

ASTM A194 Grade 4 — Material Data Sheet

ASTM A194 / ASME SA-194 · Carbon-molybdenum alloy steel

Carbon-molybdenum alloy steel nut, quenched and tempered

A carbon-molybdenum nut grade withdrawn from ASTM A194 — kept here for legacy drawings; Grade 7 is the current alloy-steel nut for B7 and L7 studs.

STATUS	Withdrawn from ASTM A194	HISTORIC HARDNESS	Per the last listing edition
REPLACEMENT	ASTM A194 Grade 7	MARKING	No current A194 marking
HISTORIC TENSILE BASIS	Carbon-molybdenum steel, quenched and tempered	PATTERN	Heavy hex (ASME B18.2.2)

Nominal composition

■ Fe balance ~ 98.2% ■ Mn ~ 0.80% ■ C, P, S, Si, Mo trace

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

Chemical composition — ASTM A194 Grade 4 (carbon-molybdenum steel)

Element	Symbol	Min %	Max %
Carbon	C	0.40	0.50
Manganese	Mn	0.70	0.90
Phosphorus	P	—	0.035
Sulfur	S	—	0.040
Silicon	Si	0.15	0.35
Molybdenum	Mo	0.20	0.30

Grade 4 (carbon-molybdenum) has been withdrawn from ASTM A194; it does not appear in A194/A194M-24. The values shown are from the last edition that listed the grade and cannot be verified against the current specification. Order Grade 7 for new work.

Physical properties (typical)

DENSITY 0.284 lb/in³ (7.85 g/cm³)

MAGNETIC Yes (ferromagnetic)

Heat treatment

Historically quenched in liquid and tempered; the current edition of A194 lists tempering temperatures only for Grades 2H, 2HM, 3, 6, 6F, 7, 7M, 43 and 16.

Mechanical properties — ASTM A194 Grade 4

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

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Applicable standards

ASTM A194 / ASME SA-194	Nuts for bolts for high-pressure or high-temperature service
ASTM A193 B7 / B16 AND A320 L7	Companion studs
ASME B18.2.2	Heavy hex nut dimensions

Forms we supply in A194 4

- Heavy hex nuts (the default for pressure bolting)
- Finished hex nuts
- Jam nuts
- Custom and special nuts to drawing

Typical applications

- Steam and hot hydrocarbon flange bolting
- Legacy utility and refinery bolting specifications
- Low-temperature service with A320 L7 (impact tested)
- Valve bonnet nuts