

INTERNATIONAL
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4017

Sixth edition
2022-06

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

*Fixations — Vis à tête hexagonale entièrement filetées — Grades A et
B*



Reference number
ISO 4017:2022(E)

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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).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 11, *Fasteners with metric external thread*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 185, *Fasteners*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This sixth edition cancels and replaces the fifth edition (ISO 4017:2014), which has been technically revised.

The main changes are as follows:

- tables for dimensions have been entirely restructured, so that the user can find the specified values in a reliable manner (no risk of picking the wrong dimension), see [Clause 4](#) and [Annex A](#);
- M7 has been added;
- $d_{w,min}$ has been changed for sizes $d \leq M5$ from $s_{min} - IT16$ to $s_{min} - IT15$, in order to have a larger bearing surface area and thus less contact pressure;
- greatest standard lengths (accidentally removed in the fifth edition) have been restored, rules for the shortest and greatest standard lengths have been added, and amended accordingly;
- for steel screws, property classes 4.8 and 12.9/12.9 have been added;
- for stainless steel screws, grades D4 and D6 and property class 80 have been added;
- property class 9.8 and non-ferrous metal screws have been deleted;
- specifications for marking and labelling have been added as [Clause 6](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Fasteners — Hexagon head screws — Product grades A and B

1 Scope

This document specifies the characteristics of hexagon head screws, in steel and stainless steel, with metric coarse pitch threads M1,6 to M64, and with product grades A and B.

If in certain cases other specifications are requested, property classes and stainless steel grades can be selected from ISO 898-1 or ISO 3506-1, and dimensional options from ISO 888 or ISO 4753.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 888, *Fasteners — Bolts, screws and studs — Nominal lengths and thread lengths*

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 1891-4, *Fasteners — Vocabulary — Part 4: Control, inspection, delivery, acceptance and quality*

ISO 3269, *Fasteners — Acceptance inspection*

ISO 3506-1, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs with specified grades and property classes*

ISO 4042, *Fasteners — Electroplated coating systems*

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 6157-3, *Fasteners — Surface discontinuities — Part 3: Bolts, screws and studs for special requirements*

ISO 8991, *Designation system for fasteners*

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

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

ISO 10684, *Fasteners — Hot dip galvanized coatings*

3 Terms and definitions

No terms and definitions are listed in this document.

Table 1 — Dimensions for product grade A – M1,6 to M7

Dimensions in millimetres

Thread, d		M1,6	M2	M2,5	M3	(M3,5)	M4	M5	M6	(M7)	
P^a		0,35	0,4	0,45	0,5	0,6	0,7	0,8	1	1	
a^b	max.	1,05	1,20	1,35	1,50	1,80	2,10	2,40	3,00	3,00	
	min.	0,35	0,40	0,45	0,50	0,60	0,70	0,80	1,00	1,00	
c	max.	0,25	0,25	0,25	0,40	0,40	0,40	0,50	0,50	0,60	
	min.	0,10	0,10	0,10	0,15	0,15	0,15	0,15	0,15	0,15	
d_a	max.	2,0	2,6	3,1	3,6	4,1	4,7	5,7	6,8	7,8	
d_w	min.	2,54	3,34	4,34	4,84	5,34	6,20	7,20	8,88	9,63	
e	min.	3,41	4,32	5,45	6,01	6,58	7,66	8,79	11,05	12,12	
k	nom.	1,1	1,4	1,7	2	2,4	2,8	3,5	4	4,8	
	max.	1,225	1,525	1,825	2,125	2,525	2,925	3,65	4,15	4,95	
	min.	0,975	1,275	1,575	1,875	2,275	2,675	3,35	3,85	4,65	
k_w	min.	0,68	0,89	1,10	1,31	1,59	1,87	2,35	2,70	3,26	
r	min.	0,10	0,10	0,10	0,10	0,10	0,20	0,20	0,25	0,25	
s	nom. = max.	3,20	4,00	5,00	5,50	6,00	7,00	8,00	10,00	11,00	
	min.	3,02	3,82	4,82	5,32	5,82	6,78	7,78	9,78	10,73	
l		Range of standard lengths between the stepped bold lines									
nom.	min.										max.
3	2,80	3,20									
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									
25	24,58	25,42									
30	29,58	30,42									
35	34,5	35,5									
40	39,5	40,5									
45	44,5	45,5									
50	49,5	50,5									
55	54,4	55,6									
60	59,4	60,6									
65	64,4	65,6									
70	69,4	70,6									
—	—	—									
NOTE Sizes shown in brackets are non-preferred dimensions.											
^a P is the pitch of the thread.											
^b $a_{\max} = 3P$ and $a_{\min} = 1P$.											

