

FINAL
DRAFT

INTERNATIONAL
STANDARD

ISO/FDIS
8765

ISO/TC 2/SC 11

Secretariat: DIN

Voting begins on:
2021-06-29

Voting terminates on:
2021-08-24

Fasteners — Hexagon head bolts, with fine pitch thread — Product grades A and B

Fixations — Vis à tête hexagonale partiellement filetées, à pas fin — Grades A et B

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Reference number
ISO/FDIS 8765:2021(E)

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Published in Switzerland

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 11, *Fasteners with metric external thread*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 185, *Fasteners*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fourth edition cancels and replaces the third edition (ISO 8765:2011), which has been technically revised.

The main changes compared to the previous edition are as follows:

- tables for dimensions have been entirely restructured, so that the user can find information in a reliable manner (no risk of picking the wrong dimension), see [Clause 4](#) and [Annex A](#);
- M18×2 has been added;
- $d_{w,min}$ for M14×1,5 has been corrected to 19,64 mm;
- the rules for the shortest and greatest standard lengths have been added, and they have been amended accordingly;
- for steel bolts, property class 5.6 has been deleted and property class 12.9/12.9 has been added;
- for stainless steel bolts, grades D4 and D6 and property class 80 have been added;
- non-ferrous metal bolts have been deleted;
- specifications for marking and labelling have been added as [Clause 6](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Fasteners — Hexagon head bolts, with fine pitch thread — Product grades A and B

1 Scope

This document specifies the characteristics of hexagon head bolts, in steel and stainless steel, with metric fine pitch threads M8×1 to M64×4, and with product grades A and B.

NOTE If in certain cases other specifications are requested, property classes and stainless steel grades can be selected from ISO 898-1 or ISO 3506-1, and dimensional options from ISO 888 or ISO 4753.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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*

ISO 262, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts*

ISO 888, *Fasteners — Bolts, screws and studs — Nominal lengths and thread lengths*

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*
<https://standards.iteh.ai/catalog/standards/sist/0749566f-798c-4341-8cd6-3c2a1d4f2001/iso-fdis-8765>

ISO 1891-4, *Fasteners — Vocabulary — Part 4: Control, inspection, delivery, acceptance and quality*

ISO 3269, *Fasteners — Acceptance inspection*

ISO 3506-1, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs with specified grades and property classes*

ISO 4042, *Fasteners — Electroplated coating systems*

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 6157-3, *Fasteners — Surface discontinuities — Part 3: Bolts, screws and studs for special requirements*

ISO 8991, *Designation system for fasteners*

ISO 8992, *Fasteners — General requirements for bolts, screws, studs and nuts*

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

3 Terms and definitions

No terms and definitions are listed in this document.

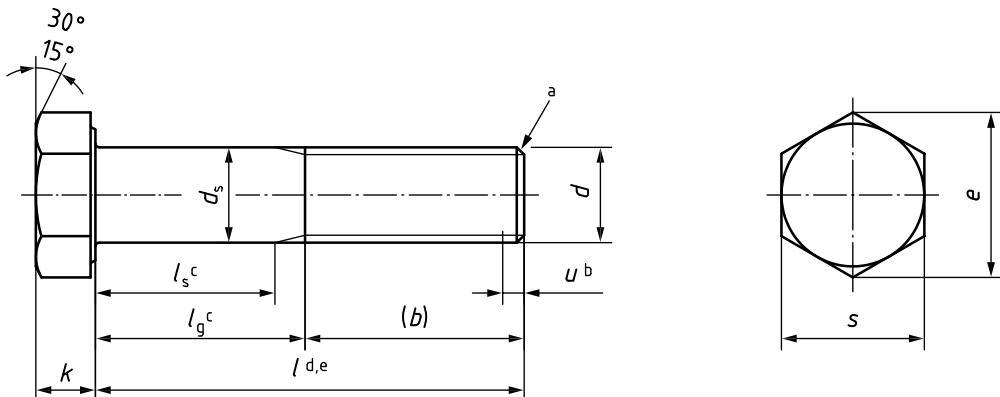
ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Dimensions

