International Standard 4014

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Hexagon head bolts — Product grades A and B

Boulons à tête hexagonale — Classes de produit A et B

First edition — 1979-07-01

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Price based on 6 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4014 was developed by Technical Committee ISO/TC 2, *Fasteners*, and was circulated to the member bodies in December 1977.

It has been approved by the member bodies of the following countries :

Australia	India	Romania
Belgium	Ireland	South Africa, Rep. of
Canada	Israel	Spain
Chile	Italy	Sweden
Czechoslovakia	Korea, Rep. of	Switzerland
Denmark	Mexico	United Kingdom
Egypt, Arab Rep. of	Netherlands	USA
Finland	New Zealand	Yugoslavia
Germany, F.R.	Norway	
Hungary	Poland	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

France
USSR

Printed in Switzerland

Hexagon head bolts — Product grades A and B

0 INTRODUCTION

This International Standard is part of the complete ISO product standards series on hexagon drive fasteners. The series comprises :

a) Hexagon head bolts (ISO 4014, ISO 4015 and ISO 4016)

b) Hexagon head screws (ISO 4017 and ISO 4018)

c) Hexagon nuts (ISO 4032, ISO 4033, ISO 4034 ISO 4035 and ISO 4036)

d) Hexagon flanged bolts
e) Hexagon flanged screws
f) Hexagon flanged nuts
g) Structural bolting

(in preparation)

1 SCOPE AND FIELD OF APPLICATION

This International Standard gives specifications for hexagon head bolts with metric dimensions and thread diameters from 3 up to and including 36 mm, with product grade A for sizes M3 to M24 and lengths $\leqslant 10\,d$ or 150 mm, whichever is shorter, and with product grade B for sizes with $d >$ M24 or lengths $> 10\,d$ or 150 mm, whichever is shorter.

If, in special cases, specifications other than those listed in this International Standard are required, it is recommended that they should be selected from existing International Standards, for example ISO 261, ISO 888, ISO 898, ISO 965, ISO 3506, ISO 4759/1.

2 REFERENCES

ISO 261, *ISO general purpose metric screw threads — General plan.*

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

ISO 898, *Mechanical properties of fasteners.*

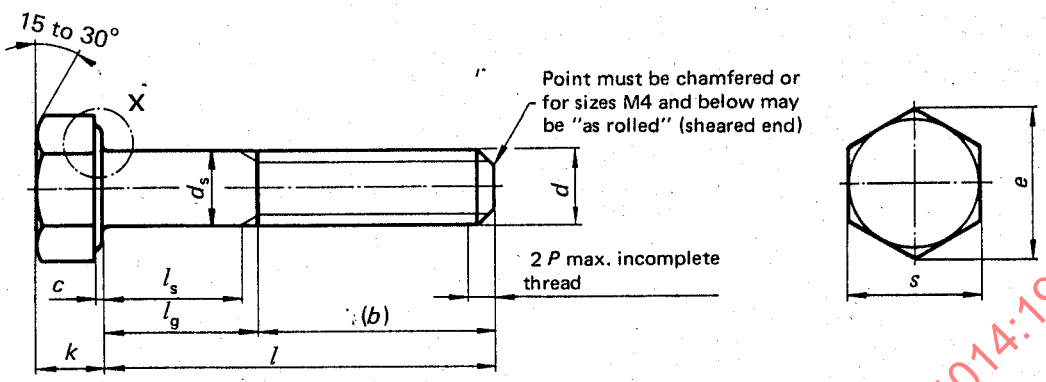
ISO 965, *ISO general purpose metric screw threads — Tolerances.*

ISO 3506, *Corrosion-resistant stainless steel fasteners — Specifications.*[1)]

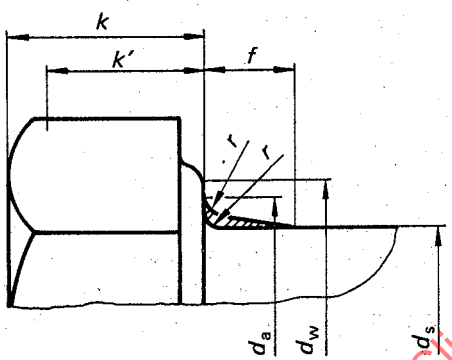
ISO 4759/1, *Tolerances for fasteners — Part 1 : Bolts, screws and nuts with thread diameters* $\geqslant 1{,}6 \leqslant 150$ mm *and product grades A, B and C.*

1) At present at the stage of draft.

