

A4-50, A4-70 and A4-80 Stainless Metric Fasteners (ISO 3506 / ASTM F738M)

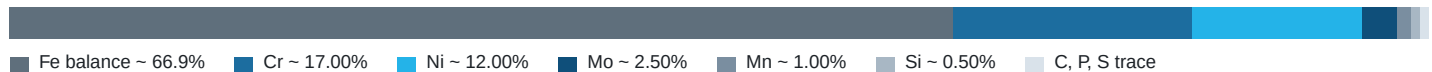
Material Data Sheet

ISO 3506-1 / ASTM F738M Alloy Group A4, Type 316 (UNS S31600) and 316L
Austenitic stainless metric bolting, molybdenum group

The metric 316 bolt: A4 is the molybdenum-bearing austenitic group for chloride and marine service, and A4-80 at 800 MPa strain hardened is the strongest standard stainless metric fastener.

A4-50 TENSILE	500 MPa (annealed)	A4-80 YIELD, M6–M20	600 MPa
A4-70 TENSILE	700 MPa (cold worked)	ALLOYS	316, 316L
A4-80 TENSILE	800 MPa (strain hardened)	INCH EQUIVALENT	ASTM F593 Group 2

Nominal composition



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

Chemical composition — ASTM F738M Alloy Group A4, Type 316 (UNS S31600)

Element	Symbol	Min %	Max %
Carbon	C	—	0.08
Manganese	Mn	—	2.00
Phosphorus	P	—	0.045
Sulfur	S	—	0.030
Silicon	Si	—	1.00
Chromium	Cr	16.0	18.0
Nickel	Ni	10.0	14.0
Molybdenum	Mo	2.00	3.00

Values per ASTM F738M-02 Table 3 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. 316L is listed in the same table with carbon 0.03 % max.

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

Condition AF: solution annealed at 1040 ± 30 °C after manufacture. Condition CW: cold worked from annealed stock. Condition SH: strain hardened to the specified strength. Not hardenable by heat treatment; passivated after machining.

Mechanical properties — ASTM F738M A4 stainless (A4-80) (full-size tests)

Property class · condition · size	Tensile strength, min (MPa)	Yield strength, min (MPa)	Elongation, min (%), machined specimen	Hardness (Rockwell)	F738M marking
A4-50 · AF (annealed) · M6–M36	500	210	30	B85 max	F738C
A4-70 · CW · M6–M20	700	450	20	B96–C33	F738F
A4-70 · CW · over M20–M36	550	300	25	B83–C31	F738F
A4-80 · SH · M6–M20	800	600	12	C23–C36	F738J
A4-80 · SH · over M20–M24	700	500	15	B96–C33	F738J
A4-80 · SH · over M24–M30	650	400	20	B93–C30	F738J
A4-80 · SH · over M30–M36	600	300	28	B89–C28	F738J

Values per ASTM F738M-02 Table 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team. ISO 3506-1 gives the same class values; extension and torsional requirements are in the specification.

Applicable standards

ISO 3506-1	Mechanical properties of corrosion-resistant stainless steel fasteners, bolts, screws and studs
ASTM F738M	Stainless steel metric bolts, screws and studs
ISO 3506-2 / ASTM F836M	Matching stainless nuts
ASTM A967	Passivation

Forms we supply in A4 stainless (A4-80)

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

Typical applications

- Marine, offshore and coastal hardware
- Seawater and desalination equipment
- Chemical and pharmaceutical plant on metric drawings
- Road, rail and bridge hardware exposed to deicing salt