
**Hexagon head bolts — Product grades A
and B**

Vis à tête hexagonale partiellement filetées — Grades A et B

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Published in Switzerland

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 4014 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 10, *Product standards for fasteners*.

This fourth edition cancels and replaces the third edition (ISO 4014:1999), of which it constitutes a minor revision.

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Introduction

This International Standard belongs to a complete group of product standards developed by ISO on external hexagon drive fasteners. It comprises the following:

- a) hexagon head bolts (ISO 4014, ISO 4015, ISO 4016 and ISO 8765);
- b) hexagon head screws (ISO 4017, ISO 4018 and ISO 8676);
- c) hexagon nuts (ISO 4032, ISO 4033, ISO 4034, ISO 4035, ISO 4036, ISO 7040, ISO 7041, ISO 7042, ISO 7719, ISO 7720, ISO 8673, ISO 8674, ISO 8675, ISO 10511, ISO 10512 and ISO 10513);
- d) hexagon bolts with flange (ISO 4162, ISO 15071 and ISO 15072);
- e) hexagon nuts with flange (ISO 4161, ISO 7043, ISO 7044, ISO 10663, ISO 12125, ISO 12126 and ISO 21670).

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Hexagon head bolts — Product grades A and B

1 Scope

This International Standard specifies the characteristics of hexagon head bolts with threads from M1,6 up to and including M64, of product grade A for threads M1,6 to M24 and nominal lengths up to and including $10d$ or 150 mm, whichever is the shorter, and product grade B for threads over M24 or nominal lengths over $10d$ or 150 mm, whichever is the shorter.

If, in special cases, specifications other than those listed in this International Standard are required, they can be selected from existing International Standards, for example ISO 724, ISO 888, ISO 898-1, ISO 965-1, ISO 3506-1, ISO 4753 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 descriptions of dimensions*
http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=225
ISO 4014:2011

ISO 724, *ISO general-purpose metric screw threads — Basic dimensions*
http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=724
1c817b54c93e/iso-4014-2011

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread*

ISO 965-1, *ISO general-purpose metric screw threads — Tolerances — Part 1: Principles and basic data*

ISO 3269, *Fasteners — Acceptance inspection*

ISO 3506-1, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs*

ISO 4017, *Hexagon head screws — Product grades A and B*

ISO 4042, *Fasteners — Electroplated coatings*

ISO 4753, *Fasteners — Ends of parts with external ISO metric thread*

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*

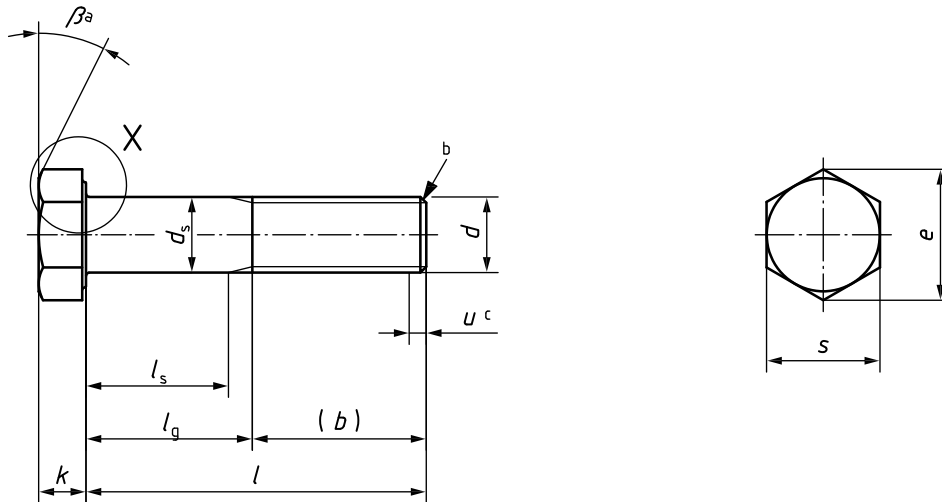
ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coatings*

