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ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 965/II

ISO GENERAL PURPOSE METRIC SCREW THREADS

TOLERANCES

LIMITS OF SIZES FOR COMMERCIAL BOLT AND NUT THREADS

MEDIUM QUALITY

1st EDITION

February 1969

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Also issued in French and Russian. Copies to be obtained through the national standards organizations.

BRIEF HISTORY

The ISO Recommendation R 965/II, *ISO general purpose metric screw threads – Tolerances – Limits of sizes for commercial bolt and nut threads – Medium quality*, was drawn up by Technical Committee ISO/TC 1, *Screw threads*, the Secretariat of which is held by the Sveriges Standardiseringskommission (SIS).

Work on this question by the Technical Committee led, in 1964, to the adoption of the proposed tolerance system for ISO metric screw threads.

In September 1966, a Draft ISO Recommendation (No. 980) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Argentina	Germany	South Africa, Rep. of
Australia	Greece	Spain
Austria	India	Sweden
Belgium	Israel	Switzerland
Brazil	Italy	Turkey
Canada	Japan	U.A.R.
Chile	Korea, Rep. of	United Kingdom
Czechoslovakia	Netherlands	U.S.A.
Denmark	New Zealand	Yugoslavia
Finland	Norway	
France	Romania	

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in February 1969, to accept it as an ISO RECOMMENDATION.

FOREWORD

This document is one of a number of ISO Recommendations determining tolerances for ISO metric screw threads.

The complete set of these ISO Recommendations is made up as follows :

ISO/R 965/I, *ISO general purpose metric screw threads – Tolerances – Principles and basic data;*

ISO/R 965/II (this document), *ISO general purpose metric screw threads – Tolerances – Limits of sizes for commercial bolt and nut threads – Medium quality;*

ISO/R 965/III, *ISO general purpose metric screw threads – Tolerances – Deviations for constructional threads;*

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

* At present Draft ISO Recommendation No. 1501

ISO Recommendation | R 965/II | February 1969

ISO GENERAL PURPOSE METRIC SCREW THREADS

TOLERANCES

LIMITS OF SIZES FOR COMMERCIAL BOLT AND NUT THREADS

MEDIUM QUALITY

1. SCOPE

This ISO Recommendation tabulates limits of sizes for pitch and crest diameters for ISO general purpose metric screw threads according to ISO Recommendation R 262*.

2. DESIGNATIONS

Tolerance designation for nut threads according to this ISO Recommendation is

- 5H for sizes up to an including M1.4,
- 6H for sizes M1.6 and larger.

Examples :

M1–5H

M10 X 1.25–6H

Tolerance designation for bolt threads according to this ISO Recommendation is

- 6h for sizes up to and including M1.4,
- 6g for sizes M1.6 and larger.

Examples :

M1–6h

M10 X 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 X 1.25–6H/6g

3. APPLICATION

The limits of sizes for the tolerance quality specified are derived from the fundamental deviations and tolerances specified in ISO Recommendation R 965/I, *ISO general purpose metric screw threads – Tolerances Principles and basic data.*

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

* At present under revision, under the new title, *ISO general purpose metric screw threads – Selected sizes for screws, bolts and nuts* (Draft ISO Recommendation No. 1500).

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.

