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## Hexagon socket set screws with cup point

*Vis sans tête à six pans creux, à bout cuvette*

FINESZ 泛微

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FINESZ 泛微

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Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
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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 4029 was prepared by Technical Committee ISO/TC 2, *Fasteners*.

This third edition cancels and replaces the second edition (ISO 4029:1993), which has been technically revised.



# Hexagon socket set screws with cup point

## 1 Scope

This International Standard specifies the characteristics of hexagon socket set screws with cup point and threads from M1,6 up to and including M24 and 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 898-5, ISO 965-2, ISO 3506-3 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 designations of dimensions*

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

ISO 898-5, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 5: Set screws and similar threaded fasteners not under tensile stresses*

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 3506-3, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 3: Set screws and similar fasteners not under tensile stress*

ISO 4042, *Fasteners — Electroplated coatings*

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 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*

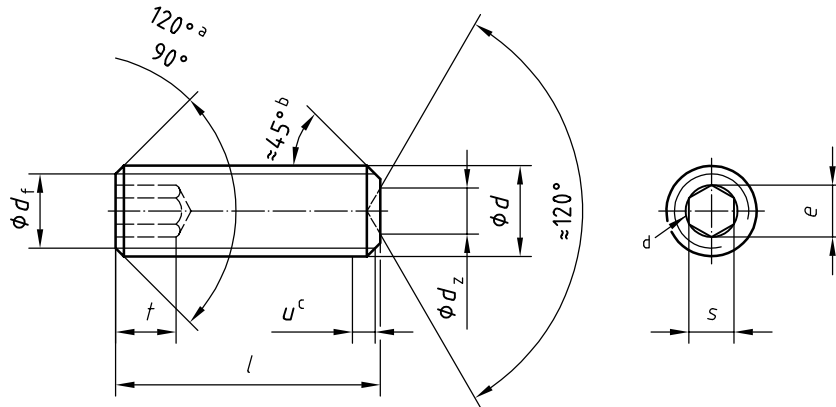
ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coatings*

ISO 23429, *Gauging of hexagon sockets*

### 3 Dimensions

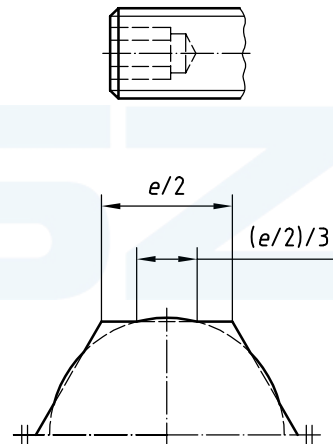
See Figure 1 and Table 1.

Symbols and designations of dimensions are specified in ISO 225.



#### Permissible alternative form of socket

For broached sockets which are at the maximum limit of size, the overcut resulting from drilling shall not exceed 1/3 of the length of any flat of the socket which is  $e/2$ .



- <sup>a</sup> The  $120^\circ$  angle is a requirement for short-length screws of nominal length,  $l$ , situated in the shaded areas in Table 1.
- <sup>b</sup> The  $45^\circ$  angle applies only to the portion of the point situated below the root diameter of the thread.
- <sup>c</sup> Incomplete thread  $u < 2P$ .
- <sup>d</sup> A slight rounding or countersink at the mouth of the socket is permissible.

