UDC 621.882.211.092.4 July 1984

Hexagon fit bolts
with long threaded dog point

DIN 609

Sechskant-Paßschrauben mit langem Gewindezapfen

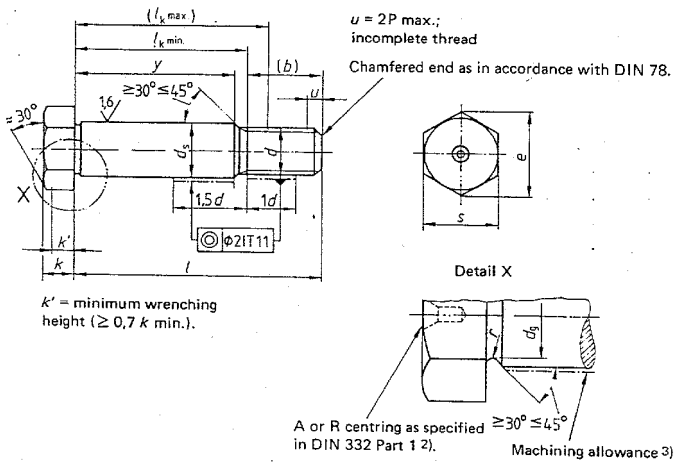
Supersedes January 1971 edition.

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

In harmonization with ISO 272, the widths across flats 16 mm, 18 mm, 21 mm and 34 mm have been adopted additionally for sizes with 10, 12, 14 and 22 mm screw thread diameter. These widths across flats shall be used in future for new designs. It is recommended in addition to amend existing drawings and documents in conformity with the new widths across flats specified.

1 Dimensions, designation



u = 2P max.; incomplete thread

Chamfered end as in accordance with DIN 78.

k' = minimum wrenching height (≥ 0,7 k min.).

Designation of an M 12 hexagon fit bolt (width across flats: 17 mm), of length l = 60 mm and assigned to property class 8.8 1):

Fit bolt DIN 609 – M 12 X 60 – 8.8

Designation of an M 20 X 1,5 hexagon fit bolt, with machining allowance (shank diameter d_s = 21,3 mm), of length l = 100 mm and assigned to property class 8.8:

Fit bolt DIN 609 – M 20 X 1,5 X 21,3 X 100 – 8.8

1) In this designation, the previous widths across flats 17 mm, 19 mm, 22 mm and 32 mm apply to the sizes with 10, 12, 14 or 22 mm thread diameter. If it is required to supply these sizes with the new widths across flats 16 mm, 18 mm, 21 mm and 34 mm as specified in ISO 272, the width across flats (SW) shall be incorporated in the designation, e.g.:

Fit bolt DIN 609 – M 12 X 60 – SW 18 – 8.8

2) Centring is only obligatory for bolts having a machining allowance (larger shank diameter d_s); for bolts having no machining allowance (finished bolts), centring is left to the manufacturer's discretion.

3) DIN 609 previously specified shank diameters having a machining allowance (grinding allowance) which could be ordered if needed (see designation example). Since the allowance required for the shank diameter differ according to the application concerned (usually between 0,2 and 0,4 mm), allocation of specific allowances has been omitted.

Continued on pages 2 to 8

Table 1.

Thread size d		M 8	M 10	M 12	(M 14)	M 16	(M 18)	M 20
		-	-	-	-	-	(M 18 × 1,5)	M 20 × 1,5
		-	-	-	-	-	(M 18 × 2)	M 20 × 2
b (auxiliary dimension)	1)	14,5	17,5	20,5	22	25	27,5	28,5
	2)	16,5	19,5	22,5	24	27	29,5	30,5
	3)	21,5	24,5	27,5	29	32	34,5	35,5
d_s	k6 4)	9	11	13	15	17	19	21
d_g	min.	7,9	9,9	11,5	13,5	15,5	17,5	19,1
	max.	8,2	10,2	11,8	13,8	15,8	17,8	19,4
e	min.	14,38	17,77 / 18,90	19,85 / 20,88	22,78 / 23,91	26,17	29,56	32,95
k	Nominal dimension	5,3	6,4	7,5	8,8	10	11,5	12,5
	min.	5,15	6,22	7,21	8,51	9,71	11,15	12,15
	max.	5,45	6,58	7,79	9,09	10,29	11,85	12,85
k'	min.	3,6	4,3	5,1	6	6,8	7,8	8,5
r	min.	0,4	0,4	0,6	0,6	0,6	0,6	0,8
	max.	0,55	0,55	0,75	0,75	0,75	0,75	0,95
s	max. = nominal dimension	13	16 / 17	18 / 19	21 / 22	24	27	30
	min.	12,73	15,73 / 16,73	17,57 / 18,48	20,16 / 21,16	23,16	26,16	29,16

