INTERNATIONAL STANDARD

ISO 21269

First edition
2004-03-01

Hexagon socket head cap screws with metric fine pitch thread

Vis à tête cylindrique à six pans creux à pas fin

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 21269 was prepared by Technical Committee ISO/TC 2, *Fasteners*.

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Hexagon socket head cap screws with metric fine pitch thread

1 Scope

This International Standard specifies the characteristics of hexagon socket head cap screws with metric fine pitch thread with nominal thread diameters, d, from 8 mm up to 64 mm and product grade A.

For approximate masses of screws see Annex A.

If, in special cases, specifications other than those listed in this International Standard are required, they should be selected from existing International Standards, e.g. ISO 261, ISO 888, ISO 898-1, ISO 965-2, ISO 3506-1, ISO 8839 and ISO 4759-1.

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.

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

ISO 261, *ISO general-purpose metric screw threads — General plan*

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ISO 888, *Bolts, screws and studs — Nominal lengths, and thread lengths for general purpose bolts*

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

ISO 965-2, *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose external and internal screw threads — Medium quality*

ISO 965-3, *ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional screw threads*

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

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

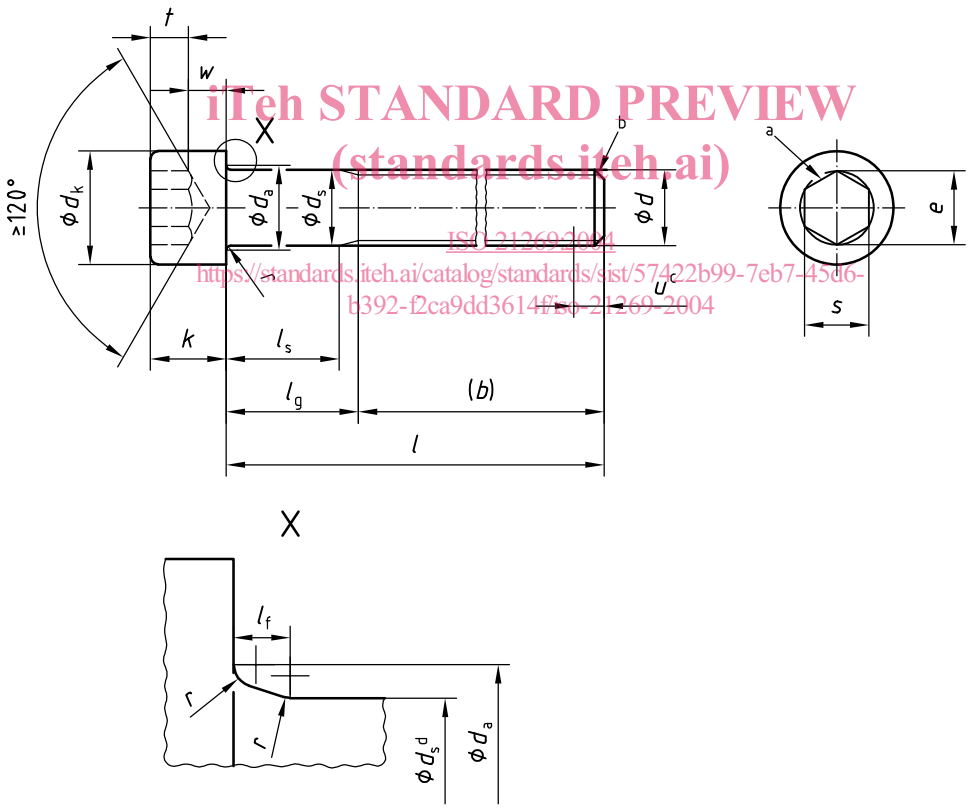
ISO 23429, *Gauging of hexagon sockets*

3 Dimensions

See Figure 1 and Table 1.

Symbols and designations of dimensions are defined in ISO 225.

