

ASTM A193 Grade B8N Class 1B (304N Stainless) — Material Data Sheet

ASTM A193 / ASME SA-193 · UNS S30451 · AISI 304N

Nitrogen-strengthened 18-8 austenitic stainless, Class 1B solution treated or Class 2 strain hardened

304N stainless bolting — nitrogen lifts the solution-treated yield to 35 ksi and tensile to 80 ksi without cold work, for larger diameters and higher design stresses.

TENSILE	80 ksi min	COMPANION NUT	ASTM A194 8N
YIELD	35 ksi min	MAGNETIC	No in the annealed condition
NITROGEN	0.10–0.16 %	MARKING	B8N

Nominal composition

■ Fe balance ~ 69.8% ■ Cr ~ 19.00% ■ Ni ~ 9.50% ■ Mn ~ 1.00% ■ Si ~ 0.50% ■ C, P, S, N trace

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

Chemical composition — ASTM A193 B8N (AISI 304N, UNS S30451)

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
Nitrogen	N	0.10	0.16

Values per ASTM A193/A193M-24, 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)
MAGNETIC	No in the annealed condition

Heat treatment

Class 1B and 1D: carbide solution treated. Class 1A (B8NA): solution treated in the finished condition. Strain-hardened Class 2 is a separate page.

Mechanical properties — ASTM A193 B8N Class 1B and 1D

Nominal diameter (in.)	Tensile strength, min (ksi)	Yield strength 0.2% offset, min (ksi)	Elongation in 4D, min (%)	Reduction of area, min (%)	Hardness, max
Class 1B / 1D — all diameters	80	35	30	40	223 HBW / 96 HRB

Values per ASTM A193/A193M-24, Tables 1 and 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. Class 1 sizes ¾ in. and smaller may be 241 HBW / 100 HRB. Strain-hardened Class 2 properties are on the B8N Class 2 page.

Applicable standards

ASTM A193 / ASME SA-193	Alloy-steel and stainless steel bolting for high-temperature or high-pressure service
ASTM A194 GRADE 8N	Companion nuts
ASME BPVC SECTION II PART D	Higher allowable stresses for 304N

Forms we supply in A193 B8N Class 1B

- 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

- Pressure-vessel and piping bolting designed to 304N allowables
- Large-diameter stainless studs where Class 2 cannot reach
- Cryogenic and LNG service
- Water treatment and chemical process flanges