l Product grade					Shank length y 5) and clamping length l_k 6), 7)													
Nominal size	A		B		y	l_k	y	l_k	y	l_k	y	l_k	y	l_k	y	l_k	y	l_k
	min.	max.	min.	max.		min.		min.		min.		min.		min.		min.		min.
25	24,6	25,4	-	-	8	11,6												
28	27,6	28,4	-	-	11	14,6												
30	29,6	30,4	-	-	13	16,6	10	13,9										
32	31,5	32,5	30,75	33,25	15	18,6	12	15,9	8,5	12,7								
35	34,5	35,5	33,75	36,25	18	21,6	15	18,9	11,5	15,7	9,5	14						
38	37,5	38,5	36,75	39,25	21	24,6	18	21,9	14,5	18,7	12,5	17	9,5	14				
40	39,5	40,5	38,75	41,25	23	26,6	20	23,9	16,5	20,7	14,5	19	11,5	16				
42	41,5	42,5	40,75	43,25	25	28,6	22	25,9	18,5	22,7	16,5	21	13,5	18	10,5	15,7		
45	44,5	45,5	43,75	46,25	28	31,6	25	28,9	21,5	25,7	19,5	24	16,5	21	13,5	18,7	12,5	17,7
48	47,5	48,5	46,75	49,25	31	34,6	28	31,9	24,5	28,7	22,5	27	19,5	24	16,5	21,7	15,5	20,7
50	49,5	50,5	48,75	51,25	33	36,6	30	33,9	26,5	30,7	24,5	29	21,5	26	18,5	23,7	17,5	22,7
55	54,4	55,6	53,5	56,5	36	39,6	33	36,9	29,5	33,7	27,5	32	24,5	29	21,5	26,7	20,5	25,7
60	59,4	60,6	58,5	61,5	41	44,6	38	41,9	34,5	38,7	32,5	37	29,5	34	26,5	31,7	25,5	30,7
65	64,4	65,6	63,5	66,5	46	49,6	43	46,9	39,5	43,7	37,5	42	34,5	39	31,5	36,7	30,5	35,7
70	69,4	70,6	68,5	71,5	51	54,6	48	51,9	44,5	48,7	42,5	47	39,5	44	36,5	41,7	35,5	40,7
75	74,4	75,6	73,5	76,5	56	59,6	53	56,9	49,5	53,7	47,5	52	44,5	49	41,5	46,7	40,5	45,7
80	79,4	80,6	78,5	81,5	61	64,6	58	61,9	54,5	58,7	52,5	57	49,5	54	46,5	51,7	45,5	50,7
85	84,3	85,7	83,25	86,75			63	66,9	59,5	63,7	57,5	62	54,5	59	51,5	56,7	50,5	55,7
90	89,3	90,7	88,25	91,75			68	71,9	64,5	68,7	62,5	67	59,5	64	56,5	61,7	55,5	60,7
95	94,3	95,7	93,25	96,75			73	76,9	69,5	73,7	67,5	72	64,5	69	61,5	66,7	60,5	65,7
100	99,3	100,7	98,25	101,75			78	81,9	74,5	78,7	72,5	77	69,5	74	66,5	71,7	65,5	70,7
105	-	-	103,25	106,75					79,5	83,7	77,5	82	74,5	79	71,5	76,7	70,5	75,7
110	-	-	108,25	111,75					84,5	88,7	82,5	87	79,5	84	76,5	81,7	75,5	80,7
115	-	-	113,25	116,75					89,5	93,7	87,5	92	84,5	89	81,5	86,7	80,5	85,7
120	-	-	118,25	121,75					94,5	98,7	92,5	97	89,5	94	86,5	91,7	85,5	90,7
125	-	-	123	127									94,5	99	91,5	96,7	90,5	95,7
130	-	-	128	132									99,5	104	96,5	101,7	95,5	100,7
135	-	-	133	137									104,5	109	101,5	106,7	100,5	105,7
140	-	-	138	142									109,5	114	106,5	111,7	105,5	110,7
145	-	-	143	147									114,5	119	111,5	116,7	110,5	115,7
150	-	-	148	152									119,5	124	116,5	121,7	115,5	120,7

For 1) to 7), see page 7.

