

SOCKET SCREWS / METRIC SERIES

Metric Socket Head Cap Screws

DIN 912

CLASS 12.9

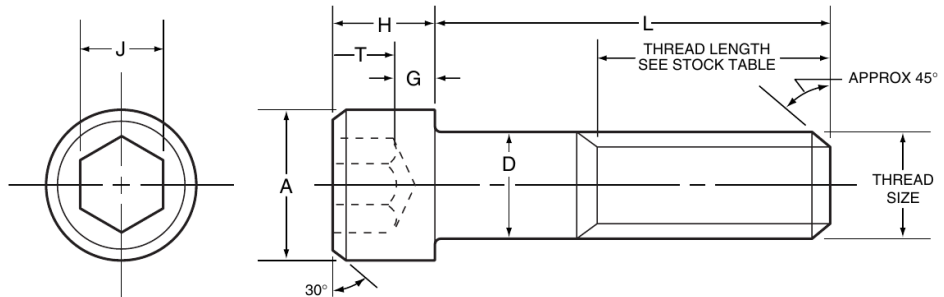
Dimensions, mechanical properties and application data

THREAD STANDARDS

ANSI B1.13M, ISO 261, ISO 262 (coarse series only)

PROPERTY CLASS

12.9 - ISO 898/1



MECHANICAL PERFORMANCE

Hardness: Rc 38-43

Tensile stress: 1300 MPa thru M16; 1250 MPa over M16

Yield stress: 1170 MPa thru M16; 1125 MPa over M16

Thread Class: 4g 6g

LENGTH TOLERANCE / mm

Nominal length	M1.6-M10	M12-M20	over 20
Up to 16 incl.	±0.3	±0.3	-
Over 16-50 incl.	±0.4	±0.4	±0.7
Over 50-120 incl.	±0.7	±1.0	±1.5
Over 120-200 incl.	±1.0	±1.5	±2.0
Over 200	±2.0	±2.5	±3.0

DIMENSIONS & MECHANICAL PROPERTIES

All dimensions in millimeters

Thread	Pitch	A	D	H	J	G	T	UTS	Tensile	Tensile	Shear	Shear	Torque**	Torque**
nom.	mm	max.	max.	max.	nom.	min.	min.	MPa min.	kN min.	lbs. min.	kN min.	lbs. min.	N-m	in-lbs.
M1.6	0.35	3.0	1.6	1.6	1.5	0.54	0.80	1300	1.65	370	1.57	352.5	0.29	2.6
M2	0.40	3.8	2.0	2.0	1.5	0.68	1.0	1300	2.69	605	2.45	550	0.60	5.3
M2.5	0.45	4.5	2.5	2.5	2.0	0.85	1.25	1300	4.41	990	3.83	860	1.21	11
M3	0.5	5.5	3.0	3.0	2.5	1.02	1.5	1300	6.54	1,470	5.5	1240	2.1	19
M4	0.7	7.0	4.0	4.0	3.0	1.52	2.0	1300	11.4	2,560	9.8	2,205	4.6	41
M5	0.8	8.5	5.0	5.0	4.0	1.90	2.5	1300	18.5	4,160	15.3	3,445	9.5	85
M6	1.0	10.0	6.0	6.0	5.0	2.28	3.0	1300	26.1	5,870	22.05	4,960	16	140
M8	1.25	13.0	8.0	8.0	6.0	3.2	4.0	1300	47.6	10,700	39.2	8,800	39	350
M10	1.5	16.0	10.0	10.0	8.0	4.0	5.0	1300	75.4	17,000	61	13,750	77	680
M12	1.75	18.0	12.0	12.0	10.0	4.8	6.0	1300	110	24,700	88	19,850	135	1,200
*(M14)	2.0	21.0	14.0	14.0	12.0	5.6	7.0	1300	150	33,700	120	27,000	215	1,900
M16	2.0	24.0	16.0	16.0	14.0	6.4	8.0	1300	204	45,900	157	35,250	330	2,900
M20	2.5	30.0	20.0	20.0	17.0	8.0	10.0	1250	306	68,800	235.5	53,000	650	5,750
M24	3.0	36.0	24.0	24.0	19.0	9.6	12.0	1250	441	99,100	339	76,500	1100	9,700
*M30	3.5	45.0	30.0	30.0	22.0	12.0	15.0	1250	701	158,000	530	119,000	2250	19,900
*M36	4.0	54.0	36.0	36.0	27.0	14.4	18.0	1250	1020	229,000	756	171,500	3850	34,100
*M42	4.5	63.0	42.0	42.0	32.0	16.8	21.0	1250	1400	315,000	1040	233,500	6270	55,580
*M48	5.0	72.0	48.0	48.0	36.0	19.2	24.0	1250	1840	413,000	1355	305,000	8560	75,800

All dimensions in millimeters. Sizes in brackets not preferred for new designs. * Non-stock diameter.

** Recommended seating torque, plain finish: calculated in accordance with VDI 2230, "Systematic Calculation of High Duty Bolted Joints," to induce approximately 800 MPa stress in screw threads. Values are for plain screws. Additional torque conditions are unavailable; do not treat these values as universal installation torque. Shear = Single shear strength of body (minimum).

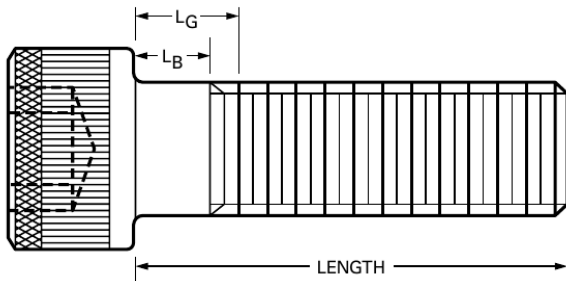
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Body and Grip Lengths

 L_G - maximum grip length

Distance from bearing surface to first complete thread.

