

ASTM A194 Grade 43 — Material Data Sheet

ASTM A194 / ASME SA-194 · UNS G43400 · AISI 4340

Nickel-chromium-molybdenum alloy steel nut, quenched and tempered

The 4340 heavy hex nut — the deep-hardening companion to A320 L43 studs and an alternative to Grade 7 on large low-temperature joints.

PROOF LOAD STRESS	175 ksi heavy hex · 150 ksi hex	PATTERN	Heavy hex (ASME B18.2.2)
HARDNESS	248–327 HBW / 24–35 HRC	COMPANION STUD	ASTM A320 L43
HEAT TREATMENT	Q&T, 1100 °F min temper	IMPACT TESTED VERSION	Grade 43L

Nominal composition

■ Fe balance ~ 95.7% ■ Ni ~ 1.82% ■ Cr ~ 0.80% ■ Mn ~ 0.72% ■ C, P, S, Si, Mo trace

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

Chemical composition — ASTM A194 Grade 43 (AISI 4340)

Element	Symbol	Min %	Max %
Carbon	C	0.38	0.43
Manganese	Mn	0.60	0.85
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 A194/A194M-24, Tables 1, 2 and 5 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Physical properties (typical)

DENSITY	0.284 lb/in ³ (7.85 g/cm ³)
MODULUS OF ELASTICITY	29.7 × 10 ⁶ psi (205 GPa)
MAGNETIC	Yes

Heat treatment

Quenched and tempered at 1100 °F (595 °C) minimum.
Grade 43L is Charpy impact tested with the studs.

Mechanical properties — ASTM A194 Grade 43

Nut style and size (in.)	Proof load stress (ksi)	Hardness, min	Hardness, max
Heavy hex, all sizes	175	248 HBW / 24 HRC	327 HBW / 35 HRC
Hex (finished pattern), all sizes	150	248 HBW / 24 HRC	327 HBW / 35 HRC

Values per ASTM A194/A194M-24, Tables 1, 2 and 5 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

ASTM A194 / ASME SA-194	Nuts for bolts for high-pressure or high-temperature service
ASTM A320 GRADE L43	Companion studs
ASME B18.2.2	Heavy hex nut dimensions

Forms we supply in A194 43

- Heavy hex nuts
- Finished hex nuts
- Custom nuts to drawing

Typical applications

- Large-diameter low-temperature flange bolting with L43
- Cryogenic exchanger and cold-box bolting
- Heavy valve bonnets at low temperature