

Transformed

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

**ISO RECOMMENDATION
R 237**

**DIAMETERS OF SHANKS AND SIZES
OF DRIVING SQUARES
FOR ROTATING TOOLS WITH PARALLEL SHANKS**

1st EDITION

December 1961

COPYRIGHT RESERVED

The copyright of ISO Recommendations and ISO Standards belongs to ISO Member Bodies. Reproduction of these documents, in any country, may be authorized therefore only by the national standards organization of that country, being a member of ISO.

For each individual country the only valid standard is the national standard of that country.

Printed in Switzerland

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

STANDARDSISO.COM : Click to view the full PDF of ISO/R 237:1961

BRIEF HISTORY

The ISO Recommendation R 237, *Diameters of Shanks and Sizes of Driving Squares for Rotating Tools with Parallel Shanks*, 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, 1958, to the adoption of a Draft ISO Recommendation.

In September 1959, this Draft ISO Recommendation (No. 303) 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:

Austria	Hungary	Portugal
Belgium	India	Romania
Burma	Italy	Sweden
Czechoslovakia	Mexico	Switzerland
France	Netherlands	United Kingdom
Germany	Pakistan	U. S. S. R.
Greece	Poland	

One Member Body opposed the approval of the Draft: U. S. A.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in December 1961, to accept it as an ISO RECOMMENDATION.

DIAMETERS OF SHANKS AND SIZES OF DRIVING SQUARES FOR ROTATING TOOLS WITH PARALLEL SHANKS

INTRODUCTION

I. SCOPE

This ISO Recommendation relates to shank diameters and driving squares for rotating tools with parallel shanks, such as reamers, screwing taps, etc.

It comprises two groups of tables:

1. a Principal Series and
2. a Secondary Series,

and gives for each of them

- (1) the dimensions in millimetres and
- (2) the corresponding dimensions in inches.

In each of the two series, the dimensions of driving squares for a given shank diameter are shown.

The complete range of diameters is divided into a certain number of diameter steps, for each of which the corresponding standard square is given

- either in the Principal Series,
- or in the Secondary Series, for use in cases where a finer subdivision is absolutely necessary in the small diameters.

In the metric tables, the values of the across flats a of the squares and the preferred diameters d are scaled in accordance with the series of preferred numbers R 20; the limits of the diameter steps are the intermediate values of the series of preferred numbers R 40.

In the inch tables, the values a and d are exact conversions of the corresponding metric values, expressed to three decimal places for the squares and to four decimal places for the diameters.

In the Principal Series, the tables give not only the two limits for each diameter step, but in addition, for each step, the value of the *preferred diameter* (see list below), which corresponds to the theoretical optimum ratio $a/d = 0.80$ between the across flats of the square and the diameter of the shank.

Within any given step, this ratio a/d varies between the extreme limits 0.75 and 0.85 for the Principal Series, and 0.80 and 0.85 for the Secondary Series, taking account of the nominal values of a and d only. If the tolerances on a and d are taken into account, it never falls below 0.72, even in the worst cases.

Preferred diameters

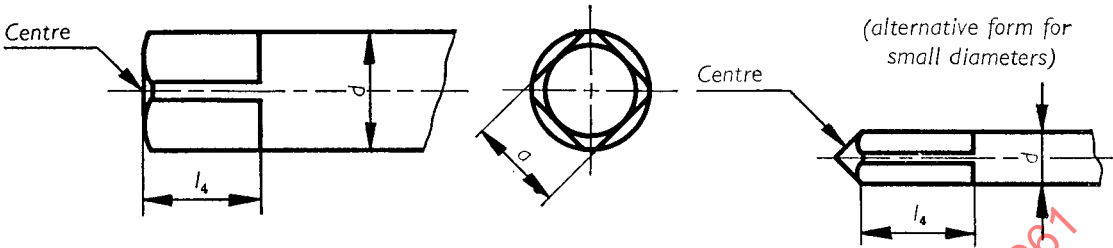
Millimetres		Inches	
1.12	11.2	0.044 1	0.440 9
1.25	12.5	0.049 2	0.492 1
1.40	14.0	0.055 1	0.551 2
1.60	16.0	0.063 0	0.629 9
1.80	18.0	0.070 9	0.708 7
2.00	20.0	0.078 7	0.787 4
2.24	22.4	0.088 2	0.881 9
2.50	25.0	0.098 4	0.984 2
2.80	28.0	0.110 2	1.102 4
3.15	31.5	0.124 0	1.240 2
3.55	35.5	0.139 8	1.397 6
4.00	40.0	0.157 5	1.574 8
4.50	45.0	0.177 2	1.771 7
5.00	50.0	0.196 9	1.968 5
5.60	56.0	0.220 5	2.204 7
6.30	63.0	0.248 0	2.480 3
7.10	71.0	0.279 5	2.795 3
8.00	80.0	0.315 0	3.149 6
9.00	90.0	0.354 3	3.543 3
10.00	100.0	0.393 7	3.937 0

II. INTERCHANGEABILITY

The dimensions in millimetres and in inches have been determined in such a way as to ensure that the squares corresponding to a given diameter step are identical, whether expressed in millimetres or in inches.