Table 2 — Dimensions for product grade A – M8 to M24

Dimensions in millimetres

Thread, d		M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24
p^a		1,25	1,5	1,75	2	2	2,5	2,5	2,5	3
a^b	max.	3,75	4,50	5,25	6,0	6,0	7,5	7,5	7,5	9,0
	min.	1,25	1,50	1,75	2,0	2,0	2,5	2,5	2,5	3,0
c	max.	0,60	0,60	0,60	0,60	0,8	0,8	0,8	0,8	0,8
	min.	0,15	0,15	0,15	0,15	0,2	0,2	0,2	0,2	0,2
d_a	max.	9,2	11,2	13,7	15,7	17,7	20,2	22,4	24,4	26,4
d_w	min.	11,63	14,63	16,63	19,64	22,49	25,34	28,19	31,71	33,61
e	min.	14,38	17,77	20,03	23,36	26,75	30,14	33,53	37,72	39,98
k	nom.	5,3	6,4	7,5	8,8	10	11,5	12,5	14	15
	max.	5,45	6,58	7,68	8,98	10,18	11,715	12,715	14,215	15,215
	min.	5,15	6,22	7,32	8,62	9,82	11,285	12,285	13,785	14,785
k_w	min.	3,61	4,35	5,12	6,03	6,87	7,90	8,60	9,65	10,35
r	min.	0,4	0,4	0,6	0,6	0,6	0,6	0,8	0,8	0,8
s	nom. = max.	13,00	16,00	18,00	21,00	24,00	27,00	30,00	34,00	36,00
	min.	12,73	15,73	17,73	20,67	23,67	26,67	29,67	33,38	35,38
l		Range of standard lengths between the stepped bold lines								
nom.	min.	max.								
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								
45	44,5	45,5								
50	49,5	50,5								
55	54,4	55,6								
60	59,4	60,6								
65	64,4	65,6								
70	69,4	70,6								
80	79,4	80,6								
90	89,3	90,7								
100	99,3	100,7								
110	109,3	110,7								
120	119,3	120,7								
130	129,2	130,8								
140	139,2	140,8								
150	149,2	150,8								
> 150			Product grade B in Annex A			Product grade B in Table 3				
NOTE Sizes shown in brackets are non-preferred dimensions.										
^a P is the pitch of the thread.										
^b $a_{\max} = 3P$ and $a_{\min} = 1P$.										

