Section 2: Louvers

Exterior horizontal louvers are an effective method for shading solar glazing in summer, especially for sloped glazing.

Passive heating strategies call for major glazed areas (solar glazing) in a building to be oriented toward the equator (south in the Northern Hemisphere and north in the Southern Hemisphere). However, large solar glazing areas, sized to admit sunlight for heating in winter, will also admit sunlight during warm periods when it is not wanted. To control direct sunlight from entering a building, it is important to incorporate shading strategies as part of architectural design.

Sizing Louvers for Vertical Glazing

Exterior louvers are horizontal slats located on the exterior of a glazed opening or window. For solar shading, louvers extend just far enough to block the hot summer sun, but allow the lower winter sun angle to transmit heat into the space during the winter months. The optimum projection (width) of louvers is dependent upon the distance between louvers (H), latitude and climate. For example, the larger the space between louvers, the wider the louvers will be. The following equation provides a quick method for determining the width of the louvers:

Louver Width (P) = distance between louvers (H) / F

[P=H/F]

Where F = a factor from the following table

Latitude	F Factor
28°	5.6-11.1
32°	4.0-6.3
36°	3.0-4.5
40°	2.5-3.4
44°	2.0-2.7
48°	1.7-2.2
52°	1.5-1.8
56°	1.3-1.5

Note: Select a factor according to your latitude. The higher values will provide 100% shading at noon on June 21st, the lower values until August 1st (for warmer climates). Source: the Passive Solar Energy Book by Edward Mazria.

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To provide summer shading in the late morning and early afternoon, extend the louvers on each side of the glazed opening. The extension should be about half the distance between the louvers. The width of the louvers, and the distance between louvers should be such that the summer sun is blocked (the angle of the sun at noon on the summer solstice) from reaching the glazed opening.



Extend the width of the louvers to block the summer sun angle, blocking heat from entering the space during the summer.

Since louvers will also block a small portion of sunlight in winter when heat gain is desirable, make the top face of the louver a light color to reflect the intercepted sunlight deep into a space. Avoid using high-gloss louver surfaces that can reflect direct sunlight into a space at eye level, creating glare and uncomfortable visual conditions.

Sizing Louvers for Sloped Glazing

Louvers are also an effective method for shading sloped solar glazing. Ensure that the angle of the winter sun can pass between the sloped louvers and extend the width of the louvers far enough to block the summer sun angle. To provide summer shading in the late morning and early afternoon, extend the louvers on each side of the glazed opening following the above method.

The horizontal louver projection (P), the number of louvers, and the distance between louvers (H) are the critical dimensions for sloped louver systems.





Make the louvers parallel to the winter sun angle to allow direct sunlight and heat to pass into the space during winter. Extend the width of the louvers to block the summer sun angle, blocking heat from entering the space during the summer.



Fixed, sloped louvers, while effective, do not account for uncharacteristically warm days during the cooling season. Though more complex, employing adjustable louvers allows for greater solar control, especially during warm periods in the winter, spring, and fall.