Table 1. (continued)

Thread size d		(M 22)		M 24	(M 27)	M 30	(M 33)	M 36	(M 39)
		(M 22 × 1,5)		M 24 × 2	(M 27 × 2)	M 30 × 2	(M 33 × 2)	M 36 × 3	(M 39 × 3)
		(M 22 × 2)		M 24 × 1,5	–	–	–	–	–
b (auxiliary dimension)	1)	32,5		–	–	–	–	–	–
	2)	34,5		36,5	39,5	43	45	49	51
	3)	39,5		41,5	44,5	48	50	54	56
d_s	k6 4)	23		25	28	32	34	38	40
d_a	min.	21,1		23,1	25,7	29,7	31,7	35,7	37,7
	max.	21,4		23,4	26	30	32	36	38
e	min.	35,03	37,29	39,55	45,2	50,85	55,37	60,79	66,44
k	Nominal dimension	14		15	17	19	21	22	25
	min.	13,65		14,65	16,65	18,58	20,58	21,58	24,58
	max.	14,35		15,35	17,35	19,42	21,42	22,42	25,42
k'	min.	9,6		10,2	11,7	13	14,4	15,1	17,2
r	min.	0,8		0,8	1	1	1	1	1
	max.	0,95		0,95	1,15	1,15	1,15	1,15	1,15
s	max. = Nominal dimension	32	34	36	41	46	50	55	60
	min.	31	33	35	40	45	49	53,8	58,8

l			Shank length y 5) and clamping length l_k 6), 7)													
Nominal size	min.	max.	y	l_k min.	y	l_k min.	y	l_k min.	y	l_k min.	y	l_k min.	y	l_k min.	y	l_k min.
48	46,75	49,25	11,5	16,7												
50	48,75	51,25	13,5	18,7												
55	53,5	56,5	16,5	21,7	14	19,8										
60	58,5	61,5	21,5	26,7	19	24,8	16	21,8								
65	63,5	66,5	26,5	31,7	24	29,8	21	26,8	17	23,5	15	21,5				
70	68,5	71,5	31,5	36,7	29	34,8	26	31,8	22	28,5	20	26,5	15	22		
75	73,5	76,5	36,5	41,7	34	39,8	31	36,8	27	33,5	25	31,5	20	27	18	25
80	78,5	81,5	41,5	46,7	39	44,8	36	41,8	32	38,5	30	36,5	25	32	23	30
85	83,25	86,75	46,5	51,7	44	49,8	41	46,8	37	43,5	35	41,5	30	37	28	35
90	88,25	91,75	51,5	56,7	49	54,8	46	51,8	42	48,5	40	46,5	35	42	33	40
95	93,25	96,75	56,5	61,7	54	59,8	51	56,8	47	53,5	45	51,5	40	47	38	45
100	98,25	101,75	61,5	66,7	59	64,8	56	61,8	52	58,5	50	56,5	45	52	43	50
105	103,25	106,75	66,5	71,7	64	69,8	61	66,8	57	63,5	55	61,5	50	57	48	55
110	108,25	111,75	71,5	76,7	69	74,8	66	71,8	62	68,5	60	66,5	55	62	53	60
115	113,25	116,75	76,5	81,7	74	79,8	71	76,8	67	73,5	65	71,5	60	67	58	65
120	118,25	121,75	81,5	86,7	79	84,8	76	81,8	72	78,5	70	76,5	65	72	63	70
125	123	127	86,5	91,7	84	89,8	81	86,8	77	83,5	75	81,5	70	77	68	75
130	128	132	91,5	96,7	89	94,8	86	91,8	82	88,5	80	86,5	75	82	73	80
135	133	137	96,5	101,7	94	99,8	91	96,8	87	93,5	85	91,5	80	87	78	85
140	138	142	101,5	106,7	99	104,8	96	101,8	92	98,5	90	96,5	85	92	83	90
145	143	157	106,5	111,7	104	109,8	101	106,8	97	103,5	95	101,5	90	97	88	95
150	148	152	111,5	116,7	109	114,8	106	111,8	102	108,5	100	106,5	95	102	93	100
160	158	162					111	116,8	107	113,5	105	111,5	100	107	98	105
170	168	172					121	126,8	117	123,5	115	121,5	110	117	108	115
180	178	182					131	136,8	127	133,5	125	131,5	120	127	118	125
190	187,7	192,3					141	146,8	137	143,5	135	141,5	130	137	128	135
200	197,7	202,3					151	156,8	147	153,5	145	151,5	140	147	138	145

For 1) to 7), see page 7.

