

JIS

JAPANESE INDUSTRIAL STANDARD

Hexagon head bolts and hexagon head screws

Ⓔ JIS B 1180—1994

Translated and Published

by

Japanese Standards Association

**In the event of any doubt arising,
the original Standard in Japanese is to be final authority**

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1. Scope This Japanese Industrial Standard specifies the hexagon head bolts and hexagon head screws for general purpose made of steel, stainless steel and nonferrous metals.

Remarks 1. When designating the hexagon head bolts made of steel, stainless steel and nonferrous metals, these are called the "steel bolts", "stainless steel bolts" and "non-ferrous metal bolts" respectively, and when naming generically, these are simply called the "bolts".

2. The hexagon head bolts not based on the Text of this Standard are specified in Annex.

3. The standards cited in this Standard are given in Attached Table 1.

4. The International standards corresponding to the Text of this Standard are given in Attached Table 2.

2. Definitions For the purposes of this Standard, the main definitions specified in JIS B 0101 apply.

3. Types The types of the bolts shall be 3 types of the following:

- (1) Nominal diameter hexagon head bolt That bolt of which shank part consists of a threaded part and cylindrical part, and the diameter of the cylindrical part is approximately the same as the nominal diameter.
- (2) Continuous thread hexagon head bolt That bolt of which overall shank part is of threaded part, and having no cylindrical part.
- (3) Effective diameter hexagon head bolt That bolt of which shank part consists of a threaded part and cylindrical part, and the diameter of the cylindrical part is approximately the same as the effective diameter.

4. Shapes, dimensions and qualities The shapes, dimensions and qualities⁽¹⁾ of the bolts shall be in accordance with Table 1.

Further, the geometrical tolerances and surface conditions of the bolts shall be in accordance with the following:

- (1) The geometrical tolerances on the coaxiality of the head part in respect to the shank part of the bolt, perpendicularity of the head bearing surface, parallelism of head width across flats side faces, and straightness of shank part shall respectively be in accordance with the Figs. 1.1, 1.23, 1.33 and 1.35 or 1.36 of Attached Table 1 of JIS B 1021.

- (2) The permissible limits in respect to the surface defects of the bolts, unless otherwise specified, shall be in accordance with JIS B 1041.
- (3) The bolts shall generally not be processed with surface treatments. When the surface treatment of plating and others are required particularly, it shall be designated by the purchaser.

Further, the steel bolts which have been processed with electroplating shall be subjected to brittleness-relief treatment, as required.

Note (1) Grades of parts, grades of screw threads and mechanical properties.

Table 1. Shapes, dimensions and qualities of hexagon head bolts and hexagon head screws

Type of bolts	Parts grade (2)	Shapes and dimensions	Screw threads			Mechanical properties			(Informative reference) corresponding international standard
			Type (3)	Range of nominal diameter (mm)	Grade (4)	Material	Steel: Stainless steel: Nonferrous metal:	Strength division Property division Quality division	
Nominal diameter hexagon head bolts	A	Attached Table 3	Coarse	1.6 to 24 (5)	6 g	Steel	$d < 3$ mm: agreement between the parties concerned	-	ISO 4014 :1988
			Fine	8 to 24 (5)					
	B	Attached Table 4	Coarse and fine	16 to 64 (6)					
Continuous thread hexagon head bolts	A	Attached Table 5	Coarse	1.6 to 24 (5)	8 g	Stainless steel	$d \leq 20$ mm: A 2-70 $20 \text{ mm} < d \leq 39$ mm: A 2-50 $d > 39$ mm: agreement between the parties concerned	JIS B 1054	ISO 4017 :1988
			Fine	8 to 24 (5)					
	B	Attached Table 6	Coarse and fine	16 to 64 (6)					
Nominal diameter hexagon head bolts	C	Attached Table 7	Coarse	5 to 64	8 g	Steel	$d \leq 39$ mm: 3.6, 4.6, 4.8 $d > 39$ mm: agreement between the parties concerned	JIS B 1051	ISO 4016 :1988
	C	Attached Table 8	Coarse	16 to 64 (6)					

Table 1. (continued)

Type of bolts	Parts grade (2)	Shapes and dimensions	Screw threads			Mechanical properties			(Informative reference) corresponding international standard
			Type (3)	Range of nominal diameter (mm)	Grade (4)	Material	Steel: Stainless steel: Nonferrous metal:	Strength division Property division Quality division	
Effective diameter hexagon head bolts	B	Attached Table 9	Coarse	3 to 20	6 g	Steel	All size: 5.8, 8.8		ISO 4015 : 1979
						Stainless steel	All size: A2-70		
						Non-ferrous metals	In accordance with 3. of JIS B 1057		

Notes (2) Parts grades A, B and C shall be in accordance with JIS B 1021.

(3) The types of screw threads shall be in accordance with JIS B 0205 and JIS B 0207.

(4) The grades of screw threads shall be in accordance with JIS B 0209 and JIS B 0211. Furthermore, the maximum permissible dimension, when processed with electroplating, shall be the maximum permissible dimension of grade 4h of JIS B 0209 or JIS B 0211.

(5) Those of 16 mm to 24 mm in nominal diameter of screw threads, and of which nominal length exceeds either of 10d (d: nominal diameter of screw threads) or 150 mm, shall be in accordance with parts grade B.

(6) Those of 16 mm to 24 mm in nominal diameter of screw threads, and of which nominal lengths are 150 mm or under shall be in accordance with parts grade A.

5. Materials The materials of the bolts shall be in accordance with the following:

- (1) The materials of the steel bolts shall be in accordance with 3. of JIS B 1051.
- (2) The materials of the stainless steel bolts shall be in accordance with 5. of JIS B 1054.
- (3) The materials of the nonferrous metal bolts shall be in accordance with 4. of JIS B 1057.

6. Inspections The inspections of the bolts shall be in accordance with the following:

- (1) The inspection on the shapes and dimensions, grade of screw threads and geometrical deviations shall be carried out by the measuring methods of JIS B 1071 or the methods instead of these, and the results shall conform to Table 1 and Attached Tables 3 to 9. However, the go screw thread ring gauge to be used for the screw threads processed with electroplating shall be of for 4h screw thread in accordance with JIS B 0251 and JIS B 0252.
- (2) The inspection on mechanical properties shall be carried out in accordance with JIS B 1051 for the steel bolts, with JIS B 1054 for the stainless steel bolts, and with JIS B 1057 for the nonferrous metal bolts, and the results shall conform to the mechanical properties of Table 1.
- (3) The permissible limit of the surface defects, unless specially specified by the purchaser, shall not exceed the limit specified in JIS B 1041.
- (4) The acceptance inspection, unless specially specified by the purchaser, shall be in accordance with JIS B 1091.

7. Designation The bolts shall be designated by the number of standard⁽⁷⁾, type, parts grade, designation of screw threads × nominal length, division of mechanical properties (strength division for steel bolts, property division for stainless steel bolts, and material division for nonferrous metal bolts) and designated items⁽⁸⁾.

Note ⁽⁷⁾ The number of standard, if not specially required, may be omitted.

⁽⁸⁾ As to the designated items, the shape of screw end, type of surface treatment, etc. shall be indicated, as required.

Examples:

Nominal diameter hexagon head bolts, coarse screw threads and steel	JIS B 1180	Nominal diameter hexagon head bolt	A M12 × 80	— 10.9	(Ep-Fe/Zn 5/CM 2)
Nominal diameter hexagon head bolts, fine screw threads and stainless steel	JIS B 1180	Nominal diameter hexagon head bolt	A M12 × 1.5 × 80	— A2-70	—
Effective diameter hexagon head bolts, coarse screw threads and steel	JIS B 1180	Effective diameter hexagon head bolt	B M10 × 50	— 5.8	(Ep-Fe/Zn 5/CM 2)
Continuous thread hexagon head bolts, fine screw threads and non-ferrous metal	JIS B 1180	Continuous thread hexagon head bolt	A M8 × 1 × 40	— CU2	(Round point)

(Standard number)	(Type)	(Parts grade)	(Designation of screw thread × nominal length)	(Strength division, Property division, Material division)	(Designated item)
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8. Markings

8.1 Markings on products The markings on the products shall be in accordance with the following:

- (1) The steel bolts shall be in accordance with 6.1 of JIS B 1051.
- (2) The stainless steel bolts shall be in accordance with 8.1 of JIS B 1054.
- (3) The nonferrous metal bolts shall be in accordance with 7.1 of JIS B 1057.

8.2 Marking on packages The packages of the bolts shall be marked with the following information.

- (1) Type
- (2) Parts grade (grade of screw threads)⁽⁹⁾
- (3) Designation of screw threads × nominal length
- (4) Strength division (for steel bolts), property division (for stainless steel bolts) or material division (for nonferrous metal bolts)
- (5) Quantity
- (6) Designated item
- (7) Manufacturer's name or abbreviation⁽¹⁰⁾

Notes (⁹) The grade of screw threads is being included in the parts grade, but, it may be indicated in parentheses, as required.

(¹⁰) The abbreviaiton of the manufacturer should preferable be to use the registered trademark.

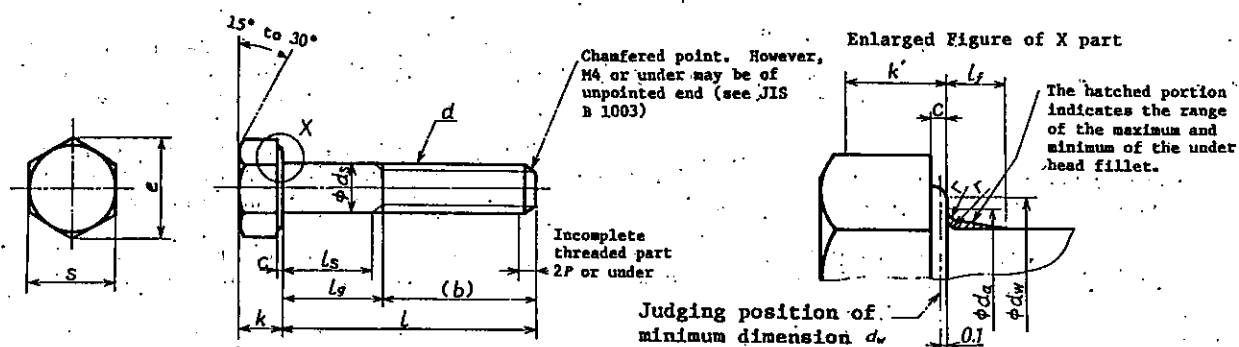
Attached Table 1. Cited standards

JIS B 0101	Screw threads and fasteners - Vocabulary
JIS B 0123	Designation of screw threads
JIS B 0205	Metric coarse screw threads
JIS B 0207	Metric fine screw threads
JIS B 0209	Limits of sizes and tolerances for metric coarse screw threads
JIS B 0211	Limits of sizes and tolerances for metric fine screw threads
JIS B 0251	Limit gauges for metric coarse screw threads
JIS B 0252	Limit gauges for metric fine screw threads
JIS B 0601	Surface roughness - Definitions and designation
JIS B 0651	Instruments for the measurement of surface roughness by the stylus method
JIS B 0659	Roughness comparison specimens
JIS B 1003	Ends of parts with external metric screw thread
JIS B 1005	Radii under the head for external threaded fasteners
JIS B 1006	Thread run-outs and thread undercuts for external threaded fasteners
JIS B 1021	Tolerance system for threaded fasteners
JIS B 1041	Fasteners - Surface discontinuities - Part 1: Bolts, screws and studs for general requirements
JIS B 1051	Mechanical properties of steel bolts and screws
JIS B 1054	Specification for corrosion-resistant stainless steel fasteners
JIS B 1057	Mechanical properties of non-ferrous metal fasteners
JIS B 1071	Method of verification for size and geometry of threaded fasteners
JIS B 1091	Fasteners - Acceptance inspection (ISO 3269:1988)

Attached Table 2. Corresponding International standards

ISO 4014:1988	Hexagon head bolts - Product grades A and B
ISO 4015:1979	Hexagon head bolts - Product grade B - Reduced shank (shank diameter $\approx$ pitch diameter)
ISO 4016:1988	Hexagon head bolts - Product grade C
ISO 4017:1988	Hexagon head screws - Product grades A and B
ISO 4018:1988	Hexagon head screws - Product grade C
ISO 8676:1988	Hexagon head screws with metric fine pitch thread - Product grades A and B
ISO 8765:1988	Hexagon head bolts with metric fine pitch thread - Product grades A and B

Attached Table 3. Shapes and dimensions of nominal diameter hexagon head bolts
(Parts grade A)



Unit: mm

Designation of screw thread	Coarse thread	Column I	M 1.6	M 2	M 2.5	M 3	—	M 4	M 5	M 6	M 8
		Column II	—	—	—	—	M 3.5	—	—	—	—
	Coarse thread pitch P		0.35	0.4	0.45	0.5	0.6	0.7	0.8	1	1.25
	Fine thread	Column I	—	—	—	—	—	—	—	—	M 8×1
		Column II	—	—	—	—	—	—	—	—	—
d											
b (Informative reference)		$l \leq 125\text{mm}$	9	10	11	12	13	14	16	18	22
		$125 < l \leq 150\text{mm}$	—	—	—	—	—	—	—	—	—
c		Min.	0.1	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15
		Max.	0.25	0.25	0.25	0.4	0.4	0.4	0.5	0.5	0.6
da		Max.	2	2.6	3.1	3.6	4.1	4.7	5.7	6.8	9.2
ds	Basic dimension = Max.		1.6	2	2.5	3	3.5	4	5	6	8
		Min.	1.46	1.86	2.36	2.86	3.32	3.82	4.82	5.82	7.78
dr		Min.	2.27	3.07	4.07	4.57	5.07	5.88	6.88	8.88	11.63
e		Min.	3.41	4.32	5.45	6.01	6.58	7.66	8.79	11.05	14.38
l_r		Max.	0.6	0.8	1	1	1	1.2	1.2	1.4	2
k	Basic dimension = Nominal		1.1	1.4	1.7	2	2.4	2.8	3.5	4	5.3
		Min.	0.975	1.275	1.575	1.875	2.275	2.675	3.35	3.85	5.15
		Max.	1.225	1.525	1.825	2.125	2.525	2.925	3.65	4.15	5.45
k'		Min.	0.68	0.89	1.1	1.31	1.59	1.87	2.35	2.7	3.61
r		Min.	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.25	0.4
s	Basic dimension = Max.		3.2	4	5	5.5	6	7	8	10	13
		Min.	3.02	3.82	4.82	5.32	5.82	6.78	7.78	9.78	12.73

Length of bolts l

l and l_g
 s

Nominal length (Basic dimension)	Min.	Max.	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g		
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
			The bolts of which " l " is within this area shall be in accordance with Attached Table 5.																			
12	11.65	12.35	1.2	3																		
16	15.65	16.35	5.2	7	4	6	2.75	5														
20	19.58	20.42			8	10	6.75	9	5.5	8	4	7										
25	24.58	25.42					11.75	14	10.5	13	9	12	7.5	11	5	9						
30	29.58	30.42							15.5	18	14	17	12.5	16	10	14	7	12				
35	34.5	35.5									19	22	17.5	21	15	19	12	17				
40	39.5	40.5											22.5	26	20	24	17	22	11.75	18		
45	44.5	45.5													25	29	22	27	16.75	23		
50	49.5	50.5													30	34	27	32	21.75	28		
55	54.4	55.6															32	37	26.75	33		
60	59.4	60.6															37	42	31.75	38		
65	64.4	65.6																	36.75	43		
70	69.4	70.6																	41.75	48		
80	79.4	80.6																	51.75	58		

The bolts of which " l " is within this area shall be in accordance with Attached Table 5.

