

INTERNATIONAL STANDARD

ISO
8676

Second edition
1999-08-15

Hexagon head screws with metric fine pitch thread — Product grades A and B

*Vis à tête hexagonale à filetage métrique à pas fin entièrement filetées —
Grades A et B*



Reference number
ISO 8676:1999(E)

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 8676 was prepared by Technical Committee ISO/TC 2, *Fasteners*.

This second edition cancels and replaces the first edition (ISO 8676:1988) which has been technically revised.

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Introduction

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

- a) hexagon head bolts (ISO 4014 to ISO 4016 and ISO 8765);
- b) hexagon head screws (ISO 4017, ISO 4018 and ISO 8676);
- c) hexagon nuts (ISO 4032 to ISO 4036, ISO 8673 to ISO 8675);
- d) hexagon bolts with flange (ISO 4162 and ISO 15071);
- e) hexagon nuts with flange (ISO 4161 and ISO 10663);
- f) structural bolts and nuts (ISO 4775, ISO 7411 to ISO 7414 and ISO 7417).

Hexagon head screws with metric fine pitch thread — Product grades A and B

1 Scope

This International Standard specifies the characteristics of hexagon head screws with metric fine pitch thread with nominal thread diameters d from 8 mm to 64 mm of product grade A for nominal thread diameters d from 8 mm to 24 mm and nominal lengths, l , up to and including $10d$ or 150 mm, whichever is shorter, and of product grade B for nominal thread diameters d over 24 mm or nominal lengths, l , over $10d$ or 150 mm, whichever is shorter.

If, in special cases, specifications other than those listed in this International Standard are required, they should 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.

Coarse thread screws according to ISO 4017 should be first choice.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 225:1983, *Fasteners — Bolts, screws, studs and nuts — Symbols and designations of dimensions*.

ISO 724:1993, *ISO general-purpose metric screw threads — Basic dimensions*.

ISO 888:1976, *Bolts, screw and studs — Nominal lengths, and thread lengths for general purpose bolts*.

ISO 898-1:1999, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts screws and studs*.

ISO 965-1:1998, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data*.

ISO 3269:—¹⁾, *Fasteners — Acceptance inspection*.

ISO 3506-1:1997, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 1: Bolts screws and studs*.

ISO 4042:1999, *Fasteners — Electroplated coatings*.

ISO 4753:—²⁾, *Fasteners — Ends of parts with external metric ISO thread*.

¹⁾ To be published. (Revision of ISO 3269:1988)

²⁾ To be published. (Revision of ISO 4753:1983)

ISO 4759-1:—³⁾, *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C.*

ISO 6157-1:1988, *Fasteners — Surface discontinuities — Part 1: Bolts, screws and studs for general requirements.*

ISO 8839:1986, *Mechanical properties of fasteners — Bolts, screws, studs and nuts made of non-ferrous metals.*

ISO 8992:1986, *Fasteners — General requirements for bolts, screws, studs and nuts.*

ISO 10683:—⁴⁾, *Fasteners — Non-electrolytically applied zinc flake coatings.*

3 Dimensions

See Figure 1 and Tables 1 and 2

Symbols and descriptions of dimensions are defined in ISO 225.

³⁾ To be published. (Revision of ISO 4759-1:1978)

⁴⁾ To be published.

