

# ISO metric screw threads

Selected sizes for screws, bolts and nuts  
from 1 to 52 mm screw thread diameter and limits of sizes

**DIN**  
**13**  
Part 13

Metrisches ISO-Gewinde; Auswahlreihen für Schrauben, Bolzen und Muttern  
von 1 bis 52 mm Gewindedurchmesser und Grenzmasse

Supersedes July 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.*

Dimensions in mm

For connection with International Standards ISO 262—1973 and ISO 965/2—1980 published by the International Organization for Standardization (ISO), see Explanatory notes.

## 1 Field of application

This standard applies to ISO metric screw threads having the basic profile as defined in DIN 13 Part 19. The limits for the bolt root radius are expressed by  $R = 0,144 P = H/6$  for the maximum dimension and by  $R_{\min} = 0,125 P \approx H/7$  for the minimum dimension of the minor diameter  $d_3$ , as specified in DIN 13 Part 14.

It specifies selected sizes for coarse and fine screw threads for screws, bolts and nuts and limits of sizes for commonly used tolerance classes.

## 2 Selected sizes

Table 1. Coarse screw threads

Nominal screw thread diameter		Pitch <i>P</i>	Nominal screw thread diameter		Pitch <i>P</i>
Series 1	Series 2		Series 1	Series 2	
1		0,25		18	2,5
1,2		0,25	20	22	2,5
	1,4	0,3			2,5
1,6		0,35	24	27	3
	1,8	0,35			3
2		0,4	30	33	3,5
		0,4			3,5
2,5		0,45	36	39	4
3		0,5			4
	3,5	0,6			4
4		0,7	42 <sup>1)</sup>	45 <sup>1)</sup>	4,5
5		0,8			4,5
6		1	48 <sup>1)</sup>		5
8	7	1		52 <sup>1)</sup>	5
		1,25			
10		1,5			
		1,5			
12		1,75			
	14	2			
		2			
16		2			

Table 2. Fine screw threads

Nominal screw thread diameter		Pitch <i>P</i>	
Series 1	Series 2		
8		1	
10		1,25	1 <sup>1)</sup>
12		1,25	1,5 <sup>1)</sup>
	14	1,5	
	18	1,5	2 <sup>1)</sup>
16		1,5	
		1,5	2 <sup>1)</sup>
20		1,5	2 <sup>1)</sup>
	22	2	
24		2	2 <sup>1)</sup>
		2	
30	27	2	
		2	
	33	2	
36		3	
	39	3	

## 3 Limits of sizes

The limits of sizes for coarse and fine screw threads with commonly used tolerance classes (see DIN 13 Part 14) have been calculated from the nominal screw threads as specified in DIN 13 Part 1 to Part 8 and from the deviations and tolerances as specified in DIN 13 Part 15. Limits of sizes for screw threads according to tolerance classes which are not included in this standard may be calculated from the deviations specified in DIN 13 Part 27.

For coated threads, the limits of sizes shall apply to the workpiece before coating, unless otherwise stated. After coating (this includes coating by phosphatizing), the actual thread profile shall not at any point transgress the maximum material limits for position H or h (see also DIN 13 Part 14).

<sup>1)</sup> Not included in ISO 262—1973

## 3.1 Nut threads

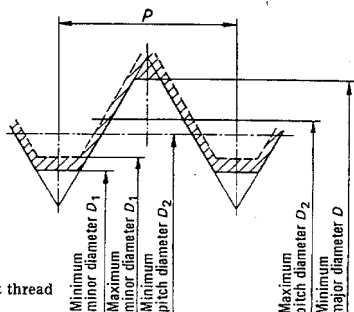


Figure 1. Nut thread

## 3.1.1 Tolerance class 5H or 6H nut threads (tolerance quality: medium)

M 1 to M 1,4 nut threads are given tolerance class 5H.

M 1,6 to M 39 nut threads are given tolerance class 6H.

