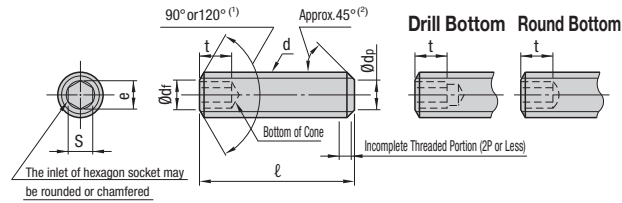


# [Technical Data] Hexagon Socket Set Screws Flat Type

## 1. Shape and Dimension of Hexagon Socket Set Screws and Its Flat End (JIS B 1177-1997).



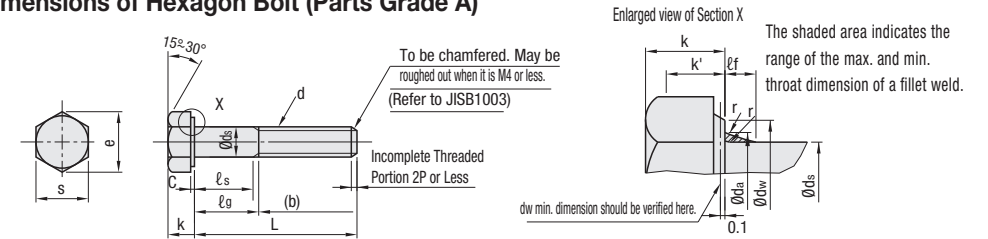
Note (1): Should be chamfered to 120° if l falls short of the dotted line, which forms stairs, in the table.  
 (2): 45° Slanted portion below the trough diameter line of the male thread.

Nominal of Thread(d)			M2	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
<b>Pitch(P)</b>			0.4	0.5	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0
$d_p$	Max.(Reference Dimension)		1.0	2.0	2.5	3.5	4.0	5.5	7.0	8.5	12.0	15.0	18.0
	Min.		0.75	1.75	2.25	3.2	3.7	5.2	6.64	8.14	11.57	14.57	17.57
$d_f$	Approx.		Thread Bottom Diameter of Male Thread										
$e$	Min.(°)		1.003	1.73	2.30	2.87	3.44	4.58	5.72	6.86	9.15	11.43	13.72
	Nominal(Reference Dimension)		0.9	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0
$s$	Max.		0.902	1.545	2.045	2.560	3.080	4.095	5.095	6.095	8.115	10.115	12.142
	Min.		0.889	1.520	2.020	2.520	3.020	4.020	5.020	6.020	8.025	10.025	12.032
$t$	Min.(*)		Column 1		Column 2								
	Min.		1.7	2.0	2.5	3.0	3.5	5.0	6.0	8.0	10.0	12.0	15.0
$\ell$ (°)			Approx. Mass Per 1000 Units										
Nominal Length(Reference Dimension)	Min.	Max.	Unit:kg (Density:7.85kg/dm³)										
2	1.8	2.2	0.029	0.059									
2.5	2.3	2.7	0.037	0.08	0.099								
3	2.8	3.2	0.044	0.1	0.14	0.2							
4	3.7	4.3	0.059	0.14	0.22	0.32	0.41						
5	4.7	5.3	0.074	0.18	0.3	0.44	0.585	0.945					
6	5.7	6.3	0.089	0.22	0.38	0.56	0.76	1.26	1.77				
8	7.7	8.3	0.119	0.3	0.54	0.8	1.11	1.89	2.78	4			
10	9.7	10.3	0.148	0.38	0.7	1.04	1.46	2.52	3.78	5.4	8.5		
12	11.6	12.4		0.46	0.86	1.28	1.81	3.15	4.78	6.8	11.1	15.8	
16	15.6	16.4		0.62	1.18	1.76	2.51	4.41	6.78	9.6	16.3	24.1	30
20	19.6	20.4			1.49	2.24	3.21	5.67	8.76	12.4	21.5	32.3	42
25	24.6	25.4				2.84	4.09	7.25	11.2	15.9	28	42.6	57
30	29.6	30.4					4.97	8.82	13.7	19.4	34.6	52.9	72
35	34.5	35.5						10.4	16.2	22.9	41.1	63.2	87
40	39.5	40.5						12	18.7	26.4	47.7	73.5	102
45	44.5	45.5							21.2	29.9	54.2	83.8	117
50	49.5	50.5							23.7	33.4	60.7	94.1	132
55	54.4	55.6							36.8	67.3	104	147	
60	59.4	60.6							40.3	73.7	115	162	

Note (°): when  $e$  min.=1.14×s(min.) Excluding nominal of thread M25 or less for screws.  
 (°): The values in Column 1 for t min. are applicable to the nominal lengths (ℓ) falling short of the dotted border, and the values in Column 2 to the nominal lengths beyond the border.  
 (°): Min.rand max. are based on JIS B 1021. They are rounded to the first digit below zero.  
 Reference 1. Recommended nominal lengths (ℓ) for individual nominal of thread are enclosed by thick lines.  
 If the required ℓ-value is not given in the table, it should be specified by the ordering side.  
 2. The shape and dimensions of the flat end of the screw are based on JIS B 1003 (shape and dimensions of the end of the screw).  
 3. The shape of the hexagon socket bottom may be a conical, drill or round bottom.  
 The shape and dimensions indicated in the reference table are based on ISO 4026-1977.

