

NATIONAL PHYSICAL LABORATORY

STANDARDS DIVISION

**Ref: MOY/SCMI/85 SPECIFICATION OF ACCURACY
(Issue 2)**

for

A 'MATRIX' 8 INCH INCLINABLE CIRCULAR TABLE

Type: An inclinable circular table, 8 ½ in. in diameter.
The circular scale can be read directly to 5 seconds of arc.
The inclinable scale can be read directly to 1 minute of arc.

Made by: The Coventry Gauge & Tool Co. 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 The table shall be marked with an identification number, and with the maker's name or trade mark.
- 1.3 The graduation lines on the handwheel for setting the rotation and those of the scale for setting the angle of inclination shall be cleanly cut and free from blemishes.

2. **BASE**

- 2.1 The under-surface of the base casting shall be free from blow holes, and the bearing area shall be adequate 20% minimum
- 2.2 The side abutment faces shall be flat, coplanar and square to the under-surface of the base Flatness 0.0001 in.
Coplanarity 0.0002 in.
Squareness 0.0001 in. over the abutment faces.
- 2.3 The height of the horizontal axis of inclination above the under-surface shall be measured and recorded to the nearest 0.0001 in.
- 2.4 The horizontal axis of inclination shall be parallel with the under-surface 0.0002 in. over the 13 in. width of base.
- 2.5 The axis of inclination shall be square to the side abutment faces 0.0002 in. over the separation of the abutment faces.

3. **TABLE**

- 3.1 The upper-surface shall be flat whether the table be clamped or unclamped 0.0003 in.
- 3.2 The upper-surface shall be square to the axis of rotation 0.0002 in. at a radius of 4 in.

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- 3.3 When the table is located on its stop, in the horizontal position, the upper-surface shall be parallel with the under-surface of the base 0.0005 in. over the 8 ½ in. diameter of table.
- 3.4 The mean height of the upper-surface above the under-surface of the base, immediately over the axis of inclination, shall be measured and recorded to the nearest 0.0001 in.
- 3.5 The backlash between the worm drive and the table shall not exceed 1 minute of arc.

- Notes: (i) The table should always be set in a direction to correspond with an increase in angular reading in order to avoid the introduction of errors due to backlash.
- (ii) When the surface of the table is appreciably inclined to the horizontal it should, as far as possible, be loaded symmetrically. If, however, the table is loaded unsymmetrically it is essential to ensure that the rotational bias in all positions, is such that the effects of backlash are eliminated.

4. **CLAMPING**

- 4.1 The action of clamping the table shall not: -
- (i) cause a change in the table height relative to the under-surface of the base 0.0001 in.
- (ii) cause any change in rotation. 1 vernier division (5 sec of arc)

5. **CENTRE PLUG**

- 5.1 The plug shall bear the same identification number as the table with which it is associated.
- 5.2 The spherical end and the tapered surface of the plug shall be hardened Min. 800 HV
- 5.3 The tapered portion of the plug shall be straight over its length 0.000 05 in.
- 5.4 The centre of the spherical end shall lie on the axis of the tapered portion 0.0001 in. (0.0002 in. FIM)
- 5.5 When the plug is inserted, the height of the centre of the spherical end above the under-surface of the base shall be measured and recorded to the nearest 0.0001 in.

6. **TAPERED SOCKET IN 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, the centre of its spherical end shall lie on the axis of rotation of the table 0.000 15 in. (0.0003 in. FIM)

		<u>LIMITING VALUE OR MAXIMUM PERMISSIBLE ERROR</u>
6.3	When the work-table is inclined through any angle in its range from 0° to 90°, any associated lateral movement in a direction parallel with the axis of inclination shall not exceed	0.0003 in.
7.	<u>SEPARATION OF AXIS</u>	
7.1	The axis of inclination and rotation shall intersect	0.0003 in.
8.	<u>ACCURACY OF SCALES</u>	
8.1	The maximum error between any two settings of the rotatable table shall not exceed	4 vernier divisions (1/3 minute of arc)
8.2	The inclination scale shall indicate correctly the inclination of the table top with respect to the under-surface of the base to within	±1 vernier division (±1 minute of arc)

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May 1959