Table 3. Limits of sizes for coarse nut threads

Thread size	Normal length of engagement		Major diameter $D$ Minimum	Pitch diameter $D_2$ Minimum      Maximum		Minor diameter $D_1$ Minimum      Maximum	
	from	to		Minimum	Maximum	Minimum	Maximum
M 1	0,6	1,7	1,000	0,838	0,894	0,729	0,785
M 1,2	0,6	1,7	1,200	1,038	1,094	0,929	0,985
M 1,4	0,7	2	1,400	1,205	1,265	1,075	1,142
M 1,6	0,8	2,6	1,600	1,373	1,458	1,221	1,321
M 1,8	0,8	2,6	1,800	1,573	1,658	1,421	1,521
M 2	1	3	2,000	1,740	1,830	1,567	1,679
M 2,5	1,3	3,8	2,500	2,208	2,303	2,013	2,138
M 3	1,5	4,5	3,000	2,675	2,775	2,459	2,599
M 3,5	1,7	5	3,500	3,110	3,222	2,850	3,010
M 4	2	6	4,000	3,545	3,663	3,242	3,422
M 5	2,5	7,5	5,000	4,480	4,605	4,134	4,334
M 6	3	9	6,000	5,350	5,500	4,917	5,153
M 7	3	9	7,000	6,350	6,500	5,917	6,153
M 8	4	12	8,000	7,188	7,348	6,647	6,912
M 10	5	15	10,000	9,026	9,206	8,376	8,676
M 12	6	18	12,000	10,863	11,063	10,106	10,441
M 14	8	24	14,000	12,701	12,913	11,835	12,210
M 16	8	24	16,000	14,701	14,913	13,835	14,210
M 18	10	30	18,000	16,376	16,600	15,294	15,744
M 20	10	30	20,000	18,376	18,600	17,294	17,744
M 22	10	30	22,000	20,376	20,600	19,294	19,744
M 24	12	36	24,000	22,051	22,316	20,752	21,252
M 27	12	36	27,000	25,051	25,316	23,752	24,252
M 30	15	45	30,000	27,727	28,007	26,211	26,771
M 33	15	45	33,000	30,727	31,007	29,211	29,771
M 36	18	53	36,000	33,402	33,702	31,670	32,270
M 39	18	53	39,000	36,402	36,702	34,670	35,270

Table 4. Limits of sizes for fine nut threads

Thread size	Normal length of engagement		Major diameter	Pitch diameter		Minor diameter	
	from	to	$D$	$D_2$		$D_1$	
			Minimum	Minimum	Maximum	Minimum	Maximum
M 8 × 1	3	9	8,000	7,350	7,500	6,917	7,153
M 10 × 1	3	9	10,000	9,350	9,500	8,917	9,153
M 10 × 1,25	4	12	10,000	9,188	9,348	8,647	8,912
M 12 × 1,25	4,5	13	12,000	11,188	11,368	10,647	10,912
M 12 × 1,5	5,6	16	12,000	11,026	11,216	10,376	10,676
M 14 × 1,5	5,6	16	14,000	13,026	13,216	12,376	12,676
M 16 × 1,5	5,6	16	16,000	15,026	15,216	14,376	14,676
M 18 × 1,5	5,6	16	18,000	17,026	17,216	16,376	16,676
M 18 × 2	8	24	18,000	16,701	16,913	15,835	16,210
M 20 × 1,5	5,6	16	20,000	19,026	19,216	18,376	18,676
M 20 × 2	8	24	20,000	18,701	18,913	17,835	18,210
M 22 × 1,5	5,6	16	22,000	21,026	21,216	20,376	20,676
M 22 × 2	8	24	22,000	20,701	20,913	19,835	20,210
M 24 × 2	8,5	25	24,000	22,701	22,925	21,835	22,210
M 27 × 2	8,5	25	27,000	25,701	25,925	24,834	25,210
M 30 × 2	8,5	25	30,000	28,701	28,925	27,835	28,210
M 33 × 2	8,5	25	33,000	31,701	31,925	30,835	31,210
M 36 × 3	12	36	36,000	34,051	34,316	32,752	33,252
M 39 × 3	12	36	39,000	37,051	37,316	35,752	36,252

