


LUMINANCE METERS

SPOT LUMINANCE METER

- Optical lens + photodiode
- Allows focus & targeting
- Narrow viewing angle → measures small areas
- Time-consuming

IMAGING LUMINANCE METERS

- Based on CCD or CMOS sensor technology
- Used for measuring illuminated surfaces & light sources
- Shows luminance distribution
- Not suitable for measuring small objects



CALIBRATION

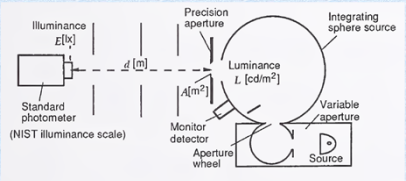
Before starting the calibration, some conditions must be met:

- Photometers shall be calibrated by **sources or detectors certified as reference standards** and the calibration of which is traceable to the International System of Units (SI).
- Photometers shall be calibrated at an **ambient temperature of 25 °C** with unpolarized light from an incandescent lamp with a correlated **colour temperature of 2856 K**.
- Photometers shall be allowed to **thermally stabilize** in the ambient conditions for at **least one hour**, before starting the calibration.

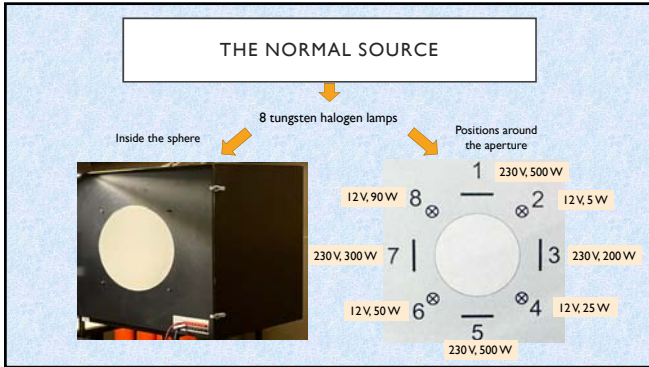
LUMINANCE UNIT

Standard photometer
Light source
Photometric bench

$$L = k E \frac{d^2}{A}$$



The average luminance **L (cd/m²)** over the aperture plane is calculated based on the illuminance **E (lx)**, the distance **d (m)**, and the area of the aperture **A (m²)**.



TEST #1

- Spectroradiometer for determining the colour temperature of 2856 K
- Measuring luminance at the centre of the aperture with luminance meter

Detailed description: The photograph shows a laboratory setup for measuring the color temperature and luminance of a normal source. A spectroradiometer is positioned to measure the light from the source, and a luminance meter is used to measure the luminance at the center of the aperture. The setup is housed in a dark enclosure with a white circular aperture.

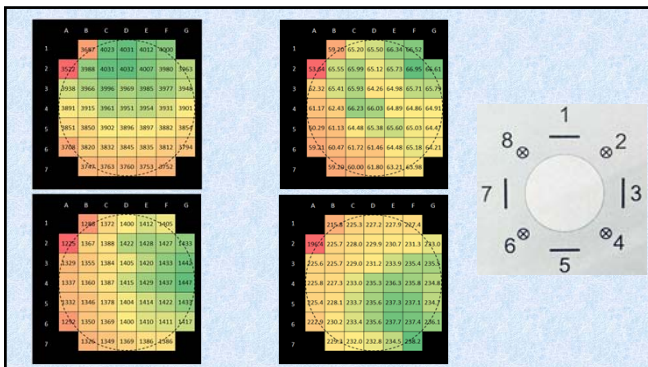
TEST #2

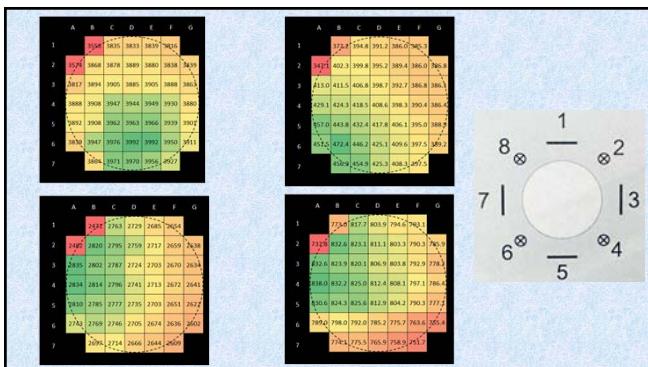
- Measuring illuminance with lux meter
- Calculating average luminance of the aperture based on illuminance measurements

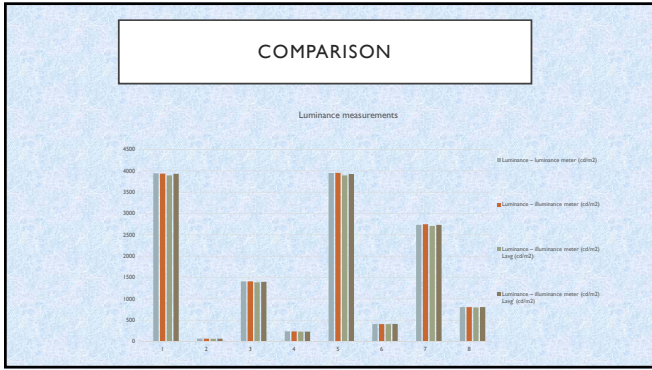
Detailed description: The photograph shows a laboratory setup for measuring the illuminance of a normal source. A lux meter is positioned to measure the illuminance of the light source. The setup is housed in a dark enclosure with a white circular aperture.

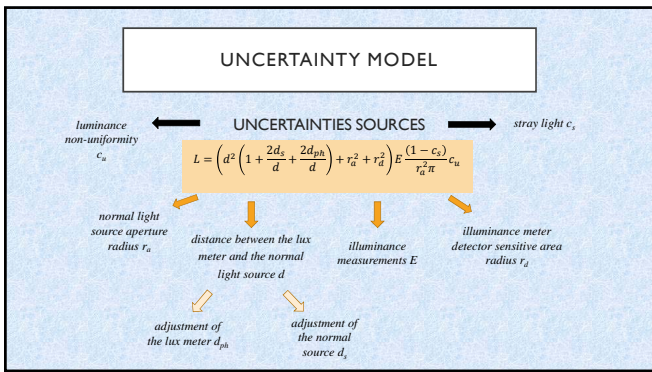
TEST #3

- Checking **luminance uniformity** of the normal light source
- Measuring 45 different spots of the aperture with **luminance meter**
- Calculating average luminance of 45 luminance measurements
- Calculating average luminance of 25 luminance measurements (taking into consideration only measured fields that are fully inside the aperture)









RESULTS

- $L_1 = 4190,0429 (1 \pm 0,0625) \text{ cd/m}^2$
- $L_2 = 70,3978 (1 \pm 0,0905) \text{ cd/m}^2$
- $L_3 = 1500,1284 (1 \pm 0,0679) \text{ cd/m}^2$
- $L_4 = 251,3603 (1 \pm 0,06246) \text{ cd/m}^2$
- $L_5 = 4212,8746 (1 \pm 0,0581) \text{ cd/m}^2$
- $L_6 = 424,0140 (1 \pm 0,1827) \text{ cd/m}^2$
- $L_7 = 2400,7129 (1 \pm 0,0667) \text{ cd/m}^2$
- $L_8 = 859,9947 (1 \pm 0,0803) \text{ cd/m}^2$

