

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

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FOREWORD

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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
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Germany, F.R.	Norway	
Hungary	Poland	

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

France
USSR

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 $\leq 10 d$ 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.*

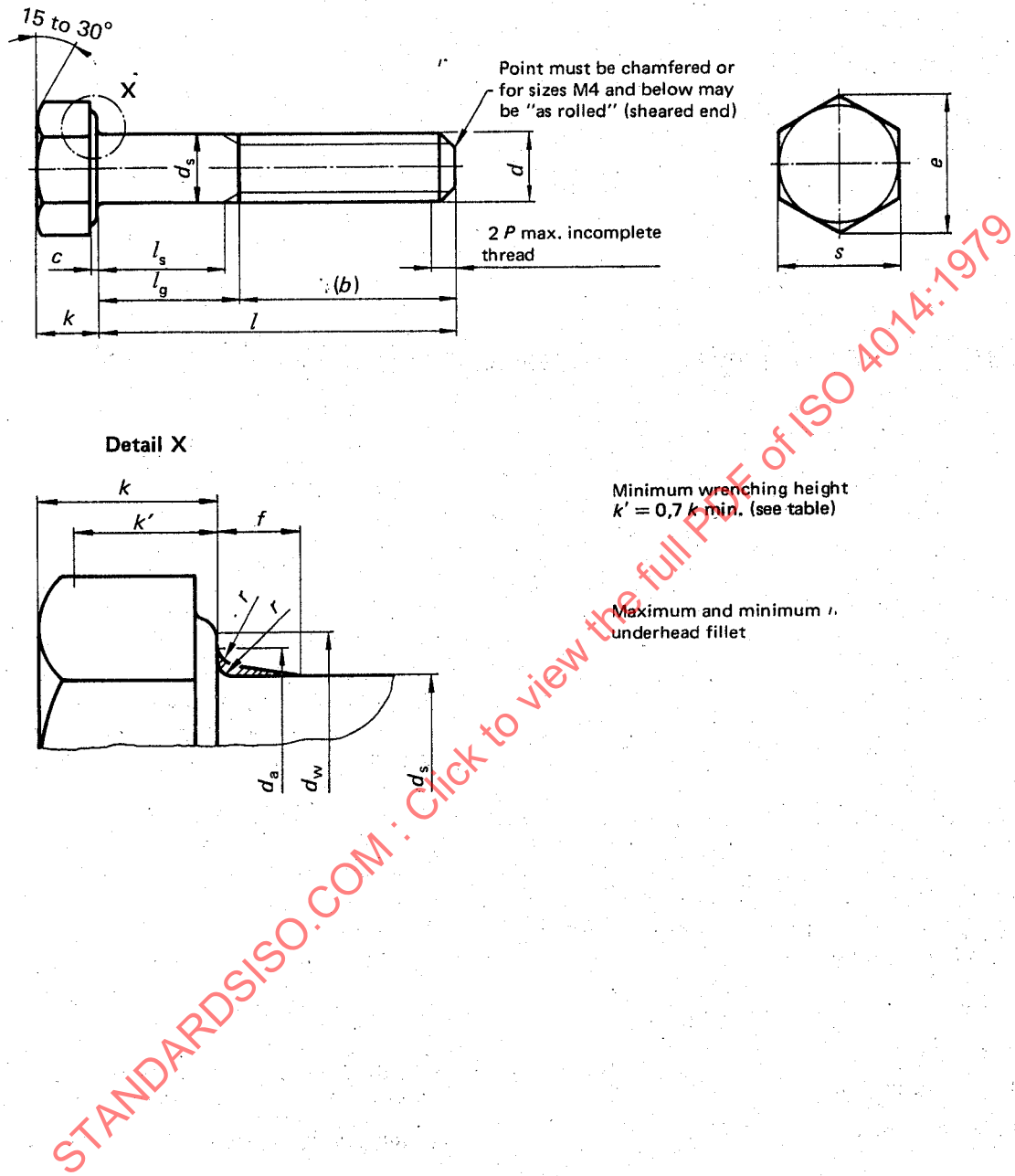
ISO 965, *ISO general purpose metric screw threads — Tolerances.*

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

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

1) At present at the stage of draft.

3 DIMENSIONS



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	$l \leq 10 d$ 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	$l \leq 10 d$ 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	nom.				2	2,8	3,5	4	5,3					
	$l \leq 10 d$ or 150 mm		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					
	$l \leq 10 d$ 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 l_g									
nom.	$\leq 10 d$ 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
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
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
45	44,5	45,5	43,75	46,25					25	29	22	27	16,75	23
50	49,5	50,5	48,75	51,25					30	34	27	32	21,75	28
55	54,4	55,6	53,5	56,5							32	37	26,75	33
60	59,4	60,6	58,5	61,5							37	42	31,75	38
65	64,4	65,6	63,5	66,5									36,75	43
70	69,4	70,6	68,5	71,5									41,75	48
80	79,4	80,6	78,5	81,5									51,75	58
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.

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	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 min.	—	—	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 min.	—	—	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 min.	—	—	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.	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																					

nes. The size M14 should be avoided if possible.

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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		

Formulae :

$$l_g \text{ max.} = l \text{ nom.} - b \text{ ref.}$$

$$l_s \text{ min.} = l_g \text{ max.} - 5 P$$

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.
For these sizes see ISO 4017															
6,25	15														
11,25	20	6	16												
16,25	25	11	21	7	17										
21,25	30	16	26	12	22										
26,25	35	21	31	17	27	6,5	19								
31,25	40	26	36	22	32	11,5	24								
41,25	50	36	46	32	42	21,5	34	11	26						
51,25	60	46	56	42	52	31,5	44	21	36	6,5	24				
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	96	85,5	98	75	90	60,5	78	46	66		
			106	116	106	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		