# [Technical Data] Hexagon Bolts Excerpts from JIS B 1180 (1999)

## 1. Shape and Dimensions of Hexagon Bolt (Parts Grade A)



Nominal of Thread d	Unit: mm												
	Coarse Thread Column I	M2	M3	M4	M5	M6	M8	M10	M12	—	M16	M20	M24
Coarse Thread Column II	—	—	—	—	—	—	—	—	—	M14	—	—	—
	Coarse Thread Pitch P	0.4	0.5	0.7	0.8	1	1.25	1.5	1.75	2	2.5	3	—
Fine Thread Column I	—	—	—	—	—	—	M8×1	M10×1	M12×1.5	—	M16×1.5	M20×1.5	M24×2
	Fine Thread Column II	—	—	—	—	—	—	M10×1.25	M12×1.25	M14×1.5	—	M20×2	—
b (Reference)	L≤125mm	10	12	14	16	18	22	26	30	34	38	46	54
	125<L≤150mm	—	—	—	—	—	—	—	—	40	44	52	60
c	Min.	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.2	0.2	0.2
	Max.	0.25	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.8	0.8	0.8
da	Max.	2.6	3.6	4.7	5.7	6.8	9.2	11.2	13.7	15.7	17.7	22.4	26.4
ds	Reference Dimension=Max.	2	3	4	5	6	8	10	12	14	16	20	24
	Min.	1.86	2.86	3.82	4.82	5.82	7.78	9.78	11.73	13.73	15.73	19.67	23.67
dw	Min.	3.07	4.57	5.88	6.88	8.88	11.63	14.63	16.63	19.64	22.49	28.19	33.61
	Max.	4.32	6.01	7.66	8.79	11.05	14.38	17.77	20.03	23.36	26.75	33.53	39.98
ℓf	Min.	0.8	1	1.2	1.2	1.4	2	2	3	3	3	4	4
	Max.	0.8	1	1.2	1.2	1.4	2	2	3	3	3	4	4
k	Reference Dimension=Nominal	1.4	2	2.8	3.5	4	5.3	6.4	7.5	8.8	10	12.5	15
	Min.	1.275	1.875	2.675	3.35	3.85	5.15	6.22	7.32	8.62	9.82	12.285	14.785
k'	Max.	1.525	2.125	2.925	3.65	4.15	5.45	6.58	7.68	8.98	10.18	12.715	15.215
	Min.	0.89	1.31	1.87	2.35	2.7	3.61	4.35	5.12	6.03	6.87	8.6	10.35
r	Min.	0.1	0.1	0.2	0.2	0.25	0.4	0.4	0.6	0.6	0.6	0.8	0.8
	Reference Dimension=Max.	4	5.5	7	8	10	13	16	18	21	24	30	36
s	Min.	3.82	5.32	6.78	7.78	9.78	12.73	15.73	17.73	20.67	23.67	29.67	35.38
	Max.	3.82	5.32	6.78	7.78	9.78	12.73	15.73	17.73	20.67	23.67	29.67	35.38
Length of Bolt L		ℓs and ℓg											
Nominal Length (Reference Dimension)	Min.	ℓs Min.	ℓg Max.	ℓs Min.	ℓg Max.	ℓs Min.	ℓg Max.	ℓs Min.	ℓg Max.	ℓs Min.	ℓg Max.	ℓs Min.	ℓg Max.
	Max.	ℓs Max.	ℓg Min.	ℓs Max.	ℓg Min.	ℓs Max.	ℓg Min.	ℓs Max.	ℓg Min.	ℓs Max.	ℓg Min.	ℓs Max.	ℓg Min.
16	15.65	16.35	4	6									
20	19.58	20.42	8	10	5.5	8							
25	24.58	25.42			10.5	13	7.5	11	5	9			
30	29.58	30.42			15.5	18	12.5	16	10	14	7	12	
35	34.5	35.5					17.5	21	15	19	12	17	
40	39.5	40.5					22.5	26	20	24	17	22	11.75
45	44.5	45.5							25	29	22	27	16.75
50	49.5	50.5							30	34	27	32	21.75
55	54.4	55.6							32	37	26.75	33	21.5
60	59.4	60.6							37	42	31.75	38	26.5
65	64.4	65.6									36.75	43	31.5
70	69.4	70.6							41.75	48	36.5	44	31.25
80	79.4	80.6							51.75	58	46.5	54	41.25
90	89.3	90.7									56.5	64	51.25
100	99.3	100.7									66.5	74	61.25
110	109.3	110.7									71.25	80	71.25
120	119.3	120.7									81.25	90	81.25
130	129.2	130.8									90	90	90
140	139.2	140.8									90	100	96
150	149.2	150.8									96	106	106

Reference 1. Priority should be given to the nominal of thread in Column I. The screw size codes are based on JIS B 1023.  
 2. Recommended nominal lengths(L)for individual nominal of thread are enclosed by thick lines.  
 3. When the thread part length (b) of a bolt exceeds the max. nominal value given within the thick lines, the tolerance of the thread part length should be agreed upon by the delivering and receiving sides, corresponding to JIS B 1021.  
 4. Max. value ℓg and Min. value ℓs as follows: ℓg max Nominal Length(L)-b, ℓs min.=ℓg max-5P(P=Coarse Thread Pitch)  
 5. da and r in this table are based on JIS B 1005.  
 6. "Chamfered" and "Unpointed", the shape of the end screw should be decided according to JIS B 1003.  
 7. The asterisked figures in the table are values after correction with the relevant international standard.

\*With some of the hexagon bolts and hexagon nuts for M10 and M12 distributed at present, the opposite side S is based on JIS prior to the revision.