Furthermore, the limits of the diameter steps correspond exactly, so that two diameters, whether in millimetres or in inches, belonging to the same diameter range have the same driving square.

SHANK DIAMETERS AND DRIVING SQUARES
FOR ROTATING TOOLS WITH PARALLEL SHANKS



1. PRINCIPAL SERIES

1.1 Dimensions in millimetres

Shank diameter * d		Driving square		Preferred shank diameter	Shank diameter* d		Driving square		Preferred shank diameter
over	incl.	a	l ₄		over	incl.	a	l ₄	
1.06	1.18	0.90	4	1.12	10.60	11.80	9.00	12	11.20
1.18	1.32	1.00		1.25	11.80	13.20	10.00	13	12.50
1.32	1.50	1.12		1.40	13.20	15.00	11.20	14	14.00
1.50	1.70	1.25		1.60	15.00	17.00	12.50	16	16.00
1.70	1.90	1.40		1.80	17.00	19.00	14.00	18	18.00
1.90	2.12	1.60		2.00	19.00	21.20	16.00	20	20.00
2.12	2.36	1.80		2.24	21.20	23.60	18.00	22	22.40
2.36	2.65	2.00		2.50	23.60	26.50	20.00	24	25.00
2.65	3.00	2.24	5	2.80	26.50	30.00	22.40	26	28.00
3.00	3.35	2.50		3.15	30.00	33.50	25.00	28	31.50
3.35	3.75	2.80		3.55	33.50	37.50	28.00	31	35.50
3.75	4.25	3.15	6	4.00	37.50	42.50	31.50	34	40.00
4.25	4.75	3.55		4.50	42.50	47.50	35.50	38	45.00
4.75	5.30	4.00	7	5.00	47.50	53.00	40.00	42	50.00
5.30	6.00	4.50		5.60	53.00	60.00	45.00	46	56.00
6.00	6.70	5.00	8	6.30	60.00	67.00	50.00	51	63.00
6.70	7.50	5.60		7.10	67.00	75.00	56.00	56	71.00
7.50	8.50	6.30	9	8.00	75.00	85.00	63.00	62	80.00
8.50	9.50	7.10	10	9.00	85.00	95.00	71.00	68	90.00
9.50	10.60	8.00	11	10.00	95.00	106.00	80.00	75	100.00

* From among a number of possible diameters in a particular step, choose the value nearest to the preferred value (see the last column of the table).

1.2 Dimensions in inches

Shank diameter*		Driving square		Preferred shank diameter	Shank diameter*		Driving square		Preferred shank diameter
<i>d</i>					<i>d</i>				
over	incl.	<i>a</i>	<i>l₄</i>		over	incl.	<i>a</i>	<i>l₄</i>	
0.041 7	0.046 5	0.035	$\frac{5}{32}$	0.044 1	0.417 3	0.464 6	0.354	$\frac{15}{32}$	0.440 9
0.046 5	0.052 0	0.039		0.049 2	0.464 6	0.519 7	0.394	$\frac{1}{2}$	0.492 1
0.052 0	0.059 1	0.044		0.055 1	0.519 7	0.590 6	0.441	$\frac{9}{16}$	0.551 2
0.059 1	0.066 9	0.049		0.063 0	0.590 6	0.669 3	0.492	$\frac{5}{8}$	0.629 9
0.066 9	0.074 8	0.055		0.070 9	0.669 3	0.748 0	0.551	$\frac{23}{32}$	0.708 7
0.074 8	0.083 5	0.063		0.078 7	0.748 0	0.834 6	0.630	$\frac{25}{32}$	0.787 4
0.083 5	0.092 9	0.071		0.088 2	0.834 6	0.929 1	0.709	$\frac{7}{8}$	0.881 9
0.092 9	0.104 3	0.079		0.098 4	0.929 1	1.043 3	0.787	$\frac{15}{16}$	0.984 2
0.104 3	0.118 1	0.088	$\frac{3}{16}$	0.110 2	1.043 3	1.181 1	0.882	$\frac{11}{32}$	1.102 4
0.118 1	0.131 9	0.098		0.124 0	1.181 1	1.318 9	0.984	$\frac{13}{32}$	1.240 2
0.131 9	0.147 6	0.110		0.139 8	0.318 9	1.476 4	1.102	$\frac{17}{32}$	1.397 6
0.147 6	0.167 3	0.124	$\frac{1}{4}$	0.157 5	1.476 4	1.673 2	1.240	$\frac{111}{32}$	1.574 8
0.167 3	0.187 0	0.140		0.177 2	1.673 2	1.870 1	1.398	$\frac{11}{2}$	1.771 7
0.187 0	0.208 7	0.157	$\frac{9}{32}$	0.196 9	1.870 1	2.086 6	1.575	$\frac{121}{32}$	1.968 5
0.208 7	0.236 2	0.177		0.220 5	2.086 6	2.362 2	1.772	$\frac{113}{16}$	2.204 7
0.236 2	0.263 8	0.197	$\frac{5}{16}$	0.248 0	2.362 2	2.637 8	1.969	2	2.480 3
0.263 8	0.295 3	0.220		0.279 5	2.637 8	2.952 8	2.205	$\frac{27}{32}$	2.795 3
0.295 3	0.334 6	0.248	$\frac{11}{32}$	0.315 0	2.952 8	3.346 5	2.480	$\frac{27}{16}$	3.149 6
0.334 6	0.374 0	0.280	$\frac{13}{32}$	0.354 3	3.346 5	3.740 2	2.795	$\frac{211}{16}$	3.543 3
0.374 0	0.417 3	0.315	$\frac{7}{16}$	0.393 7	3.740 2	4.173 2	3.150	$\frac{215}{16}$	3.937 0

