

NATIONAL PHYSICAL LABORATORY

METROLOGY CENTRE

Ref: MOY/SCMI/30 SPECIFICATION OF ACCURACY
(Issue 3)
for
A ‘MILLIONTH’ COMPARATOR

Type: A 25 mm (1 inch) Slip Gauge (“Eden”) Comparator, based on NPL design, with a magnification of approximately 20,000 times.

LIMITING VALUE OR
MAXIMUM
PERMISSIBLE ERROR

1. GENERAL

- 1.1 The workmanship and finish shall be in keeping with a precision instrument of this class.
- 1.2 The comparator shall be marked with:-
 - (i) An identification number. (The scale shall also be marked with the same identification number).
 - (ii) The maker’s name or trade mark.
 - (iii) “Based on NPL Design”.The lens also shall bear an identification number.
- 1.3 The comparator shall satisfactorily accommodate slip gauges up to 25mm (1 inch) in size.
- 1.4 The comparator scale shall be graduated in accordance with NPL Sketch No. 861.

2. MEASURING CONTACTS

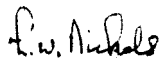
- 2.1 The ball contacts on the indicating and adjustable anvils shall be hardened and well finished. minimum hardness 850HV
- 2.2 The hardened spindle of the adjustable anvil shall be a good sliding fit in its housing.
- 2.3 Clamping the spindle of the adjustable anvil shall not cause any appreciable change in the scale reading. Approximately 5 divisions on metric scale (2 divisions on inch scale)
- 2.4 The operating force of the comparator shall lie between:- 8N & 9N (1¾ lbf & 2lbf).

3. MIRROR

- 3.1 The reflecting surface shall not give rise to any striated or mottled appearance on the scale.

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- 3.2 The reflecting surface shall be flat over any area of 75mm (3in) diameter. 0.004 mm (0.000 15 in)
4. **SCALE**
- 4.1 The illumination of the scale shall be adequate, uniform and free from colour.
- 4.2 The thickness of the image of the index line shall be approximately the same as that of the scale graduations.
- 4.3 The image of the index line shall be parallel to the scale graduations and shall remain in focus during its passage over the scale.
- 4.4 The magnification shall be not less than:- 18,000 to 1
5. **PERFORMANCE**
- 5.1 The comparator shall be capable of accurate repetition of reading. 0.000 02 mm (0.000 001 in)
- 5.2 The instrument shall be used to compare pairs of slip gauges of known difference in size. The gauges are to be selected so that their differences shall cover various ranges over the scale. The measured differences between the slip gauges shall agree with the known differences to within:-
- (i) For differences up to 0.002 mm (0.0001 in) 0.000 02 mm (0.000 001 in)
- (ii) For differences greater than 0.002 mm (0.0001 in) 0.000 05 mm (0.000 002 in)

 (Signed)
for Director

