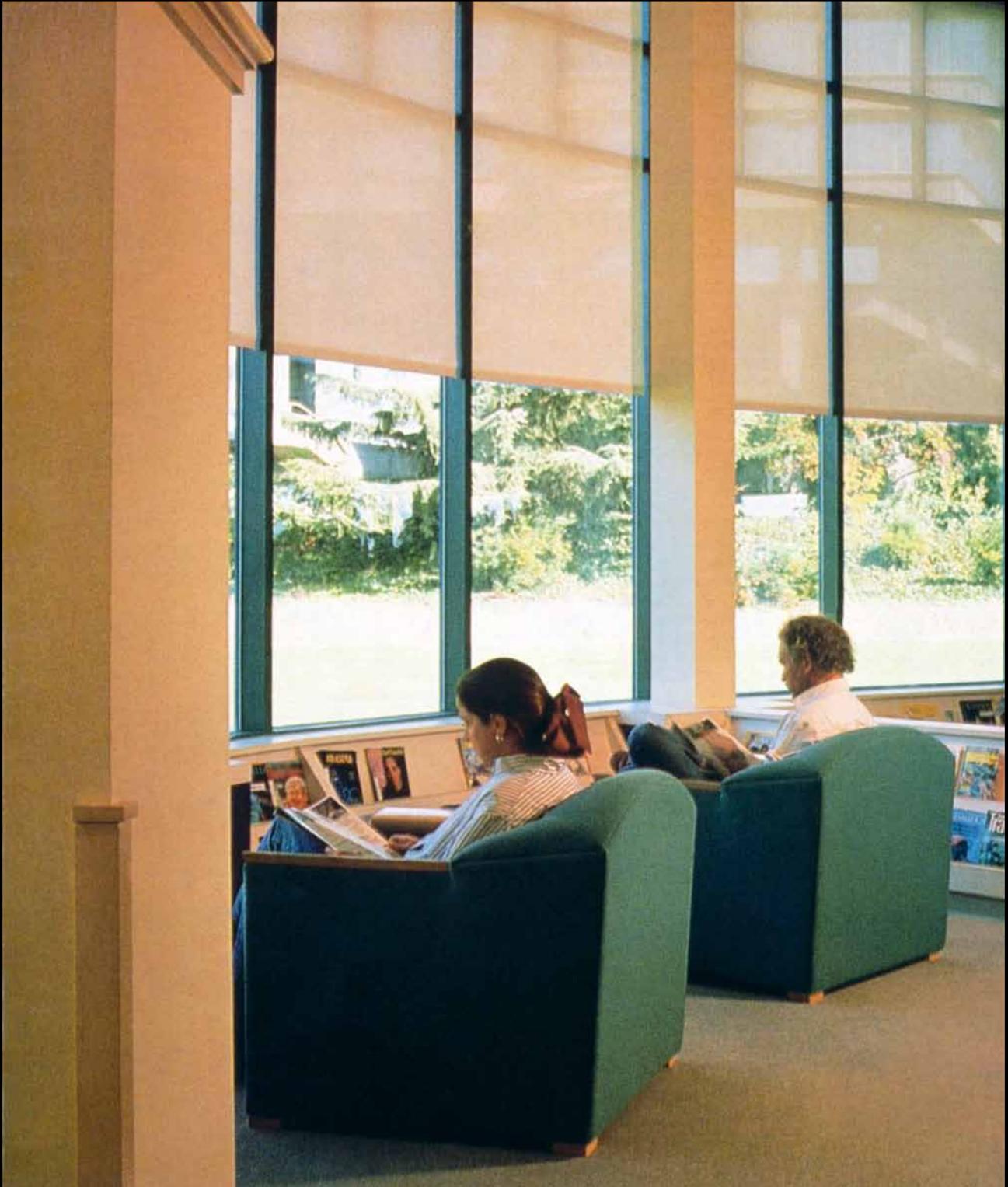


Visually Transparent Shading

An Analysis of Contemporary Shading Solutions



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Solar Gain and View with Fraser Shadings' Roller Screens

Energy-efficient transparent shading

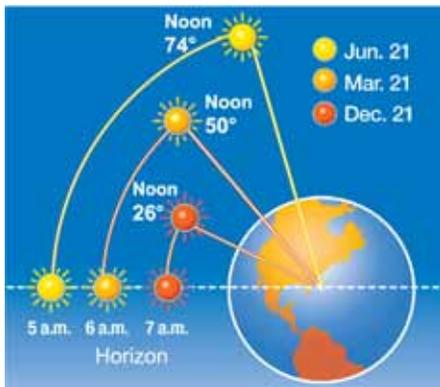
The use of glass in buildings has increased. No longer is the window an energy culprit. New energy-efficient glazings with higher degrees of visibility are used at an expanding rate. The solar-shading industry has responded by offering visually transparent shading, which fulfills solar-protection requirements, while maintaining a view to the outside. An effective solution to the problem is Fraser Shadings' Manual Shades or Motorized Shades in tandem with its exclusive shade cloths. These sunscreens feature small openings among the threads a by-product of the weaving process.

