
**Fasteners — Hexagon head screws —
Product grades A and B**

Fixations — Vis à tête hexagonale entièrement 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 2, *Fasteners*, Subcommittee SC 11, *Fasteners with metric external thread*.

This fifth edition cancels and replaces the fourth edition (ISO 4017:2011), of which it constitutes a minor revision.

Introduction

This International Standard belongs to a complete family 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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Fasteners — Hexagon head screws — Product grades A and B

1 Scope

This International Standard specifies the characteristics of hexagon head screws 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 and nominal lengths over $10 d$ or 150 mm, whichever is the shorter.

NOTE This type of product is the same as that covered by ISO 4014 with the exception of threading up to head and nominal lengths up to and including 200 mm as preferred lengths.

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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 3508, *Thread run-outs for fasteners with thread in accordance with ISO 261 and ISO 262*

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*

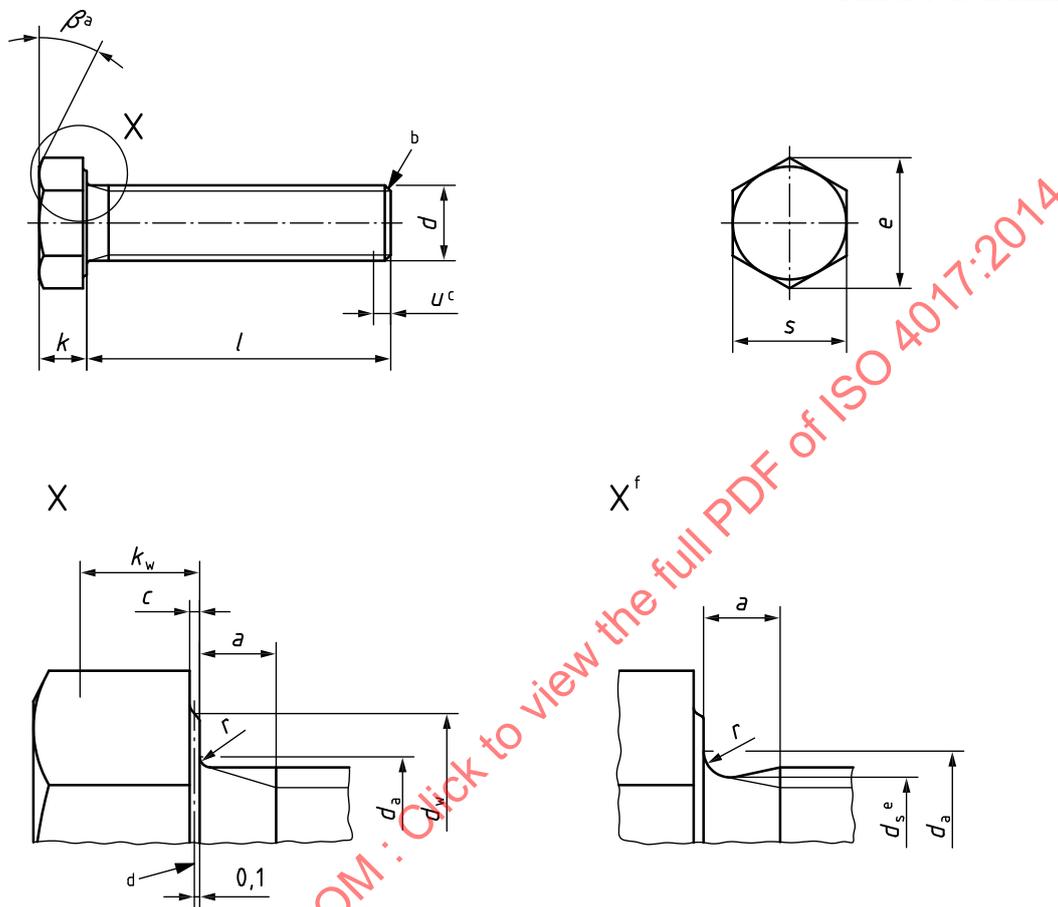
ISO 10684, *Fasteners — Hot dip galvanized coatings*

3 Dimensions

See [Figure 1](#) and [Tables 1](#) and [2](#).

Symbols and descriptions of dimensions are specified in ISO 225.

Dimensions in millimetres



Key

- 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 $d_s \approx$ pitch diameter
- f Permissible shape.

