

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 529

SHORT MACHINE TAPS AND HAND TAPS

1st EDITION
November 1966

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Printed in Switzerland

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

BRIEF HISTORY

The ISO Recommendation R 529, *Short Machine Taps and Hand Taps*, was drawn up by Technical Committee ISO/TC 29, *Small Tools*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question by the Technical Committee began in 1950 and led, in 1962, to the adoption of a Draft ISO Recommendation.

In April 1964, this Draft ISO Recommendation (No. 666) was circulated to all the ISO Member Bodies for enquiry. It was approved by the following Member Bodies:

Argentina	Denmark	Portugal
Austria	France	Spain
Belgium	Germany	Switzerland
Brazil	Hungary	Turkey
Canada	Italy	United Kingdom
Chile	Netherlands	Yugoslavia
Colombia	New Zealand	
Czechoslovakia	Poland	

Three Member Bodies opposed the approval of the Draft:

Sweden
U.S.A.
U.S.S.R.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in November 1966, to accept it as an ISO RECOMMENDATION.

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SHORT MACHINE TAPS AND HAND TAPS

1. SCOPE

This ISO Recommendation, dealing with short machine taps and hand taps, gives the general dimensions of these tools as a function of the thread diameter and pitch:

- length of thread
- overall length
- shank diameter and dimensions of driving square
- dimensions of the connecting portion between the shank and threaded part.

It comprises six groups of tables (Tables 3.1 to 8.1 for dimensions in millimetres and Tables 3.2 to 8.2 for dimensions in inches) corresponding respectively to the following threads:

Metric threads:

- coarse pitch
- fine pitch

Inch threads:

- Unified Coarse threads (UNC)
- Unified Fine threads (UNF)
- British Standard Whitworth (BSW) and British Standard Fine threads (BSF)
- British Association threads (BA).

Taps are standardized only for threads, in millimetres or in inches, having a pitch greater than that of the Unified Extra Fine thread (UNEF).

However, in the Annex A, Tables A.7.1 and A.7.2 give the values of overall lengths and shank diameters which may be used for the manufacture of taps outside the standard.

Also in the Annex A are Tables A.6.1 and A.6.2 which give the minimum permissible values of l_0 length of threads, as determined by tests carried out in different countries.

The standardized lengths of thread l , always at least equal to l_0 , have been chosen in such a way as to permit the use of the same blank for several consecutive pitches.

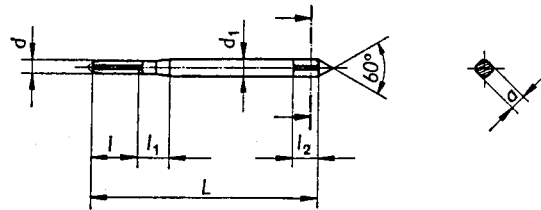
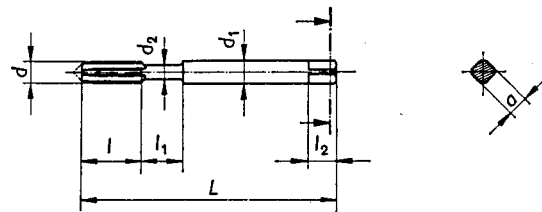
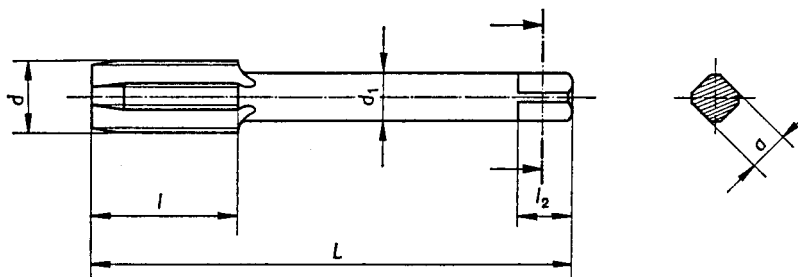
Tables in sections 3 to 8 are followed by a note giving details of tolerances and marking applying to all the standard taps covered by these tables.

2. INTERCHANGEABILITY

Tables 3.1 to 8.1, as well as Tables A.6.1 and A.7.1 in the Annex A, relate to dimensions in millimetres; Tables 3.2 to 8.2, as well as Tables A.6.2 and A.7.2 in the Annex A, relate to dimensions in inches.