 L_B - minimum body length

Length of unthreaded cylindrical shank.

BODY AND GRIP LENGTH DIMENSIONS

All dimensions in millimeters

L / mm	M1.6		M2		M2.5		M3		M4		M5		M6	
Nominal	LG	LB	LG	LB	LG	LB	LG	LB	LG	LB	LG	LB	LG	LB
20	4.8	3.0	4.0	2.0										
25	9.8	8.0	9.0	7.0	8.0	5.7	7.0	4.5						
30	14.8	13.0	14.0	12.0	13.0	10.7	12.0	9.5	10.0	6.5				
35	...	...	19.0	17.0	18.0	15.7	17.0	14.5	15.0	11.5	13.0	9.0	11.0	6.0
40	...	...	24.0	22.0	23.0	20.7	22.0	19.5	20.0	16.5	18.0	14.0	16.0	11.0
45	...	...	...	...	28.0	25.7	27.0	24.5	25.0	21.5	23.0	19.0	21.0	16.0
50	...	...	...	...	33.0	30.7	32.0	29.5	30.0	26.5	28.0	24.0	26.0	21.0
55	...	...	...	...	...	...	37.0	34.5	35.0	31.5	33.0	29.0	31.0	26.0
60	...	...	...	...	...	...	42.0	39.5	40.0	36.5	38.0	34.0	36.0	31.0
65	...	...	...	...	...	...	47.0	44.5	45.0	41.5	43.0	39.0	41.0	36.0
70	...	...	...	...	...	...	...	...	50.0	46.5	48.0	44.0	46.0	41.0
80	...	...	...	...	...	...	...	...	60.0	56.5	58.0	54.0	56.0	51.0
90	...	...	...	...	...	...	...	...	...	...	68.0	64.0	66.0	61.0
100	...	...	...	...	...	...	...	...	...	...	78.0	74.0	76.0	71.0
110	...	...	...	...	...	...	...	...	...	...	...	...	86.0	81.0
120	...	...	...	...	...	...	...	...	...	...	...	...	96.0	91.0
130	...	...	...	...	...	...	...	...	...	...	...	...	...	...
140	...	...	...	...	...	...	...	...	...	...	...	...	...	...
150	...	...	...	...	...	...	...	...	...	...	...	...	...	...
160	...	...	...	...	...	...	...	...	...	...	...	...	...	...
180	...	...	...	...	...	...	...	...	...	...	...	...	...	...
200	...	...	...	...	...	...	...	...	...	...	...	...	...	...
220	...	...	...	...	...	...	...	...	...	...	...	...	...	...
240	...	...	...	...	...	...	...	...	...	...	...	...	...	...
260	...	...	...	...	...	...	...	...	...	...	...	...	...	...
300	...	...	...	...	...	...	...	...	...	...	...	...	...	...

L / mm	M8		M10		M12		M14		M16		M20		M24	
Nominal	LG	LB	LG	LB	LG	LB	LG	LB	LG	LB	LG	LB	LG	LB
20														
25														
30														
35														
40														
45	17.0	10.7												
50	22.0	15.7	18.0	10.5										
55	27.0	20.7	23.0	15.5										
60	32.0	25.7	28.0	20.5	24.0	15.2								
65	37.0	30.7	33.0	25.5	29.0	20.2	25.0	15.0						
70	42.0	35.7	38.0	30.5	34.0	25.2	30.0	20.0	26.0	16.0				
80	52.0	45.7	48.0	40.5	44.0	35.2	40.0	30.0	36.0	26.0				
90	62.0	55.7	58.0	50.5	54.0	45.2	50.0	40.0	46.0	36.0	38.0	25.5		
100	72.0	65.7	68.0	60.5	64.0	55.2	60.0	50.0	56.0	46.0	48.0	35.5	40.0	25.0
110	82.0	75.7	78.0	70.5	74.0	65.2	70.0	60.0	66.0	56.0	58.0	45.5	50.0	35.0
120	92.0	85.7	88.0	80.5	84.0	75.2	80.0	70.0	76.0	66.0	68.0	55.5	60.0	45.0
130	102.0	95.7	98.0	90.5	94.0	85.2	90.0	80.0	86.0	76.0	78.0	65.5	70.0	55.0
140	112.0	105.7	108.0	100.5	104.0	95.2	100.0	90.0	96.0	86.0	88.0	75.5	80.0	65.0
150	122.0	115.7	118.0	110.5	114.0	105.2	110.0	100.0	106.0	96.0	98.0	85.5	90.0	75.0
160	132.0	125.7	128.0	120.5	124.0	115.2	120.0	110.0	116.0	106.0	108.0	95.5	100.0	85.0
180	...	...	148.0	140.5	144.0	135.2	140.0	130.0	136.0	126.0	128.0	115.5	120.0	105.0
200	...	...	168.0	160.5	164.0	155.2	160.0	150.0	156.0	146.0	148.0	135.5	140.0	125.0
220	...	...	...	...	184.0	175.2	180.0	170.0	176.0	166.0	168.0	155.5	160.0	145.0
240	...	...	...	...	204.0	195.2	200.0	190.0	196.0	186.0	188.0	175.5	180.0	165.0
260	...	...	...	...	...	...	220.0	210.0	216.0	206.0	208.0	195.5	200.0	185.0
300	...	...	...	...	...	...	...	...	256.0	246.0	248.0	235.5	240.0	225.0

Socket Head Cap Screws (Metric Series) per ASME/ANSI B18.3.1M-1986.

Blank cells and dotted cells have distinct meanings; neither implies a zero value.