Designation of screw thread	Coarse thread	Column I	M 10	M 12	—	M 16	—	M 20	—	M 24								
		Column II	—	—	M 14	—	M 18	—	M 22	—								
		Coarse thread pitch <i>P</i>	1.5	1.75	2	2	2.5	2.5	2.5	3								
<i>d</i>	Fine screw thread	Column I	M 10×1	M 12×1.5	—	M 16×1.5	—	M 20×1.5	—	M 24×2								
		Column II	M 10×1.25	M 12×1.25	M 14×1.5	—	M 18×1.5	M 20×2	M 22×1.5	—								
<i>b</i> (Informative reference)																		
<i>l</i> ≤ 125mm			26	30	34	38	42	46	50	54								
125 < <i>l</i> ≤ 150mm			—	—	40	44	48	52	56	60								
<i>c</i>																		
Min.			0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.2								
Max.			0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.8								
<i>da</i>																		
Max.			11.2	13.7	15.7	17.7	20.2	22.4	24.4	26.4								
<i>ds</i>																		
Basic dimension = Max.			10	12	14	16	18	20	22	24								
Min.			9.78	11.73	13.73	15.73	17.73	19.67	21.67	23.67								
<i>dw</i>																		
Min.			14.63	16.63	* 19.64	22.49	25.34	28.19	31.71	33.61								
<i>e</i>																		
Min.			17.77	20.03	23.36	26.75	30.14	33.53	37.72	39.98								
<i>l_f</i>																		
Max.			2	3	3	3	3	4	4	4								
<i>k</i>																		
Basic dimension = Nominal			6.4	7.5	8.8	10	11.5	12.5	14	15								
Min.			6.22	7.32	8.62	9.82	11.285	12.285	13.785	14.785								
Max.			6.58	7.68	8.98	10.18	* 11.715	12.715	14.215	15.215								
<i>k'</i>																		
Min.			4.35	5.12	6.03	6.87	7.9	8.6	9.65	10.35								
<i>r</i>																		
Min.			0.4	0.6	0.6	0.6	0.6	0.8	0.8	0.8								
<i>s</i>																		
Basic dimension = Max.			16	18	21	24	27	30	34	36								
Min.			15.73	17.73	20.67	23.67	26.67	29.67	33.38	35.38								
Length of bolts			<i>l_s</i> and <i>l_g</i>															
Nominal length (Basic dimension)	Min.	Max.	<i>l_s</i>		<i>l_g</i>		<i>l_s</i>		<i>l_g</i>		<i>l_s</i>		<i>l_g</i>		<i>l_s</i>		<i>l_g</i>	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
40	39.5	40.5																
45	44.5	45.5	11.5	19														
50	49.5	50.5	16.5	24	11.25	20												
55	54.4	55.6	21.5	29	16.25	25												
60	59.4	60.6	26.5	34	21.25	30	16	26										
65	64.4	65.6	31.5	39	26.25	35	21	31	17	27								
70	69.4	70.6	36.5	44	31.25	40	26	36	22	32	15.5	28						
80	79.4	80.6	46.5	54	41.25	50	36	46	32	42	25.5	38	21.5	34				
90	89.3	90.7	56.5	64	51.25	60	46	56	42	52	35.5	48	31.5	44	27.5	40	21	36
100	99.3	100.7	66.5	74	61.25	70	56	66	52	62	45.5	58	41.5	54	37.5	50	31	46
110	109.3	110.7			71.25	80	66	76	62	72	55.5	68	51.5	64	47.5	60	41	56
120	119.3	120.7			81.25	90	76	86	72	82	65.5	78	61.5	74	57.5	70	51	66
130	129.2	130.8					80	90	76	86	69.5	82	65.5	78	61.5	74	55	70
140	139.2	140.8					90	100	86	96	79.5	92	75.5	88	71.5	84	65	80
150	149.2	150.8							96	106	89.5	102	85.5	98	81.5	94	75	90

Remarks 1. As to the designations of screw threads, those of Column I should be preferred.

Further, the method of expression of the designation of screw threads is based on JIS B 0123.

- The recommendable nominal lengths (l) for the designations of screw threads shall be within the frame of bold lines.
- The tolerances on the threaded part lengths (b) of the bolts longer than the maximum nominal length in the frame of bold lines are as agreed between the parties concerned, however, it should preferably be in accordance with JIS B 1021.
- The l_s max. and l_s min. shall be in accordance with the following:

$$l_s \text{ max.} = \text{nominal length } (l) - b,$$

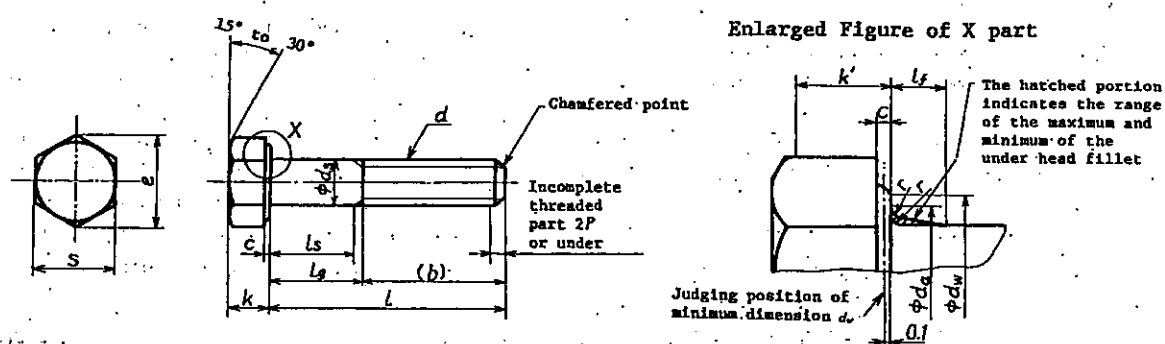
$$l_s \text{ min.} = l_s \text{ max.} - 5P \text{ (} P = \text{coarse thread pitch)}$$
- The values d_s and r specified in this Table shall be in accordance with JIS B 1005.
- The "chamfered end" and "unpointed end" of the screw-end shapes shall be in accordance with JIS B 1003.
- The numerical values with * mark in the Table shall be the values corrected the errors in the corresponding International standards.

The minimum dimension * 19.64 mm of d_w of the nominal diameter 14 mm of Attached Table 3 (continued) has been mistaken as 19.37 mm in the numerical values of ISO 4014:1988 and ISO 8765:1988.

In addition, the maximum dimension * 11.715 mm of k of the nominal diameter 18 mm has been mistaken as 11.175 mm in the numerical value of ISO 4014:1988, but the numerical value of ISO 8765: 1988 has been taken as 11.715 mm rightly.

- Among the recommendable nominal lengths, as to the lower limit of nominal diameter of screw threads 24 mm, the lower limit dimension 90 mm of ISO 4014:1988 has been employed, however, the lower limit dimension of ISO 8765:1988 has been taken as 100 mm.

Attached Table 4. Shapes and dimensions of nominal diameter hexagon head bolts (Parts grade B)



Unit: mm

Designation of screw thread	Coarse screw thread	Column I	M 16	—	M 20	—	M 24	—	M 30	—
		Column II	—	M 18	—	M 22	—	M 27	—	M 33
	Coarse thread pitch P		2	2.5	2.5	2.5	3	3	3.5	3.5
	Fine screw thread	Column I	M 16×1.5	—	M 20×1.5	—	M 24×2	—	M 30×2	—
		Column II	—	M 18×1.5	M 20×2	M 22×1.5	—	M 27×2	—	M 33×2
b (Informative reference)	$l \leq 125\text{mm}$		38	42	46	50	54	60	66	—
	$125 < l \leq 200\text{mm}$		44	48	52	56	60	66	72	78
	$l > 200\text{mm}$		—	—	—	69	73	79	85	91
c	Min.		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Max.		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
da	Max.		17.7	20.2	22.4	24.4	26.4	30.4	33.4	36.4
ds	Basic dimension = Max.		16	18	20	22	24	27	30	33
	Min.		15.57	17.57	19.48	21.48	23.48	26.48	29.48	32.38
dw	Min.		22	24.85	27.7	31.35	33.25	38	42.75	46.55
e	Min.		26.17	29.56	32.95	37.29	39.55	45.2	50.85	55.37
lf	Max.		3	3	4	4	4	6	6	6
k	Basic dimension = Nominal		10	11.5	12.5	14	15	17	18.7	21
	Min.		9.71	11.15	12.15	13.65	14.65	16.65	18.28	20.58
	Max.		10.29	11.85	12.85	14.35	15.35	17.35	19.12	21.42
k'	Min.		6.8	7.81	8.51	9.56	10.26	11.66	12.8	14.41
r	Min.		0.6	0.6	0.8	0.8	0.8	1	1	1
s	Basic dimension = Max.		24	27	30	34	36	41	46	50
	Min.		23.16	26.16	29.16	33	35	40	45	49

Length of bolts /

l_s and l_g

Nominal length (Basic dimension)	Min.	Max.																
			l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g
65	63.5	66.5	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
70	68.5	71.5	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
80	78.5	81.5	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
90	89.3	90.7	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
100	98.25	101.75	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
110	108.25	111.75	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
120	118.25	121.75	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
130	128	132	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
140	138	142	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
150	148	152	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
160	158	162	106	116	99.5	112	95.5	108	91.5	104	85	100	79	94	70.5	88	64.5	82
180	178	182	•	•	119.5	132	115.5	128	111.5	124	105	120	99	114	90.5	108	84.5	102
200	197.7	202.3	•	•	•	•	135.5	148	131.5	144	125	140	119	134	110.5	128	104.5	122
220	217.7	222.3	•	•	•	•	•	•	138.5	151	132	147	126	141	117.5	135	111.5	129
240	237.7	242.3	•	•	•	•	•	•	•	•	152	167	146	161	137.5	155	131.5	149
260	257.4	262.6	•	•	•	•	•	•	•	•	•	•	166	181	157.5	175	151.5	169
280	277.4	282.6	•	•	•	•	•	•	•	•	•	•	•	•	177.5	195	171.5	189
300	297.4	302.6	•	•	•	•	•	•	•	•	•	•	•	•	197.5	215	191.5	209
320	317.15	322.85	•	•	•	•	•	•	•	•	•	•	•	•	•	•	211.5	229

Designation of screw thread	Coarse screw thread	Column I	M 36	—	M 42	—	M 48	—	M 56	—	M 64									
		Column II	—	M 39	—	M 45	—	M 52	—	M 60	—									
		Coarse thread pitch <i>P</i>	4	4	4.5	4.5	5	5	5.5	5.5	6									
		Fine screw thread	Column I	M 36×3	—	M 42×3	—	M 48×3	—	M 56×4	—	M 64×4								
<i>d</i>	Column II	—	M 39×3	—	M 45×3	—	M 52×4	—	M 60×4	—	—									
<i>b</i> (Informative reference)		<i>l</i> ≤ 125mm	—	—	—	—	—	—	—	—	—									
		125 < <i>l</i> ≤ 200mm	84	90	96	102	108	116	—	—	—									
		<i>l</i> > 200mm	97	103	109	115	121	129	137	145	153									
<i>c</i>	Min.	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3										
	Max.	0.8	1	1	1	1	1	1	1	1										
<i>da</i>	Max.	39.4	42.4	45.6	48.6	52.6	56.6	63	67	71										
<i>ds</i>	Basic dimension = Max.	36	39	42	* 45	48	52	56	60	64										
	Min.	* 35.38	38.38	41.38	44.38	47.38	51.26	55.26	59.26	63.26										
<i>dw</i>	Min.	51.11	55.86	59.95	64.7	69.45	74.2	78.66	83.41	88.16										
<i>e</i>	Min.	60.79	66.44	71.3	76.95	82.6	88.25	93.56	99.21	104.86										
<i>l_r</i>	Max.	6	6	8	8	10	10	12	12	13										
<i>k</i>	Basic dimension = Nominal	22.5	25	26	28	30	33	35	38	40										
	Min.	22.08	24.58	25.58	27.58	29.58	32.5	34.5	37.5	39.5										
	Max.	22.92	25.42	26.42	28.42	30.42	33.5	35.5	38.5	40.5										
<i>k'</i>	Min.	15.46	17.21	17.91	19.31	20.71	22.75	24.15	26.25	27.65										
<i>r</i>	Min.	1	1	1.2	1.2	1.6	1.6	2	2	2										
<i>s</i>	Basic dimension = Max.	55	60	65	70	75	80	85	90	95										
	Min.	53.8	58.8	63.1	68.1	73.1	78.1	82.8	87.8	92.8										
Length of bolts <i>l</i>		<i>l</i> and <i>l_s</i> <i>s</i> <i>g</i>																		
Nominal length (Basic dimension)	Min.	Max.	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
140	138	142	36	56																
150	148	152	46	66	40	60														
160	158	162	56	76	50	70	41.5	64												
180	178	182	76	96	70	90	61.5	84	55.5	78	47	72								
200	197.7	202.3	96	116	90	110	81.5	104	75.5	98	67	92	59	84						
220	217.7	222.3	103	123	97	117	88.5	111	82.5	105	74	99	66	91	55.5	83				
240	237.7	242.3	123	143	117	137	108.5	131	102.5	125	94	119	86	111	75.5	103	67.5	95		
260	257.4	262.6	143	163	137	157	128.5	151	122.5	145	114	139	106	131	95.5	123	87.5	115	77	107
280	277.4	282.6	163	183	157	177	148.5	171	142.5	165	134	159	126	151	115.5	143	107.5	135	97	127
300	297.4	302.6	183	203	177	197	168.5	191	162.5	185	154	179	146	171	135.5	163	127.5	155	117	147
320	317.15	322.85	203	223	197	217	188.5	211	182.5	205	174	199	166	191	155.5	183	147.5	175	137	167
340	337.15	342.85	223	243	217	237	208.5	231	202.5	225	194	219	186	211	175.5	203	167.5	195	157	187
360	357.15	362.85	243	263	237	257	228.5	251	222.5	245	214	239	206	231	*195.5	223	187.5	215	177	207
380	377.15	382.85			257	277	248.5	271	242.5	265	234	259	226	251	215.5	243	207.5	235	197	227
400	397.15	402.85					268.5	291	262.5	285	254	279	246	271	235.5	263	227.5	255	217	247
420	416.85	423.15					288.5	311	282.5	305	274	299	266	291	255.5	283	247.5	275	237	267
440	436.85	443.15							302.5	325	294	319	286	311	275.5	303	267.5	295	257	287
460	456.85	463.15									314	339	306	331	295.5	323	287.5	315	277	307
480	476.85	483.15									334	359	326	351	315.5	343	307.5	335	297	327
500	496.85	503.15											346	371	335.5	363	327.5	355	317	347

Remarks 1. As to the designations of screw threads, those of Column I should be preferred.

Further, the method of expression of the designation of screw threads is based on JIS B 0123.

