International Standard 965/2

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE ÑORMALISATION

ISO general purpose metric screw threads — Tolerances — Part 2 : Limits of sizes for general purpose bolt and nut threads — Medium quality

Filetages métriques ISO pour usages généraux — Tolérances — Partie 2 : Dimensions limites pour la boulonnerie d'usage courant — Qualité moyenne

Second edition — 1980-09-15

UDC 621.882.082.1 **Ref. No. ISO 965/2-1980 (E)**

Descriptors : screw threads, ISO screw threads, metric system, nuts (fasteners), screws, designation, dimensions, bolts, tolerances, dimensional tolerances.

Price based on 5 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 965/2 was developed by Technical Committee ISO/TC 1, *Screw threads*, and was circulated to the member bodies in January 1979.

It has been approved by the member bodies of the following countries :

Australia	Hungary	Poland
Austria	India	Romania
Belgium	Ireland	South Africa, Rep. of
Bulgaria	Italy	Spain
Canada	Japan	Sweden
Chile	Korea, Rep. of	Switzerland
Czechoslovakia	Libyan Arab Jamahiriya	United Kingdom
Denmark	Mexico	USA
Finland	Netherlands	USSR
France	New Zealand	
Germany, F. R.	Norway	

No member body expressed disapproval of the document.

This second edition cancels and replaces the first edition (i.e. ISO 965/2-1973).

Printed in Switzerland

This International Standard is one of a number of ISO publications determining tolerances for ISO metric screw threads. The complete set is made up as follows :

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

ISO 965/2, *ISO general purpose metric screw threads — Tolerances — Part 2 : Limits of sizes for general purpose bolt and nut threads — Medium quality.*

ISO 965/3, *ISO general purpose metric screw threads — Tolerances — Part 3 : Deviations for constructional threads.*

ISO/R 1501, *ISO miniature screw threads.*

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ISO general purpose metric screw threads — Tolerances — Part 2 : Limits of sizes for general purpose bolt and nut threads — Medium quality

1 Scope and field of application

This International Standard specifies limits of sizes for pitch and crest diameters for ISO general purpose metric screw threads conforming to ISO 262, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts.*

The limits of sizes for the tolerance quality specified are derived from the fundamental deviations and tolerances specified in ISO 965/1.

2 Designation

Tolerance designation for nut threads is

— 5H for sizes up to and including M 1,4;

— 6H for sizes M 1,6 and larger.

Examples :

M1 — 5H

M10 × 1,25 — 6H

Tolerance designation for bolt threads is

— 6H for sizes up to and including M 1,4;

— 6g for sizes M 1,6 and larger.

Examples :

M1 — 6h

M10 × 1,25 — 6g

A fit between threaded parts is indicated by the nut thread tolerance designation followed by the bolt thread tolerance designation separated by a stroke.

Examples :

M1 — 5H/6h

M10 × 1,25 — 6H/6g

3 Remark

The root contour shall not in any point transgress the basic profile.

For coated threads, the tolerances apply to the parts before coating, unless otherwise stated. After coating, the actual thread profile shall not in any point transgress the maximum material limits for position H or h respectively.

NOTE — These provisions are intended for thin coatings, for example those obtained by electroplating. For thicker coatings, for example those obtained by hot-dip galvanizing, special provisions are under consideration and will be added to ISO 965/1, 2 and 3.

4 Limits of sizes

4.1 Nut threads — Coarse thread series

Tolerance quality : Medium

Thread engagement group : Normal

Tolerance class : 6H*

Table 1

Dimensions in millimetres

Thread size	Length of thread engagement		Pitch diameter		Minor diameter	
	over	up to and incl.	max.	min.	max.	min.
M1*	0,6	1,7	0,894	0,838	0,785	0,729
M1,1*	0,6	1,7	0,994	0,938	0,885	0,829
M1,2*	0,6	1,7	1,094	1,038	0,985	0,929
M1,4*	0,7	2	1,265	1,205	1,142	1,075
M1,6	0,8	2,6	1,458	1,373	1,321	1,221
M1,8	0,8	2,6	1,658	1,573	1,521	1,421
M2	1	3	1,830	1,740	1,679	1,567
M2,2	1,3	3,8	2,003	1,908	1,838	1,713
M2,5	1,3	3,8	2,303	2,208	2,138	2,013
M3	1,5	4,5	2,775	2,675	2,599	2,459
M3,5	1,7	5	3,222	3,110	3,010	2,850
M4	2	6	3,663	3,545	3,422	3,242
M4,5	2,2	6,7	4,131	4,013	3,878	3,688
M5	2,5	7,5	4,605	4,480	4,334	4,134
M6	3	9	5,500	5,350	5,153	4,917
M7	3	9	6,500	6,350	6,153	5,917
M8	4	12	7,348	7,188	6,912	6,647
M10	5	15	9,206	9,026	8,676	8,376
M12	6	18	11,063	10,863	10,441	10,106
M14	8	24	12,913	12,701	12,210	11,835
M16	8	24	14,913	14,701	14,210	13,835
M18	10	30	16,600	16,376	15,744	15,294
M20	10	30	18,600	18,376	17,744	17,294
M22	10	30	20,600	20,376	19,744	19,294
M24	12	36	22,316	22,051	21,252	20,752
M27	12	36	25,316	25,051	24,252	23,752
M30	15	45	28,007	27,727	26,771	26,211
M33	15	45	31,007	30,727	29,771	29,211
M36	18	53	33,702	33,402	32,270	31,670
M39	18	53	36,702	36,402	35,270	34,670

* The tabulated values for sizes M1,4 and smaller correspond to tolerance quality *Fine* and tolerance class 5H.

