



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS B 1180 : 2014

(JFRI/JSA)

**Hexagon head bolts and hexagon
head screws**

ICS 21.060.10

Reference number : **JIS B 1180 : 2014 (E)**

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Date of Establishment: 1961-09-01

Date of Revision: 2014-04-21

Date of Public Notice in Official Gazette: 2014-04-21

Investigated by: Japanese Industrial Standards Committee
Standards Board

Technical Committee on Machine Elements

JIS B 1180:2014, First English edition published in 2015-03

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

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Printed in Japan

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry, through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Research Institute for Screw Threads and Fasteners (JFRI)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently, **JIS B 1180:2009** is replaced with this Standard.

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Hexagon head bolts and hexagon head screws

Introduction

This Japanese Industrial Standard has been prepared based on the fourth edition of **ISO 4014** published in 2011, first edition of **ISO 4015** published in 1979, the fourth editions of **ISO 4016**, **ISO 4017** and **ISO 4018** published in 2011, and the third editions of **ISO 8676** and **ISO 8765** published in 2011 by integrating them into one standard without modifying the technical contents for corresponding parts (shapes and dimensions, product specifications and example of product designation). Annex JA contains specifications of characteristics of hexagon head bolts and screws that are not given in **ISO** standards, to reflect the actualities of the production and application of bolts and screws that are unique to Japan.

The portions given sidelines or dotted underlines are the matters in which the contents of the original International Standards have been modified. A list of modifications with the explanations is given in Annex JB.

1 Scope

This Standard specifies hexagon head bolts and hexagon head screws (hereafter generically referred to as “hexagon head bolts”) made of steel, stainless steel and non-ferrous metals.

If, in special cases, dimensions and product specifications other than those listed in this Standard are required, they shall be selected from existing Japanese Industrial Standards, for example **JIS B 0205-4**, **JIS B 0209-1**, **JIS B 1003**, **JIS B 1009**, **JIS B 1021**, **JIS B 1051** and **JIS B 1054-1** upon agreement between the purchaser and the manufacturer.

Annex JA gives specifications of hexagon head bolts not given in **ISO 4014** to **ISO 4018**, **ISO 8676** and **ISO 8765**.

NOTE : The International Standards corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 4014:2011 *Hexagon head bolts—Product grades A and B*

ISO 4015:1979 *Hexagon head bolts—Product grade B—Reduced shank (shank diameter approximately equal to pitch diameter)*

ISO 4016:2011 *Hexagon head bolts—Product grade C*

ISO 4017:2011 *Hexagon head screws—Product grades A and B*

ISO 4018:2011 *Hexagon head screws—Product grade C*

ISO 8676:2011 *Hexagon head screws with metric fine pitch thread—Product grades A and B*

ISO 8765:2011 *Hexagon head bolts with metric fine pitch thread—Product grades A and B (Overall evaluation: MOD)*

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) listed below shall be applied.

JIS B 0143 *Fasteners—Bolts, screws, studs and nuts—Symbols and descriptions of dimensions*

NOTE : Corresponding International Standard: ISO 225:2010 *Fasteners—Bolts, screws, studs and nuts—Symbols and descriptions of dimensions* (IDT)

JIS B 0205-2 *ISO general purpose metric screw threads—Part 2: General plan*

NOTE : Corresponding International Standard: ISO 261:1998 *ISO general purpose metric screw threads—General plan* (IDT)

JIS B 0205-4 *ISO general purpose metric screw threads—Part 4: Basic dimensions*

NOTE : Corresponding International Standard: ISO 724:1993 *ISO general-purpose metric screw threads—Basic dimensions* (IDT)

JIS B 0209-1 *ISO general purpose metric screw threads—Tolerances—Part 1: Principles and basic data*

NOTE : Corresponding International Standard: ISO 965-1:1998 *ISO general-purpose metric screw threads—Tolerances—Part 1: Principles and basic data* (IDT)

JIS B 0251 *Limit gauges for metric screw threads*

JIS B 0601 *Geometrical Product Specifications (GPS)—Surface texture: Profile method—Terms, definitions and surface texture parameters*

JIS B 0651 *Geometrical Product Specifications (GPS)—Surface texture: Profile method—Nominal characteristics of contact (stylus) instruments*

JIS B 0659-1 *Geometrical Product Specifications (GPS)—Surface texture: Profile method; Measurement standards—Part 1: Material measures*

JIS B 1003 *Fasteners—Ends of parts with external ISO metric thread*

NOTE : Corresponding International Standard: ISO 4753:2011 *Fasteners—Ends of parts with external ISO metric thread* (IDT)

JIS B 1006 *Fasteners—Thread run-outs for external thread in accordance with ISO general purpose metric screw threads*

NOTE : Corresponding International Standard: ISO 3508:1976 *Thread run-outs for fasteners with thread in accordance with ISO 261 and ISO 262* (MOD)

JIS B 1009 *Bolts, screws and studs—Nominal lengths, and thread lengths for general purpose bolts*

- NOTE : Corresponding International Standard: ISO 888:1976 *Bolts, screws and studs—Nominal lengths, and thread lengths for general purpose bolts* (MOD)
- JIS B 1021 *Tolerances for fasteners—Part 1: Bolts, screws, studs and nuts—Product grades A, B and C*
- NOTE : Corresponding International Standard: ISO 4759-1:2000 *Tolerances for fasteners—Part 1: Bolts, screws, studs and nuts—Product grades A, B and C* (IDT)
- JIS B 1041 *Fasteners—Surface discontinuities—Part 1: Bolts, screws and studs for general requirements*
- NOTE : Corresponding International Standard: ISO 6157-1:1988 *Fasteners—Surface discontinuities—Part 1: Bolts, screws and studs for general requirements* (IDT)
- JIS B 1044 *Fasteners—Electroplated coatings*
- NOTE : Corresponding International Standard: ISO 4042:1999 *Fasteners—Electroplated coatings* (IDT)
- JIS B 1046 *Fasteners—Non-electrolytically applied zinc flake coatings*
- NOTE : Corresponding International Standard: ISO 10683:2000 *Fasteners—Non-electrolytically applied zinc flake coatings* (IDT)
- JIS B 1051 *Mechanical properties of fasteners made of carbon steel and alloy steel—Part 1: Bolts, screws and studs*
- NOTE : Corresponding International Standard: ISO 898-1:1999 *Mechanical properties of fasteners made of carbon steel and alloy steel—Part 1: Bolts, screws and studs* (IDT)
- JIS B 1054-1 *Mechanical properties of corrosion-resistant stainless steel fasteners—Part 1: Bolts, screws and studs*
- NOTE : Corresponding International Standard: ISO 3506-1:2009 *Mechanical properties of corrosion-resistant stainless steel fasteners—Part 1: Bolts, screws and studs* (IDT)
- JIS B 1057 *Mechanical properties of non-ferrous metal fasteners*
- NOTE : Corresponding International Standard: ISO 8839:1986 *Mechanical properties of fasteners—Bolts, screws, studs and nuts made of non-ferrous metals* (MOD)
- JIS B 1071 *Fasteners—Methods of verification for size and geometry*
- JIS B 1091 *Fasteners—Acceptance inspection*
- NOTE : Corresponding International Standard: ISO 3269:2000 *Fasteners—Acceptance inspection* (IDT)
- JIS B 1099 *Fasteners—General requirements for bolts, screws, studs and nuts*
- NOTE : Corresponding International Standard: ISO 8992:2005 *Fasteners—General requirements for bolts, screws, studs and nuts* (IDT)

