

Property Classes 4.6 and 5.8 Metric Bolts (ISO 898-1 / ASTM F568M) —

Material Data Sheet

ISO 898-1 / ASTM F568M — Metric low-carbon steel
Metric low-carbon bolting, 400 and 520 MPa

The metric low-strength classes: 4.6 at 400 MPa (58 ksi), the metric A307, and 5.8 at 520 MPa (75 ksi) cold worked — for general bolting, threaded rod and anchors.

4.6 TENSILE · YIELD	400 · 240 MPa	5.8 HARDNESS	B82–B95
5.8 TENSILE · YIELD	520 · 420 MPa	HEAT TREATMENT	None (4.6) · cold worked (5.8)
4.6 HARDNESS	B67–B95	MATCHING NUT	Class 5 · Class 8

Nominal composition

■ Fe balance ~ 99.3% ■ C, C, P, S trace

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

Chemical composition — ASTM F568M Classes 4.6 and 5.8 (product analysis)

Element	Symbol	Min %	Max %
Carbon, 4.6	C	—	0.55
Carbon, 5.8	C	0.13	0.55
Phosphorus	P	—	0.048
Sulfur	S	—	0.058

Values per ASTM F568M Table 1 (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	29.0 × 10 ⁶ psi (200 GPa)
THERMAL EXPANSION (68–212 °F)	6.5 µin/in·°F
MAGNETIC	Yes

Heat treatment

4.6: none. 5.8: cold worked; stress relieved at 470 °C minimum when specified.

Mechanical properties — ASTM F568M Classes 4.6 and 5.8

Property class and size	Proof load (MPa)	Tensile strength, min (MPa)	Yield strength, min (MPa)	Elongation, min (%)	Hardness
4.6 — M5 to M100	225	400	240 (yield point)	22	B67–B95
5.8 — M5 to M24	380	520	420	10	B82–B95

Values per ASTM F568M Table 3 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

ISO 898-1	Mechanical properties of carbon and alloy steel bolts, screws and studs
ASTM F568M	Carbon and alloy steel externally threaded metric fasteners
ISO 898-2 / ASTM A563M	Matching nuts
ISO 4014 / 4017	Metric hex bolt and screw dimensions

Forms we supply in Class 4.6 / 5.8

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

Typical applications

- General-purpose metric bolting and threaded rod
- Galvanized hardware for outdoor structures
- Anchor and tie-down bolts in metric projects
- Low-load machine assembly