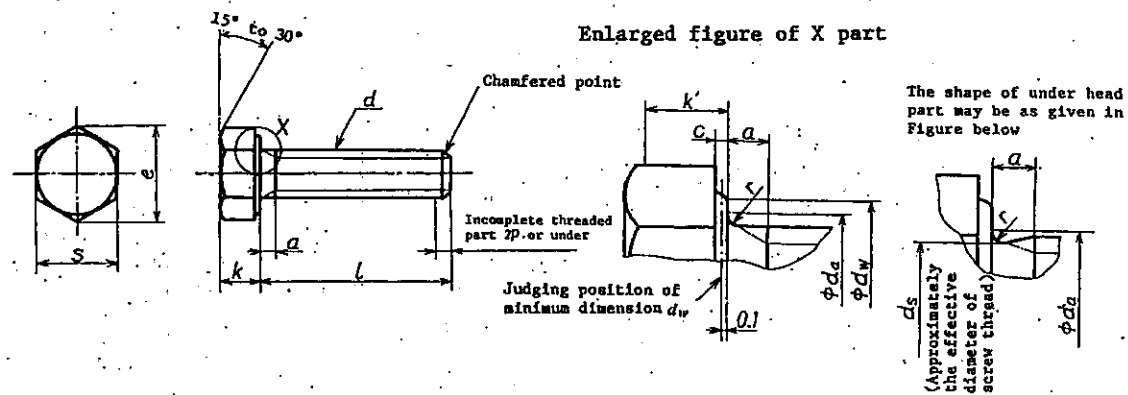
- The recommendable nominal lengths (l) for the designations of screw threads shall be within the frame of bold lines.
- The tolerances on the threaded part lengths (b) of the bolts longer than the maximum nominal length in the frame of bold lines are as agreed between the parties concerned, however, it should preferably be in accordance with JIS B 1021.
- The values of $l_{\max}$ and $l_{\min}$ shall be in accordance with the following:
 $l_{\max} = \text{nominal length } (l) - b$,
 $l_{\min} = l_{\max} - 5P$ (P = coarse thread pitch)
- The values d_s and r specified in this Table are in accordance with JIS B 1005.
- The "chamfered end" of the screw end shape shall be in accordance with JIS B 1003.
- The numerical values with * mark in the Table shall be the values corrected the errors in the corresponding International standards.

The minimum dimension * 35.38 mm of d_s of the nominal diameter 36 mm of Attached Table 4 (continued) has been mistaken as 35.8 mm in the numerical value of ISO 8765: 1988, but the numerical value of ISO 4014: 1988 has been taken as 35.38 mm rightly.

In addition, the maximum dimension * 45 mm of d_s of the nominal diameter 45 mm has been mistaken as 46 mm in the numerical value of ISO 4014: 1988, but the numerical value of ISO 8765: 1988 has been taken as 45 mm rightly.

The maximum dimension * 112 mm of l_g of the nominal diameter 18 mm of Attached Table 4 and the minimum dimension * 195.5 mm of l_g of the nominal diameter 56 mm of Attached Table 4 (continued) have been mistaken as 122 mm and 195.9 mm in the numerical values of ISO 8765: 1988, but the numerical values of ISO 4014: 1988 have been taken as 112 mm and 195.5 mm rightly.

Attached Table 5. Shapes and dimensions of continuous thread hexagon head bolts (Parts grade A)



Unit: mm

Designation of screw thread	Coarse thread	Column I	Column II	M 1.6	M 2	M 2.5	M 3	—	M 4	M 5	M 6	M 8
				—	—	—	—	M 3.5	—	—	—	—
	Coarse thread pitch P			0.35	0.4	0.45	0.5	0.6	0.7	0.8	1	1.25
	Fine thread	Column I	Column II	—	—	—	—	—	—	—	—	M 8×1
d	Coarse thread	Max.		1.05	1.2	1.35	1.5	1.8	2.1	2.4	3	4
		Min.		0.35	0.4	0.45	0.5	0.6	0.7	0.8	1	1.25
	Fine thread	Column I	Max.	—	—	—	—	—	—	—	—	3
		Min.		—	—	—	—	—	—	—	—	1
		Column II	Max.	—	—	—	—	—	—	—	—	—
		Min.		—	—	—	—	—	—	—	—	—
c		Min.		0.1	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15
		Max.		0.25	0.25	0.25	0.4	0.4	0.4	0.5	0.5	0.6
da		Max.		2	2.6	3.1	3.6	4.1	4.7	5.7	6.8	9.2
d_w		Min.		2.27	3.07	4.07	4.57	5.07	5.88	6.88	8.88	11.63
e		Min.		3.41	4.32	5.45	6.01	6.58	7.66	8.79	11.05	14.38
k	Basic dimension = Nominal			1.1	1.4	1.7	2	2.4	2.8	3.5	4	5.3
		Min.		0.975	1.275	1.575	1.875	2.275	2.675	3.35	3.85	5.15
		Max.		1.225	1.525	1.825	2.125	2.525	2.925	3.65	4.15	5.45
k'		Min.		0.68	0.89	1.1	1.31	1.59	1.87	2.35	2.7	3.61
r		Min.		0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.25	0.4
s	Basic dimension = Max.			3.2	4	5	5.5	6	7	8	10	13
		Min.		3.02	3.82	4.82	5.32	5.82	6.78	7.78	9.78	12.73
Length of bolts l												
Nominal length (Basic dimension)		Min.	Max.									
2		1.8	2.2	○								
3		2.8	3.2	○								
4		3.76	4.24	○	○							
5		4.76	5.24	○	○	○						
6		5.76	6.24	○	○	○	○					
8		7.71	8.29	○	○	○	○	○	○			
10		9.71	10.29	○	○	○	○	○	○	○		
12		11.65	12.35	○	○	○	○	○	○	○	○	
16		15.65	16.35	○	○	○	○	○	○	○	○	○
20		19.58	20.42		○	○	○	○	○	○	○	○
25		24.58	25.42			○	○	○	○	○	○	○
30		29.58	30.42				○	○	○	○	○	○
35		34.5	35.5					○	○	○	○	○
40		39.5	40.5						○	○	○	○
45		44.5	45.5							○	○	○
50		49.5	50.5								○	○
55		54.4	55.6									○
60		59.4	60.6									○
65		64.4	65.6									○
70		69.4	70.6									○
80		79.4	80.6									○

Unit: mm

Designation of screw thread	Coarse screw thread	Column I	M 10	M 12	—	M 16	—	M 20	—	M 24
		Column II	—	—	M 14	—	M 18	—	M 22	—
		Fine thread pitch	P	1.5	1.75	2	2	2.5	2.5	2.5
d	Fine screw thread	Column I	M 10×1	M 12×1.5	—	M 16×1.5	—	M 20×1.5	—	M 24×2
		Column II	M 10×1.25	M 12×1.25	M 14×1.5	—	M 18×1.5	M 20×2	M 22×1.5	—
a	Coarse screw thread	Max.	4.5	5.3	6	6	7.5	7.5	7.5	9
		Min.	1.5	1.75	2	2	2.5	2.5	2.5	3
	Fine screw thread	Column I Max.	3	4.5	—	4.5	—	* 4.5	—	6
		Min.	1	1.5	—	1.5	—	* 1.5	—	2
		Column II Max.	4	4	4.5	—	4.5	* 6	4.5	—
		Min.	1.25	1.25	1.5	—	1.5	* 2	1.5	—
c	Max.	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.2	
	Max.	0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.8	
da	Max.	11.2	13.7	15.7	17.7	20.2	22.4	24.4	26.4	
dr	Min.	14.63	16.63	* 19.64	22.49	25.34	28.19	31.71	33.61	
e	Min.	17.77	20.03	23.36	26.75	30.14	33.53	37.72	39.98	
k	Basic dimension = Nominal		6.4	7.5	8.8	10	11.5	12.5	14	15
	Min.	6.22	7.32	8.62	9.82	11.285	12.285	13.785	14.785	
	Max.	6.58	7.68	8.98	10.18	11.715	12.715	14.215	15.215	
k'	Min.	4.35	5.12	6.03	6.87	7.9	8.6	9.65	10.35	
r	Min.	0.4	0.6	0.6	0.6	0.6	0.8	0.8	0.8	
s	Basic dimension = Max.		16	18	21	24	27	30	34	36
	Min.	15.73	17.73	20.67	23.67	26.67	29.67	33.38	35.38	
Length of bolts l										
Nominal length (Basic dimension)	Min.	Max.								
20	19.58	20.42	○							
25	24.58	25.42	○	○						
30	29.58	30.42	○	○	○	○				
35	34.5	35.5	○	○	○	○	○			
40	39.5	40.5	○	○	○	○	○	○	○	○
45	44.5	45.5	○	○	○	○	○	○	○	○
50	49.5	50.5	○	○	○	○	○	○	○	○
55	54.4	55.6	○	○	○	○	○	○	○	○
60	59.4	60.6	○	○	○	○	○	○	○	○
65	64.4	65.6	○	○	○	○	○	○	○	○
70	69.4	70.6	○	○	○	○	○	○	○	○
80	79.4	80.6	○	○	○	○	○	○	○	○
90	89.3	90.7	○	○	○	○	○	○	○	○
100	99.3	100.7	○	○	○	○	○	○	○	○
110	109.3	110.7		○	○	○	○	○	○	○
120	119.3	120.7		○	○	○	○	○	○	○
130	129.2	130.8			○	○	○	○	○	○
140	139.2	140.8			○	○	○	○	○	○
150	149.2	150.8				○	○	○	○	○

Remarks 1. As to the designations of screw threads, those of Column I should be preferred.

Further, the method of expression of the designation of screw threads is based on JIS B 0123.

- The recommendable nominal lengths (l) for the designations of screw thread shall be within the frame of bold lines.
- The value of a specified in this Table shall be in accordance with JIS B 1006, and the values of d_s and r with JIS B 1005.
- The "chamfered end" and "unpointed end" of the screw end shape shall be in accordance with JIS B 1003.
- The numerical values with * mark in the Table are the values corrected the errors of the corresponding International standards.

The minimum dimension * 5.88 mm of d_s of the designation of screw thread M4 of Attached Table 5 has been mistaken as 6.03 mm in the numerical value of ISO 4017: 1988.

In addition, the minimum dimension * 19.64 mm of d_s of nominal diameter 14 mm of Attached Table 5 (continued) has been mistaken as 19.37 mm in the numerical values of ISO 4017: 1988 and ISO 8676: 1988.

In addition, the maximum and minimum of * 4.5 mm and * 1.5 mm, and * 6 mm and * 2 mm of a dimensions of Column I M 20 × 1.5 and Column II 20 × 2 of fine screw thread of Attached Table 5 (continued) have been mistaken as 6 mm and 2 mm for M 20 × 1.5, and 4.5 mm and 1.5 mm for M 20 × 2 in the numerical values of ISO 8676: 1988.

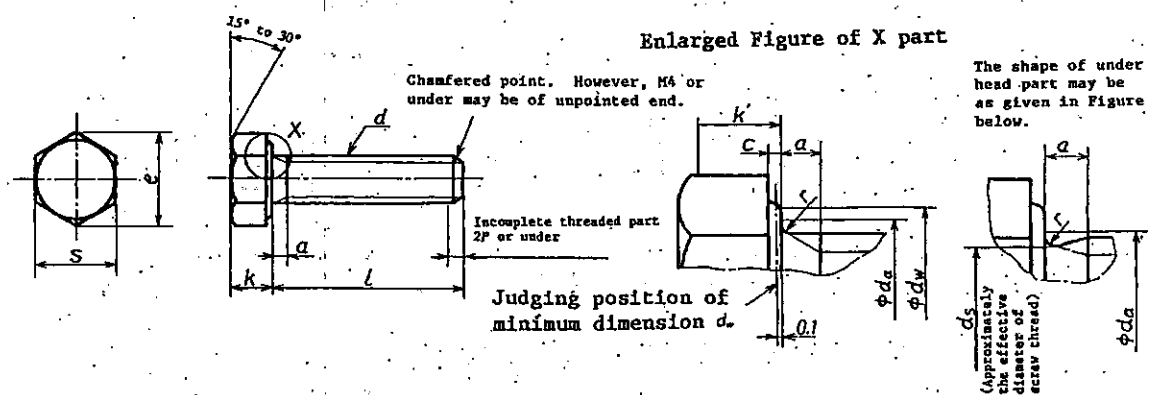
Furthermore, in ISO 4017: 1988 and ISO 8676: 1988, for the designations of screw thread other than M 20 × 1.5 and M 20 × 2, all of the maximum dimensions of a have been taken the values of 3 P (P = pitch) and the minimum dimensions of 1 P.

- Among the recommended nominal lengths, as to the lower limit of the nominal diameter 16 mm of screw thread, the lower limit dimension 30 mm of ISO 4017: 1988 has employed, however, the lower limit dimension of ISO 8676: 1988 has been taken as 35 mm.

In addition, the lower limit dimension of the nominal diameter 22 mm of screw thread, since in ISO 8676: 1988 the lower limit of the one step thicker nominal diameter of screw thread 24 mm has been taken as 40 mm, it has been defined as 40 mm in conformance with this, however, the lower limit dimension of ISO 4017: 1988 and ISO 8676: 1988 has been defined as 45 mm.

Furthermore, the lower limit of the nominal diameter of screw thread of 24 mm has been defined as 40 mm employing the lower limit dimension of ISO 8676: 1988, however, the lower limit dimension of ISO 4017: 1988 has been defined as 50 mm.

Attached Table 6. Shapes and dimensions of continuous thread hexagon head bolts (Parts grade B)



Unit: mm

Designation of screw thread	Coarse thread	Column I	M 16	—	M 20	—	M 24	—	M 30	—	M 36
		Column II	—	M 18	—	M 22	—	M 27	—	M 33	—
	Coarse thread pitch P		2	2.5	2.5	2.5	3	3	3.5	3.5	4
	Fine thread	Column I	M 16×1.5	—	M 20×1.5	—	M 24×2	—	M 30×2	—	M 36×3
		Column II	—	M 18×1.5	M 20×2	M 22×1.5	—	M 27×2	—	M 33×2	—
d	Coarse thread	Max.	6	7.5	7.5	7.5	9	9	10.5	10.5	12
		Min.	2	2.5	2.5	2.5	3	3	3.5	3.5	4
a	Fine thread	Column I Max.	4.5	—	* 4.5	—	6	—	6	—	9
		Min.	1.5	—	* 1.5	—	2	—	2	—	3
		Column II Max.	—	4.5	* 6	4.5	—	6	—	6	—
		Min.	—	1.5	* 2	1.5	—	2	—	2	—
c		Min.	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		Max.	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
da		Max.	17.7	20.2	22.4	24.4	26.4	30.4	33.4	36.4	39.4
d _w		Min.	22	24.85	27.7	31.35	33.25	38	42.75	46.55	51.11
e		Min.	26.17	29.56	32.95	37.29	39.55	45.2	50.85	55.37	60.79
k	Basic dimension = Nominal		10	11.5	12.5	14	15	17	18.7	21	22.5
		Min.	9.71	11.15	12.15	13.65	14.65	16.65	18.28	20.58	22.08
		Max.	10.29	11.85	12.85	14.35	15.35	17.35	19.12	21.42	22.92
k'		Min.	6.8	7.81	8.51	9.56	10.26	11.66	12.8	14.41	15.46
r		Min.	0.6	0.6	0.8	0.8	0.8	1	1	1	1
S	Basic dimension = Max.		24	27	30	34	36	41	46	50	55
		Min.	23.16	26.16	29.16	33	35	40	45	49	53.8

Length of bolts /

Nominal length (Basic dimension)	Min.	Max.									
30	28.95	31.05	.	.	.	.	.	.	.	.	.
35	33.75	36.25	.	.	.	.	.	.	.	.	.
40	38.75	41.25	.	.	.	.	.	.	.	.	.
45	43.75	46.25	.	.	.	.	.	.	.	.	.
50	48.75	51.25	.	.	.	.	.	.	.	.	.
55	53.5	56.5	.	.	.	.	.	.	.	.	.
60	58.5	61.5	.	.	.	.	.	.	.	.	.
65	63.5	66.5	.	.	.	.	.	.	.	.	.
70	68.5	71.5	.	.	.	.	.	.	.	.	.
80	78.5	81.5	.	.	.	.	.	.	.	.	.
90	88.25	91.75	.	.	.	.	.	.	.	.	.
100	98.25	101.75	.	.	.	.	.	.	.	.	.
110	108.25	111.75	.	.	.	.	.	.	.	.	.
120	118.25	121.75	.	.	.	.	.	.	.	.	.
130	128	132	.	.	.	.	.	.	.	.	.
140	138	142	.	.	.	.	.	.	.	.	.
150	148	152	.	.	.	.	.	.	.	.	.
160	158	162	○	○	○	○	○	○	○	○	○
180	178	182	○	○	○	○	○	○	○	○	○
200	197.7	202.3	○	○	○	○	○	○	○	○	○
220	217.7	222.3	○	○	○	○	○	○	○	○	○
240	237.7	242.3	○	○	○	○	○	○	○	○	○
260	257.4	262.6	○	○	○	○	○	○	○	○	○
280	277.4	292.6	○	○	○	○	○	○	○	○	○
300	297.4	302.6	○	○	○	○	○	○	○	○	○
320	317.15	322.85	○	○	○	○	○	○	○	○	○
340	337.15	342.85	○	○	○	○	○	○	○	○	○
360	357.15	362.85	○	○	○	○	○	○	○	○	○

The bolts of which / is in the area marked with □ shall be in accordance with Attached Table 5 (continued).