3 Types

The types of hexagon head bolts are as shown in table 1.

Table 1 Types of hexagon head bolts

Type			Range of nominal diameter d of thread	Corresponding International Standard (informative)
Designation	Pitch of thread	Product grade		
Nominal diameter hexagon head bolt	Coarse thread	A	$d = 1.6 \text{ mm to } 24 \text{ mm}$ [nominal length l is up to and including $10d$ or $150 \text{ mm}^{\text{a)}$]	ISO 4014
		B	$d = 1.6 \text{ mm to } 24 \text{ mm}$ [nominal length l is over $10d$ or $150 \text{ mm}^{\text{a)}$]	
			$d = 27 \text{ mm to } 64 \text{ mm}$	
	Fine pitch thread	C	$d = 5 \text{ mm to } 64 \text{ mm}$	ISO 4016
		A	$d = 8 \text{ mm to } 24 \text{ mm}$ [nominal length l is up to and including $10d$ or $150 \text{ mm}^{\text{a)}$]	ISO 8765
		B	$d = 8 \text{ mm to } 24 \text{ mm}$ [nominal length l is over $10d$ or $150 \text{ mm}^{\text{a)}$]	
			$d = 27 \text{ mm to } 64 \text{ mm}$	
Hexagon head screw bolt	Coarse thread	A	$d = 1.6 \text{ mm to } 24 \text{ mm}$ [nominal length l is up to and including $10d$ or $150 \text{ mm}^{\text{a)}$]	ISO 4017
		B	$d = 1.6 \text{ mm to } 24 \text{ mm}$ [nominal length l is over $10d$ or $150 \text{ mm}^{\text{a)}$]	
			$d = 27 \text{ mm to } 64 \text{ mm}$	
	Fine pitch thread	C	$d = 5 \text{ mm to } 64 \text{ mm}$	ISO 4018
		A	$d = 8 \text{ mm to } 24 \text{ mm}$ [nominal length l is up to and including $10d$ or $150 \text{ mm}^{\text{a)}$]	ISO 8676
		B	$d = 8 \text{ mm to } 24 \text{ mm}$ [nominal length l is over $10d$ or $150 \text{ mm}^{\text{a)}$]	
			$d = 27 \text{ mm to } 64 \text{ mm}$	
Pitch diameter hexagon head bolt	Coarse thread	B	$d = 3 \text{ mm to } 20 \text{ mm}$	ISO 4015
Note ^{a)} Whichever is the shorter.				

4 Shape and dimensions, product specifications and example of product designation

Shape and dimensions, product specifications and example of product designation of the hexagon head bolts shall be in accordance with table 2.

Symbols and descriptions of dimensions shall be in accordance with **JIS B 0143**.

Table 2 Shape and dimensions, product specifications and example of product designation

Type			Shape and dimensions			Product specifications	Example of product designation
Designation	Pitch of thread	Product grade	Figure	First selection	Second selection		
Nominal diameter hexagon head bolt	Coarse thread	A	Figure 1	Table 3	Table 4	Table 5	Table 6
		B					
		C	Figure 2	Table 7	Table 8	Table 9	Table 10
	Fine pitch thread	A	Figure 3	Table 11	Table 12	Table 13	Table 14
		B					
		C	Figure 5	Table 19	Table 20	Table 21	Table 22
Hexagon head screw bolt	Coarse thread	A	Figure 4	Table 15	Table 16	Table 17	Table 18
		B					
		C	Figure 5	Table 19	Table 20	Table 21	Table 22
	Fine pitch thread	A	Figure 6	Table 23	Table 24	Table 25	Table 26
		B					
		C	Figure 5	Table 19	Table 20	Table 21	Table 22
Pitch diameter hexagon head bolt	Coarse thread	B	Figure 7	Table 27		Table 28	Table 29

5 Marking

5.1 Marking on products

Products found to be in conformance with all the requirements in this Standard shall be given the following marking.

- For steel bolts, marking on products shall be in accordance with **9.3** of **JIS B 1051**.
- For stainless steel bolts, marking on products for which the requirements in **JIS B 1054-1** have been applied shall be in accordance with **4.2** of **JIS B 1054-1**.
- For non-ferrous metal bolts, marking on products for which the requirements in **JIS B 1057** have been applied shall be in accordance with **9.1** of **JIS B 1057**.

5.2 Marking on packages

Packages of products found to be in conformance with all the requirements in this Standard shall be given the following marking on their outer surface.