Figure 1 — Dimensions

Table 1 — Preferred threads

Dimensions in millimetres

Thread, <i>d</i>				M1,6	M2	M2,5	M3	M4	M5	M6
<i>P</i>				0,35	0,4	0,45	0,5	0,7	0,8	1
<i>a</i>	max. ^a			1,05	1,20	1,35	1,5	2,1	2,4	3
	min.			0,35	0,40	0,45	0,5	0,7	0,8	1
<i>c</i>	max.			0,25	0,25	0,25	0,40	0,40	0,50	0,50
	min.			0,10	0,10	0,10	0,15	0,15	0,15	0,15
<i>d_a</i>	max.			2,0	2,6	3,1	3,6	4,7	5,7	6,8
<i>d_w</i>	Product grade	A	min.	2,27	3,07	4,07	4,57	5,88	6,88	8,88
		B		2,30	2,95	3,95	4,45	5,74	6,74	8,74
<i>e</i>	Product grade	A	min.	3,41	4,32	5,45	6,01	7,66	8,79	11,05
		B		3,28	4,18	5,31	5,88	7,50	8,63	10,89
<i>k</i>	Product grade	A	nom.	1,1	1,4	1,7	2	2,8	3,5	4
			max.	1,225	1,525	1,825	2,125	2,925	3,65	4,15
		B	max.	0,975	1,275	1,575	1,875	2,675	3,35	3,85
			min.	1,30	1,60	1,90	2,20	3,00	3,74	4,24
<i>k_w^b</i>	Product grade	A	min.	0,68	0,89	1,10	1,31	1,87	2,35	2,70
		B		0,63	0,84	1,05	1,26	1,82	2,28	2,63
<i>r</i>	min.			0,1	0,1	0,1	0,1	0,2	0,2	0,25
	nom. = max.			3,2	4	5	5,5	7	8	10
<i>s</i>	Product grade	A	min.	3,02	3,82	4,82	5,32	6,78	7,78	9,78
		B		2,90	3,70	4,70	5,20	6,64	7,64	9,64
Product grade										
A										
B										
<i>l</i>										
nom.	min.	max.	min.	max.						
2	1,8	2,2	-	-						
3	2,8	3,2	-	-						
4	3,76	4,24	-	-						
5	4,76	5,24	-	-						
6	5,76	6,24	-	-						
8	7,71	8,29	-	-						
10	9,71	10,29	-	-						
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						
130	129,2	130,8	128	132						
140	139,2	140,8	138	142						
150	149,2	150,8	148	152						
160	-	-	158	162						
180	-	-	178	182						
200	-	-	197,7	202,3						

Table 1 — (continued)

Dimensions in millimetres

Thread, <i>d</i>					M8	M10	M12	M16	M20	M24	
<i>P</i>					1,25	1,5	1,75	2	2,5	3	
<i>a</i>	max. ^a				4	4,5	5,3	6	7,5	9	
	min.				1,25	1,5	1,75	2	2,5	3	
<i>c</i>	max.				0,60	0,60	0,60	0,80	0,80	0,80	
	min.				0,15	0,15	0,15	0,20	0,20	0,20	
<i>d_a</i> max.					9,2	11,2	13,7	17,7	22,4	26,4	
<i>d_w</i>	Product grade	A	min.			11,63	14,63	16,63	22,49	28,19	33,61
		B	min.			11,47	14,47	16,47	22,00	27,70	33,25
<i>e</i>	Product grade	A	min.			14,38	17,77	20,03	26,75	33,53	39,98
		B	min.			14,20	17,59	19,85	26,17	32,95	39,55
<i>k</i>	Product grade	nom.			5,3	6,4	7,5	10	12,5	15	
		A	max.			5,45	6,58	7,68	10,18	12,715	15,215
	Product grade	min.			5,15	6,22	7,32	9,82	12,285	14,785	
		B	max.			5,54	6,69	7,79	10,29	12,85	15,35
	Product grade	min.			5,06	6,11	7,21	9,71	12,15	14,65	
		A	min.			3,61	4,35	5,12	6,87	8,60	10,35
<i>k_w^b</i>	Product grade	B	min.			3,54	4,28	5,05	6,8	8,51	10,26
		min.				0,4	0,4	0,6	0,6	0,8	0,8
<i>s</i>	nom. = max.				13	16	18	24	30	36	
	Product grade	A	min.			12,73	15,73	17,73	23,67	29,67	35,38
		B	min.			12,57	15,57	17,57	23,16	29,16	35,00
Product grade											
A B											
<i>l</i>											
nom.	min.	max.	min.	max.							
2	1,8	2,2	-	-							
3	2,8	3,2	-	-							
4	3,76	4,24	-	-							
5	4,76	5,24	-	-							
6	5,76	6,24	-	-							
8	7,71	8,29	-	-							
10	9,71	10,29	-	-							
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	89,4	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							
130	129,2	130,8	128	132							
140	139,2	140,8	138	142							
150	149,2	150,8	148	152							
160	-	-	158	162							
180	-	-	178	182							
200	-	-	197,7	202,3							