Table 1. (continued)

Thread size d		M 42	(M 45)	M 48	(M 52)
		M 42 × 3	(M 45 × 3)	M 48 × 3	(M 52 × 3)
		–	–	–	–
b (auxiliary dimensions)	2)	56	59	63	65
	3)	61	64	68	70
d_s	k6 4)	44	46	50	55
d_g	min.	41,7	43,7	47,7	52,7
	max.	42	44	48	53
e	min.	71,3	76,95	82,6	88,25
k	Nominal dimension	26	28	30	33
	min.	25,58	27,58	29,58	32,5
	max.	26,42	28,42	30,42	33,5
k'	min.	17,9	19,3	20,7	22,7
r	min.	1	1	1	1
	max.	1,15	1,15	1,15	1,15
s	max. = nominal dimension	65	70	75	80
	min.	63,1	68,1	73,1	78,1

Nominal size	l min.	l max.	Shank length y 5) and clamping length l_k 6), 7)							
			y	l_k min.	y	l_k min.	y	l_k min.	y	l_k min.
70	68,5	71,5								
75	73,5	76,5								
80	78,5	81,5	17,5	25						
85	83,25	86,75	22,5	30	19,5	27				
90	88,25	91,75	27,5	35	24,5	32	20	28,3	18	26,3
95	93,25	96,75	32,5	40	29,5	37	25	33,3	23	31,3
100	98,25	101,75	37,5	45	34,5	42	30	38,3	28	36,3
105	103,25	106,75	42,5	50	39,5	47	35	43,3	33	41,3
110	108,25	111,75	47,5	55	44,5	52	40	48,3	38	46,3
115	113,25	116,75	52,5	60	49,5	57	45	53,3	43	51,3
120	118,25	121,75	57,5	65	54,5	62	50	58,3	48	56,3
125	123	127	62,5	70	59,5	67	55	63,3	53	61,3
130	128	132	67,5	75	64,5	72	60	68,3	58	66,3
135	133	137	72,5	80	69,5	77	65	73,3	63	71,3
140	138	142	77,5	85	74,5	82	70	78,3	68	76,3
145	143	147	82,5	90	79,5	87	75	83,3	73	81,3
150	148	152	87,5	95	84,5	92	80	88,3	78	86,3
160	158	162	92,5	100	89,5	97	85	93,3	83	91,3
170	168	172	102,5	110	99,5	107	95	103,3	93	101,3
180	178	182	112,5	120	109,5	117	105	113,3	103	111,3
190	187,7	192,3	122,5	130	119,5	127	115	123,3	113	121,3
200	197,7	202,3	132,5	140	129,5	137	125	133,3	123	131,3

For 1) to 7), see page 7.

2 Masses

The values of mass specified are for guidance only.

For sizes M 10, M 12, M 14 and M 22, the values of mass listed apply for bolts with the previous widths across flats 17 mm, 19 mm, 22 mm or 32 mm.

Approximately the same values of mass can be assumed for bolts with fine screw thread.

Table 2.

Thread size *d*	M 8	M 10	M 12	M 14	M 16	M 18	M 20	M 22	M 24	M 27
Length *l*	Mass, in kg per 1000 units ≈									
25	17									
28	18,5									
30	19,5	33,2								
32	20,5	34,7	48,4							
35	22	36,9	50,5	70,9						
38	23,5	39,1	53,6	75,1	101					
40	24,5	40,6	55,7	77,9	104					
42	25,5	42,1	57,7	80,6	107	141				
45	27	44,3	60,9	84,8	112	146	195			
48	28,5	46,6	64	89	118	153	200	238		
50	29,5	48,1	66,1	91,7	121	157	203	242		
55	32	51,3	70,6	99,1	130	167	215	259	310	
60	34,5	55	75,8	106	139	178	229	276	339	478
65	37	58,8	81,1	113	148	189	242	292	358	502
70	39,5	62,5	86,3	120	157	201	256	308	378	526
75	42	66,2	91,5	127	166	212	269	324	397	550
80	44,5	70	96,7	134	175	223	283	341	416	574
85		73,7	102	141	184	234	297	357	435	599
90		77,4	107	148	193	245	310	373	455	623
95		81,1	112	155	202	256	324	390	474	647
100		84,9	117	161	211	267	338	406	493	671
105			123	168	219	278	351	422	512	695
110			128	175	228	290	365	439	532	719
115			133	182	237	301	378	455	551	744
120			138	189	246	312	392	471	570	768
125					255	323	406	488	590	792
130					264	333	419	504	609	816
135					273	345	433	520	628	840
140					282	356	446	536	647	864
145					291	367	460	553	667	889
150					300	379	474	569	686	913
160										959
170										1010
180										1060
190										1110
200										1160