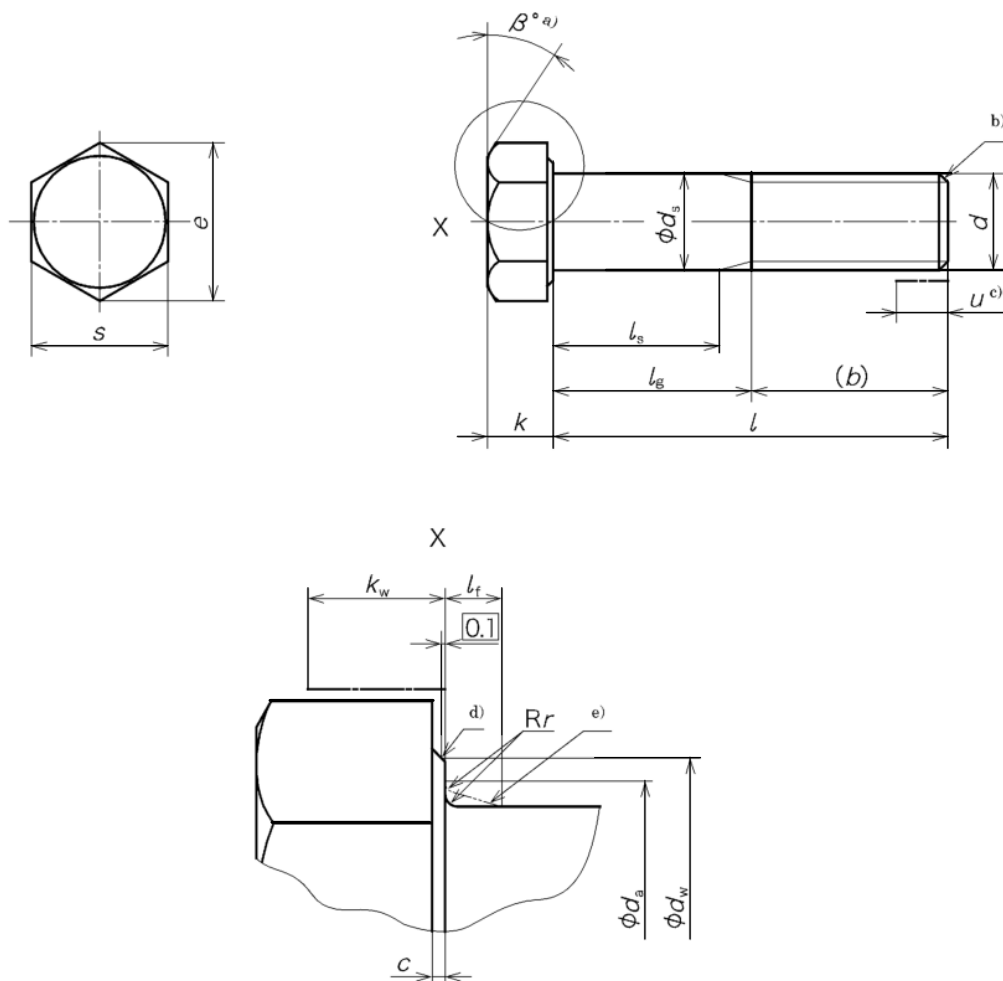
- Type
- Product grade
- Designation of thread × thread nominal length
- Tolerance class of thread
- Property class (for steel bolts for which the requirements in **JIS B 1051** have been applied), steel grade and property class (for stainless steel bolts for which the requirements in **JIS B 1054-1** have been applied), or material class (for non-ferrous metal steel bolts for which the requirements in **JIS B 1057** have been applied).

- f) Material ¹⁾
- g) Quantity and special requirements
- h) Name of manufacturer or its abbreviation

Note ¹⁾ The marking of material is mandatory for stainless steel bolts (except for those for which the requirements in **JIS B 1054-1** have been applied), non-ferrous metal bolts (except for those for which the requirements in **JIS B 1057** have been applied), and steel bolts with nominal diameter of thread 42 mm or over (except for those for which the requirements in **JIS B 1051** have been applied), and for other bolts, it is optional.

For marking of material, the general name of the material may be used.

Unit: mm



- Notes
- a) $\beta = 15^\circ$ to 30°
 - b) Point shall be chamfered. For threads of M4 or under it may be as-rolled (see **JIS B 1003**).
 - c) Incomplete thread length at thread point $u \leq 2P$.
 - d) Reference datum for d_w .
 - e) Maximum underhead fillet.

Figure 1 Nominal diameter hexagon head bolt, coarse, product grades A and B

Table 3 Dimensions of nominal diameter hexagon head bolt, coarse, product grades A and B (first selection)

Unit: mm

Designation of thread d				M1.6	M2	M2.5	M3	M4	M5	M6	M8	M10
$p^a)$				0.35	0.4	0.45	0.5	0.7	0.8	1	1.25	1.5
b (informative)		b)		9	10	11	12	14	16	18	22	26
		c)		15	16	17	18	20	22	24	28	32
		d)		28	29	30	31	33	35	37	41	45
c		max.		0.25	0.25	0.25	0.40	0.40	0.50	0.50	0.60	0.60
		min.		0.10	0.10	0.10	0.15	0.15	0.15	0.15	0.15	0.15
d_a		max.		2	2.6	3.1	3.6	4.7	5.7	6.8	9.2	11.2
d_s	Reference dimension = max.			1.60	2.00	2.50	3.00	4.00	5.00	6.00	8.00	10.00
	Product grade	A	min.	1.46	1.86	2.36	2.86	3.82	4.82	5.82	7.78	9.78
		B		1.35	1.75	2.25	2.75	3.70	4.70	5.70	7.64	9.64
d_w	Product grade	A	min.	2.27	3.07	4.07	4.57	5.88	6.88	8.88	11.63	14.63
		B		2.30	2.95	3.95	4.45	5.74	6.74	8.74	11.47	14.47
e	Product grade	A	min.	3.41	4.32	5.45	6.01	7.66	8.79	11.05	14.38	17.77
		B		3.28	4.18	5.31	5.88	7.50	8.63	10.89	14.20	17.59
l_f		max.		0.6	0.8	1	1	1.2	1.2	1.4	2	2
k	Reference dimension			1.1	1.4	1.7	2	2.8	3.5	4	5.3	6.4
	Product grade	A	max.	1.225	1.525	1.825	2.125	2.925	3.65	4.15	5.45	6.58
			min.	0.975	1.275	1.575	1.875	2.675	3.35	3.85	5.15	6.22
	Product grade	B	max.	1.3	1.6	1.9	2.2	3.0	3.74	4.24	5.54	6.69
			min.	0.9	1.2	1.5	1.8	2.6	3.26	3.76	5.06	6.11
$k_w^e)$	Product grade	A	min.	0.68	0.89	1.10	1.31	1.87	2.35	2.70	3.61	4.35
		B		0.63	0.84	1.05	1.26	1.82	2.28	2.63	3.54	4.28
r		min.		0.1	0.1	0.1	0.1	0.2	0.2	0.25	0.4	0.4
s	Reference dimension = max.			3.20	4.00	5.00	5.50	7.00	8.00	10.00	13.00	16.00
	Product grade	A	min.	3.02	3.82	4.82	5.32	6.78	7.78	9.78	12.73	15.73
		B		2.90	3.70	4.70	5.20	6.64	7.64	9.64	12.57	15.57

Table 3 (continued)

