832-446-3442
info@innovationfasteners.com
www.innovationfasteners.com

ASTM A320 Grade B8C (347 Stainless) — Material Data Sheet

ASTM A320 / ASME SA-320 · UNS S34700 · AISI 347, niobium stabilized

Niobium-stabilized austenitic stainless steel for low-temperature service

347 stainless bolting certified to A320 — niobium stabilized against sensitization, impact exempt above -425 °F, for cold service that also sees weld heat or thermal cycling.

TENSILE, CLASS 1	75 ksi min	IMPACT TESTING	Exempt above -425 °F (Cl.1, 1A)
TENSILE, CLASS 2 (<=¾ IN.)	125 ksi min	COMPANION NUT	ASTM A194 8C
HARDNESS, CLASS 1	223 HBW / 96 HRB max	MARKING	B8C (B8CSH for Class 2)

Nominal composition

Fe balance ~ 64.4% · Cr ~ 18.00% · Ni ~ 10.50% · Nb+Ta ~ 5.55% · 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 A320 B8C (AISI 347, UNS S34700)

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	17.0	19.0
Nickel	Ni	9.0	12.0
Niobium + tantalum	Nb+Ta	10 × C	1.10

Values per ASTM A320/A320M-26, Tables 1 and 3 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Physical properties (typical)

DENSITY	0.289 lb/in³ (8.00 g/cm³)
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

Carbide solution treated (Class 1): held at a temperature at which chromium carbide goes into solution, then cooled in air or liquid fast enough to prevent reprecipitation. Class 1A is solution treated in the finished condition when specified on the purchase order. Threads formed after heat treatment where practical. Carbide solution treated and then strain hardened (Class 2) when increased strength is specified on the purchase order. Full-size tensile testing of headed Class 2 components after strain hardening is permitted.

Mechanical properties — ASTM A320 B8C Classes 1, 1A and 2

Nominal diameter (in.)	Tensile strength, min (ksi)	Yield strength 0.2% offset, min (ksi)	Elongation in 2 in., min (%)	Reduction of area, min (%)	Hardness, max
Class 1 — all diameters	75	30	30	50	223 HBW / 96 HRB
Class 1A (B8CA) — all diameters	75	30	30	50	192 HBW / 90 HRB
Class 2 — ¾ and under	125	100	12	35	321 HBW / 35 HRC
Class 2 — over ¾ to 1	115	80	15	35	321 HBW / 35 HRC
Class 2 — over 1 to 1¼	105	65	20	35	321 HBW / 35 HRC
Class 2 — over 1¼ to 1½	100	50	28	45	321 HBW / 35 HRC

Values per ASTM A320/A320M-26, Tables 1 and 3 (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. Class 2 is limited to 1½ in. Strain-hardened austenitic steel may not show uniform properties through the section, particularly over ¾ in. diameter.

Impact testing — ASTM A320 austenitic grades (6.2.1.1)

Grade and class	Impact test exempt above	Below that temperature
B8, B8C, B8P, B8LN — Class 1 and 1A	-425 °F (-254 °C)	Impact tested to agreed criteria
B8M, B8T, B8F, B8MLN — Class 1 and 1A	-325 °F (-198 °C)	Impact tested to agreed criteria
All austenitic grades — Class 2	-325 °F (-198 °C)	Impact tested to agreed criteria
Any grade ½ in. and smaller	Exempt at all temperatures	Unless S1 is specified

Per ASTM A320/A320M-26 (verified against the specification). When impact tests are required for austenitic grades, the test temperature and acceptance criteria are agreed between purchaser and supplier; Supplementary Requirement S1 may be ordered.

Applicable standards

ASTM A320 / ASME SA-320	Alloy-steel and stainless steel bolting for low-temperature service
ASTM A193 GRADE B8C	The same material specified for high-temperature and high-pressure service
ASTM A194 GRADE 8C	Companion austenitic nuts; impact tested when required by 10.2
ASTM A962 / A962M	Common requirements for bolting (testing, retests, certification)
ASME B31.3 / ASME VIII	Piping and pressure-vessel codes that reference SA-320 B8C

Forms we supply in A320 B8C

- Full-thread studs and stud bolts
- Double-end and tap-end studs
- Hex and heavy hex bolts
- Socket head cap screws
- Threaded rod (cut and rolled thread)
- Machined components from certified bar

Typical applications

- LNG and ethylene plant flanged joints
- Cryogenic storage tanks and loading arms
- Air separation and industrial gas plant
- Cold-box piping and valves
- Refrigerated ammonia and propane systems
- Cold service that also cycles through the sensitization range