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ISO general purpose metric screw threads — Basic dimensions

Filetages métriques ISO pour usages généraux — Dimensions de base

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Contents

Page

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).

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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 1, *Screw threads*.

This third edition cancels and replaces the second edition (ISO 724:1993), which has been technically revised. It also incorporates the Technical Corrigendum ISO 724:1993/Cor 1:2009.

The main changes are as follows:

— “basic profile” has been replaced with “design profile” in the Scope;

— a second paragraph has been added in the Scope;

— three symbols, d_3, H_1 and h_3, have been added in Clause 4;

— the values and formula for the minor diameter of external thread, d_3, have been added in Table 1 and Clause 5;

— ISO 68-1 and ISO 261 have been added in the Bibliography.

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.

ISO general purpose metric screw threads — Basic dimensions

1 Scope

This document specifies the basic dimensions of ISO general purpose metric screw threads according to ISO 261. The values refer to the design profiles according to ISO 68-1.

This document is applicable to the metric fastening screw threads.

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 5408, *Screw threads — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5408 apply.

ISO and IEC maintain terminology 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 Symbols

For the purposes of this document, the following symbols apply.

D major diameter of internal thread (nominal diameter)

d major diameter of external thread (nominal diameter)

D_2 pitch diameter of internal thread

d_2 pitch diameter of external thread

D_1 minor diameter of internal thread

d_3 minor diameter of external thread on design profile

P pitch

H fundamental triangle height

H_1 thread height of internal thread on design profile

h_3 thread height of external thread on design profile

5 Basic dimensions

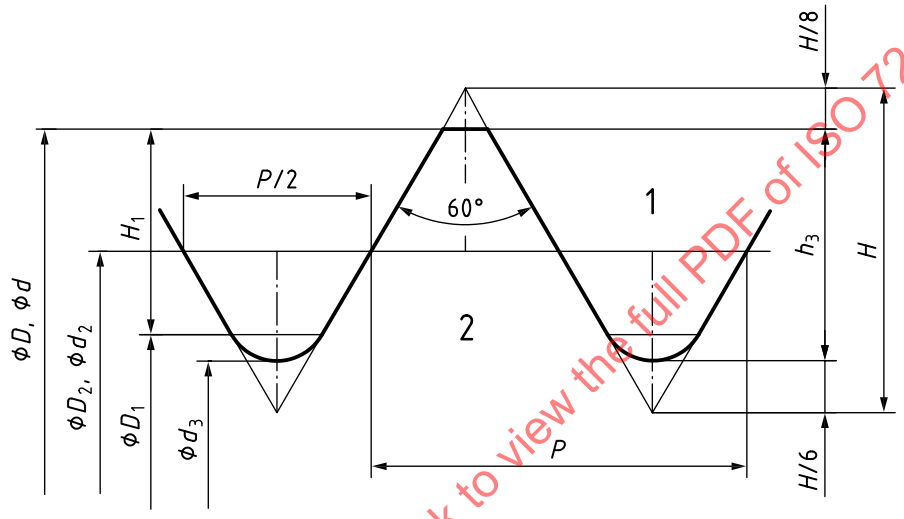
Basic dimensions shown in Figure 1 are given in Table 1.

The values of D_2, d_2, D_1 and d_3, in Table 1, have been calculated from the following formulae and rounded to the third decimal place.

$$D_2 = d_2 = d - 2 \times 3H/8 = d - 0{,}649\,519\,P$$

$$D_1 = d - 2 \times H_1 = d - 1{,}082\,532\,P$$

$$d_3 = d - 2 \times h_3 = d - 1{,}226\,869\,P$$



Key

1 internal thread

2 external thread

Figure 1 — Basic dimensions on design profiles

Table 1 — Basic dimensions

Dimensions in millimetres

Nominal diameter, major diameter	Pitch	Pitch diameter	Minor diameter	
			Internal thread flat crest	External thread rounded root
D, d	P	D_2, d_2	D_1	d_3
1	0,2	0,870	0,783	0,755
	0,25	0,838	0,729	0,693
1,1	0,2	0,970	0,883	0,855
	0,25	0,938	0,829	0,793
1,2	0,2	1,070	0,983	0,955
	0,25	1,038	0,929	0,893
1,4	0,2	1,270	1,183	1,155
	0,3	1,205	1,075	1,032

