
**Hexagon head bolts — Product grades A
and B**

Vis à tête hexagonale partiellement filetées — Grades A et B

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 4014 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 10, *Product standards for fasteners*.

This fourth edition cancels and replaces the third edition (ISO 4014:1999), of which it constitutes a minor revision.

Introduction

This International Standard belongs to a complete group of product standards developed by ISO on external hexagon drive fasteners. It comprises the following:

- a) hexagon head bolts (ISO 4014, ISO 4015, ISO 4016 and ISO 8765);
- b) hexagon head screws (ISO 4017, ISO 4018 and ISO 8676);
- c) hexagon nuts (ISO 4032, ISO 4033, ISO 4034, ISO 4035, ISO 4036, ISO 7040, ISO 7041, ISO 7042, ISO 7719, ISO 7720, ISO 8673, ISO 8674, ISO 8675, ISO 10511, ISO 10512 and ISO 10513);
- d) hexagon bolts with flange (ISO 4162, ISO 15071 and ISO 15072);
- e) hexagon nuts with flange (ISO 4161, ISO 7043, ISO 7044, ISO 10663, ISO 12125, ISO 12126 and ISO 21670).

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Hexagon head bolts — Product grades A and B

1 Scope

This International Standard specifies the characteristics of hexagon head bolts with threads from M1,6 up to and including M64, of product grade A for threads M1,6 to M24 and nominal lengths up to and including $10d$ or 150 mm, whichever is the shorter, and product grade B for threads over M24 or nominal lengths over $10d$ or 150 mm, whichever is the shorter.

If, in special cases, specifications other than those listed in this International Standard are required, they can be selected from existing International Standards, for example ISO 724, ISO 888, ISO 898-1, ISO 965-1, ISO 3506-1, ISO 4753 and ISO 4759-1.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 225, *Fasteners — Bolts, screws, studs and nuts — Symbols and descriptions of dimensions*

ISO 724, *ISO general-purpose metric screw threads — Basic dimensions*

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread*

ISO 965-1, *ISO general-purpose metric screw threads — Tolerances — Part 1: Principles and basic data*

ISO 3269, *Fasteners — Acceptance inspection*

ISO 3506-1, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs*

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

ISO 4042, *Fasteners — Electroplated coatings*

ISO 4753, *Fasteners — Ends of parts with external ISO metric thread*

ISO 4759-1, *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C*

ISO 6157-1, *Fasteners — Surface discontinuities — Part 1: Bolts, screws and studs for general requirements*

ISO 8839, *Mechanical properties of fasteners — Bolts, screws, studs and nuts made of non-ferrous metals*

ISO 8992, *Fasteners — General requirements for bolts, screws, studs and nuts*

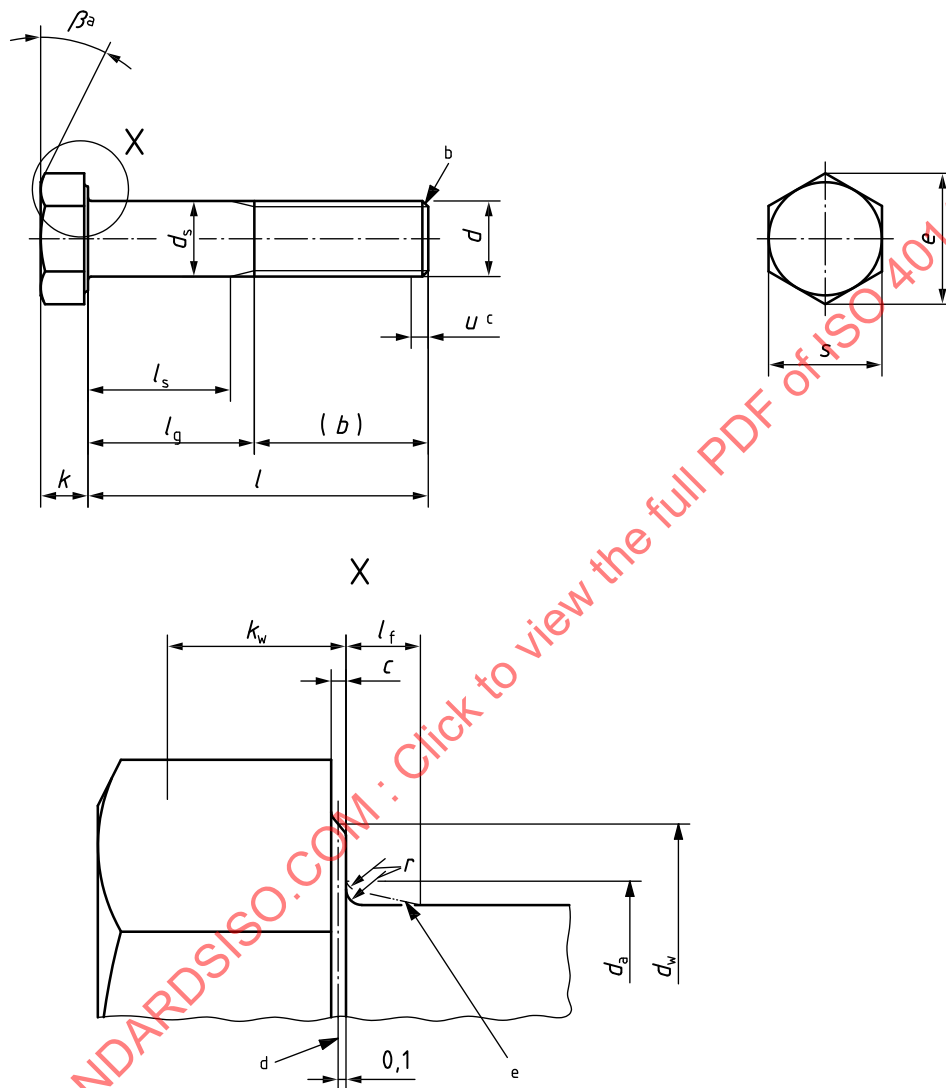
ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coatings*

