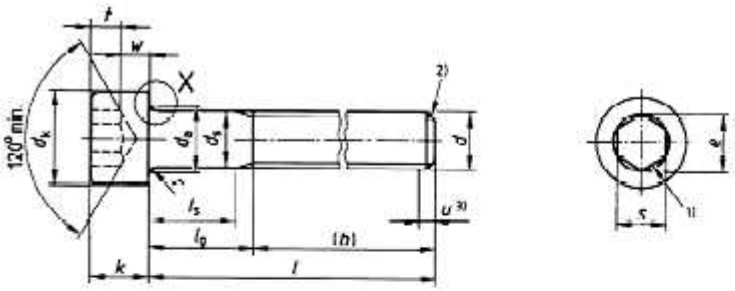
ISO4762

Hexagon socket head cap screws



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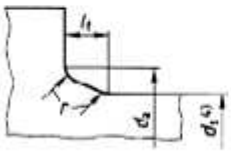


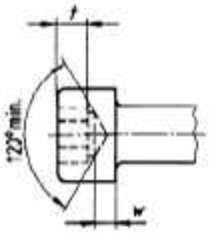
Maximum underhead fillet

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

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

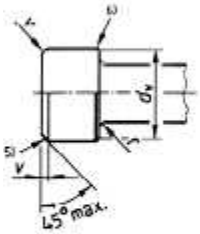
r_{min} see table 1

Permissible alternative form of socket



NOTE — For broached sockets which are at the maximum limit of size the overcut resulting from drilling shall not exceed 20 % of the length of any flat of the socket

Top and bottom edge of the head



1) A slight rounding or countersink at the mouth of the socket is permissible.
2) Point chamfered or for sizes M4 and below "as rolled", see ISO 4753.
3) Incomplete thread $u < 2\,P$.
4) d_s applies if values of $l_{s\,min}$ are specified.
5) Top edge of head may be rounded or chamfered as shown at the discretion of the manufacturer.
6) Bottom edge of head may be rounded or chamfered to d_w but in every case must be free from burrs.

Figure 1

Table 1 — Dimensions

Dimensions in millimetres

Thread (d)		M1,6	M2	M2,5	M3	M4	M5	M6	M8
$P^{1)}$		0,35	0,4	0,45	0,5	0,7	0,8	1	1,25
$b^{2)}$	ref.	15	16	17	18	20	22	24	28
d_k	max.[3]	3,00	3,80	4,50	5,50	7,00	8,50	10,00	13,00
	max.[4]	3,14	3,98	4,68	5,68	7,22	8,72	10,22	13,27
	min.	2,86	3,62	4,32	5,32	6,78	8,28	9,78	12,73
d_s	max.	2	2,6	3,1	3,6	4,7	5,7	6,8	9,2
d_p	max.	1,60	2,00	2,50	3,00	4,00	5,00	6,00	8,00
	min.	1,46	1,86	2,36	2,86	3,82	4,82	5,82	7,78
e	min.[5]	1,73	1,73	2,3	2,87	3,44	4,58	5,72	6,86
l_f	max.	0,34	0,51	0,51	0,51	0,6	0,6	0,69	1,02
k	max.	1,60	2,00	2,50	3,00	4,00	5,00	6,0	8,00
	min.	1,46	1,86	2,36	2,86	3,82	4,82	5,7	7,64
r	min.	0,1	0,1	0,1	0,1	0,2	0,2	0,25	0,4
s	nom.	1,5	1,5	2	2,5	3	4	5	6
	max.[6]	1,545	1,545	2,045	2,58	3,071	4,084	5,084	6,095
	max.[7]	1,560	1,560	2,060	2,58	3,080	4,095	5,140	6,140
	min.	1,520	1,520	2,020	2,52	3,020	4,020	5,020	6,020
t	min.	0,7	1	1,1	1,3	2	2,5	3	4
v	max.	0,16	0,2	0,25	0,3	0,4	0,5	0,6	0,8
d_w	min.	2,72	3,48	4,18	5,07	6,53	8,03	9,38	12,33
w	min.	0,55	0,55	0,85	1,15	1,4	1,9	2,3	3,3

P			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
nom.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
2,5	2,3	2,7																
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			2	4												
25	24,58	25,42					5,75	8	4,5	7								
30	29,58	30,42							9,5	12	6,5	10	4	8				
35	34,5	35,5									11,5	15	9	13	6	11		
40	39,5	40,5									16,5	20	14	18	11	16	5,76	12
45	44,5	45,5											19	23	16	21	10,75	17
50	49,5	50,5											24	28	21	26	15,75	22
55	54,4	55,6													26	31	20,75	27
60	59,4	60,6													31	36	25,75	32
65	64,4	65,6															30,75	37
70	69,4	70,6															35,75	42
80	79,4	80,6															45,75	52

1) P is the pitch of the thread.
2) For lengths below the thick dashed line
3) For plain heads.
4) For knurled heads
5) $e_{min} = 1{,}14\ s_{min}$
6) For property class 12.9.
7) For all other property classes.
8) The range of commercial lengths is between the thick stepped lines. Lengths above the dashed stepped line are threaded to the head within 3 P. Lengths below the dashed stepped line have values of l_g and l_s in accordance with the following formulae:

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

$l_{s\,min} = l_{g\,max} - 5\,P$

Table 1 (*continued*)

