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Hexagon socket countersunk head cap screws

DIN 7991

Senkschrauben mit Innensechskant

Supersedes May 1985 edition.

In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.

Dimensions in mm

1 Field of application

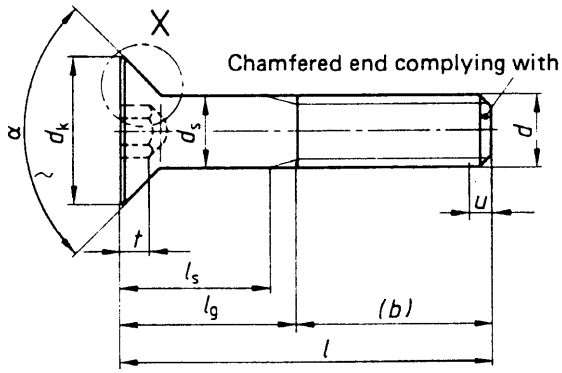
This standard specifies product grade A hexagon socket countersunk head cap screws with ISO metric screw thread from size M3 up to and including size M24.

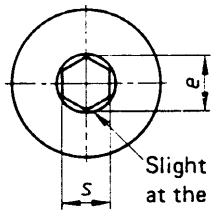
If, in special cases, the screws are to meet requirements other than those given in this standard, e.g. with regard to property class or material, these shall be selected in accordance with the appropriate standard. This also applies to the fine pitch thread conforming to DIN 13 Part 13 required in exceptional cases.

As a consequence of the head geometry and the form of the wrench engagement, the critical cross section of screws covered by this standard is located below the hexagon socket and not in the thread. It is thus recommended that the screws should not be used for the transmission of high axial loads involving prestressing.

If a DIN 911 double offset screwdriver is used to tighten the screws by way of their socket, the torsional strength and the design of the key only permit the application of prestressing loads corresponding to about 80 % of the prestressing loads specified for the commonly used property class 8.8 screws.

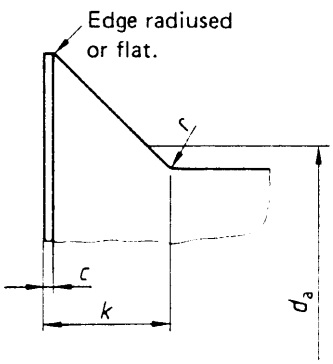
2 Dimensions





d_s is applicable only for screws with unthreaded portion of shank.
u = 2 P maximum; incomplete thread.

Detail X



Continued on pages 2 to 6

Thread size d		M3	M4	M5	M6	M8	M10	M12
P [1]		0,5	0,7	0,8	1	1,25	1,5	1,75
a	$^{+2}_{0}{}^{\circ}$	90°						
b Thread length	[2]	12	14	16	18	22	26	30
	[3]	–	–	–	24	28	32	36
	[4]	–	–	–	–	–	45	49
c	≈	0,2	0,3	0,3	0,3	0,4	0,5	0,5
d_k	max. = nominal dimension	6	8	10	12	16	20	24
	min.	5,7	7,64	9,64	11,57	15,57	19,48	23,48
d_a	max.	3,6	4,7	5,7	6,8	9,2	11,2	13,7
d_s	max. = nominal dimension	3	4	5	6	8	10	12
	min.	2,86	3,82	4,82	5,82	7,78	9,78	11,73
e [5]	min.	2,3	2,87	3,44	4,58	5,72	6,86	9,15
k [6]	max.	1,7	2,3	2,8	3,3	4,4	5,5	6,5
r	min.	0,1	0,2	0,2	0,3	0,5	0,5	1
s	Nominal dimension	2	2,5	3	4	5	6	8
	min.	2,02	2,52	3,02	4,02	5,02	6,02	8,025
	max.	2,10	2,60	3,10	4,12	5,14	6,14	8,175
t	max. = nominal dimension	1,2	1,8	2,3	2,5	3,5	4,4	4,6
	min.	0,95	1,55	2,05	2,25	3,2	4,1	4,3