## 3.1.2 Tolerance class 7H nut threads (tolerance quality: coarse)

Table 5. Limits of sizes for coarse nut threads

Thread size	Normal length of engagement		Major diameter	Pitch diameter		Minor diameter	
	from	to	$D$	$D_2$		$D_1$	
			Minimum	Minimum	Maximum	Minimum	Maximum
M 5	2,5	7,5	5,000	4,480	4,640	4,134	4,384
M 6	3	9	6,000	5,350	5,540	4,917	5,217
M 7	3	9	7,000	6,350	6,540	5,917	6,217
M 8	4	12	8,000	7,188	7,388	6,647	6,982
M 10	5	15	10,000	9,026	9,250	8,376	8,751
M 12	6	18	12,000	10,863	11,113	10,106	10,531
M 14	8	24	14,000	12,701	12,966	11,835	12,310
M 16	8	24	16,000	14,701	14,966	13,835	14,310
M 18	10	30	18,000	16,376	16,656	15,294	15,854
M 20	10	30	20,000	18,376	18,656	17,294	17,854
M 22	10	30	22,000	20,376	20,656	19,294	19,854
M 24	12	36	24,000	22,051	22,386	20,752	21,382
M 27	12	36	27,000	25,051	25,386	23,752	24,382
M 30	15	45	30,000	27,727	28,082	26,211	26,921
M 33	15	45	33,000	30,727	31,082	29,211	29,921
M 36	18	53	36,000	33,402	33,777	31,670	32,420
M 39	18	53	39,000	36,402	36,777	34,670	35,420
M 42	21	63	42,000	39,077	39,477	37,129	37,979
M 45	21	63	45,000	42,077	42,477	40,129	40,979
M 48	24	71	48,000	44,752	45,177	42,587	43,487
M 52	24	71	52,000	48,752	49,177	46,587	47,487

## 3.2 Bolt threads

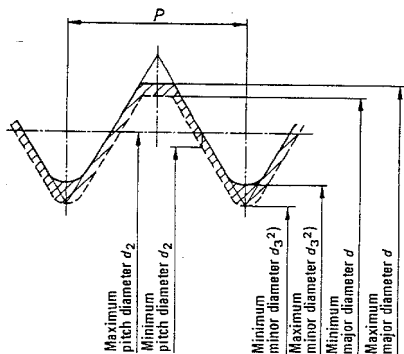


Figure 2. Bolt thread in tolerance position h

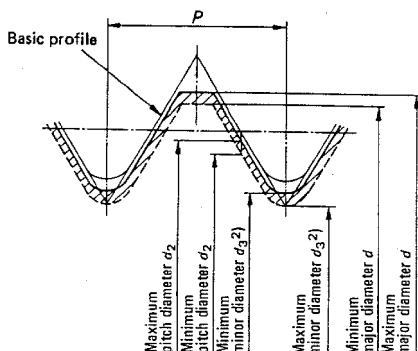


Figure 3. Bolt thread in tolerance position g

## 3.2.1 Tolerance class 6g or 6h bolt threads (tolerance quality: medium)

M 1 to M 1,4 bolt threads are given tolerance class 6h.

M 1,6 to M 39 bolt threads are given tolerance class 6g.

Table 6. Limits of sizes for coarse bolt threads

Thread size	Normal length of engagement		Major diameter $d$		Pitch diameter $d_2$		Minor diameter $d_3$	
	from	to	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
M 1	0,6	1,7	1,000	0,933	0,838	0,785	0,693	0,630
M 1,2	0,6	1,7	1,200	1,133	1,038	0,985	0,893	0,830
M 1,4	0,7	2	1,400	1,325	1,205	1,149	1,032	0,964
M 1,6	0,8	2,6	1,581	1,496	1,354	1,291	1,151	1,075
M 1,8	0,8	2,6	1,781	1,696	1,554	1,491	1,352	1,275
M 2	1	3	1,981	1,886	1,721	1,654	1,490	1,407
M 2,5	1,3	3,8	2,480	2,380	2,188	2,117	1,928	1,840
M 3	1,5	4,5	2,980	2,874	2,655	2,580	2,367	2,273
M 3,5	1,7	5	3,479	3,354	3,089	3,004	2,743	2,635
M 4	2	6	3,978	3,838	3,523	3,433	3,119	3,002
M 5	2,5	7,5	4,976	4,826	4,456	4,361	3,995	3,869
M 6	3	9	5,974	5,794	5,324	5,212	4,747	4,596
M 7	3	9	6,974	6,794	6,324	6,212	5,747	5,596
M 8	4	12	7,972	7,760	7,160	7,042	6,438	6,272
M 10	5	15	9,968	9,732	8,994	8,862	8,128	7,938
M 12	6	18	11,966	11,701	10,829	10,679	9,819	9,602
M 14	8	24	13,962	13,682	12,663	12,503	11,508	11,271
M 16	8	24	15,962	15,682	14,663	14,503	13,508	13,271
M 18	10	30	17,958	17,623	16,334	16,164	14,891	14,625
M 20	10	30	19,958	19,623	18,334	18,164	16,891	16,625
M 22	10	30	21,958	21,623	20,334	20,164	18,891	18,625
M 24	12	36	23,952	23,577	22,003	21,803	20,271	19,955
M 27	12	36	26,952	26,577	25,003	24,803	23,271	22,955
M 30	15	45	29,947	29,522	27,674	27,462	25,653	25,306
M 33	15	45	32,947	32,522	30,674	30,462	28,653	28,306
M 36	18	53	35,940	35,465	33,342	33,118	31,033	30,655
M 39	18	53	38,940	38,465	36,342	36,118	34,033	33,655

