HEX FLANGE SCREWS

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IFI
111
1986

IFI Note:

1. ***IFI-111 is a standard developed through the procedures of Industrial Fasteners Institute. IFI-111 was first published in 1970 and modestly revised and reissued in 1986.***

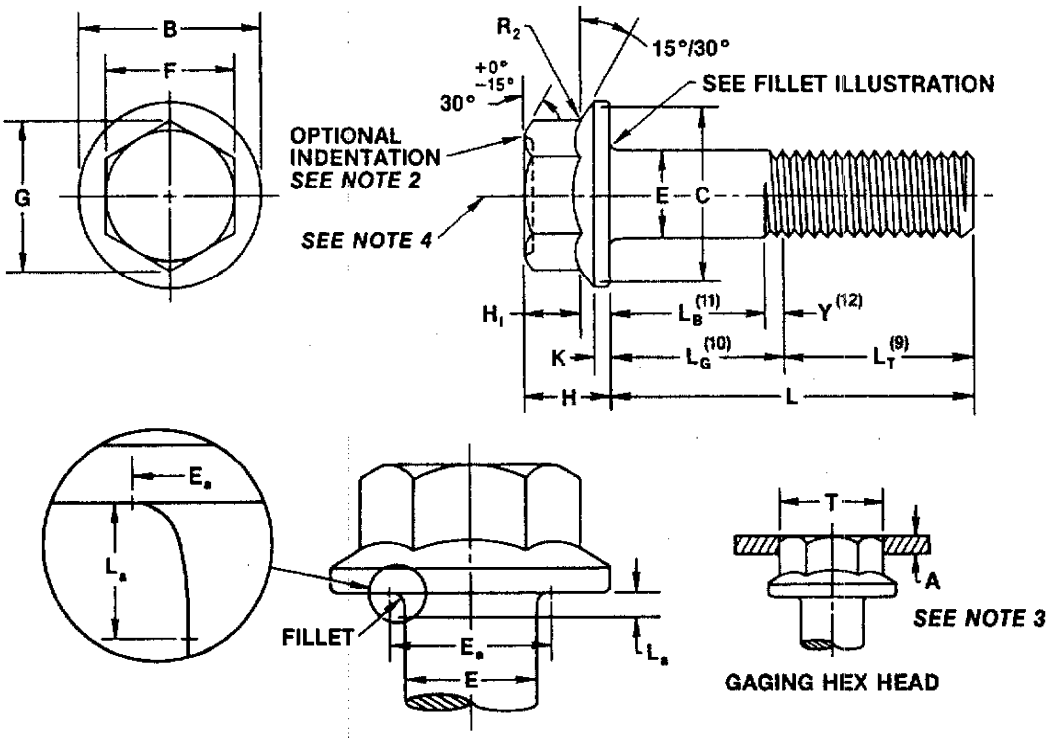

Table 1 Dimensions of Hex Flange Screws

Nominal Size or Basic Major Dia of Thread		E		F			G		B	K	H	H_1	R_2	A	
		Body Dia		Width Across Flats			Width Across Corners		Flange Dia	Flange Thick-ness	Ht	Hex Ht	Flange Top Radius	Gaging Ring Thickness	
		Max	Min	Basic	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	Min
1/4	0.2500	0.2500	0.2450	3/8	0.3750	0.367	0.433	0.409	0.56	0.04	0.28	0.17	0.015	0.0514	0.0511
5/16	0.3125	0.3125	0.3065	1/2	0.5000	0.489	0.577	0.548	0.68	0.05	0.32	0.21	0.019	0.0643	0.0640
3/8	0.3750	0.3750	0.3690	9/16	0.5625	0.551	0.650	0.618	0.81	0.06	0.39	0.25	0.022	0.0771	0.0768
7/16	0.4375	0.4375	0.4305	5/8	0.6250	0.612	0.722	0.685	0.93	0.07	0.46	0.30	0.026	0.0900	0.0897
1/2	0.5000	0.5000	0.4930	3/4	0.7500	0.736	0.866	0.825	1.07	0.08	0.51	0.34	0.030	0.1029	0.1026
9/16	0.5625	0.5625	0.5545	13/16	0.8125	0.798	0.938	0.895	1.19	0.09	0.57	0.38	0.034	0.1157	0.1154
5/8	0.6250	0.6250	0.6170	15/16	0.9375	0.922	1.083	1.034	1.33	0.10	0.62	0.42	0.038	0.1286	0.1283
3/4	0.7500	0.7500	0.7410	1-1/8	1.1250	1.100	1.299	1.234	1.59	0.11	0.73	0.51	0.045	0.1543	0.1540
See Note	20	15					3							3	