3 Dimensions

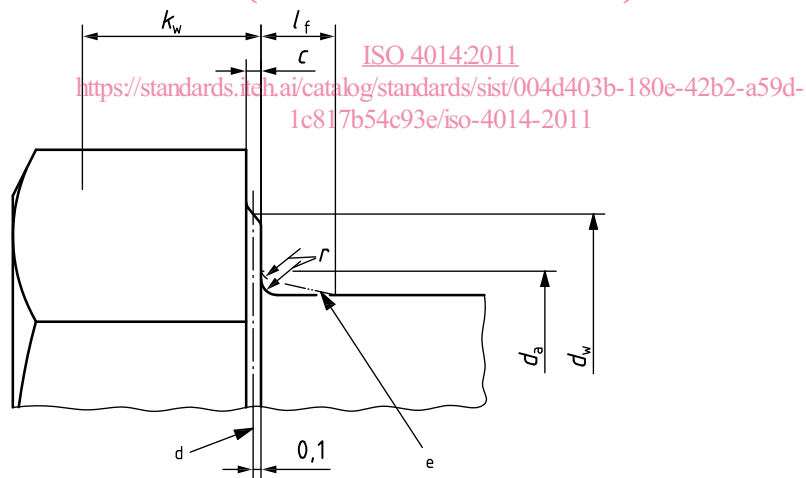
See Figure 1 and Tables 1 and 2.

Symbols and descriptions of dimensions are specified in ISO 225.

Dimensions in millimetres



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- a $\beta = 15^\circ$ to 30° .
- b Point shall be chamfered or for threads $\leq M4$ may be as-rolled (sheared end) in accordance with ISO 4753.
- c Incomplete thread $u \leq 2P$.
- d Reference datum for d_w .
- e Maximum underhead fillet.

Figure 1

Table 1 — Preferred threads

Dimensions in millimetres

Thread, <i>d</i>	M1,6	M2	M2,5	M3	M4	M5	M6	M8	M10
<i>p</i> ^a	0,35	0,4	0,45	0,5	0,7	0,8	1	1,25	1,5
<i>b</i>	9	10	11	12	14	16	18	22	26
<i>c</i>	15	16	17	18	20	22	24	28	32
<i>d</i>	28	29	30	31	33	35	37	41	45
<i>c</i>	max. 0,25	0,25	0,25	0,40	0,40	0,50	0,50	0,60	0,60
	min. 0,10	0,10	0,10	0,15	0,15	0,15	0,15	0,15	0,15
<i>d_a</i>	max. 2	2,6	3,1	3,6	4,7	5,7	6,8	9,2	11,2
	nom. = max. 1,60	2,00	2,50	3,00	4,00	5,00	6,00	8,00	10,00
<i>d_s</i>	1,46	1,86	2,36	2,86	3,82	4,82	5,82	7,78	9,78
	min. 1,35	1,75	2,25	2,75	3,70	4,70	5,70	7,64	9,64
<i>d_w</i>	2,27	3,07	4,07	4,57	5,88	6,88	8,88	11,63	14,63
	min. 2,30	2,95	3,95	4,45	5,74	6,74	8,74	11,47	14,47
<i>e</i>	3,41	4,32	5,45	6,01	7,66	8,79	11,05	14,38	17,77
	min. 3,28	4,18	5,31	5,88	7,50	8,63	10,89	14,20	17,59
<i>f_t</i>	max. 0,6	0,8	1	1	1,2	1,2	1,4	2	2
	nom. 1,1	1,4	1,7	2	2,8	3,5	4	5,3	6,4
<i>k</i>	max. 1,225	1,525	1,825	2,125	2,925	3,65	4,15	5,45	6,58
	min. 0,975	1,275	1,575	1,875	2,675	3,35	3,85	5,15	6,22
<i>k_w</i>	max. 1,3	1,6	1,9	2,2	3,0	3,74	4,24	5,54	6,69
	min. 0,9	1,2	1,5	1,8	2,6	3,26	3,76	5,06	6,11
<i>k_w^e</i>	0,68	0,89	1,10	1,31	1,87	2,35	2,70	3,61	4,35
	min. 0,63	0,84	1,05	1,26	1,82	2,28	2,63	3,54	4,28
<i>r</i>	0,1	0,1	0,1	0,1	0,2	0,2	0,25	0,4	0,4
	min. 3,20	4,00	5,00	5,50	7,00	8,00	10,00	13,00	16,00
<i>s</i>	max. 3,02	3,82	4,82	5,32	6,78	7,78	9,78	12,73	15,73
	min. 2,90	3,70	4,70	5,20	6,64	7,64	9,64	12,57	15,57

