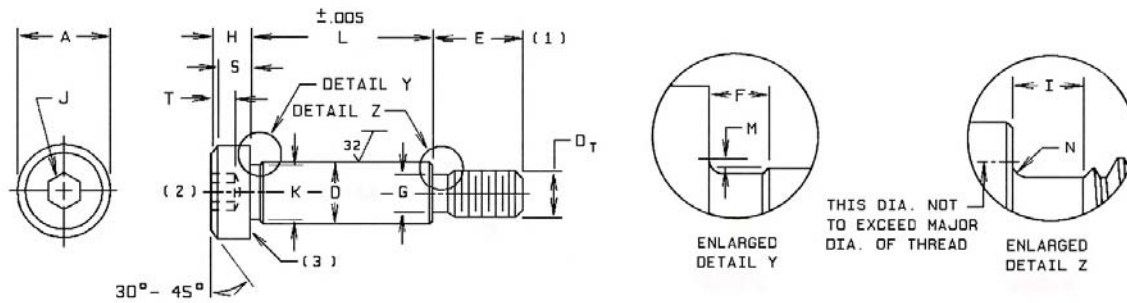


Inch Series Socket Head Shoulder Screws



Nominal Shoulder Diameter	D(1) Shoulder Diameter		A Head Diameter		H Head Side Height		S Head Height	J Hex Socket Size	T Key Engagement	E(3) Thread Length
	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Nominal	Min.	Basic
1/4	0.2480	0.2460	0.375	0.357	0.188	0.177	0.157	1/8	0.094	0.375
5/16	0.3105	0.3085	0.438	0.419	0.219	0.209	0.183	5/32	0.117	0.438
3/8	0.3730	0.3710	0.562	0.543	0.250	0.240	0.209	3/16	0.141	0.500
1/2	0.4980	0.4960	0.750	0.729	0.312	0.302	0.262	1/4	0.188	0.625
5/8	0.6230	0.6210	0.875	0.853	0.375	0.365	0.315	5/16	0.234	0.750
3/4	0.7480	0.7460	1.000	0.977	0.500	0.490	0.421	3/8	0.281	0.875
1	0.9980	0.9960	1.312	1.287	0.625	0.610	0.527	1/2	0.375	1.000
1 1/4	1.2480	1.2460	1.750	1.723	0.750	0.735	0.633	5/8	0.469	1.125
1 1/2	1.4980	1.4960	2.125	2.095	1.000	0.980	0.842	7/8	0.656	1.500
1 3/4	1.7480	1.7460	2.375	2.345	1.125	1.105	0.948	1	0.750	1.750
2	1.9980	1.9960	2.750	2.270	1.250	1.230	1.054	1 1/4	0.937	2.000

Nominal Shoulder Diameter	M Head Fillet Ext. Above D		K Shoulder Neck Diameter	F Shoulder Neck Width	Dt Basic Thread Diameter And Pitch	G Thread Neck Diameter		I Thread Neck Width	N Thread Neck Fillet	
	Max.	Min.	Min.	Max.		Max.	Min.	Max.	Max.	Min.
1/4	0.014	0.009	0.227	0.093	#10-24	0.142	0.133	0.083	0.023	0.017
5/16	0.017	0.012	0.289	0.093	1/4-20	0.193	0.182	0.100	0.028	0.022
3/8	0.020	0.015	0.352	0.093	5/16-18	0.249	0.237	0.111	0.031	0.025
1/2	0.026	0.020	0.477	0.093	3/8-16	0.334	0.291	0.125	0.035	0.029
5/8	0.032	0.024	0.602	0.093	1/2-13	0.414	0.397	0.154	0.042	0.036
3/4	0.039	0.030	0.727	0.093	5/8-11	0.521	0.502	0.182	0.051	0.045
1	0.050	0.040	0.977	0.125	3/4-10	0.638	0.616	0.200	0.055	0.049
1 1/4	0.060	0.050	1.227	0.125	7/8-9	0.750	0.726	0.222	0.062	0.056
1 1/2	0.070	0.060	1.478	0.125	1 1/8-7	0.964	0.934	0.286	0.072	0.066
1 3/4	0.080	0.070	1.728	0.125	1 1/4-7	1.089	1.059	0.286	0.072	0.066
2	0.090	0.080	1.978	0.125	1 1/2-6	1.307	1.277	0.333	0.102	0.096

Applicable Standards: ASME B18.3.

Tensile Strength: 140,000psi min., Yield Strength 120,000 psi min.

Hardness: R_C 32 minimum.

Inch Series Socket Shoulder Screws (continued)

Notes:

1. Thread Length Tolerance: -0.020in. for sizes up to 3/8 in., inclusive, and -0.030 for sizes over 3/8 inch.
2. Concentricity: Head shall be concentric with the shoulder within 1 percent (2 percent total runout) of the nominal diameter D or 0.003 inch (0.006 inch total runout), whichever is greater. Concentricity, parallelism, bow and squareness of shoulder to thread shall be within 0.005 inch total runout per inch of shoulder length, with a maximum of 0.025 inch, when firmly seated against the shoulder in a threaded bushing, and checked on the shoulder a distance of 2F from the underside of the head. Threads of bushing shall be basic size, and bushing OD and ends shall be concentric and square with the axis.
3. Bearing surface: The plane of the bearing surface of the head shall be perpendicular to the axis of the shoulder within a maximum deviation of 2 degrees.

