INTERNATIONAL STANDARD

ISO 4014

Fourth edition
2011-03-15

Hexagon head bolts — Product grades A and B

Vis à tête hexagonale partiellement filetées — Grades A et B

Reference number
ISO 4014:2011(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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).

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 10*d* or 150 mm, whichever is the shorter, and product grade B for threads over M24 or nominal lengths over 10*d* 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*

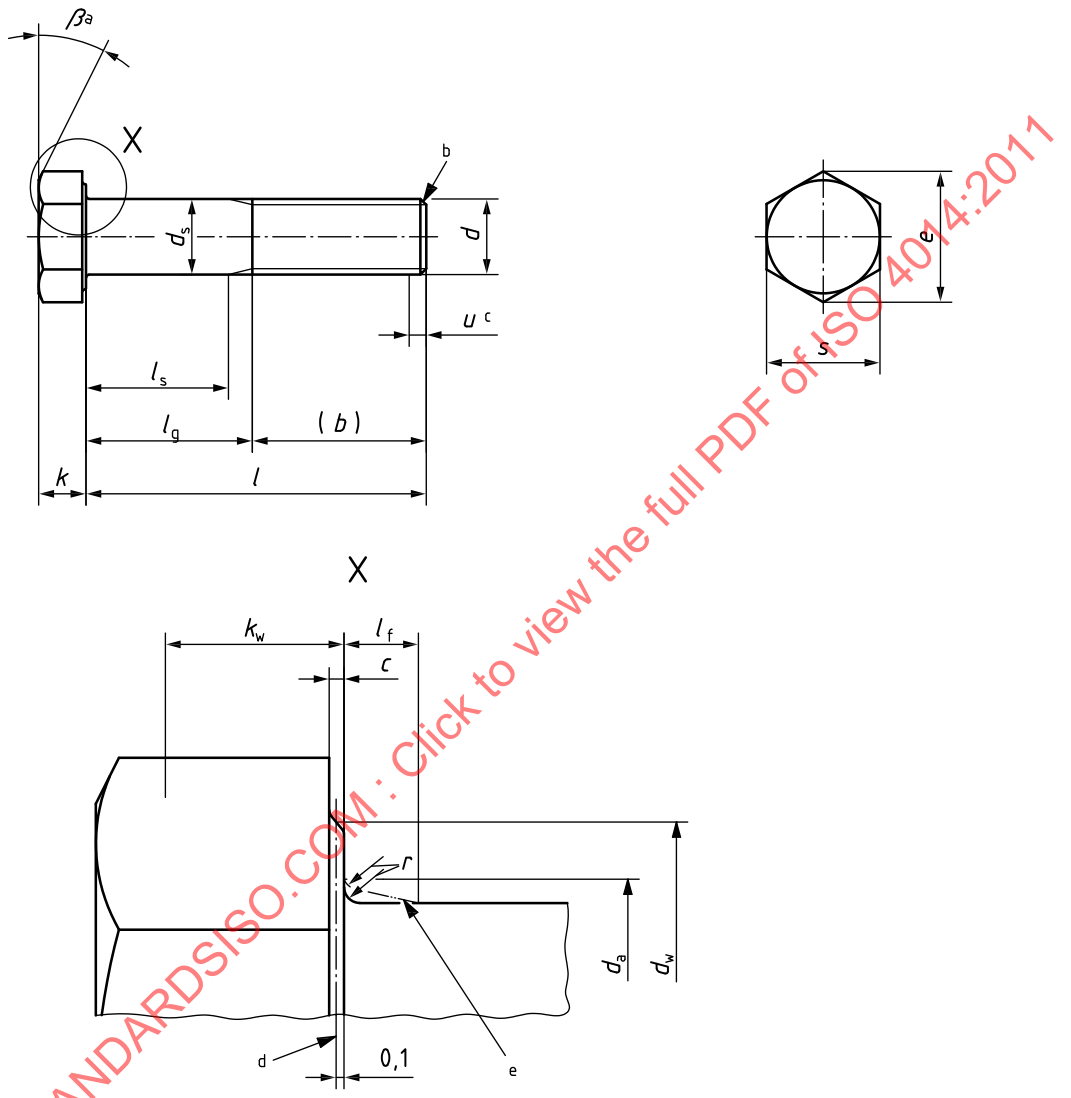
ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coatings*

3 Dimensions

See Figure 1 and Tables 1 and 2.