Attached Table 6. (continued)

Unit: mm

Unit: mm											
Designation of screw thread	Coarse screw thread		Column I	—	M 42	—	M 48	—	M 56	—	M 64
			Column II	M 39	—	M 45	—	M 52	—	M 60	—
	Coarse thread pitch <i>P</i>			4	4.5	4.5	5	5	5.5	5.5	6
<i>d</i>	Fine screw thread		Column I	—	M 42×3	—	M 48×3	—	M 56×4	—	M 64×4
			Column II	M 39×3	—	M 45×3	—	M 52×4	—	M 60×4	—
<i>a</i>	Coarse screw thread		Max.	12	13.5	13.5	15	15	16.5	16.5	18
			Min.	4	4.5	4.5	5	5	5.5	5.5	6
	Fine screw thread	Column I	Max.	—	9	—	9	—	12	—	12
			Min.	—	3	—	3	—	4	—	4
		Column II	Max.	9	—	9	—	12	—	12	—
			Min.	3	—	3	—	4	—	4	—
<i>c</i>			Min.	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
			Max.	1	1	1	1	1	1	1	
<i>da</i>			Max.	42.4	45.6	48.6	52.6	56.6	63	67	71
<i>dv</i>			Min.	55.86	59.95	64.7	69.45	74.2	78.66	83.41	88.16
<i>e</i>			Min.	66.44	71.3	76.95	82.6	88.25	93.56	99.21	104.86
<i>k</i>	Basic dimension — Nominal			25	26	28	30	33	35	38	40
			Min.	24.58	25.58	27.58	29.58	32.5	34.5	37.5	39.5
			Max.	25.42	26.42	28.42	30.42	33.5	35.5	38.5	40.5
<i>k'</i>			Min.	17.21	17.91	19.31	20.71	22.75	24.15	26.25	27.65
<i>r</i>			Min.	1	1.2	1.2	1.6	1.6	2	2	2
<i>s</i>	Basic dimension — Max.			60	65	70	75	80	85	90	95
			Min.	58.8	63.1	68.1	73.1	78.1	82.8	87.8	92.8
Length of bolts <i>l</i>											
Nominal length (Basic dimension)	Min.	Max.									
80	78.5	81.5	○	○							
90	88.25	91.75	○	○	○						
100	98.25	101.75	○	○	○	○	○				
110	108.25	111.75	○	○	○	○	○	○			
120	118.25	121.75	○	○	○	○	○	○	○	○	
130	128	132	○	○	○	○	○	○	○	○	
140	138	142	○	○	○	○	○	○	○	○	
150	148	152	○	○	○	○	○	○	○	○	
160	158	162	○	○	○	○	○	○	○	○	
180	178	182	○	○	○	○	○	○	○	○	
200	197.7	202.3	○	○	○	○	○	○	○	○	
220	217.7	222.3	○	○	○	○	○	○	○	○	
240	237.7	242.3	○	○	○	○	○	○	○	○	
260	257.4	262.6	○	○	○	○	○	○	○	○	
280	277.4	292.6	○	○	○	○	○	○	○	○	
300	297.4	302.6	○	○	○	○	○	○	○	○	
320	317.15	322.85	○	○	○	○	○	○	○	○	
340	337.15	342.85	○	○	○	○	○	○	○	○	
360	357.15	362.85	○	○	○	○	○	○	○	○	
380	377.15	382.85	○	○	○	○	○	○	○	○	
400	397.15	402.85		○	○	○	○	○	○	○	
420	416.85	423.15		○	○	○	○	○	○	○	
440	436.85	443.15			○		○	○	○	○	
460	456.85	463.15					○	○	○	○	
480	476.85	483.15					○	○	○	○	
500	496.85	503.15						○	○	○	

Remarks 1. As to the designations of screw threads, those of Column I should be preferred.

Further, the method of expression of the designation of screw threads is based on JIS B 0123.

- The recommendable nominal lengths (*l*) for the designations of screw threads shall be within the frame of bold lines.
- The value of *a* specified in this Table shall be in accordance with JIS B 1006, and the values of *d_s* and *r* with JIS B 1005.
- The "chamfered end" of the screw end shape shall be in accordance with JIS B 1003.
- The numerical values marked with * in the Table shall be the values corrected the errors of the corresponding International standards.

*4.5 mm and *1.5 mm, and *6 mm and *2 mm of the max. and min. of *a*-dimensions of Column I M 20 × 1.5 and Column II M 20 × 2 of fine screw thread of designation of screw thread of Attached Table 6 have been mistaken as 6 mm and 2 mm for M 20 × 1.5 and 4.5 mm and 1.5 mm for M 20 × 2 in the numerical values of ISO 8676: 1988.

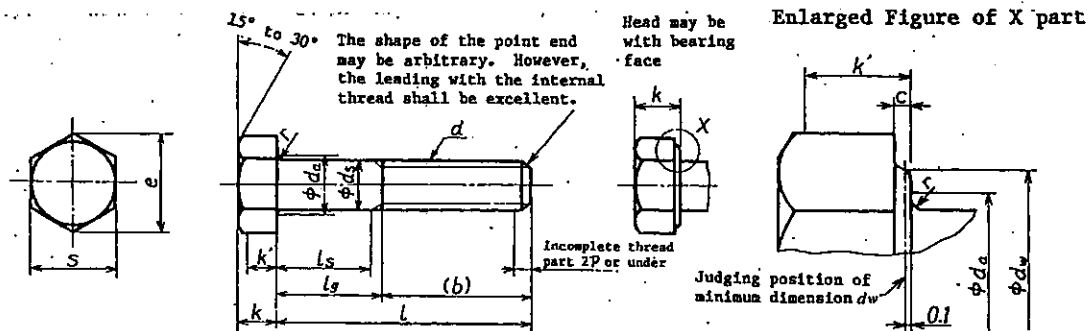
Furthermore, in ISO 4017: 1988 and ISO 8676: 1988, for the designations of screw thread other than M 20 × 1.5 and M 20 × 2, all of the maximum dimensions of *a* have been taken the values of 3 *P* (*P* = pitch) and the minimum dimension of 1 *P*.

- As to the recommendable lower limits of nominal length, for those of 27 mm to 36 mm in nominal diameter of screw thread, the lower limit dimension 40 mm of the nominal diameter 36 mm of ISO 8676: 1988 has been employed, and for those of nominal diameters 42 mm, 56 mm and 64 mm, the lower limit dimensions 80 mm, 110 mm and 120 mm of ISO 4017: 1988 have been employed respectively. The upper limit dimension shall be defined as 10 times the nominal diameter, and the longest of its length has been defined as 500 mm. However, when the 10 times the calculated value becomes the intermediate value of the nominal lengths, the smaller value has been employed.

The lower limit dimensions of ISO 4017: 1988 have been defined as 55 mm for designation of screw thread M 27, 60 mm for M 30, 65 mm for M 33 and 70 mm for M 36, and the upper limit dimension has been defined as 200 mm for all of the designations of screw thread of M 16 to M 64.

The lower limit dimensions of ISO 8676: 1988 have been defined as 55 mm for designation of screw thread M 27 × 2, 65 mm for M 33 × 2, 90 mm for M 42 × 3, 120 mm for M 56 × 4, and 130 mm for M 64 × 4, and the upper limit dimensions have been defined as 200 mm for designations of screw thread M 24 × 3, M 30 × 2 and M 36 × 3, and 360 mm for M 33 × 2.

Attached Table 7. Shapes and dimensions of nominal diameter hexagon head bolts
(Parts grade C)



Unit: mm																						
Designation of screw thread	Coarse thread pitch	Column I	M 5	M 6	M 8	M 10	M 12	—	M 16	—												
		Column II	—	—	—	—	—	M 14	—	M 18												
<i>d</i>		<i>P</i>	0.8	1	1.25	1.5	1.75	2	2	2.5												
<i>b</i> (Informative reference)	<i>l</i> ≤ 125 mm		16	18	22	26	30	34	38	42												
	125 < <i>l</i> ≤ 200 mm		—	—	—	—	—	40	44	48												
	<i>l</i> > 200 mm		—	—	—	—	—	—	—	—												
<i>c</i>	Max.		0.5	0.5	0.6	0.6	0.6	0.6	0.8	0.8												
<i>d_a</i>	Max.		6	7.2	10.2	12.2	14.7	16.7	18.7	21.2												
<i>d_s</i>	Max.		5.48	6.48	8.58	10.58	12.7	14.7	16.7	18.7												
	Min.		4.52	5.52	7.42	9.42	11.3	13.3	15.3	17.3												
<i>d_w</i>	Min.		6.74	8.74	11.47	14.47	16.47	19.15	22	24.85												
<i>e</i>	Min.		8.63	10.89	14.2	17.59	19.85	22.78	26.17	29.56												
<i>k</i>	Basic dimension = Max.		3.5	4	5.3	6.4	7.5	8.8	10	11.5												
	Min.		3.125	3.625	4.925	5.95	7.05	8.35	9.25	10.6												
	Max.		3.875	4.375	5.675	6.85	7.95	9.25	10.75	12.4												
<i>k'</i>	Min.		2.19	2.54	3.45	4.17	4.94	5.85	6.48	7.42												
<i>r</i>	Min.		0.2	0.25	0.4	0.4	0.6	0.6	0.6	0.6												
<i>S</i>	Basic dimension = Max.		8	10	13	16	18	21	24	27												
	Min.		7.64	9.64	12.57	15.57	17.57	20.16	23.16	26.16												
Length of bolts <i>l</i>			<i>l</i> and <i>l_s</i>																			
Nominal length (Basic dimension)	Min.	Max.	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>		
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
25	23.95	26.05	5	9																		
30	28.95	31.05	10	14	7	12			The bolts of which " <i>l</i> " is within this area shall be in accordance with Attached Table 8.													
35	33.75	36.25	15	19	12	17																
40	38.75	41.25	20	24	17	22	11.75	18														
45	43.75	46.25	25	29	22	27	16.75	23	11.5	19												
50	48.75	51.25	30	34	27	32	21.75	28	16.5	24												
55	53.5	56.5			32	37	26.75	33	21.5	29	16.25	25										
60	58.5	61.5			37	42	31.75	38	26.5	34	21.25	30	16	26								
65	63.5	66.5					36.75	43	31.5	39	26.25	35	21	31	17	27						
70	68.5	71.5					41.75	48	36.5	44	31.25	40	26	36	22	32						
80	78.5	81.5					51.75	58	46.5	54	41.25	50	36	46	32	42	25.5	38				
90	88.25	91.75							56.5	64	51.25	60	46	56	42	52	35.5	48				
100	98.25	101.75							66.5	74	61.25	70	56	66	52	62	45.5	58				
110	108.25	111.75									71.25	80	66	76	62	72	55.5	68				
120	118.25	121.75									81.25	90	76	86	72	82	65.5	78				
130	128	132											80	90	76	86	69.5	82				
140	138	142											90	100	86	96	79.5	92				
150	148	152													96	106	89.5	102				
160	156	164													106	116	99.5	112				
180	176	184															119.5	132				

The bolts of which " l " is within this area shall be in accordance with Attached Table 8.

Attached Table 7. (continued)

Unit: mm

Unit: mm																				
Designation of screw thread	Coarse screw thread	Column I	M 20	—	M 24	—	M 30	—	M 36	—										
		Column II	—	M 22	—	M 27	—	M 33	—	M 39										
<i>d</i>	Coarse thread pitch <i>P</i>		2.5	2.5	3	3	3.5	3.5	4	4										
<i>b</i> (Informative reference)	<i>l</i> ≤ 125mm		46	50	54	60	66	—	—	—										
	125 < <i>l</i> ≤ 200mm		52	56	60	66	72	78	84	90										
	<i>l</i> > 200mm		—	69	73	79	85	91	97	103										
<i>c</i>	Max.		0.8	0.8	0.8	0.8	0.8	0.8	0.8	1										
<i>d_a</i>	Max.		24.4	26.4	28.4	32.4	35.4	38.4	42.4	45.4										
<i>d_s</i>	Max.		20.84	22.84	24.84	27.84	30.84	34	37	40										
	Min.		19.16	21.16	23.16	26.16	29.16	32	35	38										
<i>d_w</i>	Min.		27.7	31.35	33.25	38	42.75	46.55	51.11	55.86										
<i>e</i>	Min.		32.95	37.29	39.55	45.2	50.85	55.37	60.79	66.44										
<i>k</i>	Basic dimension = Nominal		12.5	14	15	17	18.7	21	22.5	25										
	Min.		11.6	13.1	14.1	16.1	17.65	19.95	21.45	23.95										
	Max.		13.4	14.9	15.9	17.9	19.75	22.05	23.55	26.05										
<i>k'</i>	Min.		8.12	9.17	9.87	11.27	12.36	13.97	15.02	16.77										
<i>r</i>	Min.		0.8	0.8	0.8	1	1	1	1	1										
<i>s</i>	Basic dimension = Max.		30	34	36	41	46	50	55	60										
	Min.		29.16	33	35	40	45	49	53.8	58.8										
Length of bolts <i>l</i>			<i>l_s</i> and <i>l_g</i>																	
Nominal length (Basic dimension)	Min.	Max.	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>		
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
80	78.5	81.5	21.5	34																
90	88.25	91.75	31.5	44	27.5	40			The bolts of which " <i>l</i> " is within this area shall be in accordance with Attached Table 8.											
100	98.25	101.75	41.5	54	37.5	50	31	46												
110	108.25	111.75	51.5	64	47.5	60	41	56	35	50										
120	118.25	121.75	61.5	74	57.5	70	51	66	45	60	36.5	54								
130	128	132	65.5	78	61.5	74	55	70	49	64	40.5	58	34.5	52						
140	138	142	75.5	88	71.5	84	65	80	59	74	50.5	68	44.5	62	36	56				
150	148	152	85.5	98	81.5	94	75	90	69	84	60.5	78	54.5	72	46	66	40	60		
160	156	164	95.5	108	91.5	104	85	100	79	94	70.5	88	64.5	82	56	76	50	70		
180	176	184	115.5	128	111.5	124	105	120	99	114	90.5	108	84.5	102	76	96	70	90		
200	195.4	204.6	135.5	148	131.5	144	125	140	119	134	110.5	128	104.5	122	96	116	90	110		
220	215.4	224.6			138.5	151	132	147	126	141	117.5	135	111.5	129	103	123	97	117		
240	235.4	244.6					152	167	146	161	137.5	155	131.5	149	123	143	117	137		
260	254.8	265.2							166	181	157.5	175	151.5	167	143	163	137	157		
280	274.8	285.2									177.5	195	171.5	189	163	183	157	177		
300	294.8	305.2									197.5	215	191.5	209	183	203	177	197		
320	314.3	325.7											211.5	229	203	223	197	217		
340	334.3	345.7													223	243	217	237		
360	354.3	365.7													243	263	237	257		
380	374.3	385.7															257	277		

The bolts of which "*l*" is within this area shall be in accordance with Attached Table 8.

