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January 1984

Widths across flats

for bolts, screws, valves and fittings

DIN 475 Part 1

Schlüsselweiten für Schrauben, Armaturen, Fittings

Supersedes March 1980 edition

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

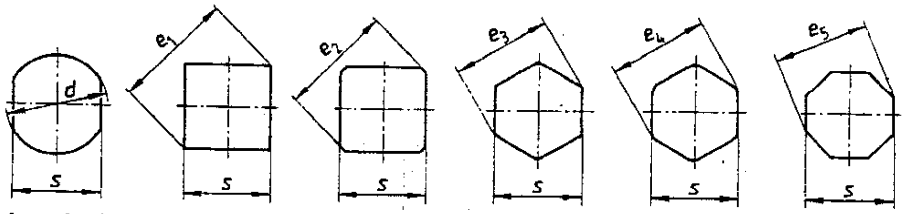
1 Field of application

The widths across flats in accordance with this standard apply to all 2-flats, squares, hexagons and octagons, even if they are not moved by wrenches.

A selection of widths across flats of hexagon bolts, screws and nuts is given in DIN ISO 272.

Squares and square holes for spindles, handwheels and crank handles shall be chosen in accordance with DIN 79 and squares for tools in accordance with DIN 10 Part 1.

2 Dimensions, designation



Designation of a series 1 width across flats with nominal dimension s = 16 mm (SW 16):

DIN 475 – SW 16 – 1

Table.

Width across flats (SW)				Width across corners						
	s			d	e_1	e_2 min.	e_3 [2] min.		e_4	e_5 min.
Nominal dimension	max.	min. [1] Series 1	min. [1] Series 2				Series 1	Series 2		
2	2	1,9		2,5	–	–	–			
2,5	2,5	2,4		3						
3	3	2,9		3,5	4,2	4,1	3,28			
3,2 *	3,2	3,08		3,7	4,5	4,3	3,48			
3,5	3,5	3,38		4	4,9	4,6	3,82			
4 *	4	3,88	–	4,5	5,7	5,3	4,38	–		
4,5	4,5	4,32		5	6,4	5,9	4,88			
5 *	5	4,82		6	7,1	6,5	5,45			
5,5 *	5,5	5,32		7	7,8	7,1	6,01		–	–
6	6	5,82		7	8,5	8	6,58			
7 *	7	6,78		8	9,9	9	7,66			
8 *	8	7,78	7,64	9	11,3	10	8,79	8,63		
9	9	8,78	8,64	10	12,7	12	9,92	9,76		
10 *	10	9,78	9,64	12	14,1	13	11,05	10,89		
11 *	11	10,73	10,57	13	15,6	14	12,12	11,94		
12	12	11,73	11,57	14	17,0	16	13,25	13,07		
13 *	13	12,73	12,57	15	18,4	17	14,38	14,20		

* See page 3.
For [1] and [2] see page 3.

Continued on pages 2 to 4

Table. (continued)

Width across flats (SW)				Width across corners						
Nominal dimension	s max.	s min. 1) Series 1	s min. 1) Series 2	d	e_1	e_2 min.	e_3 2) min. Series 1	e_3 2) min. Series 2	e_4	e_5 min.
14	14	13,73	13,57	16	19,8	18	15,51	15,33		
15	15	14,73	14,57	17	21,2	20	16,64	16,46		
16 *	16	15,73	15,57	18	22,6	21	17,77	17,59		
17	17	16,73	16,57	19	24	22	18,90	18,72		...
18 *	18	17,73	17,57	21	25,4	23,5	20,03	19,85		
19	19	18,67	18,48	22	26,9	25	21,10	20,88		
20	20	19,67	19,16	23	28,3	26	22,23	21,65		
21 *	21	20,67	20,16	24	29,7	27	23,36	22,78		22,7
22	22	21,67	21,16	25	31,1	28	24,49	23,91		23,8
23	23	22,67	22,16	26	32,5	30,5	25,62	25,04		24,9
24 *	24	23,67	23,16	28	33,9	32	26,75	26,17		26
25	25	24,67	24,16	29	35,5	33,5	27,88	27,30		27
26	26	25,67	25,16	31	36,8	34,5	29,01	28,43		28,1
27 *	27	26,67	26,16	32	38,2	36	30,14	29,56		29,1
28	28	27,67	27,16	33	39,6	37,5	31,27	30,69		30,2
30 *	30	29,67	29,16	35	42,4	40	33,53	32,95		32,5
32	32	31,61	31,00	38	45,3	42	35,72	35,03		34,6
34 *	34	33,38	33,00	40	48	46	37,72	37,29		36,7
36 *	36	35,38	35,00	42	50,9	48	39,98	39,55		39
41 *	41	40,38	40,00	48	58	54	45,63	45,20	—	44,4
46 *	46	45,38	45,00	52	65,1	60	51,28	50,85		49,8
50 *	50	49,38	49,00	58	70,7	65	55,80	55,37		54,1
55 *	55	54,26	53,80	65	77,8	72	61,31	60,79		59,5
60 *	60	59,26	58,80	70	84,8	80	66,96	66,44		64,9
65 *	65	64,26	63,10	75	91,9	85	72,61	71,30		70,3
70 *	70	69,26	68,10	82	99	92	78,26	76,95		75,7
75 *	75	74,26	73,10	88	106	98	83,91	82,60		81,2
80 *	80	79,26	78,10	92	113	105	89,56	88,25		86,6
85 *	85	84,13	82,80	98	120	112	95,07	93,56		92,0
90 *	90	89,13	87,80	105	127	118	100,72	99,21		97,4
95 *	95	94,13	92,80	110	134	125	106,37	104,86		103
100 *	100	99,13	97,80	115	141	132	112,02	110,51		108
105 *	105	104,13	102,80	122	148	138	117,67	116,16		114
110 *	110	109,13	107,80	128	156	145	123,32	121,81		119
115 *	115	114,13	112,80	132	163	152	128,97	127,46		124
120 *	120	119,13	117,80	140	170	160	134,62	133,11		130
130 *	130	129,00	127,50	150	184	170	145,77	144,08		141
135 *	135	134,00	132,50	158	191	178	151,42	149,72		146
145 *	145	144,00	142,50	168	205	190	162,72	161,02		157
150 *	150	149,00	147,50	—	—	—	168,37	166,78	165	162
155 *	155	154,00	152,50				174,02	172,32	170	168

* See page 3.
For 1) and 2) see page 3.