Table 1 *(continued)*

Nominal diameter, major diameter	Pitch	Pitch diameter	Minor diameter	
			Internal thread flat crest	External thread rounded root
D, d	P	D_2, d_2	D_1	d_3
1,6	0,2	1,470	1,383	1,355
	0,35	1,373	1,221	1,171
1,8	0,2	1,670	1,583	1,555
	0,35	1,573	1,421	1,371
2	0,25	1,838	1,729	1,693
	0,4	1,740	1,567	1,509
2,2	0,25	2,038	1,929	1,893
	0,45	1,908	1,713	1,648
2,5	0,35	2,273	2,121	2,071
	0,45	2,208	2,013	1,948
3	0,35	2,773	2,621	2,571
	0,5	2,675	2,459	2,387
3,5	0,35	3,273	3,121	3,071
	0,6	3,110	2,850	2,764
4	0,5	3,675	3,459	3,387
	0,7	3,545	3,242	3,141
4,5	0,5	4,175	3,959	3,887
	0,75	4,013	3,688	3,580
5	0,5	4,675	4,459	4,387
	0,8	4,480	4,134	4,019
5,5	0,5	5,175	4,959	4,887
6	0,75	5,513	5,188	5,080
	1	5,350	4,917	4,773
7	0,75	6,513	6,188	6,080
	1	6,350	5,917	5,773
8	0,75	7,513	7,188	7,080
	1	7,350	6,917	6,773
	1,25	7,188	6,647	6,466
9	0,75	8,513	8,188	8,080
	1	8,350	7,917	7,773
	1,25	8,188	7,647	7,466
10	0,75	9,513	9,188	9,080
	1	9,350	8,917	8,773
	1,25	9,188	8,647	8,466
	1,5	9,026	8,376	8,160
11	0,75	10,513	10,188	10,080
	1	10,350	9,917	9,773
	1,5	10,026	9,376	9,160

Table 1 *(continued)*

Nominal diameter, major diameter	Pitch	Pitch diameter	Minor diameter	
			Internal thread flat crest	External thread rounded root
D, d	P	D_2, d_2	D_1	d_3
12	1	11,350	10,917	10,773
	1,25	11,188	10,647	10,466
	1,5	11,026	10,376	10,160
	1,75	10,863	10,106	9,853
14	1	13,350	12,917	12,773
	1,5	13,026	12,376	12,160
	2	12,701	11,835	11,546
15	1	14,350	13,917	13,773
	1,5	14,026	13,376	13,160
16	1	15,350	14,917	14,773
	1,5	15,026	14,376	14,160
	2	14,701	13,835	13,546
17	1	16,350	15,917	15,773
	1,5	16,026	15,376	15,160
18	1	17,350	16,917	16,773
	1,5	17,026	16,376	16,160
	2	16,701	15,835	15,546
	2,5	16,376	15,294	14,933
20	1	19,350	18,917	18,773
	1,5	19,026	18,376	18,160
	2	18,701	17,835	17,546
	2,5	18,376	17,294	16,933
22	1	21,350	20,917	20,773
	1,5	21,026	20,376	20,160
	2	20,701	19,835	19,546
	2,5	20,376	19,294	18,933
24	1	23,350	22,917	22,773
	1,5	23,026	22,376	22,160
	2	22,701	21,835	21,546
	3	22,051	20,752	20,319
25	1	24,350	23,917	23,773
	1,5	24,026	23,376	23,160
	2	23,701	22,835	22,546
26	1,5	25,026	24,376	24,160
27	1	26,350	25,917	25,773
	1,5	26,026	25,376	25,160
	2	25,701	24,835	24,546
	3	25,051	23,752	23,319
28	1	27,350	26,917	26,773
	1,5	27,026	26,376	26,160
	2	26,701	25,835	25,546

Table 1 *(continued)*

Nominal diameter, major diameter D, d	Pitch P	Pitch diameter D_2, d_2	Minor diameter	
			Internal thread flat crest D_1	External thread rounded root d_3
30	1	29,350	28,917	28,773
	1,5	29,026	28,376	28,160
	2	28,701	27,835	27,546
	3	28,051	26,752	26,319
	3,5	27,727	26,211	25,706
32	1,5	31,026	30,376	30,160
	2	30,701	29,835	29,546
33	1,5	32,026	31,376	31,160
	2	31,701	30,835	30,546
	3	31,051	29,752	29,319
	3,5	30,727	29,211	28,706
36	1,5	35,026	34,376	34,160
	2	34,701	33,835	33,546
	3	34,051	32,752	32,319
	4	33,402	31,670	31,093
38	1,5	37,026	36,376	36,160
39	1,5	38,026	37,376	37,160
	2	37,701	36,835	36,546
	3	37,051	35,752	35,319
	4	36,402	34,670	34,093
40	1,5	39,026	38,376	38,160
	2	38,701	37,835	37,546
	3	38,051	36,752	36,319
42	1,5	41,026	40,376	40,160
	2	40,701	39,835	39,546
	3	40,051	38,752	38,319
	4	39,402	37,670	37,093
	4,5	39,077	37,129	36,479
45	1,5	44,026	43,376	43,160
	2	43,701	42,835	42,546
	3	43,051	41,752	41,319
	4	42,402	40,670	40,093
	4,5	42,077	40,129	39,479
48	1,5	47,026	46,376	46,160
	2	46,701	45,835	45,546
	3	46,051	44,752	44,319
	4	45,402	43,670	43,093
	5	44,752	42,587	41,866
50	1,5	49,026	48,376	48,160
	2	48,701	47,835	47,546
	3	48,051	46,752	46,319