The values given in each of these two groups of tables have been determined in such a way as to ensure interchangeability between taps made to one of the systems of measurement and taps made to the other system, for whichever system of thread, metric or inch, the tap is required.

3. COARSE PITCH METRIC THREADS

 $d = 1 \text{ to } 2.5 \text{ mm}$  $d = 3 \text{ to } 10 \text{ mm}$  $d > 10 \text{ mm}$ 

3.2 Dimensions in inches

Designation	d nominal	Pitch	d ₁ h9	l	L	d ₂ min.	l ₁	Square		
								a h11	l ₂	
M 1.0	0.0394	0.00984	0.0984	7/32	1 17/32		3/16	0.079	5/32	
M 1.1	0.0433									
M 1.2	0.0472									
M 1.4	0.0551	0.01181		9/32	1 19/32		7/32	1/4	0.088	3/16
M 1.6	0.0630	0.01378		5/16	1 5/8					
M 1.8	0.0709									
M 2.0	0.0787	0.01575		3/8	1 3/4		0.083	9/32	0.098	1/4
M 2.2	0.0866	0.01772	0.1102			0.110				
M 2.5	0.0984	0.01969	0.1240			7/16			1 7/8	
M 3.0	0.1181		0.1398	1/2	1 15/16	0.110	0.124			
M 3.5	0.1378		0.02362	1/2	2 1/16	0.124	0.140			
M 4.0	0.1575	0.02756	0.1575	5/8	2 1/4	0.140	11/32	0.157	9/32	
M 4.5	0.1772	0.02953	0.1772	3/4	2 5/8	0.177	7/16	0.197	5/16	
M 5.0	0.1969	0.03150	0.1969	7/8	2 7/8	0.209	1/2	0.220	11/32	
M 6.0	0.2362	0.03937	0.2480			0.236		0.248		
M 7.0	0.2756		0.2795	0.3150	0.280	0.295	9/16	0.280	13/32	
M 8.0	0.3150	0.04921	0.3150	15/16	3 1/8		19/32	0.315	7/16	
M 9.0	0.3543		0.3543	1	3 3/8		0.248	11/32		
M 10.0	0.3937	0.05906	0.3937	1 1/8	3 1/2		0.295	13/32		
M 11.0	0.4331	0.05906	0.3150	1 3/16	3 3/4		0.354	15/32		
M 12.0	0.4724	0.06890	0.3740	1 1/4	4		0.394	1/2		
M 14.0	0.5512	0.07874	0.4409	1 7/16	4 7/16		0.441	9/16		
M 16.0	0.6299		0.4921	1 1/2	4 5/8		0.492	5/8		
M 18.0	0.7087	0.09842	0.5512	1 3/4	5 1/8		0.551	23/32		
M 20.0	0.7874		0.6299	1 3/4	5 5/16		0.630	25/32		
M 22.0	0.8661	0.11811	0.7087	1 7/8	5 7/16		0.709	7/8		
M 24.0	0.9449		0.7874	2	5 15/16		0.787	15/16		
M 27.0	1.0630	0.13780	0.8819	2 1/4	6 3/8		0.882	1 1/32		
M 30.0	1.1811		0.9842	2 3/8	6 11/16		0.984	1 3/32		
M 33.0	1.2992	0.15748	1.1024	2 3/4	7 7/8		1.102	1 7/32		
M 36.0	1.4173		1.2402	3	8 11/16		1.240	1 11/32		
M 39.0	1.5354	0.17717	1.3976	3 1/8	9 3/16		1.398	1 1/2		
M 42.0	1.6535		1.5748							
M 45.0	1.7717	0.19685	1.7717							
M 48.0	1.8898									
M 52.0	2.0472	0.21654								
M 56.0	2.2047									
M 60.0	2.3622	0.23622								
M 64.0	2.5197									
M 68.0	2.6772									

NOTES

1. *Tolerances*

(a) THREAD AND OVERALL LENGTH

Negative deviations in inches, according to the following indications:

Nominal diameter of tap		Maximum deviation on l and L
over	including	
—	$7/32$	— $3/32$
$7/32$	$1/2$	— $1/8$
$1/2$	$1 1/2$	— $3/16$
$1 1/2$	—	— $1/4$

(b) SHANK DIAMETERS AND DRIVING SQUARES

Tolerances in accordance with ISO Recommendation R 237, *Diameters of Shanks and Sizes of Driving Squares for Rotating Tools with Parallel Shanks*,

— on diameter d_1 :

h9* for precision shanks,

h11* for non-precision shanks;

— on the across flats dimension a :

h11, *

h12* (including errors of form of the square and of its position in relation to the shank).

