Window Overhang Shading (Profile Angle)

Shadow depth cast by a horizontal overhang on a window from the sun's altitude and the wall-solar azimuth, and the shaded and sunlit fractions of the glass.

Method: Shading by horizontal projections

Input parameters

Unit system: SI

Parameter	Value	Unit
Overhang projection	0.60000	m
Gap from overhang to window head	0.30000	m
Window height	1.5000	m
Window width	1.8000	m
Solar altitude	60.000	°
Wall-solar azimuth (sun relative to wall normal)	20.000	°

Calculated results

Parameter	Value	Unit
Profile (vertical shadow) angle	61.519	°
Shadow depth below the overhang	1.1059	m
Shaded fraction of the window	53.728	%
Sunlit glass area	1.2493	m²

Notes for this case

• A long horizontal overhang casts a shadow line whose depth below its edge is P·tan Ω, where the profile angle Ω is the sun's altitude projected onto a vertical plane normal to the wall: tan Ω = tan β/cos γ. The glass from the head down to that line is shaded, less the gap between overhang and head. South-facing (north in the southern hemisphere) overhangs shade high summer sun and admit low winter sun; on east and west walls the low sun gets under them, so vertical fins or external blinds work better there. End effects of a finite overhang are ignored.

Formula and method

$$\tan\Omega = \frac{\tan\beta}{\cos\gamma}, \quad y = P\tan\Omega, \quad f_s = \frac{\min(H, \max(0, y - G))}{H}$$

Variables

P	Overhang projection	m
G	Gap from overhang to window head	m
H	Window height	m
W	Window width	m
β	Solar altitude	rad
γ	Wall-solar azimuth (sun relative to wall normal)	rad
Ω	Profile (vertical shadow) angle	rad
y	Shadow depth below the overhang	m
f_s	Shaded fraction of the window	-
A_{sun}	Sunlit glass area	m²

Method and standards

Overhang shading.

Assumptions and limits

- Infinitely long overhang; direct beam only.

References

Shading by horizontal projections

Report details

Report reference	FCC-B1G7-DS6H (the same inputs always give the same reference)
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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/hvac/loads/window-overhang-shading

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.