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ISO metric screw threads

Fundamental deviations and tolerances for screw threads from 1 mm diameter upwards

DIN 13 Part 15

Metrisches ISO-Gewinde; Grundabmasse und Toleranzen für Gewinde ab 1 mm Durchmesser

Supersedes March 1972 edition

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.

For connection with International Standard ISO 965/1-1980 published by the International Organization for Standardization (ISO), see DIN 13 Part 14, Explanatory notes.

For ISO metric screw threads, principles of the tolerance system for screw threads from 1 mm diameter upwards, see DIN 13 Part 14.

Contents

Values in µm

1 Field of application and purpose

This standard specifies deviations and tolerances for screw threads from 1 mm nominal diameter upwards dealt with in DIN 13 Part 1 to Part 11 with a basic profile for ISO metric screw threads in accordance with DIN 13 Part 19.

2 Thread profiles and tolerance positions

2.1 Nut thread

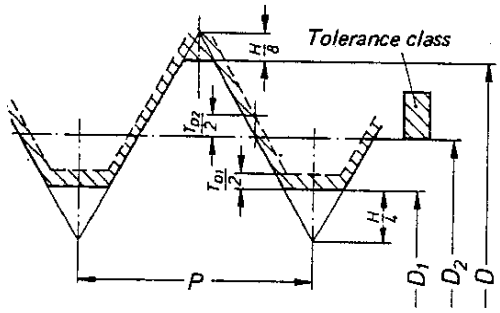

Figure 1. Nut thread with fundamental deviation 0 (tolerance position H)

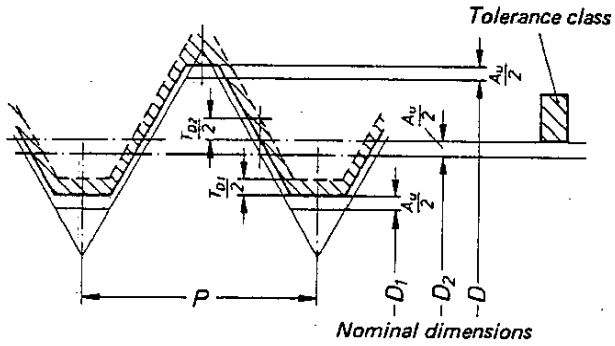

Figure 2. Nut thread with positive fundamental deviation (tolerance position G)

2.2 Bolt thread

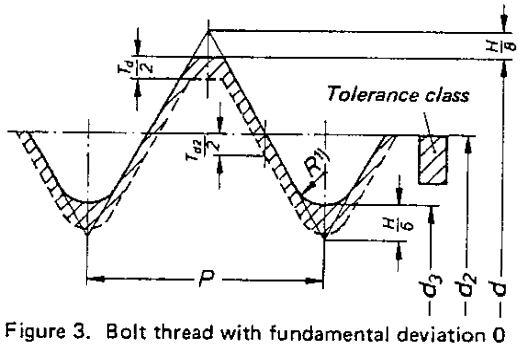

Figure 3. Bolt thread with fundamental deviation 0 (tolerance position h)

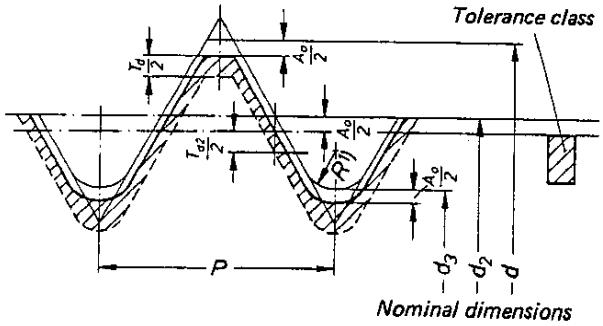

Figure 4. Bolt thread with negative fundamental deviation (e.g. tolerance position g)

1) Recommended radius $R = \frac{H}{6} = 0{,}144\,P$

Continued on pages 2 to 6

3 Fundamental deviations

3.1 Nut thread

Table 1. **Deviations A_u**

Pitch P mm	Deviations A_u for tolerance position G	H
0,2	+ 17	0
0,25	+ 18	0
0,3	+ 18	0
0,35	+ 19	0
0,4	+ 19	0
0,45	+ 20	0
0,5	+ 20	0
0,6	+ 21	0
0,7	+ 22	0
0,75	+ 22	0
0,8	+ 24	0
1	+ 26	0
1,25	+ 28	0
1,5	+ 32	0
1,75	+ 34	0
2	+ 38	0
2,5	+ 42	0
3	+ 48	0
3,5	+ 53	0
4	+ 60	0
4,5	+ 63	0
5	+ 71	0
5,5	+ 75	0
6	+ 80	0
8	+ 100	0

If, in special cases, further tolerance positions for nut threads are required which are not given in table 1, the same tolerance positions and deviations may be used as for bolt threads conforming to table 2, however using capital letters and the opposite sign.