2. *Marking*

The tap should be marked, on the shank, by any means not impairing the metal surface.

Marking should consist of the following:

Thread

In accordance with the standard designation (see tables in sections 3 to 8, first column) completed by

- an indication of the class of tap thread;
- a clear mark (the letter L for example) for left-hand threads.

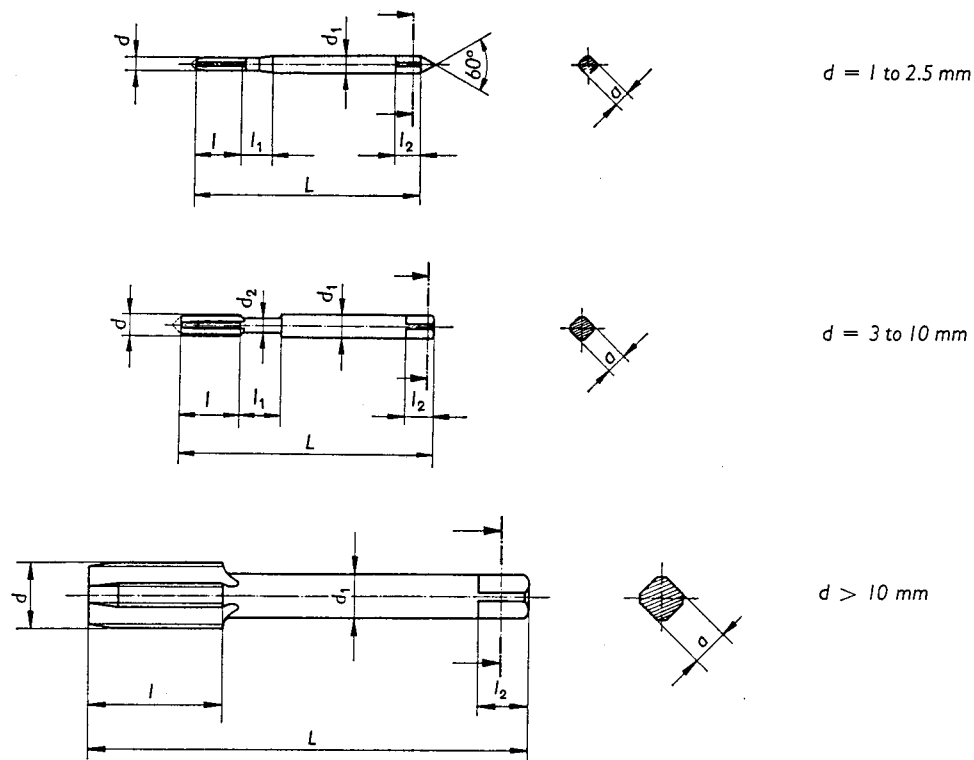
Serial taps

A mark indicating the order in which the taps should be used, except for the finishing tap.

Material.

* See ISO Recommendation R 286, *ISO System of Limits and Fits – Part 1: General, Tolerances and Deviations*. For inch size taps, direct conversion into inches from the metric values of h9, h11 and h12.