Table 3 — Dimensions for product grade B – M16 to M36

Dimensions in millimetres

Thread, d	M16	(M18)	M20	(M22)	M24	(M27)	M30	(M33)	M36	
P^a	2	2,5	2,5	2,5	3	3	3,5	3,5	4	
a^b	max.	6,0	7,5	7,5	7,5	9,0	9,0	10,5	10,5	12,0
	min.	2,0	2,5	2,5	2,5	3,0	3,0	3,5	3,5	4,0
c	max.	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	
	min.	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	
d_a	max.	17,7	20,2	22,4	24,4	26,4	30,4	33,4	36,4	39,4
d_w	min.	22,00	24,85	27,70	31,35	33,25	38,00	42,75	46,55	51,11
e	min.	26,17	29,56	32,95	37,29	39,55	45,20	50,85	55,37	60,79
k	nom.	10	11,5	12,5	14	15	17	18,7	21	22,5
	max.	10,29	11,85	12,85	14,35	15,35	17,35	19,12	21,42	22,92
	min.	9,71	11,15	12,15	13,65	14,65	16,65	18,28	20,58	22,08
k_w	min.	6,80	7,81	8,51	9,56	10,26	11,66	12,80	14,41	15,46
r	min.	0,6	0,6	0,8	0,8	0,8	1,0	1,0	1,0	1,0
s	nom. = max.	24,00	27,00	30,00	34,00	36,00	41,00	46,00	50,00	55,00
	min.	23,16	26,16	29,16	33,00	35,00	40,00	45,00	49,00	53,80
l			Range of standard lengths between the stepped bold lines							
nom.	min.	max.								
55	53,5	56,5	Product grade A in Table 2				Screws with too short lengths			
60	58,5	61,5								
65	63,5	66,5								
70	68,5	71,5								
80	78,5	81,5								
90	88,25	91,75								
100	98,25	101,75								
110	108,25	111,75								
120	118,25	121,75								
130	128,0	132,0								
140	138,0	142,0								
150	148,0	152,0								
160	158,0	162,0								
180	178,0	182,0								
200	197,7	202,3								
> 200	Length by agreement in accordance with ISO 888			Bolts specified in ISO 4014, or screws with length by agreement in accordance with ISO 888						

NOTE Sizes shown in brackets are non-preferred dimensions.

^a P is the pitch of the thread.^b $a_{\max} = 3P$ and $a_{\min} = 1P$.

Table 4 — Dimensions for product grade B - M39 to M64

Dimensions in millimetres

Thread, d		(M39)	M42	(M45)	M48	(M52)	M56	(M60)	M64
p^a		4	4,5	4,5	5	5	5,5	5,5	6
a^b	max.	12,0	13,5	13,5	15,0	15,0	16,5	16,5	18,0
	min.	4,0	4,5	4,5	5,0	5,0	5,5	5,5	6,0
c	max.	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
	min.	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3
d_a	max.	42,4	45,6	48,6	52,6	56,6	63,0	67,0	71,0
d_w	min.	55,86	59,95	64,70	69,45	74,20	78,66	83,41	88,16
e	min.	66,44	71,30	76,95	82,60	88,25	93,56	99,21	104,86
k	nom.	25	26	28	30	33	35	38	40
	max.	25,42	26,42	28,42	30,42	33,50	35,50	38,50	40,50
	min.	24,58	25,58	27,58	29,58	32,50	34,50	37,50	39,50
k_w	min.	17,21	17,91	19,31	20,71	22,75	24,15	26,25	27,65
r	min.	1,0	1,2	1,2	1,6	1,6	2,0	2,0	2,0
s	nom. = max.	60,00	65,00	70,00	75,00	80,00	85,00	90,00	95,00
	min.	58,80	63,10	68,10	73,10	78,10	82,80	87,80	92,80
l			Range of standard lengths between the stepped bold lines						
nom.	min.	max.							
80	78,5	81,5							
90	88,25	91,75							
100	98,25	101,75							
110	108,25	111,75							
120	118,25	121,75							
130	128,0	132,0							
140	138,0	142,0							
150	148,0	152,0							
160	158,0	162,0							
180	178,0	182,0							
200	197,7	202,3							
> 200	Bolts specified in ISO 4014, or screws with length by agreement in accordance with ISO 888								
NOTE Sizes shown in brackets are non-preferred dimensions.									
^a P is the pitch of the thread.									
^b $a_{\max} = 3P$ and $a_{\min} = 1P$.									

5 Requirements and reference International Standards

The requirements specified in the International standards listed in [Table 5](#) shall apply.

