

304 Stainless Steel (UNS S30400) — Material Data Sheet

ASTM A276 bar · ASTM F593 bolts · UNS S30400 · AISI 304

Austenitic 18-8 chromium-nickel stainless steel

The general-purpose 18-8 stainless: 75 ksi annealed bar, cold-worked bolts to 160 ksi, non-magnetic, and resistant to water, food and most mild chemicals.

TENSILE, ANNEALED BAR	75 ksi min	CONDITION	Annealed, cold worked or strain hardened
YIELD, ANNEALED BAR	30 ksi min	MAGNETIC	No (annealed)
BOLTS, F593 CW1 (<=! IN.)	100–150 ksi	PRESSURE-FLANGE GRADE	ASTM A193 B8

Nominal composition



■ Fe balance ~ 69.9% ■ Cr ~ 19.00% ■ Ni ~ 9.50% ■ Mn ~ 1.00% ■ Si ~ 0.50% ■ C, P, S trace

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

Chemical composition — Type 304 (UNS S30400)

Element	Symbol	Min %	Max %
Carbon	C	—	0.08
Manganese	Mn	—	2.00
Phosphorus	P	—	0.045
Sulfur	S	—	0.030
Silicon	Si	—	1.00
Chromium	Cr	18.0	20.0
Nickel	Ni	8.0	11.0

Values per ASTM A276/A276M-17 Tables 1 and 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Physical properties (typical)

DENSITY	0.289 lb/in ³ (8.00 g/cm ³)
MODULUS OF ELASTICITY	28.0 × 10 ⁶ psi (193 GPa)
THERMAL EXPANSION (68–212 °F)	9.6 µin/in·°F
MAGNETIC	No in the annealed condition; slightly magnetic after cold work

Heat treatment

Solution annealed at 1850 to 2050 °F and quenched; cannot be hardened by heat treatment. Strength is raised only by cold work (F593 conditions CW and SH, A276 Conditions B and S). Passivated per ASTM A967 after machining.

Bar properties — ASTM A276 Type 304

Condition and nominal diameter (in.)	Tensile strength, min (ksi)	Yield strength 0.2% offset, min (ksi)	Elongation, min (%)	Reduction of area, min (%)	Hardness
Condition A (annealed), hot finished — all	75	30	40	50	—
Condition A, cold finished — ½ and under	90	45	30	40	—
Condition A, cold finished — over ½	75	30	30	40	—
Condition B (cold worked) — ¾ and under	125	100	12	35	—
Condition B — over ¾ to 1	115	80	15	35	—
Condition B — over 1 to 1¼	105	65	20	35	—
Condition B — over 1¼ to 1½	100	50	24	45	—
Condition B — over 1½ to 1¾	95	45	28	45	—
Condition S (strain hardened) — 2 and under	95	75	25	40	—
Condition S — over 2 to 2½	90	65	30	40	—
Condition S — over 2½ to 3	80	55	30	40	—

Values per ASTM A276/A276M-17 Tables 1 and 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. Condition B applies to 202, 302, 304, 304N, 316, 316N, 304L and 316L; Condition S to 304, 304N, 316, 316N, 304L and 316L.

Bolt and stud properties — ASTM F593 Alloy Group 1 (304, 304L, 305, 303 and related grades)

F593 condition · marking	Nominal diameter (in.)	Tensile strength (ksi)	Yield strength, min (ksi)	Rockwell hardness
AF (annealed after forming) · F593A	¼ to 1½	65 to 85	20	B85 max
A (annealed) · F593B	¼ to 1½	75 to 100	30	B65 to B95
CW1 (cold worked) · F593C	¼ to 1]	100 to 150	65	B95 to C32
CW2 (cold worked) · F593D	¾ to 1½	85 to 140	45	B80 to C32
SH1 (strain hardened) · F593A	¼ to 1]	120 to 160	95	C24 to C36
SH2 (strain hardened) · F593B	¾ to 1	110 to 150	75	C20 to C32
SH3 (strain hardened) · F593C	1![" to 1¼	100 to 140	60	B95 to C30
SH4 (strain hardened) · F593D	1!\" to 1½	95 to 130	45	B90 to C28

Values per ASTM F593-24 Table 2, full-size tests (verified against the specification). Yield is 0.2 % offset; hardness is Rockwell. Machined-specimen limits differ slightly.

Applicable standards

ASTM A276 / A479	Stainless steel bars and shapes
ASTM F593	Stainless steel bolts, hex cap screws and studs
ASTM F594	Stainless steel nuts
ASTM A193 / A320 GRADE B8	The same alloy for high-temperature and low-temperature pressure bolting
ASTM A967 / A380	Passivation and cleaning

Forms we supply in 304 Stainless

- Hex and heavy hex bolts and cap screws
- Full-thread studs and threaded rod
- Socket head cap and set screws
- Hex, jam and lock nuts
- Washers and spacers
- Machined components from certified bar

Typical applications

- Water treatment and waterworks hardware
- Food, beverage and pharmaceutical equipment
- Architectural and building fasteners
- Marine-atmosphere hardware away from salt spray
- Chemical plant fasteners in mild media
- Machined components in corrosive atmospheres