Table 1 *(continued)*

Nominal diameter, major diameter	Pitch	Pitch diameter	Minor diameter	
			Internal thread flat crest	External thread rounded root
D, d	P	D_2, d_2	D_1	d_3
52	1,5	51,026	50,376	50,160
	2	50,701	49,835	49,546
	3	50,051	48,752	48,319
	4	49,402	47,670	47,093
	5	48,752	46,587	45,866
55	1,5	54,026	53,376	53,160
	2	53,701	52,835	52,546
	3	53,051	51,752	51,319
	4	52,402	50,670	50,093
56	1,5	55,026	54,376	54,160
	2	54,701	53,835	53,546
	3	54,051	52,752	52,319
	4	53,402	51,670	51,093
	5,5	52,428	50,046	49,252
58	1,5	57,026	56,376	56,160
	2	56,701	55,835	55,546
	3	56,051	54,752	54,319
	4	55,402	53,670	53,093
60	1,5	59,026	58,376	58,160
	2	58,701	57,835	57,546
	3	58,051	56,752	56,319
	4	57,402	55,670	55,093
	5,5	56,428	54,046	53,252
62	1,5	61,026	60,376	60,160
	2	60,701	59,835	59,546
	3	60,051	58,752	58,319
	4	59,402	57,670	57,093
64	1,5	63,026	62,376	62,160
	2	62,701	61,835	61,546
	3	62,051	60,752	60,319
	4	61,402	59,670	59,093
	6	60,103	57,505	56,639
65	1,5	64,026	63,376	63,160
	2	63,701	62,835	62,546
	3	63,051	61,752	61,319
	4	62,402	60,670	60,093
68	1,5	67,026	66,376	66,160
	2	66,701	65,835	65,546
	3	66,051	64,752	64,319
	4	65,402	63,670	63,093
	6	64,103	61,505	60,639

Table 1 *(continued)*

Nominal diameter, major diameter	Pitch	Pitch diameter	Minor diameter	
			Internal thread flat crest	External thread rounded root
D, d	P	D_2, d_2	D_1	d_3
70	1,5	69,026	68,376	68,160
	2	68,701	67,835	67,546
	3	68,051	66,752	66,319
	4	67,402	65,670	65,093
	6	66,103	63,505	62,639
72	1,5	71,026	70,376	70,160
	2	70,701	69,835	69,546
	3	70,051	68,752	68,319
	4	69,402	67,670	67,093
	6	68,103	65,505	64,639
75	1,5	74,026	73,376	73,160
	2	73,701	72,835	72,546
	3	73,051	71,752	71,319
	4	72,402	70,670	70,093
76	1,5	75,026	74,376	74,160
	2	74,701	73,835	73,546
	3	74,051	72,752	72,319
	4	73,402	71,670	71,093
	6	72,103	69,505	68,639
78	2	76,701	75,835	75,546
80	1,5	79,026	78,376	78,160
	2	78,701	77,835	77,546
	3	78,051	76,752	76,319
	4	77,402	75,670	75,093
	6	76,103	73,505	72,639
82	2	80,701	79,835	79,546
85	2	83,701	82,835	82,546
	3	83,051	81,752	81,319
	4	82,402	80,670	80,093
	6	81,103	78,505	77,639
90	2	88,701	87,835	87,546
	3	88,051	86,752	86,319
	4	87,402	85,670	85,093
	6	86,103	83,505	82,639
95	2	93,701	92,835	92,546
	3	93,051	91,752	91,319
	4	92,402	90,670	90,093
	6	91,103	88,505	87,639

