Hexagon set screws with small hexagon and full dog point

DIN 561

ICS 21.060.10

Supersedes February 1985 edition.

Descriptors: Fasteners, screws, set screws.

Sechskantschrauben mit Zapfen und kleinem Sechskant

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 Scope and field of application

This standard specifies dimensions and technical delivery conditions for coarse and fine pitch thread M6 to M56 hexagon set screws with small hexagon and full dog point, assigned to product grade A. These screws are only to be used as forcing screws (i.e. for adjusting and locating purposes when there is considerable resistance to motion).

NOTE: For sizes M12 and M16 screws, this standard specifies widths across flats which are in current use, i.e. 16 mm and 18 mm, in accordance with ISO 272. Specifications for obsolete widths across flats (17 mm and 19 mm) are provided in Appendix A.

Where screws are to comply with specifications other than those given in this standard (e.g. regarding nominal length or property class), these shall be selected in accordance with the relevant standards.

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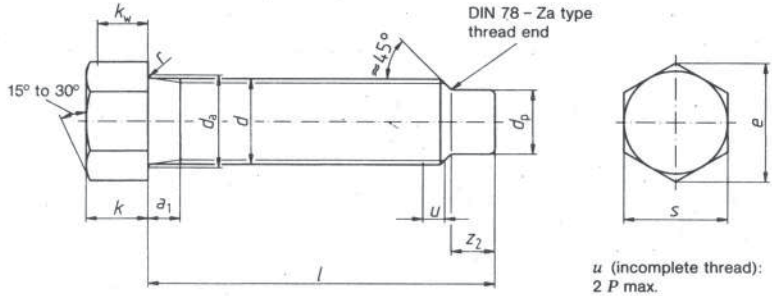
2 Dimensions



u (incomplete thread): 2 P max.

k_w is the minimum wrenching height; e shall be maintained within k_w.
a_1 as in DIN 76-1, d_p and z_2 as in DIN 78.

Table 1: Dimensions

	Thread size	M6	M8	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56
		—	—	—	—	—	M20 × 2	M24 × 2	M30 × 2	M36 × 3	M42 × 3	M48 × 3	M56 × 3
P [1]		1	1,25	1,5	1,75	2	2,5	3	3,5	4	4,5	5	5,5
a_1	max.	3	3,75	4,5	5,25	6	7,5	9	10,5	12	13,5	15	16,5
d_a	max.	6,8	9,2	11,2	13,7	17,7	22,4	26,4	33,4	39,4	45,6	52,6	63
d_p	max. = nominal size	4	5,5	7	8,5	12	15	18	23	28	32	38	45
	min.	3,82	5,32	6,78	8,28	11,73	14,73	17,73	22,67	27,67	31,61	37,61	44,61
e	min.	8,79	11,05	14,38	17,77	19,92	26,75	33,53	39,98	51,28	61,31	72,61	83,91
k	Nominal size	5	6	7	9	11	14	17	21	25	30	34	40
	min.	4,85	5,85	6,82	8,82	10,79	13,79	16,79	20,74	24,74	29,74	33,69	39,69
	max.	5,15	6,15	7,18	9,18	11,21	14,21	17,21	21,26	25,26	30,26	34,31	40,31
k_w	min.	3,4	4,1	4,8	6,2	7,6	9,7	11,8	14,5	17,3	20,8	23,6	27,8
r	min.	0,25	0,4	0,4	0,6	0,6	0,8	0,8	1	1	1,2	1,6	2
s	max. = nominal size	8	10	13	16	18	24	30	36	46	55	65	75
	min.	7,78	9,78	12,73	15,73	17,73	23,67	29,67	35,38	45,38	54,26	64,26	74,26
z_2	min. = nominal size	3	4	5	6	8	10	12	15	18	21	24	28
	max.	3,25	4,3	5,3	6,3	8,36	10,36	12,43	15,43	18,43	21,52	24,52	28,52

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

(continued)

Table 1 (concluded)

Thread size			M6	M8	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56
			—	—	—	—	—	M20 × 2	M24 × 2	M30 × 2	M36 × 3	M42 × 3	M48 × 3	M56 × 3
Nominal size	l min.	l max.	Approx. mass (7,85 kg/dm³) per 1 000 units, in kg											
12	11,65	12,35	4,26											
(14)	13,65	14,35	4,60											
16	15,65	16,35	4,95	8,66										
(18)	17,65	18,35	5,30	9,30										
20	19,58	20,42	5,65	9,94	17,0									
25	24,58	25,42	6,53	11,4	19,5	34,1								
30	29,58	30,42	7,38	13,0	22,0	37,7	62,6							
35	34,5	35,5		14,6	24,4	41,2	69,1							
40	39,5	40,5		16,1	26,9	44,8	75,7	132						
45	44,5	45,5			29,4	48,4	82,3	143	233					
50	49,5	50,5			31,9	52,0	88,9	154	249					
60	59,4	60,6				59,2	102	176	281	446				
70	69,4	70,6				66,4	115	198	313	493				
80	79,4	80,6					128	220	345	540	876	1 320		
90	89,3	90,7					142	242	377	587	944	1 410	2 040	
100	99,3	100,7						264	409	634	1 010	1 510	2 160	3 120
120	119,3	120,7							473	727	1 150	1 700	2 410	3 450
140	139,2	140,8								821	1 280	1 890	2 660	3 780
160	159,2	160,8								914	1 420	2 080	2 910	4 110
180	179,2	180,8									1 560	2 270	3 160	4 440
200	199,075	200,925									1 690	2 460	3 410	4 770
220	219,075	220,925										2 650	3 660	5 100
240	239,075	240,925										2 840	3 910	5 430
260	258,95	261,105										3 030	4 160	5 760
280	278,95	281,105											4 410	6 090
300	298,95	301,105											4 660	6 420

For the range of commercial sizes between the continuous thick lines, values of mass have been specified (for guidance only).

