

# INTERNATIONAL STANDARD

**ISO**  
**14579**

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## Hexalobular socket head cap screws

*Vis à métaux à tête cylindrique à six lobes internes*



Reference number  
ISO 14579:2001(E)

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ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.ch](mailto:copyright@iso.ch)  
Web [www.iso.ch](http://www.iso.ch)

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## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 14579 was prepared by Technical Committee ISO/TC 2, *Fasteners*.

Annex A of this International Standard is for information only.

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# Hexalobular socket head cap screws

## 1 Scope

This International Standard specifies the characteristics of hexalobular socket head cap screws with thread sizes from M2 up to and including M20, of product grade 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 965-3, ISO 3506-1, ISO 4759-1.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

ISO 261:1998, *ISO general-purpose metric screw threads — General plan*

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

ISO 898-1:1999, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs*

ISO 965-2:1998, *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose external and internal screw threads — Medium quality*

ISO 965-3:1999, *ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional screw threads*

ISO 3269:2000, *Fasteners — Acceptance inspection*

ISO 3506-1:1997, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 1: Bolts, screws and studs*

ISO 4042:1999, *Fasteners — Electroplated coatings*

ISO 4753:1999, *Fasteners — Ends of parts with external ISO metric thread*

ISO 4759-1:2000, *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — 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, studs and nuts*

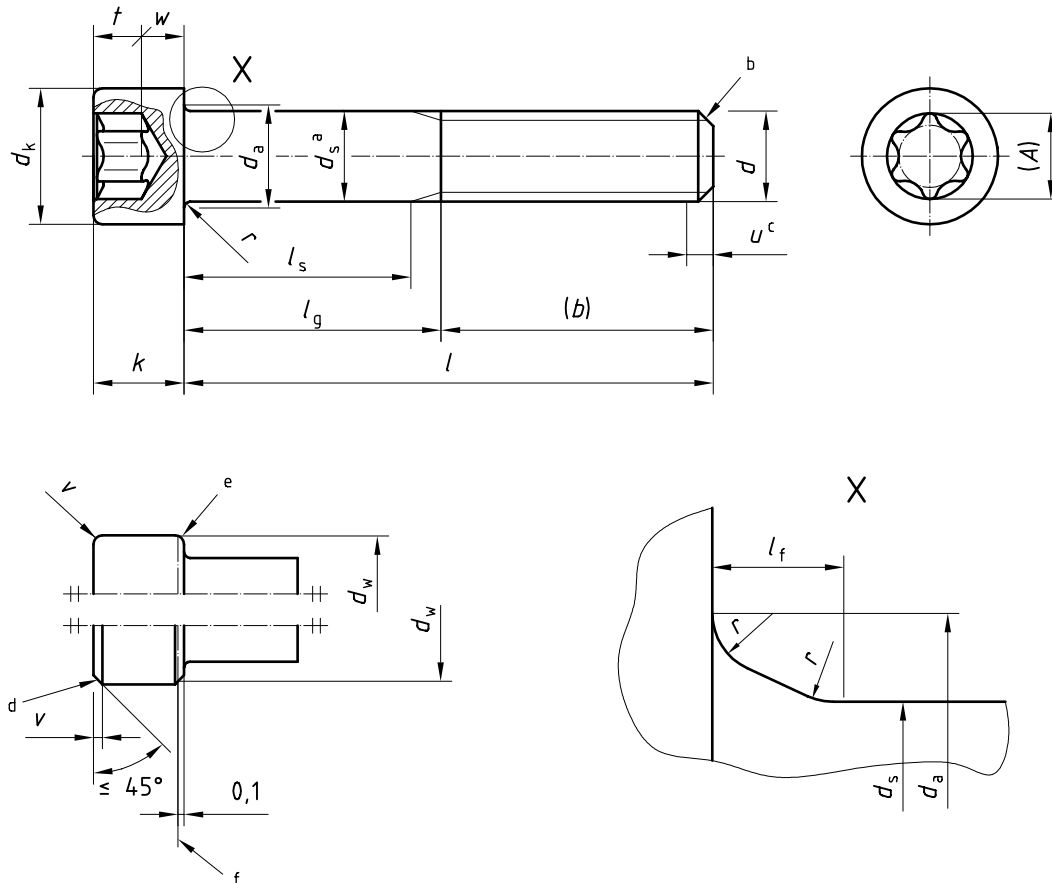
ISO 10664:1999, *Hexalobular internal driving feature for bolts and screws*

ISO 10683:2000, *Fasteners — Non-electrolytically applied zinc flake coatings*

### 3 Dimensions

See Figure 1 and Table 1.

Symbols and designations of dimensions, except dimensions *A* and *v*, are specified in ISO 225.



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

- a  $d_s$  applies if values of  $l_s$  min are specified.
- b Point chamfered or for sizes M4 and below "as rolled", see ISO 4753.
- c Incomplete thread  $u \leq 2 P$ .
- d Top edge of head may be rounded or chamfered as shown at the discretion of the manufacturer.
- e Bottom edge of head may be rounded or chamfered to  $d_w$  but in every case shall be free from burrs.
- f Reference datum for  $d_w$ .