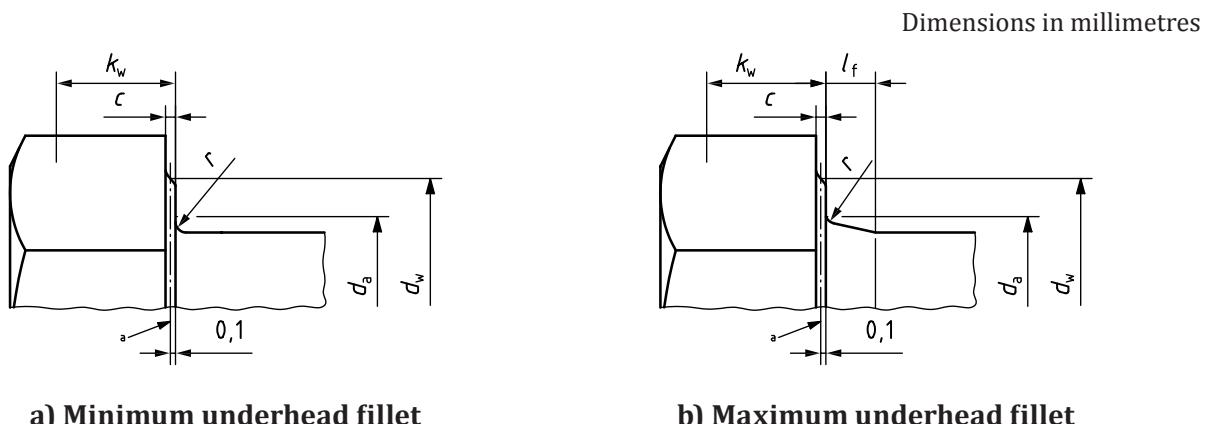
Dimensions shall be in accordance with [Figures 1](#) and [2](#) and with [Tables 1](#) to [5](#).

Symbols and descriptions of dimensions are defined in ISO 225.



- a Chamfered end (CH) in accordance with ISO 4753.
- b Incomplete thread $u \leq 2P$, where P is the fine pitch specified in [Tables 1](#) to [5](#).
- c $l_{g,\max} = l_{\text{nom}} - b$ and $l_{s,\min} = l_{g,\max} - 5P$, where P is the coarse pitch in accordance with ISO 262.
- d Shortest standard length l_{nom} determined with 5d for thread size 8 mm, 4,5d for 10 mm, 4d for 12 mm to 22 mm, 3,75d for 24 mm to 60 mm, and rounded (if necessary) to the nearest standard length; shortest standard length $l_{\text{nom}} = 220$ mm for 64 mm.
- e Greatest standard length $l_{\text{nom}} \leq 10d$ or 500 mm, whichever is the shorter.

Figure 1 — Hexagon head bolt



- a Reference datum for d_w .