Dimensions in millimetres

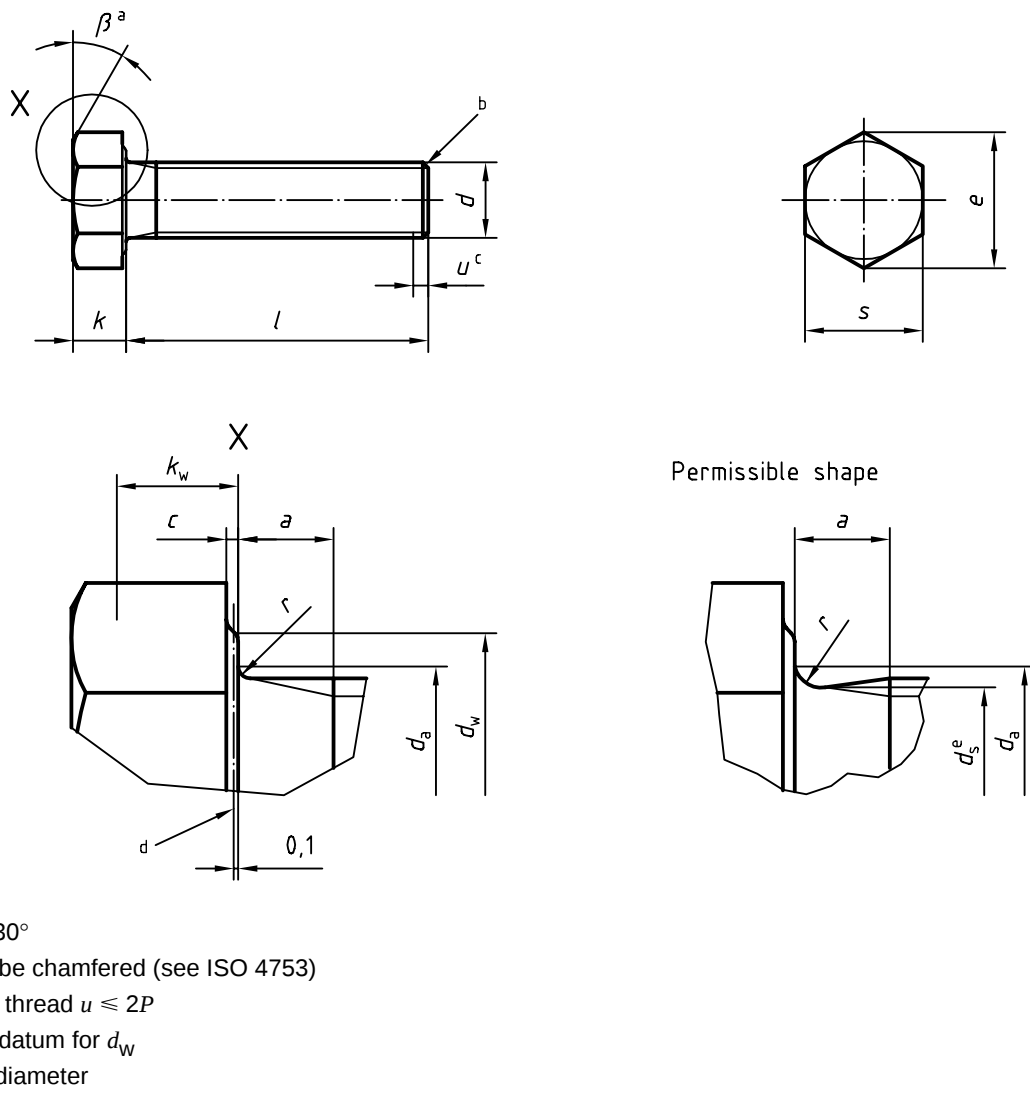


Figure 1

Table 1 — Preferred threads

Thread ($d \times P$)		M8 × 1	M10 × 1	M12 × 1,5	M16 × 1,5	M20 × 1,5	M24 × 2	M30 × 2	M36 × 3	M42 × 3	M48 × 3	M56 × 4	M64 × 4
a	max.	3	3	4,5	4,5	4,5	6	6	9	9	9	12	12
	min.	1	1	1,5	1,5	1,5	2	2	3	3	3	4	4
c	max.	0,60	0,60	0,60	0,8	0,8	0,8	0,8	0,8	1,0	1,0	1,0	1,0
	min.	0,15	0,15	0,15	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3
d_a	max.	9,2	11,2	13,7	17,7	22,4	26,4	33,4	39,4	45,6	52,6	63	71
d_w	Product grade A	11,63	14,63	16,63	22,49	28,19	33,61	—	—	—	—	—	—
	Product grade B	11,47	14,47	16,47	22	27,7	33,25	42,75	51,11	59,95	69,45	78,66	88,16
e	Product grade A	14,38	17,77	20,03	26,75	33,53	39,98	—	—	—	—	—	—
	Product grade B	14,20	17,59	19,85	26,17	32,95	39,55	50,85	60,79	71,3	82,6	93,56	104,86
k	norm.	5,3	6,4	7,5	10	12,5	15	18,7	22,5	26	30	35	40
	Product grade A	5,45	6,58	7,68	10,18	12,715	15,215	—	—	—	—	—	—
	min.	5,15	6,22	7,32	9,82	12,285	14,785	—	—	—	—	—	—
	Product grade B	5,54	6,69	7,79	10,29	12,85	15,35	19,12	22,92	26,42	30,42	35,5	40,5
k_w^a	max.	5,06	6,11	7,21	9,71	12,15	14,65	18,28	22,08	25,58	29,58	34,5	39,5
	min.	3,61	4,35	5,12	6,87	8,6	10,35	—	—	—	—	—	—
r	Product grade A	3,54	4,28	5,05	6,8	8,51	10,26	12,8	15,46	17,91	20,71	24,15	27,65
	Product grade B	0,4	0,4	0,6	0,6	0,8	0,8	1	1	1,2	1,6	2	2
s	norm. = max.	13,00	16,00	18,00	24,00	30,00	36,00	46	55,0	65,0	75,0	85,0	95,0
	Product grade A	12,73	15,73	17,73	23,67	29,67	35,38	—	—	—	—	—	—
