



Table 2A Dimensions of Hexagon and Spline Socket Flat Countersunk Head Cap Screws

Nominal Size or Basic Screw Dia	D		A		H	G		P		M	J		T	F	
	Body Dia		Head Dia		Head Height	Protrusion Gage Dia		Protrusion			Spline Socket Size	Hexagon Socket Size		Key Engagement	Fillet Transition Dia
	Max	Min	Theo. Sharp Max	Abs. Min	Ref	Max	Min	Max	Min	Nominal		Min	Max		
0	0.0600	0.0600	0.0568	0.138	0.117	0.044	0.078	0.077	0.036	0.026	0.048	...	0.035	0.025	0.072
1	0.0730	0.0730	0.0695	0.168	0.143	0.054	0.101	0.100	0.040	0.028	0.060	...	0.050	0.031	0.089
2	0.0860	0.0860	0.0822	0.197	0.168	0.064	0.124	0.123	0.043	0.031	0.060	...	0.050	0.038	0.106
3	0.0990	0.0990	0.0949	0.226	0.193	0.073	0.148	0.147	0.046	0.033	0.072	1/16	0.062	0.044	0.119
4	0.1120	0.1120	0.1075	0.255	0.218	0.083	0.172	0.171	0.049	0.036	0.072	1/16	0.062	0.055	0.136
5	0.1250	0.1250	0.1202	0.281	0.240	0.090	0.196	0.195	0.051	0.037	0.096	5/64	0.078	0.061	0.153
6	0.1380	0.1380	0.1329	0.307	0.263	0.097	0.220	0.219	0.052	0.037	0.096	5/64	0.078	0.066	0.168
8	0.1640	0.1640	0.1585	0.359	0.311	0.112	0.267	0.266	0.055	0.039	0.111	3/32	0.094	0.076	0.194
10	0.1900	0.1900	0.1840	0.411	0.359	0.127	0.313	0.312	0.058	0.041	0.145	1/8	0.125	0.087	0.220
1/4	0.2500	0.2500	0.2435	0.531	0.480	0.161	0.424	0.423	0.064	0.043	0.183	5/32	0.156	0.111	0.280
5/16	0.3125	0.3125	0.3053	0.656	0.600	0.198	0.539	0.538	0.070	0.047	0.216	3/16	0.188	0.135	0.343
3/8	0.3750	0.3750	0.3678	0.781	0.720	0.234	0.653	0.652	0.076	0.050	0.251	7/32	0.219	0.159	0.405
7/16	0.4375	0.4375	0.4294	0.844	0.781	0.234	0.690	0.689	0.092	0.063	0.291	1/4	0.250	0.159	0.468
1/2	0.5000	0.5000	0.4919	0.938	0.872	0.251	0.739	0.738	0.119	0.087	0.372	5/16	0.312	0.172	0.530
5/8	0.6250	0.6250	0.6163	1.188	1.112	0.324	0.962	0.961	0.135	0.096	0.454	3/8	0.375	0.220	0.655
3/4	0.7500	0.7500	0.7406	1.438	1.355	0.396	1.186	1.185	0.150	0.105	0.454	1/2	0.500	0.220	0.780
7/8	0.8750	0.8750	0.8647	1.688	1.604	0.468	1.411	1.410	0.165	0.118	...	9/16	0.562	0.248	0.905
1	1.0000	1.0000	0.9886	1.938	1.841	0.540	1.635	1.634	0.181	0.130	...	5/8	0.625	0.297	1.030
1-1/8	1.1250	1.1250	1.1086	2.188	2.079	0.611	1.859	1.858	0.196	0.140	...	3/4	0.750	0.325	1.187
1-1/4	1.2500	1.2500	1.2336	2.438	2.316	0.683	2.083	2.082	0.212	0.150	...	7/8	0.875	0.358	1.312
1-3/8	1.3750	1.3750	1.3568	2.688	2.553	0.755	2.306	2.305	0.228	0.162	...	7/8	0.875	0.402	1.437
1-1/2	1.5000	1.5000	1.4818	2.938	2.791	0.827	2.530	2.529	0.243	0.173	...	1	1.000	0.435	1.562
See Notes	1	2	3	4	5	5	18	19						13	

NOTES TO TABLE 2A:

1. Nominal Size. Where specifying nominal size in decimals, zeros preceding decimal and in the fourth decimal place shall be omitted.

2. Body. The term *body* refers to the unthreaded cylindrical portion of the shank for those screws not threaded to the head.

SOCKET CAP, SHOULDER, SET SCREWS, HEX, AND SPLINE KEYS

NOTES TO TABLE 2A CONT.