Figure 2 — Head details and permissible shapes

Table 1 — Dimensions for product grade A – 8 mm to 16 mm

Dimensions in millimetres

Thread, $d \times P$ ^a			M8×1		M10×1,25		(M10×1)		M12×1,5		(M12×1,25)		(M14×1,5)		M16×1,5													
<i>b</i> ref.	<i>b</i>		22		26		26		30		30		34		38													
	<i>c</i>		—		—		—		—		—		40		44													
<i>c</i>	max.		0,60		0,60		0,60		0,60		0,60		0,60		0,80													
	min.		0,15		0,15		0,15		0,15		0,15		0,15		0,20													
<i>d_a</i>	max.		9,2		11,2		11,2		13,7		13,7		15,7		17,7													
<i>d_s</i>	nom. = max.		8,00		10,00		10,00		12,00		12,00		14,00		16,00													
	min.		7,78		9,78		9,78		11,73		11,73		13,73		15,73													
<i>d_w</i>	min.		11,63		14,63		14,63		16,63		16,63		19,64		22,49													
<i>e</i>	min.		14,38		17,77		17,77		20,03		20,03		23,36		26,75													
<i>k</i>	nom.		5,3		6,4		6,4		7,5		7,5		8,8		10													
	max.		5,45		6,58		6,58		7,68		7,68		8,98		10,18													
	min.		5,15		6,22		6,22		7,32		7,32		8,62		9,82													
<i>k_w</i>	min.		3,61		4,35		4,35		5,12		5,12		6,03		6,87													
<i>l_f</i>	max.		2		2		2		3		3		3		3													
<i>r</i>	min.		0,4		0,4		0,4		0,6		0,6		0,6		0,6													
<i>s</i>	nom. = max.		13,00		16,00		16,00		18,00		18,00		21,00		24,00													
	min.		12,73		15,73		15,73		17,73		17,73		20,67		23,67													
<i>l</i>			Range of standard lengths between the stepped bold lines <i>iTeh STANDARD PREVIEW</i> https://standards.iteh.cat/standards/iso/1749566f-798c-4341-8cd6-5c2a4d2007iso-kits-8765																									
nom.	min.	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.														
40	39,5	40,5	11,75	18,0	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676																							
45	44,5	45,5	16,75	23,0	11,5	19,0	11,5	19,0	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676																			
50	49,5	50,5	21,75	28,0	16,5	24,0	16,5	24,0	11,25	20,0	11,25	20,0	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676															
55	54,4	55,6	26,75	33,0	21,5	29,0	21,5	29,0	16,25	25,0	16,25	25,0	11,0	21,0	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676													
60	59,4	60,6	31,75	38,0	26,5	34,0	26,5	34,0	21,25	30,0	21,25	30,0	16,0	26,0	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676													
65	64,4	65,6	36,75	43,0	31,5	39,0	31,5	39,0	26,25	35,0	26,25	35,0	21,0	31,0	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676													
70	69,4	70,6	41,75	48,0	36,5	44,0	36,5	44,0	31,25	40,0	31,25	40,0	26,0	36,0	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676													
80	79,4	80,6	51,75	58,0	46,5	54,0	46,5	54,0	41,25	50,0	41,25	50,0	36,0	46,0	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676													
90	89,3	90,7	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676																									
100	99,3	100,7	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676																									
110	109,3	110,7	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676																									
120	119,3	120,7	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676																									
130	129,2	130,8	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676																									
140	139,2	140,8	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676																									
150	149,2	150,8	ISO/FDIS 8765 Fully threaded screws specified in ISO 8676																									
> 150			ISO/FDIS 8765 Fully threaded screws specified in ISO 8676																									
NOTE Sizes shown in brackets are non-preferred diameters.																												
a <i>P</i> is the pitch of the thread.																												
b For $l_{\text{nom}} \leq 125$ mm.																												
c For 125 mm < $l_{\text{nom}} \leq 200$ mm.																												
d Product grade B, see Table 3 .																												

Table 2 — Dimensions for product grade A - 18 mm to 24 mm

Dimensions in millimetres

Thread, $d \times P$ ^a		(M18×2)	(M18×1,5)	M20×2	(M20×1,5)	(M22×2)	(M22×1,5)	M24×2							
<i>b</i> ref.	<i>b</i>	42	42	46	46	50	50	54							
	<i>c</i>	48	48	52	52	56	56	60							
<i>c</i>	max.	0,8	0,8	0,8	0,8	0,8	0,8	0,8							
	min.	0,2	0,2	0,2	0,2	0,2	0,2	0,2							
<i>d_a</i>	max.	20,2	20,2	22,4	22,4	24,4	24,4	26,4							
<i>d_s</i>	nom. = max.	18,00	18,00	20,00	20,00	22,0	22,0	24,00							
	min.	17,73	17,73	19,67	19,67	21,67	21,67	23,67							
<i>d_w</i>	min.	25,34	25,34	28,19	28,19	31,71	31,71	33,61							
<i>e</i>	min.	30,14	30,14	33,53	33,53	37,72	37,72	39,98							
<i>k</i>	nom.	11,5	11,5	12,5	12,5	14	14	15							
	max.	11,715	11,715	12,715	12,715	14,215	14,215	15,215							
	min.	11,285	11,285	12,285	12,285	13,785	13,785	14,785							
<i>k_w</i>	min.	7,90	7,90	8,60	8,60	9,65	9,65	10,35							
<i>l_f</i>	max.	3	3	4	4	4	4	4							
<i>r</i>	min.	0,6	0,6	0,8	0,8	0,8	0,8	0,8							
<i>s</i>	nom. = max.	27,00	27,00	30,00	30,00	34,00	34,00	36,00							
	min.	26,67	26,67	29,67	29,67	33,38	33,38	35,38							
<i>l</i>		Range of standard lengths between the stepped bold lines <i>iTeh STANDARD PREVIEW</i> (standards.iteh.ai)													
nom.	min.	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.							
70	69,4	70,6	15,5	28,0	15,5	28,0									
80	79,4	80,6	25,5	38,0	25,5	38,0	21,5	34,0							
90	89,3	90,7	35,5	48,0	35,5	48,0	31,5	44,0							
100	99,3	100,7	45,5	58,0	45,5	58,0	41,5	54,0							
110	109,3	110,7	55,5	68,0	55,5	68,0	51,5	64,0							
120	119,3	120,7	65,5	78,0	65,5	78,0	61,5	74,0							
130	129,2	130,8	69,5	82,0	69,5	82,0	65,5	78,0							
140	139,2	140,8	79,5	92,0	79,5	92,0	75,5	88,0							
150	149,2	150,8	89,5	102,0	89,5	102,0	85,5	98,0							
> 150		Product grade B: see Table 3 or Table 4													
NOTE Sizes shown in brackets are non-preferred diameters.															
^a <i>P</i> is the pitch of the thread.															
^b For <i>l_{nom}</i> ≤ 125 mm.															
^c For 125 mm < <i>l_{nom}</i> ≤ 200 mm.															

