

# ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

## ISO RECOMMENDATION R 839

MILLING MACHINE ARBORS WITH 7/24 TAPERS  
AND MILLING MACHINE ACCESSORIES

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October 1968

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## BRIEF HISTORY

The ISO Recommendation R 839, *Milling machine arbors with 7/24 tapers and milling machine accessories*, 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 1958 and led, in 1965, to the adoption of a Draft ISO Recommendation.

In June 1966, this Draft ISO Recommendation (No. 938) 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	Hungary	Netherlands
Belgium	India	Poland
Brazil	Ireland	Portugal
Chile	Israel	Spain
Czechoslovakia	Italy	Sweden
France	Japan	Turkey
Greece	Korea, Rep. of	United Kingdom

Three Member Bodies opposed the approval of the Draft :

Germany  
Switzerland  
U.S.A.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in October 1968, to accept it as an ISO RECOMMENDATION.

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## MILLING MACHINE ARBORS WITH 7/24 TAPERS AND MILLING MACHINE ACCESSORIES

### INTRODUCTION

During the preparatory work on this ISO Recommendation it was found that existing conditions with regard to industrial equipment made it impossible to unify milling machine arbors and their accessories in a manner which would be satisfactory both to countries using the metric system and to those using the inch system.

This ISO Recommendation therefore standardizes two completely distinct series of arbors and accessories.

There is thus no interchangeability between these two series which are based respectively on the metric and inch series of ISO Recommendation R 240\*. There are many features which are not strictly identical in both types, the only interchangeable elements being the shanks with 7/24 tapers in accordance with ISO Recommendation R 297\*\*.

### 1. SCOPE

This ISO Recommendation, concerning milling machine arbors with 7/24 tapers and their accessories (spacing collars, bearing collars and clamping nuts), gives two completely distinct series of recommended manufacturing dimensions :

- the one, for the metric series, is covered by the various tables in section 3;
- the other, for the inch series, is covered by the various tables in section 4.

### 2. CHOICE OF DIMENSIONS AND TOLERANCES

#### 2.1 Dimensions

The diameters which have been adopted in this ISO Recommendation as those most commonly used correspond to the values given in ISO Recommendation R 240\* from 16 to 100 mm (omitting 19 mm and 70 mm) for the metric series and from 0.625 to 2.500 in for the inch series.

The shoulder, whether parallel or tapered, between the flange of diameter  $D_1$  and the parallel portion of diameter  $d$ , is optional and is not generally found in the inch series. With or without the shoulder, however, the diameter of the flange locating face should not in any case be less than  $D_2$ .

\* Interchangeability dimensions for milling cutters and cutter arbors.

\*\* 7/24 tapers for tool shanks.

The dimensions of spacing collars, bearing collars and clamping nuts are given respectively in clauses 3.2.1, 3.2.2 and 3.2.3 for the metric series and in clauses 4.2.1, 4.2.2 and 4.2.3 for the inch series.

Bearing collars are specified only for arbors with useful lengths  $l$  greater than 160 mm or 6 in, as shorter arbors are usually intended for work which does not entail mounting on the machine with a steady (working in air) nor, as a result, the use of a bearing collar or possibly of a pilot on the end of the arbor.

## 2.2 Tolerances

In addition to the tolerances shown in this ISO Recommendation, studies to be carried out in the future with the object of preparing a Recommendation for acceptance conditions for milling machine arbors and accessories will lead in particular to the establishment of tolerances on the squareness in relation to the axis of each of the faces of bearing collars and spacing collars, and of the flange locating face of the arbor.\*