Table 2. (concluded)

Thread size d	M 30	M 33	M 36	M 39	M 42	M 45	M 48	M 52
Length l	Mass, in kg per 1000 units ≈							
65	630	782						
70	661	818	1020					
75	693	854	1070	1290				
80	724	890	1110	1340	1600			
85	756	926	1160	1390	1660	1960	2340	
90	787	961	1200	1440	1720	2030	2410	2890
95	819	997	1250	1490	1780	2100	2490	2980
100	850	1040	1290	1540	1840	2170	2570	3080
105	882	1070	1330	1590	1900	2240	2640	3170
110	914	1110	1380	1640	1960	2300	2720	3270
115	945	1140	1420	1690	2020	2370	2790	3360
120	977	1180	1470	1740	2080	2430	2870	3460
125	1010	1220	1510	1790	2140	2500	2950	3550
130	1050	1250	1560	1840	2200	2560	3020	3640
135	1080	1290	1600	1890	2260	2630	3100	3740
140	1110	1320	1650	1940	2320	2690	3180	3830
145	1140	1360	1690	1990	2380	2760	3260	3920
150	1170	1390	1740	2040	2440	2820	3330	4020
160	1230	1460	1810	2130	2540	2940	3470	4180
170	1290	1530	1900	2220	2660	3070	3630	4370
180	1350	1600	1990	2320	2780	3200	3780	4550
190	1420	1670	2080	2420	2900	3330	3940	4740
200	1480	1740	2170	2520	3020	3460	4090	4930

3 Technical delivery conditions

Material		Steel	Stainless steel	Nonferrous metal
General requirements		In accordance with DIN 267 Part 1.		
Thread	Tolerance	6g		
	Standard	DIN 13 Part 12 and Part 15		
Mechanical properties	Property class (material) 1)	≦ M 39: 8.8; > M 39: subject to agreement.	≦ M 20: A 2-70; > M 20 ≦ M 39: A2-50; > M 39: subject to agreement.	e.g. CU 2, CU 3
	Standard	ISO 898 Part 1	DIN 267 Part 11	DIN 267 Part 18
Permissible dimensional deviations and deviations of form	Product grade 2)	≦ M 10: A (previously m); ≧ M 12: B (previously mg).		
	Standard	ISO 4759 Part 1		
Surface		Blackened 3) (thermally or chemically)	Bright	Bright
		Fit shank: bright. DIN 267 Part 2 shall apply with regard to surface roughness. DIN 267 Part 19 shall apply with regard to permissible surface discontinuities. DIN 267 Part 9 4) shall apply with regard to electroplating. DIN 267 Part 10 shall apply with regard to hot-dip galvanizing.		
Acceptance inspection		DIN 267 Part 5 shall apply with regard to acceptance inspection.		

1) Where, for special purposes, the bolts are to meet requirements differing from those specified, e.g. in respect of property class or material, the specifications of the relevant standards shall be complied with.

2) If product grade A is required for sizes from M 12 upwards, this shall be incorporated in the designation, e.g.:

Fit bolt DIN 609 – M 20 × 100 – 8.8 – A

In this case, the appropriate tolerances as specified in ISO 4759 Part 1 shall apply. This does not apply however to the diameter of the fit shank.

3) Different surfaces are the standard for different property classes or materials, as appropriate, e.g. "as rolled", i.e. without additional surface treatment, for property class 5.6.

4) The supply of electroplated fit bolts with bright shank is permitted for manufacturing reasons, because surface protection applied to the shank would preclude maintenance of the tolerance specified for the shank. If necessary, agreements shall be made with regard to a surface protection possibly required for the fit bolts.

Footnotes to table 1

1) For lengths l not exceeding 50 mm.

2) For lengths l exceeding 50 mm up to and including 150 mm.

3) For lengths l exceeding 150 mm.

4) Differing tolerance classes shall be stated when ordering, e.g.:
Fit bolt DIN 609 – M 12 n6 × 60 – 8.8
A k6 fit shank is normally mated with an H7 clearance hole.