Table 3 — Dimensions for product grade B – 16 mm to 22 mm

Dimensions in millimetres

Thread, $d \times P^a$			M16×1,5	(M18×2)	(M18×1,5)	M20×2	(M20×1,5)	(M22×2)	(M22×1,5)							
<i>b</i> ref.	<i>b</i>		44	48	48	52	52	56	56							
	<i>c</i>		—	—	—	—	—	69	69							
<i>c</i>	max.		0,80	0,80	0,80	0,80	0,80	0,80	0,80							
	min.		0,20	0,20	0,20	0,20	0,20	0,20	0,20							
<i>d_a</i>	max.		17,7	20,2	20,2	22,4	22,4	24,4	24,4							
<i>d_s</i>	nom. = max.		16,00	18,00	18,00	20,00	20,00	22,00	22,00							
	min.		15,57	17,57	17,57	19,48	19,48	21,48	21,48							
<i>d_w</i>	min.		22,00	24,85	24,85	27,70	27,70	31,35	31,35							
<i>e</i>	min.		26,17	29,56	29,56	32,95	32,95	37,29	37,29							
<i>k</i>	nom.		10	11,5	11,5	12,5	12,5	14	14							
	max.		10,29	11,85	11,85	12,85	12,85	14,35	14,35							
	min.		9,71	11,15	11,15	12,15	12,15	13,65	13,65							
<i>k_w</i>	min.		6,80	7,81	7,81	8,51	8,51	9,56	9,56							
<i>l_f</i>	max.		3	3	3	4	4	4	4							
<i>r</i>	min.		0,6	0,6	0,6	0,8	0,8	0,8	0,8							
<i>s</i>	nom. = max.		24,00	27,00	27,00	30,00	30,00	34,00	34,00							
	min.		23,16	26,16	26,16	29,16	29,16	33,00	33,00							
<i>l</i>			Range of standard lengths between the stepped bold lines													
nom.	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_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.				
≤ 150			Product grade A: see Table 1 or Table 2													
160	158,0	162,0	106	116	99,5	112	99,5	112	95,5	108	95,5	108	91,5	104	91,5	104
180	178,0	182,0			119,5	132	119,5	132	115,5	128	115,5	128	111,5	124	111,5	124
200	197,7	202,3							135,5	148	135,5	148	131,5	144	131,5	144
220	217,7	222,3											138,5	151	138,5	151
—	—	—														
Lengths to be agreed between the purchaser and the manufacturer in accordance with ISO 888																

NOTE Sizes shown in brackets are non-preferred diameters.

a *P* is the pitch of the thread.b For 125 mm < *l_{nom}* ≤ 200 mm.c For *l_{nom}* > 200 mm.

