NATIONAL PHYSICAL LABORATORY

METROLOGY CENTRE

Ref: MOY/SCMI/6 (Issue 5)

SPECIFICATION OF ACCURACY

for

A "MICROPTIC" VERTICAL MEASURING MACHINE

Type: "Microptic" vertical measuring machine Range 0 to 100 mm (0 to 4 in).

Made by: Rank Precision Industries Ltd. Metrology Division.

> LIMITING VALUE OR MAXIMUM PERMISSIBLE ERROR

1. GENERAL

- 1.1 The workmanship and finish shall be in keeping with a 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. The main scale shall also be marked with an identification number.
- 1.3 The illumination of the scales shall be adequate and uniform.
- 1.4 The graduations of the main scale, graticule, and optical micrometer shall all be clear-cut and free from blemishes.
- 1.5 The main scale, graticule, and optical micrometer graduations shall be in focus simultaneously.

2. WORK TABLE

3.

2.1	The work-table shall be hard.	800 HV minimum.			
2.2	The upper surface of the work-table shall have a lapped finish and be flat.	0.001 mm (0.000 04 in))			
	Note: Any departure from flatness shall be in the nature of a convexity.				
2.3	The fine adjustment of the work-table shall be smooth in action and the table shall be provided with an adequate clamp. On clamping the table, no appreciable change in setting shall be observed.				
MEASURING HEAD					
3.1	The measuring head shall run freely without any shake between its guides.				

3.2 The working force shall not exceed 5N (16 ozf)
3.3 The contact tip of the measuring head shall be hard and well finished. 800 HV minimum

LIMITING VALUE OR MAXIMUM PERMISSIBLE ERROR

3.4 The travel of the measuring head shall be perpendicular to the surface of the work-table.

0.05mm per 25mm (0.002 in per in)

4. ACCURACY OF SCALES AT 20°C

4.1 The main scale shall be accurate with respect to the zero graduation to within the tolerances give in Table 1.

Ra	Tolerances		
mm	in	mm	in
0 up to 25	0 up to 1	±0.0005	±0.000 02
Above 25 & up to 50	Above 1 & up to 2	±0.0008	±0.000 03
" 50 " " " 75	" 2 " " " 3	±0.0008	±0.000 03
" 75 " " "100	" 3 " " " 4	±0.0010	±0.000 04

4.2 The graticule and optical micrometer scales shall each be accurate with respect to its zero graduation.

±0.0005 mm (±0.000 02 in)

Note: It is clearly not practicable to check the accuracy of every graduation on all three scales. It is considered that a fair assessment of accuracy will be obtained by testing the scales at the intervals shown in Table II.

TABLE II

	Intervals of Test		
Description	Graduated	intervals of rest	
Main scale	0 to 100 mm by 1.0 mm (0 to 4 in by 0.05 in)	every 5 mm (0.2 in)	
Double line graticule	0 to 0.9 mm by 0.1 mm (0 to 0.04 in by 0.01 in)	every interval	
Optical micrometer scale	0 to 0.1 mm by 0.001 mm (0 to 0.01 in by 0.000 05 in)	every 0.01 mm (0.001 in)	

4.3 Without the application of any corrections, the functional accuracy of the "Microptic" measuring machine shall be within the tolerances given in Table III.

TABLE I

LIMITING VALUE OR MAXIMUM PERMISSIBLE ERROR

TABLE III

Range		Tolerances	
mm	in	mm	in
0 up to 25	0 up to 1	± 0.0008	±0.000 03
Above 25 & up to 50	Above 1 & up to 2	±0.0010	±0.000 04
" 50 " " " 75	" 2 " " " 3	±0.0010	±0.000 04
" 75 " " " 100	" 3 " " " 4	±0.0013	±0.000 05

(Signed) L.w. Nukals

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for Director

October 1969 MOY/SCMI/6 Issue 5