Figure 1

Table 1 — Dimensions

Dimensions in millimetres

Thread ( <i>d</i> )		M1,6	M2	M2,5	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24	
<i>P</i> <sup>a</sup>		0,35	0,4	0,45	0,5	0,7	0,8	1	1,25	1,5	1,75	2	2,5	3	
<i>d<sub>z</sub></i>	max.	0,80	1,00	1,20	1,40	2,00	2,50	3,00	5,0	6,0	8,00	10,00	14,00	16,00	
	min.	0,55	0,75	0,95	1,15	1,75	2,25	2,75	4,7	5,7	7,64	9,64	13,57	15,57	
<i>d<sub>t</sub></i>	min.	≈ Minor thread diameter													
<i>e</i> <sup>b, c</sup>	min.	0,809	1,011	1,454	1,733	2,303	2,873	3,443	4,583	5,723	6,863	9,149	11,429	13,716	
<i>s</i> <sup>c</sup>	nom.	0,7	0,9	1,3	1,5	2	2,5	3	4	5	6	8	10	12	
	max.	0,724	0,913	1,300	1,58	2,08	2,58	3,08	4,095	5,14	6,14	8,175	10,175	12,212	
	min.	0,710	0,887	1,275	1,52	2,02	2,52	3,02	4,020	5,02	6,02	8,025	10,025	12,032	
<i>t</i>	min. <sup>d</sup>	0,7	0,8	1,2	1,2	1,5	2	2	3	4	4,8	6,4	8	10	
	min. <sup>e</sup>	1,5	1,7	2	2	2,5	3	3,5	5	6	8	10	12	15	
<i>l</i>		Approximate mass, in kilograms per 1 000 pieces ( $\rho = 7,85 \text{ kg/dm}^3$ ) (for information only)													
nom.	min.	max.													
<b>2</b>	1,8	2,2	0,019	0,029											
<b>2,5</b>	2,3	2,7	0,025	0,037	0,063										
<b>3</b>	2,8	3,2	0,029	0,044	0,075	0,1									
<b>4</b>	3,76	4,24	0,037	0,059	0,1	0,14	0,23								
<b>5</b>	4,76	5,24	0,046	0,074	0,125	0,18	0,305	0,42							
<b>6</b>	5,76	6,24	0,054	0,089	0,15	0,22	0,38	0,54	0,74						
<b>8</b>	7,71	8,29	0,07	0,119	0,199	0,3	0,53	0,78	1,09	1,88					
<b>10</b>	9,71	10,29		0,148	0,249	0,38	0,68	1,02	1,44	2,51	3,72				
<b>12</b>	11,65	12,35			0,299	0,46	0,83	1,26	1,79	3,14	4,73	6,7			
<b>16</b>	15,65	16,35				0,62	1,13	1,74	2,49	4,4	6,73	9,5	15,7		
<b>20</b>	19,58	20,42					1,4	2,22	3,19	5,66	8,72	12,3	20,9	31,1	
<b>25</b>	24,58	25,42						2,82	4,07	7,24	11,2	15,8	27,4	41,4	
<b>30</b>	29,58	30,42							4,94	8,81	13,7	19,3	33,9	51,7	
<b>35</b>	34,5	35,5								10,4	16,2	22,7	40,4	62	
<b>40</b>	39,5	40,5								12	18,7	26,2	46,9	72,3	
<b>45</b>	44,5	45,5									21,2	29,7	53,3	82,6	
<b>50</b>	49,5	50,5									23,6	33,2	59,8	92,6	
<b>55</b>	54,4	55,6										36,6	66,3	103	
<b>60</b>	59,4	60,6										40,1	72,8	114	

NOTE Commercial lengths are those between the bold stepped lines.

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

<sup>b</sup>  $e_{\min} = 1,14 s_{\min}$ .

<sup>c</sup> Combined gauging of socket dimensions *e* and *s*, see ISO 23429.

<sup>d</sup> For screws with nominal lengths in the shaded areas.

<sup>e</sup> For screws with nominal lengths below the shaded areas.

## 4 Requirements 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		
	Tolerance	6g		
<b>Thread</b>	International Standards	ISO 261, ISO 965-2, ISO 965-3		
	Property class	45H	A1-12H, A2-21H, A3-21H, A4-21H, A5-21H	As agreed
<b>Mechanical properties</b>	International Standards	ISO 898-5	ISO 3506-3	ISO 8839
	Product grade	A		
<b>Tolerances</b>	International Standard	ISO 4759-1		
	<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.	—	—
<b>Acceptability</b>		For acceptance procedure, see ISO 3269.		

## 5 Designation

EXAMPLE A hexagon socket set screw with cup point, thread M6, nominal length  $l = 12$  mm and of property class 45H, is designated as follows:

**Hexagon socket set screw ISO 4029 - M6×12 - 45H**