Figure 1

Table 1

Dimensions in millimetres

Thread ( <i>d</i> )		M2	M2,5	M3	M4	M5	M6	M8									
<i>p</i> <sup>a</sup>		0,4	0,45	0,5	0,7	0,8	1	1,25									
<i>b</i> <sup>b</sup>	ref.	16	17	18	20	22	24	28									
<i>d<sub>k</sub></i>	max. <sup>c</sup>	3,80	4,50	5,50	7,00	8,50	10,00	13,00									
	max. <sup>d</sup>	3,98	4,68	5,68	7,22	8,72	10,22	13,27									
	min.	3,62	4,32	5,32	6,78	8,28	9,78	12,73									
<i>d<sub>a</sub></i>	max.	2,6	3,1	3,6	4,7	5,7	6,8	9,2									
<i>d<sub>s</sub></i>	max.	2,00	2,50	3,00	4,00	5,00	6,00	8,00									
	min.	1,86	2,36	2,86	3,82	4,82	5,82	7,78									
<i>l<sub>f</sub></i>	max.	0,51	0,51	0,51	0,6	0,6	0,68	1,02									
<i>k</i>	max.	2,00	2,50	3,00	4,00	5,00	6,0	8,00									
	min.	1,86	2,36	2,86	3,82	4,82	5,7	7,64									
<i>r</i>	min.	0,1	0,1	0,1	0,2	0,2	0,25	0,4									
<i>v</i>	max.	0,2	0,25	0,3	0,4	0,5	0,6	0,8									
<i>d<sub>w</sub></i>	min.	3,48	4,18	5,07	6,53	8,03	9,38	12,33									
<i>w</i>	min.	0,55	0,85	1,15	1,4	1,9	2,3	3,3									
Hexalobular socket	Socket No.	<b>6</b>	<b>8</b>	<b>10</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>45</b>									
	<i>A</i> ref.	1,75	2,4	2,8	3,95	4,5	5,6	7,95									
	<i>t</i>	max.	0,84	1,04	1,27	1,80	2,03	2,42	3,31								
		min.	0,71	0,91	1,01	1,42	1,65	2,02	2,92								
<i>l<sub>e</sub></i>		Shank length <i>l<sub>s</sub></i> and grip length <i>l<sub>g</sub></i>															
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.	
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	

<sup>a</sup> *P* pitch of the thread.

<sup>b</sup> For length below the thick dashed line.

<sup>c</sup> For plain heads.

<sup>d</sup> For knurled heads.

<sup>e</sup> 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<sub>g</sub>* and *l<sub>s</sub>* in accordance with the following formulae:  $l_{g \max} = l_{\text{nom}} - b$ ;  $l_{s \min} = l_{g \max} - 5 P$ . See ISO 888.

Table 1 (continued)

Dimensions in millimetres

Thread ( <i>d</i> )		M10	M12	(M14) <sup>f</sup>	M16	(M18) <sup>f</sup>	M20								
<i>p</i> <sup>a</sup>		1,5	1,75	2	2	2,5	2,5								
<i>b</i> <sup>b</sup>	ref.	32	36	40	44	48	52								
<i>d<sub>k</sub></i>	max. <sup>c</sup>	16,00	18,00	21,00	24,00	27,00	30,00								
	max. <sup>d</sup>	16,27	18,27	21,33	24,33	27,33	30,33								
	min.	15,73	17,73	20,67	23,67	26,67	29,67								
<i>d<sub>a</sub></i>	max.	11,2	13,7	15,7	17,7	20,2	22,4								
<i>d<sub>s</sub></i>	max.	10,00	12,00	14,00	16,00	18,00	20,00								
	min.	9,78	11,73	13,73	15,73	17,73	19,67								
<i>l<sub>f</sub></i>	max.	1,02	1,45	1,45	1,45	1,87	2,04								
<i>k</i>	max.	10,00	12,00	14,00	16,00	18,00	20,00								
	min.	9,64	11,57	13,57	15,57	17,57	19,48								
<i>r</i>	min.	0,4	0,6	0,6	0,6	0,6	0,8								
<i>v</i>	max.	1	1,2	1,4	1,6	1,8	2								
<i>d<sub>w</sub></i>	min.	15,33	17,23	20,17	23,17	25,87	28,87								
<i>w</i>	min.	4	4,8	5,8	6,8	7,8	8,6								
Hexalobular socket	Socket No.	<b>50</b>	<b>55</b>	<b>60</b>	<b>70</b>	<b>80</b>	<b>90</b>								
	<i>A</i> ref.	8,95	11,35	13,45	15,7	17,75	20,2								
	<i>t</i>	max.	4,02	5,21	5,99	7,01	8,00	9,20							
		min.	3,62	4,82	5,62	6,62	7,50	8,69							
<i>l<sup>e</sup></i>		Shank length <i>l<sub>s</sub></i> and grip length <i>l<sub>g</sub></i>													
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.	
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	29									
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	9,5	22			
80	79,4	80,6	40,5	48	35,25	44	30	40	26	36	19,5	32	15,5	28	
90	89,3	90,7	50,5	58	45,25	54	40	50	36	46	29,5	42	25,5	38	
100	99,3	100,7	60,5	68	55,25	64	50	60	46	56	39,5	52	35,5	48	
110	109,3	110,7			65,25	74	60	70	56	66	49,5	62	45,5	58	
120	119,3	120,7			75,25	84	70	80	66	76	59,5	72	55,5	68	
130	129,2	130,8					80	90	76	86	69,5	82	65,5	78	
140	139,2	140,8					90	100	86	96	79,5	92	75,5	88	
150	149,2	150,8							96	106	89,5	102	85,5	98	
160	159,2	160,8							106	116	99,5	112	95,5	108	
180	179,2	180,8									119,5	132	115,5	128	
200	199,075	200,925											135,5	148	
Footnotes <sup>a</sup> to <sup>e</sup> see page 3.															
<sup>f</sup> Size in parentheses should be avoided if possible.															



