Lighting Design by the Lumen Method

Number of light fittings for a required illuminance by the lumen method, from area, lumens per fitting, utilisation factor and maintenance factor.

Method: Lumen method of average illuminance

Input parameters

Unit system: SI

Parameter	Value	Unit
Required average illuminance (lux)	150.00	
Area to light	600.00	m²
Lumens per fitting	20,000	
Utilisation factor From the fitting's photometric tables for the room index and reflectances.	60.000	%
Maintenance factor Allows for dirt and lumen depreciation; lower for dusty boiler houses and coal yards.	70.000	%

Calculated results

Parameter	Value	Unit
Fittings needed (whole number)	11.000	
Average illuminance with that number (lux)	154.00	
Fittings, exact	10.714	

Notes for this case

- Space the fittings no wider than their spacing-to-height ratio allows, or the illuminance will be uneven.

Formula and method

$$N = \frac{E\,A}{\Phi\,UF\,MF} \qquad E_{act} = \frac{\lceil N \rceil\,\Phi\,UF\,MF}{A}$$

Variables

E	required illuminance	lux
A	area	m²
Φ	lumens per fitting	lm
UF	utilisation factor	–
MF	maintenance factor	–
N	fittings needed	–
E_{act}	illuminance achieved	lux
N_c	fittings, exact	–

Method and standards

Lumen method for average illuminance over a work plane.

Assumptions and limits

- Average illuminance; uniform layout.

References

- Lumen method of average illuminance

Report details

Report reference	FCC-EWPK-C3DC (the same inputs always give the same reference)
Generated	17 November 2026, 19:44 UTC
Calculator	Lighting Design by the Lumen Method
Method last reviewed	11 November 2026
Software release	FireCAD Calc, release of 17 November 2026
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-lumen-method

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.