इंटरनेट मानक

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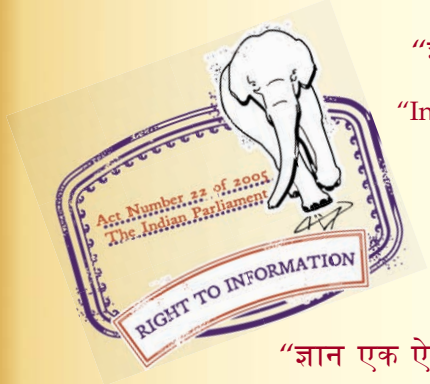
"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 11103 (1984): Cylindrical Measuring Pins (Size Range from 0.1 mm up to and Including 20 mm) [PGD 25: Engineering Metrology]



"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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UDC 531·716·085·311 : 681·2

(Reaffirmed 2005)

Indian Standard

SPECIFICATION FOR CYLINDRICAL MEASURING PINS (SIZE RANGE FROM 0·1 mm UP TO AND INCLUDING 20 mm)

Engineering Metrology Sectional Committee, EDC 43; Gauges Subcommittee, EDC 43 : 3 [Ref : Doc : EDC 43 (3828)]

1. Scope — Covers dimensions and other requirements of cylindrical measuring pins which are used for checking bores, tapers, distances, teeth, threads and for general gauging purposes. It covers pins in the nominal diameter range from 0·1 mm up to and including 20 mm, in three grades of accuracies namely 0, 1 and 2.

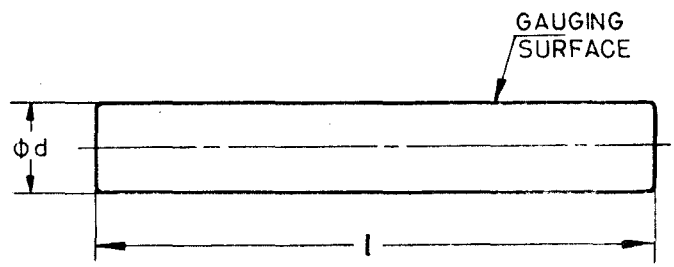
2. Dimensions — Shall be as given in Table 1.

2.1 If the measuring pins are provided with a grip, the grip shall be solidly fixed with the pin. Then the length '*l*' will remain as an effective length.

2.2 The edges shall be slightly chamfered or rounded off and its values are left to the discretion of the manufacturer.

TABLE 1 DIMENSIONS OF CYLINDRICAL MEASURING PINS

All dimensions in millimetres.



Nominal Diameter Range *d*		Length* *l*	Diameter Step		
			Grade 0	Grade 1	Grade 2
Above	Up to and Including				
†0·1	1	25	0·001	0·005	0·01
1	3	32			
3	6	40			
6	10	50			
10	20	63	0·002		

*Total lengths greater than '*l*' are allowed, as agreed between the manufacturer and the user.
†Including.

3. Material — Shall be as prescribed in IS : 7018 (Part 1) - 1983 'Technical supply conditions for gauges : Part 1 General', or carbide/hard chromium plated steel as agreed between the manufacturer and the purchaser.

4. Hardness — The gauging surface shall have a hardness of 700 *HV Min* (60 *HRC*).

Adopted 21 September 1984

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

5. Designation

5.1 A measuring pin, with nominal diameter $d = 3{\cdot}99$ mm and accuracy Grade 1, will be designated as:

Measuring Pin 3·99 Grade 1 IS : 11103

5.2 A set of measuring pins with smallest pin of nominal diameter $d = 1$ mm and largest pin with $d = 10$ mm, with 0·01 mm diameter step, accuracy Grade 2, will be designated as :

Measuring Pin Set 1-10/0·01 Grade 2 IS : 11103

6. Accuracy — Technical requirements in accordance with IS : 7018 (Part 1)-1983 shall be applicable in addition to the following.

6.1 *Tolerances and Permissible Deviations*

6.1.1 General tolerances shall be as per medium grade of IS : 2102 (Part 2) ' General tolerances for dimensions and form and position : Part 2 General tolerances for form and position (*under preparation*)'.

Note — The tolerances shall be as agreed between the supplier and the purchaser till IS : 2102 (Part 2) is published.

6.1.2 Permissible deviations of the nominal diameter and tolerances on circularity shall be as given in Table 2.

TABLE 2 DEVIATIONS OF NOMINAL DIAMETER AND TOLERANCES ON CIRCULARITY

Nominal Diameter *d* mm	Permissible Deviation μm			Tolerances on Circularity μm		
	Grade 0	Grade 1	Grade 2	Grade 0	Grade 1	Grade 2
From 0·1 up to and including 20	±0·3	±1	±2	0·15	0·5	1·0

Note — On individual measuring pins the diameter over the entire length can deviate from the nominal diameter only by half the permissible deviation.

6.1.3 Straightness tolerance shall be as given in Table 3.

TABLE 3 STRAIGHTNESS TOLERANCES

Nominal Diameter *d* mm		Straightness Tolerance for Accuracy Grades μm		
Above	Up to and Including	Grade 0	Grade 1	Grade 2
*0·1	1	50/10 mm	50/10 mm	50/10 mm
1	1·5	5/10 mm	5/10 mm	5/10 mm
1·5	3	1/10 mm	1/10 mm	1/10 mm
3	6	0·5/10 mm	0·5/10 mm	0·5/10 mm
6	20	0·25	0·5	1·0

*Including.