	min.	12,57	15,57	17,57	23,16	29,16	35,00	45	53,8	63,1	73,1	82,8	92,8
	Product grade B												

Dimensions in millimetres

	Product grade																		
	A			B															
	ρ_b																		
nom.	min.	max.	min.	max.	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	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															
220	—	—	217,7	222,3															
240	—	—	237,7	242,3															
260	—	—	257,4	262,6															
280	—	—	277,4	282,6															

Table 1 (continued)

Thread (<i>d</i> × <i>P</i>)		Product grade										M8 × 1	M10 × 1	M12 × 1,5	M16 × 1,5	M20 × 1,5	M24 × 2	M30 × 2	M36 × 3	M42 × 3	M48 × 3	M56 × 4	M64 × 4	
		A		B																				
		<i>l</i> ^b																						
nom.		min.	max.	min.	max.																			
300	—	—	—	297,4	302,6																			
320	—	—	—	317,15	322,85																			
340	—	—	—	337,15	342,85																			
360	—	—	—	357,15	362,85																			
380	—	—	—	377,15	382,85																			
400	—	—	—	397,15	402,85																			
420	—	—	—	416,85	423,15																			
440	—	—	—	436,85	443,15																			
460	—	—	—	456,85	463,15																			
480	—	—	—	476,85	483,15																			
500	—	—	—	496,85	503,15																			

a *k_w*, min = 0,7 *k_{min}*

b Range of popular lengths between the solid, boldface, stepped lines
— for product grade A, above the dashed, stepped line;
— for product grade B, below this stepped line.