l			Shank lengths l_s and l_g [6]													
Nominal length	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.
8	7,71	8,29	–	3,2	–	4,4	–	5,2	–	6,3						
10	9,71	10,29	–	3,2	–	4,4	–	5,2	–	6,3	–	8,2				
12	11,65	12,35	–	3,2	–	4,4	–	5,2	–	6,3	–	8,2	–	10		
16	15,65	16,35	–	3,2	–	4,4	–	5,2	–	6,3	–	8,2	–	10		
20	19,58	20,42	–	3,2	–	4,4	–	5,2	–	6,3	–	8,2	–	10	–	11,8
25	24,58	25,42	10,5	13	–	4,4	–	5,2	–	6,3	–	8,2	–	10	–	11,8
30	29,58	30,42	15,5	18	12,5	16	–	5,2	–	6,3	–	8,2	–	10	–	11,8
35	34,5	35,5			17,5	21	15	19	–	6,3	–	8,2	–	10	–	11,8
40	39,5	40,5			22,5	26	20	24	17	22	–	8,2	–	10	–	11,8
50	49,5	50,5					30	34	27	32	21,7	28	16,5	24	–	11,8
60	59,4	60,6									31,7	38	26,5	34	21,25	30
70	69,4	70,6											36,5	44	31,25	40

[1] P = pitch of thread (coarse pitch thread).

[2] For lengths $l \leq 125$ mm.

[3] For lengths $l > 125$ mm ≤ 200 mm.

[4] For lengths $l > 200$ mm.

[5] e min. = 1,14 s min.

[6] The head height k is included in the shank lengths.

Thread size d		(M 14)	M 16	(M 18)	M 20	(M 22)	M 24
P [1]		2	2	2,5	2,5	2,5	3
a	$^{+2}_{0}{}^{\circ}$	90°				60°	
b Thread length	[2]	34	38	42	46	50	54
	[3]	40	44	48	52	56	60
	[4]	53	57	61	65	69	73
c	≈	0,5	0,5	0,5	0,5	1	1
d_k	max. = nominal dimension	27	30	33	36	36	39
	min.	26,48	29,48	32,38	35,38	35,38	38,38
d_a	max.	15,7	17,7	20,2	22,4	24,4	26,4
d_s	max. = nominal dimension	14	16	18	20	22	24
	min.	13,73	15,73	17,73	19,67	21,67	23,67
e [5]	min.	11,43	11,43	13,72	13,72	16	16
k [6]	max.	7	7,5	8	8,5	13,1	14
r	min.	1	1	1	1	1	1,6
s	Nominal dimension	10	10	12	12	14	14
	min.	10,025	10,025	12,032	12,032	14,032	14,032
	max.	10,175	10,175	12,212	12,212	14,212	14,212
t	max. = nominal dimension	4,8	5,3	5,5	5,9	8,8	10,3
	min.	4,5	5	5,2	5,6	8,44	9,87

l			Shank lengths l_s and l_g [6]											
Nominal length	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.
20	19,58	20,42												
25	24,58	25,42	–	13										
30	29,58	30,42	–	13	–	13,5								
35	34,5	35,5	–	13	–	13,5	–	15,5	–	16				
40	39,5	40,5	–	13	–	13,5	–	15,5	–	16	–	20,6		
50	49,5	50,5	–	13	–	13,5	–	15,5	–	16	–	20,6	–	23
60	59,4	60,6	16	26	–	13,5	–	15,5	–	16	–	20,6	–	23
70	69,4	70,6	26	36	22	32	15,5	28	–	16	–	20,6	–	23
80	79,4	80,6	36	46	32	42	25,5	38	21,5	34	–	20,6	–	23
90	89,3	90,7			42	52	35,5	48	31,5	44	27,5	40	–	23
100	99,3	100,7					45,5	58	41,5	54	37,5	50	31	46

See page 2 for [1]) to [6]).

The commercial nominal lengths are designated by giving the shank lengths.

The thread sizes and intermediate lengths given in brackets shall be avoided where possible.

Nominal lengths above 100 mm shall be graded by steps of 10 mm, and those above 200 mm by steps of 20 mm.

Screws with nominal lengths above the dashed stepped line shall be threaded up to the head (the maximum distance from the last full form thread to the head bearing surface, l_g, is k max. + 3 P). The l_g and l_s values for bolts with nominal lengths below the dashed stepped line shall be determined in accordance with the following equations:

l_g max. = l (nominal length) − b (nominal length); l_s min. = l_g max. − 5 P.