2) Maximum expressed by  $R = 0,144 P = H/6$ , minimum by  $R_{\min} = 0,125 P = H/7$  (see DIN 13 Part 14)

Table 7. Limits of sizes for fine bolt threads

Thread size	Normal length of engagement		Major diameter $d$		Pitch diameter $d_2$		Minor diameter $d_3$ <sup>2)</sup>	
	from	to	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
M 8 x 1	3	9	7,974	7,794	7,324	7,212	6,747	6,596
M 10 x 1	3	9	9,974	9,794	9,324	9,212	8,747	8,596
M 10 x 1,25	4	12	9,972	9,760	9,160	9,042	8,438	8,272
M 12 x 1,25	4,5	13	11,972	11,760	11,160	11,028	10,438	10,258
M 12 x 1,5	5,6	16	11,968	11,732	10,994	10,854	10,128	9,930
M 14 x 1,5	5,6	16	13,968	13,732	12,994	12,854	12,128	11,930
M 16 x 1,5	5,6	16	15,968	15,732	14,994	14,854	14,128	13,930
M 18 x 1,5	5,6	16	17,968	17,732	16,994	16,854	16,128	15,930
M 18 x 2	8	24	17,962	17,682	16,663	16,503	15,508	15,271
M 20 x 1,5	5,6	16	19,968	19,732	18,994	18,854	18,128	17,930
M 20 x 2	8	24	19,962	19,682	18,663	18,503	17,508	17,271
M 22 x 1,5	5,6	16	21,968	21,732	20,994	20,854	20,128	19,930
M 22 x 2	8	24	21,962	21,682	20,663	20,503	19,508	19,271
M 24 x 2	8,5	25	23,962	23,682	22,663	22,493	21,508	21,261
M 27 x 2	8,5	25	26,962	26,682	25,663	25,483	24,508	24,261
M 30 x 2	8,5	25	29,962	29,682	28,663	28,493	27,508	27,261
M 33 x 2	8,5	25	32,962	32,682	31,663	31,493	30,508	30,261
M 36 x 3	12	36	35,952	35,577	34,003	33,803	32,271	31,955
M 39 x 3	12	36	38,952	38,577	37,003	36,803	35,271	34,955

