Luminance of a Diffuse Surface from Illuminance and Reflectance

Luminance and luminous exitance of a matt (Lambertian) surface from the illuminance on it and its reflectance, with the luminance contrast to a second surface.

Method: Lambertian luminance; Photometry of diffuse surfaces

Input parameters

Unit system: SI

Parameter	Value	Unit
Illuminance on the surface	500.00	lx
Reflectance	70.000	%
Reflectance of a second surface (for contrast)	10.000	%

Calculated results

Parameter	Value	Unit
Luminous exitance ρE	350.00	lx
Luminance ρE/π (cd/m²)	111.41	
Second surface luminance (cd/m²)	15.915	
Luminance contrast (L − L_2)/L	85.714	%

Notes for this case

• Perfectly diffuse (Lambertian) surface: L = ρE/π in cd/m². Glossy surfaces reflect specularly and look brighter or darker depending on viewing angle.

Formula and method

$$L = \frac{\rho E}{\pi}, \quad C = \frac{L - L_2}{L}$$

Variables

E	Illuminance on the surface	lx
ρ	Reflectance	-
ρ_2	Reflectance of a second surface (for contrast)	-
M	Luminous exitance ρE	lx
L	Luminance ρE/π (cd/m²)	-
L_2	Second surface luminance (cd/m²)	-
C	Luminance contrast (L − L_2)/L	-

Method and standards

Diffuse luminance.

Assumptions and limits

- Lambertian surfaces.

References

Lambertian luminance, Photometry of diffuse surfaces

Report details

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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/electrical/lighting/luminance-from-illuminance

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.