6.2 *Edge Slope* — An edge slope of maximum 2 μm with respect to the diameter within 1 mm distance from the end faces is allowed.

6.3 *Roughness* — The average roughness, value *Ra*, of the pin shall not exceed the values given below:

Grade of Accuracy	Average Roughness Value* *Ra*	
	Gauging Surface	Other Surface
0	N2	N6
1	N3	N6
2	N3	N6

**See* IS : 3073-1963 ' Assessment of surface roughness '.

6.4 *Coefficient of Linear Expansion* — In case of measuring pins made of gauge steel, a coefficient of linear expansion of $(11{\cdot}5 \pm 1) \times 10^{-6}K^{-1}$ in the range between the prevailing temperature and 20°C shall be taken into account. The differences of such coefficients for different grades of gauge steel can be neglected. Measurements shall be made at 20°C.

For pins that are not made of steel/hard metal and whose coefficent of linear expansion differs from the value indicated in this standard, these coefficients shall be considered.

7. Inspection

7.1 *Nominal Diameter* — For testing measuring pins of accuracy Grades 1 and 2, use can be made of methods of measurements with parallel gauging faces. As the non-parallelism of these faces directly affects measurement, it should not exceed 0·2 μm. Measuring force shall not exceed 2 N.

When using measuring instruments with spherical contact surfaces the error of measurement due to flattening which depends on the measuring force and diameter would have to be taken into account.

When using two spherical measuring contacts the error due to misalignment of the measuring axis shall also be taken into account.

7.2 *Circularity and Straightness* — Depending on the tolerances to be maintained, these deviations of form are tested either with a simple device (like prism and precision indicator) or with form-error testing instrument.

7.3 *Measurement of Roughness* — Shall be carried out in accordance with IS : 3073-1967 'Assessment of surface roughness'. The roughness of the end faces of the measuring pins with nominal diameter less than 3 mm is not measured because of the very short measuring length.

8. Marking — Measuring pins of nominal diameter 3 mm and above shall be marked with the nominal diameter and the grade of accuracy, indelibly.

Pins with permanently fixed handle shall be marked on the handle.

The grade of accuracy shall be marked as follows:

Grade of accuracy 0 as 0

Grade of accuracy 1 as –

Grade of accuracy 2 as =

8.1 *ISI Certification Marking* — Details available with the Indian Standards Institution.

EXPLANATORY NOTE

The function of the cylindrical measuring pins primarily requires a close circularity tolerance. Secondly however also the straightness and parallelity tolerance of the mantle line shall be kept as small as possible, the fixation of the cylindrical form tolerance as the sum of the tolerances of circularity, straightness and parallelism is close enough. However for this cylindrical measuring pins no close straightness tolerance are maintained but a relatively large cylindrical form tolerance had to be maintained which would not conform to the requirements of circularity.

Hence, in Tables 2 and 3 circularity and straightness tolerances are given separately and together with a relatively large bending of the thinner cylindrical measuring pins are allowed since the parallelity tolerance is too big. On the basis of this, parallelity variation is restricted so that the diameter on individual pins is varying within the allowable variation referred to the diameter.

According to IS : 8000 (Part 1)-1976 'Tolerance of form and of position for engineering drawings: Part 1 Generalities, symbols, indication on drawings' defines the circularity tolerance as the 'tolerance zone in the considered plane is limited by two concentric circles a distance '*t*' apart. The circularity tolerance is thus the difference between *R* and *r* (*see* Fig. 1).

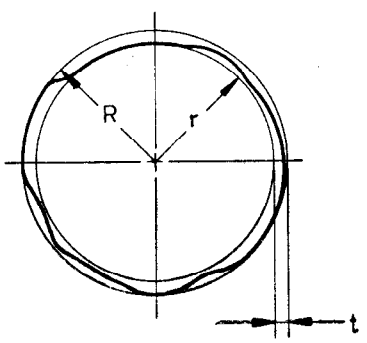


FIG. 1

According to IS : 8000 (Part 2)-1976 'Tolerance of form and of position for engineering drawings : Part 2 Maximum material principle' the dimensional tolerance is the difference between the maximum and minimum dimension with reference to cylindrical parts, this means the difference between diameter *D* and *d* (*see* Fig. 2).

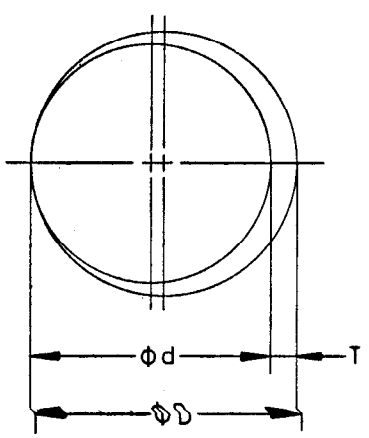


FIG. 2

The circularity tolerances given in Table 2 are based on the relationship between the circularity tolerance (*t*) and the dimensional tolerance (*T*) and utilization of half the dimensional tolerance is permitted.

In preparation of this standard considerable assistance has been derived from DIN 2269-1980 ' Cylindrical measuring pins ' issued by Deutsches Institut für Normung (DIN).

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