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

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
	over	up to and incl.	max.	min.	max.	min.	min.
M1 *	0.6	1.7	1.000	0.933	0.838	0.785	0.025
M1.1 *	0.6	1.7	1.100	1.033	0.938	0.885	0.025
M1.2 *	0.6	1.7	1.200	1.133	1.038	0.985	0.025
M1.4 *	0.7	2	1.400	1.325	1.205	1.149	0.030
M1.6	0.8	2.6	1.581	1.496	1.354	1.291	0.035
M1.8	0.8	2.6	1.781	1.696	1.554	1.491	0.035
M2	1	3	1.981	1.886	1.721	1.654	0.040
M2.2	1.3	3.8	2.180	2.080	1.888	1.817	0.045
M2.5	1.3	3.8	2.480	2.380	2.188	2.117	0.045
M3	1.5	4.5	2.980	2.874	2.655	2.580	0.050
M3.5	1.7	5	3.479	3.354	3.089	3.004	0.060
M4	2	6	3.978	3.838	3.523	3.433	0.070
M4.5	2.2	6.7	4.478	4.338	3.991	3.901	0.075
M5	2.5	7.5	4.976	4.826	4.456	4.361	0.080
M6	3	9	5.974	5.794	5.324	5.212	0.100
M7	3	9	6.974	6.794	6.324	6.212	0.100
M8	4	12	7.972	7.760	7.160	7.042	0.125
M10	5	15	9.968	9.732	8.994	8.862	0.150
M12	6	18	11.966	11.701	10.829	10.679	0.175
M14	8	24	13.962	13.682	12.663	12.503	0.200
M16	8	24	15.962	15.682	14.663	14.503	0.200
M18	10	30	17.958	17.623	16.334	16.164	0.250
M20	10	30	19.958	19.623	18.334	18.164	0.250
M22	10	30	21.958	21.623	20.334	20.164	0.250
M24	12	36	23.952	23.577	22.003	21.803	0.300
M27	12	36	26.952	26.577	25.003	24.803	0.300
M30	15	45	29.947	29.522	27.674	27.462	0.350
M33	15	45	32.947	32.522	30.674	30.462	0.350
M36	18	53	35.940	33.465	33.342	33.118	0.400
M39	18	53	38.940	38.465	36.342	36.118	0.400

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

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

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 X 1	3	9	7.500	7.350	7.153	6.917
M10 X 1.25	4	12	9.348	9.188	8.912	8.647
M12 X 1.25	4.5	13	11.368	11.188	10.912	10.647
M14 X 1.5	5.6	16	13.216	13.026	12.676	12.376
M16 X 1.5	5.6	16	15.216	15.026	14.676	14.376
M18 X 1.5	5.6	16	17.216	17.026	16.676	16.376
M20 X 1.5	5.6	16	19.216	19.026	18.676	18.376
M22 X 1.5	5.6	16	21.216	21.026	20.676	20.376
M24 X 2	8.5	25	22.925	22.701	22.210	21.835
M27 X 2	8.5	25	25.925	25.701	25.210	25.835
M30 X 2	8.5	25	28.925	28.701	28.210	27.835
M33 X 2	8.5	25	31.925	31.701	31.210	30.835
M36 X 3	12	36	34.316	34.051	33.252	32.752
M39 X 3	12	36	37.316	37.051	36.252	35.752

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

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.
	over	up to and incl.	max.	min.	max.	min.	
M8 X 1	3	9	7.974	7.794	7.324	7.212	0.100
M10 X 1.25	4	12	9.972	9.760	9.160	9.042	0.125
M12 X 1.25	4.5	13	11.972	11.760	11.160	11.028	0.125
M14 X 1.5	5.6	16	13.968	13.732	12.994	12.854	0.150
M16 X 1.5	5.6	16	15.968	15.732	14.994	14.854	0.150
M18 X 1.5	5.6	16	17.968	17.732	16.994	16.854	0.150
M20 X 1.5	5.6	16	19.968	19.732	18.994	18.854	0.150
M22 X 1.5	5.6	16	21.968	21.732	20.994	20.854	0.150
M24 X 2	8.5	25	23.962	23.682	22.663	22.493	0.200
M27 X 2	8.5	25	26.962	26.682	25.663	25.493	0.200
M30 X 2	8.5	25	29.962	29.682	28.663	28.493	0.200
M33 X 2	8.5	25	32.962	32.682	31.663	31.493	0.200
M36 X 3	12	36	35.952	35.577	34.003	33.803	0.300
M39 X 3	12	36	38.952	38.577	37.003	36.803	0.300

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