3.2 Bolt thread

Table 2. **Deviations A_o**

Pitch P mm	Deviations A_o for tolerance position a	b	c	d	e	f	g	h
0,2	–	–	–	–	– 45	– 32	– 17	0
0,25	–	–	–	–	– 45	– 33	– 18	0
0,3	–	–	–	–	– 46	– 33	– 18	0
0,35	–	–	–	–	– 46	– 34	– 19	0
0,4	–	–	(– 120)	(– 72)	– 48	– 34	– 19	0
0,45	–	–	(– 120)	(– 73)	– 48	– 35	– 20	0
0,5	–	–	(– 122)	(– 74)	– 50	– 36	– 20	0
0,6	–	–	(– 124)	(– 76)	– 53	– 36	– 21	0
0,7	–	–	(– 125)	(– 78)	– 56	– 38	– 22	0
0,75	–	–	(– 126)	(– 79)	– 56	– 38	– 22	0
0,8	–	–	(– 127)	(– 80)	– 60	– 38	– 24	0
1	– 290	– 200	– 130	– 85	– 60	– 40	– 26	0
1,25	– 295	– 205	– 135	– 90	– 63	– 42	– 28	0
1,5	– 300	– 212	– 140	– 95	– 67	– 45	– 32	0
1,75	– 310	– 220	– 145	– 100	– 71	– 48	– 34	0
2	– 315	– 225	– 150	– 105	– 71	– 52	– 38	0
2,5	– 325	– 235	– 160	– 110	– 80	– 58	– 42	0
3	– 335	– 245	– 170	– 115	– 85	– 63	– 48	0
3,5	– 345	– 255	– 180	– 125	– 90	– 70	– 53	0
4	– 355	– 265	– 190	– 130	– 95	– 75	– 60	0
4,5	– 365	– 280	– 200	– 135	– 100	– 80	– 63	0
5	– 375	– 290	– 212	– 140	– 106	– 85	– 71	0
5,5	– 385	– 300	– 224	– 150	– 112	– 90	– 75	0
6	– 395	– 310	– 236	– 155	– 118	– 95	– 80	0
8	– 425	– 340	– 265	– 180	– 140	– 118	– 100	0

If the bracketed fundamental deviations are used, it shall be verified whether the remaining thread overlap is sufficient for the application concerned.

4 Tolerances for nut thread

4.1 Pitch diameter tolerances (T_{D2})

Table 3. **Pitch diameter tolerances T_{D2}**

Nominal screw thread diameter D mm over	up to	Pitch P mm	Pitch diameter tolerances T_{D2} for tolerance grade 4	5	6	7	8
0,99	1,4	0,2	40	–	–	–	–
		0,25	45	56	–	–	–
		0,3	48	60	75	–	–
1,4	2,8	0,2	42	–	–	–	–
		0,25	48	60	–	–	–
		0,35	53	67	85	–	–
		0,4	56	71	90	–	–
		0,45	60	75	95	–	–
2,8	5,6	0,2	45	–	–	–	–
		0,25	50	63	–	–	–
		0,35	56	71	–	–	–
		0,5	63	80	100	125	–
		0,6	71	90	112	140	–
		0,7	75	95	118	150	–
		0,75	75	95	118	150	–
		0,8	80	100	125	160	200
5,6	11,2	0,2	48	–	–	–	–
		0,25	53	–	–	–	–
		0,35	60	75	–	–	–
		0,5	71	90	112	–	–
		0,75	85	106	132	170	–
		1	95	118	150	190	236
		1,25	100	125	160	200	250
		1,5	112	140	180	224	280
11,2	22,4	0,35	67	85	–	–	–
		0,5	75	95	118	–	–
		0,75	90	112	140	180	–
		1	100	125	160	200	250
		1,25	112	140	180	224	280
		1,5	118	150	190	236	300
		1,75	125	160	200	250	315
		2	132	170	212	265	335
		2,5	140	180	224	280	355
22,4	45	0,35	71	90	–	–	–
		0,5	80	100	125	–	–
		0,75	95	118	150	190	–
		1	106	132	170	212	–
		1,5	125	160	200	250	315
		2	140	180	224	280	355
		3	170	212	265	335	425
		3,5	180	224	280	355	450
		4	190	236	300	375	475
		4,5	200	250	315	400	500
45	90	0,35	75	–	–	–	–
		0,5	90	112	–	–	–
		0,75	100	125	160	–	–
		1	118	150	180	236	–
		1,5	132	170	212	265	335
		2	150	190	236	300	375
		3	180	224	280	355	450
		4	200	250	315	400	500
		5	212	265	335	425	530
		5,5	224	280	355	450	560
		6	236	300	375	475	600