Table. (continued)

Width across flats (SW)				Width across corners						
Nominal dimension	s max.	s min. 1) Series 1	s min. 1) Series 2	d	e_1	e_2 min.	e_3 2) min. Series 1	e_3 2) min. Series 2	e_4	e_5 min.
165 *	165	164,00	162,50				185,32	183,62	180	179
170 *	170	169,00	167,50				190,97	189,28	186	184
175	175	174,00	172,50				196,62	194,92	192	189
180 *	180	179,00	177,50				202,27	200,58	198	195
185 *	185	183,85	180,40				207,75	203,85	205	200
190	190	188,85	185,40				213,40	209,50	210	206
200 *	200	198,85	195,40				224,70	220,80	220	216
210 *	210	208,85	205,40				236,00	227,58	232	227
220	220	218,85					247,30		242	238
230	230	228,85					258,60		255	249
235	235	233,85					264,25		260	254
245	245	243,85					275,55		270	265
255	255	253,70					286,68		280	276
265	265	263,70					297,98		290	287
270	270	268,70					303,63		298	292
280	280	278,70					314,93		308	303
290	290	288,70					326,23		320	314
300	300	298,70		–	–	–	337,53		330	325
310	310	308,70					348,83		340	335
320	320	318,60					360,02		352	346
330	330	328,60					371,32		362	357
340	340	338,60	–				382,62	–	375	368
350	350	348,60					393,92		385	379
365	365	363,60					410,87		400	395
380	380	378,60					427,82		420	411
395	395	393,60					444,77		435	427
410	410	408,45					461,55		452	444
425	425	423,45					478,50		470	460
440	440	438,45					495,45		485	476
455	455	453,45					512,40		500	492
470	470	468,45					529,35		518	509
480	480	478,45					540,65		528	519
495	495	493,45					557,60		545	536
510	510	–					–		560	552
525	525	–					–		580	568

* Series of preferred sizes for hexagon bolts, screws and nuts in accordance with DIN ISO 272.

1) The following tolerance classes shall apply:

Series 1	Series 2
s up to 4: h 12	s up to 19: h 14
s over 4 up to 32: h 13	s over 19 up to 60: h 15
s over 32: h 14	s over 60 up to 180: h 16
	s over 180: h 17

These tolerance classes comply with DIN ISO 4759 Part 1, except for tolerance class h 12 for widths across flats up to 4 mm in series 1. Tolerance class h 13 is given in DIN ISO 4759 Part 1 for this (see Explanatory notes).

2) e_3 min. = 1,13 s min.; for hexagon bolts, screws and nuts with a flange and for finished extruded hexagons: e_3 min. = 1,12 s min.

Other relevant standards

DIN 10 Part 1	Driving squares and shank diameters of rotating tools in accordance with ISO; dimensions
DIN 79	Squares for operating spindles and operating elements
DIN ISO 272	Fasteners, widths across flats for hexagon products
DIN ISO 4759 Part 1	Tolerances for fasteners; bolts, screws and nuts with thread diameters $\geq 1{,}6$ and ≤ 150 mm and product classes A, B and C

Previous editions

DIN 475: 12.21, 01.43xx; DIN 475 Part 2: 01.24, 01.42, 03.57;
DIN 475 Part 1: 05.20, 04.28, 03.64, 11.65, 03.80.

Amendments

Compared with the March 1980 edition, the following amendments have been made:

a) The tolerance class has been changed from h 13 to h 12 for widths across flats up to 4 mm.

b) The minimum width across corners e_3 has been changed accordingly.

c) s min and e_3 min for SW 7 and SW 8 have been corrected.

d) The content of the standard has been editorially revised.

Explanatory notes

As early as in 1980 DIN Standard 475 Part 1 was harmonized with International Standard ISO 272 – 1979 (= DIN ISO 272) with regard to the widths across flats for hexagon bolts, screws and nuts, no serious changes being considered necessary. The widths across flats of the series of preferred sizes for hexagon bolts, screws and nuts in accordance with DIN ISO 272 were marked with an asterisk. The tolerances for the widths across flats and the minimum dimensions of the widths across corners were adopted from International Standard ISO 4759/I – 1980 (= DIN ISO 4759 Part 1).

Widths across flats for hexagon products are laid down in DIN ISO 272, which represent a rational selection also with regard to the tightening tools, and which are recommended for general use. A revision (as far as is necessary) of the tool standards concerned is intended or has already been carried out.

After the publication of the March 1980 edition of DIN 475 Part 1, it was found that tolerance class h 13 in accordance with DIN ISO 4759 Part 1 for small widths across flats up to SW 4 (series 1) is too large in borderline cases for the ability of hexagons to operate (coordination of screw and wrench). Tolerance class h 12 was therefore specified in the range up to SW 4. An application has been made for a corresponding amendment of ISO 4759/I – 1980.

International Patent Classification

B 23 C 3-24