Unit: mm

Product grade					l_s and l_g^D																			
l					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		
Nominal length	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
12	11.65	12.35	—	—	1.2	3																		
16	15.65	16.35	—	—	5.2	7	4	6	2.75	5			For sizes of bolts with l above the solid, bold, stepped line, table 15 is recommended.											
20	19.58	20.42	18.95	21.05			8	10	6.75	9	5.5	8												
25	24.58	25.42	23.95	26.05					11.75	14	10.5	13	7.5	11	5	9								
30	29.58	30.42	28.95	31.05							15.5	18	12.5	16	10	14	7	12						
35	34.5	35.5	33.75	36.25									17.5	21	15	19	12	17						
40	39.5	40.5	38.75	41.25									22.5	26	20	24	17	22	11.75	18				
45	44.5	45.5	43.75	46.25											25	29	22	27	16.75	23	11.5	19		
50	49.5	50.5	48.75	51.25											30	34	27	32	21.75	28	16.5	24		
55	54.4	55.6	53.5	56.5													32	37	26.75	33	21.5	29		
60	59.4	60.6	58.5	61.5													37	42	31.75	38	26.5	34		
65	64.4	65.6	63.5	66.5															36.75	43	31.5	39		
70	69.4	70.6	68.5	71.5																41.75	48	36.5	44	
80	79.4	80.6	78.5	81.5																51.75	58	46.5	54	
90	89.3	90.7	88.25	91.75																		56.5	64	
100	99.3	100.7	98.25	101.75																		66.5	74	
110	109.3	110.7	108.25	111.75																				
120	119.3	120.7	118.25	121.75																				

For sizes of bolts with l above the solid, bold, stepped line, table 15 is recommended.

Table 3 (continued)

Unit: mm

Designation of thread d				M12	M16	M20	M24	M30	M36	M42	M48	M56	M64
$p^{a)}$				1.75	2	2.5	3	3.5	4	4.5	5	5.5	6
b (informative)		b)		30	38	46	54	66	—	—	—	—	—
		c)		36	44	52	60	72	84	96	108	—	—
		d)		49	57	65	73	85	97	109	121	137	153
c		max.		0.60	0.8	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0
		min.		0.15	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
d_a		max.		13.7	17.7	22.4	26.4	33.4	39.4	45.6	52.6	63	71
d_s	Reference dimension = max.			12.00	16.00	20.00	24.00	30.00	36.00	42.00	48.00	56.00	64.00
	Product grade	A	min.	11.73	15.73	19.67	23.67	—	—	—	—	—	—
		B		11.57	15.57	19.48	23.48	29.48	35.38	41.38	47.38	55.26	63.26
d_w	Product grade	A	min.	16.63	22.49	28.19	33.61	—	—	—	—	—	—
		B		16.47	22	27.7	33.25	42.75	51.11	59.95	69.45	78.66	88.16
e	Product grade	A	min.	20.03	26.75	33.53	39.98	—	—	—	—	—	—
		B		19.85	26.17	32.95	39.55	50.85	60.79	71.3	82.6	93.56	104.86
l_f		max.		3	3	4	4	6	6	8	10	12	13
k	Reference dimension			7.5	10	12.5	15	18.7	22.5	26	30	35	40
	Product grade	A	max.	7.68	10.18	12.715	15.215	—	—	—	—	—	—
			min.	7.32	9.82	12.285	14.785	—	—	—	—	—	—
	Product grade	B	max.	7.79	10.29	12.85	15.35	19.12	22.92	26.42	30.42	35.5	40.5
			min.	7.21	9.71	12.15	14.65	18.28	22.08	25.58	29.58	34.5	39.5
$k_w^{e)}$	Product grade	A	min.	5.12	6.87	8.6	10.35	—	—	—	—	—	—
		B		5.05	6.8	8.51	10.26	12.8	15.46	17.91	20.71	24.15	27.65
r		min.		0.6	0.6	0.8	0.8	1	1	1.2	1.6	2	2
s	Reference dimension = max.			18.00	24.00	30.00	36.00	46	55.0	65.0	75.0	85.0	95.0
	Product grade	A	min.	17.73	23.67	29.67	35.38	—	—	—	—	—	—
		B		17.57	23.16	29.16	35.00	45	53.8	63.1	73.1	82.8	92.8

Table 3 (continued)

Unit: mm

Product grade					l_s and l_g ^①																			
l					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		
Nominal length	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
50	49.5	50.5	—	—	11.25	20																		
55	54.4	55.6	53.5	56.5	16.25	25																		
60	59.4	60.6	58.5	61.5	21.25	30																		
65	64.4	65.6	63.5	66.5	26.25	35	17	27																
70	69.4	70.6	68.5	71.5	31.25	40	22	32																
80	79.4	80.6	78.5	81.5	41.25	50	32	42	21.5	34														
90	89.3	90.7	88.25	91.75	51.25	60	42	52	31.5	44	21	36												
100	99.3	100.7	98.25	101.75	61.25	70	52	62	41.5	54	31	46												
110	109.3	110.7	108.25	111.75	71.25	80	62	72	51.5	64	41	56	26.5	44										
120	119.3	120.7	118.25	121.75	81.25	90	72	82	61.5	74	51	66	36.5	54										
130	129.2	130.8	128	132			76	86	65.5	78	55	70	40.5	58										
140	139.2	140.8	138	142			86	96	75.5	88	65	80	50.5	68	36	56								
150	149.2	150.8	148	152			96	106	85.5	98	75	90	60.5	78	46	66								
160	—	—	158	162			106	116	95.5	108	85	100	70.5	88	56	76	41.5	64						
180	—	—	178	182					115.5	128	105	120	90.5	108	76	96	61.5	84	47	72				
200	—	—	197.7	202.3					135.5	148	125	140	110.5	128	96	116	81.5	104	67	92				
220	—	—	217.7	222.3							132	147	117.5	135	103	123	88.5	111	74	99	55.5	83		
240	—	—	237.7	242.3							152	167	137.5	155	123	143	108.5	131	94	119	75.5	103		
260	—	—	257.4	262.6									157.5	175	143	163	128.5	151	114	139	95.5	123	77	
280	—	—	277.4	282.6									177.5	195	163	183	148.5	171	134	159	115.5	143	97	
300	—	—	297.4	302.6									197.5	215	183	203	168.5	191	154	179	135.5	163	117	
320	—	—	317.15	322.85											203	223	188.5	211	174	199	155.5	183	137	
340	—	—	337.15	342.85											233	243	208.5	231	194	219	175.5	203	157	
360	—	—	357.15	362.85											243	263	228.5	251	214	239	195.5	223	177	
380	—	—	377.15	382.85													248.5	271	234	259	215.5	243	197	
400	—	—	397.15	402.85													268.5	291	254	279	235.5	263	217	
420	—	—	416.85	423.15													288.5	311	274	299	255.5	283	237	
440	—	—	436.85	443.15													308.5	331	294	319	275.5	303	257	
460	—	—	456.85	463.15															314	339	295.5	323	277	
480	—	—	476.85	483.15															334	359	315.5	343	297	
500	—	—	496.85	503.15																	335.5	363	317	

Table 3 (concluded)

Preferred lengths are defined in terms of l_s and l_g :

- product grade A, above the discontinuous, stepped line;
- product grade B, below this stepped line.