Table 5 — Requirements and reference International Standards

Material		Steel	Stainless steel	
General requirements	International Standard	ISO 8992		
Thread	Tolerance class	6g ^a		
	International Standard	ISO 965-1		
Mechanical properties	Property class	M1,6 ≤ d ≤ M39	4.8, 5.6, 8.8, 10.9, 12.9/12.9 ^b	
	Symbol	d > M39	As agreed	
	Grade ^c and property class	—	M1,6 ≤ d ≤ M24	A2-70, A4-70, A4-80, D4-80, D6-80
			M24 < d ≤ M39	A2-50, A2-70, A4-50, A4-70, D4-70, D6-70
Symbol		d > M39	As agreed	
	International Standard	ISO 898-1	ISO 3506-1	
Tolerances	Product grade	For d ≤ M24 and l ≤ 10d or 150 mm ^d : A (except for sizes d ≤ M5 where d _{w,min} = s _{min} - IT15) For d > M24 or l > 10d or 150 mm ^d : B		
	International Standard	ISO 4759-1		
Surface condition		As processed (no coating) Electroplated coatings as specified in ISO 4042 Non-electrolytically applied zinc flake coatings as specified in ISO 10683 Hot dip galvanized coatings as specified in ISO 10684 Other finishes, coatings and/or additional requirements shall be agreed between the purchaser and the supplier	Clean and bright and/or Passivated ^e	
Surface integrity		Limits for surface discontinuities as specified in ISO 6157-1, and in ISO 6157-3 for property class 12.9/12.9	As agreed ^f	
Acceptability		Acceptance inspection as specified in ISO 3269		

^a Depending on the type of coating to be applied, another tolerance position of the thread may be specified for the uncoated fastener in accordance with the relevant coating standard.

^b Fasteners of property class 12.9/12.9 are susceptible to hydrogen embrittlement: see ISO/TR 20491.

^c The most common stainless steel grades are A2 and A4; however, depending on the application, it can be necessary to select other grades in ISO 3506-1 suitable for the service corrosive environment. For use at high temperatures (up to 800 °C), mechanical properties are specified in ISO 3506-5. See also ISO 3506-6 for the selection of suitable stainless steel grades.

^d Whichever is the shorter.

^e See e.g. ISO 16048.

^f See e.g. ISO 6157-1.

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6 Marking and labelling

6.1 Marking on product

Marking shall be:

- for steel fasteners, as specified in ISO 898-1,
- for stainless steel fasteners, as specified in ISO 3506-1.

6.2 Labelling on package

Labelling on the package shall be in accordance with ISO 898-1 or ISO 3506-1, and shall include at least:

- the reference to this document, i.e. ISO 4017,
- the thread size d and nominal length l ,
- the symbol of the property class for steel fasteners,
- the grade and symbol of the property class for stainless steel fasteners,
- the type of surface condition (finish and/or coating),
- the manufacturer's and/or distributor's identification and/or name,
- the manufacturing lot number as specified in ISO 1891-4,
- the quantity of pieces in the package.

7 Designation

The designation requirements as specified in ISO 8991 shall apply for all sizes, with:

- the symbol of the property class for steel fasteners, as specified in ISO 898-1,
- the grade and symbol of the property class for stainless steel fasteners, as specified in ISO 3506-1.

When no specific surface condition (finish and/or coating) is specified in the designation, steel fasteners are delivered in the "as processed" condition, and stainless steel fasteners in the "clean and bright" condition.

EXAMPLE A hexagon head screw, with thread size M12, nominal length $l = 50$ mm, product grade A, stainless steel grade A2 and property class 70, clean and bright, is designated as follows:

Hexagon head screw ISO 4017 - M12 × 50 - A2-70

Annex A (normative)

Dimensions for screws M1,6 to M14 with product grade B

Tables A.1 and A.2 are included in this document to specify the dimensions for screws M1,6 to M14 with product grade B because of their longer length $l_{\text{nom}} > 10d$ or 150 mm: the length of these screws shall be agreed between the purchaser and the manufacturer at the time of the order.