Table 2 — Non-preferred threads

Thread ($d \times P$)		M10 × 1,25	M12 × 1,25	M14 × 1,5	M18 × 1,5	M20 × 2	M22 × 1,5	M27 × 2	M33 × 2	M39 × 3	M45 × 3	M52 × 4	M60 × 4
a	max.	4	4	4,5	4,5	6	4,5	6	6	9	9	12	12
	min.	1,25	1,25	1,5	1,5	2	1,5	2	2	3	3	4	4
c	max.	0,60	0,60	0,60	0,8	0,8	0,8	0,8	0,8	1,0	1,0	1,0	1,0
	min.	0,15	0,15	0,15	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3
d_a	max.	11,2	13,7	15,7	20,2	22,4	24,4	30,4	36,4	42,4	48,6	56,6	67
d_w	Product grade A	14,63	16,63	19,64	25,34	28,19	31,71	—	—	—	—	—	—
	Product grade B	14,47	16,47	19,15	24,85	27,7	31,35	38	46,55	55,86	64,7	74,2	83,41
e	Product grade A	17,77	20,03	23,36	30,14	33,53	37,72	—	—	—	—	—	—
	Product grade B	17,59	19,85	22,78	29,56	32,95	37,29	45,2	55,37	66,44	76,95	88,25	99,21
k	norm.	6,4	7,5	8,8	11,5	12,5	14,00	17	21	25	28	33	38
	max.	6,58	7,68	8,98	11,715	12,715	14,215	—	—	—	—	—	—
k_w^a	Product grade A	6,22	7,32	8,62	11,285	12,285	13,785	—	—	—	—	—	—
	Product grade B	6,69	7,79	9,09	11,85	12,85	14,35	17,35	21,42	25,42	28,42	33,5	38,5
r	min.	6,11	7,21	8,51	11,15	12,15	13,65	16,65	20,58	24,58	27,58	32,5	37,5
	min.	4,35	5,12	6,03	7,9	8,6	9,65	—	—	—	—	—	—
s	Product grade A	4,28	5,05	5,96	7,81	8,51	9,56	11,66	14,41	17,21	19,31	22,75	26,25
	Product grade B	0,4	0,6	0,6	0,6	0,8	0,8	1	1	1	1,2	1,6	2
s	norm. = max.	16,00	18,00	21,00	27,00	30,00	34,00	41	50	60,0	70,0	80,0	90,0
	Product grade A	15,73	17,73	20,67	26,67	29,67	33,38	—	—	—	—	—	—
	Product grade B	15,57	17,57	20,16	26,16	29,16	33,00	40	49	58,8	68,1	78,1	87,8

Dimensions in millimetres

Table 2 (continued)

Thread ($d \times P$)				Product grade												M10 × 1,25	M12 × 1,25	M14 × 1,5	M18 × 1,5	M20 × 2	M22 × 1,5	M27 × 2	M33 × 2	M39 × 3	M45 × 3	M52 × 4	M60 × 4
				A		B																					
				l_b																							
nom.	min.	max.		min.	max.																						
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	53,5	53,5	56,5																						
60	59,4	60,6	58,5	58,5	61,5																						
65	64,4	65,6	63,5	63,5	66,5																						
70	69,4	70,6	68,5	68,5	71,5																						
80	79,4	80,6	78,5	78,5	81,5																						
90	89,3	90,7	88,25	88,25	91,75																						
100	99,3	100,7	98,25	98,25	101,75																						
110	109,3	110,7	108,25	108,25	111,75																						
120	119,3	120,7	118,25	118,25	121,75																						
130	129,2	130,8	128	128	132																						
140	139,2	140,8	138	138	142																						
150	149,2	150,8	148	148	152																						
160	—	—	158	158	162																						
180	—	—	178	178	182																						
200	—	—	197,7	197,7	202,3																						
220	—	—	217,7	217,7	222,3																						
240	—	—	237,7	237,7	242,3																						
260	—	—	257,4	257,4	262,6																						

280	—	—	277,4	282,6
300	—	—	297,4	302,6
320	—	—	317,15	322,85
340	—	—	337,15	342,85
360	—	—	357,15	362,85
380	—	—	377,15	382,85
400	—	—	397,15	402,85
420	—	—	416,85	423,15
440	—	—	436,85	443,15
460	—	—	456,85	463,15
480	—	—	476,85	483,15
500	—	—	496,85	503,15

a $k_w, \min = 0,7 k_{\min}$

b Range of popular lengths between the solid, boldface, stepped lines
— for product grade A, above the dashed, stepped line;
— for product grade B, below this stepped line.

4 Specifications and reference standards

See Table 3.

