

# INTERNATIONAL STANDARD

**ISO  
4762**

Second edition  
1989-05-01

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## Hexagon socket head cap screws — Product grade A

*Vis à tête cylindrique à six pans creux — Grade A*

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 4762:1989

<https://standards.iteh.ai/catalog/standards/sist/4e7852b9-5eb1-4c7d-baa4-0c3ef78a2e06/iso-4762-1989>



Reference number  
ISO 4762 : 1989 (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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4762 was prepared by Technical Committee ISO/TC 2, *Fasteners*.

This second edition cancels and replaces the first edition (ISO 4762:1977), of which it constitutes a technical revision.

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# Hexagon socket head cap screws — Product grade A

## iTeh STANDARD PREVIEW (standards.iteh.ai)

### 1 Scope

This International Standard specifies the characteristics of hexagon socket head cap screws with metric dimensions and nominal thread diameters,  $d$ , from 1,6 mm up to and including 36 mm, of product grade A.

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

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

ISO 261 : 1973, *ISO general purpose metric screw threads — General plan.*

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

ISO 898-1 : 1988, *Mechanical properties of fasteners — Part 1: Bolts, screws and studs.*

ISO 965-2 : 1980, *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose bolt and nut threads — Medium quality.*

ISO 3269 : 1984, *Fasteners — Acceptance inspection.*

ISO 3506 : 1979, *Corrosion-resistant stainless steel fasteners — Specifications.*

ISO 4042 : 1989, *Threaded components — Electroplated coatings.*

ISO 4753 : 1983, *Fasteners — Ends of parts with external metric ISO thread.*

ISO 4759-1 : 1978, *Tolerances for fasteners — Part 1: Bolts, screws and nuts with thread diameters between 1,6 (inclusive) and 150 mm (inclusive) and product grades A, B and C.*

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

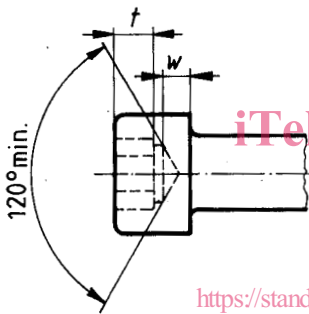
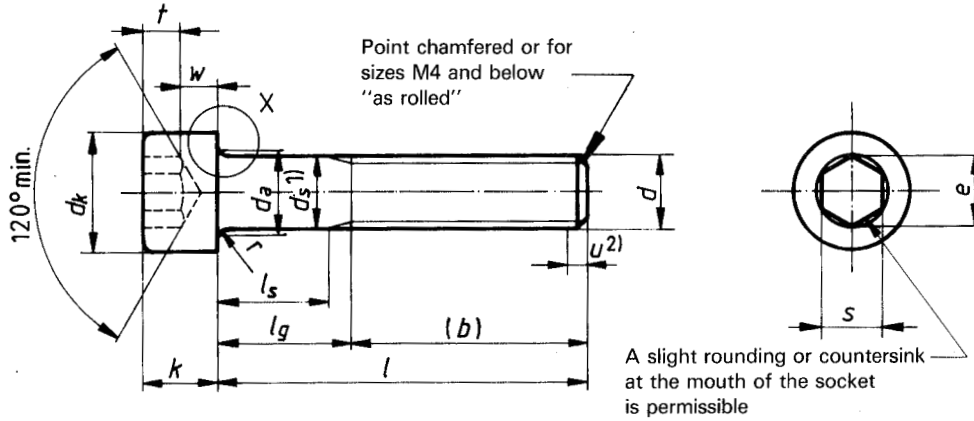
ISO 6157-3 : 1988, *Fasteners — Surface discontinuities — Part 3: Bolts, screws and studs for special requirements.*

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 and nuts.*

3 Dimensions

NOTE — Symbols and designation of dimensions are specified in ISO 225.

