Lighting Power Density, Efficacy and Average Lux

Lighting power density in W/m², installed efficacy in lumens per watt and the average illuminance of a room from the lamps installed and the area.

Method: Lumen method (CIBSE Code for Lighting / IES Lighting Handbook)

Input parameters

Unit system: SI

Parameter	Value	Unit
Total power of the lighting	2,400.0	W
Total lumens of the lamps	312,000	
Floor area	400.00	m²
Utilisation factor	60.000	%
Maintenance factor	80.000	%

Calculated results

Parameter	Value	Unit
Lighting power density	6.0000	W/m²
Efficacy (lumens per watt)	130.00	
Average maintained illuminance (lux)	374.40	
Power per m² per 100 lux (W/m² per 100 lx)	1.6026	

Formula and method

$$LPD = \frac{P}{A}, \quad \eta_L = \frac{\Phi}{P}, \quad E = \frac{\Phi UFMF}{A}$$

Variables

P	Total power of the lighting	W
Φ	Total lumens of the lamps	-
A	Floor area	m²
UF	Utilisation factor	-
MF	Maintenance factor	-
LPD	Lighting power density	W/m²
η_L	Efficacy (lumens per watt)	-
E	Average maintained illuminance (lux)	-
$\mathcal{W}$	Power per m² per 100 lux (W/m² per 100 lx)	-

Method and standards

Lumen method in reverse.

Assumptions and limits

- Uniform general lighting.

References

- Lumen method (CIBSE Code for Lighting / IES Lighting Handbook)

Report details

Report reference	FCC-RVBP-FMX2 (the same inputs always give the same reference)
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Calculator	Lighting Power Density, Efficacy and Average Lux
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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/lighting-power-density

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.