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## Hexalobular socket head cap screws

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

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Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
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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 14579 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 10, *Product standards for fasteners*.

This second edition cancels and replaces the first edition (ISO 14579:2001), of which it constitutes a minor revision.

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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 can be selected from existing International Standards, for example ISO 261, ISO 888, ISO 898-1, ISO 965-2, ISO 965-3, ISO 3506-1 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.

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

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

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread*

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*

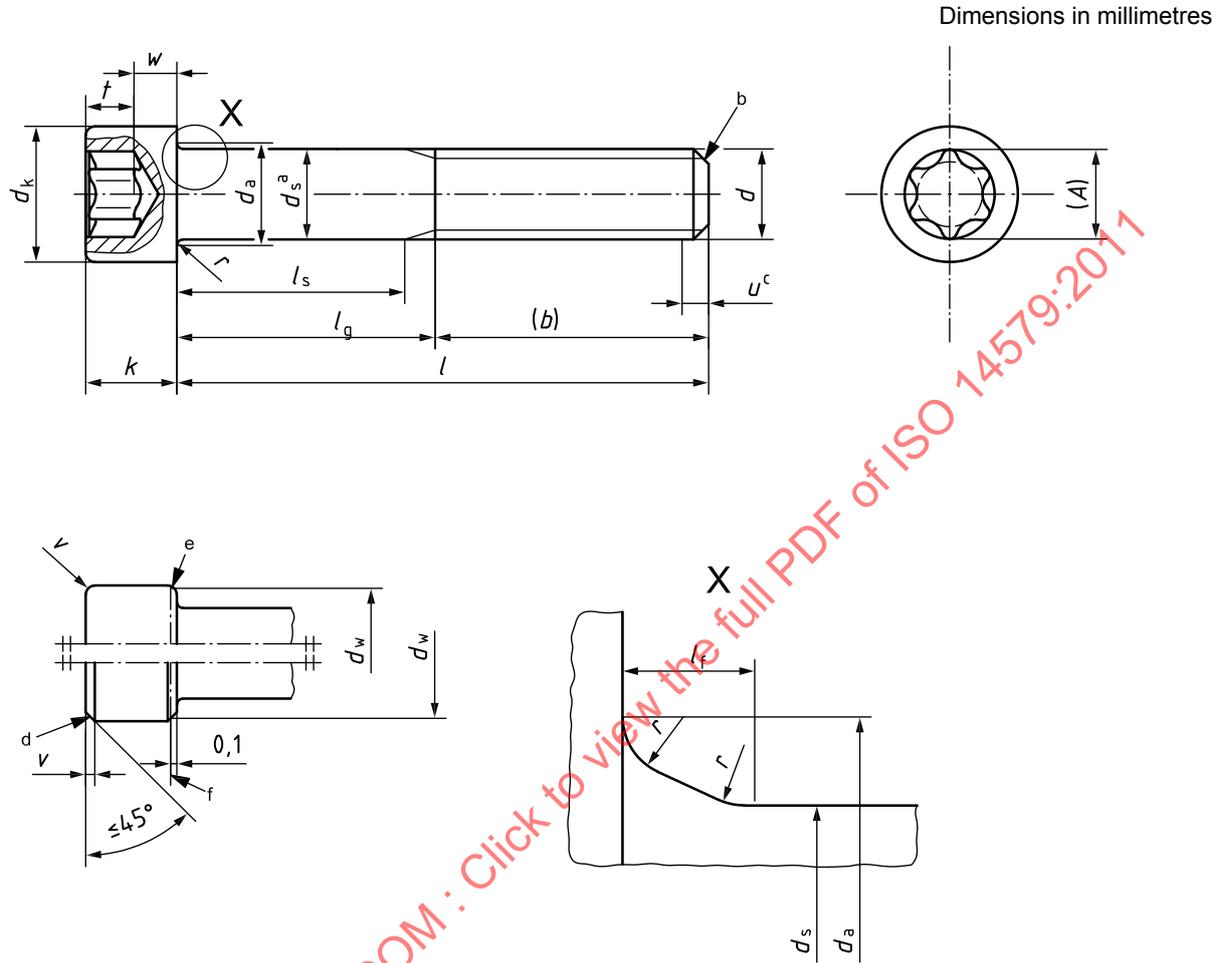
ISO 8992, *Fasteners — General requirements for bolts, screws, studs and nuts*

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

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

### 3 Dimensions

See Figure 1 and Table 1. Symbols and descriptions of dimensions are specified in ISO 225.



Maximum underhead fillet,  $l_{f,max} = 1,7 r_{max}$

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

For  $r_{min}$ , see Table 1.

- a  $d_s$  applies if values of  $l_{s,min}$  are specified.
- b The point shall be chamfered or, for threads  $\leq M4$ , may be as-rolled, in accordance with ISO 4753.
- c Incomplete thread  $u \leq 2P$ .
- 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 of burrs.
- f Reference datum for  $d_w$ .

