

ASTM F3125 Grade A325 Structural Bolts (120 ksi) — Material Data Sheet

ASTM F3125/F3125M Grade A325 · Type 1 and Type 3 · Carbon, carbon-boron or alloy steel, quenched and tempered
Heavy hex structural bolting, 120 ksi

The structural steel connection bolt: heavy hex head, 120 ksi tensile, ½ to 1½ in., quenched and tempered, with the twist-off F1852 and metric A325M variants in the same specification.

TENSILE	120 ksi min	HARDNESS	25–34 HRC
PROOF LOAD	85 ksi (length measurement)	SIZES	½ to 1½ in.
YIELD (ALTERNATIVE PROOF)	92 ksi	MATCHING NUT · WASHER	A563 DH · F436

Nominal composition

■ Fe balance ~ 98.7% ■ Mn ~ 0.60% ■ C, P, S, Si, B trace

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

Chemical composition — F3125 Grade A325 Type 1, carbon or alloy steel (heat analysis) Physical properties (typical)

Element	Symbol	Min %	Max %
Carbon	C	0.30	0.52
Manganese	Mn	0.60	—
Phosphorus	P	—	0.035
Sulfur	S	—	0.040
Silicon	Si	0.15	0.30
Boron	B	—	0.003

Values per ASTM F3125/F3125M-23 Table 3 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. Type 3 weathering steel compositions are given separately in the same table.

DENSITY	0.284 lb/in ³ (7.85 g/cm ³)
MODULUS OF ELASTICITY	29.0 × 10 ⁶ psi (200 GPa)
THERMAL EXPANSION (68–212 °F)	6.5 µin/in·°F
MAGNETIC	Yes

Heat treatment

Quenched and tempered at 800 °F minimum. Hot-dip galvanized A325 bolts are tested after galvanizing; A490 must not be hot-dip galvanized.

Mechanical properties — F3125 Grade A325 and F1852 (full-size, stress basis) and hardness

Grade / condition and size	Tensile strength, min (ksi)	Yield or proof, min (ksi)	Elongation, min (%)	Reduction of area, min (%)	Hardness
A325 / F1852 — ½ to 1½ in.	120	85 proof (92 by yield method)	—	—	25–34 HRC (253–319 HBW)

Values per ASTM F3125/F3125M-23 Tables 5 and 7 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. Loads per thread size are listed in Table 5; the stress basis is shown here.

Applicable standards

ASTM F3125/F3125M	High-strength structural bolts and assemblies, 120 ksi and 150 ksi
ASTM A563 GRADE DH	Matching heavy hex nuts
ASTM F436	Hardened washers
RCSC SPECIFICATION	Structural joints using high-strength bolts
ASME B18.2.6	Heavy hex structural bolt dimensions

Forms we supply in A325 (F3125)

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

Typical applications

- Bolted steel building and bridge connections
- Pipe-rack and module structural joints
- Equipment structural frames
- Crane runway and rail connections