## 4 Specifications and reference International Standards

See Table 2.

**Table 2 — Specification and reference International Standards**

Material		Steel	Stainless steel	Non-ferrous metal
<b>General requirements</b>	International Standard	ISO 8992		
	Tolerances	5g6g for property class 12.9; for other property classes: 6g		
<b>Thread</b>	International Standards	ISO 261, ISO 965-2, ISO 965-3		
	Property class	< M3: as agreed ≥ M3 and ≤ M20: 8.8, 9.8, 10.9, 12.9	A2-70, A4-70 <sup>b</sup> A3-70, A5-70	As agreed
<b>Mechanical properties</b>	International Standards	ISO 898-1 <sup>a</sup>	ISO 3506-1	ISO 8839
	Product grade	A		
<b>Tolerances</b>	International Standard	ISO 4759-1		
	International Standard	ISO 10664		
<b>Hexalobular socket</b>	International Standard	ISO 10664		
	<b>Finish</b>	As processed Requirements for electroplating are covered in ISO 4042.  Requirements for non-electrolytically applied zinc flake coatings are covered in ISO 10683.	Plain  —	Plain Requirements for electroplating are covered in ISO 4042.
<b>Surface discontinuities</b>	Limits for surface discontinuities are covered in ISO 6157-1 and ISO 6157-3 for 12.9.	—	—	
<b>Acceptability</b>		For acceptance procedure, see ISO 3269.		
<p><sup>a</sup> For screws unsuitable for tensile testing, the hardness requirements shall be complied with throughout the section of the screw.</p> <p><sup>b</sup> For stainless steel screws machined from bar it is permissible to use grade A1-70 for sizes ≤ M12 and A1-50 for sizes &gt; M12 and to mark them accordingly.</p>				

## 5 Designation

EXAMPLE A hexalobular socket head cap screw with thread M5, nominal length  $l = 20$  mm and property class 8.8 is designated as follows:

**Hexalobular socket head cap screw ISO 14579 - M5 × 20 - 8.8**

## Annex A (informative)

### Masses of carbon steel screws

In Table A.1 approximate masses of carbon steel screws with commercial lengths are given for information only.

**Table A.1 — Approximate mass of carbon steel screws**

Thread <i>d</i>	M2	M2,5	M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20
Nominal length <i>l</i>	Approximate mass of carbon steel screws, in kilograms per 1 000 pieces ( $\rho = 7,85 \text{ kg/dm}^3$ )												
3	0,155												
4	0,175	0,345											
5	0,195	0,375	0,67										
6	0,215	0,405	0,71	1,50									
8	0,255	0,465	0,80	1,65	2,45								
10	0,295	0,525	0,88	1,80	2,70	4,70							
12	0,355	0,585	0,96	1,95	2,95	5,07	10,9						
16	0,415	0,705	1,16	2,25	3,45	5,75	12,1	20,9					
20	0,495	0,825	1,36	2,65	4,01	6,53	13,4	22,9	32,1				
25		0,975	1,61	3,15	4,78	7,59	15,0	25,4	35,7	48,0	71,3		
30			1,86	3,65	5,55	8,30	16,9	27,9	39,3	53,0	77,8	111	128
35				4,15	6,32	9,91	18,9	30,4	42,9	58,0	84,4	120	139
40				4,65	7,09	11,0	20,9	32,9	46,5	63,0	91,0	129	150
45					7,86	12,1	22,9	36,1	50,1	68,0	97,6	128	161
50					8,63	13,2	24,9	30,3	54,5	73,0	106	147	172
55						14,3	26,9	42,5	58,9	78,0	114	156	183
60						15,4	28,9	45,7	63,4	84,0	122	165	194
65							31,0	48,9	67,8	90,0	130	174	205
70							33,0	52,1	71,3	96,0	138	183	216
80							37,0	58,5	80,2	108	154	203	241
90								64,9	89,1	120	170	223	266
100								71,2	98,0	132	186	243	291
110									107	144	202	263	316
120									116	156	218	283	341
130										168	234	303	366
140										180	250	323	391
150											266	343	416
160											282	363	441
180												403	491
200													541