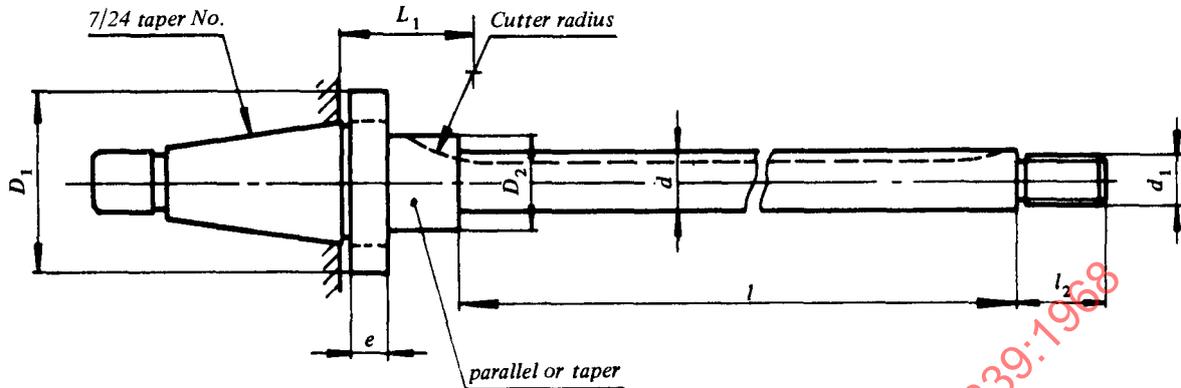
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\* Without prejudice to the outcome of these studies, it may be noted as a matter of information that the United Kingdom specifies a squareness tolerance of 0.0002 in for the faces of bearing collars and 0.001 in for those of spacing collars.

3. RECOMMENDED DIMENSIONS FOR THE METRIC SERIES

3.1 Arbor dimensions

3.1.1 Principal dimensions



Dimensions in millimetres

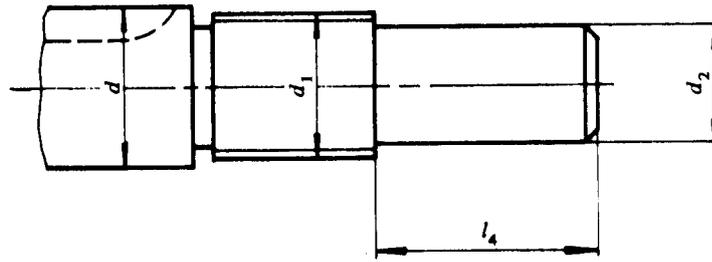
7/24 taper No.	D <sub>1</sub>	e	L <sub>1</sub> max.	D <sub>2</sub> min.	d h6	Useful length l										d <sub>1</sub>	l <sub>2</sub>		
						63	100	160	200	250	345	400	500 (450)	630 (560)	800 (710)			1000 (900)	
30	50	8	32	27	16	-	-	-	-	-	-	-	-	-	-	-	M 16 × 1.5	1 to 1.25 d <sub>1</sub> + 2 mm	
				34	22	-	-	-	-	-	-	-	-	-	-	-	-		M 20 × 2
				41	27	-	-	-	-	-	-	-	-	-	-	-	-		M 24 × 2
40	63	10	36	27	16	-	-	-	-	-	-	-	-	-	-	-	M 16 × 1.5	1 to 1.25 d <sub>1</sub> + 2 mm	
				34	22	-	-	-	-	-	-	-	-	-	-	-	-		M 20 × 2
				41	27	-	-	-	-	-	-	-	-	-	-	-	-		M 24 × 2
				47	32	-	-	-	-	-	-	-	-	-	-	-	-		M 27 × 2
				55	40	-	-	-	-	-	-	-	-	-	-	-	-		M 33 × 2
50	100	12	45	34	22	-	-	-	-	-	-	-	-	-	-	-	M 20 × 2	1 to 1.25 d <sub>1</sub> + 2 mm	
				41	27	-	-	-	-	-	-	-	-	-	-	-	-		M 24 × 2
				47	32	-	-	-	-	-	-	-	-	-	-	-	-		M 27 × 2
				55	40	-	-	-	-	-	-	-	-	-	-	-	-		M 33 × 2
				69	50	-	-	-	-	-	-	-	-	-	-	-	-		M 39 × 3
				84	60	-	-	-	-	-	-	-	-	-	-	-	-		M 45 × 3
60	160	16	56	69	50	-	-	-	-	-	-	-	-	-	-	-	M 39 × 3	1 to 1.25 d <sub>1</sub> + 2 mm	
				84	60	-	-	-	-	-	-	-	-	-	-	-	-		M 45 × 3
				109	80	-	-	-	-	-	-	-	-	-	-	-	-		M 56 × 4
				134	100	-	-	-	-	-	-	-	-	-	-	-	-		M 68 × 4