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Permissible underhead fillet

$$l_{f,\,max} = 1{,}7\, r_{max}$$

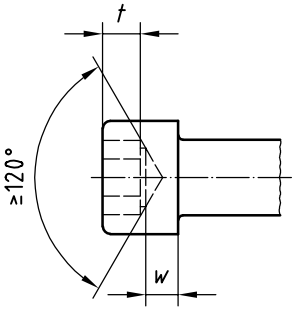
$$r_{max} = \frac{d_{a,\,max} - d_{s,\,max}}{2}$$

r_{min}, see Table 1

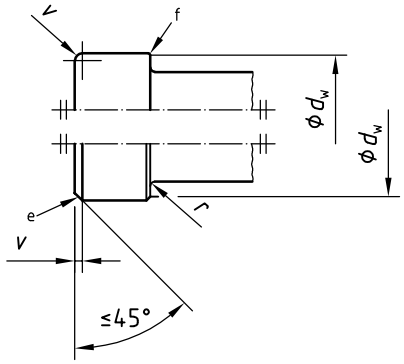
Figure 1

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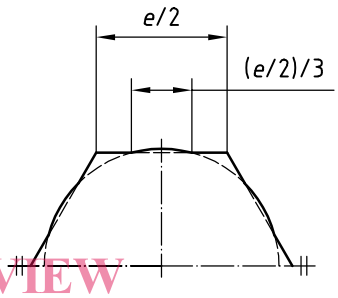
Permissible alternative form of socket



Top and bottom edge of the head



For broached sockets which are at the maximum limit of size the overcut resulting from drilling shall not exceed 1/3 of the length of any flat of the socket which is e/2.



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[a] A slight rounding or countersink at the mouth of the socket is permissible.

[b] Point chamfered according to ISO 4753.

[c] Incomplete thread $u \leqslant 2\ P$.

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[d] d_s applies if values of $l_{s,\,min}$ are specified.

[e] Top edge of head may be rounded or chamfered as shown at the option of the manufacturer.

[f] Bottom edge of head may be rounded or chamfered to d_w but in every case shall be free from burrs.

Figure 1(*continued*)

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Table 1 — Dimensions

Dimensions in millimetres

Thread ($d \times P$ [a])		M8×1	M10×1	M12×1,5	—	M16×1,5	M20×1,5	M24×2	M30×2	M36×3	M42×3	M46×3	M56×4	M64×4
		—	(M10×1,25)	(M12×1,25)	(M14×1,5)	—	(M20×2)	—	—	—	—	—	—	—
b[b]	ref.	28	32	36	40	44	52	60	72	84	96	108	124	140
d_k	max.[c]	13,00	16,00	18,00	21,00	24,00	30,00	36,00	45,00	54,00	63,00	72,00	84,00	96,00
	max.[d]	13,27	16,27	18,27	21,33	24,33	30,33	36,39	45,39	54,46	63,46	72,46	84,54	96,54
	min.	12,73	15,73	17,73	20,67	23,67	29,67	35,61	44,61	53,54	62,54	71,54	83,46	95,46
d_a	max.	9,2	11,2	13,7	15,7	17,7	22,4	26,4	33,4	39,4	45,6	52,6	63	71
d_s	max.	8,00	10,00	12,00	14,00	16,00	20,00	24,00	30,00	36,00	42,00	48,00	56,00	64,00
	min.	7,78	9,78	11,73	13,73	15,73	19,67	23,67	29,67	35,61	41,61	47,61	55,54	63,54
e[e, f]	min.	6,863	9,149	11,429	13,716	15,996	19,437	21,734	25,154	30,854	36,571	41,131	46,831	52,531
l_f	max	1,02	1,02	1,45	1,45	1,45	2,04	2,04	2,89	2,89	3,06	3,91	5,95	5,95
k	max.	8,00	10,00	12,00	14,00	16,00	20,00	24,00	30,00	36,00	42,00	48,00	56,00	64,00
	min.	7,64	9,64	11,57	13,57	15,57	19,48	23,48	29,48	35,38	41,38	47,38	55,26	63,26
r	min.	0,4	0,4	0,6	0,6	0,6	0,8	0,8	1	1	1,2	1,6	2	2
s[f]	nom.	6	8	10	12	14	17	19	22	27	32	36	41	46
	max.	6,14	8,175	10,175	12,212	14,212	17,23	19,275	22,275	27,275	32,33	36,33	41,33	46,33
	min.	6,02	8,025	10,025	12,032	14,032	17,05	19,065	22,065	27,065	32,08	36,08	41,08	46,08
t	min.	4	5	6	7	8	10	12	15,5	19	24	28	34	38
v	max.	0,8	1	1,2	1,4	1,6	2	2,4	3	3,6	4,2	4,8	5,6	6,4
d_w	min	12,33	15,33	17,23	20,17	23,17	28,87	34,81	43,61	52,54	61,34	70,34	82,26	94,26
w	min.	3,3	4	4,8	5,8	6,8	8,6	10,4	13,1	15,3	16,3	17,5	19	22