Notes ^{a)} P is the pitch of the thread.

^{b)} For $l_{\text{nom}} \leq 125$ mm.

^{c)} For $125 \text{ mm} < l_{\text{nom}} \leq 200$ mm.

^{d)} For $l_{\text{nom}} > 200$ mm.

^{e)} $k_{w,\text{min}} = 0.7 k_{\text{min}}$

^{f)} $l_{g,\text{max}} = l_{\text{nom}} - b$

$l_{s,\text{min}} = l_{g,\text{max}} - 5P$

Table 4 Dimensions of nominal diameter hexagon head bolt, coarse, product grades A and B (second selection)

Unit: mm

Designation of thread <i>d</i>					M3.5	M14	M18	M22	M27					
<i>p</i> ^{a)}					0.6	2	2.5	2.5	3					
<i>b</i> (informative)			b)		13	34	42	50	60					
			c)		19	40	48	56	66					
			d)		32	53	61	69	79					
<i>c</i>			max.		0.40	0.60	0.8	0.8	0.8					
			min.		0.15	0.15	0.2	0.2	0.2					
<i>d</i> _a			max.		4.1	15.7	20.2	24.4	30.4					
<i>d</i> _s	Reference dimension = max.				3.50	14.00	18.00	22.00	27.00					
	Product grade	A	min.		3.32	13.73	17.73	21.67	—					
		B			3.20	13.57	17.57	21.48	26.48					
<i>d</i> _w	Product grade	A	min.		5.07	19.64	25.34	31.71	—					
		B			4.95	19.15	24.85	31.35	38					
<i>e</i>	Product grade	A	min.		6.58	23.36	30.14	37.72	—					
		B			6.44	22.78	29.56	37.29	45.2					
<i>l</i> _f			max.		1	3	3	4	6					
<i>k</i>	Reference dimension				2.4	8.8	11.5	14	17					
	Product grade	A	max.		2.525	8.98	11.715	14.215	—					
			min.		2.275	8.62	11.285	13.785	—					
	Product grade	B	max.		2.6	9.09	11.85	14.35	17.35					
			min.		2.2	8.51	11.15	13.65	13.65					
<i>k</i> _w ^{e)}	Product grade	A	min.		1.59	6.03	7.9	9.65	—					
		B			1.54	5.96	7.81	9.56	11.66					
<i>r</i>			min.		0.1	0.6	0.6	0.8	1					
<i>s</i>	Reference dimension = max.				6.00	21.00	27.00	34.00	41					
	Product grade	A	min.		5.82	20.67	26.67	33.38	—					
		B			5.70	20.16	26.16	33.00	40					
Product grade					<i>l</i> _s and <i>l</i> _g ^{f)}									
<i>l</i>					<i>l</i> _s	<i>l</i> _g	<i>l</i> _s	<i>l</i> _g	<i>l</i> _s	<i>l</i> _g	<i>l</i> _s	<i>l</i> _g	<i>l</i> _s	<i>l</i> _g
Nominal length	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
20	19.58	20.42	—	—	4	7								
25	24.58	25.42	—	—	9	12								
30	29.58	30.42	—	—	14	17								
35	34.5	35.5	—	—	19	22	For sizes of bolts with <i>l</i> above the solid, bold, stepped line, table 16 is recommended.							
40	39.5	40.5	38.75	41.25										
45	44.5	45.5	43.75	46.25										
50	49.5	50.5	48.75	51.25										
55	54.4	55.6	53.5	56.5										
60	59.4	60.6	58.5	61.5			16	26						
65	64.4	65.6	63.5	66.5			21	31						
70	69.4	70.6	68.5	71.5			26	36	15.5	28				
80	79.4	80.6	78.5	81.5			36	46	25.5	38				
90	89.3	90.7	88.25	91.75			46	56	35.5	48	27.5	40		
100	99.3	100.7	98.25	101.75			56	66	45.5	58	37.5	50	25	40
110	109.3	110.7	108.25	111.75			66	76	55.5	68	47.5	60	35	50
120	119.3	120.7	118.25	121.75			76	86	65.5	78	57.5	70	45	60
130	129.2	130.8	128	132			80	90	69.5	82	61.5	74	49	64
140	139.2	140.8	138	142			90	100	79.5	92	71.5	84	59	74
150	149.2	150.8	148	152					89.5	102	81.5	94	69	84
160	—	—	158	162					99.5	112	91.5	104	79	94
180	—	—	178	182					119.5	132	111.5	124	99	114
200	—	—	197.7	202.3							131.5	144	119	134
220	—	—	217.7	222.3							138.5	151	126	141
240	—	—	237.7	242.3									146	161
260	—	—	257.4	262.6									166	181

Table 4 (continued)

