

NATIONAL PHYSICAL LABORATORY

METROLOGY CENTRE

Ref: **MOY/SCMI/82** **SPECIFICATION OF ACCURACY**
(Issue 3)
for
AN END MEASURING MACHINE

Type: A "Newall" end measuring machine fitted with a spacing roller unit as a standard of reference. The fiducial indicator for the machine is fitted in the headstock. The tailstock carries a spirit level for locating its position on the spacing roller unit. A pair of universally adjustable supports is supplied with the machine.

The machine is manufactured in the following range of sizes: -

0 to 24 in, 48 in, 72 in, and 144 in respectively.

Made by: Optical Measuring Tools Ltd.

All measurements refer to the basic temperature of 20°C

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 bed, headstock, tailstock and the adjustable supports shall bear an identification number and the makers name or trade mark.

2. MEASURING BED

- 2.1 The upper surface shall have a uniformly distributed bearing area. 20% minimum bearing area
- 2.2 The upper surface shall be flat. 0.0002 in per 12 in
- 2.3 The guiding edge shall be straight. 0.0002 in per 12 in

3. MEASURING FACES OF HEADSTOCK AND TAILSTOCK ANVILS

- 3.1 The measuring faces shall be hard. 800 HV minimum
- 3.2 The faces shall be flat. 0.000 03 in
- 3.3 The faces shall be parallel at all positions of the headstock and tailstock along the measuring bed. 0.000 03 in over the diameter of the face
- 3.4 The faces shall be square to the upper and front guiding surfaces of the machine bed. 0.000 05 in over the diameter of the face

LIMITING VALUE OR
MAXIMUM
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4. MEASURING FORCE

4.1 The force necessary to bring the fiducial indicator pointer to the zero position shall be approximately 5 lbf

5. HEADSTOCK AND TAILSTOCK

5.1 The fit of the headstock and tailstock on the bed shall be such as to enable a smooth and uniform movement along the bed to be obtained.

5.2 The clamping of the headstock and the tailstock to the bed shall function satisfactorily.

5.3 The fiducial indicator in the headstock shall permit of repetition of reading. 0.000 01 in

5.4 The location of the tailstock on the bed, by means of the spirit level indicator and the spacing roller unit, shall function satisfactorily.

6. MICROMETER

6.1 The "feel" of the micrometer screw shall be smooth and uniform throughout its one inch range.

6.2 There shall be an over-run of at least one revolution at each end of its travel.

6.3 The graduated surfaces shall be non-reflecting.

6.4 The graduation lines shall be cleanly cut and uniform in thickness. Uniform to 0.002 in

6.5 The graduation lines shall preferably be blacked in.

6.6 The thickness of the graduation lines should preferably be approximately 1/5th of the distance between the centres of adjacent lines. The minimum thickness of the lines shall be 0.004 in

6.7 Any progressive error present in the screw shall be reasonably uniform and shall not exceed 0.0001 in overall

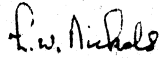
6.8 Any periodic error present shall not exceed $\pm 0.000 01$ in

7. SPACING ROLLER UNIT

7.1 The location of the headstock and tailstock determined by the spacing roller unit shall be accurate. ± 0.0001 in per 12 in

8. **MACHINE SUPPORTS**

- 8.1 The adjustments to the supports shall operate smoothly and be adequate to align satisfactorily length bars or setting rods, from 3/8 in diameter upwards, between the measuring faces of the machine.


(Signed)

for Director

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