l^g			Shank length l_s and grip length l_g																									
			l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g
nom.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
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	5,75	12																								
45	44,5	45,5	10,75	17	5,5	13																						

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Table 1 — Dimensions (*continued*)

50	49,5	50,5	15,75	22	10,5	18																						
55	54,4	55,6	20,75	27	15,5	23	10,25	19																				
60	59,4	60,6	25,75	32	20,5	28	15,25	24	10	20																		
65	64,4	65,6	30,75	37	25,5	33	20,25	29	15	25	11	21																
70	69,4	70,6	35,75	42	30,5	38	25,25	34	20	30	16	26																
80	79,4	80,6	45,75	52	40,5	48	35,25	44	30	40	26	36	15,5	28														
90	89,3	90,7			50,5	58	45,25	54	40	50	36	46	25,5	38	15	30												
100	99,3	100,7			60,5	68	55,25	64	50	60	46	56	35,5	48	25	40												
110	109,3	110,7					65,25	74	60	70	56	66	45,5	58	35	50	20,5	38										
120	119,3	120,7					75,25	84	70	80	66	76	55,5	68	45	60	30,5	48	16	36								
130	129,2	130,8							80	90	76	66	65,5	78	55	70	40,5	58	26	46								
140	139,2	140,8							90	100	86	96	75,5	88	65	80	50,5	68	36	56	21,5	44						
150	149,2	150,8									96	106	85,5	98	75	90	60,5	78	46	66	31,5	54						
160	159,2	160,8									106	116	95,5	108	85	100	70,5	88	56	76	41,5	64	27	52				
180	179,2	180,8											115,5	128	105	120	90,5	108	76	96	61,5	84	47	72	28,5	56		
200	199,075	200,925											135,5	148	125	140	110,5	128	96	116	81,5	104	67	92	48,5	76	30	60
220	219,075	220,925																			101,5	124	87	112	68,5	96	50	80
240	239,075	240,925																			121,5	155	107	132	88,5	116	70	100
260	258,95	261,05																			141,5	164	127	152	108,5	136	90	120
280	278,95	281,05																			161,5	184	147	172	128,5	156	110	140
300	298,95	301,05																			181,5	204	167	192	148,5	176	130	160

NOTE Sizes in brackets should be avoided if possible.

[a] P is the pitch of the thread.

[b] For lengths between the bold stepped lines in the unshaded area.

[c] For plain heads.

[d] For knurled heads.

[e] $e_{min} = 1{,}14\ s_{min}$

[f] Combined gauging of socket dimensions e and s, see ISO 23429.

[g] The range of commercial lengths is between the bold stepped lines. Lengths in the shaded area are threaded to the head within 3 times the respective pitch of the coarse thread. Lengths below the shaded area have values of l_g and l_s in accordance with the following formulae:

$l_{g,\,max} = l_{nom} - b$

$l_{s,\,min} = l_{g,\,max}$ − 5 times the respective pitch of the coarse thread.

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