
INTERNATIONAL STANDARD



496

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Driving and driven machines — Shaft heights

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 13 has reviewed ISO Recommendation R 496 and found it suitable for transformation. International Standard ISO 496 therefore replaces ISO Recommendation R 496-1966.

ISO Recommendation R 496 was approved by the Member Bodies of the following countries:

Argentina	Germany	Spain
Austria	Greece	Sweden
Bulgaria	Israel	Switzerland
Chile	Japan	Turkey
Colombia	Korea, Rep. of	United Kingdom
Czechoslovakia	Netherlands	U.S.A.
Denmark	New Zealand	U.S.S.R.
France	Portugal	Yugoslavia

The Member Bodies of the following countries have subsequently approved this Recommendation:

Philippines
South Africa, Rep. of

The Member Bodies of the following countries expressed disapproval of the Recommendation on technical grounds:

Belgium
India

The Member Body of the following country disapproved the transformation of ISO/R 496 into an International Standard:

India

Driving and driven machines — Shaft heights

1 SCOPE AND FIELD OF APPLICATION

This International Standard establishes four series in millimetres and five series in inches, of shaft heights for driving and driven machines.

2 DEFINITION

<https://standards.iteh.ai/catalog/standards/sist/1d7dc00a-f8d6-4d00-b608-a29c0885290/iso-496-1973>

For the purpose of this International Standard the following definition applies.

shaft height : The distance, measured on the machine ready for delivery, between the centre line of the shaft and the base plane of the machine itself.

It does not include the liners used for assembly but, in cases where an insulation shim is supplied with the machine, the thickness of this shim shall be included in the shaft height.

3 NOMINAL DIMENSION h

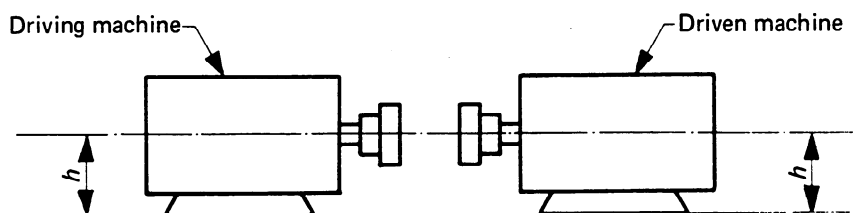


TABLE 1 — Shaft heights in millimetres* and in inches

Shaft heights								
millimetres				inches				
Series				Series				
I	II	III	IV	I	II	III	IV	V
25	25	25	25	0.984	0.984	0.984	0.984	
		26	26				1.024	
		28	28			1.102	1.102	
		30	30				1.181	
	32	32	32		1.260	1.260	1.260	
		34	34				1.339	
		36	36			1.417	1.417	
		38	38				1.496	
40	40	40	40	1.575	1.575	1.575	1.575	
		42	42				1.654	
		45	45			1.772	1.772	
		48	48				1.890	
	50	50	50		1.969	1.969	1.969	
		53	53				2.09	
		56	56			2.20	2.20	
		60	60				2.36	
63	63	63	63	2.48	2.48	2.48	2.48	2.625
		67	67				2.64	
		71	71			2.80	2.80	
		75	75			2.95	2.95	
	80	80	80		3.15	3.15	3.15	3
		85	85				3.35	3.5
		90	90			3.54	3.54	
		95	95				3.74	
100	100	100	100	3.94	3.94	3.94	3.94	4.125
		106	106				4.17	
		112	112			4.41	4.41	4.5
		118	118				4.65	
	125	125	125		4.92	4.92	4.92	
		132	132				5.20	5.25
		140	140			5.51	5.51	
		150	150				5.91	6.25
160	160	160	160	6.30	6.30	6.30	6.30	
		170	170				6.69	7
		180	180			7.09	7.09	
		190	190				7.48	
	200	200	200		7.87	7.87	7.87	8
		212	212				8.35	
		225**	225**			8.86	8.86	9
		236	236				9.29	

Shaft heights									
millimetres				inches					
Series				Series					
I	II	III	IV	I	II	III	IV	V	
250	250	250	250	9.84	9.84	9.84	9.84		10
			265				10.43		11
		280	280			11.02	11.02		
			300				11.81		
	315	315	315		12.40	12.40	12.40		12.5
			335				13.19		
		355	355			13.98	13.98		
			375				14.76		
400	400	400	400	15.75	15.75	15.75	15.75		
			425				16.73		
		450	450			17.72	17.72		
			475				18.70		
	500	500	500		19.69	19.69	19.69		
			530				20.87		
		560	560			22.05	22.05		
			600				23.62		
	630	630	630	24.80	24.80	24.80	24.80		
			670				26.38		
		710	710			27.95	27.95		
			750				29.53		
	800	800	800		31.50	31.50	31.50		
			850				33.46		
		900	900			35.43	35.43		
			950				37.40		
1 000	1 000	1 000	1 000	39.37	39.37	39.37	39.37		
			1 060				41.73		
		1 120	1 120			44.09	44.09		
			1 180				46.46		
	1 250	1 250	1 250		49.21	49.21	49.21		
			1 320				51.97		
		1 400	1 400			55.12	55.12		
			1 500				59.06		
1 600	1 600	1 600	1 600	62.99	62.99	62.99	62.99		
> 1 600***				> 62,99***					