3. Head Diameters. Maximum sharp values under column A are theoretical values only, as it is not practical to make the edges of the head sharp. The maximum sharp value represents the exact diameter of a hole countersunk to exactly 82 deg, in which a screw having maximum head size will fit flush.

4. Head Height. Tabulated values for head height are given for reference only and are calculated to the maximum formulation.

5. Protrusion. Suitability of socket flat countersunk head cap screws for application in countersinks designed to the principal dimensions of the screws shall be determined by use of a protrusion gage. The protrusion limits shown shall apply only when the gaging diameter is exactly as indicated with the gaging edge of a sharpness obtained by lapping the hole and the top surface of the gage. The top of the head shall be flat within the limits of the protrusion tolerance. See Appendix II for gaging details.

6. Length. The length of the screw shall be measured, parallel to the axis of the screw, from the plane of the top of the head to the plane of the flat of the point. The basic length dimension on the product shall be the nominal length expressed as a two-place decimal.

7. Standard Lengths. Standard length increments for socket flat countersunk head cap screws shall be as tabulated below:

Nom Screw Size, in.	Nom Screw Length, in.	Standard Length Increment
0 to 1.00, incl.	0.13 thru 0.25	0.06
	0.25 thru 1.00	0.13
	1.00 thru 3.50	0.25
	3.50 thru 7.00	0.50
	7.00 thru 10.00	1.00
Over 1.00	1.00 thru 7.00	0.50
	7.00 thru 10.00	1.00
	Over 10.00	2.00

8. Length Tolerances. The allowable tolerance on length shall be as tabulated below:

Nom Screw Size	0 thru 3/8, incl.	7/16 thru 3/4, incl.	7/8 thru 1-1/2, incl.
	Tolerance on Length		
Up to 1.00, incl.	-0.03	-0.03	-0.05
Over 1.00 to 2.50, incl.	-0.04	-0.06	-0.10
Over 2.50 to 6.00, incl.	-0.06	-0.08	-0.14
Over 6.00	-0.12	-0.12	-0.20

9. Thread Length L_t . The length of the thread shall be measured, parallel to the axis of the screw, from the extreme point to the last complete (full-form) thread. Thread

length, on socket flat countersunk head cap screws, shall be as defined by Table 2B and notes thereto.

10. Grip Gaging Length L_{GH} . Grip gaging length is the distance, measured parallel to the axis of the screw, from the top of the head to the first complete (full form) thread under the head (see Table 2C, page G-19).

11. Body Length L_{BH} . Body length is the length, measured parallel to the axis of the screw, of the unthreaded portion of the shank and the head height (see Table 2C).

12. Screw Point Chamfer. The point shall be flat or slightly concave and chamfered. The plane of the point shall be approximately normal to the axis of the screw. The chamfer shall extend slightly below the root of the thread and the edge between the flat and chamfer may be slightly rounded. The included angle of the point should be approximately 90 deg. Chamfering of screw sizes up to and including size 8 (0.164 in.) and lengths below 1.5D shall be optional.

13. Fillet. A fillet between the conical bearing surface of the head and the shank (body) of the screw is allowable above the maximum F value (Table 2A).

14. Bearing Surface. The runout of the conical bearing surface shall be within one degree obtained by holding the screw on the body or major screw thread diameter within one diameter of the bearing surface of the head, but beyond the maximum length of the fillet (F), rotating 360 deg and inspecting on an optical comparator, or comparable inspection equipment.

15. Runout

(a) The runout of the socket with the axis of the shank of the screw shall be within 3 percent of the maximum screw diameter (D) or 0.005 in., whichever is greater for sizes through 1/2 in. diameter and 6 percent for sizes above 1/2 in. diameter.

Runout for above is defined as the full indicator movement (FIM) obtained by holding the screw on the body or major thread diameter within one diameter of the bearing surface of the head, but beyond the maximum length of the fillet (F), rotating 360 deg, indicating on each of the six hexagon flats.

(b) The conformance of screws to shank straightness or camber limitations shall be as set forth as D_0 in Table 1E (Socket Head Cap Screws), and shall be checked by the use of the procedures and typical gage illustrated in Appendix III.

16. Threads. Threads shall be Unified external threads with radius root: Class 3A UNRC and UNRF Series for sizes 0 (0.060 in.) through 1 in.; Class 2A UNRC and UNRF Series for sizes over 1 in. to 1-1/2 in., inclusive.

Acceptability shall be based on System 22, ASME B1.3M, page A-63.