Table 3 — Specification and reference standards

Material		Steel	Stainless steel	Non-ferrous metal
General requirements	International Standard	ISO 8992		
	Tolerance	6g		
	International Standards	ISO 724, ISO 965-1		
Mechanical properties	Property class ^a	$d \leq 39$ mm: 5.6, 8.8, 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 $d > 39$ mm: as agreed	$d \leq 39$ mm: ISO 3506-1 $d > 39$ mm: as agreed	
Tolerances	Product grades	For $d \leq 24$ mm and $l \leq 10 d$ or 150 mm ^b : A For $d > 24$ mm or $l > 10 d$ or 150 mm ^b : B		
	International Standard	ISO 4759-1		
Finish and/or coating		As processed Requirements for electroplating are covered in ISO 4042 Requirements for non-electrolytically applied zinc flake coatings are covered in ISO 10683 If different electroplating requirements are desired or if requirements are needed for other finishes, they should be negotiated between customer and supplier. Limits for surface discontinuities are covered in ISO 6157-1	Plain	Plain Requirements for electroplating are covered in ISO 4042
Acceptability		For acceptance procedure, see ISO 3269.		
^a For other property classes see ISO 898-1 for steel and ISO 3506 for stainless steel respectively.				
^b Whichever is shorter.				

5 Designation

EXAMPLE

A hexagon head screw with thread $M12 \times 1,5$, nominal length $l = 80$ mm and property class 8.8 is designated as follows:

Hexagon head screw ISO 8676 - $M12 \times 1,5 \times 80$ - 8.8

Bibliography

- [1] ISO 4014:1999, *Hexagon head bolts — Product grades A and B.*
- [2] ISO 4015:1979, *Hexagon head bolts — Product grade B — Reduced shank (shank diameter approximately equal to pitch diameter).*
- [3] ISO 4016:1999, *Hexagon head bolts — Product grade C.*
- [4] ISO 4017:1999, *Hexagon head screws — Product grades A and B.*
- [5] ISO 4018:1999, *Hexagon head screws — Product grade C.*
- [6] ISO 4032:1999, *Hexagon nuts, style 1 — Product grades A and B.*
- [7] ISO 4033:1999, *Hexagon nuts, style 2 — Product grades A and B.*
- [8] ISO 4034:1999, *Hexagon nuts — Product grade C.*
- [9] ISO 4035:1999, *Hexagon thin nuts (chamfered) — Product grades A and B.*
- [10] ISO 4036:1999, *Hexagon thin nuts (unchamfered) — Product grade B.*
- [11] ISO 4161:1999, *Hexagon nuts with flange — Coarse thread.*
- [12] ISO 4162:—⁵⁾, *Hexagon bolts with flange — Small series — Product grade combination A/B.*
- [13] ISO 4775:1984, *Hexagon nuts for high-strength structural bolting with large width across flats — Product grade B — Property classes 8 and 10.*
- [14] ISO 7411:1984, *Hexagon bolts for high-strength structural bolting with large width across flats (thread lengths according to ISO 888) — Product grade C — Property classes 8.8 and 10.9.*
- [15] ISO 7412:1984, *Hexagon bolts for high-strength structural bolting with large width across flats (short thread length) — Product grade C — Property classes 8.8 and 10.9.*
- [16] ISO 7413:1984, *Hexagon nuts for structural bolting, style 1, hot-dip galvanized (oversize tapped) — Product grades A and B — Property classes 5, 6 and 8.*
- [17] ISO 7414:1984, *Hexagon nuts for structural bolting with large width across flats, style 1 — Product grade B — Property class 10.*
- [18] ISO 7417:1984, *Hexagon nuts for structural bolting, style 2, hot-dip galvanized (oversize tapped) — Product grade A — Property class 9.*
- [19] ISO 8673:1999, *Hexagon nuts, style 1, with metric fine pitch thread — Product grades A and B.*
- [20] ISO 8674:1999, *Hexagon nuts, style 2, with metric fine pitch thread — Product grades A and B.*
- [21] ISO 8675:1999, *Hexagon thin nuts (chamfered) with metric fine pitch thread — Product grades A and B.*
- [22] ISO 8765:1999, *Hexagon head bolts with metric fine pitch thread — Product grades A and B.*
- [23] ISO 10663:1999, *Hexagon nuts with flange — Fine pitch thread.*
- [24] ISO 15071:1999, *Hexagon bolts with flange — Small series — Product grade A.*

⁵⁾ To be published. (Revision of ISO 4162:1990)