Dimensions in millimetres

Thread (d)		M10	M12	(M14)[9]	M16	M20	M24	M30	M36
P[1]		1,5	1,75	2	2	2,5	3	3,5	4
b[2]	ref.	32	36	40	44	52	60	72	84
d_k	max.[3]	16,00	18,00	21,00	24,00	30,00	36,00	45,00	54,00
	max.[4]	16,27	18,27	21,33	24,33	30,33	36,39	45,39	54,46
	min.	15,73	17,73	20,67	23,67	29,67	35,61	44,61	53,54
d_s	max.	11,2	13,7	15,7	17,7	22,4	26,4	33,4	39,4
d_s	max.	10,00	12,00	14,00	16,00	20,00	24,00	30,00	36,00
	min.	9,78	11,73	13,73	15,73	19,67	23,67	29,67	35,61
e	min.[5]	9,15	11,43	13,72	16	19,44	21,73	25,15	30,85
l_1	max.	1,02	1,45	1,45	1,45	2,04	2,04	2,89	2,89
k	max.	10,00	12,00	14,00	16,00	20,00	24,00	30,00	36,00
	min.	9,64	11,57	13,57	15,57	19,48	23,48	29,48	35,38
r	min	0,4	0,6	0,6	0,6	0,8	0,8	1	1
s	nom.	8	10	12	14	17	19	22	27
	max.[6]	8,115	10,115	12,142	14,142	17,23	19,275	22,275	27,275
	max.[7]	8,175	10,175	12,212	14,212				
	min.	8,025	10,025	12,032	14,032	17,05	19,065	22,065	27,065
t	min.	5	6	7	8	10	12	15,5	19
v	max.	1	1,2	1,4	1,6	2	2,4	3	3,6
d_w	min.	15,33	17,23	20,17	23,17	28,87	34,81	43,61	52,54
w	min.	4	4,8	5,8	6,8	8,6	10,4	13,1	15,3

l[8]			Shank length l_s and grip length l_g															
nom.	min.	max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g 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	5,5	13														
50	49,5	50,5	10,5	18														
55	54,4	55,6	15,5	23	10,25	19												
60	59,4	60,6	20,5	28	15,25	24	10	20										
65	64,4	65,6	25,5	33	20,25	29	15	25	11	21								
70	69,4	70,6	30,5	38	25,25	34	20	30	16	26								
80	79,4	80,6	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	86	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
150	149,2	150,8							96	106	85,5	98	75	90	60,5	78	46	66
160	159,2	160,8							106	116	95,5	108	85	100	70,5	88	56	76
180	179,2	180,8									115,5	128	105	120	90,5	108	76	96
200	199,075	200,925									135,5	148	125	140	110,5	128	96	116

NOTE — For (footnotes1) to 8) see table 1, page 4.

9) The size in brackets should be avoided if possible.

Table 1 (*concluded*)

Dimensions in millimetres

Thread (d)		M42	M48	M56	M64
$P^{1)}$		4,5	5	5,5	6
$b^{2)}$	ref.	96	108	124	140
d_k	max.[3]	63,00	72,00	84,00	96,00
	max.[4]	63,46	72,46	84,54	96,54
	min.	62,54	71,54	83,46	95,46
d_s	max.	46,6	52,6	63	71
d_1	max.	42,00	48,00	56,00	64,00
	min.	41,61	47,61	55,54	63,54
e	min.[5]	36,57	41,13	46,63	52,53
f_1	max.	3,06	3,91	5,95	5,95
k	max.	42,00	48,00	56,00	64,00
	min.	41,38	47,38	55,26	63,26
r	min.	1,2	1,6	2	2
s	nom.	32	36	41	46
	max.[7]	32,33	36,33	41,33	46,33
	min.	32,08	36,08	41,08	46,08
t	min.	24	28	34	38
v	max.	4,2	4,8	5,6	6,4
d_w	min.	61,34	70,34	82,26	94,26
w	min.	16,3	17,5	19	22

l			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
nom.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
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	21,5	44						
150	149,2	150,8	31,5	54						
160	159,2	160,8	41,5	64	27	52				
180	179,2	180,8	61,5	84	47	72	28,5	56		
200	199,075	200,925	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	144	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 — For footnotes 1) to 5), 7) and 8) see table 1, page 4.

Table 2 — Requirements and reference International Standards

Material		Steel	Stainless steel	Non-ferrous metal
General requirements	International Standard	ISO 8992		
Thread	Tolerances	5g6g for property class 12.9; for other property classes: 6g		
	International Standards	ISO 261, ISO 965-2, ISO 965-3		
Mechanical properties	Property class	< M3: as agreed ≥ M3 and ≤ M39: 8.8, 10.9, 12.9 > M39: as agreed	≤ M24: A2-70, A4-70[2] > M24 and ≤ M39: A2-50, A4-50[2] > M39: as agreed	all defined materials
	International Standards	ISO 898-1[1]	ISO 3506-1	ISO 8839
Tolerances	Product grade	A		
	International Standard	ISO 4759-1		
Finish		Black oxide (thermal or chemical) Requirements for electroplating are covered in ISO 4042	Plain –	Plain Requirements for electroplating are covered in ISO 4042
		If different electroplating requirements are desired or if requirements are needed for other finishes, they should be agreed between customer and supplier.		
		Limits for surface discontinuities are covered in ISO 6157-1 and ISO 6157-3.		
Acceptability		Acceptance procedure is dealt with in ISO 3269.		

1) For screws unsuitable for tensile testing, the hardness requirements shall be fulfilled throughout the section of the screw.

2) For stainless steel screws machined from bar it is permissible to use grade A1-70 for sizes ≤ M12 and A1-50 for sizes > M12 but they should be marked according to their property class.