Table 1 *(continued)*

Nominal diameter, major diameter D, d	Pitch P	Pitch diameter D_2, d_2	Minor diameter	
			Internal thread flat crest D_1	External thread rounded root d_3
100	2	98,701	97,835	97,546
	3	98,051	96,752	96,319
	4	97,402	95,670	95,093
	6	96,103	93,505	92,639
105	2	103,701	102,835	102,546
	3	103,051	101,752	101,319
	4	102,402	100,670	100,093
	6	101,103	98,505	97,639
110	2	108,701	107,835	107,546
	3	108,051	106,752	106,319
	4	107,402	105,670	105,093
	6	106,103	103,505	102,639
115	2	113,701	112,835	112,546
	3	113,051	111,752	111,319
	4	112,402	110,670	110,093
	6	111,103	108,505	107,639
120	2	118,701	117,835	117,546
	3	118,051	116,752	116,319
	4	117,402	115,670	115,093
	6	116,103	113,505	112,639
125	2	123,701	122,835	122,546
	3	123,051	121,752	121,319
	4	122,402	120,670	120,093
	6	121,103	118,505	117,639
	8	119,804	116,340	115,185
130	2	128,701	127,835	127,546
	3	128,051	126,752	126,319
	4	127,402	125,670	125,093
	6	126,103	123,505	122,639
	8	124,804	121,340	120,185
135	2	133,701	132,835	132,546
	3	133,051	131,752	131,319
	4	132,402	130,670	130,093
	6	131,103	128,505	127,639
140	2	138,701	137,835	137,546
	3	138,051	136,752	136,319
	4	137,402	135,670	135,093
	6	136,103	133,505	132,639
	8	134,804	131,340	130,185

Table 1 *(continued)*

Nominal diameter, major diameter	Pitch	Pitch diameter	Minor diameter	
			Internal thread flat crest	External thread rounded root
D, d	P	D_2, d_2	D_1	d_3
145	2	143,701	142,835	142,546
	3	143,051	141,752	141,319
	4	142,402	140,670	140,093
	6	141,103	138,505	137,639
150	2	148,701	147,835	147,546
	3	148,051	146,752	146,319
	4	147,402	145,670	145,093
	6	146,103	143,505	142,639
	8	144,804	141,340	140,185
155	3	153,051	151,752	151,319
	4	152,402	150,670	150,093
	6	151,103	148,505	147,639
160	3	158,051	156,752	156,319
	4	157,402	155,670	155,093
	6	156,103	153,505	152,639
	8	154,804	151,340	150,185
165	3	163,051	161,752	161,319
	4	162,402	160,670	160,093
	6	161,103	158,505	157,639
170	3	168,051	166,752	166,319
	4	167,402	165,670	165,093
	6	166,103	163,505	162,639
	8	164,804	161,340	160,185
175	3	173,051	171,752	171,319
	4	172,402	170,670	170,093
	6	171,103	168,505	167,639
180	3	178,051	176,752	176,319
	4	177,402	175,670	175,093
	6	176,103	173,505	172,639
	8	174,804	171,340	170,185
185	3	183,051	181,752	181,319
	4	182,402	180,670	180,093
	6	181,103	178,505	177,639
190	3	188,051	186,752	186,319
	4	187,402	185,670	185,093
	6	186,103	183,505	182,639
	8	184,804	181,340	180,185
195	3	193,051	191,752	191,319
	4	192,402	190,670	190,093
	6	191,103	188,505	187,639

Table 1 *(continued)*

Nominal diameter, major diameter	Pitch	Pitch diameter	Minor diameter	
			Internal thread flat crest	External thread rounded root
D, d	P	D_2, d_2	D_1	d_3
200	3	198,051	196,752	196,319
	4	197,402	195,670	195,093
	6	196,103	193,505	192,639
	8	194,804	191,340	190,185
205	3	203,051	201,752	201,319
	4	202,402	200,670	200,093
	6	201,103	198,505	197,639
210	3	208,051	206,752	206,319
	4	207,402	205,670	205,093
	6	206,103	203,505	202,639
	8	204,804	201,340	200,185
215	3	213,051	211,752	211,319
	4	212,402	210,670	210,093
	6	211,103	208,505	207,639
220	3	218,051	216,752	216,319
	4	217,402	215,670	215,093
	6	216,103	213,505	212,639
	8	214,804	211,340	210,185
225	3	223,051	221,752	221,319
	4	222,402	220,670	220,093
	6	221,103	218,505	217,639
230	3	228,051	226,752	226,319
	4	227,402	225,670	225,093
	6	226,103	223,505	222,639
	8	224,804	221,340	220,185
235	3	233,051	231,752	231,319
	4	232,402	230,670	230,093
	6	231,103	228,505	227,639
240	3	238,051	236,752	236,319
	4	237,402	235,670	235,093
	6	236,103	233,505	232,639
	8	234,804	231,340	230,185
245	3	243,051	241,752	241,319
	4	242,402	240,670	240,093
	6	241,103	238,505	237,639
250	3	248,051	246,752	246,319
	4	247,402	245,670	245,093
	6	246,103	243,505	242,639
	8	244,804	241,340	240,185
255	4	252,402	250,670	250,093
	6	251,103	248,505	247,639