Hexagon flange bolts
with reduced shank

DIN 6922

Sechskantschrauben mit Flansch und reduziertem Schaft

As it is current practice in standards published by the International Organization for Standardization (ISO), the comma has been used throughout as a decimal marker.

This standard incorporates all the essential specifications of an international standard which is in preparation (see Explanatory notes), together with national addenda.

Dimensions in mm

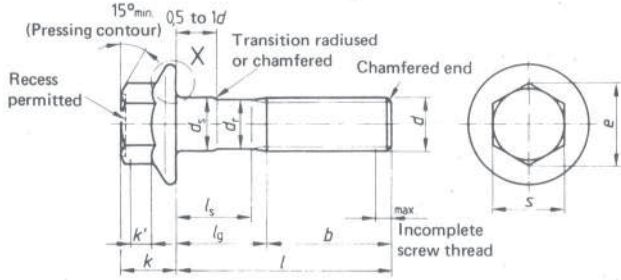
1 Field of application

This standard specifies product grade A hexagon flange bolts with metric coarse screw thread or metric fine screw thread from 5 up to and including 20 mm nominal thread diameter. If, in special cases, specifications other than those listed in this standard are required, e.g. different nominal lengths or property classes, these shall be selected in accordance with the appropriate standards.

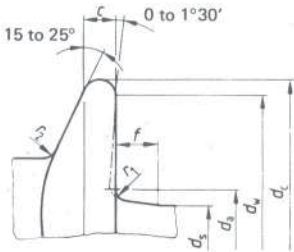
2 Reference to other standards

See list of "Standards referred to" on page 5

3 Dimensions

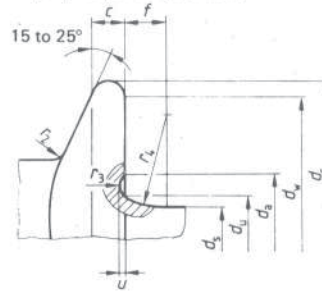


Standard design



Detail X

Grooved design (Ho)
(only subject to agreement)



k' is the minimum wrenching height
At least e shall be available over this height.
For designation see clause 5.

Continued on pages 2 to 6

Table 1.

Thread d		M 5	M 6	M 8	M 10	M 12	M 14	M 16	M 20
		–	–	M8×1	M10×1,25	M12×1,5	M14×1,5	M16×1,5	M20×1,5
		–	–	–	(M10×1)	(M12×1,25)	–	–	–
P 1)		0,8	1	1,25	1,5	1,75	2	2	2,5
b Nominal dimension	2)	16	18	22	26	30	34	38	46
	3)	–	–	28	32	36	40	44	52
	4)	–	–	–	–	–	–	57	65
c	min.	1	1,1	1,2	1,5	1,8	2,1	2,4	3
d_a max.	Coarse	5,7	6,8	9,2	11,2	13,7	15,7	17,7	22,4
	Ho	6,2	7,4	10	12,6	15,2	17,7	20,7	25,7
d_c	max.	11,8	14,2	18	22,3	26,6	30,5	35	43
d_r		≈ Pitch diameter of thread							
d_s	max.	5	6	8	10	12	14	16	20
	min.	4,82	5,82	7,78	9,78	11,73	13,73	15,73	19,67
d_u	max.	5,5	6,6	9	11	13,5	15,5	17,5	22
d_w	min.	9,8	12,2	15,8	19,6	23,8	27,6	31,9	39,9
e	min.	8,71	10,95	14,26	16,5	17,62	19,86	23,15	29,87
f	max.	1,4	2	2	2	3	3	3	4
k	max.	5,4	6,6	8,1	9,2	11,5	12,8	14,4	17,1
k'	min.	2	2,5	3,2	3,6	4,6	5,1	5,8	6,8
r_1	min.	0,25	0,4	0,4	0,4	0,6	0,6	0,6	0,8
r_2 5)	max.	0,3	0,4	0,5	0,6	0,7	0,9	1	1,2
r_3	min.	0,1	0,1	0,15	0,2	0,25	0,3	0,35	0,4
r_4	≈	3	3,4	4,3	4,3	6,4	6,4	6,4	8,5
s Nominal dimension	= max.	8	10	13	15	16	18	21	27
	min.	7,78	9,78	12,73	14,73	15,73	17,73	20,67	26,67
u	max.	0,15	0,2	0,25	0,3	0,35	0,45	0,5	0,65
	min.	0,05	0,05	0,1	0,15	0,15	0,2	0,25	0,3

e min. = 1,12 × s min.

The screw threads in brackets shall be avoided wherever possible, for functional reasons.

1) p = Pitch of coarse thread as specified in DIN 13 Part 12

2) For nominal lengths up to and including 125 mm

3) For nominal lengths over 125 up to 200 mm

4) For nominal lengths exceeding 200 mm

5) Radius r_2 shall apply both for the edges of adjoining flats and for the transition between hexagon corners and flange.

Table 2.