Table A.1 — Dimensions for product grade B - M1,6 to M4

Dimensions in millimetres

Thread, d		M1,6	M2	M2,5	M3	(M3,5)	M4
P^a		0,35	0,4	0,45	0,5	0,6	0,7
a^b	max.	1,05	1,20	1,35	1,50	1,80	2,10
	min.	0,35	0,40	0,45	0,50	0,60	0,70
c	max.	0,25	0,25	0,25	0,40	0,40	0,40
	min.	0,10	0,10	0,10	0,15	0,15	0,15
d_a	max.	2,0	2,6	3,1	3,6	4,1	4,7
d_w	min.	2,42	3,22	4,22	4,72	5,22	6,06
e	min.	3,28	4,18	5,31	5,88	6,44	7,50
k	nom.	1,1	1,4	1,7	2	2,4	2,8
	max.	1,30	1,60	1,90	2,20	2,60	3,00
	min.	0,90	1,20	1,50	1,80	2,20	2,60
k_w	min.	0,63	0,84	1,05	1,26	1,54	1,82
r	min.	0,10	0,10	0,10	0,10	0,10	0,20
s	nom. = max.	3,20	4,00	5,00	5,50	6,00	7,00
	min.	2,90	3,70	4,70	5,20	5,70	6,64
l		Range of lengths to be agreed below the stepped bold line					
nom.	min.	max.	Product grade A in Table 1				
20	18,95	21,05					
25	23,95	26,05					
30	28,95	31,05					
35	33,75	36,05					
40	38,75	41,25					
45	43,75	46,25					
50	48,75	51,25					
> 50							
		Length by agreement in accordance with ISO 888					

NOTE Size shown in brackets is a non-preferred dimension.

^a P is the pitch of the thread.

^b $a_{\text{max}} = 3P$ and $a_{\text{min}} = 1P$.

Table A.2 — Dimensions for product grade B – M5 to M14

Dimensions in millimetres

Thread, d		M5	M6	(M7)	M8	M10	M12	(M14)
P^a		0,8	1	1	1,25	1,5	1,75	2
a^b	max.	2,40	3,00	3,00	3,75	4,50	5,25	6,0
	min.	0,80	1,00	1,00	1,25	1,50	1,75	2,0
c	max.	0,50	0,50	0,60	0,60	0,60	0,60	0,60
	min.	0,15	0,15	0,15	0,15	0,15	0,15	0,15
d_a	max.	5,7	6,8	7,8	9,2	11,2	13,7	15,7
d_w	min.	7,06	8,74	9,47	11,47	14,47	16,47	19,15
e	min.	8,63	10,89	11,94	14,20	17,59	19,85	22,78
k	nom.	3,5	4,0	4,8	5,3	6,4	7,5	8,8
	max.	3,74	4,24	5,04	5,54	6,69	7,79	9,09
	min.	3,26	3,76	4,56	5,06	6,11	7,21	8,51
k_w	min.	2,28	2,63	3,19	3,54	4,28	5,05	5,96
r	min.	0,20	0,25	0,25	0,40	0,40	0,60	0,60
s	nom. = max.	8,00	10,00	11,00	13,00	16,00	18,00	21,00
	min.	7,64	9,64	10,57	12,57	15,57	17,57	20,16
l		Range of lengths to be agreed below the stepped bold line						
nom.	min.	max.	Product grade A in Table 1		Product grade A in Table 2			
55	53,50	56,50						
60	58,50	61,50						
65	63,50	66,50						
70	68,50	71,50						
80	78,50	81,50						
90	88,25	91,75						
100	98,25	101,75						
110	108,25	111,75						
120	118,25	121,75	Length by agreement in accordance with ISO 888					
130	128	132						
140	138	142						
150	148	152						
> 150								
NOTE Sizes shown in brackets are non-preferred dimensions.								
^a P is the pitch of the thread.								
^b $a_{\max} = 3P$ and $a_{\min} = 1P$.								

Bibliography

- ISO 3506-5, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 5: Special fasteners (also including fasteners from nickel alloys) for high temperature applications*
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