

Alloy 20 (Carpenter 20Cb-3, UNS N08020) — Material Data Sheet

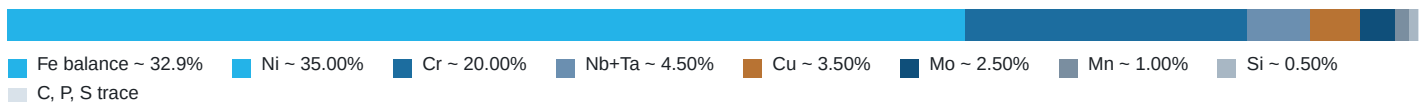
ASTM B473 bar · UNS N08020 · Alloy 20 / 20Cb-3® (Ni-Fe-Cr-Mo-Cu)

Niobium-stabilised nickel-iron-chromium alloy with copper and molybdenum, annealed

The sulfuric-acid alloy — 3.5 % copper and 2.5 % molybdenum in a stabilised 35 % nickel base — for acid plants, pickling lines and pharmaceutical process equipment.

TENSILE, B473 ANNEALED	80 ksi min	NICKEL / COPPER	32–38 / 3–4 %
YIELD, B473 ANNEALED	35 ksi min	STRAIN HARDENED (<=2 IN.)	90 ksi tensile · 60 ksi yield
ELONGATION / RA	30 / 50 % min	MAGNETIC	No

Nominal composition



Midpoints of the specification ranges, for orientation only. Limits are in the table.

Chemical composition — Alloy 20 (N08020) per ASTM B473 Table 1

Element	Symbol	Min %	Max %
Nickel	Ni	32.00	38.00
Chromium	Cr	19.00	21.00
Copper	Cu	3.00	4.00
Molybdenum	Mo	2.00	3.00
Niobium + tantalum	Nb+Ta	8 × C	1.00
Manganese	Mn	—	2.00
Silicon	Si	—	1.00
Carbon	C	—	0.07
Phosphorus	P	—	0.045
Sulfur	S	—	0.035
Iron	Fe	balance	—

Values per ASTM B473-07(2018) Table 1 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Physical properties (typical)

DENSITY	0.292 lb/in ³ (8.08 g/cm ³)
MODULUS OF ELASTICITY	28.0 × 10 ⁶ psi (193 GPa)
MAGNETIC	No

Heat treatment

Not age hardenable. Annealed; a strain-hardened condition is available to 2 in. for higher yield.

Bar properties — Alloy 20 per ASTM B473 Table 2

Condition and size	Tensile strength, min (ksi)	Yield strength, min (ksi)	Elongation, min (%)	Reduction of area, min (%)
Annealed, hot or cold finished — all sizes	80	35	30	50
Annealed, strain hardened — up to 2 in.	90	60	15	40

Values per ASTM B473-07(2018) Table 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

ASTM B473	UNS N08020, N08024 and N08026 bar and wire
ASME SB-473	Boiler and Pressure Vessel Code equivalent
ASTM B463	Alloy 20 plate, sheet and strip
ASTM B462	Alloy 20 forged flanges and fittings

Forms we supply in Alloy 20

- Full-thread studs and stud bolts
- Hex and heavy hex bolts
- Socket head cap screws
- Hex nuts in the same alloy
- Threaded rod
- Machined components from certified bar

Typical applications

- Sulfuric acid plants, storage and piping
- Pickling and plating lines
- Pharmaceutical and food processing
- Phosphoric acid and fertiliser plants
- Chemical pumps, valves and mixers