

BS EN ISO 8676:2011



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

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EUROPEAN STANDARD

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NORME EUROPÉENNE

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English Version

## Hexagon head screws with metric fine pitch thread - Product grades A and B (ISO 8676:2011)

Vis à tête hexagonale à filetage métrique à pas fin entièrement filetées - Grades A et B (ISO 8676:2011)

Sechskantschrauben mit Gewinde bis Kopf und metrischen Feingewinde - Produktklassen A und B (ISO 8676:2011)

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## Foreword

This document (EN ISO 8676:2011) has been prepared by Technical Committee ISO/TC 2 "Fasteners" in collaboration with Technical Committee CEN/TC 185 "Fasteners" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2011, and conflicting national standards shall be withdrawn at the latest by October 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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## Foreword

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ISO 8676 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 10, *Product standards for fasteners*.

This third edition cancels and replaces the second edition (ISO 8676:1999), of which it constitutes a minor revision.

## Introduction

This International Standard belongs to a complete group 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).

# 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 the 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 the shorter.

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.

It is intended that coarse thread screws according to ISO 4017 be the first choice.

## 2 Normative references

The following referenced documents are indispensable for the application 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 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 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*

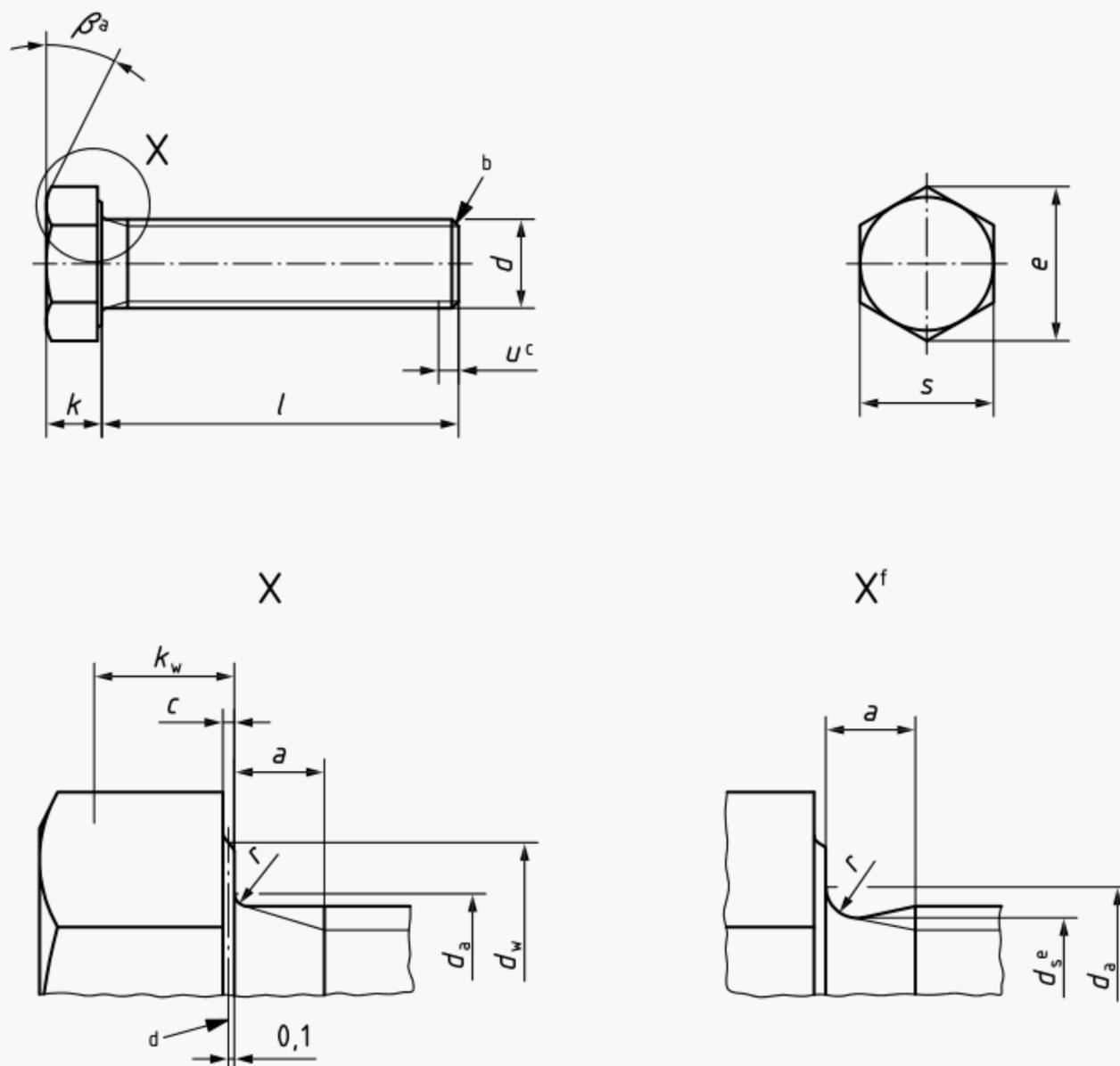
ISO 10683, *Fasteners —Non-electrolytically applied zinc flake coatings*

