

ASTM A193 Grade B8P Class 1 (305 Stainless) — Material Data Sheet

ASTM A193 / ASME SA-193 · UNS S30500 · AISI 305

High-nickel 18-8 austenitic stainless with low work-hardening, Class 1 solution treated or Class 2 strain hardened

305 stainless bolting — the low-work-hardening 18-8 for cold-headed and deep-formed fasteners that must stay non-magnetic.

TENSILE	75 ksi min	COMPANION NUT	ASTM A194 8P
HARDNESS	223 HBW / 96 HRB max	MAGNETIC	No, even after cold work
NICKEL	11.0–13.0 %	MARKING	B8P

Nominal composition

■ Fe balance ~ 68.4% ■ Cr ~ 18.00% ■ Ni ~ 12.00% ■ 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 — ASTM A193 B8P (AISI 305, UNS S30500)

Element	Symbol	Min %	Max %
Carbon	C	—	0.12
Manganese	Mn	—	2.00
Phosphorus	P	—	0.045
Sulfur	S	—	0.030
Silicon	Si	—	1.00
Chromium	Cr	17.0	19.0
Nickel	Ni	11.0	13.0

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 1: carbide solution treated. Class 1A (B8PA): solution treated in the finished condition, 192 HBW / 90 HRB max. Strain-hardened Class 2 is a separate page.

Mechanical properties — ASTM A193 B8P Class 1 and Class 1A

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 1 — all diameters	75	30	30	50	223 HBW / 96 HRB
Class 1A (B8PA) — all diameters	75	30	30	50	192 HBW / 90 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 ¼ in. and smaller may be 241 HBW / 100 HRB. Strain-hardened Class 2 properties are on the B8P Class 2 page.

Applicable standards

ASTM A193 / ASME SA-193	Alloy-steel and stainless steel bolting for high-temperature or high-pressure service
ASTM A320 GRADE B8P	Low-temperature service
ASTM A194 GRADE 8P	Companion nuts

Forms we supply in A193 B8P Class 1

- 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

- Cold-headed stainless bolts and screws
- Non-magnetic instrumentation hardware
- Formed fasteners that would work-harden in 304
- Cryogenic service