Attached Table 7. (continued)

Unit: mm

Designation of screw thread	Coarse thread	Column I	M 42	—	M 48	—	M 56	—	M 64									
		Column II	—	M 45	—	M 52	—	M 60	—									
<i>d</i>	Coarse thread pitch <i>P</i>		4.5	4.5	5	5	5.5	5.5	6									
<i>b</i> (Informative reference)	<i>l</i> ≤ 125mm		—	—	—	—	—	—	—									
	125 < <i>l</i> ≤ 200mm		96	102	108	116	—	—	—									
	<i>l</i> > 200mm		109	115	121	129	137	145	153									
<i>c</i>	Max.		1	1	1	1	1	1	1									
<i>da</i>	Max.		48.6	52.6	56.6	62.6	67	71	75									
<i>ds</i>	Max.		43	46	49	53.2	57.2	61.2	65.2									
	Min.		41	44	47	50.8	54.8	58.8	62.8									
<i>dv</i>	Min.		59.95	64.7	69.45	74.2	78.66	83.41	88.16									
<i>e</i>	Min.		71.3	76.95	82.6	88.25	93.56	99.21	104.86									
<i>k</i>	Basic dimension = Nominal		26	28	30	33	35	38	40									
	Min.		24.95	26.95	28.95	31.75	33.75	36.75	38.75									
	Max.		27.05	29.05	31.05	34.25	36.25	39.25	41.25									
<i>k'</i>	Min.		17.47	18.87	20.27	22.23	23.63	25.73	27.13									
<i>r</i>	Min.		1.2	1.2	1.6	1.6	2	2	2									
<i>s</i>	Basic dimension = Max.		65	70	75	80	85	90	95									
	Min.		63.1	68.1	73.1	78.1	82.8	87.8	92.8									
Length of bolts <i>l</i>			<i>l</i> and <i>l</i> _s and <i>l</i> _g															
Nominal length (Basic dimension)	Min.	Max.	<i>l</i> _s Min.	<i>l</i> _g Max.	<i>l</i> _s Min.	<i>l</i> _g Max.	<i>l</i> _s Min.	<i>l</i> _g Max.	<i>l</i> _s Min.	<i>l</i> _g Max.	<i>l</i> _s Min.	<i>l</i> _g Max.	<i>l</i> _s Min.	<i>l</i> _g Max.	<i>l</i> _s Min.	<i>l</i> _g Max.		
180	176	184	61.5	84	55.5	78												
200	195.4	204.6	81.5	104	75.5	98	67	92	59	84	The bolts of which " <i>l</i> " is within this area shall be in accordance with Attached Table 8 (continued).							
220	215.4	224.6	88.5	111	82.5	105	74	99	66	91								
240	235.4	244.6	108.5	131	102.5	125	94	119	86	111	75.5	103	67.5	95				
260	254.8	265.2	128.5	151	122.5	145	114	139	106	131	95.5	123	87.5	115	77	107		
280	274.8	285.2	148.5	171	142.5	165	134	159	126	151	115.5	143	107.5	135	97	127		
300	294.8	305.2	168.5	191	162.5	185	154	179	146	171	135.5	163	127.5	155	117	147		
320	314.3	325.7	188.5	211	182.5	205	174	199	166	191	155.5	183	147.5	175	137	167		
340	334.3	345.7	208.5	231	202.5	225	194	219	186	211	175.5	203	167.5	195	157	187		
360	354.3	365.7	228.5	251	222.5	245	214	239	206	231	195.5	223	187.5	215	177	207		
380	374.3	385.7	248.5	271	242.5	265	234	259	226	251	215.5	243	207.5	235	197	227		
400	394.3	405.7	268.5	291	262.5	285	254	279	246	271	235.5	263	227.5	255	217	247		
420	413.7	426.3	288.5	311	282.5	305	274	299	266	291	255.5	283	247.5	275	237	267		
440	433.7	446.3			302.5	325	294	319	286	311	275.5	303	267.5	295	257	287		
460	453.7	466.3					314	339	306	331	295.5	323	287.5	315	277	307		
480	473.7	486.3					334	359	326	351	315.5	343	307.5	335	297	327		
500	493.7	506.3							346	371	335.5	363	327.5	355	317	347		

Remarks 1. As to the designations of screw threads, those of Column I should be preferred.

Further, the method of expression of the designation of screw threads is based on JIS B 0123.

- The recommendable nominal lengths (*l*) for the designations of screw threads shall be within the frame of bold lines.
- The tolerances on the threaded part lengths (*b*) of the bolts longer than the maximum nominal length in the frame of bold lines are as agreed between the parties concerned, however, it should preferably be in accordance with JIS B 1021.
- The values of *l*_s max and *l*_s min. shall be in accordance with the following:
 $l_{s \text{ max.}} = \text{nominal length } (l) - b$
 $l_{s \text{ min.}} = l_{s \text{ max.}} - 5P$ (*P* = coarse thread pitch)
- The values *d*_s and *r* specified in this Table are in accordance with JIS B 1005.
- The upper limit dimension of the recommendable nominal length of designation of screw thread M 39, of which calculated value of 10 times the nominal diameter becomes the intermediate value of the nominal lengths, so that the smaller one of 380 mm has been employed in conformance with that of the other designation of screw thread, however, in ISO 4016: 1988, the upper limit dimension of 400 mm has been employed.

Attached Table 8. (continued)

Unit: mm

Designation of screw thread	Coarse screw thread	Column I	M 20	—	M 24	—	M 30	—	M 36	—
		Column II	—	M 22	—	M 27	—	M 33	—	M 39
<i>d</i>	Coarse thread pitch <i>P</i>		2.5	2.5	3	3	3.5	3.5	4	4
<i>a</i>	Max.		7.5	7.5	9	9	10.5	10.5	12	12
	Min.		2.5	2.5	3	3	3.5	3.5	4	4
<i>c</i>	Max.		0.8	0.8	0.8	0.8	0.8	0.8	0.8	1
<i>da</i>	Max.		24.4	26.4	28.4	32.4	35.4	38.4	42.4	45.4
<i>dw</i>	Min.		27.7	31.35	33.25	38	42.75	46.55	51.11	55.86
<i>e</i>	Min.		32.95	37.29	39.55	45.2	50.85	55.37	60.79	66.44
<i>k</i>	Basic dimension = Nominal		12.5	14	15	17	18.7	21	22.5	25
	Min.		11.6	13.1	14.1	16.1	17.65	19.95	21.45	23.95
	Max.		13.4	14.9	15.9	17.9	19.75	22.05	23.55	26.05
<i>k'</i>	Min.		8.12	9.17	9.87	11.27	12.36	13.97	15.02	16.77
<i>r</i>	Min.		0.8	0.8	0.8	1	1	1	1	1
<i>s</i>	Basic dimension = Max.		30	34	36	41	46	50	55	60
	Min.		29.16	33	35	40	45	49	53.8	58.8
Length of bolts /										
Nominal length (Basic dimension)	Min.	Max.								
40	38.75	41.25	○							
45	43.75	46.25	○	○						
50	48.75	51.25	○	○	○					
55	53.5	56.5	○	○	○	○				
60	58.5	61.5	○	○	○	○	○			
65	63.5	66.5	○	○	○	○	○	○		
70	68.5	71.5	○	○	○	○	○	○	○	
80	78.5	81.5	○	○	○	○	○	○	○	○
90	88.25	91.75	○	○	○	○	○	○	○	○
100	98.25	101.75	○	○	○	○	○	○	○	○
110	108.25	111.75	○	○	○	○	○	○	○	○
120	118.25	121.75	○	○	○	○	○	○	○	○
130	128	132	○	○	○	○	○	○	○	○
140	138	142	○	○	○	○	○	○	○	○
150	148	152	○	○	○	○	○	○	○	○
160	156	164	○	○	○	○	○	○	○	○
180	176	184	○	○	○	○	○	○	○	○
200	195.4	204.6	○	○	○	○	○	○	○	○
220	215.4	224.6		○	○	○	○	○	○	○
240	235.4	244.6			○	○	○	○	○	○
260	254.8	265.2				○	○	○	○	○
280	274.8	285.2					○	○	○	○
300	294.8	305.2					○	○	○	○
320	314.3	325.7						○	○	○
340	334.3	345.7							○	○
360	354.3	365.7							○	○
380	374.3	385.7								○

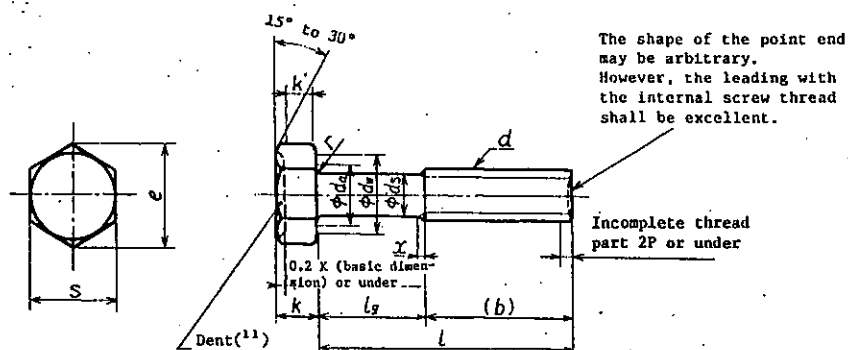
Designation of screw thread	Coarse screw thread	Column I	M 42	—	M 48	—	M 56	—	M 64
		Column II	—	M 45	—	M 52	—	M 60	—
<i>d</i>	Coarse thread pitch <i>P</i>		4.5	4.5	5	5	5.5	5.5	6
<i>a</i>	Max.		13.5	13.5	15	15	16.5	16.5	18
	Min.		4.5	4.5	5	5	5.5	5.5	6
<i>c</i>	Max.		1	1	1	1	1	1	1
<i>da</i>	Max.		48.6	52.6	56.6	62.6	67	71	75
<i>dr</i>	Min.		59.95	64.7	69.45	74.2	78.66	83.41	88.16
<i>e</i>	Min.		71.3	76.95	82.6	88.25	93.56	99.21	104.86
<i>k</i>	Basic dimension = Nominal		26	28	30	33	35	38	40
	Min.		24.95	26.95	28.95	31.75	33.75	36.75	38.75
	Max.		27.05	29.05	31.05	34.25	36.25	39.25	41.25
<i>k'</i>	Min.		17.47	18.87	20.27	22.23	23.63	25.73	27.13
<i>r</i>	Min.		1.2	1.2	1.6	1.6	2	2	2
<i>s</i>	Basic dimension = Max.		65	70	75	80	85	90	95
	Min.		63.1	68.1	73.1	78.1	82.8	87.8	92.8
Length of bolts /									
Nominal length (Basic dimension)	Min.	Max.							
80	78.5	81.5	○						
90	88.25	91.75	○	○					
100	98.25	101.75	○	○	○	○			
110	108.25	111.75	○	○	○	○	○		
120	118.25	121.75	○	○	○	○	○	○	○
130	128	132	○	○	○	○	○	○	○
140	138	142	○	○	○	○	○	○	○
150	148	152	○	○	○	○	○	○	○
160	156	164	○	○	○	○	○	○	○
180	176	184	○	○	○	○	○	○	○
200	195.4	204.6	○	○	○	○	○	○	○
220	215.4	224.6	○	○	○	○	○	○	○
240	235.4	244.6	○	○	○	○	○	○	○
260	254.8	265.2	○	○	○	○	○	○	○
280	274.8	285.2	○	○	○	○	○	○	○
300	294.8	305.2	○	○	○	○	○	○	○
320	314.3	325.7	○	○	○	○	○	○	○
340	334.3	345.7	○	○	○	○	○	○	○
360	354.3	365.7	○	○	○	○	○	○	○
380	374.3	385.7	○	○	○	○	○	○	○
400	394.3	405.7	○	○	○	○	○	○	○
420	413.7	426.3	○	○	○	○	○	○	○
440	433.7	446.3		○	○	○	○	○	○
460	453.7	466.3			○	○	○	○	○
480	473.7	486.3			○	○	○	○	○
500	493.7	506.3				○	○	○	○

Remarks 1. As to the designations of screw threads, those of Column I should be preferred.

Further, the method of expression of the designation of screw threads is based on JIS B 0123.

- The recommendable nominal lengths (*l*) for the designations of screw thread shall be within the frame of bold lines.
- The value of *a* specified in this Table shall be in accordance with JIS B 1006, and the values of *d_s* and *r* with JIS B 1005.
- Among the recommendable values of nominal lengths, the upper limit dimensions for designations of screw threads M 27, M 33 and M 39, of which calculated values of 10 times the nominal diameters become the intermediate values of nominal length, so that the smaller ones of 260 mm, 320 mm and 380 mm have been employed in conformance with those of other designations of screw thread, however, in ISO 4018: 1988 the upper limit dimensions of 280 mm, 360 mm and 400 mm have been employed.