The lengths l in brackets should be avoided as far as possible.

7/24 tapers and drive seatings conform to ISO Recommendation R 297, 7/24 tapers for tool shanks.

Body of arbor and keys and keyways conform to ISO Recommendation R 240, Interchangeability dimensions for milling cutters and cutter arbors.

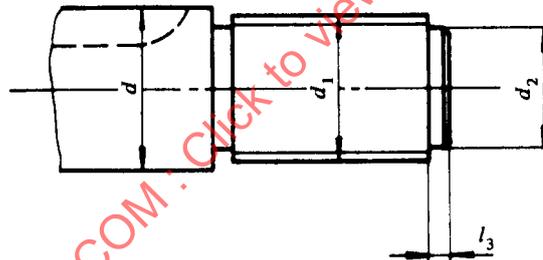
3.1.2 Pilot at end of arbor



Dimensions in millimetres

$d$	$d_1$	$d_2$ g6	$l_4$
16	M 16 X 1.5	13	20
22	M 20 X 2	16	25
27	M 24 X 2	20	32
32	M 27 X 2	23	
40	M 33 X 2	29	
50	M 39 X 3	34	56
60	M 45 X 3	40	

3.1.3 Protective boss at end of arbor

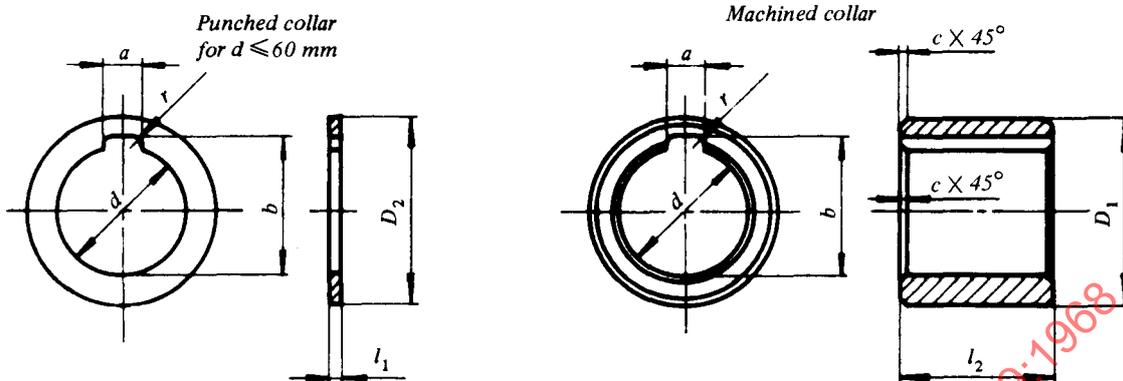


Dimensions in millimetres

$d$	$d_1$	$d_2$	$l_3$ min.
16	M 16 X 1.5	13	2
22	M 20 X 2	16	
27	M 24 X 2	20	
32	M 27 X 2	23	
40	M 33 X 2	29	3
50	M 39 X 3	34	
60	M 45 X 3	40	
80	M 56 X 4	49	5
100	M 68 X 4	61	