Figure 1

Table 1 — Dimensions

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							
Socket no.			<b>6</b>	<b>8</b>	<b>10</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>45</b>							
Hexalobular socket	<i>A</i> ref.		1,75	2,4	2,8	3,95	4,5	5,6	7,95							
	max.		0,84	1,04	1,27	1,80	2,03	2,42	3,31							
	<i>t</i> min.		0,71	0,91	1,01	1,42	1,65	2,02	2,92							
<i>l<sup>e</sup></i>			<i>l<sub>s</sub></i> and <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

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 <sup>e</sup>	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>g</i>			<i>l<sub>s</sub></i> and <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.
<b>16</b>	15,65	16,35												
<b>20</b>	19,58	20,42												
<b>25</b>	24,58	25,42												
<b>30</b>	29,58	30,42												
<b>35</b>	34,5	35,5												
<b>40</b>	39,5	40,5												
<b>45</b>	44,5	45,5	5,5	13										
<b>50</b>	49,5	50,5	10,5	18										
<b>55</b>	54,4	55,6	15,5	23	10,25	29								
<b>60</b>	59,4	60,6	20,5	28	15,25	24	10	20						
<b>65</b>	64,4	65,6	25,5	33	20,25	29	15	25	11	21				
<b>70</b>	69,4	70,6	30,5	38	25,25	34	20	30	16	26	9,5	22		
<b>80</b>	79,4	80,6	40,5	48	35,25	44	30	40	26	36	19,5	32	15,5	28
<b>90</b>	89,3	90,7	50,5	58	45,25	54	40	50	36	46	29,5	42	25,5	38
<b>100</b>	99,3	100,7	60,5	68	55,25	64	50	60	46	56	39,5	52	35,5	48
<b>110</b>	109,3	110,7			65,25	74	60	70	56	66	49,5	62	45,5	58
<b>120</b>	119,3	120,7			75,25	84	70	80	66	76	59,5	72	55,5	68
<b>130</b>	129,2	130,8					80	90	76	86	69,5	82	65,5	78
<b>140</b>	139,2	140,8					90	100	86	96	79,5	92	75,5	88
<b>150</b>	149,2	150,8							96	106	89,5	102	85,5	98
<b>160</b>	159,2	160,8							106	116	99,5	112	95,5	108
<b>180</b>	179,2	180,8									119,5	132	115,5	128
<b>200</b>	199,075	200,925											135,5	148

<sup>a</sup> *P* is the pitch of the thread.  
<sup>b</sup> For lengths below the discontinuous, stepped line.  
<sup>c</sup> For plain heads.  
<sup>d</sup> For knurled heads.  
<sup>e</sup> For the acceptance of the hexalobular socket and for gauges, see ISO 10664.  
<sup>f</sup> Sizes in parentheses should be avoided, if possible.  
<sup>g</sup> The range of preferred lengths is between the solid, bold, stepped lines. Lengths above the dashed, stepped line are threaded to the head within 3*P*. Lengths below the discontinuous, stepped line have values of *l<sub>g</sub>* and *l<sub>s</sub>* in accordance with the following equation:  $l_{g,max} = l_{nom} - b$ ;  $l_{s,min} = l_{g,max} - 5P$ .

## 4 Specifications and reference International Standards

See Table 2.

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

Material		Steel	Stainless steel	Non-ferrous metal
<b>General requirements</b>	International Standard	ISO 8992		
<b>Thread</b>	Tolerance class	5g6g for property class 12.9/12.9; for other property classes: 6g		
	International Standard	ISO 261, ISO 965-2, ISO 965-3		
<b>Mechanical property</b>	Property class	<M3: as agreed ≥M3: 8.8, 9.8, 10.9, 12.9/12.9	A2-70, A4-70 <sup>b</sup> A3-70, A5-70	As agreed
	International Standard	ISO 898-1 <sup>a</sup>	ISO 3506-1	ISO 8839
<b>Tolerance</b>	Product grade	A		
	International Standard	ISO 4759-1		
<b>Hexalobular socket</b>	International Standard	ISO 10664		
<b>Finish — Coating</b>		As processed Requirements for electroplating are specified in ISO 4042.  Requirements for non-electrolytically applied zinc flake coatings are specified in ISO 10683.	As processed	As processed Requirements for electroplating are specified in ISO 4042.
		Additional requirements or other finishes or coatings shall be agreed between the supplier and the purchaser.		
<b>Surface integrity</b>		Limits for surface discontinuities are specified in ISO 6157-1 and, for property class 12.9/12.9, in ISO 6157-3.	—	—
<b>Acceptability</b>		Acceptance inspection is specified in ISO 3269.		
<sup>a</sup> For screws unsuitable for tensile testing, the hardness requirements shall be complied with throughout the section of the screw. <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 >M12, and to mark them accordingly.				

## 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**