Attached Table 9. Shapes and dimensions of effective diameter hexagon head bolts (Parts grade B)



Unit: mm

Designation of screw thread	Coarse screw thread	Column I	M 3	M 4	M 5	M 6	M 8	M 10	M 12	M 14	M 16	M 20
d	Coarse thread pitch P	Column II	0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5
b (Informative reference)	$l \leq 125\text{mm}$		12	14	16	18	22	26	30	34	38	46
	$125 < l \leq 200\text{mm}$		—	—	—	—	28	32	36	40	44	52
d_a	Max.		3.6	4.7	5.7	6.8	9.2	11.2	13.7	15.7	17.7	22.4
d_s	Approx.		2.6	3.5	4.4	5.3	7.1	8.9	10.7	12.5	14.5	18.2
d_w	Min.		4.4	5.7	6.7	8.7	11.4	14.4	16.4	19.2	22	27.7
e	Min.		* 5.88	7.50	8.63	10.89	14.20	17.59	19.85	22.78	26.17	32.95
k	Basic dimension = Nominal		2	2.8	3.5	4	5.3	6.4	7.5	8.8	10	12.5
	Min.		1.80	2.60	3.26	3.76	5.06	6.11	7.21	8.51	9.71	12.15
	Max.		2.20	3.00	3.74	4.24	5.54	6.69	7.79	9.09	10.29	12.85
k	Min.		1.3	1.8	2.3	2.6	3.5	4.3	5.1	6	6.8	8.5
r	Min.		0.1	0.2	0.2	0.25	0.4	0.4	0.6	0.6	0.6	0.8
s	Basic dimension = Max.		5.5	7	8	10	13	16	18	21	24	30
	Min.		5.20	6.64	7.64	9.64	12.57	15.57	17.57	20.16	23.16	29.16
x	Min.		1.25	1.75	2	2.5	3.2	3.8	4.3	5	5	6.3

Length of bolts /			l and l s g																											
Nominal length (basic dimension)	Min.	Max.	/ s g		/ s g		/ s g		/ s g		/ s g		/ s g		/ s g		/ s g		/ s g		/ s g		/ s g		/ s g		/ s g		/ s g	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
20	18.95	21.05	7	8	4.6	6																								
25	23.95	26.05	12	13	9.6	11	7.4	9	5	7																				
30	28.95	31.05	17	18	14.6	16	12.4	14	10	12	5.5	8																		
35	33.75	36.25			19.6	21	17.4	19	15	17	10.5	13																		
40	38.75	41.25			24.6	26	22.4	24	20	22	15.5	18	11	14																
45	43.75	46.25					27.4	29	25	27	20.5	23	16	19	11.5	15														
50	48.75	51.25					32.4	34	30	32	25.5	28	21	24	16.5	20	12	16												
55	53.5	56.5							35	37	30.5	33	26	29	21.5	25	17	21	13	17										
60	58.5	61.5							40	42	35.5	38	31	34	26.5	30	22	26	18	22										
65	63.5	66.5									40.5	43	36	39	31.5	35	27	31	23	27	14	19								
70	68.5	71.5									45.5	48	41	44	36.5	40	32	36	28	32	19	24								
80	78.5	81.5									55.5	58	51	54	46.5	50	42	46	38	42	29	34								
90	88.25	91.75											61	64	56.5	60	52	56	48	52	39	44								
100	98.25	101.75											71	74	66.5	70	62	66	58	62	49	54								
110	108.25	111.75													76.5	80	72	76	68	72	59	64								
120	118.25	121.75													86.5	90	82	86	78	82	69	74								
130	128	132															86	90	82	86	73	* 78								
140	138	142															96	100	92	96	83	88								
150	150	152																	102	106	93	98								

Note (1) The presence of dent, and its shape when the dent is to be attached, unless particularly designated by the user, shall be the option of the manufacturer.

Remarks 1. As to the designations of screw threads, those of Column I should be preferred.

Further, the method of expression of the designation of screw threads is based on JIS B 0123.

- The recommendable nominal lengths (l) for the designations of screw thread shall be within the frame of bold lines.
- The tolerances on the threaded part lengths (b) of the bolts out of the frame of bold lines are as agreed between the parties concerned, however, it should preferably be in accordance with JIS B 1021.
- The values of l_b max. and l_b min. shall be in accordance with the following:

$$l_b \text{ max.} = \text{nominal length } (l) - b,$$

$$l_b \text{ min.} = l_b \text{ max.} - 2P \quad (P = \text{coarse thread pitch})$$

- The values d_a and r specified in this Table shall be in accordance with JIS B 1005 and value x , with JIS B 1006.
- The diameter (d_s) of the cylindrical part shall approximately be the effective diameter of the screw thread. However, up to the point of $0.5d$ (d : nominal diameter of screw thread) from the bearing surface, it may be permissible to the nominal diameter of the screw thread.
- The numerical values marked with * in the Table shall be the values corrected the errors in the corresponding International standards.

The minimum dimension * 5.88 mm for e of designation of screw thread M 3 and l_b maximum * 78 mm of designation of screw thread M 20 have been mistaken as 5.98 mm and 70 mm in the values of ISO 4015: 1979.

Annex Hexagon head bolts not based on ISO 4014 to 4018,
ISO 8676 and ISO 8765

1. scope This Annex specifies the hexagon head bolts made of steel (hereafter, referred to as "steel bolts"), hexagon head bolts made of stainless steel (hereafter, referred to as "stainless steel bolts") and hexagon head bolts made of nonferrous metals (hereafter, referred to as "non-ferrous metal bolts") not based on ISO 4014 to 4018, ISO 8676 and ISO 8765.

Further, the Column II of the strength division of mechanical properties specified in this Annex shall be abolished on April 1, 1999.

Remarks: When the steel bolts, stainless steel bolts and nonferrous metal bolts are called generically in this Annex, these are simply referred to as "bolts".

2. Types The types of the bolts shall be 2 types of Annex Table 1, being classified according to the ratios of width across flats (s) to the nominal diameter of screw thread (d).

Annex Table 1. Types

Type	s/d
Hexagon head bolts ⁽¹⁾	1.45 or over ⁽²⁾
Small hexagon head bolts	Under 1.45 ⁽³⁾

Notes ⁽¹⁾ When it is necessary to discriminate from the small ones, these shall be called as the regular hexagon head bolts.

⁽²⁾ The hexagon head bolts of M 76 × 6 and M 80 × 6 are exceptions, and s/d thereof is under 1.45.

⁽³⁾ The small hexagon head bolts of M 8 is an exception, and its s/d is 1.45 or over.

3. Grades The grades of the bolts shall be classified according to the materials of products, and shall be those which have combined the degree of finish, grade of screw thread and strength division of mechanical properties given in Annex Table 2.

Annex Table 2. Grades

Type	Division according to materials	Grade			
		Degree of finish ⁽⁴⁾	Grade of screw thread ⁽⁵⁾	Strength division of mechanical properties ⁽⁶⁾	
				Column I	Column II
Hexagon head bolts	Steel (for nominal diameter of screw thread 39 mm or under)	Finished	4h	4.6, 4.8, 5.6, 5.8, 6.8, 8.8, 10.9, 12.9	4T, 5T, 6T, 7T
		.	.		
	Steel (for nominal diameter of screw thread 42 mm or over)	Semi-finished	6 g	-	-
		.	.		
	Stainless steel	Regular	8 g		
	Nonferrous metal				
Small hexagon head bolts	Steel	Finished	4h	4.6, 4.8, 5.6, 5.8, 6.8, 8.8, 10.9, 12.9	4T, 5T, 6T, 7T
		.	.		
		Semi-finished	6g		
	Stainless steel	.	.	-	-
	Nonferrous metal		8g		

Notes ⁽⁴⁾ As to the degrees of finish, refer to 9.

⁽⁵⁾ The grades of screw thread shall be based on the Texts of JIS B 0209 and JIS B 0211.

When not specially specified, 6 g shall be applicable.

⁽⁶⁾ The columns of I and II shall be based on the Text and Annex of JIS B 1051.

Remarks: As to the strength divisions of mechanical properties, those in Column I should be preferred.

4. Mechanical properties

4.1 Mechanical properties of steel bolts The mechanical properties of the steel bolts shall be in accordance with the following:

- (1) Mechanical properties for 39 mm or under in nominal diameter of screw thread The mechanical properties for the steel bolts of 39 mm or under in nominal diameter of screw thread shall be in accordance with the strength divisions of the mechanical properties of the Text and Annex of JIS B 1051. However, the strength divisions for the types of the bolts shall be in accordance with Annex Table 3.

Further, the strength divisions in Annex Table 3 shall not be applicable to the steel bolts to which weldability, thermal resistance of 300°C or over (for free cutting steel, 250°C or over) and low temperature resistance of -50°C or under are required.

Annex Table 3. Mechanical properties of steel bolts

Type	Mechanical properties		
	Strength division		Applicable standard
Hexagon head bolts Small hexagon head bolts	Column I	4.6, 4.8, 5.6, 5.8 6.8, 8.7, 10.9, 12.9	Text of JIS B 1051
	Column II	4T, 5T, 6T, 7T	Annex of JIS B 1051

- (2) Mechanical properties for 42 mm or over in nominal diameter of screw thread The mechanical properties for the steel bolts of 42 mm or over in nominal diameter of screw thread shall be as agreed between the parties concerned.

Further, even those of 42 mm or over in nominal diameter of screw thread, if conforming to any one of the strength division of Annex Table 3, its strength division may be applied to the said bolts.

4.2 Mechanical properties of stainless steel bolts The mechanical properties of the stainless steel bolts shall be as agreed between the parties concerned. In this case, unless particularly impedimental, the property division of JIS B 1054 should preferably be applicable.

4.3 Mechanical properties of nonferrous metal bolts The mechanical properties of the nonferrous metal bolts shall be as agreed between the parties concerned. In this case, unless particularly impedimental, the mechanical properties of JIS B 1057 should preferably be applicable.

5. Shapes and dimensions The shapes and dimensions of the bolts shall be in accordance with Annex Table 4.

Annex Table 4. Shapes and dimensions

Type	Degree of finish	Shapes and dimensions	Range of nominal diameter mm
Hexagon head bolts	Finished	In accordance with Annex Attached Table 1.1	3 to 80
	Semi-finished	In accordance with Annex Attached Table 1.2	6 to 80
	Regular	In accordance with Annex Attached Table 1.3	6 to 52
Small hexagon head bolts	Finished	In accordance with Annex Attached Table 2.1	8 to 39
	Semi-finished	In accordance with Annex Attached Table 2.2	

6. Screw threads The screw threads of the bolts shall be in accordance with Annex Table 5-1, and the pitches thereof shall be in accordance with Annex Table 5-2.

Further, the maximum permissible dimension of the electroplated screw thread shall be the maximum permissible dimension of external screw thread 4h. However, the precision of the screw threads when processed with hot-dip plating shall be as agreed between the parties concerned.

Annex Table 5-1. Screw threads

Types of bolts	Screw threads	
	Type	Grade
Hexagon head bolts and small hexagon head bolts	JIS B 0205	4h, 6g and 8g of the Text of JIS B 0209
	JIS B 0207	4h, 6g and 8g of the Text of JIS B 0211

Annex Table 5-2. Pitches

Unit: mm

Designation of screw thread		3	(3.5)	4	(4.5)	5	6	(7)	8	10	12	(14)	16	(18)	20	(22)	24
Pitches	Coarse screw thread	0.5	0.6	0.7	0.75	0.8	1	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3
	Fine screw thread	—	—	—	—	—	—	—	1	1.25	1.25	1.5	1.5	1.5	1.5	1.5	2
Designation of screw thread		(27)	30	(33)	36	(39)	42	(45)	48	(52)	56	(60)	64	(68)	72	(76)	80
Pitches	Coarse screw thread	3	3.5	3.5	4	4	4.5	4.5	5	5	5.5	5.5	6	6	—	—	—
	Fine screw thread	2	2	2	3	3	—	—	—	—	—	—	—	—	6	6	6

Remarks 1. Those of which nominal diameters of screw thread are parenthesized should not be used as far as possible.

2. When the pitches of fine screw thread other than given in Annex Table 5-2 are required, the pitches specified in JIS B 0207 may be used.

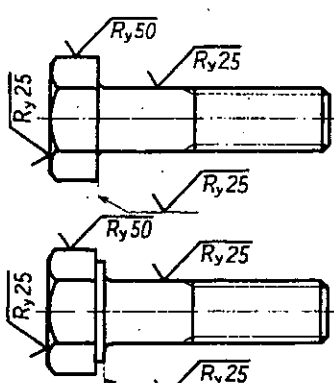
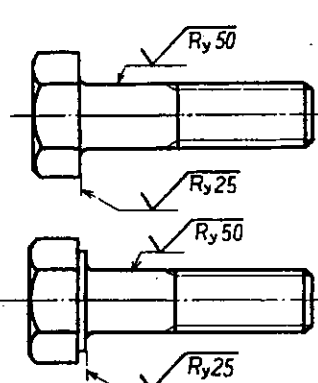
7. Surface defects The permissible limits in respect to the surface defects of the bolts, unless particularly specified, shall be in accordance with JIS B 1041.

8. Surface treatment The bolts shall be generally be not processed with surface treatment. When plating or other surface treatment is particularly required, it shall be designated by the purchaser.

Further, the steel bolts processed with electroplating, as required, shall be subjected to brittleness-relief treatment.

9. Degree of finish The degree of finish of the bolts shall be in accordance with Annex Table 6.

Annex Table 6. Degree of finish

Division	Degree of finish	
Finished		The surface roughness⁽⁷⁾ of the bearing face, shank and top face of head shall be $R_y 25$, and the surface roughness of the side face of head shall be $R_y 50$, and the shapes and dimensions shall conform to Annex Attached Table 1.1 or Annex Attached Table 2.1.
Semi-finished		The surface roughness⁽⁷⁾ of the bearing face shall be $R_y 25$, and the surface roughness of the shank shall be $R_y 50$, and the shapes and dimensions shall conform to Annex Attached Table 1.2 or Annex Attached Table 2.2.

Annex Table 6. (continued)

Division	Degree of finish
Regular	The surface roughness shall not particularly be specified, however, the shapes and dimensions shall conform to Annex Attached Table 1.3.

Note (⁷) The surface roughness shall be in accordance with JIS B 0601.

Further, if the surface roughness conforms to Annex Table 6, the stain due to heat treatment may be remained on the surface.

10. Materials The materials of the bolts shall be in accordance with the following:

- (1) The material for the steel bolts of 39 mm or under in nominal diameter of screw thread shall be that of which products are conforming to the strength division of mechanical properties of 4.1 (1).
- (2) The materials for the stainless steel bolts, nonferrous metal bolts and the steel bolts of 42 mm or over in nominal diameter of screw thread shall be as agreed between the parties concerned.

11. Inspections

11.1 Inspection on mechanical properties

11.1.1 Inspection on mechanical properties of steel bolts The inspection on mechanical properties of the steel bolts shall be in accordance with the following:

- (1) Inspection on mechanical properties of 39 mm or under in nominal diameter of screw thread The inspection on mechanical properties of the steel bolts 39 mm or under in nominal diameter of screw thread shall be carried out in accordance with the Text or Annex of JIS B 1051 according to the strength divisions thereof, and the results shall satisfy the strength divisions of mechanical properties of 4.1 (1).
- (2) Inspection on mechanical properties of 42 mm or over in nominal diameter of screw thread The inspection on mechanical properties of the steel bolts 42 mm or over in nominal diameter of screw thread shall be as agreed between the parties concerned.

Further, when the strength divisions of Annex Table 3 have been applied to the steel bolts of 42 mm or over in nominal diameter of screw thread, inspection shall be carried out in accordance with (1) as appropriate.

11.1.2 Inspection on mechanical properties of stainless steel bolts The inspection on the mechanical properties of the stainless steel bolts shall be as agreed between the parties concerned.

Further, when JIS B 1054 has been applied to the inspection on the mechanical properties of the stainless steel bolts, the inspection shall be carried out in accordance with the Standard as appropriate.

11.1.3 Inspection on mechanical properties of nonferrous metal bolts The inspection on the mechanical properties of the nonferrous metal bolts shall be as agreed between the parties concerned.

Further, when JIS B 1057 has been applied to the inspection on the mechanical properties of the nonferrous metal bolts, the inspection shall be carried out in accordance with the Standard as appropriate.

11.2 Inspection on shapes and dimensions The inspection on the shapes and dimensions shall be carried out in accordance with the measuring method of JIS B 1071 or the method instead of this, and the results shall conform to 5.

11.3 Inspection on screw threads The inspection on the screw threads shall be carried out by the limit gauge for screw thread of JIS B 0251 or JIS B 0252, or the inspecting tool for screw thread instead of this, and the results shall conform to 6.

Further, the go screw thread ring gauge used for the screw threads processed with plating shall be that of 4h.

11.4 Inspection on surface conditions The inspection on the surface conditions shall be carried out by the visual inspection, and the results shall conform to 7. and 9. The surface roughness shall be inspected by using the surface roughness comparison specimens (see JIS B 0659) or surface roughness measuring instruments (see JIS B 0651).

