

Solar Gain Rules



General Rules for Solar Gain, Ottawa/Outaouais Region:

Hi quality window

Casements and awnings reduce losses/better seals

Low-e/argon as it still lets in wavelengths where most of the energy is

Southern exposure = natural gain

No more than 10% of floor area on southern face

Add thermal mass where possible, but not necessarily beyond thermal mass of drywall, ceramics, etc...

Header Distance of 12 to 15 inches (12 inches minimum)

Overhangs not to exceed 3 feet

Position on outermost face of wall

Sealed openings (e.g., drywall reveals)

Passive Solar Notes

Intensity

Peak: Noon, 900 W/m²

Bell Curve: 9 am and 3 pm; 400W/m²

Window Placement

South: Best

North: Avoid

E-W: keep to minimum

Horizontals: avoid (e.g., skylights on low slope)

Ottawa: Number 7 in solar gain

Balance

Must balance solar gain vs heat losses – R value, thermal batteries, leakage

Window R value

1/10th of window glass

Angle of incidence

Angle between rays and glass pane. Best at 90 deg

Winter angle usually less than 50%

Solar Heat Gain Coefficient

Air, clear: .78

Hard coat low-e: .75

Soft coat low-e: .68

But low-e admits rays where highest energy content is.

Rule for glass:

6 to 10% of heated floor area

Winter:

Avoid southern shading

Heat Losses

-transmission loss through panes

-convection

-conductive (materials, poor workmanship, insulation)

Thermal Mass

Drywall, masonry, stone, ceramics, etc...

Header distance

32 to 37 cm: 12 to 15 inches

Unshaded at Winter Solstice

Overhang max projection, Ottawa: 87.5 cm max = 36 inches or less.

Position

Towards outface of wall.