Thread d	M 5	M 6	M 8	M 10	M 12	M 14	M 16	M 20
	–	–	M8X1	M10X1,25	M12X1,5	M14X1,5	M16X1,5	M20X1,5
	–	–	–	(M10X1)	(M12X1,25)	–	–	–

l			Shank lengths															
			l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g
Nominal dimension	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
30	29,58	30,42	10	14														
35	34,5	35,5	15	19	12	17												
40	39,4	40,5	20	24	17	22	11,75	18										
45	44,5	45,5	25	29	22	27	16,75	23	11,5	19								
50	49,5	50,5	30	34	27	32	21,75	28	16,5	24	11,25	20						
55	54,4	55,6			32	37	26,75	33	21,5	29	16,25	25	11	21				
60	59,4	60,6			37	42	31,75	38	26,5	34	21,25	30	16	26	12	22		
65	64,4	65,6					36,75	43	31,5	39	26,25	35	21	31	17	27		
70	69,4	70,6					41,75	48	36,5	44	31,25	40	26	36	22	32	11,5	24
80	79,4	80,6					51,75	58	46,5	54	41,25	50	36	46	32	42	21,5	34
90	89,3	90,7							56,5	64	51,25	60	46	56	42	52	31,5	44
100	99,3	100,7							66,5	74	61,25	70	56	66	52	62	41,5	54
110	109,3	110,7									71,25	80	66	76	62	72	51,5	64
120	119,3	120,7									81,25	90	76	86	72	82	61,5	74
130	129,2	130,8											80	90	76	86	65,5	78
140	139,2	140,8											90	100	86	96	75,5	88
150	149,2	150,8													96	106	85,5	98
160	159,2	160,8													106	116	95,5	108
180	179,2	180,8															115,5	128
200	199	201															135,5	148

The commercial sizes are identified by specifying their shank lengths.

Intermediate lengths are permitted, but should be avoided wherever possible.

Formulae: l_g max. = l (nominal dimension) – b (nominal dimension)

l_s min. = lg max. – 5 P

The values specified for l_s and l_g have been calculated taking the pitches given for coarse threads as the basis. As a rule, they may also be used for fine screw threads.

4 Technical delivery conditions

Material		Steel	Stainless steel
General requirements		as specified in DIN 267 Part 1	
Thread	Tolerance	6g	
	Standard	DIN 13 Part 12 and Part 15	
Mechanical properties	Property class [1] (material)	8.8, 10.9, 12.9	A2-70
	Standard	DIN ISO 898 Part 1	DIN 267 Part 11
Permissible dimensional deviations and deviations of form	Product grade	A	
	Standard	DIN ISO 4759 Part 1 [2]	
Surface		blackened (thermally or chemically)	bright
		DIN 267 Part 2 (at present at the stage of draft) shall apply with regard to the surface peak-to-valley heights DIN 267 Part 19 shall apply with regard to the permissible surface defects DIN 267 Part 9 shall apply with regard to galvanic surface protection DIN 267 Part 10 shall apply with regard to hot dip galvanizing	
Types and design requiring additional ordering details		as specified in DIN 962	
Acceptance testing		DIN 267 Part 5 (at present at the stage of draft) shall apply with regard to acceptance testing	

1) Other property classes or materials subject to agreement.

2) In a deviation from DIN ISO 4759 Part 1, May 1980 edition, subclause 11.3, the parallelism of the flats may lie within the tolerance field h13 for the width across flats.

5 Designation

Designation of a standard design hexagon flange bolt with thread size d = M 10, length l = 60 mm and property class 10.9:

Hexagon head bolt DIN 6922 – M 10 × 60 – 10.9

If a grooved design is required, then the letter symbol Ho shall be included in the designation, e.g.:

Hexagon bolt DIN 6922 – M 10 × 60 – Ho – 10.9

Standards referred to

DIN 13 Part 12	ISO metric screw threads; coarse and fine screw threads from 1 to 300 mm thread diameter, selection of diameters and pitches
DIN 13 Part 15	ISO metric screw threads; basic deviations and tolerances for screw threads of 1 mm and larger
DIN 267 Part 1	Fasteners; technical delivery conditions, general requirements
DIN 267 Part 2	(at present at the stage of draft) Fasteners; technical delivery conditions, types and dimensional accuracy
DIN 267 Part 5	(at present at the stage of draft) Fasteners; technical delivery conditions, acceptance testing
DIN 267 Part 9	Fasteners; technical delivery conditions, electroplated components
DIN 267 Part 10	Fasteners; technical delivery conditions, hot dip galvanized components
DIN 267 Part 11	Fasteners; technical delivery conditions with addenda to ISO 3056, stainless and acid resistant steel components
DIN 267 Part 19	Fasteners; technical delivery conditions, surface irregularities on bolts
DIN 962	Screws, bolts, studs and nuts; additional types and finishes; ordering details and dimensions
DIN ISO 898 Part 1	Mechanical properties of fasteners; bolts, screws and studs
DIN ISO 4759 Part 1	Fasteners; tolerances for bolts, screws and nuts with thread diameters from 1,6 to 150 mm, product grades A, B and C

Other relevant standards

DIN 6921 Hexagon flange bolts
DIN 6923 Hexagon flange nuts

Explanatory notes

Draft Standards DIN 6921, DIN 6922 and DIN ISO 4161 dealing with hexagon flange bolts and nuts were published in August and September 1981, draft DIN ISO 4161 being the German version of draft International Standard ISO/DIS 4161 dealing with hexagon flange nuts. As this draft International Standard has since been approved by a large majority of ISO Member Bodies, the international standard will be published shortly.