3 Dimensions

See Figure 1 and Tables 1 and 2.

Symbols and descriptions of dimensions are specified in ISO 225.

Dimensions in millimetres



- a $\beta = 15^\circ$ to 30°
- b Point shall be chamfered or for threads $\leq M4$ may be as-rolled (sheared end) in accordance with ISO 4753.
- c Incomplete thread $u \leq 2P$.
- d Reference datum for d_w .
- e Maximum underhead fillet.

Figure 1

Table 1 — Preferred threads

Dimensions in millimetres

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	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	0,40	0,40	0,50	0,50	0,60	0,60
	min.	0,10	0,10	0,15	0,15	0,15	0,15	0,15	0,15
d_a	max.	2	2,6	3,1	4,7	5,7	6,8	9,2	11,2
	nom. = max.	1,60	2,00	3,00	4,00	5,00	6,00	8,00	10,00
d_s	Product grade	1,46	1,86	2,86	3,82	4,82	5,82	7,78	9,78
	A								
	B								
d_w	Product grade	1,35	1,75	2,25	3,70	4,70	5,70	7,64	9,64
	A								
	B								
e	Product grade	2,27	3,07	4,07	5,88	6,88	8,88	11,63	14,63
	A								
	B								
l_f	Product grade	2,30	2,95	3,95	5,74	6,74	8,74	11,47	14,47
	A								
	B								
k	Product grade	3,41	4,32	5,45	6,01	8,79	11,05	14,38	17,77
	A								
	B								
l_t	Product grade	3,28	4,18	5,31	5,88	8,63	10,89	14,20	17,59
	A								
	B								
k_w	Product grade	0,6	0,8	1	1	1,2	1,4	2	2
	A								
	B								
r	Product grade	1,1	1,4	1,7	2	3,5	4	5,3	6,4
	A								
	B								
s	Product grade	1,225	1,525	1,825	2,125	3,65	4,15	5,45	6,58
	A								
	B								
t	Product grade	0,975	1,275	1,575	1,875	3,35	3,85	5,15	6,22
	A								
	B								
u	Product grade	1,3	1,6	1,9	2,2	3,74	4,24	5,54	6,69
	A								
	B								
v	Product grade	0,9	1,2	1,5	1,8	3,26	3,76	5,06	6,11
	A								
	B								
w	Product grade	0,68	0,89	1,10	1,31	2,35	2,70	3,61	4,35
	A								
	B								
x	Product grade	0,63	0,84	1,05	1,26	2,28	2,63	3,54	4,28
	A								
	B								
y	Product grade	0,1	0,1	0,1	0,1	0,2	0,25	0,4	0,4
	A								
	B								
z	Product grade	3,20	4,00	5,00	5,50	7,00	10,00	13,00	16,00
	A								
	B								
z	Product grade	3,02	3,82	4,82	5,32	6,78	9,78	12,73	15,73
	A								
	B								
z	Product grade	2,90	3,70	4,70	5,20	6,64	9,64	12,57	15,57
	A								
	B								