3 DIMENSIONS



Detail X



Minimum wrenching height $k' = 0{,}7\ k$ min. (see table)

Maximum and minimum r underhead fillet

Thread size d			M3	M4	M5	M6	M8
P		1)	0,5	0,7	0,8	1	1,25
b ref.		2)	12	14	16	18	22
		3)	–	–	–	–	28
		4)	–	–	–	–	–
c		min.	0,15	0,15	0,15	0,15	0,15
		max.	0,4	0,4	0,5	0,5	0,6
d_a		max.	3,6	4,7	5,7	6,8	9,2
d_s		max.	3	4	5	6	8
		min.	2,86	3,82	4,82	5,82	7,78
d_w	$l \leqslant 10\,d$ or 150 mm	min.	4,6	5,9	6,9	8,9	11,6
	$l > 10\,d$ or 150 mm		–	–	6,7	8,7	11,4
e	$l \leqslant 10\,d$ or 150 mm	min.	6,07	7,66	8,79	11,05	14,38
	$l > 10\,d$ or 150 mm		–	–	8,63	10,89	14,20
f		max.	1	1,2	1,2	1,4	2
k	$l \leqslant 10\,d$ or 150 mm	nom.	2	2,8	3,5	4	5,3
		min.	1,88	2,68	3,35	3,85	5,15
		max.	2,12	2,92	3,65	4,15	5,45
	$l > 10\,d$ or 150 mm	min.	–	–	3,26	3,76	5,06
		max.	–	–	3,74	4,24	5,54
k'		min.	1,3	1,9	2,28	2,63	3,54
r		min.	0,1	0,2	0,2	0,25	0,4
s		max.	5,5	7	8	10	13
	$l \leqslant 10\,d$ or 150 mm	min.	5,32	6,78	7,78	9,78	12,73
	$l > 10\,d$ or 150 mm		–	–	7,64	9,64	12,57

l					shank length l_s and grip length										
	$\leqslant 10\,d$ or 150 mm		$> 10\,d$ or 150 mm		l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s
nom.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.
20	19,58	20,42	–	–	5,5	8									
25	24,58	25,42	–	–	10,5	13	7,5	11	5	9					
30	29,58	30,42	–	–	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	6,75	13	
40	39,5	40,5	38,75	41,25			22,5	26	20	24	17	22	11,75	18	6,5
45	44,5	45,5	43,75	46,25					25	29	22	27	16,75	23	11,5
50	49,5	50,5	48,75	51,25					30	34	27	32	21,75	28	16,5
55	54,4	55,6	53,5	56,5							32	37	26,75	33	21,5
60	59,4	60,6	58,5	61,5							37	42	31,75	38	26,5
65	64,4	65,6	63,5	66,5									36,75	43	31,5
70	69,4	70,6	68,5	71,5									41,75	48	36,5
80	79,4	80,6	78,5	81,5									51,75	58	46,5
90	89,3	90,7	88,25	91,75											56,5
100	99,3	100,7	98,25	101,75											66,5
110	109,3	110,7	108,25	111,75											
120	119,3	120,7	118,25	121,75											
130	129,2	130,8	128	132											
140	139,2	140,8	138	142											
150	149,2	150,8	148	152											
160	159,2	160,8	158	162											
180	179,2	180,8	178	182											
200	199,02	200,92	197,7	202,3											
220	219,02	220,92	217,7	222,3											
240	239,02	240,92	237,7	242,3											
260	258,95	261,05	257,4	262,6											
280	278,95	281,05	277,4	282,6											
300	298,95	301,05	297,4	302,6											

The popular lengths are between the stepped lines. The size M14 should be avoided if possible.

1) P = pitch of the thread

2) For nominal lengths ⩽ 125 mm

3) For nominal lengths > 125 and ⩽ 200 mm

4) For nominal lengths > 200 mm.

	M3	M4	M5	M6	M8	M10	M12	(M14)	M16
1)	0,5	0,7	0,8	1	1,25	1,5	1,75	2	2
2)	12	14	16	18	22	26	30	34	38
3)	–	–	–	–	28	32	36	40	44
4)	–	–	–	–	–	–	–	–	57
min.	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,2
max.	0,4	0,4	0,5	0,5	0,6	0,6	0,6	0,6	0,8
max.	3,6	4,7	5,7	6,8	9,2	11,2	13,7	15,7	17,7
max.	3	4	5	6	8	10	12	14	16
min.	2,86	3,82	4,82	5,82	7,78	9,78	11,73	13,73	15,73
m min.	4,6	5,9	6,9	8,9	11,6	14,6	16,6	19,6	22,5
m	–	–	6,7	8,7	11,4	14,4	16,4	19,2	22
m min.	6,07	7,66	8,79	11,05	14,38	17,77	20,03	23,35	26,75
m	–	–	8,63	10,89	14,20	17,59	19,85	22,78	26,17
max.	1	1,2	1,2	1,4	2	2	3	3	3
nom.	2	2,8	3,5	4	5,3	6,4	7,5	8,8	10
m min.	1,88	2,68	3,35	3,85	5,15	6,22	7,32	8,62	9,82
m max.	2,12	2,92	3,65	4,15	5,45	6,58	7,68	8,98	10,18
m min.	–	–	3,26	3,76	5,06	6,11	7,21	8,51	9,71
m max.	–	–	3,74	4,24	5,54	6,69	7,79	9,09	10,29
min.	1,3	1,9	2,28	2,63	3,54	4,28	5,05	5,96	6,8
min.	0,1	0,2	0,2	0,25	0,4	0,4	0,6	0,6	0,6
max.	5,5	7	8	10	13	16	18	21	24
m min.	5,32	6,78	7,78	9,78	12,73	15,73	17,73	20,67	23,67
m	–	–	7,64	9,64	12,57	15,57	17,57	20,16	23,16