Unit: mm

Designation of thread <i>d</i>					M33	M39	M45	M52	M60							
<i>p</i> ^{a)}					3.5	4	4.5	5	5.5							
<i>b</i> (informative)			b)		—	—	—	—	—							
			c)		78	90	102	116	—							
			d)		91	103	115	129	145							
<i>c</i>			max.		0.8	1.0	1.0	1.0	1.0							
			min.		0.2	0.3	0.3	0.3	0.3							
<i>d</i> _a			max.		36.4	42.4	48.6	56.6	67							
<i>d</i> _s	Reference dimension = max.				33.00	39.00	45.00	52.00	60.00							
	Product grade	A	min.		—	—	—	—	—							
B		32.38			38.38	44.38	51.26	59.26								
<i>d</i> _w	Product grade	A	min.		—	—	—	—	—							
		B			46.55	55.86	64.7	74.2	83.41							
<i>e</i>	Product grade	A	min.		—	—	—	—	—							
		B			55.37	66.44	76.95	88.25	99.21							
<i>l</i> _f			max.		6	6	8	10	12							
<i>k</i>	Reference dimension				21	25	28	33	38							
	Product grade	A	max.		—	—	—	—	—							
			min.		—	—	—	—	—							
	Product grade	B	max.		21.42	25.42	28.42	33.5	38.5							
			min.		20.58	24.58	27.58	32.5	37.5							
<i>k</i> _w ^{e)}	Product grade	A	min.		—	—	—	—	—							
		B			14.41	17.21	19.31	22.75	26.25							
<i>r</i>			min.		1	1	1.2	1.6	2							
<i>s</i>	Reference dimension = max.				50	60.0	70.0	80.0	90.0							
	Product grade	A	min.		—	—	—	—	—							
		B			49	58.8	68.1	78.1	87.8							
Product grade					<i>l</i> _s and <i>l</i> _g ^{f)}											
A			B													
<i>l</i>					<i>l</i> _s	<i>l</i> _g	<i>l</i> _s	<i>l</i> _g	<i>l</i> _s	<i>l</i> _g	<i>l</i> _s	<i>l</i> _g	<i>l</i> _s	<i>l</i> _g		
Nominal length	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.		
130	129.2	130.8	128	132	34.5	52	For sizes of bolts with <i>l</i> above the solid, bold, stepped line, table 16 is recommended.									
140	139.2	140.8	138	142	44.5	62										
150	149.2	150.8	148	152	54.5	72	40	60								
160	—	—	158	162	64.5	82	50	70								
180	—	—	178	182	84.5	102	70	90	55.5	78						
200	—	—	197.7	202.3	104.5	122	90	110	75.5	98	59	84				
220	—	—	217.7	222.3	111.5	129	97	117	82.5	105	66	91				
240	—	—	237.7	242.3	131.5	149	117	137	102.5	125	86	111	67.5	95		
260	—	—	257.4	262.6	151.5	169	137	157	122.5	145	106	131	87.5	115		
280	—	—	277.4	282.6	171.5	189	157	177	142.5	165	126	151	107.5	135		
300	—	—	297.4	302.6	191.5	209	177	197	162.5	185	146	171	127.5	155		
320	—	—	317.15	322.85	211.5	229	197	217	182.5	205	166	191	147.5	175		
340	—	—	337.15	342.85			217	237	202.5	225	186	211	167.5	195		
360	—	—	357.15	362.85			237	257	222.5	245	206	231	187.5	215		
380	—	—	377.15	382.85			257	277	242.5	265	226	251	207.5	235		
400	—	—	397.15	402.85					262.5	285	246	271	227.5	255		
420	—	—	416.85	423.15					282.5	305	266	291	247.5	275		
440	—	—	436.85	443.15					302.5	325	286	311	267.5	295		
460	—	—	456.85	463.15							306	331	287.5	315		
480	—	—	476.85	483.15							326	351	307.5	335		
500	—	—	496.85	503.15									327.5	355		

Table 4 (concluded)

Preferred lengths are defined in terms of l_s and l_g :	
—	for product grade A, above the discontinuous, stepped line;
—	for product grade B, below this stepped line.
Notes	a) P is the pitch of the thread. b) For $l_{\text{nom}} \leq 125$ mm. c) For $125 \text{ mm} < l_{\text{nom}} \leq 200$ mm. d) For $l_{\text{nom}} > 200$ mm. e) $k_{w,\text{min}} = 0.7 k_{\text{min}}$ f) $l_{g,\text{max}} = l_{\text{nom}} - b$ $l_{s,\text{min}} = l_{g,\text{max}} - 5P$

Table 5 Product specifications of nominal diameter hexagon head bolt, coarse, product grades A and B

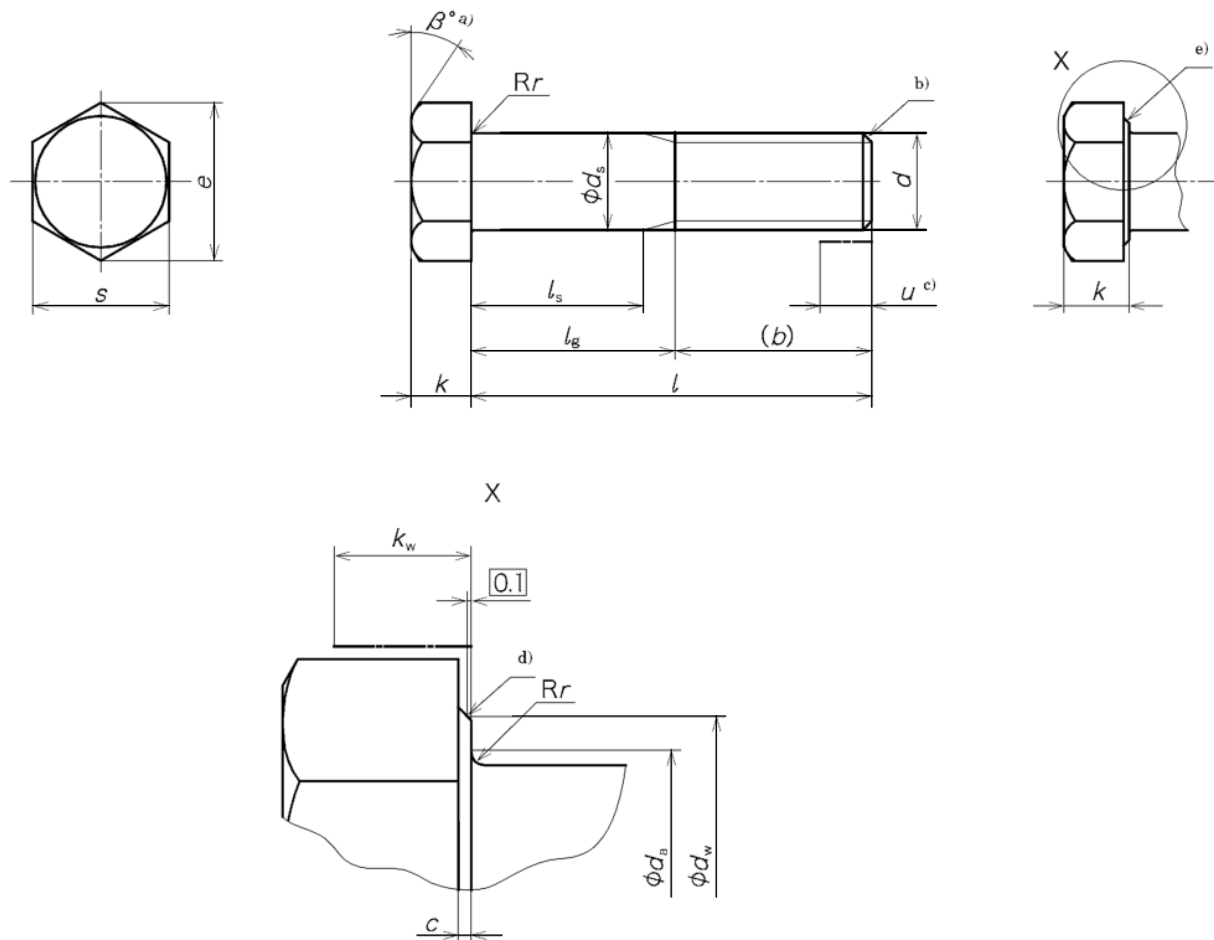
Material		Steel	Stainless steel	Non-ferrous metal
General requirements	Applicable standard	JIS B 1099		
Thread	Tolerance class	6g		
	Applicable standard	JIS B 0205-4, JIS B 0209-1		
Mechanical properties	Property class ^{a)}	$d < 3$ mm: as agreed $3 \text{ mm} \leq d \leq 39$ mm: 5.6, 8.8, 9.8, 10.9 $d > 39$ mm: as agreed	$d \leq 24$ mm: A2-70, A4-70 $24 \text{ mm} < d \leq 39$ mm: A2-50, A4-50 $d > 39$ mm: as agreed	Materials are specified in JIS B 1057.
	Applicable standard	$3 \text{ mm} \leq d \leq 39$ mm: JIS B 1051 $d < 3$ mm and $d > 39$ mm: as agreed	$d \leq 39$ mm: JIS B 1054-1 $d > 39$ mm: as agreed	
Tolerance	Product grade	For $d \leq 24$ mm and $l \leq 10d$ or $l \leq 150$ mm ^{b)} : A For $d > 24$ mm or $l > 10d$ or $l > 150$ mm ^{b)} : B		
	Applicable standard	JIS B 1021		
Finish—Coating		As processed Requirements for electroplating are specified in JIS B 1044. Requirements for non-electrolytically applied zinc flake coatings are specified in JIS B 1046.	As processed	As processed Requirements for electroplating are specified in JIS B 1044.
		Additional requirements or other finishes or coatings shall be agreed between the purchaser and the manufacturer.		
Surface integrity		Limits for surface discontinuities are specified in JIS B 1041.	—	—
Acceptability		Acceptance inspection is specified in JIS B 1091.		
Notes ^{a)} Other property classes are specified in JIS B 1051 for steel and JIS B 1054-1 for stainless steel, respectively. ^{b)} Whichever is the shorter.				