Table 1 (continued)

Thread, d		Product grade										Dimensions in millimetres									
		A		B		M1,6	M2	M2,5		M3	M4		M5	M6	M8	M10					
nom.		l		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.				
		min.	max.																		
12	11,65	12,35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
16	15,65	16,35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
20	19,58	20,42	18,95	21,05	—	—	—	—	—	—	—	—	—	—	—	—	—				
25	24,58	25,42	23,95	26,05	—	—	—	—	—	—	—	—	—	—	—	—	—				
30	29,58	30,42	28,95	31,05	—	—	—	—	—	—	—	—	—	—	—	—	—				
35	34,5	35,5	33,75	36,25	—	—	—	—	—	—	—	—	—	—	—	—	—				
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	—	—	—	—	—	—	—	—	—	—	—	—	—				
65	64,4	65,6	63,5	66,5	—	—	—	—	—	—	—	—	—	—	—	—	—				
70	69,4	70,6	68,5	71,5	—	—	—	—	—	—	—	—	—	—	—	—	—				
80	79,4	80,6	78,5	81,5	—	—	—	—	—	—	—	—	—	—	—	—	—				
90	89,3	90,7	88,25	91,75	—	—	—	—	—	—	—	—	—	—	—	—	—				
100	99,3	100,7	98,25	101,75	—	—	—	—	—	—	—	—	—	—	—	—	—				
110	109,3	110,7	108,25	111,75	—	—	—	—	—	—	—	—	—	—	—	—	—				
120	119,3	120,7	118,25	121,75	—	—	—	—	—	—	—	—	—	—	—	—	—				

For sizes above the solid, bold, stepped line, ISO 4017 is recommended.

Table 1 (continued)

Thread, d		Dimensions in millimetres											
		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	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	nom. = max.	12,00	16,00	20,00	24,00	30,00	36,00	42,00	48,00	56,00	64,00		
	Product grade $\frac{A}{B}$ min.	11,73	15,73	19,67	23,67	—	—	—	—	—	—		
d_w	Product grade $\frac{A}{B}$ min.	11,57	15,57	19,48	23,48	29,48	35,38	41,38	47,38	55,26	63,26		
		16,63	22,49	28,19	33,61	—	—	—	—	—	—		
e		16,47	22	27,7	33,25	42,75	51,11	59,95	69,45	78,66	88,16		
	Product grade $\frac{A}{B}$ min.	20,03	26,75	33,53	39,98	—	—	—	—	—	—		
l_f		19,85	26,17	32,95	39,55	50,85	60,79	71,3	82,6	93,56	104,86		
	max.	3	3	4	4	6	6	8	10	12	13		
k	nom.	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	—	—	—	—	—	—		
k	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		
k_w^e	min.	7,21	9,71	12,15	14,65	18,28	22,08	25,58	29,58	34,5	39,5		
	Product grade $\frac{A}{B}$ min.	5,12	6,87	8,6	10,35	—	—	—	—	—	—		
r		5,05	6,8	8,51	10,26	12,8	15,46	17,91	20,71	24,15	27,65		
	min.	0,6	0,6	0,8	0,8	1	1	1,2	1,6	2	2		
s	nom. = max.	18,00	24,00	30,00	36,00	46	55,0	65,0	75,0	85,0	95,0		
	Product grade $\frac{A}{B}$ min.	17,73	23,67	29,67	35,38	—	—	—	—	—	—		
		17,57	23,16	29,16	35,00	45	53,8	63,1	73,1	82,8	92,8		

Table 1 (continued)

Dimensions in millimetres

Thread, <i>d</i>	Product grade				<i>l_s</i> and <i>l_g^f</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	A		B		M12	M16	M20	M24	M30	M36	M42	M48	M56	M64																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
	nom.	min.	max.	<i>l</i>											min.	max.	<i>l_s</i>	min.	max.	<i>l_s</i>	min.	max.	<i>l_s</i>	min.	max.	<i>l_s</i>	min.	max.	<i>l_s</i>	min.	max.	<i>l_s</i>	min.	max.	<i>l_s</i>	min.	max.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
50	49,5	50,5	—	—	11,25	20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				

Table 1 (continued)