## 3.2.2 Tolerance class 8g bolt threads (tolerance quality: coarse)

Table 8. Limits of sizes for coarse bolt threads

Thread size	Normal length of engagement		Major diameter $d$		Pitch diameter $d_2$		Minor diameter $d_3$ <sup>2)</sup>	
	from	to	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
M 5	2,5	7,5	4,976	4,740	4,456	4,306	3,995	3,814
M 6	3	9	5,974	5,694	5,324	5,144	4,747	4,528
M 7	3	9	6,974	6,694	6,324	6,144	5,747	5,528
M 8	4	12	7,972	7,637	7,160	6,970	6,438	6,200
M 10	5	15	9,968	9,593	8,994	8,782	8,128	7,858
M 12	6	18	11,966	11,541	10,829	10,593	9,819	9,516
M 14	8	24	13,962	13,512	12,663	12,413	11,508	11,181
M 16	8	24	15,962	15,512	14,663	14,413	13,508	13,181
M 18	10	30	17,958	17,428	16,334	16,069	14,891	14,530
M 20	10	30	19,958	19,428	18,334	18,069	16,891	16,530
M 22	10	30	21,958	21,428	20,334	20,069	18,891	18,530
M 24	12	36	23,952	23,352	22,003	21,688	20,271	19,840
M 27	12	36	26,952	26,352	25,003	24,688	23,271	22,840
M 30	15	45	29,947	29,277	27,674	27,339	25,653	25,183
M 33	15	45	32,947	32,277	30,674	30,339	28,653	28,183
M 36	18	53	35,940	35,190	33,342	32,987	31,033	30,524
M 39	18	53	38,940	38,190	36,342	35,987	34,033	33,524
M 42	21	63	41,937	41,137	39,014	38,639	36,416	35,868
M 45	21	63	44,937	44,137	42,014	41,639	39,416	38,868
M 48	24	71	47,929	47,079	44,681	44,281	41,795	41,202
M 52	24	71	51,929	51,079	48,681	48,281	45,705	45,202

2) See page 4

### Standards referred to

DIN 13 Part 1	ISO metric screw threads; coarse screw threads from 1 to 68 mm screw thread diameter, nominal sizes
DIN 13 Part 2	ISO metric screw threads; fine screw threads with 0,2, 0,25 or 0,35 mm pitch in screw thread diameters from 1 to 50 mm, nominal sizes
DIN 13 Part 3	ISO metric screw threads; fine screw threads with 0,5 mm pitch in screw thread diameters from 3,5 to 90 mm, nominal sizes
DIN 13 Part 4	ISO metric screw threads; fine screw threads with 0,75 mm pitch in screw thread diameters from 5 to 110 mm, nominal sizes
DIN 13 Part 5	ISO metric screw threads; fine screw threads with 1 mm and 1,25 mm pitches in screw thread diameters from 7,5 to 200 mm, nominal sizes
DIN 13 Part 6	ISO metric screw threads, fine screw threads with 1,5 mm pitch in screw thread diameters from 12 to 300 mm, nominal sizes
DIN 13 Part 7	ISO metric screw threads; fine screw threads with 2 mm pitch in screw thread diameters from 17 to 300 mm, nominal sizes
DIN 13 Part 8	ISO metric screw threads; fine screw threads with 3 mm pitch in screw thread diameters from 28 to 300 mm, nominal sizes
DIN 13 Part 14	ISO metric screw threads; principles for a tolerance system for screw threads from 1 mm diameter
DIN 13 Part 15	ISO metric screw threads; basic deviations and tolerances for screw threads from 1 mm diameter
DIN 13 Part 19	ISO metric screw threads; basic profile and production profiles
DIN 13 Part 27	ISO metric screw threads; coarse and fine screw threads from 1 to 355 mm screw thread diameter, deviations

### Previous editions

DIN 40 404:	11.57
DIN 13 Part 33:	11.60, 10.62, 06.64, 08.65
DIN 13 Part 13:	05.72, 07.72

### Amendments

Compared with the July 1972 edition, the following amendments have been made:

- The minimum dimensions for the minor diameter of the bolt thread given in tables 6, 7 and 8 have been recalculated taking as a basis the minimum radius  $R_{\min} = 0,125P$  which has been specified for the first time.
- The standard has been revised editorially.

### Explanatory notes

This standard conforms in substance to ISO Standard 262—1973:

ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts and to ISO Standard 965/2—1980:

ISO general purpose metric screw threads — Tolerances — Part 2:

Limits of sizes for general purpose bolt and nut threads — Medium quality

Deviations from the ISO Standards:

thread sizes M 1,1, M 2,2 and M 4,5 have been deleted;

the following specifications have been adopted for the first time:

- M42, M45, M48 and M52 coarse screw threads; M10 × 1, M12 × 1,5, M18 × 2, M20 × 2 and M22 × 2 fine screw threads
- limits of sizes for tolerance class 7H and 8g threads (tolerance quality: coarse);
- limits of sizes for the minor diameter of the bolt thread.

### International Patent Classification

F 16 B 33-02