

NATIONAL PHYSICAL LABORATORY

STANDARDS DIVISION

Ref: **MOY/SCMI/79** **SPECIFICATION OF ACCURACY**
(Issue 3)

for

A HEIGHT MICROMETER

Type: A "Cadillac" design of height micrometer comprising a measuring spindle with annular measuring faces positioning by a precision micrometer reading direct to 0.0001 in. In the larger size of instrument made the spindle carries 12 measuring faces spaced 1 in. apart, whilst in the smaller size the spindle has 6 measuring faces. The instrument is intended to be used in conjunction with a transfer medium comprising a precision indicator mounted on a suitable stand.

Note All settings made on the annular measuring faces should be confined to the vertical plane containing the fiducial line of the micrometer head.

Made by: Messrs. Hommelwerke, Mannheim, Germany.

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

LIMITING VALUE OR
MAXIMUM
PERMISSIBLE ERROR

1. **GENERAL**

- | | | |
|-----|---|--------------|
| 1.1 | The general workmanship and finish shall be in keeping with a precision measuring instrument of this class. | |
| 1.2 | The instrument shall be marked with the maker's name or trade mark and with an identification number. | |
| 1.3 | The clamp for locking the spindle shall be effective and its application shall not change the height of the measuring faces | 0.000 03 in. |
| 1.4 | The spindle shall have no appreciable backlash | 0.000 05 in. |

2. **SUPPORTING FEET**

- | | | |
|-----|---|-----------------|
| 2.1 | The three supporting feet shall be hard | 800 HV minimum. |
| 2.2 | The bearing surfaces of the feet shall be co-planar | 0.0001 in. |

3. **ANNULAR MEASURING FACES**

- | | | |
|-----|--|-------------------------------------|
| 3.1 | The annular measuring faces shall be hard and well finished | 800 HV minimum. |
| 3.2 | The faces shall be parallel with the supporting base in the localised vertical plane (See Note under "Type") | 0.000 04 in.
over width of face. |

LIMITING VALUE OR
MAXIMUM
PERMISSIBLE ERROR

3.3 The faces shall be square to the axis of rotation

Note Since error of squareness cannot be dissociated from periodic error in the micrometer the two errors are tested simultaneously

Combined squareness error and periodic error (see para. 4.3) shall not exceed $\pm 0.000\ 04$ in.

3.4 When the instrument is placed on an accurately flat surface plate and the micrometer set precisely to 1 in., the height of the measuring face of each step above this supporting base shall agree with its nominal value

$\pm 0.000\ 05$ in.

4. MICROMETER

4.1 The graduation lines on the micrometer drum shall be clear, distinct and approximately equal in thickness to the fiducial line.

4.2 Any progressive error present in the micrometer screw shall be of a uniform nature and shall not exceed

0.000 05 in. overall.

4.3 Any periodic error in the screw when combined with any out-of-squareness of the measuring faces shall not exceed

See para. 3.3

5. PERFORMANCE TEST

5.1 A test on the overall accuracy of the instrument shall be made as follows: -

The height of each of three combinations of slip gauges shall be measured by the instrument. The observed height, without correction, shall agree, in each case, with the known height of the combination

± 0.0001 in.

Note The combinations used shall be chosen so as to be symmetrically spaced over the measuring range of the instrument both as regards height and position around the measuring spindle.

e.g. Suitable heights for a 6 in. gauge would be

- 1.100 in.
- 3.508 in.
- 5.916 in.

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Director



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