Average Daylight Factor of a Room

Average daylight factor of a side-lit room from window area, transmittance, sky angle, room surface area and reflectance, with indoor illuminance.

Method: Average daylight factor DF = TA_wθM/(A(1 − R²)) (Lynes; CIBSE Lighting Guide LG10)

Input parameters

Unit system: SI

Parameter	Value	Unit
Net glazed area	6.0000	m²
Glazing light transmittance	70.000	%
Visible sky angle from the window centre	69.998	°
Maintenance (dirt) factor	90.000	%
Total room surface area (floor, ceiling, walls, windows)	150.00	m²
Area-weighted average reflectance	50.000	%
Outdoor unobstructed sky illuminance	10,000	lx

Calculated results

Parameter	Value	Unit
Average daylight factor	2.3519	%
Average indoor daylight illuminance	235.19	lx

Notes for this case

• Average daylight factor formula (Lynes, as used in the BRE and CIBSE guides) with θ in degrees: DF% = TA_wθM/(A(1 − R²)). Above 5 % is well daylit; below 2 % needs electric light much of the day.

Formula and method

$$DF = \frac{TA_w\theta M}{A(1-R^2)} \ (\theta \text{ in degrees, DF in \%}), \quad E_i = DF \cdot E_o$$

Variables

A_w	Net glazed area	m²
T	Glazing light transmittance	-
θ	Visible sky angle from the window centre	rad
M	Maintenance (dirt) factor	-
A	Total room surface area (floor, ceiling, walls, windows)	m²
R	Area-weighted average reflectance	-
E_o	Outdoor unobstructed sky illuminance	lx
DF	Average daylight factor	-
E_i	Average indoor daylight illuminance	lx

Method and standards

Average daylight factor.

Assumptions and limits

- Overcast sky; side-lit room.
- The formula is empirical in degrees: θ is converted to degrees inside it, and DF comes out in per cent before being shown as a fraction.

References

• Average daylight factor DF = TA_wθM/(A(1 − R²)) (Lynes; CIBSE Lighting Guide LG10)

Report details

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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/daylight-factor-average

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.