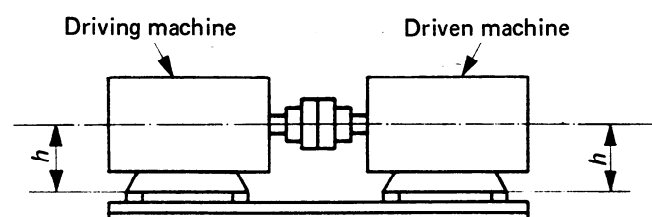
* The values in millimetres of the series I to IV correspond respectively, taking into account some roundings, to the values of the preferred numbers R 5, R 10, R 20, R 40 (see ISO 3, *Preferred numbers — Series of preferred numbers*).

** Deviation from the series of preferred numbers which contains the number 224.

*** For values > 1 600 mm and > 62,99 in, adopt a preferred number in millimetres or its corresponding value in inches.

The values of the first series are the preferred choice. If these do not suffice, use first the values of the second series, then those of the third and in exceptional cases the fourth series. The values in inches of the fifth series are transitional values for foot-mounted induction motors with shaft heights between 56 mm and 315 mm (2.20 and 12.40 in), which comply with IEC Publication 72, *Recommendation for the dimensions and output ratings of electric motors*.

4 TOLERANCES



4.1 Field of application

4.1.1 The following tolerances, relating to shaft heights, as well as the more limited tolerances relating to parallelism errors, concern only machines directly coupled and assembled on a common base. They shall be respected at all points along the shafts ends.

4.1.2 Exceptions to the tolerances shall be the subject of a special agreement between the interested parties, for example, in the following cases:

- when, during the assembly, allowance must be made in the alignment for the deflection of the shaft;
- when, owing to thermal expansion, a particular problem may arise concerning the thickness of shims;
- when other reasons require a departure from the specified values.

4.2 Limit deviations (see table 2)

4.3 Guiding principles for assembly

4.3.1 Height deviations within the tolerances shall be adjusted with shims on assembly.

4.3.2 If several machines are to be coupled and the tolerance on the shaft height is negative for each, the heights shall be adjusted by means of shims, at least up to the nominal dimension.

4.3.3 In all other cases, adjustment to the greater shaft height shall be made and the machine with the positive shaft height deviation shall be assembled first.

4.4 Parallelism error (see table 3)

The parallelism error is the difference in height from the base plane of two points on the axis of the shaft. These points are normally at the two ends of the shaft, but where

this is impracticable, any two convenient points may be taken and the resulting measured value shall be increased in the ratio of the shaft length to the distance apart of the two points.

If it is desired to limit the parallelism error to a lower value, special agreements shall be made for this matter.

TABLE 2 — Limit deviations

Shaft heights <i>h</i> in millimetres*		Limit deviations for			
		electrical machines driven machines speed reducers driving mechanisms for ship propeller shafts		driving machines other than electrical motors and driving mechanisms for ship propeller shafts	
from	to	mm	in	mm	in
25	50	0 − 0,4	0 − 0.016	+ 0,4 0	+ 0.016 0
> 50	250	0 − 0,5	0 − 0.02	+ 0,5 0	+ 0.02 0
> 250	630	0 − 1,0	0 − 0.04	+ 1,0 0	+ 0.04 0
> 630	1 000	0 − 1,5	0 − 0.06	+ 1,5 0	+ 0.06 0
> 1 000		0 − 2,0	0 − 0.08	+ 2,0 0	+ 0.08 0

* The stepping applies to machines with the feet at the base of the machine. In the case of machines where the feet are not at the lowest point, for example raised nearer to the centre line, the tolerance to be selected from the table is that which corresponds to the centre height of the frame, i.e. with the feet at the lowest point.

TABLE 3 — Maximum parallelism error

Shaft heights <i>h</i> in millimetres*		Maximum allowable parallelism error for a length <i>l</i> between two measuring points when the measuring points are at the ends of the shaft					
		$2,5 h > l$		$2,5 h \leq l \leq 4 h$		$l > 4 h$	
		mm	in	mm	in	mm	in
from	to						
25	50	0,2	0.008	0,3	0.012	0,4	0.016
> 50	250	0,25	0.01	0,4	0.015	0,5	0.02
> 250	630	0,5	0.02	0,75	0.03	1,0	0.04
> 630	1 000	0,75	0.03	1,0	0.04	1,5	0.06
> 1 000		1,0	0.04	1,5	0.06	2,0	0.08

* The stepping applies to machines with the feet at the base of the machine. In the case of machines where the feet are not at the lowest point, for example raised nearer to the centre line, the tolerance to be selected from the table is that which corresponds to the centre height of the frame, i.e. with the feet at the lowest point.

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