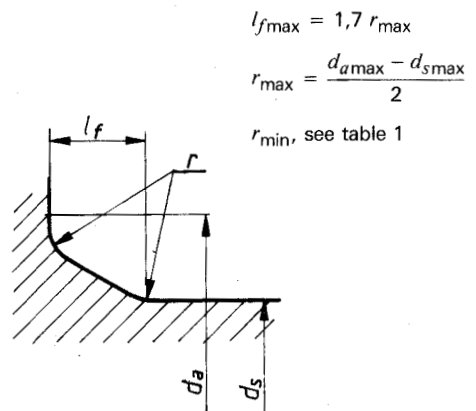
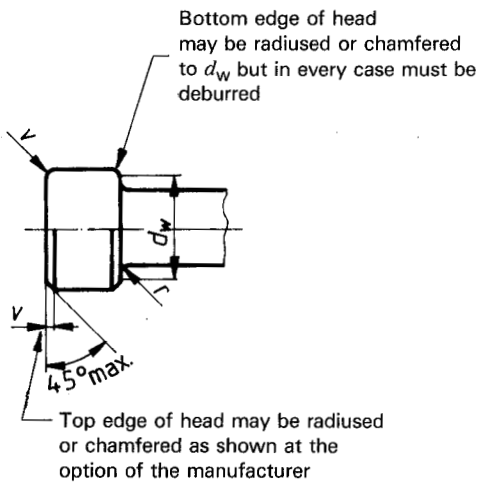


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X  
 Maximum underhead fillet



1)  $d_s$  applies to positive values of  $l_s$ .

2) Incomplete thread  $u < 2 P$

Table 1

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. <sup>3)</sup>	3	3,8	4,5	5,5	7	8,5	10	13
	max. <sup>4)</sup>	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
$d_a$	max.	2	2,6	3,1	3,6	4,7	5,7	6,8	9,2
$d_s$	max.	1,6	2	2,5	3	4	5	6	8
	min.	1,46	1,86	2,36	2,86	3,82	4,82	5,82	7,78
$e$	min. <sup>5)</sup>	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	0,68	1,02
$k$	max.	1,6	2	2,5	3	4	5	6	8
	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
	min.	1,52	1,52	2,02	2,52	3,02	4,02	5,02	6,02
	max. <sup>6)</sup>	1,545	1,545	2,045	2,56	3,08	4,095	5,095	6,095
	max. <sup>7)</sup>	1,56	1,56	2,06	2,58	3,08	4,095	5,14	6,14
$t$	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

$l$			Shank length $l_s$ and grip length $l_g^{8)}$															
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.
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	5,75	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)  $P$  = 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 continuous thick lines. Lengths above the thick dashed line are threaded to the head within  $3P$ . Lengths below the thick dashed line have values of  $l_g$  and  $l_s$  in accordance with the following formulae:  
 $l_{gmax} = l_{nom} - b$   
 $l_{smin} = l_{gmax} - 5P$

Table 1 (concluded)

Dimensions in millimetres

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

1) *P* = 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 continuous thick lines. Lengths above the thick dashed line are threaded to the head within  $3P$ . Lengths below the thick dashed line have values of  $l_g$  and  $l_s$  in accordance with the following formulae:  
 $l_{gmax} = l_{nom} - b$   
 $l_{smin} = l_{gmax} - 5P$

#### 4 Specifications and reference International Standards

Table 2

Material		Steel <sup>1)</sup>	Stainless steel	Non-ferrous metal
General requirements	International Standard	ISO 8992		
Thread	Tolerances	5g6g for class 12.9; for other classes : 6g		
	International Standards	ISO 261, ISO 965-2		
Mechanical properties	Class	8.8, 12.9	$d < 20$ mm : A2-70 $d > 20$ mm : A2-50	...
	International Standards	ISO 898-1 <sup>2)</sup>	ISO 3506	ISO 8839
Tolerances	Product grade	A		
	International Standard	ISO 4759-1		
Finish		Black oxide (thermal or chemical)	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		For acceptance procedure, see ISO 3269.		
1) Alloy steel is mandatory as the material for screws of property class 12.9. 2) For screws unsuitable for tensile testing, the hardness requirements shall be complied with throughout the section of the screw.				

#### 5 Designation

ISO 4762:1989

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Example for the designation of a hexagon socket head cap screw with thread M5, nominal length  $l = 20$  mm and property class 12.9 :

**Hexagon socket head cap screw ISO 4762 - M5 × 20 - 12.9**

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**UDC 621.882.215.6**

**Descriptors :** fasteners, screws, socket head screws, cheese head screws, specifications, dimensions, designation.

Price based on 5 pages

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