or 150 mm	shank length l_s and grip length 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.	l_s min.	l_g max.	l_s min.	l_g max.
–	5,5	8																
–	10,5	13	7,5	11	5	9												
–	15,5	18	12,5	16	10	14	7	12										
36,25			17,5	21	15	19	12	17	6,75	13								
41,25			22,5	26	20	24	17	22	11,75	18	6,5	14						
46,25					25	29	22	27	16,75	23	11,5	19	6,25	15				
51,25					30	34	27	32	21,75	28	16,5	24	11,25	20	6	16		
56,5							32	37	26,75	33	21,5	29	16,25	25	11	21	7	17
61,5							37	42	31,75	38	26,5	34	21,25	30	16	26	12	22
66,5									36,75	43	31,5	39	26,25	35	21	31	17	27
71,5									41,75	48	36,5	44	31,25	40	26	36	22	32
81,5									51,75	58	46,5	54	41,25	50	36	46	32	42
91,75											56,5	64	51,25	60	46	56	42	52
101,75											66,5	74	61,25	70	56	66	52	62
111,75													71,25	80	66	76	62	72
121,75													81,25	90	76	86	72	82
132															80	90	76	86
142															90	100	86	96
152																	96	106
162																	106	116
182																		
202,3																		
222,3																		
242,3																		
262,6																		
282,6																		
302,6																		

For these sizes see ISO 4017

nes. The size M14 should be avoided if possible.

Dimensions in millimetres

	M12	(M14)	M16	M20	M24	M30	M36
	1,75	2	2	2,5	3	3,5	4
	30	34	38	46	54	66	78
	36	40	44	52	60	72	84
	–	–	57	65	73	85	97
	0,15	0,15	0,2	0,2	0,2	0,2	0,2
	0,6	0,6	0,8	0,8	0,8	0,8	0,8
	13,7	15,7	17,7	22,4	26,4	33,4	39,4
	12	14	16	20	24	30	36
	11,73	13,73	15,73	19,67	23,67	29,67	35,61
	16,6	19,6	22,5	28,2	33,6	42,7	51,1
	16,4	19,2	22	27,7	33,2		
	20,03	23,35	26,75	33,53	39,98	50,85	60,79
	19,85	22,78	26,17	32,95	39,55		
	3	3	3	4	4	6	6
	7,5	8,8	10	12,5	15	18,7	22,5
	7,32	8,62	9,82	12,28	14,78	–	–
	7,68	8,98	10,18	12,72	15,22	–	–
	7,21	8,51	9,71	12,15	14,65	18,28	22,08
	7,79	9,09	10,29	12,85	15,35	19,12	22,92
	5,05	5,96	6,8	8,5	10,3	12,8	15,5
	0,6	0,6	0,6	0,8	0,8	1	1
	18	21	24	30	36	46	55
	17,73	20,67	23,67	29,67	35,38	45	53,8
	17,57	20,16	23,16	29,16	35		

x.	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.
	For these sizes see ISO 4017													
4														
9	6,25	15												
4	11,25	20	6	16										
9	16,25	25	11	21	7	17								
4	21,25	30	16	26	12	22								
9	26,25	35	21	31	17	27	6,5	19						
4	31,25	40	26	36	22	32	11,5	24						
4	41,25	50	36	46	32	42	21,5	34	11	26				
4	51,25	60	46	56	42	52	31,5	44	21	36	6,5	24		
4	61,25	70	56	66	52	62	41,5	54	31	46	16,5	34		
	71,25	80	66	76	62	72	51,5	64	41	56	26,5	44	12	32
	81,25	90	76	86	72	82	61,5	74	51	66	36,5	54	22	42
			80	90	76	86	65,5	78	55	70	40,5	58	26	46
			90	100	86	96	75,5	88	65	80	50,5	68	36	56
					96	106	85,5	98	75	90	60,5	78	46	66
					106	116	95,5	108	85	100	70,5	88	56	76
							115,5	128	105	120	90,5	108	76	96
							135,5	148	125	140	110,5	128	96	116
									132	147	117,5	135	103	123
									152	167	137,5	155	123	143
											157,5	175	143	163
											177,5	195	163	183
											197,5	215	183	203

Formulae :

l_g max. $= l$ nom. $- b$ ref.

l_s min. $= l_g$ max. $- 5P$