### 3 Dimensions

See Figure 1 and Tables 1 and 2.

Symbols and descriptions of dimensions are specified in ISO 225.

Dimensions in millimetres



- a  $\beta = 15^\circ$  to  $30^\circ$ .
- b The point shall be chamfered 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

Table 1 — Preferred threads

Dimensions in millimetres

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

Table 1 (continued)

Thread ( $d \times P$ )	Product grade		Dimensions in millimetres											
	A		M8 x 1	M10 x 1	M12 x 1,5	M16 x 1,5	M20 x 1,5	M24 x 2	M30 x 2	M36 x 3	M42 x 3	M48 x 3	M56 x 4	M64 x 4
	nom.	$f_b$	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
16	—	16,35	—	—	—	—	—	—	—	—	—	—	—	—
20	—	19,58	—	—	—	—	—	—	—	—	—	—	—	—
25	—	24,58	—	—	—	—	—	—	—	—	—	—	—	—
30	—	29,58	—	—	—	—	—	—	—	—	—	—	—	—
35	—	34,5	—	—	—	—	—	—	—	—	—	—	—	—
40	—	39,5	38,75	40,5	—	—	—	—	—	—	—	—	—	—
45	—	44,5	43,75	45,5	—	—	—	—	—	—	—	—	—	—
50	—	49,5	48,75	50,5	—	—	—	—	—	—	—	—	—	—
55	—	54,4	53,5	55,6	—	—	—	—	—	—	—	—	—	—
60	—	59,4	58,5	60,6	—	—	—	—	—	—	—	—	—	—
65	—	64,4	63,5	65,6	—	—	—	—	—	—	—	—	—	—
70	—	69,4	68,5	70,6	—	—	—	—	—	—	—	—	—	—
80	—	79,4	78,5	80,6	—	—	—	—	—	—	—	—	—	—
90	—	89,3	88,25	90,7	—	—	—	—	—	—	—	—	—	—
100	—	99,3	98,25	100,7	—	—	—	—	—	—	—	—	—	—
110	—	109,3	108,25	110,7	—	—	—	—	—	—	—	—	—	—
120	—	119,3	118,25	120,7	—	—	—	—	—	—	—	—	—	—
130	—	129,2	128	130,8	—	—	—	—	—	—	—	—	—	—
140	—	139,2	138	140,8	—	—	—	—	—	—	—	—	—	—
150	—	149,2	148	150,8	—	—	—	—	—	—	—	—	—	—
160	—	—	158	—	—	—	—	—	—	—	—	—	—	—
180	—	—	178	—	—	—	—	—	—	—	—	—	—	—
200	—	—	197,7	—	—	—	—	—	—	—	—	—	—	—
220	—	—	217,7	—	—	—	—	—	—	—	—	—	—	—

Table 1 (continued)

Thread ( $d \times P$ )	Dimensions in millimetres															
	Product grade		M8 x 1	M10 x 1	M12 x 1,5	M16 x 1,5	M20 x 1,5	M24 x 2	M30 x 2	M36 x 3	M42 x 3	M48 x 3	M56 x 4	M64 x 4		
	A	B														
nom.	min.	max.	min.	max.	$f^b$											
<b>240</b>	—	—	237,7	242,3												
<b>260</b>	—	—	257,4	262,6												
<b>280</b>	—	—	277,4	282,6												
<b>300</b>	—	—	297,4	302,6												
<b>320</b>	—	—	317,15	322,85												
<b>340</b>	—	—	337,15	342,85												
<b>360</b>	—	—	357,15	362,85												
<b>380</b>	—	—	377,15	382,85												
<b>400</b>	—	—	397,15	402,85												
<b>420</b>	—	—	416,85	423,15												
<b>440</b>	—	—	436,85	443,15												
<b>460</b>	—	—	456,85	463,15												
<b>480</b>	—	—	476,85	483,15												
<b>500</b>	—	—	496,85	503,15												

a  $k_{w,min} = 0,7 k_{min}$ .

b Range of preferred lengths between the solid, bold, stepped lines:

— for product grade A, above the discontinuous, stepped line;

— for product grade B, below this stepped line.