5) Tolerance on shank length y: $_{-0}^{1}$ mm.

6) Clamping length l_k max. = l min. – v min. (or nut height + u) (see DIN 78).

7) The clamping length l_k min. corresponds to the effective length l_k min. specified in the previous edition of DIN 609, and thus will not jeopardize interchangeability.

Lengths over 200 mm shall be graded in 10 mm steps.

Bracketed sizes and intermediate lengths (see DIN 962) shall be avoided as far as possible.

The bolts are normally manufactured in the sizes for which clamping lengths and mass values have been specified.

Fit bolts with a shank diameter larger by 1 mm are recommended for repairs (drilled out holes), e.g. d_s = 22 mm instead of 21 mm for an M 20 screw thread. The larger shank diameter shall be incorporated in the designation of the fit bolt, e.g.:

Fit bolt DIN 609 – M 20 × 22 × 120 – 8.8

Standards referred to

DIN 13 Part 12	ISO metric screw thread; coarse and fine threads from 1 to 300 mm diameter; selection of diameters and pitches
DIN 13 Part 15	ISO metric screw thread; fundamental deviations and tolerances for screw threads from 1 mm diameter
DIN 78	Thread ends and lengths of projection of bolt ends for ISO metric screw threads in accordance with DIN 13
DIN 267 Part 1	Fasteners; technical delivery conditions; general requirements
DIN 267 Part 2	Fasteners; technical delivery conditions; design and dimensional accuracy
DIN 267 Part 5	Fasteners; technical delivery conditions; acceptance inspection
DIN 267 Part 9	Fasteners; technical delivery conditions; electroplated components
DIN 267 Part 10	Fasteners; technical delivery conditions; hot-dip galvanized parts
DIN 267 Part 11	Fasteners; technical delivery conditions with additions to ISO 3506; components made from stainless and acidproof steels
DIN 267 Part 18	Fasteners; technical delivery conditions; components made from nonferrous metals
DIN 267 Part 19	Fasteners; technical delivery conditions; surface discontinuities on bolts and screws
DIN 332 Part 1	60° centre holes; types R, A, B and C
DIN 962	Bolts, screws, studs and nuts; designations, types and finishes
ISO 272	Fasteners; hexagon products; widths across flats
ISO 898 Part 1	Mechanical properties of fasteners; bolts, screws and studs
ISO 4759 Part 1	Tolerances for fasteners; bolts, screws and nuts with thread diameters from 1,6 to 150 mm, product grades A, B and C

Previous editions

DIN 609: 04.42, 09.51, 07.53, 11.53, 04.56, 05.63, 01.71

Amendments

The following amendments have been made in comparison with the January 1971 edition:

a) The dimensioning of the fit bolts has been partially amended.

b) Clamping lengths have been included.

c) The designation of the fit bolts has been complemented.

d) The widths across flats 16 mm, 18 mm, 21 mm and 34 mm as specified in ISO 272 have been additionally adopted for sizes M 10, M 12, M 14 and M 22.

e) The technical delivery conditions have been expanded and harmonized with ISO 898 Part 1 and with ISO 4759 Part 1.

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

Explanatory notes

This standard is a revision of the January 1971 edition of DIN 609. A new system of dimensioning has been chosen, which includes and specifies the shank length and the clamping length, because these two lengths are of particular significance to fit bolts. The adoption of the new system of dimensioning ensures that the previous configuration of the fit bolts is not altered in any way, and that interchangeability remains unaffected. The clamping length l_k min. has been calculated on the basis of the previous specifications.

The specified thread lengths and the grading of the nominal lengths cover all the clamping lengths, and intermediate sizes are therefore not required. Furthermore, the adoption of (taller) nuts as specified in DIN 970 or DIN 971 (ISO nuts) is possible.

The dimensions now specified for the undercut between the shank and the head of the bolt enables fit bolts to be fitted without countersinking the clearance hole. This revision, together with the fact that the specified lengths of projection of bolt ends are also given in DIN 78, prompted the deletion of the former "Application" clause. The undercut now specified in no way diminishes the strength of the fit bolt.

DIN 610 has been revised simultaneously with DIN 609, but is not intended for use in new designs, the aim being to reduce the number of types. With a view to a smooth transition within the length grading, the use of DIN 609 fit bolts with long thread is expressly recommended instead of DIN 610 bolts with short thread, in all cases where the bearing area of the bolt hole is adequate for its purpose.

International Patent Classification

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