12. Designations The bolts shall be designated by the number of Standard⁽⁸⁾, type, degree of finish, designation of screw thread × nominal length, grade of screw thread, strength division⁽⁹⁾ of mechanical properties, material and designated items⁽¹⁰⁾. For those to which JIS B 1051, JIS B 1054 and JIS B 1057 have been applied, the material, and for those other than these, the strength division of mechanical properties, shall be omitted.

Notes⁽⁸⁾ The number of the Standard, unless specially required, may be omitted.

⁽⁹⁾ When the property division of JIS B 1054 has been applied to the stainless steel bolts, and when the material division of JIS B 1057 has been applied to the nonferrous metal bolts, these shall be treated with the same as the strength division.

⁽¹⁰⁾ As to the designated items, washer head (head), screw thread length, shape of end, width across flats (s) of one step larger, type of surface treatment, etc. shall be indicated, as required.

Example:

For steel bolts of M39 or under	JIS B 1180	Hexagon head bolt	Finished	M8 × 40	-6g	8.8	(Ep-Fe/Zn 5/CM 2)
Steel bolts of M42 or over, to which JIS B 1051 not applied	JIS B 1180	Hexagon head bolt	Semi-finished	M42 × 150	-6g		S20C (s = 70)
Stainless steel bolts to which JIS B 1054 applied	JIS B 1180	Small hexagon head bolt	Finished	M12 × 1.25 × 30	-6g	A2-70	
Nonferrous metal bolts, to which JIS B 1057 applied	JIS B 1180	Hexagon head bolt	Finished	M3 × 20	-6g	CU2	

(No. of Standard)	(Type)	(Degree of finish)	(Designation of screw thread × nominal length)	(Grade of screw thread)	(Strength division Property division Material division)	(Material)	(Designated item)
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13. Markings

13.1 Markings on products The markings on the products shall be in accordance with the following:

- (1) The marking on the products for the steel bolts of strength division Column I shall be in accordance with 6.1 of the Text of JIS B 1051.
- (2) The marking on the products for the steel bolts of strength division Column II shall be in accordance with 5. of Annex of JIS B 1051.
- (3) The marking on the products for those of stainless steel bolts, to which JIS B 1054 has applied, shall be in accordance with 8.1 of JIS B 1054.
- (4) The marking on the products for those of nonferrous metal bolts, to which JIS B 1057 has applied, shall be in accordance with 7.1 of JIS B 1057.

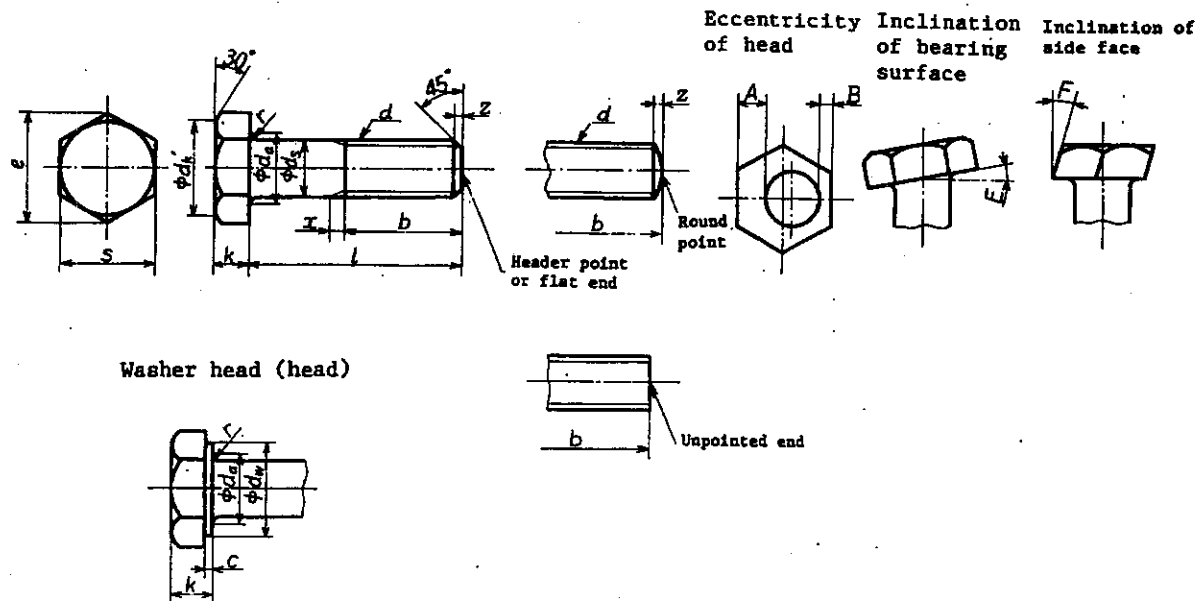
13.2 Marking on packages The packages shall be marked with the following information on the exterior faces.

- (1) Type
- (2) Degree of finish
- (3) Designation of screw thread × nominal length
- (4) Grade of screw thread
- (5) Strength division (for the steel bolts, to which JIS B 1051 has applied), property division (for the stainless steel bolts, to which JIS B 1054 has applied), or material property division (for the nonferrous metal bolts to which JIS B 1057 has applied)
- (6) Material⁽¹⁾
- (7) Quantity and designated items
- (8) Manufacturer's name or abbreviation

Note ⁽¹⁾ The markings of the materials shall be carried out for the stainless steel bolts (except those to which JIS B 1054 has applied), nonferrous metal bolts (except those to which JIS B 1057 has applied) and the steel bolts (except those to which JIS B 1051 has applied), and for other bolts than these may be omitted.

Further, the marking of the material may also be in the common name of the material.

Annex Attached Table 1.1. Hexagon head bolts, finished



Unit: mm

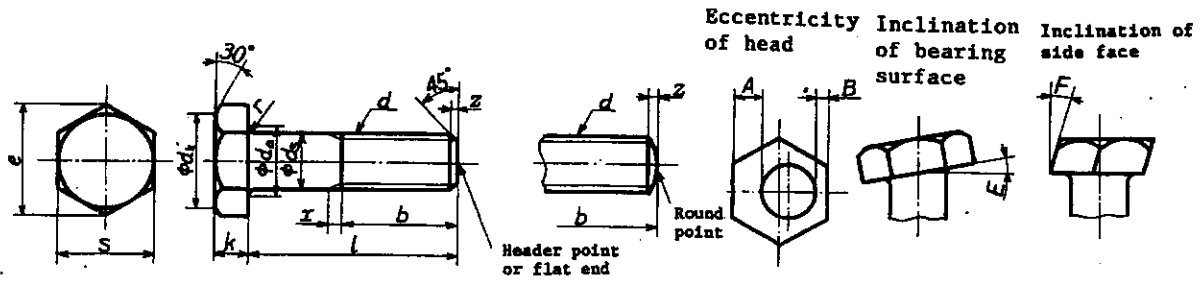
Designations of screw thread (d)		d_s		k		s		e	d_s'	r	d_e	z	$A-B$	E and F
Coarse	Fine	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Approx.	Approx.	Min.	Max.	Approx.	Max.	Max.
M 3	—	3	0 -0.1	2	± 0.1	5.5	0 -0.2	6.4	5.3	0.1	3.6	0.6	0.2	
(M 3.5)	—	3.5		2.4		6		6.9	5.8	0.1	4.1	0.6	0.2	
M 4	—	4		2.8		7		8.1	6.8	0.2	4.7	0.8	0.2	
(M 4.5)	—	4.5		3.2		8		9.2	7.8	0.2	5.2	0.8	0.3	
M 5	—	5	0 -0.15	3.5	± 0.15	8	0 -0.25	9.2	7.8	0.2	5.7	0.9	0.3	
M 6	—	6		4		10		11.5	9.8	0.25	6.8	1	0.3	
(M 7)	—	7		5		11		12.7	10.7	0.25	7.8	1	0.3	
M 8	M 8x1	8		5.5		13		15	12.6	0.4	9.2	1.2	0.4	
M 10	M 10x1.25	10	0 -0.2	7	± 0.2	17	0 -0.35	19.6	16.5	0.4	11.2	1.5	0.5	
M 12	M 12x1.25	12		8		19		21.9	18	0.6	13.7	2	0.7	
(M 14)	(M 14x1.5)	14		9		22		25.4	21	0.6	15.7	2	0.7	
M 16	M 16x1.5	16		10		24		27.7	23	0.6	17.7	2	0.8	
(M 18)	(M 18x1.5)	18	0 -0.25	12	± 0.25	27	0 -0.45	31.2	26	0.6	20.2	2.5	0.9	
M 20	M 20x1.5	20		13		30		34.6	29	0.8	22.4	2.5	0.9	
(M 22)	(M 22x1.5)	22		14		32		37	31	0.8	24.4	2.5	1.1	
M 24	M 24x2	24		15		36		41.6	34	0.8	26.4	3	1.2	
(M 27)	(M 27x2)	27	0 -0.25	17	± 0.25	41	0 -0.55	47.3	39	1	30.4	3	1.3	
M 30	M 30x2	30		19		46		53.1	44	1	33.4	3.5	1.5	
(M 33)	(M 33x2)	33		21		50		57.7	48	1	36.4	3.5	1.6	
M 36	M 36x3	36		23		55		63.5	53	1	39.4	4	1.8	
(M 39)	(M 39x3)	39	0 -0.25	25	± 0.25	60	0 -0.45	69.3	57	1	42.4	4	2	
M 42	—	42		26		65		75	62	1.2	45.6	4.5	2.1	
(M 45)	—	45		28		70		80.8	67	1.2	48.6	4.5	2.3	
M 48	—	48		30		75		86.5	72	1.6	52.6	5	2.4	
(M 52)	—	52	0 -0.3	33	± 0.3	80	0 -0.55	92.4	77	1.6	56.6	5	2.6	
M 56	—	56		35		85		98.1	82	2	63	5.5	2.8	
(M 60)	—	60		38		90		104	87	2	67	5.5	3	
M 64	—	64		40		95		110	92	2	71	6	3	
(M 68)	—	68	0 -0.3	43	± 0.3	100	0 -0.55	115	97	2	75	6	3.3	
—	M 72x6	72		45		105		121	102	2	79	6	3.3	
—	(M 76x6)	76		48		110		127	107	2	83	6	3.5	
—	M 80x6	80		50		115		133	112	2	87	6	3.5	

- Remarks 1. Those of which designations of screw thread are given in parentheses should preferably be not used as far as possible.
2. The nominal length (l), length of threaded part (b) and length of incomplete thread part (x) shall be in accordance with Annex Attached Table 3.
3. The end, unless particularly designated, shall be unpointed end for M6 or under in designation, and be header point, flat point or round point for exceeding that, and, when any one of these is required, it shall be designated by the purchaser.
4. In the case of the rolled thread, for that of M6 or under, unless particularly designated, d_s shall be approximately the effective diameter of screw thread.
- In addition, for that of exceeding M6, d_s may be taken as approximately the effective diameter of screw thread by the designation.
5. When particularly large bearing surface is required, s and e dimensions of one step larger may also be used.
6. When the washer faced head is required, it shall be as designated by the purchaser. However, the thickness (c) and diameter (d_w) of the washer shall be in accordance with the following:

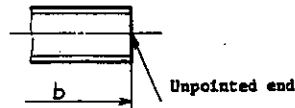
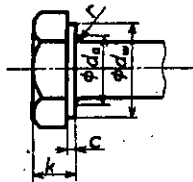
Unit: mm

Designation of screw thread		5	6	7	8	10	12	14	16	18	20	22	24
c	Approx.	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6
d_w	Min.	7.2	9	10	11.7	15.8	17.6	20.4	22.3	25.6	28.5	30.4	34.2

Annex Attached Table 1.2. Hexagon head bolts, semifinished



Washer head (head)



Unit: mm

Designations of screw thread (d)		d_s		k		s		e	d_s'	r	d_s	z	$A-B$	E	F
Fine	Coarse	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Approx.	Approx.	Min.	Max.	Approx.	Max.	Max.	Max.
M 6	—	6	-0.2	4	± 0.25	10	0 -0.6	11.5	9.8	0.25	6.8	1	0.3	1°	2°
(M 7)	—	7		5		11	0	12.7	10.7	0.25	7.8	1	0.3		
M 8	M 8×1	8		5.5		13	0 -0.7	15	12.6	0.4	9.2	1.2	0.4		
M 10	M 10×1.25	10	-0.25	7	± 0.3	17	0 -0.8	19.6	16.5	0.4	11.2	1.5	0.5		
M 12	M 12×1.25	12		8		19		21.9	18	0.6	13.7	2	0.7		
(M 14)	(M 14×1.5)	14		9		22		25.4	21	0.6	15.7	2	0.7		
M 16	M 16×1.5	16	-0.25	10	± 0.35	24	0 -1	27.7	23	0.6	17.7	2	0.8		
(M 18)	(M 18×1.5)	18		12		27		31.2	26	0.6	20.2	2.5	0.9		
M 20	M 20×1.5	20		13		30		34.6	29	0.8	22.4	2.5	0.9		
(M 22)	(M 22×1.5)	22	-0.35	14	± 0.4	32	0 -1.2	37	31	0.8	24.4	2.5	1.1		
M 24	M 24×2	24		15		36		41.6	34	0.8	26.4	3	1.2		
(M 27)	(M 27×2)	27		17		41		47.3	39	1	30.4	3	1.3		
M 30	M 30×2	30	-0.4	19	± 0.5	46	0 -1.4	53.1	44	1	33.4	3.5	1.5		
(M 33)	(M 33×2)	33		21		50		57.7	48	1	36.4	3.5	1.6		
M 36	M 36×3	36		23		55		63.5	53	1	39.4	4	1.8		
(M 39)	(M 39×3)	39	-0.45	25	± 0.5	60	0 -1.4	69.3	57	1	42.4	4	2		
M 42	—	42		26		65		75	62	1.2	45.6	4.5	2.1		
(M 45)	—	45		28		70		80.8	67	1.2	48.6	4.5	2.3		
M 48	—	48	0	30	± 0.5	75	0 -1.4	86.5	72	1.6	52.6	5	2.4		
(M 52)	—	52		33		80		92.4	77	1.6	56.6	5	2.6		
M 56	—	56		35		85		98.1	82	2	63	5.5	2.8		
(M 60)	—	60	-0.45	38	± 0.5	90	0 -1.4	104	87	2	67	5.5	3		
M 64	—	64		40		95		110	92	2	71	6	3		
(M 68)	—	68		43		100		115	97	2	75	6	3.3		
—	M 72×6	72	-0.45	45	± 0.5	105	0 -1.4	121	102	2	79	6	3.3		
—	(M 76×6)	76		48		110		127	107	2	83	6	3.5		
—	M 80×6	80		50		115		133	112	2	87	6	3.5		

- Remarks 1. Those of which designations of screw thread are given in parentheses should preferably be not used as far as possible.
2. The nominal length (l), length of threaded part (b) and length of incomplete thread part (x) shall be in accordance with Annex Attached Table 3.
3. The end shall be chamfered to header point, flat end or round end, and when any one of these is required, it shall be designated by the purchaser. However, those of M6, unless particularly designated, shall be unpointed end.
4. In the case of the rolled thread, for that of M6 or under, unless particularly designated, d_s shall be approximately the effective diameter of screw thread.

