

ASTM F594 Stainless Steel Nuts — Material Data Sheet

ASTM F594 · UNS S30400 / S31600 groups and others · 303, 304, 316, 321, 347, 410, 416, 431, 430, 630

Stainless hex and heavy hex nuts matched to F593 bolts

The stainless nut specification: the same alloy groups and conditions as F593 bolts, with proof stress from 70 ksi annealed to 120 ksi strain hardened for austenitic grades and 160 ksi for hardened 410.

GROUP 1 · 2 · 3, AF	70 ksi proof (hex)	GROUP 1 · 2 · 3, SH1 (¼–1½)	120 ksi proof
GROUP 1 · 2 · 3, A	75 ksi proof (hex)	GROUP 5 (410, 416), HT	160 ksi proof
GROUP 1 · 2 · 3, CW1 (¼–1½)	100 ksi proof	HEAVY HEX	About 8 % higher proof than hex

Nominal composition

■ Fe balance ~ 68.8%	■ 18.0–20.0 ~ 16.00%	■ 8.0–10.5 ~ 10.00%	■ 2.00 ~ 2.00%	■ — ~ 2.00%	■ 1.00 ~ 1.00%	■ 0.08, 0.045, 0.030 trace
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Midpoints of the specification ranges, for orientation only. Limits are in the table.

Chemical composition — ASTM F594 Types 304 and 316 (per F594 Table 1)

Element	304	316	—
Carbon, max	0.08	0.08	
Manganese, max	2.00	2.00	
Phosphorus, max	0.045	0.045	
Sulfur, max	0.030	0.030	
Silicon, max	1.00	1.00	
Chromium	18.0–20.0	16.0–18.0	
Nickel	8.0–10.5	10.0–14.0	
Molybdenum	—	2.00–3.00	

Values per ASTM F594-22 Table 1 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. All groups are listed in the same table; compositions match F593.

Physical properties (typical)

DENSITY	0.289 lb/in ³ (8.00 g/cm ³)
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

Austenitic groups: annealed (A, AF), cold worked (CW) or strain hardened (SH). Martensitic: hardened and tempered at 1050 °F minimum (H) or 525 °F minimum (HT). Passivated after machining.

Proof stress and hardness — ASTM F594 austenitic and martensitic nuts

Alloy group · condition · size	Proof stress, hex nuts (ksi)	Proof stress, heavy hex nuts (ksi)	Rockwell hardness	Marking (Group 1 / 2 / 3)	—
Austenitic · AF · ¼–1½	70	76	B85 max	F594A / E / J	
Austenitic · A · ¼–1½	75	81	B65–B95	F594B / F / K	
Austenitic · CW1 · ¼–1½	100	108	B95–C35	F594C / G / L	
Austenitic · CW2 · ¾–1½	85	92	B80–C35	F594D / H / M	
Austenitic · SH1 · ¼–1½	120	130	C24–C36	F594A / E / J	
Austenitic · SH2 · ¾–1	110	119	C20–C32	F594B / F / K	
Austenitic · SH3 · 1½–1¾	100	108	B95–C30	F594C / G / L	
Austenitic · SH4 · 1½–1¾	85	92	B90–C28	F594D / H / M	
410, 416 · H · ¼–1½	100	108	C20–C30	F594P	
410, 416 · HT · ¼–1½	160	173	C34–C45	F594R	

Values per ASTM F594-22 Table 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. Groups 1, 2 and 3 share the same values with different markings (A–D, E–H, J–M).

Applicable standards

ASTM F594	Stainless steel nuts
ASTM F593	Matching stainless bolts, hex cap screws and studs
ASME B18.2.2	Nut dimensions
ASTM A194 GRADES 8, 8M	Pressure-code stainless nuts, the alternative for flanges

Forms we supply in F594 stainless nuts

- Hex and heavy hex bolts and cap screws
- Studs and threaded rod
- Nuts and washers to match
- Machined specials to drawing

Typical applications

- Nuts for F593 stainless bolts and studs
- Marine, food and pharmaceutical equipment
- Architectural and water-treatment hardware
- Silver-plated nuts for cryogenic and vacuum service