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FASTENER SPECIALISTS SINCE 1977

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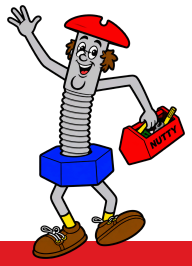
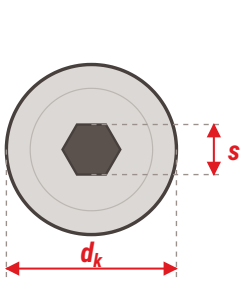
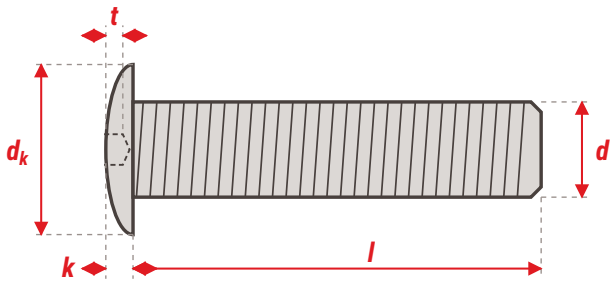


PRODUCT DATA SHEET

Metric Button Head Socket Cap Screws







- **Metric button head socket cap screws** to **ISO 7380-1**: low, rounded head with hex socket for a clean, snag-free finish.
- **Material:** property **Class 12.9** alloy steel, quenched & tempered to **ISO 898-1**.
- **Thread:** standard (coarse) pitch, 6g, fully threaded. Stocked M3 through M12; M16 shown for reference.
- **Finish:** thermal black oxide. See 5.0 for the sizes and lengths we stock.

1.0 Dimensions ISO 7380-1, millimeters

Size d	Pitch P	d_k Head Dia. Max	k Head Height Max	s Hex Key Nom	t Key Depth Min	e Socket Min	Tap Drill	Clearance Hole	Socket Head Cap Key (DIN 912)
M3	0.5	5.70	1.65	2	1.04	2.303	2.5	3.4	2.5
M4	0.7	7.60	2.20	2.5	1.30	2.873	3.3	4.5	3
M5	0.8	9.50	2.75	3	1.56	3.443	4.2	5.5	4
M6	1.0	10.50	3.30	4	2.08	4.583	5.0	6.6	5
M8	1.25	14.00	4.40	5	2.60	5.723	6.8	9.0	6
M10	1.5	17.50	5.50	6	3.12	6.863	8.5	11.0	8
M12	1.75	21.00	6.60	8	4.16	9.149	10.2	13.5	10
M16	2.0	28.00	8.80	10	5.20	11.429	14.0	17.5	14

l = length under head. Tap drill for coarse thread; clearance hole = ISO 273 medium fit. Last column shows the larger key used by a DIN 912 socket head cap screw of the same size, for comparison.

2.0 Chemical Composition ISO 898-1, % by weight (cast analysis)

Class	Material & Treatment	Carbon	Phosphorus max.	Sulfur max.	Boron max.	Min. Tempering Temp.
12.9	Alloy steel, quenched & tempered	0.30 – 0.50	0.025	0.025	0.003	425°C

Alloying elements such as chromium, nickel, molybdenum or vanadium are added for hardenability. Typical steels: SCM435 / 4135 / 4140 Cr-Mo.

3.0 Mechanical Properties ISO 898-1 material, at room temperature

Property – Class 12.9	Metric	Inch
Min. tensile strength R_m	1,220 MPa	176,900 psi
Min. yield strength $R_{p0.2}$	1,100 MPa	159,500 psi
Proof stress S_p	970 MPa	140,700 psi
Min. elongation after fracture A	8%	–
Min. reduction of area Z	44%	–
Vickers hardness HV	385 – 435	–
Rockwell hardness HRC	39 – 44	–
Brinell hardness HB	366 – 414	–
Matching nut (ISO 898-2)	Class 12	–
Approx. inch equivalent	ASTM F835 alloy button head	–



HEAD MARKING

Class 12.9 plus the manufacturer's ID (shown as XYZ), on the head.

3.1 Thread Loads reference only – calculated

Size	Stress Area A_s (mm²)	Thread Proof Load		Thread Min. Tensile Load	
		N	lbf	N	lbf
M3 x 0.5	5.03	4,880	1,100	6,140	1,380
M4 x 0.7	8.78	8,520	1,920	10,700	2,410
M5 x 0.8	14.2	13,800	3,100	17,300	3,890
M6 x 1.0	20.1	19,500	4,380	24,500	5,510
M8 x 1.25	36.6	35,500	7,980	44,700	10,000
M10 x 1.5	58.0	56,300	12,700	70,800	15,900
M12 x 1.75	84.3	81,800	18,400	103,000	23,200
M16 x 2.0	157	152,000	34,200	192,000	43,200

Load = A_s × 970 MPa (proof) or 1,220 MPa (min. tensile), 3 significant figures; lbf = N × 0.2248. Because of the low head, button head screws may not reach these loads – the head can fail first. Not working loads.

4.0 Installation Notes

- **Not for full-strength joints:** the low, rounded head is much shallower than a socket head cap screw. Where the full Class 12.9 load is needed, use a DIN 912 socket head cap screw.
- **Smaller hex key:** a button head takes a key one size smaller than a socket head cap screw of the same diameter (e.g. M6 = 4 mm vs 5 mm). Do not over-torque; the shallow socket rounds out more easily.
- **Use the exact key** and seat it fully in the socket before tightening – worn or ball-end keys strip button head sockets quickly.
- **Use a washer** under the head in soft materials, plastics or slotted holes to spread the load.
- **Thread engagement:** in a tapped hole allow about 1–1.5 × d in steel, more in aluminum or cast iron. Use a Class 12 nut for through-bolting.
- **Black oxide** gives only light rust protection. For wet or outdoor use, choose stainless button head screws.

5.0 Stocked Sizes stock # MBSC…

Size	Lengths in stock, mm (Class 12.9 • ISO 7380 • full thread • black oxide)
M3 x 0.5	5, 6, 8, 10, 12, 16, 20, 25, 30
M4 x 0.7	6, 8, 10, 12, 16, 20, 25, 30, 35, 40
M5 x 0.8	6, 8, 10, 12, 16, 20, 25, 30, 35, 40
M6 x 1.0	8, 10, 12, 16, 20, 25, 30, 35, 40, 45, 50, 60
M8 x 1.25	12, 16, 20, 25, 30, 35, 40, 45, 50, 60
M10 x 1.5	16, 20, 25, 30, 35, 40, 45, 50, 60
M12 x 1.75	20, 25, 30, 35, 40, 45, 50, 60

Disclaimer: The above is a compilation of ISO 7380-1, ISO 273 and ISO 898-1 data. Loads in 3.1 are calculated thread values for reference, not ratings or working loads for the screw. The Nutty Company, Inc. has made every effort to present the data accurately. However, The Nutty Company, Inc. cannot be held liable for any claim traceable to any errors, typographical or otherwise, contained herein.



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