

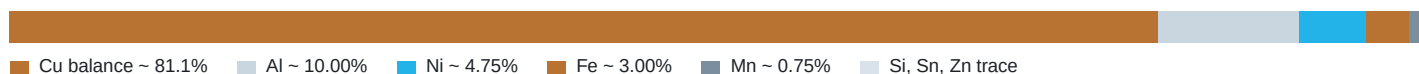
Nickel-Aluminum Bronze C63000 — Material Data Sheet

ASTM F468 / F467 fasteners · ASTM B150 rod and bar · UNS C63000 · Nickel-aluminum bronze (Alloy 630, 10 % Al – 5 % Ni – 3 % Fe)
Two-phase nickel-aluminum bronze, among the strongest of the wrought copper alloys and the strongest fastener alloy in ASTM F468

Steel-like strength in a bronze — 100 to 130 ksi as a fastener — with seawater, cavitation and wear resistance for propellers, pumps, valve seats and subsea hardware.

TENSILE, F468 FULL SIZE	100–130 ksi	NUT PROOF STRESS, F467	100 ksi hex · 108 heavy hex
YIELD, F468	50 ksi min	ALUMINUM / NICKEL	9–11 % / 4–5.5 %
HARDNESS, F468	85–100 HRB	MAGNETIC	Slightly (iron content)

Nominal composition



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

Chemical composition — C63000 per ASTM B150 Table 1

Element	Symbol	Min %	Max %
Copper	Cu	balance	—
Aluminum	Al	9.0	11.0
Nickel (incl. cobalt)	Ni	4.0	5.5
Iron	Fe	2.0	4.0
Manganese	Mn	—	1.5
Silicon	Si	—	0.25
Tin	Sn	—	0.20
Zinc	Zn	—	0.30

Values per ASTM B150/B150M-19 Table 1 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Physical properties (typical)

DENSITY	0.274 lb/in ³
MAGNETIC	Slightly, from the iron content
SPARKING	Non-sparking

Heat treatment

Supplied drawn and stress relieved (HR50) or hot worked and annealed. A high-strength level is available in some sizes by agreement. Not normally heat treated after machining.

Fastener mechanical properties per ASTM F468 Table 2 (marking F468H)

Nominal diameter (in.)	Hardness	Full-size tensile (ksi)	Full-size yield, min (ksi)	Machined tensile, min (ksi)	Machined yield, min (ksi)	Elongation in 4D, min (%)
All sizes	85–100 HRB	100–130	50	100	50	5

Values per ASTM F468-23 Table 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. Full-size tensile range and yield; machined-specimen minimums in the last three columns.

Nut requirements per ASTM F467 Table 2 (marking F467H)

Nut style	Hardness, min	Proof stress, min (ksi)
Hex and hex flange	85 HRB	100
Heavy hex, large hex flange and thick	85 HRB	108

Values per ASTM F467-24 Table 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Bar and rod properties per ASTM B150 Table 2 (C63000 standard-strength rod, HR50 drawn and stress relieved)

Temper and size (in.)	Tensile strength, min (ksi)	Yield strength at 0.5 % extension, min (ksi)	Elongation, min (%)
HR50 — ½ to 1	100	50	5
HR50 — over 1 to 2	90	45	6
HR50 — over 2 to 3	85	42.5	10
HR50 / annealed — over 3 to 4	85	42.5	10
HR50 / annealed — over 4	80	40	12

Values per ASTM B150/B150M-19 Table 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

ASTM F468 / F468M	Nonferrous bolts, cap screws and studs (Cu 630, F468H)
ASTM F467 / F467M	Nonferrous nuts (Cu 630, F467H)
ASTM B150 / B150M	Aluminum bronze rod, bar and shapes
ASTM B171	Nickel-aluminum bronze plate for tube sheets
NACE MR0175 / ISO 15156	Aluminum bronzes are listed for sour service within their limits

Forms we supply in C63000 Ni-Al Bronze

- Hex bolts, studs and cap screws to F468
- Hex and heavy hex nuts to F467
- Valve seats, stems and pump wear rings machined to print
- Bushings, gears and slides
- Certified B150 rod and bar

Typical applications

- Naval and marine propellers, shafts and hardware
- Seawater pumps, valves and desalination equipment
- Subsea and offshore bolting where a non-magnetic, non-sparking fastener is required
- Heavy duty bushings, gears and wear plates
- Aircraft landing-gear bushings