Table 4 — Dimensions for product grade B – 24 mm to 42 mm

Dimensions in millimetres

Thread, $d \times P^a$			M24×2		(M27×2)		M30×2		(M33×2)		M36×3		(M39×3)		M42×3															
<i>b</i> ref.	b	—	—	60	—	66	—	72	—	—	—	—	—	—	—	—														
	c	60	—	66	—	72	—	78	—	84	—	90	—	96	—	—														
	d	73	—	79	—	85	—	91	—	97	—	103	—	109	—	—														
<i>c</i>	max.	0,8	—	0,8	—	0,8	—	0,8	—	0,8	—	1,0	—	1,0	—	—														
	min.	0,2	—	0,2	—	0,2	—	0,2	—	0,2	—	0,3	—	0,3	—	—														
<i>d_a</i>	max.	26,4	—	30,4	—	33,4	—	36,4	—	39,4	—	42,4	—	45,6	—	—														
<i>d_s</i>	nom. = max.	24,00	—	27,00	—	30,00	—	33,00	—	36,00	—	39,00	—	42,00	—	—														
	min.	23,48	—	26,48	—	29,48	—	32,38	—	35,38	—	38,38	—	41,38	—	—														
<i>d_w</i>	min.	33,25	—	38,00	—	42,75	—	46,55	—	51,11	—	55,86	—	59,95	—	—														
<i>e</i>	min.	39,55	—	45,20	—	50,85	—	55,37	—	60,79	—	66,44	—	71,30	—	—														
<i>k</i>	nom.	15	—	17	—	18,7	—	21	—	22,5	—	25	—	26	—	—														
	max.	15,35	—	17,35	—	19,12	—	21,42	—	22,92	—	25,42	—	26,42	—	—														
	min.	14,65	—	16,65	—	18,28	—	20,58	—	22,08	—	24,58	—	25,58	—	—														
<i>k_w</i>	min.	10,26	—	11,66	—	12,80	—	14,41	—	15,46	—	17,21	—	17,91	—	—														
<i>l_f</i>	max.	4	—	6	—	6	—	6	—	6	—	6	—	8	—	—														
<i>r</i>	min.	0,8	—	1,0	—	1,0	—	1,0	—	1,0	—	1,0	—	1,2	—	—														
<i>s</i>	nom. = max.	36,00	—	41,00	—	46,00	—	50,00	—	55,00	—	60,00	—	65,00	—	—														
	min.	35,00	—	40,00	—	45,00	—	49,00	—	53,80	—	58,80	—	63,10	—	—														
<i>l</i>			Range of standard lengths between the stepped bold lines																											
nom.	min.	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.														
100	98,25	101,75	Product grade A: see Table 2	25,0	40,0	ISO/FDIS 8765 https://standards.iteh.ai/catalog/standards/list/0749566f-798c-4341-80d0-3c21d4f011/iso-fdis-8765																								
110	108,25	111,75		35,0	50,0	26,5	44,0	Fully threaded screws specified in ISO 8676																						
120	118,25	121,75		45,0	60,0	36,5	54,0	30,5	48,0																					
130	128,0	132,0		49,0	64,0	40,5	58,0	34,5	52,0																					
140	138,0	142,0		59,0	74,0	50,5	68,0	44,5	62,0	36,0	56,0																			
150	148,0	152,0		69,0	84,0	60,5	78,0	54,5	72,0	46,0	66,0	40,0	60,0																	
160	158,0	162,0	85,0	100	79,0	94,0	70,5	88,0	64,5	82,0	56,0	76,0	50,0	70,0	41,5	64,0														
180	178,0	182,0	105	120	99,0	114	90,5	108	84,5	102	76,0	96,0	70,0	90,0	61,5	84,0														
200	197,7	202,3	125	140	119	134	110,5	128	104,5	122	96,0	116	90,0	110	81,5	104														
220	217,7	222,3	132	147	126	141	117,5	135	111,5	129	103	123	97,0	117	88,5	111														
240	237,7	242,3	152	167	146	161	137,5	155	131,5	149	123	143	117	137	108,5	131														
260	257,4	262,6	166		181	157,5	175	151,5	169	143	163	137	157	128,5	151															
280	277,4	282,6	177,5		195	171,5	189	163	183	157	177	148,5	171																	
300	297,4	302,6	197,5		215	191,5	209	183	203	177	197	168,5	191																	
320	317,15	322,85	211,5		229	203	223	197	217	188,5	211																			
340	337,15	342,85	223		243	223	217	237	208,5	231																				
360	357,15	362,85	243		263	237	257	228,5	251																					
380	377,15	382,85	257		277	248,5	271																							
400	397,15	402,85	268,5		291																									
420	416,85	423,15	288,5		311																									
—	—	—	Lengths to be agreed between the purchaser and the manufacturer in accordance with ISO 888																											

NOTE Sizes shown in brackets are non-preferred diameters.

^a *P* is the pitch of the thread.

^b For $l_{\text{nom}} \leq 125$ mm.

^c For $125 \text{ mm} < l_{\text{nom}} \leq 200$ mm.

^d For $l_{\text{nom}} > 200$ mm.