

ASTM F835 Alloy Steel Socket Button and Flat Head Cap Screws — Material Data Sheet

ASTM F835 — Similar to 835 Alloy steel, quenched and tempered
Alloy steel socket button and countersunk head cap screws, 136 to 144 ksi

The low-head socket screws: button and flat countersunk heads in alloy steel at 144 ksi (½ in. and smaller) and 136 ksi above, 37 to 44 HRC — rated below A574 because the shallow head, not the shank, limits the load.

TENSILE, ≤½ IN.	144 ksi min	CARBON	0.30–0.48 %
TENSILE, >½ IN.	136 ksi min	FINISH	Black oxide unless specified
HARDNESS	39–44 HRC (≤½) · 37–44 HRC	DIMENSIONS	ASME B18.3

Nominal composition

■ Fe balance ~ 99.6% ■ C, P, S trace

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

Chemical composition — ASTM F835 (heat analysis)

Element	Symbol	Min %	Max %
Carbon	C	0.30	0.48
Phosphorus	P	—	0.035
Sulfur	S	—	0.040
Alloying elements	—	required	—

Values per ASTM F835-23 Table 2 (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 oil and tempered at 650 °F minimum (A574 socket head cap screws require 700 °F).

Mechanical properties — ASTM F835 socket button and flat head cap screws

Grade / condition and size	Tensile strength, min (ksi)	Yield or proof, min (ksi)	Elongation, min (%)	Reduction of area, min (%)	Hardness
½ in. and smaller (full size)	144	—	—	—	39–44 HRC
Over ½ in. (full size)	136	—	—	—	37–44 HRC
Machined specimen, over ½ in.	170	153	8	35	37–44 HRC

Values per ASTM F835-23 Table 1 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

ASTM F835	Alloy steel socket button and flat countersunk head cap screws
ASME B18.3	Socket cap, shoulder and set screw dimensions
ASTM A574	Alloy steel socket head cap screws (full-strength head)

Forms we supply in F835

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

Typical applications

- Guards, covers and flush-mounted hardware
- Machinery where a low head is required
- Tooling and fixture plates
- Countersunk fastening of plates and rails