# Luminance L [cd/m²]

**Luminance L** indicates the brightness impression perceived by the eye when positioned in front of **self-luminous or illuminated surface A**.

> *Luminance L = Luminous Intensity I / Surface A*

Luminance is used for **planning outdoor lighting**. It describes the physiological effect of light on the eye and is the only visible light quantity.

Luminance can be determined either by means of contact measurement in the case of self-luminous surfaces or by means of a distance measurement in the case of self-luminous or illuminated surfaces. Special luminance meters are used to this end, or a luxmeter with a luminance attachment can be used to obtain a ballpark measurement.

## Measurement Circle for Distance Measurement

In the case of the distance measurement, luminance meters with a tight measuring angle are used as a rule. They usually have an optical viewfinder making it possible to aim at the surface to be measured.
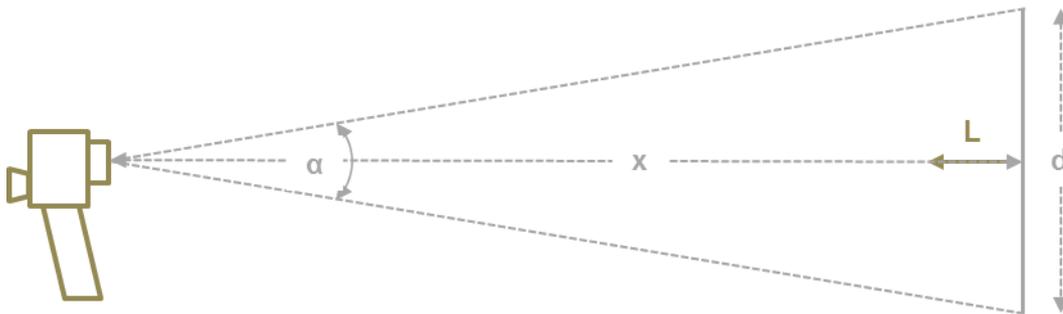


Diameter d of the measuring circle can be calculated from measuring angle α and distance x with the help of the following trigonometric function:

$$d = 2 * \tan(\alpha / 2) * x$$

**Example:**  A luminance meter has a measuring angle of 1° and can measures distance from 1 m to ∞. Smaller distances within a range of 51 to 100 cm are made possible with close-up lens 1, and within a range of 34 to 50 cm with close-up lens 2. Which measurement circle ranges result for the two close-up lenses?

$$d = 2 * \tan(\alpha / 2) * x = 2 * \tan(1° / 2) * x = 2 * 0.00873 * x = 0.01746 * x$$

|  | Measuring Distance | Measuring Circle Diameter |
|---|---|---|
| Close-up lens 1 | 51 … 100 cm | 8.9 … 17.46 mm |
| Close-up lens 2 | 34 … 50 cm | 5.94 … 8.73 mm |