

NATIONAL PHYSICAL LABORATORY

STANDARDS DIVISION

Ref: **MOY/SCMI/90** **SPECIFICATION OF ACCURACY**
(Issue 1)

for

AN 8-INCH INCLINABLE ROTATABLE TABLE

Type: An 8 inch Inclined, Rotatable Table. The scale for measuring the rotation reads directly to 2 seconds of arc and that for measuring the inclination reads directly to ½ minute of arc.

Made by: Optical Measuring Tools Ltd.

LIMITING VALUE OR
MAXIMUM
PERMISSIBLE ERROR

1. **GENERAL**

- 1.1 The general workmanship and finish shall be in conformity with a precision measuring tool of this class.
- 1.2 Each Table shall be marked with an identification number, and with the maker's name or trade mark. In addition, a plate indicating the direction of setting the angle of inclination shall be fixed to the Table.
- 1.3 The graduation lines of the interior glass degree scale and those of its associated scales for setting the rotation of the work-table shall be clearly defined and free from blemishes.
- 1.4 The degree scale and its associated graticule scale for setting the inclination of the work-table shall be in focus for one setting of the eyepiece. The focus shall fall reasonably within the focusing range of the eyepiece. All graduation lines shall be clearly defined and free from blemishes.
- 1.5 The exterior adjustable degree scale for the identifying the graduation lines of the interior rotary glass scale shall be graduated with sufficient precision to ensure that no confusion arises over the identity of the glass scale graduation lines.

2. **BASE**

- 2.1 The under surface of the base casting shall be reasonably free from blow holes, and it shall have an adequate bearing surface as revealed by a blueing test using a certified Grade A surface plate (BS 817) Not less than 20% bearing surface.
- 2.2 If a side abutment face is provided, it shall be satisfactorily flat and square with the base, as revealed by a blueing test against an edge of a certified plate known to be square with its upper surface.
- 2.3 The axis of inclination shall be parallel with the base 0.0002 in. in 12 in.
(0.005 mm in 30 ½ cm).
- 2.4 The height of the axis of inclination above the base shall be measured and recorded to the nearest 0.0001 in. (0.0025 mm).

	<u>LIMITING VALUE OR MAXIMUM PERMISSIBLE ERROR</u>
2.5 If a side abutment face is provided, it shall be square with the axis of inclination as measured in the horizontal plane	0.0002 in. (0.005 mm) in the overall length of the abutment face.
3. <u>CLAMPING</u>	
3.1 The action of clamping the work-table shall not cause: -	
(i) Any appreciable change in the reading of the two setting scales	maximum angular change Rotation: 10 sec. Inclination: ¼ min.
(ii) Any appreciable change in the height of the work-table surface above the base when the work-table is in the horizontal position	Maximum change in height 0.0002 in. (0.005 mm).
4. <u>CENTRE PLUG</u>	
4.1 This plug shall bear the same identification number as the Table with which it is associated.	
4.2 The parallel and tapered surfaces of the plug shall be hardened and well finished	Minimum 800 HV.
4.3 The parallel and tapered portions shall be straight	0.00005 in. (0.0013 mm) over its length.
4.4 The parallel portion shall be cylindrical	0.00005 in. (0.0013 mm).
4.5 The parallel and tapered portions shall be concentric	0.00005 in. (0.0013 mm) i.e. 0.0001 in. (0.0025 mm) FIM
5. <u>WORK-TABLE</u>	
5.1 The upper surface shall be flat whether the work-table be clamped or unclamped	0.0002 in. (0.005 mm).
5.2 The upper surface shall be square with the axis of rotation	0.00015 in. (0.004 mm) at a radius of 3 ¾ in.
5.3 The upper surface shall be parallel with the under surface of the base, in all positions of rotation, when the inclination scale reads zero	0.0003 in. (0.008 mm) over the diameter of the table.
5.4 The mean height of the upper surface above the base, immediately over the axis of inclination, shall be measured and recorded to the nearest 0.0001 in. (0.0025 mm).	
5.5 When the work-table is in the 90 degree position its surface shall be square, in the horizontal plane, with the side abutment face when the latter is provided	0.0004 in. (0.01 mm) over the length of the abutment face.
5.6 When the work-table is inclined through any angle in its range from 0 to 90 degrees there shall be no associated lateral movement in a direction parallel with the axis of inclination	0.0004 in. (0.01 mm) over the total range of 90 degrees.

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6. TAPERED SOCKET IN WORK-TABLE

6.1 The centre plug shall be a good fit in the tapered socket, as revealed by a blueing test.

6.2 When the centre plug is fitted in the tapered socket, in any azimuth, its axis shall coincide with the axis of rotation of the work-table

0.0001 in. (0.0025 mm)
i.e. 0.0002 in. (0.005 mm)
FIM

7. COINCIDENCE OF AXIS

The axis of rotation shall pass through the axis of inclination

0.0002 in. (0.005 mm).

8. ACCURACY OF SCALES

8.1 The maximum error between any two readings on: -

(i) the scale graduated in degrees, and its associated 60-minute linear scale and 2-minute micrometer drum scale, for setting the rotation of the work-table shall not exceed

15 sec. of arc.

(ii) the scale graduated in degrees, and its associated one-degree graticule scale, for setting the inclination of the work-table shall not exceed

1/3rd min. of arc.

G.B.B.M. SUTHERLAND

Director



Superintendent, Standards Division



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