Dimensions in millimetres

Thread, d		M12	M16	M20	M24	M30	M36	M42	M48	M56	M64
Product grade		l_s and l_g^f									
nom.	A										
	B										
		l	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s
		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
360	—	—	—	357,15	362,85	—	—	228,5	239	195,5	207
380	—	—	—	377,15	382,85	—	—	248,5	259	215,5	227
400	—	—	—	397,15	402,85	—	—	268,5	279	235,5	247
420	—	—	—	416,85	423,15	—	—	288,5	299	255,5	267
440	—	—	—	436,85	443,15	—	—	308,5	319	275,5	287
460	—	—	—	456,85	463,15	—	—	—	339	295,5	307
480	—	—	—	476,85	483,15	—	—	—	359	315,5	327
500	—	—	—	496,85	503,15	—	—	—	—	335,5	347

NOTE 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.

a p is the pitch of the thread.b For $l_{nom} \leq 125$ mm.c For $125 \text{ mm} < l_{nom} \leq 200$ mm.d For $l_{nom} > 200$ mm.e $k_{w,min} = 0,7 k_{min}$.f $l_{g,max} = l_{nom} - b$. $l_{g,min} = l_{g,max} - 5 p$.

Table 2 — Non-preferred threads

Dimensions in millimetres

Thread, d					M3,5	M14	M18	M22	M27					
p^a					0,6	2	2,5	2,5	3					
b ref.	b	ref.			13	34	42	50	60					
					19	40	48	56	66					
					32	53	61	69	79					
c					max.	0,40	0,60	0,8	0,8					
					min.	0,15	0,15	0,2	0,2					
d_a					max.	4,1	15,7	20,2	24,4	30,4				
d_s	Product grade	A	min.		nom. = max.	3,50	14,00	18,00	22,0	27,00				
						3,32	13,73	17,73	21,67	—				
						3,20	13,57	17,57	21,48	26,48				
d_w	Product grade	A	min.			5,07	19,64	25,34	31,71	—				
						4,95	19,15	24,85	31,35	38				
e	Product grade	A	min.			6,58	23,36	30,14	37,72	—				
						6,44	22,78	29,56	37,29	45,2				
l_f					max.	1	3	3	4	6				
k	Product grade	A	min.		nom.	2,4	8,8	11,5	14	17				
					max.	2,525	8,98	11,715	14,215	—				
						2,275	8,62	11,285	13,785	—				
					max.	2,6	9,09	11,85	14,35	17,35				
					min.	2,2	8,51	11,15	13,65	13,65				
k_w^e	Product grade	A	min.			1,59	6,03	7,9	9,65	—				
						1,54	5,96	7,81	9,56	11,66				
r					min.	0,1	0,6	0,6	0,8	1				
s	Product grade	A	min.		nom. = max.	6,00	21,00	27,00	34,00	41				
						5,82	20,67	26,67	33,38	—				
						5,70	20,16	26,16	33,00	40				
Product grade					l_s and l_g^f									
A B														
l														
nom.	min.	max.	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.
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 above the dashed, bold, stepped line, ISO 4017 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

Table 2 (continued)

Dimensions in millimetres

Thread, d					M3,5	M14	M18	M22	M27					
p^a					0,6	2	2,5	2,5	3					
b ref.		b			13	34	42	50	60					
			c		19	40	48	56	66					
			d		32	53	61	69	79					
c			max.		0,40	0,60	0,8	0,8	0,8					
			min.		0,15	0,15	0,2	0,2	0,2					
d_a					max.	4,1	15,7	20,2	24,4	30,4				
d_s	nom.		=	max.	3,50	14,00	18,00	22,0	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					
d_w	Product grade	A	min.		5,07	19,64	25,34	31,71	—					
		B			4,95	19,15	24,85	31,35	38					
e	Product grade	A	min.		6,58	23,36	30,14	37,72	—					
		B			6,44	22,78	29,56	37,29	45,2					
l_f					max.	1	3	3	4	6				
k	nom.				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					
k_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					
r					min.	0,1	0,6	0,6	0,8	1				
s	nom.		=	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				l_s and l_g^f									
	A		B											
	l				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.
nom.	min.	max.	min.	max.										
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 2 (continued)