Symbols and descriptions of dimensions are specified in ISO 225.

Dimensions in millimetres



a $\beta = 15°$ to $30°$.

b Point shall be chamfered or for threads $\leqslant$ M4 may be as-rolled (sheared end) in accordance with ISO 4753.

c Incomplete thread $u \leqslant 2P$.

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 ref.			[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	nom.	=	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			nom.	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	nom.	=	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 1 (*continued*)

Dimensions in millimetres

Thread, d					**M1,6**		**M2**		**M2,5**		**M3**		**M4**		**M5**		**M6**		**M8**		**M10**	
	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	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.	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												
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 above the solid, bold, stepped line, ISO 4017 is recommended.

Table 1 (*continued*)

Dimensions in millimetres

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 ref.			[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	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			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	—	—	—	—	—	—
			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	nom. =		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 1 (*continued*)

Dimensions in millimetres

Thread, d	Product grade A		Product grade B		M12		M16		M20		M24		M30		M36		M42		M48		M56		M64	
	l				l_s and l_g[f]																			
	l_s	l_g																						
nom.	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	107
280	—	—	277,4	282,6									177,5	195	163	183	148,5	171	134	159	115,5	143	97	127
300	—	—	297,4	302,6									197,5	215	183	203	168,5	191	154	179	135,5	163	117	147
320	—	—	317,15	322,85											203	223	188,5	211	174	199	155,5	183	137	167
340	—	—	337,15	342,85											233	243	208,5	231	194	219	175,5	203	157	187

Table 1 (*continued*)

Dimensions in millimetres

Thread, d					**M12**		**M16**		**M20**		**M24**		**M30**		**M36**		**M42**		**M48**		**M56**		**M64**	
	Product grade A		Product grade B		l_s and l_g[f]																			
	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	l_s	l_g
nom.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
360	—	—	357,15	362,85											243	263	228,5	251	214	239	195,5	223	177	207
380	—	—	377,15	382,85													248,5	271	234	259	215,5	243	197	227
400	—	—	397,15	402,85													268,5	291	254	279	235,5	263	217	247
420	—	—	416,85	423,15													288,5	311	274	299	255,5	283	237	267
440	—	—	436,85	443,15													308,5	331	294	319	275,5	303	257	287
460	—	—	456,85	463,15															314	339	295,5	323	277	307
480	—	—	476,85	483,15															334	359	315,5	343	297	327
500	—	—	496,85	503,15																	335,5	363	317	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 $l_{nom} \leqslant 125$ mm.

[c] For 125 mm $< l_{nom} \leqslant 200$ 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]	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	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.
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													
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.
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]	—		—		—		—		—	
				[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.
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 $l_{nom} \leqslant 125$ mm.

[c] For 125 mm $< l_{nom} \leqslant 200$ 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		
Thread	Tolerance class	6g		
	International Standard	ISO 724, ISO 965-1		
Mechanical property	Property class[a]	$d < 3$ mm: as agreed 3 mm $\leqslant d \leqslant$ 39 mm: 5.6, 8.8, 9.8, 10.9 $d >$ 39 mm: as agreed	$d \leqslant$ 24 mm: A2-70, A4-70 24 mm $< d \leqslant$ 39 mm: A2-50, A4-50 $d >$ 39 mm: as agreed	Materials are specified in ISO 8839.
	International Standard	3 mm $\leqslant d \leqslant$ 39 mm: ISO 898-1 $d <$ 3 mm and $d >$ 39 mm: as agreed	$d \leqslant$ 39 mm: ISO 3506-1 $d >$ 39 mm: as agreed	
Tolerance	Product grade	For $d \leqslant$ 24 mm and $l \leqslant 10d$ 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 Requirements for electroplating are specified in ISO 4042. Requirements for non-electrolytically applied zinc flake coatings are specified in ISO 10683.	As processed	As processed Requirements for electroplating are specified in ISO 4042.
		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