Table 6 Example of product designation

	Example
Product	Nominal diameter hexagon head bolt with thread M12, nominal length $l = 80$ mm, property class 8.8, and product grade A
Designation	Nominal diameter hexagon head bolt— JIS B 1180—ISO 4014—M12 × 80—8.8— product grade A

NOTE : Figure 1 and tables 3 to 6 are in accordance with **ISO 4014**.

Unit: mm



- Notes
- a) $\beta = 15^\circ$ to 30°
 - b) End without special requirements.
 - c) Incomplete thread length at thread point $u \leq 2P$.
 - d) Reference datum for d_w .
 - e) Washer face permissible.

Figure 2 Nominal diameter hexagon head bolt, coarse, product grade C

**Table 7 Dimensions of nominal diameter hexagon head bolt, coarse,
product grade C (first selection)**

Unit: mm

Designation of thread <i>d</i>			M5	M6	M8	M10	M12	M16	M20									
<i>p</i> ^{a)}			0.8	1	1.25	1.5	1.75	2	2.5									
<i>b</i> (informative)		b)	16	18	22	26	30	38	46									
		c)	22	24	28	32	36	44	52									
		d)	35	37	41	45	49	57	65									
<i>c</i>	max.		0.5	0.5	0.6	0.6	0.6	0.8	0.8									
<i>d_a</i>	max.		6	7.2	10.2	12.2	14.7	18.7	24.4									
<i>d_s</i>	max.		5.48	6.48	8.58	10.58	12.7	16.7	20.84									
	min.		4.52	5.52	7.42	9.42	11.3	15.3	19.16									
<i>d_w</i>	min.		6.74	8.74	11.47	14.47	16.47	22	27.7									
<i>e</i>	min.		8.63	10.89	14.2	17.59	19.85	26.17	32.95									
<i>k</i>	Reference dimension		3.5	4	5.3	6.4	7.5	10	12.5									
	max.		3.875	4.375	5.675	6.85	7.95	10.75	13.4									
	min.		3.125	3.625	4.925	5.95	7.05	9.25	11.6									
<i>k_w</i> ^{e)}	min.		2.19	2.54	3.45	4.17	4.94	6.48	8.12									
<i>r</i>	min.		0.2	0.25	0.4	0.4	0.6	0.6	0.8									
<i>s</i>	Reference dimension = max.		8.00	10.00	13.00	16.00	18.00	24.00	30.00									
	min.		7.64	9.64	12.57	15.57	17.57	23.16	29.16									
<i>l</i>			<i>l_s</i> and <i>l_g</i> ^{h)}															
Nominal length	min.	max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.		
25	23.95	26.05	5	9														
30	28.95	31.05	10	14	7	12	For sizes of bolts with <i>l</i> above the solid, bold, stepped line, table 19 is recommended.											
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						
65	63.5	66.5					36.75	43	31.5	39	26.25	35	17	27				
70	68.5	71.5					41.75	48	36.5	44	31.25	40	22	32				
80	78.5	81.5					51.75	58	46.5	54	41.25	50	32	42	21.5	34		
90	88.25	91.75							56.5	64	51.25	60	42	52	31.5	44		
100	98.25	101.75							66.5	74	61.25	70	52	62	41.5	54		
110	108.25	111.75									71.25	80	62	72	51.5	64		
120	118.25	121.75									81.25	90	72	82	61.5	74		
130	128	132											76	86	65.5	78		
140	138	142											86	96	75.5	88		
150	148	152											96	106	85.5	98		
160	156	164											106	116	95.5	108		
180	176	184													115.5	128		
200	195.4	204.6													135.5	148		
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																

Table 7 (continued)

