

AISI 4340 Alloy Steel (UNS G43400) — Material Data Sheet

ASTM A322 bar · ASTM A434 Q&T bar · UNS G43400 · G43406 · AISI 4340 / E4340 nickel-chromium-molybdenum steel
Medium-carbon nickel-chromium-molybdenum alloy steel with deep hardenability, supplied annealed or quenched and tempered

The deep-hardening high-strength steel — 4340 reaches 155 ksi and beyond in large sections — for crankshafts, drilling tools, aircraft parts and A320 L43 bolting.

Q&T, TYPICAL (A434 CLASS BC BASIS)	130 ksi tensile · 110 ksi yield	NICKEL / CHROMIUM / MOLYBDENUM	1.65–2.00 / 0.70–0.90 / 0.20–0.30 %
A434 CLASS BD (<=1½ IN.)	155 ksi tensile · 130 ksi yield	BOLTING GRADES MADE FROM IT	A320 L43 · A194 43
CARBON	0.38–0.43 %	MAGNETIC	Yes

Nominal composition

■ Fe balance ~ 95.7% ■ Ni ~ 1.82% ■ Cr ~ 0.80% ■ Mn ~ 0.70% ■ C, P, S, Si, Mo trace

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

Chemical composition — AISI 4340 (G43400) per ASTM A322 Table 1

Element	Symbol	Min %	Max %
Carbon	C	0.38	0.43
Manganese	Mn	0.60	0.80
Phosphorus	P	—	0.035
Sulfur	S	—	0.040
Silicon	Si	0.15	0.35
Nickel	Ni	1.65	2.00
Chromium	Cr	0.70	0.90
Molybdenum	Mo	0.20	0.30

Values per ASTM A322-13(2018) Table 1 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. E4340 (G43406): manganese 0.65–0.85 %, phosphorus and sulfur 0.025 % max.

Physical properties (typical)

DENSITY	0.284 lb/in ³ (7.85 g/cm ³)
MODULUS OF ELASTICITY	29.0 × 10 ⁶ psi (200 GPa)
MAGNETIC	Yes

Heat treatment

Supplied annealed for machining, or quenched and tempered to an A434 class. A434 lists the 4300 series for Class BD in all sizes and Class BC in sizes over 4 in.; fasteners to A320 L43 are heat treated to that specification after threading.

Quenched and tempered bar — ASTM A434 Class BD (4300 series)

Diameter (in.)	Yield strength, min (ksi)	Tensile strength, min (ksi)	Elongation, min (%)	Reduction of area, min (%)
1½ and under	130	155	14	35
Over 1½ to 2½	120	150	14	35
Over 2½ to 4	110	140	14	35
Over 4 to 7	105	135	14	35
Over 7 to 10	100	130	14	35

Values per ASTM A434/A434M-18 Table 1 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Quenched and tempered bar — ASTM A434 Class BC (4300 series, over 4 in.)

Diameter (in.)	Yield strength, min (ksi)	Tensile strength, min (ksi)	Elongation, min (%)	Reduction of area, min (%)
Over 4 to 7	85	110	16	45
Over 7 to 10	80	105	15	40

Values per ASTM A434/A434M-18 Table 1 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

ASTM A322	Hot-wrought alloy steel bars (grade chemistry)
ASTM A434 / A434M	Quenched-and-tempered alloy steel bars
AMS 6415 / AMS 6414	Aircraft-quality 4340 and E4340 bar
ASTM A320 L43 / A194 43	The bolting grades produced from 4340

Forms we supply in 4340

- Studs, bolts and threaded rod machined from bar
- Shafts, pins, couplings and machined components
- Certified A322 bar, annealed, normalised or quenched and tempered to A434

Typical applications

- Crankshafts, connecting rods and gears
- Drill collars, subs and downhole tools
- Aircraft landing-gear and structural parts
- Large-diameter high-strength studs and pins
- Press and forging tooling