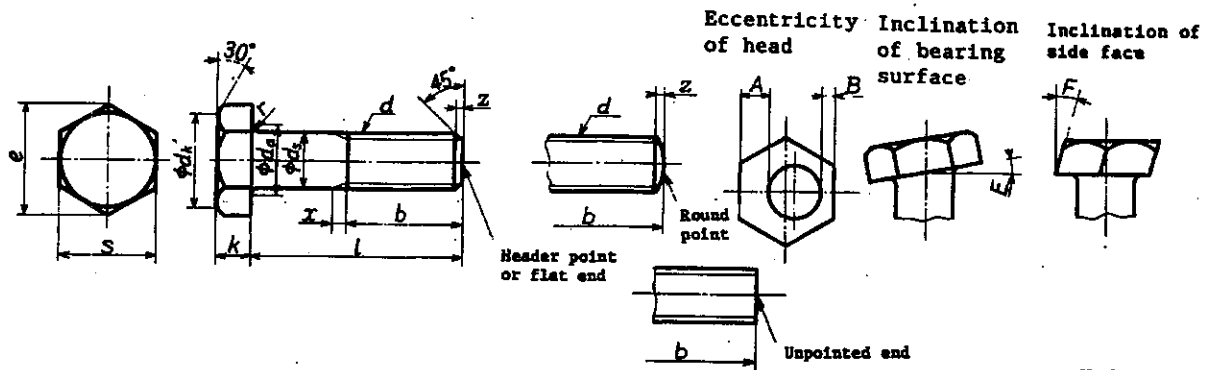
In addition, for that of exceeding M6, d_s may be taken as approximately the effective diameter of screw thread by the designation.

5. When particularly large bearing surface is required, s and e dimensions of one step larger may also be used.
6. When the washer faced head is required, it shall be as designated by the purchaser. However, the thickness (c) and diameter (d_w) of the washer shall be in accordance with the following:

Unit: mm

Designation of screw thread		6	7	8	10	12	14	16	18	20	22	24
c	Approx.	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6
d_w	Min.	9	10	11.7	15.8	17.6	20.4	22.3	25.6	28.5	30.4	34.2

Annex Attached Table 1.3. Hexagon head bolts, regular

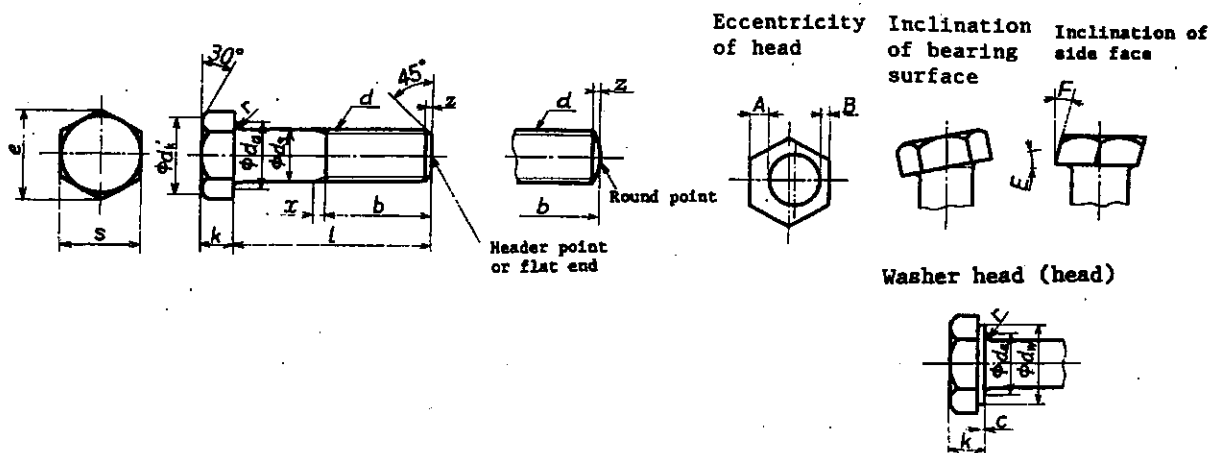


Unit: mm

Designations of screw thread (d)		d_s		k		s		e	d_t'	r	d_e	z	$A-B$	E and F
Coarse	Fine	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Approx.	Approx.	Min.	Max.	Approx.	Max.	Max.
M 6	—	6	+0.6 -0.15	4	± 0.6	10	0 -0.6	11.5	9.8	0.25	7.2	1	0.5	2°
(M 7)	—	7	+0.7 -0.2	5		11	0	12.7	10.7	0.25	8.2	1	0.5	
M 8	M 8×1	8		5.5		13	-0.7	15	12.6	0.4	10.2	1.2	0.6	
M 10	M 10×1.25	10	+0.9 -0.2	7	± 0.8	17	-0.8	19.6	16.5	0.4	12.2	1.5	0.7	
M 12	M 12×1.25	12		8		19		21.9	18	0.6	14.7	2	1	
(M 14)	(M 14×1.5)	14		9		22	0	25.4	21	0.6	16.7	2	1.1	
M 16	M 16×1.5	16	+0.95 -0.35	10	± 0.9	24	-1	27.7	23	0.6	18.7	2	1.2	
(M 18)	(M 18×1.5)	18		12		27		31.2	26	0.6	21.2	2.5	1.4	
M 20	M 20×1.5	20		13		30		34.6	29	0.8	24.4	2.5	1.5	
(M 22)	(M 22×1.5)	22	+1.2 -0.4	14	± 0.9	32	0	37	31	0.8	26.4	2.5	1.6	
M 24	M 24×2	24		15		36		41.6	34	0.8	28.4	3	1.8	
(M 27)	(M 27×2)	27		17		41		47.3	39	1	32.4	3	2	
M 30	M 30×2	30	+1.2 -0.4	19	± 1	46	-1.2	53.1	44	1	35.4	3.5	2.2	
(M 33)	(M 33×2)	33		21		50		57.7	48	1	38.4	3.5	2.4	
M 36	M 36×3	36		23		55		63.5	53	1	42.4	4	2.6	
(M 39)	(M 39×3)	39	+1.2 -0.4	25	± 1	60	-1.2	69.3	57	1	45.4	4	2.8	
M 42	—	42		26		65		75	62	1.2	48.6	4.5	3.1	
(M 45)	—	45		28		70		80.8	67	1.2	52.6	4.5	3.3	
M 48	—	48	+1.2 -0.7	30	± 1.5	75	-1.2	86.5	72	1.6	56.6	5	3.6	
(M 52)	—	52		33		80		92.4	77	1.6	62.6	5	3.8	

- Remarks
1. Those of which designations of screw thread are given in parentheses should preferably be not used as far as possible.
 2. The nominal length (l), length of threaded part (b) and length of incomplete thread part (x) shall be in accordance with Annex Attached Table 3.
 3. The end shall be chamfered to header point, flat end or round end, and when any one of these is required, it shall be designated by the purchaser. However, those of M6, unless particularly designated, shall be unpointed end.
 4. When particularly large bearing surface is required, s and e dimensions of one step larger may also be used.

Annex Attached Table 2.1. Small hexagon head bolts, finished



Unit: mm

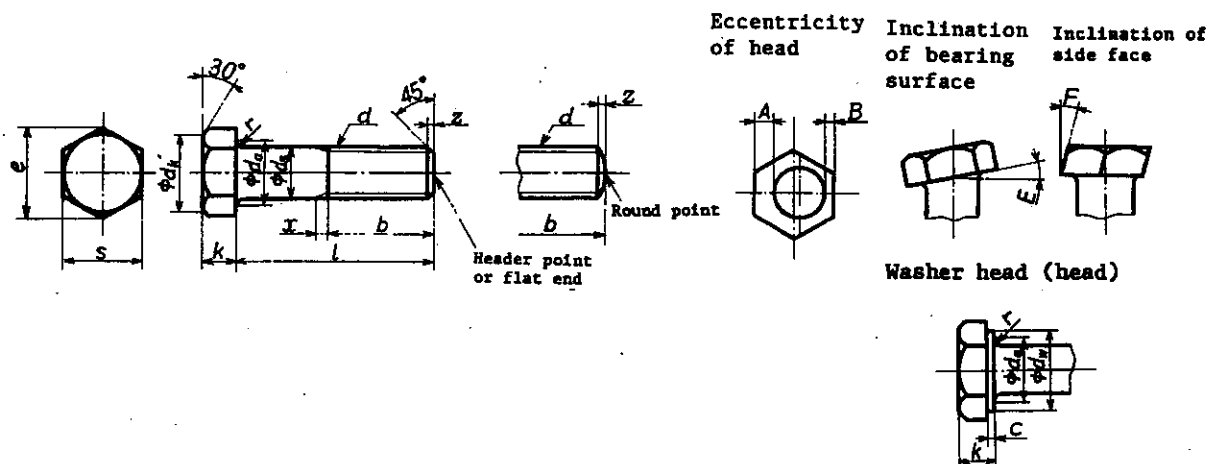
Designations of screw thread (d)		d_s		k		s		c	d_1'	r	d_2	z	$A-B$	E and F
Coarse	Fine	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Approx.	Approx.	Min.	Max.	Approx.	Max.	Max.
M 8	M 8×1	8	0	5.5	± 0.15	12	0	13.9	11.5	0.4	9.2	1.2	0.4	1°
M 10	M 10×1.25	10	-0.15	7		14	-0.25	16.2	13.5	0.4	11.2	1.5	0.4	
M 12	M 12×1.25	12	0 -0.2	8	± 0.2	17	0 -0.35	19.6	16.5	0.6	13.7	2	0.5	
(M 14)	(M 14×1.5)	14		9		19		21.9	18	0.6	15.7	2	0.7	
M 16	M 16×1.5	16		10		22		25.4	21	0.6	17.7	2	0.7	
(M 18)	(M 18×1.5)	18		12		24		27.7	23	0.6	20.2	2.5	0.8	
M 20	M 20×1.5	20		13		27	0 -0.4	31.2	26	0.8	22.4	2.5	0.9	
(M 22)	(M 22×1.5)	22		14		30		34.6	29	0.8	24.4	2.5	0.9	
M 24	M 24×2	24		15		32		37	31	0.8	26.4	3	1.1	
(M 27)	(M 27×2)	27		17		36		41.6	34	1	30.4	3	1.2	
M 30	M 30×2	30	0 -0.25	19	± 0.25	41	0 -0.45	47.3	39	1	33.4	3.5	1.3	
(M 33)	(M 33×2)	33		21		46		53.1	44	1	36.4	3.5	1.5	
M 36	M 36×3	36		23		50		57.7	48	1	39.4	4	1.6	
(M 39)	(M 39×3)	39		25		55		63.5	53	1	42.4	4	1.8	

- Remarks**
1. Those of which designations of screw thread are given in parentheses should preferably be not used as far as possible.
 2. The nominal length (l), length of threaded part (b) and length of incomplete thread part (x) shall be in accordance with Annex Attached Table 3.
 3. The end shall be chamfered to header point, flat end or round end, and when any one of these is required, it shall be designated by the purchaser.
 4. In the case of the rolled thread, d_s may be taken approximately as the effective diameter of screw thread by the designation.
 5. When the washer faced head is required, it shall be as designated by the purchaser. However, the thickness (c) and diameter (d_w) of the washer shall be in accordance with the following:

Unit: mm

Designation of screw thread		8	10	12	14	16	18	20	22	24
c	Approx.	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6
d_w	Min.	10.8	12.6	15.8	17.6	20.4	22.3	25.6	28.5	30.4

Annex Attached Table 2.2. Small hexagon head bolts, semifinished



Unit: mm

Designations of screw thread (d)		d_s		k		s		e	d_k'	r	d_s	z	$A-B$	E	F
Coarse	Fine	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Approx.	Approx.	Min.	Max.	Approx.	Max.	Max.	Max.
M 8	M 8×1	8	0 -0.2	5.5	± 0.25	12	0 -0.7	13.9	11.5	0.4	9.2	1.2	0.4	1°	2°
M 10	M 10×1.25	10	0 -0.25	7	± 0.3	14	0 -0.8	16.2	13.5	0.4	11.2	1.5	0.4		
M 12	M 12×1.25	12		8		17		19.6	16.5	0.6	13.7	2	0.5		
(M 14)	(M 14×1.5)	14		9		19		21.9	18	0.6	15.7	2	0.7		
M 16	M 16×1.5	16		10	± 0.35	22		25.4	21	0.6	17.7	2	0.7		
(M 18)	(M 18×1.5)	18	0 -0.35	12		24	0 -1	27.7	23	0.6	20.2	2.5	0.8		
M 20	M 20×1.5	20		13		27		31.2	26	0.8	22.4	2.5	0.9		
(M 22)	(M 22×1.5)	22		14		30		34.6	29	0.8	24.4	2.5	0.9		
M 24	M 24×2	24		15	± 0.4	32		37	31	0.8	26.4	3	1.1		
(M 27)	(M 27×2)	27	0 -0.4	17		36	0 -1.2	41.6	34	1	30.4	3	1.2		
M 30	M 30×2	30		19		41		47.3	39	1	33.4	3.5	1.3		
(M 33)	(M 33×2)	33		21		46		53.1	44	1	36.4	3.5	1.5		
M 36	M 36×3	36		23	± 0.4	50		57.7	48	1	39.4	4	1.6		
(M 39)	(M 39×3)	39		25		55		63.5	53	1	42.4	4	1.8		

- Remarks 1. Those of which designations of screw thread are given in parentheses should preferably be not used as far as possible.
2. The nominal length (l), length of threaded part (b) and length of incomplete thread part (x) shall be in accordance with Annex Attached Table 3.
3. The end shall be chamfered to header point, flat end or round end, and when any one of these is required, it shall be designated by the purchaser.
4. In the case of the rolled thread, d_s may be taken approximately as the effective diameter of screw thread by the designation.
5. When the washer faced head is required, it shall be as designated by the purchaser. However, the thickness (c) and diameter (d_w) of the washer shall be in accordance with the following.

Unit: mm

Designation of screw thread		8	10	12	14	16	18	20	22	24
c	Approx.	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6
d_w	Min.	10.8	12.6	15.8	17.6	20.4	22.3	25.6	28.5	30.4

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Remarks 1. Inside the frame of bold lines shall be the recommended nominal lengths (l) respectively for each designation of screw thread, and the numerical values in the frame indicate the recommended threaded part lengths (b).

Those of l dimensions given in parentheses should preferably be not used as far as possible.

2. The length (x) of incomplete threaded part shall be approximately 2 pitches, and a be as approximately 3 pitches.
3. In the case of $b+x \geq l$, it shall be of continuous thread stud.
4. As to l and b , if particularly required, those of other than Annex Attached Table 3 may be used by the designation.
5. The tolerances for l and b , unless particularly designated, shall be in accordance with Table A and Table B.

Table A

Unit: mm

Division of l	Tolerances on l		
	Finished and semifinished		Regular
	Nominal diameter 3 to 24	Nominal diameter 27 to 80	Nominal diameter 6 to 52
50 or under	± 0.5	± 0.8	± 1
Over 50 up to and incl. 120	± 0.7	± 1.1	± 1.4
Over 120 up to and incl. 250	± 0.9	± 1.4	± 1.8
Over 250	± 1.2	± 1.8	± 2.3

Table B

Unit: mm

Division of b		Tolerances on b^*
30 or under	Finished and semifinished	+ 3
	Regular	+ 5
Over 30 up to and incl. 50	Finished and semifinished	+ 4
	Regular	+ 6
Over 50 up to and incl. 80	Finished and semifinished	+ 5
	Regular	+ 8
Over 80 up to and incl. 120	Finished and semifinished	+ 7
	Regular	+ 10
Over 120	Finished and semifinished	+ 10
	Regular	+ 13

Note * The lower tolerance shall be 0.

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