4. FINE PITCH METRIC THREADS



4.1 Dimensions in millimetres

Designation	d nominal	Pitch	d_1 h9	l	L	d_2 min.	l_1	Square	
								a h11	l_2
M 1.0 × 0.20	1.0	0.20	2.50	5.5	38.5		4.5	2.00	4
M 1.1 × 0.20	1.1								
M 1.2 × 0.20	1.2								
M 1.4 × 0.20	1.4			7.0	40.0		5.0		
M 1.6 × 0.20	1.6								
M 1.8 × 0.20	1.8			8.0	41.0				
M 2.0 × 0.25	2.0	0.25	2.80				5.5	2.24	5
M 2.2 × 0.25	2.2								
M 2.5 × 0.35	2.5	0.35	3.15	9.5	44.5	2.12	6.0	2.50	6
M 3.0 × 0.35	3.0			11.0	48.0		7.0		
M 3.5 × 0.35	3.5			13.0	50.0				
M 4.0 × 0.50	4.0	0.50	4.00			2.80		3.15	7
M 4.5 × 0.50	4.5			13.0	53.0		8.0		
M 5.0 × 0.50	5.0			16.0	58.0				
M 5.5 × 0.50	5.5	0.75	5.00	17.0	62.0	3.55	9.0	4.00	8
M 6.0 × 0.75	6.0								
M 7.0 × 0.75	7.0			19.0	66.0		11.0		
M 8.0 × 1.00	8.0	1.00	7.10			5.30		5.60	9
M 9.0 × 1.00	9.0			19.0	69.0		13.0		
M 10.0 × 1.00	10.0								
M 10.0 × 1.25	10.0	1.25	10.00	20.0	76.0	7.50	15.0	8.00	11

4.1 Dimensions in millimetres (continued)

Designation	d nominal	Pitch	d ₁ h9	l	L	d ₂ min.	l ₁	Square	
								a h11	l ₂
M 12.0 × 1.25	12.0	1.25	9.5	24.0	84.0			7.5	10
M 12.0 × 1.50		1.50		29.0	89.0				
M 14.0 × 1.25	14.0	1.25	11.2	25.0	90.0			9.0	12
M 14.0 × 1.50		1.50		30.0	95.0				
M 15.0 × 1.50	15.0	1.50		30.0	95.0				
M 16.0 × 1.50	16.0	1.50	12.5	32.0	102.0			10.0	13
M 17.0 × 1.50	17.0	1.50		32.0	102.0				
M 18.0 × 1.50	18.0	1.50	14.0	33.0*	108.0*			11.2	14
M 18.0 × 2.00		2.00							
M 20.0 × 1.50	20.0	1.50		33.0*	108.0*				
M 20.0 × 2.00		2.00							
M 22.0 × 1.50	22.0	1.50	16.0	35.0*	115.0*			12.5	16
M 22.0 × 2.00		2.00							
M 24.0 × 1.50	24.0	1.50	18.0	35.0	120.0			14.0	18
M 24.0 × 2.00		2.00							
M 25.0 × 1.50	25.0	1.50		35.0	120.0				
M 25.0 × 2.00		2.00							
M 27.0 × 1.50	27.0	1.50	20.0	37.0	127.0			16.0	20
M 27.0 × 2.00		2.00							
M 28.0 × 1.50	28.0	1.50		37.0	127.0				
M 28.0 × 2.00		2.00							
M 30.0 × 1.50	30.0	1.50	22.4	37.0	127.0			18.0	22
M 30.0 × 2.00		2.00							
M 30.0 × 3.00		3.00		48.0	138.0				
M 32.0 × 1.50	32.0	1.50	25.0	37.0	137.0			20.0	24
M 32.0 × 2.00		2.00							
M 33.0 × 1.50	33.0	1.50		37.0	137.0			22.4	26
M 33.0 × 2.00		2.00							
M 33.0 × 3.00		3.00		51.0	151.0				
M 35.0 × 1.50	35.0	1.50	28.0	39.0	144.0			20.0	24
M 36.0 × 1.50	36.0	1.50		39.0	144.0				
M 36.0 × 2.00		2.00							
M 36.0 × 3.00		3.00		57.0	162.0				
M 39.0 × 1.50	39.0	1.50	30.0	39.0	149.0			22.4	26
M 39.0 × 2.00		2.00							
M 39.0 × 3.00		3.00		60.0	170.0				
M 40.0 × 1.50	40.0	1.50	32.0	39.0	149.0			22.4	26
M 40.0 × 2.00		2.00							
M 40.0 × 3.00		3.00		60.0	170.0				

* As a departure from general Tables A.7.1 and A.7.2, the lengths *l* and *L* which are marked with an asterisk in the present table, have been unified to a common value for M 18 and M 20 threads and also for the M 22 thread.