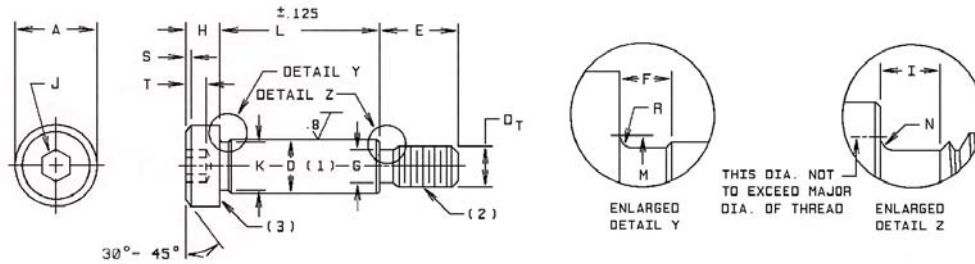
Standard Lengths

Nominal Shoulder (Screw) Length	Standard Length Increment
1/4 through 3/4	1/8
3/4 through 5	1/4
Over 5	1/2

Mechanical Properties and Tightening Torques

Nominal Shoulder Diameter	Nominal Thread Size	Tensile Strength Threads Pounds Min.	Single Shear Strength Pounds Min.		Hex Key Size	Tightening Torque Inch-Pounds
			Thread Neck	Shoulder		
1/4	10-24	2540	1250	4515	1/8	50
5/16	1/4-20	4610	2340	7100	5/32	125
3/8	5/16-18	7600	3970	10280	3/16	265
1/2	3/8-16	11240	5985	18350	1/4	470
5/8	1/2-13	20570	11140	28785	5/16	1150
3/4	5/8-11	32770	17800	41515	3/8	2000
1	3/4-10	48430	26800	74000	1/2	4000

Metric Socket Head Shoulder Screws



Nominal Shoulder Diameter	D(1) Shoulder Diameter Max. Min.	A Head Diameter Max. Min.	H Head Side Height Max. Min.	C Chamfer Max.	J Hex Socket Size Nominal	T Key Engagement Min.	E Thread Length Max.
6.5	6.487 6.451	10.00 9.78	4.50 4.32	0.6	3	2.4	9.75
8.0	7.987 7.951	13.00 12.73	5.50 5.32	0.8	4	3.3	11.25
10.0	9.987 9.951	16.00 15.73	7.00 6.78	1.0	5	4.2	13.25
13.0	12.984 12.941	18.00 17.73	9.00 8.78	1.2	6	4.9	16.40
16.0	15.984 15.941	24.00 23.67	11.00 10.73	1.6	8	6.6	18.40
20.0	19.980 19.928	30.00 29.67	14.00 13.73	2.0	10	8.8	22.40
25.0	24.980 24.928	36.00 35.61	16.00 15.73	2.4	12	10.0	27.40

Nominal Shoulder Diameter	M Head Fillet Extension Diameter Max.	K Shoulder Neck Diameter Min.	F Shoulder Neck Width Max.	D _T Basic Thread Diameter And Pitch	G Thread Neck Diameter Max. Min.	I Thread Neck Width Max.	N Thread Neck Fillet Max. Min.
6.5	7.5	5.92	2.5	M5x0.8	3.86 3.68	2.4	0.66 0.50
8.0	9.2	7.42	2.5	M6x1.0	4.58 4.40	2.6	0.69 0.53
10.0	11.2	9.42	2.5	M8x1.25	6.25 6.03	2.8	0.80 0.64
13.0	15.2	12.42	2.5	M10x1.50	7.91 7.69	3.0	0.93 0.77
16.0	18.2	15.42	2.5	M12x1.75	9.57 9.35	4.0	1.03 0.87
20.0	22.4	19.42	2.5	M16x2.0	13.23 12.96	4.8	1.30 1.14
25.0	27.4	24.42	3.0	M20x2.5	16.57 16.30	5.6	1.46 1.30

Applicable Standards: ASME B18.3.3M

Tensile Strength: 1100 MPa, based upon strength at thread neck

Hardness: R_C 36 minimum.

Notes:

1. The shoulder diameter is the basis for the determination and callout of the screw size.
2. Screw threads are Class 4g6g.
3. **Concentricity:** The shoulder and thread pitch diameter shall be concentric within 0.10 mm full indicator movement (FIM), determined at a distance of 4.75 mm from the face of the shoulder. Concentricity, parallelism, bow, and squareness of the face of the shoulder with the axis of the thread shall be within 0.125mm FIM per 25.0mm of shoulder length, with a maximum of 0.70 mm when the shoulder face is firmly seated against a threaded bushing and deviation is checked on the shoulder at a distance of 2F from the underside of the head. The thread in the bushing shall be basic size, and the bushing O.D. and ends shall be concentric and square with the axis of the thread respectively.

Metric Socket Shoulder Screws (continued)

Mechanical Properties and Tightening Torques

Nominal Shoulder Diameter	Nominal Thread Size	Tensile Strength Neck kN Min.	Single Shear Strength kN Min.		Hex Key Size	Tightening Torque Nm
			Thread	Neck Shoulder		
M6.5	M5x0.8	11.7	7.0	21.6	3 mm	6.9
M8	M6x1.0	15.2	10.0	32.7	4 mm	12
M10	M8x1.25	28.6	18.9	51.3	5 mm	28
M13	M10x1.50	51.1	30.7	86.8	6 mm	56
M16	M12x1.75	75.5	45.3	131	8 mm	99
M20	M16x2.0	145	87.1	206	10 mm	250
M25	M20x2.5	230	137	322	12 mm	400