Table 3. (concluded)

Nominal screw thread diameter D mm over	up to	Pitch P mm	Pitch diameter tolerances T_{D2} for tolerance grade 4	5	6	7	8
90	180	0,75	112	140	180	–	–
		1	125	160	200	250	–
		1,5	140	180	224	280	–
		2	160	200	250	315	400
		3	190	236	300	375	475
		4	212	265	335	425	530
		6	250	315	400	500	630
		8	280	355	450	560	710
180	355	1	132	170	212	–	–
		1,5	150	190	236	300	–
		2	180	224	280	355	–
		3	212	265	335	425	530
		4	236	300	375	475	600
		6	265	335	425	530	670
		8	300	375	475	600	750
355	500	2	180	224	280	–	–
		3	212	265	335	425	530
		4	236	300	375	475	600
		6	280	355	450	560	710
		8	315	400	500	630	800
500	1000	8	–	425	530	670	850

4.2 Minor diameter tolerances (T_{D1})

Table 4. **Minor diameter tolerances T_{D1}**

Pitch P mm	Minor diameter tolerances T_{D1} for tolerance grade 4	5	6	7	8
0,2	38	–	–	–	–
0,25	45	56	–	–	–
0,3	53	67	85	–	–
0,35	63	80	100	–	–
0,4	71	90	112	–	–
0,45	80	100	125	–	–
0,5	90	112	140	180	–
0,6	100	125	160	200	–
0,7	112	140	180	224	–
0,75	118	150	190	236	–
0,8	125	160	200	250	315
1	150	190	236	300	375
1,25	170	212	265	335	425
1,5	190	236	300	375	475
1,75	212	265	335	425	530
2	236	300	375	475	600
2,5	280	355	450	560	710
3	315	400	500	630	800
3,5	355	450	560	710	900
4	375	475	600	750	950
4,5	425	530	670	850	1060
5	450	560	710	900	1120
5,5	475	600	750	950	1180
6	500	630	800	1000	1250
8	630	800	1000	1250	1600

5 Tolerances for bolt thread

5.1 Major diameter tolerances (T_d)

Table 5. **Major diameter tolerances T_d**

Pitch P mm	Major diameter tolerances T_d for tolerance grade		
	4	6	8
0,2	36	56	–
0,25	42	67	–
0,3	48	75	–
0,35	53	85	–
0,4	60	95	–
0,45	63	100	–
0,5	67	106	–
0,6	80	125	–
0,7	90	140	–
0,75	90	140	–
0,8	95	150	236
1	112	180	280
1,25	132	212	335
1,5	150	236	375
1,75	170	265	425
2	180	280	450
2,5	212	335	530
3	236	375	600
3,5	265	425	670
4	300	475	750
4,5	315	500	800
5	335	530	850
5,5	355	560	900
6	375	600	950
8	450	710	1180

5.2 Pitch diameter tolerances (T_{d2})

Table 6. **Pitch diameter tolerances T_{d2}**

Nominal screw thread diameter d mm		Pitch P	Pitch diameter tolerances T_{d2} for tolerance grade						
over	up to	mm	3	4	5	6	7	8	9
0,99	1,4	0,2	24	30	38	48	–	–	–
		0,25	26	34	42	53	–	–	–
		0,3	28	36	45	56	–	–	–
1,4	2,8	0,2	25	32	40	50	–	–	–
		0,25	28	36	45	56	–	–	–
		0,35	32	40	50	63	80	–	–
		0,4	34	42	53	67	85	–	–
		0,45	36	45	56	71	90	–	–
2,8	5,6	0,2	26	34	42	53	–	–	–
		0,25	30	38	48	60	–	–	–
		0,35	34	42	53	67	85	–	–
		0,5	38	48	60	75	95	–	–
		0,6	42	53	67	85	106	–	–
		0,7	45	56	71	90	112	–	–
		0,75	45	56	71	90	112	–	–
		0,8	48	60	75	95	118	150	190