View and solar-protection opportunities

Fraser Shadings' shade cloths, woven in densities from 0–30% open and available in a variety of colors, from light to dark, complement glazings' heat-gain requirements and solar transmittance. A shade cloth's natural openings assure a uniform view and provide appropriate solar protection. Color and density selection are important in controlling interior brightness, energy efficiency, and glare. Recent studies have found that a shade cloth's composition can also play a factor in solar transmittance. Shade cloths composed of filament polyester materials tend to have a higher solar transmission than Fraser Shadings' traditional shade cloths.

The alternatives

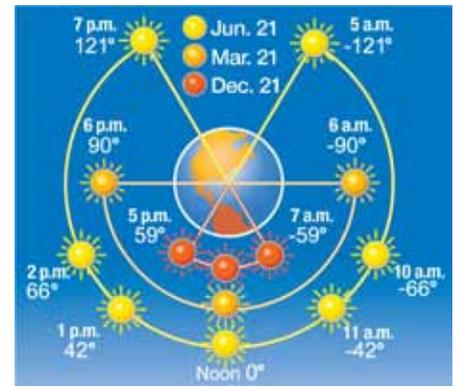
Venetian- and vertical-blind manufacturers offer mechanically perforated slats and louvers as an alternative to Fraser Shadings' shade cloths. These devices filter light when the angle of their slats is altered. The slat's opaque composition limits a blind's ability to provide uniform light distribution across a window. To properly filter high visible light, a translucent material with a uniform scrim effect and low-density factor of 0–30% open is needed. Fraser Shadings' shade cloths offer uniform transparency with less distortion of the view and appropriate solar control. (Calculations are based on 40° N. lat. and the nearest whole degree of solar time.)



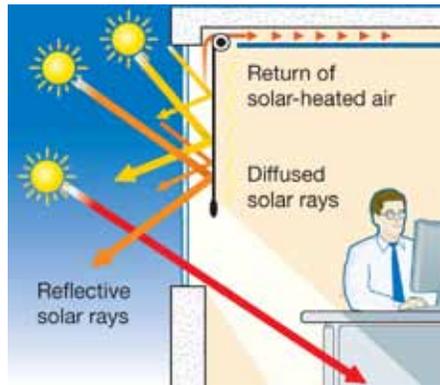
The vertical solar ray (or altitude) effects the depth of solar penetration.

The dynamic sun

The sun's effect on an interior space is best evaluated by looking at the components of the profile or shadow angle. Evaluate the vertical ray (or altitude) and the horizontal ray (or azimuth) and discover how they impact a person's visual and physical comfort. Solar-heat-gain penetration is greatest in winter due to the low angle of the sun, which generates the greatest amount of discomfort. Flat, woven shade cloths, components of Manual Shades and Electric Shades, provide visual transparency. The shade cloths effectively complement the vertical and horizontal solar rays. Louvered-shading products of opaque materials tend to be left open because people want a view.



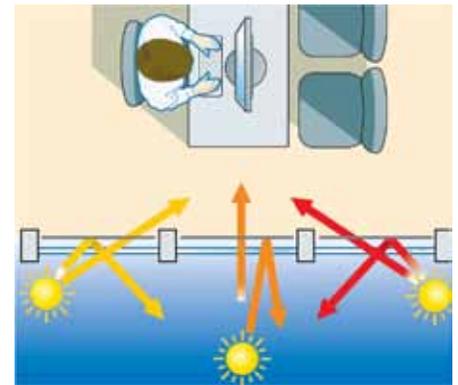
The horizontal solar ray (or azimuth) affects personal comfort.



Protection from solar gain with partially drawn solar-screen shades (section view).

Visually transparent shades

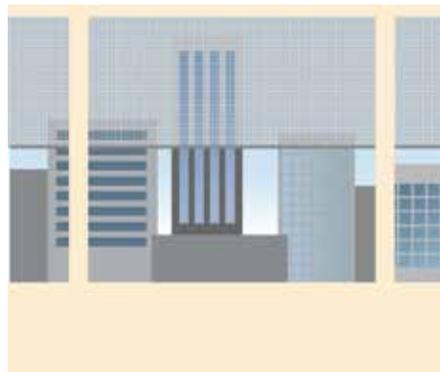
Fraser Shadings' manual and motorized shades are visually transparent systems and most aptly complement solar geometry by providing a cut-off angle similar to an awning or overhang. To provide protection from the sun in a south-facing window, the shade must be lowered only halfway. This single position permits more winter heat and less summer heat to enter the interior space. Thus, the changing seasons are appropriately complemented. Fraser Shadings' Systems' flat-shade cloth design eliminates the need for continuous readjustment throughout the day. And the hardware design permits convective airflow around the shade to reduce thermal stress.