Table 2 — Non-preferred threads

Dimensions in millimetres

Thread, <i>d</i>					M3,5	M14	M18	M22	M27
<i>P</i>					0,6	2	2,5	2,5	3
<i>a</i>	max. ^a				1,8	6	7,5	7,5	9
	min.				0,6	2	2,5	2,5	3
<i>c</i>	max.				0,40	0,60	0,80	0,80	0,80
	min.				0,15	0,15	0,2	0,2	0,2
<i>d_a</i>					4,1	15,7	20,2	24,4	30,4
<i>d_w</i>	Product grade	A	min.		5,07	19,64	25,34	31,71	38,00
		B			4,95	19,15	24,85	31,35	38,00
<i>e</i>	Product grade	A	min.		6,58	23,36	30,14	37,72	-
		B			6,44	22,78	29,56	37,29	45,20
<i>k</i>	nom.				2,4	8,8	11,5	14	17
	Product grade	A	max.		2,525	8,980	11,715	14,215	-
			min.		2,275	8,620	11,285	13,785	-
	Product grade	B	max.		2,60	9,09	11,85	14,35	17,35
			min.		2,20	8,51	11,15	13,65	16,65
	<i>k_w</i> ^b	Product grade	A	min.		1,59	6,03	7,90	9,65
B					1,54	5,96	7,81	9,56	11,66
<i>r</i>					0,1	0,6	0,6	0,8	1
<i>s</i>	nom. = max.				6	21	27	34	41
	Product grade	A	min.		5,82	20,67	26,67	33,38	-
			B			5,70	20,16	26,16	33,00
Product grade									
A									
B									
<i>l</i>									
nom.	min.	max.	min.	max.					
8	7,71	8,29	-	-					
10	9,71	10,29	-	-					
12	11,65	12,35	-	-					
16	15,65	16,35	-	-					
20	19,58	20,42	-	-					
25	24,58	25,42	-	-					
30	29,58	30,42	-	-					
35	34,5	35,5	-	-					
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					
130	129,2	130,8	128	132					
140	139,2	140,8	138	142					
150	149,2	150,8	148	152					
160	-	-	158	162					
180	-	-	178	182					
200	-	-	197,7	202,3					

Table 2 — (continued)

Dimensions in millimetres

Thread, <i>d</i>			M33	M39	M45	M52	M60
<i>P</i>			3,5	4	4,5	5	5,5
<i>a</i>	Product grade	max. ^a	10,5	12	13,5	15	16,5
		min.	3,5	4	4,5	5	5,5
<i>c</i>	Product grade	max.	0,8	1,0	1,0	1,0	1,0
		min.	0,2	0,3	0,3	0,3	0,3
<i>d_a</i>		max.	36,4	42,4	48,6	56,6	67
<i>d_w</i>	Product grade	A min.	—	—	—	—	—
		B min.	46,55	55,86	64,70	74,20	83,41
<i>e</i>	Product grade	A min.	—	—	—	—	—
		B min.	55,37	66,44	76,95	88,25	99,21
<i>k</i>	Product grade	nom.	21	25	28	33	38
		max.	—	—	—	—	—
	Product grade	A min.	—	—	—	—	—
		B min.	21,42	25,42	28,42	33,5	38,5
<i>k_w^b</i>	Product grade	A min.	—	—	—	—	—
		B min.	14,41	17,21	19,31	22,75	26,25
<i>r</i>		min.	1	1	1,2	1,6	2
<i>s</i>	Product grade	nom. = max.	50	60	70	80	90
		A min.	—	—	—	—	—
	Product grade	B min.	49,0	58,8	68,1	78,1	87,8
			Product grade				
			A	B			
			<i>l</i>				
	nom.	min.	max.	min.	max.		
8		7,71	8,29	—	—		
10		9,71	10,29	—	—		
12		11,65	12,35	—	—		
16		15,65	16,35	—	—		
20		19,58	20,42	—	—		
25		24,58	25,42	—	—		
30		29,58	30,42	—	—		
35		34,5	35,5	—	—		
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		
130		129,2	130,8	128	132		
140		139,2	140,8	138	142		
150		149,2	150,8	148	152		
160		—	—	158	162		
180		—	—	178	182		
200		—	—	197,7	202,3		
<p>NOTE The range of preferred lengths is between the solid, bold stepped line: — for product grade A, above the dashed, stepped line; — for product grade B, below this line.</p>							
<p>^a Values in accordance with <i>a_{max}</i>, normal series, in ISO 3508. ^b <i>k_{w,min}</i> = 0,7 <i>k_{min}</i></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 Standards	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 specified in ISO 8839.
International Standards	$d \leq 39$ 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		
Tolerances	Product grade	$d \leq 24$ mm and $l \leq 10 d$ or 150 mm ^b : A $d > 24$ mm or $l > 10 d$ 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. Requirements for hot dip galvanized coatings are specified in ISO 10684. Additional requirements or other finishes or coatings shall be agreed between the supplier and the purchaser.	Clean and bright	As processed
	Requirements for electroplating are specified in ISO 4042.			
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. ^b Whichever is the shorter.				

5 Designation

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

Hexagon head screw ISO 4017 – M12 × 80 – 8.8