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Table 1 (Cont'd.)

Nominal Size or Basic Major Dia of Thread		T		C	Runout of Bearing Surface FIM	R	E_a		L_a		L_T		Y	
		Gaging Ring Dia		Bearing Dia		Radius of Fillet	Transition Dia		Fillet Length		Thread Length		Transition Thread Length	
											For Screws with L≤6 in.	For Screws with L>6 in.	For Screws with L≤6 in.	For Screws with L>6 in.
		Max	Min	Min	Max	Min	Max	Min	Max	Min	Basic		Max	Max
1/4	0.2500	0.4093	0.4090	0.48	0.010	0.015	0.300	0.280	0.087	0.043	0.750	1.000	0.400	0.650
5/16	0.3125	0.5483	0.5480	0.60	0.011	0.015	0.362	0.342	0.087	0.043	0.875	1.125	0.417	0.667
3/8	0.3750	0.6183	0.6180	0.73	0.012	0.015	0.425	0.405	0.087	0.043	1.000	1.250	0.438	0.688
7/16	0.4375	0.6853	0.6850	0.85	0.013	0.015	0.488	0.468	0.087	0.043	1.125	1.375	0.464	0.714
1/2	0.5000	0.8253	0.8250	0.98	0.014	0.015	0.550	0.530	0.087	0.043	1.250	1.500	0.481	0.731
9/16	0.5625	0.8953	0.8950	1.10	0.015	0.020	0.652	0.602	0.157	0.078	1.375	1.625	0.750	0.750
5/8	0.6250	1.0343	1.0340	1.23	0.017	0.020	0.715	0.665	0.157	0.078	1.500	1.750	0.773	0.773
3/4	0.7500	1.2343	1.2340	1.47	0.020	0.020	0.840	0.790	0.157	0.078	1.750	2.000	0.800	0.800
See Note	20	3		6	5	7					9		12	

1. Dimensions.

All dimensions are in inches.

2. Top of Head.

Top of head may be full form or indented at option of the manufacturer. If full form, the top of head shall be chamfered or rounded with the diameter of chamfer circle or start of rounding being equal to the max width across flats, within a tolerance of minus 15 percent. If the top of head is indented, the periphery may be rounded.

3. Corner Fill.

The rounding due to lack of fill on all six corners of the head shall be reasonably uniform and the width across corners of the head shall be such that when a sharp ring having an inside diameter equal to the specified T dimension is placed on the top of the head and normal to the screw axis, the screw head may enter, but not protrude through the gage.

4. True Position of Head.

The axis of the head shall be located at true position with respect to the axis of the body (determined over a distance under the head equal to one diameter) within a tolerance zone whose diameter is equivalent to 6 percent of the maximum width across flats, regardless of feature size.

5. Bearing Surface.

Runout of the bearing surface with respect to the axis of the body shall be within the FIM limits specified. Measurement of FIM shall be made as close to the periphery of the bearing surface as possible while the screw is held in a collet or other gripping device at a distance of one screw diameter from the underside of the head.

6. Bearing Diameter.

The bearing diameter is determined from the bearing area necessary to support 75 percent of the specified proof load of a fine thread SAE Grade 5 screw with a bearing stress of 20,000 psi. This same bearing area will support 100 percent of the specified proof load of a fine thread SAE Grade 8 screw with a max bearing stress of 37,800 psi.