Bracketed sizes should be avoided if possible.

Lengths above 300 mm shall be graded in 20 mm steps.

3 Technical delivery conditions

Table 2: Technical delivery conditions

Material		Steel	Stainless steel	Nonferrous metal
General requirements		As specified in ISO 8992.		
Thread	Tolerance	6g		
	As specified in	DIN 13-15.		
Mechanical properties	Property class (material)	14H or 22H	A2–50	CuZn[1])
	As specified in	ISO 898-5	ISO 3506	DIN EN 28 839.
Limit deviations and geometrical tolerances	Product grade	A		
	As specified in	ISO 4759-1.		
Surface finish		As processed.	Bright.	Bright.
		Property class 22H: (thermally or chemically) blackened.	–	–
		ISO 4042 shall apply with regard to electroplating.	–	–
		DIN 267-10 shall apply with regard to hot-dip galvanizing.	–	–
		DIN 267-2 shall apply with regard to surface roughness.		
		DIN EN 26 157-3 shall apply with regard to the limits of surface discontinuities.		
Acceptance inspection		As specified in ISO 3269.		

[1]) Copper-zinc alloy CU2 or CU3, at the manufacturer's discretion.

4 Designation

Designation of an M8 hexagon screw with a nominal length, *l*, of 40 mm and assigned to property class 14H:

Hexagon screw DIN 561 – M8 × 40 – 14 H

For M12 and M16 hexagon screws, widths across flats in current use, as specified in ISO 272, shall apply and are to be given in the designation, e.g.:

Designation of an M12 hexagon screw with a nominal length, *l*, of 60 mm with a width across flats of 16 mm (SW 16), and assigned to property class 14H:

Hexagon screw DIN 561 – M12 × 60 – SW 16 – 14H

The screws may also be supplied with a thread undercut (Ri) conforming to DIN 962. In this case, symbol Ri shall be included in the designation, e.g.:

Hexagon screw DIN 561 – M8 × 40 – Ri – 14H

DIN 962 shall apply to the designation of type and finish, with additional information to be given on ordering.

The DIN 4000 – 2 – 1 tabular layout of article characteristics shall apply to the screws covered in this standard.

Appendix A

Widths across flats for replacement and maintenance purposes

17 mm and 19 mm widths across flats are not included in ISO 272, and their further use is deprecated. However, should such screws be required as replacement parts, they may still be ordered with the dimensions specified in the table below.

For ordering purposes, the following designation may be used (example):

Hexagon set screw DIN 561 – M12 × 60 – 14H

Table A.1: Obsolete widths across flats

	Thread size	M12	M16
e	min.	18,9	21,1
s	max. = nominal size	17	19
	min.	16,73	18,67

Standards referred to

DIN 13-15	ISO metric screw threads; fundamental deviations and tolerances for screw threads of 1 mm diameter and larger
DIN 76-1	Thread run-outs and thread undercuts for ISO metric screw threads in accordance with the DIN 13 series
DIN 78	Thread ends and lengths of projection of bolt ends for ISO metric screw threads in accordance with the DIN 13 series
DIN 267-2	Fasteners; technical delivery conditions; product grades and tolerances
DIN 267-10	Fasteners; technical delivery conditions; hot-dip galvanized components
DIN 962	Designation system for fasteners
DIN 4000-2	Tabular layouts of article characteristics for bolts, screws and nuts
DIN EN 26 157-3	Fasteners; surface discontinuities; bolts, screws and studs for special requirements (ISO 6157-3 : 1988)
DIN EN 28 839	Mechanical properties of fasteners; nonferrous metal bolts, screws, studs and nuts
ISO 272 : 1982	Fasteners; hexagon products; widths across flats
ISO 898-5 : 1980	Mechanical properties of fasteners; set screws and similar threaded fasteners not under tensile stresses
ISO 3269 : 1988	Fasteners; acceptance inspection
ISO 3506 : 1979	Corrosion-resistant stainless steel fasteners; specifications
ISO 4042 : 1989	Threaded components; electroplated coatings
ISO 4759-1 : 1978	Tolerances for fasteners; bolts, screws and nuts with thread diameters between 1,6 (inclusive) and 150 mm (inclusive) and product grades A, B and C
ISO 8992 : 1986	Fasteners; general requirements for bolts, screws, studs and nuts

Previous editions

DIN 561: 1922-09, 1923-06, 1938x-12, 1951-01, 1953-06, 1963-04, 1967-12, 1985-02.

Amendments

The following amendments have been made to the February 1985 edition.

a) The symbol k' has been replaced by k_w.
b) For size d_p, tolerance b13 has been replaced by tolerance h13 as specified in DIN 78.
c) The widths across flats have been amended for M12 and M16 screws.
d) For property classes, reference is now made to ISO 898-5.
e) The technical delivery conditions now also cover stainless steel and nonferrous metal screws.
f) For screws with thread undercut, symbol A has been replaced by 'Ri', in accordance with DIN 962.
g) The standard has been editorially revised.