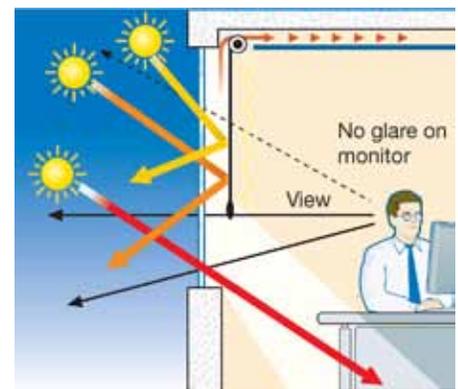
Protection from solar gain with partially drawn shades (plan view).

Glare and view with shades

Roll-down manual or motorized shades provide effective shading of workstations, monitors, and people by reducing direct solar penetration. A woven shade cloth with density and color suitably matched to the glass permits a view through the unshaded portion of a window, as well as a diminished view through the shade cloth. This configuration creates a sense of the outside. Unlike horizontal or vertical blinds, which will obstruct views at any angle. Fraser Shadings' fully lowered Manual or Electric shades offer a panoramic view. A fully raised shade can completely disappear with no stack at the top—in contrast with vertical or horizontal blinds, which can have an unsightly stack.

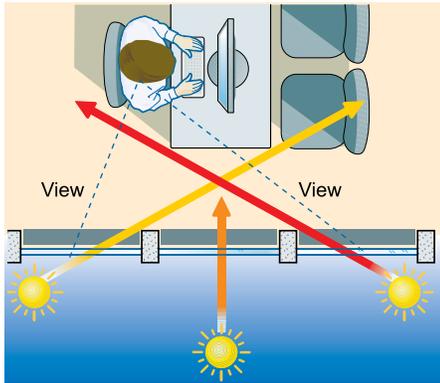


View through and under partially drawn roller screen shades.



Glare control on the monitor and a view under partially drawn roller-screen shades

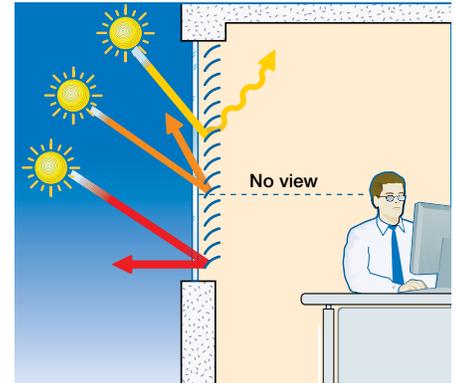
Solar Gain and View with Horizontal and Vertical Blinds



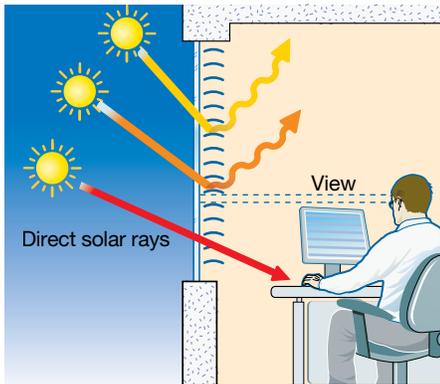
Total solar gain and view with open horizontal-slat blinds, offering little heat reduction.

Solar gain and view with horizontal blinds

An open horizontal-slat blind (or Venetian blind) provides little to no solar protection. The published shading coefficient of an open Venetian blind reveals that it is similar to unshaded glass. A Venetian blind is open at 0°, fully closed at 69°, and 2/3 closed at 45°. Tilted Venetian-blind slats can reduce heat gain, but the outside view will be reduced accordingly. Therefore, the reduction in heat gain and view occurs at an increasing rate when the tilt angle is more than 25°. Published data indicates that effective heat gain can only be achieved when the view has been almost obliterated—especially for someone sitting near the window wall.



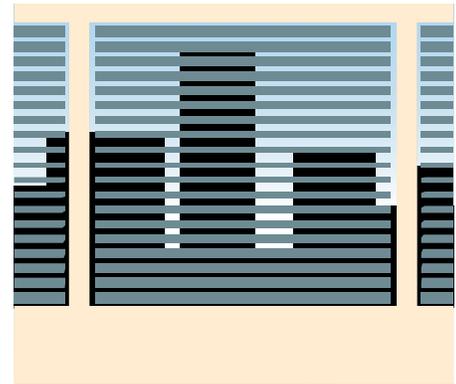
Reduced solar gain and view with partially open horizontal blinds.



