June 2011

DIN EN ISO 4014

DIN

ICS 21.060.10

Supersedes
DIN EN ISO 4014:2001-03 and
DIN EN ISO 4014
Corrigendum 1:2006-10

Hexagon head bolts – Product grades A and B (ISO 4014:2011) English translation of DIN EN ISO 4014:2011-06

Sechskantschrauben mit Schaft –
Produktklassen A und B (ISO 4014:2011)
Englische Übersetzung von DIN EN ISO 4014:2011-06

Vis à tête hexagonale partiellement filetées –
Grades A et B (ISO 4014:2011)
Traduction anglaise de DIN EN ISO 4014:2011-06

Document comprises 22 pages

Translation by DIN-Sprachendienst.
In case of doubt, the German-language original shall be considered authoritative.

English price group 12
www.din.de
www.beuth.de

06.11 1799703

A comma is used as the decimal marker.

National foreword

This standard has been prepared by Technical Committee ISO/TC 2 “Fasteners” in collaboration with Technical Committee CEN/TC 185 “Fasteners” (both secretariats are held by DIN, Germany).

The responsible German body involved in its preparation was the *Normenausschuss Mechanische Verbindungselemente* (Fasteners Standards Committee), Working Committee NA 067-00-02 AA *Verbindungselemente mit metrischem Außengewinde.*

The DIN 4000-160-1 tabular layout of article characteristics shall apply to screws covered in this standard.

The DIN Standards corresponding to the International Standards referred to in this document are as follows:

ISO 225	DIN EN ISO 225
ISO 724	DIN ISO 724
ISO 898-1	DIN EN ISO 898-1
ISO 965-1	DIN ISO 965-1
ISO 3269	DIN EN ISO 3269
ISO 3506-1	DIN EN ISO 3506-1
ISO 4017	DIN EN ISO 4017
ISO 4042	DIN EN ISO 4042
ISO 4753	DIN EN ISO 4753
ISO 4759-1	DIN EN ISO 4759-1
ISO 6157-1	DIN EN 26157-1
ISO 8839	DIN EN 28839
ISO 8992	DIN ISO 8992
ISO 10683	DIN EN ISO 10683

Amendments

This standard differs from DIN EN ISO 4014:2001-03 and DIN EN ISO 4014 Corrigendum 1:2006-10 as follows:

a) normative references are now undated;

b) a number of corrections has been incorporated;

c) the standard has been editorially revised and normative references have been updated;

d) Annex ZA has been deleted.

Previous editions

DIN 932-1: 1926-01
DIN 932-2: 1926-01
DIN Kr 551: 1935-11, 1936-11
DIN 931-2: 1926-01, 1942-04
DIN 931: 1967-12, 1970-11
DIN 931-1: 1926-01, 1942-04, 1952-12, 1963-03, 1982-07, 1987-09
DIN 532: 1929x-11
DIN 600: 1926x-10
DIN ISO 4014: 1987-09, 1989-09

DIN EN 24014: 1992-02
DIN EN ISO 4014: 2001-03
DIN EN ISO 4014 Corrigendum 1: 2006-10

National Annex NA
(informative)

Bibliography

DIN 4000-160, *Tabular layout of product properties — Part 160: Fasteners with external thread*

DIN EN 26157-1, *Fasteners — Surface discontinuities — Bolts, screws and studs subject to general requirements*

DIN EN 28839, *Mechanical properties of fasteners — Nonferrous metal bolts, screws, studs and nuts*

DIN EN ISO 225, *Fasteners — Bolts, screws, studs and nuts — Symbols and designations of dimensions*

DIN EN 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*

DIN EN ISO 3269, *Fasteners — Acceptance inspection*

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

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

DIN EN ISO 4042, *Fasteners — Electroplated coatings*

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

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

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

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

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

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

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 4014

March 2011

ICS 21.060.10

Supersedes EN ISO 4014:2000

English Version

Hexagon head bolts - Product grades A and B (ISO 4014:2011)

Vis à tête hexagonale partiellement filetées - Grades A et B (ISO 4014:2011)

Sechskantschrauben mit Schaft - Produktklassen A und B (ISO 4014:2011)

This European Standard was approved by CEN on 31 January 2011.