Table 1 (continued)

Dimensions in millimetres

Thread, <i>d</i>	Product grade										M1,6		M2		M2,5		M3		M4		M5		M6		M8		M10	
	A					B					<i>l_s</i>		<i>l_g</i>		<i>l_s</i>		<i>l_g</i>		<i>l_s</i>		<i>l_g</i>		<i>l_s</i>		<i>l_g</i>			
	nom.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	<i>l_s</i> min.	<i>l_s</i> max.	<i>l_g</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_s</i> max.	<i>l_g</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_s</i> max.	<i>l_g</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_s</i> max.	<i>l_g</i> min.	<i>l_g</i> max.	
12	11,65	12,35	—	—	—	—	—	—	—	—	1,2	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16	15,65	16,35	—	—	—	—	—	—	—	—	5,2	7	4	6	2,75	5	—	—	—	—	—	—	—	—	—	—	—	—
20	19,58	20,42	18,95	21,05	—	—	—	—	—	—	8	10	8	10	6,75	9	5,5	8	—	—	—	—	—	—	—	—	—	—
25	24,58	25,42	23,95	26,05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30	29,58	30,42	28,95	31,05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
35	34,5	35,5	33,75	36,25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
40	39,5	40,5	38,75	41,25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
45	44,5	45,5	43,75	46,25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
50	49,5	50,5	48,75	51,25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
55	54,4	55,6	53,5	56,5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
60	59,4	60,6	58,5	61,5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
65	64,4	65,6	63,5	66,5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
70	69,4	70,6	68,5	71,5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
80	79,4	80,6	78,5	81,5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
90	89,3	90,7	88,25	91,75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
100	99,3	100,7	98,25	101,75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
110	109,3	110,7	108,25	111,75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
120	119,3	120,7	118,25	121,75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

l_s and *l_g*[†]

For sizes above the solid, bold, stepped line, ISO 4017 is recommended.

Table 1 (continued)

Thread, <i>d</i>	Dimensions in millimetres												
	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64			
<i>p</i> ^a	1,75	2	2,5	3	3,5	4	4,5	5	5,5	6			
<i>b</i> ref.	b	30	46	54	66	—	—	—	—	—			
	c	36	44	52	60	72	96	108	—	—			
	d	49	57	65	73	85	109	121	137	153			
<i>c</i>	max.	0,60	0,8	0,8	0,8	0,8	1,0	1,0	1,0	1,0			
	min.	0,15	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3			
<i>d</i> _a	max.	13,7	17,7	22,4	26,4	33,4	45,6	52,6	63	71			
	nom. = max.	12,00	16,00	20,00	24,00	30,00	42,00	48,00	56,00	64,00			
<i>d</i> _s	Product grade A	11,73	15,73	19,67	23,67	—	—	—	—	—			
	Product grade B	11,57	15,57	19,48	23,48	29,48	41,38	47,38	55,26	63,26			
<i>d</i> _w	Product grade A	16,63	22,49	28,19	33,61	—	—	—	—	—			
	Product grade B	16,47	22	27,7	33,25	42,75	59,95	69,45	78,66	88,16			
<i>e</i>	Product grade A	20,03	26,75	33,53	39,98	—	—	—	—	—			
	Product grade B	19,85	26,17	32,95	39,55	50,85	71,3	82,6	93,56	104,86			
<i>l</i> _f	max.	3	3	4	4	6	8	10	12	13			
	nom.	7,5	10	12,5	15	18,7	26	30	35	40			
<i>k</i>	Product grade A	7,68	10,18	12,715	15,215	—	—	—	—	—			
	Product grade B	7,32	9,82	12,285	14,785	—	—	—	—	—			
<i>k</i> _w ^e	Product grade A	7,79	10,29	12,85	15,35	19,12	26,42	30,42	35,5	40,5			
	Product grade B	7,21	9,71	12,15	14,65	18,28	25,58	29,58	34,5	39,5			
<i>r</i>	Product grade A	5,12	6,87	8,6	10,35	—	—	—	—	—			
	Product grade B	5,05	6,8	8,51	10,26	12,8	17,91	20,71	24,15	27,65			
<i>s</i>	min.	0,6	0,6	0,8	0,8	1	1,2	1,6	2	2			
	nom. = max.	18,00	24,00	30,00	36,00	46	65,0	75,0	85,0	95,0			
<i>s</i>	Product grade A	17,73	23,67	29,67	35,38	—	—	—	—	—			
	Product grade B	17,57	23,16	29,16	35,00	45	63,1	73,1	82,8	92,8			