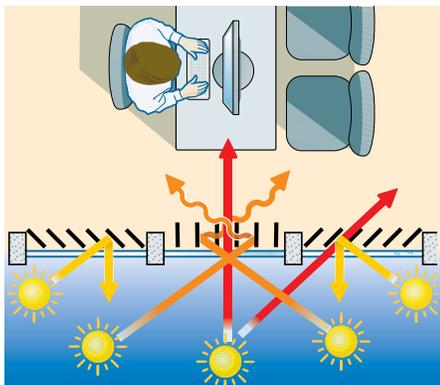
Total solar gain with open horizontal blinds. Notice the horizontal striations on the monitor.

Glare on monitors—view with horizontals

Office interiors require computer monitors near a window wall. Direct and diffused illumination through and off the surfaces of horizontal-slat (or Venetian) blinds tends to cause disturbing patterns on the screen of monitors. The solution is to shut the slats of the blinds. However, the window wall will become opaque and the view obliterated. For a view to the outside, the blinds may be raised halfway up, but this condition will block the top half of the window and leave the bottom half unshaded. In this typical configuration, the Venetian blinds are attempting to simulate a half-drawn roller shade. Generally, for Venetian blinds to be effective, the entire view to the outside must be sacrificed.



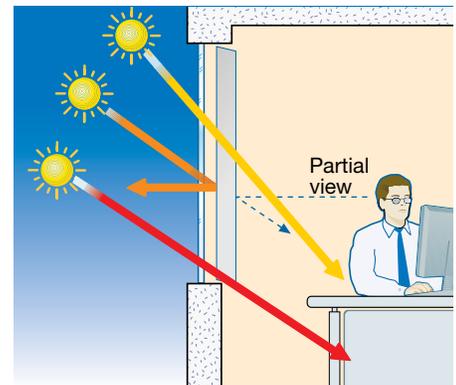
Horizontal louvers, which produce undesirable striations on computer monitors.



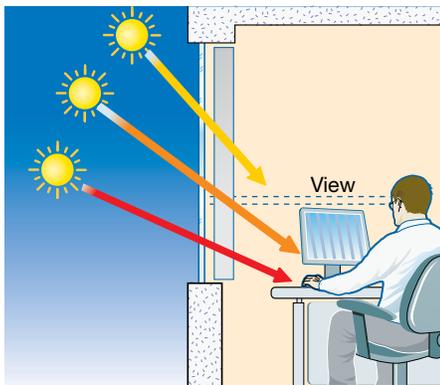
Total solar gain and view with fully or partially open vertical blinds. (plan view)

Solar gain and view with vertical blinds

Open vertical louvers are approximately equivalent to an unshaded window with similar glazing. The horizontal solar rays that impact vertical louvers are similar to the vertical rays on Venetian blinds. The sun is dynamic and can arc up and around a window as much as 30° between 11 a.m. and 1 p.m. It is difficult, probably impossible, to manually adjust vertical louvers hourly so that they are effective. More often, vertical louvers are left open. In the section drawing (right), the sun is above the 41° cut-off angle, where a reduction in solar gain is not possible. Below the 41° angle, solar gain is indirect but not diminished.



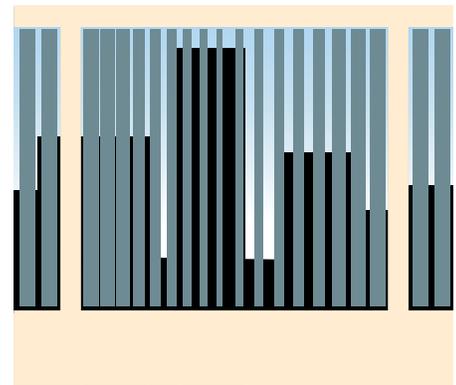
A diminished view with partially opened louvers, resulting in a visual cut-off angle of 41° (section view).



Total solar gain and view with the use of open vertical blinds. Notice the vertical striations on the monitor.

Glare on monitors—view with verticals

The average person's field of vision is about 160° horizontally and 60° vertically. Because vertical blinds have a cut-off angle of about 41°, the outside view is dramatically diminished as people move closer to the window wall. Solar-lit vertical louvers create striated shadows on monitor screens. To reduce or eliminate the effect, the louvers must be closed, but the view to the outside will be obliterated. The sun is dynamic and moves so rapidly over and across a typical south-facing window that the louvers must constantly be adjusted. However, when the louvers are rotated closed, a person's field of vision is narrowed to zero—or completely eliminated.



Open vertical blinds will create disturbing patterns on computer monitors.