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7. Fillet.

For screws with specified tensile strengths of 120,000 psi or less, the fillet at the junction of head and shank shall be a smooth concave curve within an envelope of R min and a smooth multi-radius curve tangent to the underside of head at a point no greater than one-half of E_a max from the axis of the screw and tangent to the shank of the screw at a distance no greater than L_a max from the underside of head.

For screws with specified tensile strengths greater than 120,000 psi, the fillet shall be a smooth multi-radius curve tangent to the underside of head at a point no greater than one-half of E_a max nor less than one-half of E_a min from the axis of the screw, and tangent to the shank at a distance from the underside of head within the limits specified for L_a. No radius in the fillet shall be less than R.

8. Threads.

Threads, when rolled, shall be Unified coarse or fine thread series UNRC or UNRF, Class 2A, in accordance with ANSI/ASME B1.1, page A-26. Threads produced by other methods shall preferably be UNRC or UNRF, Class 2A but at manufacturer's option may be Unified coarse or fine thread series UNC or UNF, Class 2A. Acceptability of screw threads shall be determined based on System 21, ANSI/ASME B1.3 Screw Thread Gaging Systems for Dimensional Acceptability, page A-53.

9. Thread Length, L_T.

Basic thread length is the distance from the extreme end of the screw to the last full form threads. Variations in thread length are controlled by L_B min and L_G max. On screws too short for basic thread lengths, the minimum unthreaded length shall not be less than L_a max and the distance from the bearing surface of the head to the first full form thread shall not be greater than L_a max plus a length of 1½ threads, as measured with a properly selected GO thread ring gage.

10. Grip Gaging Length, L_G.

Grip gaging length is the distance, as measured parallel to the axis of the screw, from the underside of head to the face of a non-counterbored or non-countersunk standard GO thread ring gage which has been assembled by hand on the screw as far as the thread will permit. Max grip gaging length for any screw length equals nominal screw length minus the basic thread length (L_G max = L nom − L_T).

11. Body Length, L_B.

Body length is the distance, as measured parallel to the axis of the screw, from the underside of head to the last scratch of thread or top of the extrusion angle. Min body length equals max grip gaging length minus the max transition thread length (L_B min = L_G max − Y max).

12. Transition Thread Length, Y.

Transition thread length is the distance, as measured parallel to the axis of the screw, from the last full form thread to the last scratch of thread or top of extrusion angle. The transition thread length includes the incomplete threads and tolerances for grip gaging and body lengths.

13. Incomplete Thread.

The major diameter of incomplete thread shall not exceed the actual major diameter of the full form thread.

14. Thread Runout and Screw Straightness.

The runout of the thread in relation to screw body and the shank straightness shall be such that the screw will meet the requirements given on page C-22.

15. Body Diameter.

On screws threaded full length, diameter of the body under the head shall not be less than the specified minimum pitch diameter of the thread.

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16. Point.

Point shall be chamfered or rounded at manufacturer's option from approximately 0.016 in. below the minor diameter of the thread, the length of point to be from ½ to 1½ threads.

17. Length Tolerances.

Screw length tolerances are given in Table 9, page C-20. Tolerances for pointed products shall apply.

18. Identification Symbols.

Identification marking symbols on the tops of heads for screw sizes 5/8 in. and smaller shall project not less than 0.005 in. above the surface nor more than 0.015 in. over the specified max head height; and for 3/4 in. diameter screws shall project not less than 0.006 in. above the surface nor more than 0.030 in. over the specified max head height. ASTM and SAE grade markings for steel screws are given on page M-71.

19. Material.

Chemical and mechanical properties of steel screws normally conform to Grades 2, 5 or 8 of SAE J429, page B-50, ASTM A449, page B-63, or ASTM A354 Grade BD, page B-68.

Properties of several grades of nonferrous materials are covered in ASTM F468, page B-100, and of several stainless steels in ASTM F593, page B-92.

20. Nominal Size.

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