

NATIONAL PHYSICAL LABORATORY

METROLOGY DIVISION

Ref: **MOY/SCMI/72** **SPECIFICATION OF ACCURACY**
(Issue 1)

for

SCREW MICROMETER MICROSCOPES

1. GENERAL

- 1.1 In design, construction and finish the instrument shall confirm to generally accepted standards of good micrometer microscopes.
- 1.2 The instrument shall bear the maker's name or trade mark, and an identification number.
- 1.3 The instrument shall be clearly marked with the nominal value of one turn, or one division, of the micrometer drum. (The value of one turn is not the pitch, p , of the micrometer screw, but is equal to p/m where m is the magnification of the microscope objective).
- 1.4 The micrometer drum shall be uniformly divided around its periphery, and at least ten of the subdivisions should be numbered. The drum may be provided with a fixed index mark or with a vernier, and means shall be provided for reading the number of turns of the micrometer drum.

2. GRATICULE

The pattern of the graticule shall be suitable for the type of object to be measured. If pairs of transverse lines are provided for this purpose, they should be straight and parallel and of suitable separation, and the lines of any pair should be similar.

MAXIMUM PERMISSIBLE ERROR

3. MICROMETER SCREW AND ITS MOUNTING

- 3.1 The micrometer screw shall run smoothly line its nut, and the torque required to turn its nut, and the torque required to turn the micrometer shall lie within the limits of 20 g.cm and 200 g.cm.
- 3.2 Backlash shall be kept as small as possible compatible with a smoothly running screw and nut.
- 3.3 The total periodic error in the micrometer screw and its mounting shall not exceed $\pm 0.002 p$, equivalent to $\pm p/500 m$ at the work being measured.
- 3.4 The pitch of the micrometer screw over its working range shall be uniform within $\pm 0.002p$, equivalent to $\pm p/500 m$ at the work being measured.

4. ADJUSTMENT AND MAGNIFICATION

The tube length shall be adjusted and securely fixed to give the correct magnification corresponding with the stated value of one turn of the micrometer drum, within

± 0.15 per cent

5. **PERFORMANCE TEST**

After allowing for the measured departure from nominal of the mean value of one turn of the micrometer drum, the instrument shall measure correctly any length (within its working range) within

$\pm 0.007p$, equivalent to
 $\pm 7p/1000$ m at the work
being measured.

Note:

The magnification of the objective lens should not normally be less than 4 nor greater than 20.

The objective lens should be achromatic or apochromatic and of numerical aperture between 0.07 and 0.35.

The pitch of the micrometer screw should not normally be less than 0.015 inch. (0.4 mm) nor greater than 0.04 inch (1 mm).

E. C BULLARD

Director



Superintendent, Standards Division



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