3.2 Milling machine accessories

3.2.1 Spacing collars



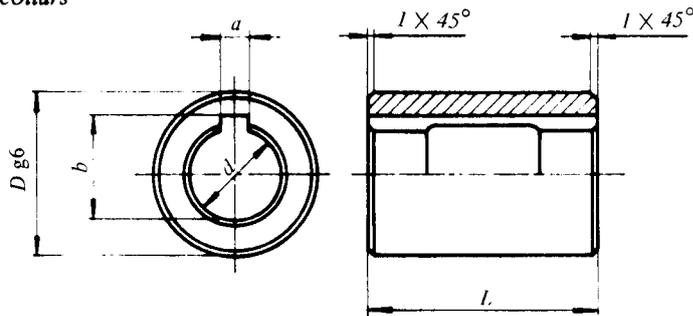
Dimensions in millimetres

$d$	C 11	16	22	27	32	40	50	60	80	100	
$D_1$	h 11	27	34	41	47	54.9	69	84	109	134	
$D_2$	h 11	26	33	40	46	54	68	83	—	—	
$a$	C 11	4	6	7	8	10	12	14	18	24	
$b$	$+0.2$ $0$	17.8	24.3	30	35	43.7	53.7	64.4	85.7	107.2	
$r$	max.	1	1	1.2	1.2	1.6	1.6	1.6	2	2.5	
$c$		0.4	0.4	0.4	0.6	0.6	0.6	0.6	1	1	
$l_1$		(0.03) – (0.04) – 0.05 – 0.1 – 0.2 – 0.3 – 0.6 – 1							—		
$l_2$	$\pm 0.1$	2 – 3 – 6							—		
		10							—		
		—							(12)	(13)	(16)
		20							—		
		30							—		
		—	60							—	
—	—	100							—		
Parallelism of faces		0.004				0.005			0.006		

The dimensions in brackets should be avoided as far as possible.

In the case of punched collars, the periphery, the bore and the key seating should be carefully deburred.

3.2.2 Bearing collars



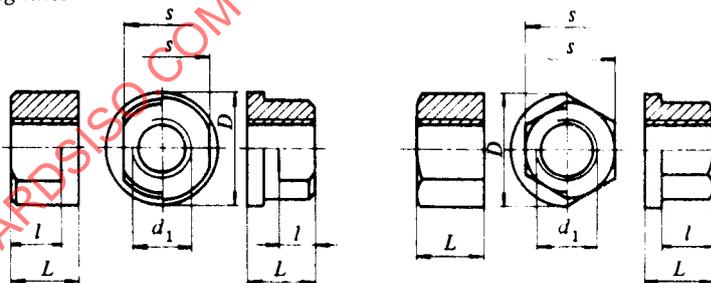
Dimensions in millimetres

<i>d</i>	<i>a</i>	<i>b</i>		<i>D</i>	<i>L</i>	<i>D</i>	<i>L</i>	<i>D</i>	<i>L</i>	<i>D</i>	<i>L</i>	
H7	C11			45	63	55	80	71	100	140	140	
16	4	17.7	+0.1 0									
22	6	24.1										
27	7	29.8										
32	8	34.8										
40	10	43.5		+0.2 0					*			
50	12	53.5										
60	14	64.2									**	
80	18	85.5										
100	24	107.0										
For arbors with 7/24 taper No.					30		40		50		60	
Parallelism of faces					0.004		0.005		0.006			

\* Dimensions also applicable to 40 mm shafts with taper No. 40.

\*\* Dimensions also applicable to 60 mm shafts with taper No. 50.

3.2.3 Clamping nuts



Dimensions in millimetres

For arbor with <i>d</i> =	16	22	27	32	40	50	60	80	100
<i>d</i> <sub>1</sub>	M 16 × 1.5	M 20 × 2	M 24 × 2	M 27 × 2	M 33 × 2	M 39 × 3	M 45 × 3	M 56 × 4	M 68 × 6
<i>D</i> ≈	27	34	41	47	55	69	84	109	134
<i>L</i>	1 to 1.25 <i>d</i> <sub>1</sub>								
<i>s</i>	It is essential that values of standard widths across flats be used.								
<i>l</i>	> thickness of spanner in question								