

ISO

Revised
ISO 1641/I, II, III

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 1641

END MILLS WITH PARALLEL SHANKS
AND WITH MORSE TAPER SHANKS

STANDARD SERIES AND LONG SERIES

2324
2/34
shanks

1st EDITION

January 1970

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.

CONTENTS

	Page
1. Scope	3
2. Interchangeability	3
3. End mills with parallel shanks	4
3.1 Standard series	4
3.2 Long series	7
4. End mills with Morse taper shanks	10
4.1 Standard series	10
4.2 Long series	13

**END MILLS WITH PARALLEL SHANKS
AND WITH MORSE TAPER SHANKS
STANDARD SERIES AND LONG SERIES**

1. SCOPE

This ISO Recommendation relating to end mills with parallel shanks and with Morse taper shanks deals with the four following types of mills :

- (1) with parallel shanks, standard series (see Tables 1 to 3);
- (2) with parallel shanks, long series (see Tables 4 to 6);
- (3) with Morse taper shanks, standard series (see Tables 7 to 9);
- (4) with Morse taper shanks, long series (see Tables 10 to 12).

For each of the above-mentioned types of mills, this ISO Recommendation includes three tables giving respectively

- recommended dimensions in millimetres,
- recommended dimensions in inches,
- corresponding dimensions in millimetres and in inches, defined with respect to ranges of diameters.

2. INTERCHANGEABILITY

Numerical tables have been established so as to ensure the greatest possible correspondence between standard dimensions in millimetres and in inches.

For this purpose, the whole scale of outside diameters d has been divided into a number of ranges whose limits are taken from the R 40 series of preferred numbers for values in millimetres. Inch values are obtained by direct conversion of metric values. Lengths and Morse taper number remain constant within any one range, for values in millimetres and values in inches.

The recommended diameters for the two systems of units of measurement differ from one another, in conformity with ISO Recommendation R 523, *Recommended range of outside diameters for milling cutters*. The number of diameters retained in a determined range may also be different.

For the same purpose of interchangeability, the values in inches of diameter d_1 of the parallel shank are the exact conversions, to four decimal places, of corresponding values in millimetres, in conformity with ISO Recommendation R 237, *Diameters of shanks and sizes of driving squares for rotating tools with parallel shanks*.

3. END MILLS WITH PARALLEL SHANKS

3.1 Standard series

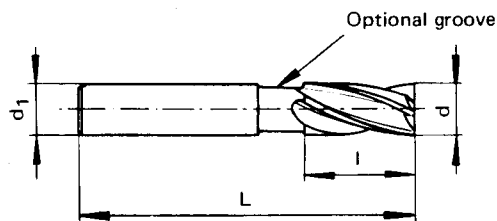


FIG. 1

TABLE 1 – Standard series in millimetres

Recommended dimensions in millimetres				Conversion into inches			
d j _s 14	d_1 h8	l	L	d	d_1	l	L
2.00	4.0	7	39	0.079	0.1575	$\frac{9}{32}$	$1 \frac{17}{32}$
2.50		8	40	0.098		$\frac{5}{16}$	$1 \frac{9}{16}$
3.15*		10	42	0.124		$\frac{3}{8}$	$1 \frac{5}{8}$
4.00		11	43	0.157		$\frac{7}{16}$	$1 \frac{11}{16}$
5.00	5.0	13	47	0.197	0.1968	$\frac{1}{2}$	$1 \frac{7}{8}$
6.30*	6.3	16	52	0.248	0.2480	$\frac{5}{8}$	$2 \frac{1}{16}$
7.10*				0.279			
8.00	8.0	19	59	0.315	0.3150	$\frac{3}{4}$	$2 \frac{5}{16}$
9.00				0.354			
10.00	10.0	22	67	0.394	0.3937	$\frac{7}{8}$	$2 \frac{5}{8}$
11.20*				0.441			
12.50*	12.5	26	76	0.492	0.4921	1	3
14.00				0.551			
16.00	16.0	32	88	0.630	0.6299	$1 \frac{1}{4}$	$3 \frac{1}{2}$
18.00				0.709			
20.00	20.0	38	101	0.788	0.7874	$1 \frac{1}{2}$	4
22.40*				0.882			
25.00	25.0	45	116	0.984	0.9842	$1 \frac{3}{4}$	$4 \frac{1}{2}$
28.00				1.102			

* In conformity with ISO Recommendation R 523, the dimensions marked with an asterisk may be replaced by more rounded values, i.e. 3 – 6 – 7 – 11 – 12 and 22 respectively.

NOTES

1. *Intermediate diameters.* Should intermediate diameters be required, refer to Table 3 for shank diameters and lengths.
2. *Tolerances.* For inch values, use a direct conversion to inches of the j_s14 and h8 metric values.
3. *Designation.* The values in millimetres in column d are used for the designation of these end mills.

TABLE 2 — Standard series in inches

Recommended dimensions in inches				Conversion into millimetres			
d	d_1	l	L	d js14	d_1 h8	l	L
$\frac{1}{16}$	0.1575	$\frac{9}{32}$	$1 \frac{17}{32}$	1.59	4.0	7	39
$\frac{5}{64}$				1.98			
$\frac{3}{32}$		$\frac{5}{16}$	$1 \frac{9}{16}$	2.38		8	40
$\frac{7}{64}$				2.78			
$\frac{1}{8}$		$\frac{3}{8}$	$1 \frac{5}{8}$	3.18		10	42
$\frac{9}{64}$				3.57			
$\frac{5}{32}$		$\frac{7}{16}$	$1 \frac{11}{16}$	3.97		11	43
$\frac{11}{64}$				4.37			
$\frac{3}{16}$	0.1968	$\frac{1}{2}$	$1 \frac{7}{8}$	4.76	5.0	13	47
$\frac{7}{32}$				5.56			
$\frac{1}{4}$	0.2480	$\frac{5}{8}$	$2 \frac{1}{16}$	6.35	6.3	16	52
$\frac{9}{32}$				7.14			
$\frac{5}{16}$	0.3150	$\frac{3}{4}$	$2 \frac{5}{16}$	7.94	8.0	19	59
$\frac{11}{32}$				8.73			
$\frac{3}{8}$	0.3937	$\frac{7}{8}$	$2 \frac{5}{8}$	9.52	10.0	22	67
$\frac{7}{16}$				11.11			
$\frac{1}{2}$	0.4921	1	3	12.70	12.5	26	76
$\frac{9}{16}$				14.29			
$\frac{5}{8}$	0.6299	$1 \frac{1}{4}$	$3 \frac{1}{2}$	15.88	16.0	32	88
$\frac{11}{16}$				17.46			
$\frac{3}{4}$	0.7874	$1 \frac{1}{2}$	4	19.05	20.0	38	101
$\frac{7}{8}$				22.22			
1	0.9842	$1 \frac{3}{4}$	$4 \frac{1}{2}$	25.40	25.0	45	116
$1 \frac{1}{8}$				28.58			

NOTES

1. *Intermediate diameters.* Should intermediate diameters be required, refer to Table 3 for shank diameters and lengths.
2. *Tolerances.* For inch values, use a direct conversion to inches of the js14 and h8 metric values.
3. *Designation.* The values in inches in column d are used for the designation of these end mills.