless, welded, and exchanger-tube form. ASTM B729 governs seamless product from 6 to 219 mm outside diameter, B464 covers welded pipe up to NPS 6 in Schedule 5S, 10S, and 40S, and B468 covers welded tube from 3.2 to 88.9 mm. Tubular product serves acid coolers, evaporator heating tubes, and transfer lines where dilute acid runs at moderate temperature. Every route ships stabilised annealed and quenched, and welded bundles usually enter service as welded.

Chemical Composition

Element	Content (UNS N08020)	Element	Content (UNS N08020)
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 (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		

Copper is the deliberate addition behind the acid performance, and the niobium range scales with the carbon content at eight times carbon as a minimum. ASTM B463, B473, and B729 share this one composition table, so a single window governs every product form. The mill certificate governs final acceptance.

Minimum Room-Temperature Mechanical Properties

Standard / Form and Condition	Tensile Strength, min.	Yield Strength (0.2%), min.	Elongation / Hardness, min.
Seamless pipe and tube, ASTM B729 – stabilised annealed	≥ 80 ksi (550 MPa)	≥ 35 ksi (240 MPa)	30%
Welded pipe, ASTM B464 – stabilised annealed	≥ 80 ksi (551 MPa)	≥ 35 ksi (241 MPa)	30%
Welded tube, ASTM B468 – stabilised annealed	≥ 80 ksi (551 MPa)	≥ 35 ksi (241 MPa)	30%

ASTM B729 prints 80 and 35 ksi against 550 and 240 MPa, while the welded documents round those figures to 551 and 241 MPa. We keep each standard exactly as printed. ASTM B464 reaches NPS 6 with Schedule 5S, 10S, and 40S, allows Schedule 80S up to NPS 2, and calls for a flattening test on every lot.

Physical Properties (typical values)

Property	Value
Density	Approx. 8.08 g/cm ³
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·°C
Magnetic response	Essentially non-magnetic
Strengthening route	Cold work only

Typical values from the published Special Metals data sheet for the grade, intended for design work rather than acceptance testing. Density is quoted at 8.08 g/cm³, and the melting range follows the same source.

Applicable Standards

Standard / Designation	Scope
ASTM B729 / ASME SB729	Seamless pipe and tube
ASTM B464 / ASME SB464	Welded pipe, NPS 6 with Schedule 5S, 10S, and 40S
ASTM B468 / ASME SB468	Welded tube
ASTM B366 / ASME SB366	Factory-made wrought fittings for the same grade
ASTM B463 / ASME SB463	Plate, sheet, and strip in the same grade
NACE MR0175 / ISO 15156-3	Sour service qualification for oil and gas
UNS N08020 · W.Nr. 2.4660 · NiCr20CuMo · GB/T 15007 NS1403	Material designations
SAE AMS	No aerospace specification covers this grade

Alloy 20 is stabilised with niobium, so most welded joints need no post-weld anneal and enter service as welded. Heat treatment differs by form: flat product and tubular product hold at 982–1010 °C, while bar holds at 927–1010 °C, and every route is water quenched or rapidly cooled. Filler metal: ER320LR to AWS A5.14, or E320LR to AWS A5.11.

Typical Supply Dimensions

Product Form	Outside Diameter	Wall Thickness
Seamless pipe and tube, ASTM B729	6–219 mm	0.5–12 mm
Welded pipe, ASTM B464	NPS 1/8 to 6 in Schedule 5S, 10S, and 40S	Per schedule
Welded pipe, light wall	NPS up to 2 in Schedule 80S	Per schedule
Welded tube, ASTM B468	3.2–88.9 mm	0.4–3.7 mm
U-bend tube	Bent to the bundle drawing	As drawn

Welded pipe follows the scope ASTM B464 prints, and larger sizes or heavier wall are quoted by agreement. Tubular product holds at 982–1010 °C for the anneal.

Surface Finishes

Surface Condition	Typical Use
Stabilised annealed and pickled	Standard delivery for acid and chloride service
Bright annealed	Scale-free bore for instrument and clean circuits
Cold drawn	Close wall control with a smoother bore and outside surface
Polished bore	Reduced roughness for product-contact hygienic lines
U-bend stress relieved	Bends annealed after forming for exchanger service

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