Table 1 (continued)

Dimensions in millimetres

Thread, <i>d</i>	Product grade										M12		M16		M20		M24		M30		M36		M42		M48		M56		M64							
	A					B					<i>l_s</i>		<i>l_g</i>		<i>l_s</i>		<i>l_g</i>		<i>l_s</i>		<i>l_g</i>		<i>l_s</i>		<i>l_g</i>		<i>l_s</i>		<i>l_g</i>							
	nom.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>	<i>l_s</i>	<i>l_g</i>					
50	49,5	50,5	—	—	—	—	—	—	—	—	11,25	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
55	54,4	55,6	53,5	56,5	—	—	—	—	—	—	16,25	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
60	59,4	60,6	58,5	61,5	—	—	—	—	—	—	21,25	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
65	64,4	65,6	63,5	66,5	17	27	—	—	—	—	26,25	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
70	69,4	70,6	68,5	71,5	22	32	—	—	—	—	31,25	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
80	79,4	80,6	78,5	81,5	32	42	—	—	—	—	41,25	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
90	89,3	90,7	88,25	91,75	42	52	21	36	—	—	51,25	60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
100	99,3	100,7	98,25	101,75	52	62	31	46	—	—	61,25	70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
110	109,3	110,7	108,25	111,75	62	72	41	56	—	—	71,25	80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
120	119,3	120,7	118,25	121,75	72	82	51	66	—	—	81,25	90	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
130	129,2	130,8	128	132	76	86	55	70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
140	139,2	140,8	138	142	86	96	65	80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
150	149,2	150,8	148	152	96	106	75	90	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
160	—	—	158	162	106	116	85	100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
180	—	—	178	182	—	—	115,5	128	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
200	—	—	197,7	202,3	—	—	135,5	148	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
220	—	—	217,7	222,3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
240	—	—	237,7	242,3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
260	—	—	257,4	262,6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
280	—	—	277,4	282,6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
300	—	—	297,4	302,6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
320	—	—	317,15	322,85	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
340	—	—	337,15	342,85	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Table 1 (continued)

Dimensions in millimetres

Thread, <i>d</i>	Product grade												M12		M16		M20		M24		M30		M36		M42		M48		M56		M64	
	A						B																									
	nom.	min.	max.	min.	max.	max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.				
360	—	—	357,15	362,85	362,85							243	263	228,5	251	214	239	195,5	223	177	207											
380	—	—	377,15	382,85	382,85									248,5	271	234	259	215,5	243	197	227											
400	—	—	397,15	402,85	402,85									268,5	291	254	279	235,5	263	217	247											
420	—	—	416,85	423,15	423,15									288,5	311	274	299	255,5	283	237	267											
440	—	—	436,85	443,15	443,15									308,5	331	294	319	275,5	303	257	287											
460	—	—	456,85	463,15	463,15											314	339	295,5	323	277	307											
480	—	—	476,85	483,15	483,15											334	359	315,5	343	297	327											
500	—	—	496,85	503,15	503,15													335,5	363	317	347											

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NOTE Preferred lengths are defined in terms of *l_s* and *l_g*:
 — for product grade A, above the discontinuous, stepped line;
 — for product grade B, below this stepped line.

a *P* is the pitch of the thread.
 b For *l_{nom}* ≤ 125 mm.
 c For 125 mm < *l_{nom}* ≤ 200 mm.
 d For *l_{nom}* > 200 mm.
 e *k_{w,min}* = 0,7 *k_{n,min}*.
 f *l_{g,max}* = *l_{nom}* - *b*.
l_{g,min} = *l_{g,max}* - 5 *P*.