

Property Class 8.8 Metric Bolts (ISO 898-1 / ASTM F568M) — Material Data Sheet

ISO 898-1: ASTM F568M Class 8.8 · Medium-carbon or low-carbon martensite steel, quenched and tempered
Metric quenched-and-tempered bolting, 830 MPa

The metric Grade 5: medium-carbon steel quenched and tempered to 830 MPa (120 ksi) tensile and 660 MPa yield — the general-purpose high-strength metric bolt, equivalent to A449 and A325.

TENSILE	830 MPa (120 ksi) min	HARDNESS	23–34 HRC
YIELD	660 MPa min	TEMPERING	425 °C min
PROOF LOAD	600 MPa	MATCHING NUT	Class 8 (ISO 898-2 / A563M)

Nominal composition

■ Fe balance ~ 98.5% ■ Mn ~ 0.74% ■ C, C, B, P, S trace

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

Chemical composition — ASTM F568M Class 8.8 (product analysis)

Element	Symbol	Min %	Max %
Carbon (medium carbon)	C	0.25	0.55
Carbon (low-carbon martensite)	C	0.15	0.40
Manganese (low-carbon martensite)	Mn	0.74	—
Boron (low-carbon martensite)	B	0.0005	—
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

Quenched in liquid from above the transformation temperature and tempered at 425 °C (800 °F) minimum. Threads rolled before or after heat treatment.

Mechanical properties — ASTM F568M Class 8.8

Property class and size	Proof load (MPa)	Tensile strength, min (MPa)	Yield strength, min (MPa)	Elongation, min (%)	Hardness
8.8 — M20 to M80 (F568M scope)	600	830	660	12	C23–C34
8.8.3 weathering — M20 to M36	600	830	660	12	C23–C34

Values per ASTM F568M Table 3 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. Proof load and tensile loads by thread size are in Table 5 of the specification.

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 CLASS 8	Matching nuts
ISO 4014 / 4017 / 4762	Hex bolt, hex screw and socket cap screw dimensions

Forms we supply in Class 8.8

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

Typical applications

- Machinery and equipment assembly
- Metric structural and pipe-rack bolting
- Vehicle, trailer and mobile-plant fasteners
- Flange and coupling bolting outside pressure codes