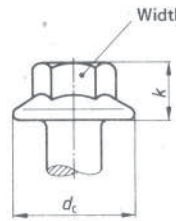
Originally it was intended to adopt the international standard in full as a national standard and draft Standard DIN ISO 4161 was prepared. Then the competent technical committee of the *Normenausschuss Mechanische Verbindungselemente* (Fasteners Standards Committee) decided, however, to issue a DIN Standard as the international standard was not considered to be sufficiently comprehensive.

There are no international reference standards for technical delivery conditions, for example, which are therefore to be dealt with in national standards (see e.g. acceptance testing as specified in DIN 267 Part 5 (at present at the stage of draft)). Given this fact, ISO 4161 has been incorporated in DIN 6923 without alterations in its material content, though with national addenda.

During the international work considerable difficulties arose with respect to the standardization of hexagon flange bolts, especially with regard to the installation conditions and the resulting head dimensions. The German position was defined in draft Standards DIN 6921 and DIN 6922 (September 1981 editions). Though these drafts took the results of international standardization so far achieved into account, they specified head sizes which, to a certain extent, ran counter to the views held by other countries.

The contents of draft Standards DIN 6921 and DIN 6922 was given due consideration in the continuing international work and especially approved of by various European manufacturers and consumers. The discussions eventually concluded in a compromise, resulting in four types with varying head sizes in two product grades and each with two different types of shank. The compromise resulted in eight draft International Standards which are at present in preparation. Only two of them the contents of which have been incorporated in DIN 6921 and DIN 6922 are needed for national purposes. The following table summarizes the position.

Head sizes of hexagon flange bolts



Thread size		M 5	M 6	M 8	M 10	M 12	M 14	M 16	M 20	Product grade	Standard national	Standard international
Width across flats s	Small series	7	8	10	13	15	18	21	–	A	–	ISO/DIS 8104 ISO/DIS 8105
		7	8	10	13	15	18	21	–	B	–	ISO/DIS 4160 ISO/DIS 4162
	Heavy series	8	10	13	15	16	18	21	27	A	DIN 6921 DIN 6922	ISO/DIS 8100 ISO/DIS 8101
		8	10	13	15	18	21	24	30	B	–	ISO/DIS 8102 ISO/DIS 8103
Flange diameter d_c	Small series	11,4	13,6	17	20,8	24,7	28,6	32,8	–	A	–	ISO/DIS 8104 ISO/DIS 8105
		11,4	13,6	17	20,8	24,7	28,6	32,8	–	B	–	ISO/DIS 4160 ISO/DIS 4161
	Heavy series	11,8	14,2	18	22,3	26,6	30,5	35	43	A	DIN 6921 DIN 6922	ISO/DIS 8100 ISO/DIS 8101
		11,8	14,2	18	22,3	26,6	30,5	35	43	B	–	ISO/DIS 8102 ISO/DIS 8103
Head height k	Small series	5,6	6,8	8,5	9,7	11,9	12,9	15,1	–	A	–	ISO/DIS 8104 ISO/DIS 8105
		5,6	6,8	8,5	9,7	11,9	12,9	15,1	–	B	–	ISO/DIS 4160 ISO/DIS 4162
	Heavy series	5,4	6,6	8,1	9,2	11,5	12,8	14,4	17,1	A	DIN 6921 DIN 6922	ISO/DIS 8100 ISO/DIS 8101
		5,4	6,6	8,1	8,6	10,4	12,4	14,1	17,7	B	–	ISO/DIS 8102 ISO/DIS 8103

Dimensions of hexagon flange nuts (for comparison)

Width across flats s	8	10	13	15	18	21	24	30	A	DIN 6923	ISO/DIS 4161
Flange diameter d_c	11,8	14,2	17,9	21,8	26	29,9	34,5	42,8			
Nut height m	5	6	8	10	12	14	16	20			

As can be seen from the table, for product grade A only the "heavy series" has been incorporated in DIN 6921 and DIN 6922. Identical widths across flats are specified for bolts and nuts of product grade B, heavy series. This corresponds to USA requirements for which no demand could be established in Germany, neither for manufacturing reasons nor as a result of tightening requirements.

For product grades A and B, the small series provides for equal widths across flats. Differences in the tightening conditions are allowed for in the dimensional tolerances. Adoption of the small series was not approved of at the national level because experience has shown that, even for product grade A, the head dimensions of this series do not satisfy all possible installation requirements, especially in cases where locking elements, such as bonding agents are used, requiring a higher loosening torque.

The relevant international standards work has not yet been finalized and so the above table is for information purposes only. The draft International Standards (ISO/DIS) given in the table have not yet been published.

International Patent Classification

F 16 B 35/00