Table 6. (concluded)

Nominal screw thread diameter d mm		Pitch P	Pitch diameter tolerances T_{d2} for tolerance grade						
over	up to	mm	3	4	5	6	7	8	9
5,6	11,2	0,2	28	36	45	56	–	–	–
		0,25	32	40	50	63	–	–	–
		0,35	36	45	56	71	–	–	–
		0,5	42	53	67	85	106	–	–
		0,75	50	63	80	100	125	–	–
		1	56	71	90	112	140	180	224
		1,25	60	75	95	118	150	190	236
		1,5	–	85	106	132	170	212	265
11,2	22,4	0,35	40	50	63	80	–	–	–
		0,5	45	56	71	90	–	–	–
		0,75	53	67	85	106	132	–	–
		1	60	75	95	118	150	190	236
		1,25	67	85	106	132	170	212	265
		1,5	–	90	112	140	180	224	280
		1,75	–	95	118	150	190	236	300
		2	–	100	125	160	200	250	315
		2,5	–	106	132	170	212	265	335
22,4	45	0,35	42	53	67	85	–	–	–
		0,5	48	60	75	95	–	–	–
		0,75	56	71	90	112	140	–	–
		1	63	80	100	125	160	200	250
		1,5	–	95	118	150	190	236	300
		2	–	106	132	170	212	265	335
		3	–	125	160	200	250	315	400
		3,5	–	132	170	212	265	335	425
		4	–	140	180	224	280	355	450
		4,5	–	150	190	236	300	375	475
45	90	0,35	45	56	71	–	–	–	–
		0,5	53	67	85	106	–	–	–
		0,75	60	75	95	118	–	–	–
		1	71	90	112	140	180	224	–
		1,5	–	100	125	160	200	250	315
		2	–	112	140	180	224	280	355
		3	–	132	170	212	265	335	425
		4	–	150	190	236	300	375	475
		5	–	160	200	250	315	400	500
		5,5	–	170	212	265	335	425	530
		6	–	180	224	280	355	450	560
90	180	0,75	67	85	106	132	–	–	–
		1	75	95	118	150	–	–	–
		1,5	–	106	132	170	–	–	–
		2	–	118	150	190	236	300	375
		3	–	140	180	224	280	355	450
		4	–	160	200	250	315	400	500
		6	–	190	236	300	375	475	600
		8	–	212	265	335	425	530	670
180	355	1	80	100	125	160	–	–	–
		1,5	–	112	140	180	–	–	–
		2	–	132	170	212	–	–	–
		3	–	160	200	250	315	400	500
		4	–	180	224	280	355	450	560
		6	–	200	250	315	400	500	630
		8	–	224	280	355	450	560	710
355	500	2	–	140	170	212	–	–	–
		3	–	160	200	250	315	400	500
		4	–	180	224	280	355	450	560
		6	–	212	265	335	425	530	670
		8	–	236	300	375	475	600	750
500	1000	8	–	–	315	400	500	630	800

6 Tolerances for M 1,7; M 2,3; M 2,6 screw threads

These screw threads are not contained in ISO 261 (see Supplement to DIN 13 Part 12). Therefore, in order to avoid having to change the tolerances for the period in which the threads are still in use, they have not been modified to conform to the ISO standard. The tolerances below have been taken from the January 1952 edition of DIN 13 Part 15.

Values in µm

Screw thread [1]	T_d	T_{D2} and T_{d2}		Minor diameter of nut thread d_1 [2]		
		fine	medium	A_u (+)	A_o (+)	T_{d1}
M 1,7	71	45	71	10	100	90
M 2,3	100	50	80	15	140	125
M 2,6	112	50	80	20	160	140

1) Screw thread profiles shall correspond to DIN 13 Part 15, January 1952 edition.
2) For d_1 see DIN 13 Part 1, page 2.

Standards referred to

DIN 13 Part 1 to Part 11, Part 14, Part 19 ISO metric screw threads

Previous editions

DIN 13 Part 32: 10.60, 10.62, 06.64, 07.65; DIN 13 Part 15: 01.52, 03.72

Amendments

Compared with the March 1972 edition, the following amendments have been made:
This standard has been adapted to the updated edition of DIN 13 Part 14 and has been revised editorially.

Explanatory notes

See DIN 13 Part 14