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Ref. No. EN ISO 4014:2011: E

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Foreword

This document (EN ISO 4014:2011) has been prepared by Technical Committee ISO/TC 2 “Fasteners” in collaboration with Technical Committee CEN/TC 185 “Fasteners” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2011, and conflicting national standards shall be withdrawn at the latest by September 2011.

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

This document supersedes EN ISO 4014:2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 4014:2011 has been approved by CEN as a EN ISO 4014:2011 without any modification.

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).

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*

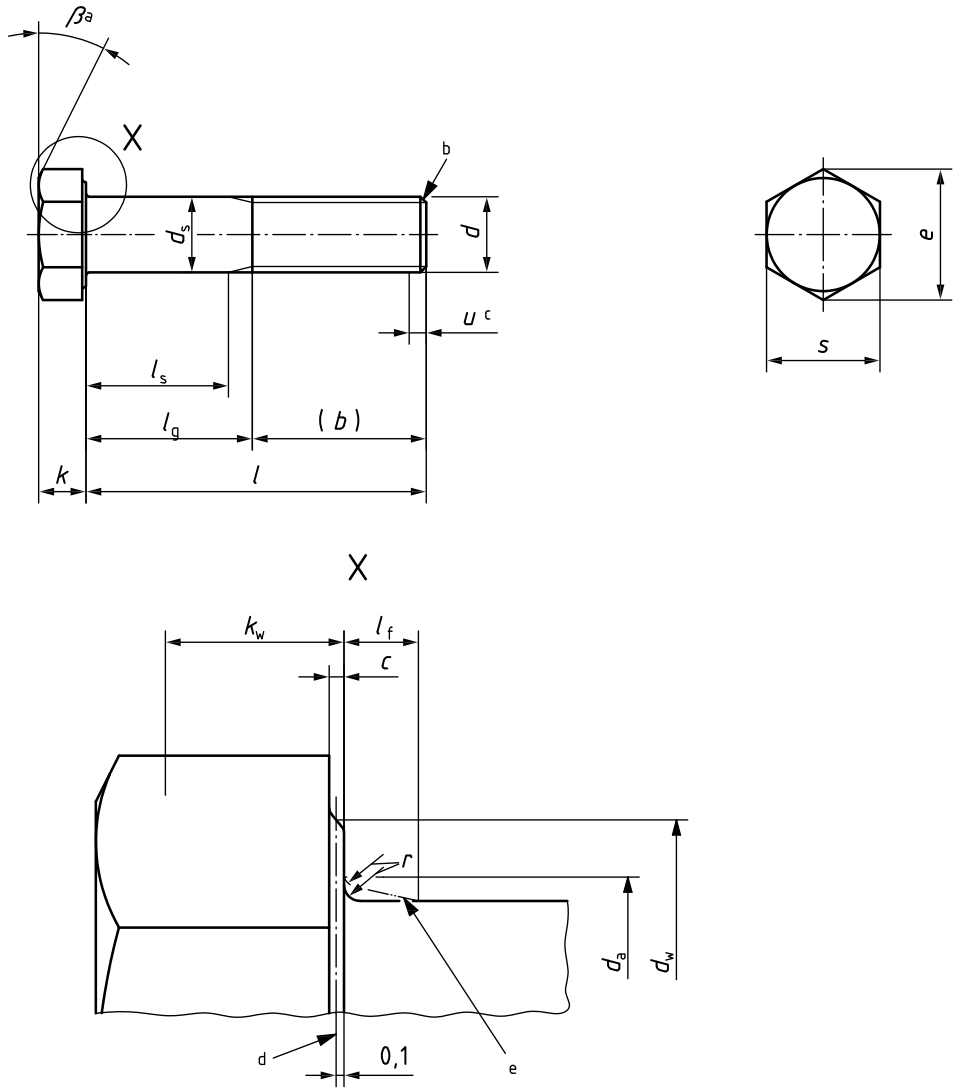
ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coatings*

