

ASTM A194 Grade 2H — Material Data Sheet

ASTM A194 / ASME SA-194 · Medium-carbon steel (0.40% C min)

Medium-carbon steel heavy hex nut, quenched and tempered

The standard heavy hex nut for A193 B7 studs — quenched and tempered carbon steel, 175 ksi proof load, 24 to 35 HRC.

PROOF LOAD STRESS	175 ksi heavy hex · 150 ksi hex	PATTERN	Heavy hex (ASME B18.2.2)
HARDNESS	248–327 HBW / 24–35 HRC (<=1½ in.)	COMPANION STUD	ASTM A193 B7
HEAT TREATMENT	Q&T, 850 °F min temper	TYPICAL SERVICE	-20 °F to 800 °F

Nominal composition

■ Fe balance ~ 98.9% ■ Mn ~ 0.50% ■ C, P, S, Si trace

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

Chemical composition — ASTM A194 2H (medium-carbon steel)

Element	Symbol	Min %	Max %
Carbon	C	0.40	—
Manganese	Mn	—	1.00
Phosphorus	P	—	0.040
Sulfur	S	—	0.050
Silicon	Si	—	0.40

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/in³ (7.85 g/cm³)
MAGNETIC	Yes (ferromagnetic)

Heat treatment

Quenched in liquid and tempered at 850 °F (455 °C) minimum.

Mechanical properties — ASTM A194 Grade 2H

Nut style and size (in.)	Proof load stress (ksi)	Hardness, min	Hardness, max
Heavy hex, 1½ and under	175	248 HBW / 24 HRC	327 HBW / 35 HRC
Heavy hex, over 1½	175	212 HBW / 95 HRB	327 HBW / 35 HRC
Hex (finished pattern), 1½ and under	150	248 HBW / 24 HRC	327 HBW / 35 HRC
Hex (finished pattern), over 1½	150	212 HBW / 95 HRB	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	Carbon steel, alloy steel and stainless steel nuts for bolts for high-pressure or high-temperature service
ASTM A193 GRADE B7	Companion studs and bolts
ASME B18.2.2	Heavy hex nut dimensions
ASTM A563 GRADE DH	Structural nut 2H is commonly substituted for

Forms we supply in A194 2H

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

Typical applications

- Flange stud bolt sets with A193 B7
- Valve, pump and compressor bolting
- Pressure vessel manways and covers
- Structural bolting where A563 DH is unavailable
- Anchor bolts and threaded rod assemblies