Table 2 — Non-preferred threads

Dimensions in millimetres

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
$a$	4	4	4,5	4,5	6	4,5	6	6	9	9	12	12
max.	1,25	1,25	1,5	1,5	2	1,5	2	2	3	3	4	4
$c$	0,60	0,60	0,60	0,8	0,8	0,8	0,8	0,8	1,0	1,0	1,0	1,0
max.	0,15	0,15	0,15	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3
min.	11,2	13,7	15,7	20,2	22,4	24,4	30,4	36,4	42,4	48,6	56,6	67
$d_a$	14,63	16,63	19,64	25,34	28,19	31,71	—	—	—	—	—	—
max.	14,47	16,47	19,15	24,85	27,7	31,35	38	46,55	55,86	64,7	74,2	83,41
min.	17,77	20,03	23,36	30,14	33,53	37,72	—	—	—	—	—	—
$e$	17,59	19,85	22,78	29,56	32,95	37,29	45,2	55,37	66,44	76,95	88,25	99,21
Product grade A	6,4	7,5	8,8	11,5	12,5	14	17	21	25	28	33	38
Product grade B	6,58	7,68	8,98	11,715	12,715	14,215	—	—	—	—	—	—
$k$	6,22	7,32	8,62	11,285	12,285	13,785	—	—	—	—	—	—
Product grade A	6,69	7,79	9,09	11,85	12,85	14,35	17,35	21,42	25,42	28,42	33,5	38,5
Product grade B	6,11	7,21	8,51	11,15	12,15	13,65	16,65	20,58	24,58	27,58	32,5	37,5
$k_w^a$	4,35	5,12	6,03	7,9	8,6	9,65	—	—	—	—	—	—
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
$r$	16,00	18,00	21,00	27,00	30,00	34,00	41	50	60,0	70,0	80,0	90,0
nom. = max.	15,73	17,73	20,67	26,67	29,67	33,38	—	—	—	—	—	—
Product grade A	15,57	17,57	20,16	26,16	29,16	33	40	49	58,8	68,1	78,1	87,8
Product grade B												

Table 2 (continued)

Thread ( $d \times P$ )	Product grade		Dimensions in millimetres											
	A		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
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	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	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	—	—	—	—	—	—	—	—	—	—

Table 2 (continued)

Thread ( $d \times P$ )	Dimensions in millimetres												
	Product grade												
	A	B	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
nom.	min.	max.	min.	max.	$f^b$								
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									
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 preferred lengths between the solid, bold, stepped lines:

— for product grade A, above the discontinuous, stepped line;

— for product grade B, below this stepped line.

## 4 Specifications and reference International Standards

See Table 3.

**Table 3 — Specifications and reference International Standards**

Material		Steel	Stainless steel	Non-ferrous metal
<b>General requirements</b>	International Standard	ISO 8992		
<b>Thread</b>	Tolerance class	6g		
	International Standard	ISO 724, ISO 965-1		
<b>Mechanical property</b>	Property class <sup>a</sup>	$d \leq 39$ mm: 5.6, 8.8, 10.9 $d > 39$ mm: as agreed	$d \leq 24$ mm: A2-70, A4-70 $24$ mm $< d \leq 39$ mm: A2-50, A4-50 $d > 39$ mm: as agreed	Materials are specified in ISO 8839.
	International Standard	$d \leq 39$ mm: ISO 898-1 $d > 39$ mm: as agreed	$d \leq 39$ mm: ISO 3506-1 $d > 39$ mm: as agreed	
<b>Tolerance</b>	Product grade	For $d \leq 24$ mm and $l \leq 10d$ or $150$ mm <sup>b</sup> : A For $d > 24$ mm or $l > 10d$ or $150$ mm <sup>b</sup> : B		
	International Standard	ISO 4759-1		
<b>Finish — Coating</b>		As processed Requirements for electroplating are specified in ISO 4042. Requirements for non-electrolytically applied zinc flake coatings are specified in ISO 10683.	As processed	As processed Requirements for electroplating are specified in ISO 4042.
		Additional requirements or other finishes or coatings shall be agreed between the supplier and the purchaser.		
<b>Surface integrity</b>		Limits for surface discontinuities are specified in ISO 6157-1.		
<b>Acceptability</b>		Acceptance inspection is specified in ISO 3269.		
<sup>a</sup> Other property classes are specified in ISO 898-1 for steel and ISO 3506-1 for stainless steel, respectively. <sup>b</sup> Whichever is the shorter.				

