# NATIONAL PHYSICAL LABORATORY

## **STANDARDS DIVISION**

SPECIFICATION OF ACCURACY

## Ref: MOY/SCMI/91 (Issue 1)

for

# A "MINIDEKKOR"

Type: A Hilger & Watts "Minidekkor", comprising a small autocollimating telescope having a measuring range of 60 minutes of arc in two directions inclined at 90 degrees to each other. The eyepiece graticule scales in the instrument are graduated in 1-minute intervals.

LIMITING VALUE OR MAXIMUM PERMISSIBLE ERROR

#### 1. GENERAL

- 1.1 The general workmanship and finish shall be in keeping with a precision 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 nominal value of a unit division of the eyepiece graticule scales shall be indicated on the instrument.

#### 2. BODY TUBE

- 2.1 The body tube shall be made of steel, and shall be chrome-plated and ground.
- 2.2 The outside diameter shall be 1 in

+0

-0.0005 in (This tolerance to include straightness and roundness).

#### 3. **EYEPIECE**

- 3.1 The focusing movement of the eyepiece shall be smooth.
- 3.2 With the eyepiece approximately at the centre of its focusing range, it shall be possible to see the graticule scales in sharp focus when viewed through a low magnification telescope focused for infinity.

### 4. **<u>ILLUMINATION</u>**

4.1 The lighting unit shall provide adequate and uniform illumination over the field of view.

# 5. <u>90-DEGREE TARGET CROSS-LINES</u>

	5.1	The 90-degree target cross-lines shall be clearly defined and of uniform thickness. Their thickness shall match the thickness of the eyepiece graticule scales.	
	5.2	The cross-lines shall be straight over their total length	0.0004 in.
	5.3	There shall be no appreciable lack of parallelism between the image of the 90-degree cross-lines and the eyepiece graticule scales, as observed by visual inspection.	
6.	EYEPI	ECE GRATICULE SCALES	
	6.1	The eyepiece graticule scales shall be clearly defined and of uniform thickness.	
	6.2	The two scales shall be set at right-angles to each other	5 minutes of arc.
7.	TELESCOPE OBJECTIVE		
	7.1	Provision shall be made for locking the objective lens securely in position.	
	7.2	The telescope objective shall be accurately set such that the eyepiece graticule scales and the image of the 90-degree cross-wires, as reflected from an optically flat surface, may be brought to a simultaneous sharp focus by movement of the eyepiece.	
	7.3	Any residual parallax, as observed by a transverse eye movement across the eyepiece, shall not exceed	$1/5^{\text{th}}$ graticule-scale division ( $1/5^{\text{th}}$ minute of arc)
8.	ACCURACY OF PERFORMANCE		
	8.1	It shall be possible to estimate the instrument readings to	$1/5^{\text{th}}$ graticule-scale division ( $1/5^{\text{th}}$ minute of arc).
	8.2	The instrument shall function satisfactorily over distances up to (As the distance increases the field of view becomes restricted).	12 feet.
	8.3	When the instrument is sighted on a flat reflector which has been set normal to the axis of the body tube, the reflected image of the 90-degree target cross-lines shall fall within the range of eyepiece graticule scales.	

- 8.4 The eyepiece graticule scales shall be calibrated with the instrument sighted on an optically flat reflecting surface placed one foot from the objective lens. Any errors present in the scales shall be of a reasonably uniform nature and shall not exceed
- <sup>1</sup>/<sub>2</sub> graticule-scale division overall (1/2 minute of arc)

or

 $1/5^{\text{th}}$  graticule-scale division over any one division interval  $(1/5^{\text{th}}$  minute of arc).

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