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			For sizes above the solid, bold, stepped line, ISO 4017 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																		

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					**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.
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				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.
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

Bibliography

[1] ISO 888, *Bolts, screws and studs — Nominal lengths and thread lengths for general purpose bolts*

[2] ISO 4015, *Hexagon head bolts — Product grade B — Reduced shank (shank diameter approximately equal to pitch diameter)*

[3] ISO 4016, *Hexagon head bolts — Product grade C*

[4] ISO 4018, *Hexagon head screws — Product grade C*

[5] ISO 4032, *Hexagon nuts, style 1 — Product grades A and B*

[6] ISO 4033, *Hexagon nuts, style 2 — Product grades A and B*

[7] ISO 4034, *Hexagon nuts — Product grade C*

[8] ISO 4035, *Hexagon thin nuts (chamfered) — Product grades A and B*

[9] ISO 4036, *Hexagon thin nuts (unchamfered) — Product grade B*

[10] ISO 4161, *Hexagon nuts with flange — Coarse thread*

[11] ISO 4162, *Hexagon flange bolts — Small series*

[12] ISO 7040, *Prevailing torque type hexagon nuts (with non-metallic insert), style 1 — Property classes 5, 8 and 10*

[13] ISO 7041, *Prevailing torque type hexagon nuts (with non-metallic insert), style 2 — Property classes 9 and 12*

[14] ISO 7042, *Prevailing torque type all-metal hexagon nuts, style 2 — Property classes 5, 8, 10 and 12*

[15] ISO 7043, *Prevailing torque type hexagon nuts with flange (with non-metallic insert) — Product grades A and B*

[16] ISO 7044, *Prevailing torque type all-metal hexagon nuts with flange — Product grades A and B*

[17] ISO 7719, *Prevailing torque type all-metal hexagon nuts, style 1 — Property classes 5, 8 and 10*

[18] ISO 7720, *Prevailing torque type all-metal hexagon nuts, style 2 — Property class 9*

[19] ISO 8673, *Hexagon nuts, style 1, with metric fine pitch thread — Product grades A and B*

[20] ISO 8674, *Hexagon nuts, style 2, with metric fine pitch thread — Product grades A and B*

[21] ISO 8675, *Hexagon thin nuts (chamfered) with metric fine pitch thread — Product grades A and B*

[22] ISO 8676, *Hexagon head screws with metric fine pitch thread — Product grades A and B*

[23] ISO 8765, *Hexagon head bolts with metric fine pitch thread — Product grades A and B*

[24] ISO 10511, *Prevailing torque type hexagon thin nuts (with non-metallic insert)*

[25] ISO 10512, *Prevailing torque type hexagon nuts (with non-metallic insert), style 1, with metric fine pitch thread — Property classes 6, 8 and 10*

[26] ISO 10513, *Prevailing torque type all-metal hexagon nuts, style 2, with metric fine pitch thread — Property classes 8, 10 and 12*

[27] ISO 10663, *Hexagon nuts with flange — Fine pitch thread*

[28] ISO 12125, *Prevailing torque type hexagon nuts with flange (with non-metallic insert) with metric fine pitch thread — Product grades A and B*

[29] ISO 12126, *Prevailing torque type all-metal hexagon nuts with flange with metric fine pitch thread — Product grades A and B*

[30] ISO 15071, *Hexagon bolts with flange —Small series — Product grade A*

[31] ISO 15072, *Hexagon bolts with flange with metric fine pitch thread — Small series — Product grade A*

[32] ISO 21670, *Hexagon weld nuts with flange*