NOTE relating to Tables 1.1 and 1.2

Tolerances

- (1) on *a*: h12** including errors of form and position
(recommended manufacturing tolerance: h11)**;
- (2) on dimension *a* of the internal square intended to accept the tool shank: D11**;
- (3) on the shank: for precision tools: h9,**
for other tools: h11.**

For dimensions in inches, direct conversion into inches of the metric values of h9, h11, h12 and D11.

* From among a number of possible diameters in a particular step, choose the value nearest to the preferred value (see the last column of the table).

** ISO System of Limits and Fits.

2. SECONDARY SERIES
(to be avoided wherever possible)

2.1 Dimensions in millimetres

Shank diameter* d		Driving square		Shank diameter* d		Driving square	
over	incl.	a	l ₄	over	incl.	a	l ₄
1.06	1.12	0.90	4	3.35	3.55	2.80	5
1.12	1.18	0.95		3.55	3.75	3.00	6
1.18	1.25	1.00		3.75	4.00	3.15	
1.25	1.32	1.06		4.00	4.25	3.35	
1.32	1.40	1.12		4.25	4.50	3.55	
1.40	1.50	1.18		4.50	4.75	3.75	7
1.50	1.60	1.25		4.75	5.00	4.00	
1.60	1.70	1.32		5.00	5.30	4.25	8
1.70	1.80	1.40		5.30	5.60	4.50	
1.80	1.90	1.50		5.60	6.00	4.75	
1.90	2.00	1.60		6.00	6.30	5.00	
2.00	2.12	1.70	5	6.30	6.70	5.30	9
2.12	2.24	1.80		6.70	7.10	5.60	
2.24	2.36	1.90		7.10	7.50	6.00	10
2.36	2.50	2.00		7.50	8.00	6.30	
2.50	2.65	2.12		8.00	8.50	6.70	
2.65	2.80	2.24		8.50	9.00	7.10	
2.80	3.00	2.36		9.00	9.50	7.50	
3.00	3.15	2.50					
3.15	3.35	2.65					

2.2 Dimensions in inches

Shank diameter* d		Driving square		Shank diameter* d		Driving square	
over	incl.	a	l ₄	over	incl.	a	l ₄
0.041 7	0.044 1	0.035	5/32	0.131 9	0.139 8	0.110	3/16
0.044 1	0.046 5	0.037		0.139 8	0.147 6	0.118	1/4
0.046 5	0.049 2	0.039		0.147 6	0.157 5	0.124	
0.049 2	0.052 0	0.042		0.157 5	0.167 3	0.132	
0.052 0	0.055 1	0.044		0.167 3	0.177 2	0.140	9/32
0.055 1	0.059 1	0.046		0.177 2	0.187 0	0.148	
0.059 1	0.063 0	0.049		0.187 0	0.196 9	0.157	
0.063 0	0.066 9	0.052		0.196 9	0.208 7	0.167	
0.066 9	0.070 9	0.055		0.208 7	0.220 5	0.177	5/16
0.070 9	0.074 8	0.059		0.220 5	0.236 2	0.187	
0.074 8	0.078 7	0.063		0.236 2	0.248 0	0.197	
0.078 7	0.083 5	0.067		0.248 0	0.263 8	0.209	
0.083 5	0.088 2	0.071	3/16	0.263 8	0.279 5	0.220	11/32
0.088 2	0.092 9	0.075		0.279 5	0.295 3	0.236	
0.092 9	0.098 4	0.079		0.295 3	0.315 0	0.248	13/32
0.098 4	0.104 3	0.083		0.315 0	0.334 6	0.264	
0.104 3	0.110 2	0.088		0.334 6	0.354 3	0.280	
0.110 2	0.118 1	0.093		0.354 3	0.374 0	0.295	
0.118 1	0.124 0	0.098					
0.124 0	0.131 9	0.104					

* From among a number of possible diameters in a particular step, choose the value nearest to the preferred value (see the last column of the table).