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Light Measurement Formulas

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List of 18 Light Measurement Formulas

Light Measurement

1) Area affected by Light Incident

Open Calculator

fx $$A = \frac{L_p}{H}$$

ex $$28.20513\text{m}^2 = \frac{22\text{W}}{0.78\text{W/m}^2}$$

2) Area Projected at solid angle

Open Calculator

fx $$\Omega = \frac{\Phi_m}{I}$$

ex $$8\text{m}^2 = \frac{230\text{Wb}}{28.75\text{cd}}$$

3) Flux at Solid Angle

Open Calculator

fx $$\Phi_m = I \cdot \Omega$$

ex $$230\text{Wb} = 28.75\text{cd} \cdot 8\text{m}^2$$

4) Illuminance

Open Calculator

fx $$\mathrm{E} = \frac{\Phi_{\mathrm{m}}}{\mathrm{A}}$$

ex $$8.070175\mathrm{lx} = \frac{230\mathrm{Wb}}{28.5\mathrm{m^2}}$$

5) Incident Luminous Flux

Open Calculator

fx $$\Phi_{\mathrm{i}} = \frac{\Phi_{\mathrm{r}}}{\rho}$$

ex $$2\mathrm{lm} = \frac{5.1\mathrm{lm}}{2.55}$$

6) Intensity on Solid Angle

Open Calculator

fx $$\mathrm{I} = \frac{\Phi_{\mathrm{m}}}{\Omega}$$

ex $$28.75\mathrm{cd} = \frac{230\mathrm{Wb}}{8\mathrm{m^2}}$$

7) Irradiation

Open Calculator

fx $$\mathrm{H} = \frac{\mathrm{L_p}}{\mathrm{A}}$$

ex $$0.77193\mathrm{W/m^2} = \frac{22\mathrm{W}}{28.5\mathrm{m^2}}$$

8) Light flux

Open Calculator

$$\Phi = \frac{I_{pc}}{P_s}$$

$$3.870968\text{lm} = \frac{12\text{A}}{3.1}$$

9) Light Power

Open Calculator

$$L_p = A \cdot H$$

$$22.23\text{W} = 28.5\text{m}^2 \cdot 0.78\text{W/m}^2$$

10) Luminous Flux incident upon Object

Open Calculator

$$L_i = \frac{L_t}{\tau}$$

$$7.738095\text{lm} = \frac{32.5\text{lm}}{4.2}$$

11) Luminous Flux Transmitted by Object

Open Calculator

$$L_t = \tau \cdot L_i$$

$$32.34\text{lm} = 4.2 \cdot 7.7\text{lm}$$

12) Luminous Intensity in Direction at Angle

Open Calculator

$$I_\theta = L_n \cdot A \cdot \cos(\theta)$$

$$5.608471\text{cd} = 0.37\text{lx} \cdot 28.5\text{m}^2 \cdot \cos(1.01\text{rad})$$

13) Luminous Intensity in Direction Normal to Surface

Open Calculator

$$I_n = A \cdot L_n$$

$$10.545\text{cd} = 28.5\text{m}^2 \cdot 0.37\text{lx}$$

14) Photoelectric Current

Open Calculator

$$I_{pc} = F \cdot P_s$$

$$12.09\text{A} = 3.9\text{lm} \cdot 3.1$$

15) Photoelectric Sensitivity

Open Calculator

$$P_s = \frac{I_{pc}}{F}$$

$$3.076923 = \frac{12\text{A}}{3.9\text{lm}}$$

16) Reflected Luminous Flux

Open Calculator

$$\Phi_r = \Phi_i \cdot \rho$$

$$5.865\text{lm} = 2.3\text{lm} \cdot 2.55$$

17) Reflection Factor

Open Calculator

fx $$\rho = \frac{\Phi_r}{\Phi_i}$$

ex $$2.217391 = \frac{5.1\text{lm}}{2.3\text{lm}}$$

18) Transmission Factor

Open Calculator

fx $$\tau = \frac{L_t}{L_i}$$

ex $$4.220779 = \frac{32.5\text{lm}}{7.7\text{lm}}$$

Variables Used

- **A** Surface Area *(Square Meter)*
- **E** Illumination *(Lux)*
- **F** Luminous Flux *(Lumen)*
- **H** Irradiation *(Watt per Square Meter)*
- **I** Luminous Intensity *(Candela)*
- I_n Luminous Intensity Normal to Surface *(Candela)*
- I_{pc} Photoelectric Current *(Ampere)*
- I_θ Luminous Intensity at Angle *(Candela)*
- L_i Luminous Flux Incident upon Object *(Lumen)*
- L_n Luminance Normal to Surface *(Lux)*
- L_p Power *(Watt)*
- L_t Luminous Flux Transmitted by Object *(Lumen)*
- P_s Photoelectric Sensitivity
- **θ** Angle to Normal *(Radian)*
- **ρ** Reflection Factor
- **τ** Transmission Factor
- **Φ** Flux *(Lumen)*
- Φ_i Incident Luminous Flux *(Lumen)*
- Φ_m Magnetic Flux *(Weber)*
- Φ_r Reflected Luminous Flux *(Lumen)*
- **Ω** Area Projected at Solid Angle *(Square Meter)*

Constants, Functions, Measurements used

- Function: **cos**, cos(Angle)
  Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.
- Measurement: **Electric Current** in Ampere (A)
  Electric Current Unit Conversion
- Measurement: **Luminous Intensity** in Candela (cd)
  Luminous Intensity Unit Conversion
- Measurement: **Area** in Square Meter (m²)
  Area Unit Conversion
- Measurement: **Illuminance** in Lux (lx)
  Illuminance Unit Conversion
- Measurement: **Power** in Watt (W)
  Power Unit Conversion
- Measurement: **Angle** in Radian (rad)
  Angle Unit Conversion
- Measurement: **Magnetic Flux** in Weber (Wb)
  Magnetic Flux Unit Conversion
- Measurement: **Heat Flux Density** in Watt per Square Meter (W/m²)
  Heat Flux Density Unit Conversion
- Measurement: **Luminous Flux** in Lumen (lm)
  Luminous Flux Unit Conversion

Check other formula lists

- **Flow Measurement Formulas**
- **Light Measurement Formulas**
- **Level Measurement Formulas**

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