4.2 Bolt threads — Coarse thread series

Tolerance quality : Medium

Thread engagement group : Normal

Tolerance class : 6g*

Table 2

Dimensions in millimetres

Thread size	Length of thread engagement		Major diameter		Pitch diameter		Root radius min.[1]
	over	up to and incl.	max.	min.	max.	min.	
M1*	0,6	1,7	1,000	0,933	0,838	0,785	0,031
M1,1*	0,6	1,7	1,100	1,033	0,938	0,885	0,031
M1,2*	0,6	1,7	1,200	1,133	1,038	0,985	0,031
M1,4*	0,7	2	1,400	1,325	1,205	1,149	0,038
M1,6	0,8	2,6	1,581	1,496	1,354	1,291	0,044
M1,8	0,8	2,6	1,781	1,696	1,554	1,491	0,044
M2	1	3	1,981	1,886	1,721	1,654	0,050
M2,2	1,3	3,8	2,180	2,080	1,888	1,817	0,056
M2,5	1,3	3,8	2,480	2,380	2,188	2,117	0,056
M3	1,5	4,5	2,980	2,874	2,655	2,580	0,063
M3,5	1,7	5	3,479	3,354	3,089	3,004	0,075
M4	2	6	3,978	3,838	3,523	3,433	0,088
M4,5	2,2	6,7	4,478	4,338	3,991	3,901	0,094
M5	2,5	7,5	4,976	4,826	4,456	4,361	0,100
M6	3	9	5,974	5,794	5,324	5,212	0,125
M7	3	9	6,974	6,794	6,324	6,212	0,125
M8	4	12	7,972	7,760	7,160	7,042	0,156
M10	5	15	9,968	9,732	8,994	8,862	0,188
M12	6	18	11,966	11,701	10,829	10,679	0,219
M14	8	24	13,962	13,682	12,663	12,503	0,250
M16	8	24	15,962	15,682	14,663	14,503	0,250
M18	10	30	17,958	17,623	16,334	16,164	0,313
M20	10	30	19,958	19,623	18,334	18,164	0,313
M22	10	30	21,958	21,623	20,334	20,164	0,313
M24	12	36	23,952	23,577	22,003	21,803	0,375
M27	12	36	26,952	26,577	25,003	24,803	0,375
M30	15	45	29,947	29,522	27,674	27,462	0,438
M33	15	45	32,947	32,522	30,674	30,462	0,438
M36	18	53	35,940	35,465	33,342	33,118	0,500
M39	18	53	38,940	38,465	36,342	36,118	0,500

* The tabulated values for sizes M1,4 and smaller correspond to tolerance class 6h.

1) See ISO 965/1, clause 11.

4.3 Nut threads — Fine thread series

Tolerance quality : Medium

Thread engagement group : Normal

Tolerance class : 6H

Table 3

Dimensions in millimetres

Thread size	Length of thread engagement		Pitch diameter		Minor diameter	
	over	up to and incl.	max.	min.	max.	min.
M8 × 1	3	9	7,500	7,350	7,153	6,917
M10 × 1,25	4	12	9,348	9,188	8,912	8,647
M12 × 1,25	4,5	13	11,368	11,188	10,912	10,647
M14 × 1,5	5,6	16	13,216	13,026	12,676	12,376
M16 × 1,5	5,6	16	15,216	15,026	14,676	14,376
M18 × 1,5	5,6	16	17,216	17,026	16,676	16,376
M20 × 1,5	5,6	16	19,216	19,026	18,676	18,376
M22 × 1,5	5,6	16	21,216	21,026	20,676	20,376
M24 × 2	8,5	25	22,925	22,701	22,210	21,835
M27 × 2	8,5	25	25,925	25,701	25,210	24,835
M30 × 2	8,5	25	28,925	28,701	28,210	27,835
M33 × 2	8,5	25	31,925	31,701	31,210	30,835
M36 × 3	12	36	34,316	34,051	33,252	32,752
M39 × 3	12	36	37,316	37,051	36,252	35,752

4.4 Bolt threads — Fine thread series

Tolerance quality : Medium

Thread engagement group : Normal

Tolerance class : 6g

Table 4

Dimensions in millimetres

Thread size	Length of thread engagement		Major diameter		Pitch diameter		Root radius min.[1]
	over	up to and incl.	max.	min.	max.	min.	
M8 × 1	3	9	7,974	7,794	7,324	7,212	0,125
M10 × 1,25	4	12	9,972	9,760	9,160	9,042	0,156
M12 × 1,25	4,5	13	11,972	11,760	11,160	11,028	0,156
M14 × 1,5	5,6	16	13,968	13,732	12,994	12,854	0,188
M16 × 1,5	5,6	16	15,968	15,732	14,994	14,854	0,188
M18 × 1,5	5,6	16	17,968	17,732	16,994	16,854	0,188
M20 × 1,5	5,6	16	19,968	19,732	18,994	18,854	0,188
M22 × 1,5	5,6	16	21,968	21,732	20,994	20,854	0,188
M24 × 2	8,5	25	23,962	23,682	22,663	22,493	0,250
M27 × 2	8,5	25	26,962	26,682	25,663	25,493	0,250
M30 × 2	8,5	25	29,962	29,682	28,663	28,493	0,250
M33 × 2	8,5	25	32,962	32,682	31,663	31,493	0,250
M36 × 3	12	36	35,952	35,577	34,003	33,803	0,375
M39 × 3	12	36	38,952	38,577	37,003	36,803	0,375

1) See ISO 965/1, clause 11.