Dimensions in millimetres

Thread, d					M33	M39	M45	M52	M60									
p^a					3,5	4	4,5	5	5,5									
b ref.	b	—			—	—	—	—	—									
		78			90	102	116	—										
		91			103	115	129	145										
c	c	max.			0,8	1,0	1,0	1,0	1,0									
		min.			0,2	0,3	0,3	0,3	0,3									
d_a					max.	36,4	42,4	48,6	56,6	67								
d_s	nom.		=	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										
d_w	Product grade	A	min.	—	—	—	—	—	—									
		B		46,55	55,86	64,7	74,2	83,41										
e	Product grade	A	min.	—	—	—	—	—	—									
		B		55,37	66,44	76,95	88,25	99,21										
l_f					max.	6	6	8	10	12								
k	k	nom.			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									
		k_w^e	Product grade	A	min.	—	—	—	—	—	—							
B	14,41			17,21		19,31	22,75	26,25										
r					min.	1	1	1,2	1,6	2								
s	nom.		=	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				l_s and l_g^f													
	A				B													
l					l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g				
nom.	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 above the solid, bold, stepped line, ISO 4017 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				

Table 2 (continued)

Dimensions in millimetres

Thread, d					M33	M39	M45	M52	M60					
p^a					3,5	4	4,5	5	5,5					
b ref.	b				—	—	—	—	—					
		c			78	90	102	116	—					
		d			91	103	115	129	145					
c	max.			0,8	1,0	1,0	1,0	1,0						
	min.			0,2	0,3	0,3	0,3	0,3						
d_a					max.	36,4	42,4	48,6	56,6	67				
d_s	nom.		=	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						
d_w	Product grade	A	min.	—	—	—	—	—						
		B		46,55	55,86	64,7	74,2	83,41						
e	Product grade	A	min.	—	—	—	—	—						
		B		55,37	66,44	76,95	88,25	99,21						
l_f					max.	6	6	8	10	12				
k	nom.				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					
	k_w^e	Product grade	A	min.	—	—	—	—	—					
B			14,41		17,21	19,31	22,75	26,25						
r					min.	1	1	1,2	1,6	2				
s	nom.		=	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					l_s and l_g^f									
A					B									
l					l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g
nom.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
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
NOTE 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.														
^a P is the pitch of the thread.														
^b For $l_{nom} \leq 125$ mm.														
^c For $125 \text{ mm} < l_{nom} \leq 200$ mm.														
^d For $l_{nom} > 200$ mm.														
^e $k_{w,min} = 0,7 k_{min}$.														
^f $l_{g,max} = l_{nom} - b$.														
$l_{g,min} = l_{g,max} - 5 P$.														

4 Specifications and reference International Standards

See Table 3.

Table 3 — Specifications and reference International Standards

Material		Steel	Stainless steel	Non-ferrous metal
General requirements	International Standard	ISO 8992		
	Tolerance class	6g		
Thread	International Standard	ISO 724, ISO 965-1		
	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 ISO 8839.
Mechanical property	International Standard	$3 \text{ mm} \leq d \leq 39$ mm: ISO 898-1 $d < 3$ mm and $d > 39$ mm: as agreed	$d \leq 39$ mm: ISO 3506-1 $d > 39$ mm: as agreed	
Tolerance	Product grade	For $d \leq 24$ mm and $l \leq 10d$ or 150 mm ^b : A For $d > 24$ mm or $l > 10d$ or 150 mm ^b : B		
	International Standard	ISO 4759-1		
Finish — Coating	As processed	As processed	As processed	As processed
	Requirements for electroplating are specified in ISO 4042. Requirements for non-electrolytically applied zinc flake coatings are specified in ISO 10683. Additional requirements or other finishes or coatings shall be agreed between the supplier and the purchaser.	Requirements for electroplating are specified in ISO 4042. Requirements for non-electrolytically applied zinc flake coatings are specified in ISO 10683. Additional requirements or other finishes or coatings shall be agreed between the supplier and the purchaser.	Requirements for electroplating are specified in ISO 4042. Requirements for non-electrolytically applied zinc flake coatings are specified in ISO 10683. Additional requirements or other finishes or coatings shall be agreed between the supplier and the purchaser.	Requirements for electroplating are specified in ISO 4042. Requirements for non-electrolytically applied zinc flake coatings are specified in ISO 10683. Additional requirements or other finishes or coatings shall be agreed between the supplier and the purchaser.
Surface integrity	Limits for surface discontinuities are specified in ISO 6157-1.	—	—	—
Acceptability	Acceptance inspection is specified in ISO 3269.			
^a Other property classes are specified in ISO 898-1 for steel and ISO 3506-1 for stainless steel, respectively.				
^b Whichever is the shorter.				

5 Designation

EXAMPLE A hexagon head bolt with thread M12, nominal length $l = 80$ mm and property class 8.8 is designated as follows:

Hexagon head bolt ISO 4014 - M12 × 80 - 8.8