## 5 Designation

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

**Hexagon head screw ISO 8676 - M12 × 1,5 × 80 - 8.8**

## Bibliography

- [1] ISO 888, *Bolts, screws and studs —Nominal lengths, and thread lengths for general purpose bolts*
- [2] ISO 4014, *Hexagon head bolts —Product grades A and B*
- [3] ISO 4015, *Hexagon head bolts —Product grade B —Reduced shank (shank diameter approximately equal to pitch diameter)*
- [4] ISO 4016, *Hexagon head bolts —Product grade C*
- [5] ISO 4017, *Hexagon head screws —Product grades A and B*
- [6] ISO 4018, *Hexagon head screws —Product grade C*
- [7] ISO 4032, *Hexagon nuts, style 1 —Product grades A and B*
- [8] ISO 4033, *Hexagon nuts, style 2 —Product grades A and B*
- [9] ISO 4034, *Hexagon nuts —Product grade C*
- [10] ISO 4035, *Hexagon thin nuts (chamfered) —Product grades A and B*
- [11] ISO 4036, *Hexagon thin nuts (unchamfered) —Product grade B*
- [12] ISO 4161, *Hexagon nuts with flange —Coarse thread*
- [13] ISO 4162, *Hexagon flange bolts —Small series*
- [14] ISO 7040, *Prevailing torque type hexagon nuts (with non-metallic insert), style 1 — Property classes 5, 8 and 10*
- [15] ISO 7041, *Prevailing torque type hexagon nuts (with non-metallic insert), style 2 —Property classes 9 and 12*
- [16] ISO 7042, *Prevailing torque type all-metal hexagon nuts, style 2 —Property classes 5, 8, 10 and 12*
- [17] ISO 7043, *Prevailing torque type hexagon nuts with flange (with non-metallic insert) — Product grades A and B*
- [18] ISO 7044, *Prevailing torque type all-metal hexagon nuts with flange —Product grades A and B*
- [19] ISO 7719, *Prevailing torque type all-metal hexagon nuts, style 1 —Property classes 5, 8 and 10*
- [20] ISO 7720, *Prevailing torque type all-metal hexagon nuts, style 2 —Property class 9*
- [21] ISO 8673, *Hexagon nuts, style 1, with metric fine pitch thread —Product grades A and B*
- [22] ISO 8674, *Hexagon nuts, style 2, with metric fine pitch thread —Product grades A and B*
- [23] ISO 8675, *Hexagon thin nuts (chamfered) with metric fine pitch thread —Product grades A and B*
- [24] ISO 8765, *Hexagon head bolts with metric fine pitch thread —Product grades A and B*
- [25] ISO 10511, *Prevailing torque type hexagon thin nuts (with non-metallic insert)*

- [26] ISO 10512, *Prevailing torque type hexagon nuts (with non-metallic insert), style 1, with metric fine pitch thread —Property classes 6, 8 and 10*
- [27] ISO 10513, *Prevailing torque type all-metal hexagon nuts, style 2, with metric fine pitch thread —Property classes 8, 10 and 12*
- [28] ISO 10663, *Hexagon nuts with flange —Fine pitch thread*
- [29] ISO 12125, *Prevailing torque type hexagon nuts with flange (with non-metallic insert) with metric fine pitch thread —Product grades A and B*
- [30] ISO 12126, *Prevailing torque type all-metal hexagon nuts with flange with metric fine pitch thread —Product grades A and B*
- [31] ISO 15071, *Hexagon bolts with flange —Small series —Product grade A*
- [32] ISO 15072, *Hexagon bolts with flange with metric fine pitch thread —Small series —Product grade A*
- [33] ISO 21670, *Hexagon weld nuts with flange*





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