

NATIONAL PHYSICAL LABORATORY

STANDARDS DIVISION

**Ref: MOY/SCMI/73 SPECIFICATION OF ACCURACY**  
**(Issue 3)**  
**for**  
**A CYLINDER GAUGE**

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Type: A "Mercer" Cylinder Gauge fitted with a dial gauge reading directly to 0.0001 in.

Made by: Messrs. Thomas Mercer Ltd., St. Albans, Herts.

Notes: (i) This gauge is manufactured in three sizes to cover the following ranges of measurement: -

1/2 in. to 7/8 in. inclusive  
7/8 in. to 2 in. "  
2 in. to 6 in. "

(ii) Test to the following specification shall be made with the dial gauge assembled in the holder of the instrument so that the pointer just registers on the dial.

All measurements refer to the basic temperature of 68 °F.

LIMITING VALUE OR  
MAXIMUM  
PERMISSIBLE ERROR

1. GENERAL

- 1.1 The workmanship and finish shall be in keeping with a precision measuring instrument of this class.
- 1.2 The instrument shall be marked with an identification number and the maker's name or trade mark. The identification number shall appear on both the holder and the dial gauge.

2. CONTACT POINTS

- 2.1 All external contacts shall be hard 850 HV minimum.
- 2.2 Each contact shall be well formed and of smooth contour.

3. OPERATING FORCE

- 3.1 The maximum operating force exerted by the instrument during measurement shall not exceed 12 ozf  
1 ozf = 1 ounce force.
- 3.2 An variation in the operating force over the total range of the instrument shall not exceed 4 ozf.

4. 0.0001 in. DIAL GAUGE

- 4.1 The range of the dial gauge shall be restricted to 10 revolutions maximum.

LIMITING VALUE OR  
MAXIMUM  
PERMISSIBLE ERROR

4.2 The accuracy of the dial gauge over any two successive revolutions within the total range shall conform with that laid down in Table 2 of B.S. 907: 1954 (Dial Gauges for Linear Measurement).

5. MAGNIFICATION

5.1 The magnification of the link mechanism in the holder shall be correctly adjusted so that the overall error of the instrument shall not exceed 0.0003 in.

6. PERFORMANCE

6.1 The instrument shall be capable of use for measuring any diameter within the range for which it is designed.

6.2 When employing a cylindrical ring gauge of known size as a standard of reference, it shall be possible to use the cylinder gauge to measure other ring gauges so that the error of measurement does not exceed: -

(i) When the size of the standard is within 0.001 in. of the ring being measured 0.0001 in.

(ii) When the size of the standard is within 0.01 in. of the ring being measured 0.0002 in.

6.3 When using as a standard of reference a gap built from slip gauges of known sizes, and the dimension of the standard is within 0.001 in. of the ring diameter, it shall be possible to use the cylinder gauge to measure a ring a nominal diameter  $\frac{1}{2}$  in.,  $\frac{7}{8}$  in. or 2 in. (according to the size of the instrument) so that the error does not exceed 0.00025 in.

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