Unit: mm

Designation of thread d			M24	M30	M36	M42	M48	M56	M64											
$p^{a)}$			3	3.5	4	4.5	5	5.5	6											
b (informative)		b)	54	66	—	—	—	—	—											
		c)	60	72	84	96	108	—	—											
		d)	73	85	97	109	121	137	153											
c	max.		0.8	0.8	0.8	1	1	1	1											
d_a	max.		28.4	35.4	42.4	48.6	56.6	67	75											
d_s	max.		24.84	30.84	37	43	49	57.2	65.2											
	min.		23.16	29.16	35	41	47	54.8	62.8											
d_w	min.		33.25	42.75	51.11	59.95	69.45	78.66	88.16											
e	min.		39.55	50.85	60.79	71.3	82.6	93.56	104.86											
k	Reference dimension		15	18.7	22.5	26	30	35	40											
	max.		15.9	19.75	23.55	27.05	31.05	36.25	41.25											
	min.		14.1	17.65	21.45	24.95	28.95	33.75	38.75											
$k_w^{e)}$	min.		9.87	12.36	15.02	17.47	20.27	23.63	27.13											
r	min.		0.8	1	1	1.2	1.6	2	2											
s	Reference dimension = max.		36	46	55.0	65.0	75.0	85.0	95.0											
	min.		35	45	53.8	63.1	73.1	82.8	92.8											
l			l_s and $l_g^{f)}$																	
Nominal length	min.	max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.		
25	23.95	26.05			For sizes of bolts with l above the solid, bold, stepped line, table 19 is recommended.															
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	31	46																
110	108.25	111.75	41	56																
120	118.25	121.75	51	66	36.5	54														
130	128	132	55	70	40.5	58														
140	138	142	65	80	50.5	68	36	56												
150	148	152	75	90	60.5	78	46	66												
160	156	164	85	100	70.5	88	56	76												
180	176	184	105	120	90.5	108	76	96	61.5	84										
200	195.4	204.6	125	140	110.5	128	96	116	81.5	104	67	92								
220	215.4	224.6	132	147	117.5	135	103	123	88.5	111	74	99								
240	235.4	244.6	152	167	137.5	155	123	143	108.5	131	94	119	75.5	103						
260	254.8	265.2			157.5	175	143	163	128.5	151	114	139	95.5	123	77	107				
280	274.8	285.2			177.5	195	163	183	148.5	171	134	159	115.5	143	97	127				
300	294.8	305.2			197.5	215	183	203	168.5	191	154	179	135.5	163	117	147				
320	314.3	325.7					203	223	188.5	211	174	199	155.5	183	137	167				
340	334.3	345.7					223	243	208.5	231	194	219	175.5	203	157	187				
360	354.3	365.7					243	263	228.5	251	214	239	195.5	223	177	207				
380	374.3	385.7							248.5	271	234	259	215.5	243	197	227				
400	394.3	405.7							268.5	291	254	279	235.5	263	217	247				
420	413.7	426.3							288.5	311	274	299	255.5	283	237	267				
440	433.7	446.3									294	319	275.5	303	257	287				
460	453.7	466.3									314	339	295.5	323	277	307				
480	473.7	486.3									334	359	315.5	343	297	327				
500	493.7	506.3											335.5	363	317	347				

Table 7 (concluded)

Preferred lengths are defined in terms of l_s and l_g .	
Notes	a) P is the pitch of the thread.
	b) For $l_{\text{nom}} \leq 125$ mm.
	c) For $125 \text{ mm} < l_{\text{nom}} \leq 200$ mm.
	d) For $l_{\text{nom}} > 200$ mm.
	e) $k_{w,\text{min}} = 0.7 k_{\text{min}}$
	f) $l_{g,\text{max}} = l_{\text{nom}} - b$ $l_{s,\text{min}} = l_{g,\text{max}} - 5P$

Table 8 Dimensions of nominal diameter hexagon head bolts, coarse, product grade C (second selection)

Unit: mm

Designation of thread <i>d</i>			M14	M18	M22	M27	M33						
<i>P</i> ^{a)}			2	2.5	2.5	3	3.5						
<i>b</i> (informative)		b)	34	42	50	60	—						
		c)	40	48	56	66	78						
		d)	53	61	69	79	91						
<i>c</i>	max.		0.6	0.8	0.8	0.8	0.8						
<i>d</i> _a	max.		16.7	21.2	26.4	32.4	38.4						
<i>d</i> _s	max.		14.7	18.7	22.84	27.84	34						
	min.		13.3	17.3	21.16	26.16	32						
<i>d</i> _w	min.		19.15	24.85	31.35	38	46.55						
<i>e</i>	min.		22.78	29.56	37.29	45.2	55.37						
<i>k</i>	Reference dimension		8.8	11.5	14	17	21						
	max.		9.25	12.4	14.9	17.9	22.05						
	min.		8.35	10.6	13.1	16.1	19.95						
<i>k</i> _w ^{e)}	min.		5.85	7.42	9.17	11.27	13.97						
<i>r</i>	min.		0.6	0.6	0.8	1	1						
<i>s</i>	Reference dimension = max.		21.00	27.00	34	41	50						
	min.		20.16	26.16	33	40	49						
<i>l</i>			<i>l</i> _s and <i>l</i> _g ^{h)}										
Nominal length	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.	
60	58.5	61.5	16	26	For sizes of bolts with <i>l</i> above the solid, bold, stepped line, table 20 is recommended.								
65	63.5	66.5	21	31									
70	68.5	71.5	26	36									
80	78.5	81.5	36	46	25.5	38							
90	88.25	91.75	46	56	35.5	48	27.5	40					
100	98.25	101.75	56	66	45.5	58	37.5	50					
110	108.25	111.75	66	76	55.5	68	47.5	60	35	50			
120	118.25	121.75	76	86	65.5	78	57.5	70	45	60			
130	128	132	80	90	69.5	82	61.5	74	49	64	34.5	52	
140	138	142	90	100	79.5	92	71.5	84	59	74	44.5	62	
150	148	152			89.5	102	81.5	94	69	84	54.5	72	
160	156	164			99.5	112	91.5	104	79	94	64.5	82	
180	176	184			119.5	132	111.5	124	99	114	84.5	102	
200	195.4	204.6					131.5	144	119	134	104.5	122	
220	215.4	224.6					138.5	151	126	141	111.5	129	
240	235.4	244.6							146	161	131.5	149	
260	254.8	265.2							166	181	151.5	167	
280	274.8	285.2									171.5	189	
300	294.8	305.2									191.5	209	
320	314.3	325.7									211.5	229	
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											