



Energy-Saving Window Treatments

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Window treatments can help reduce energy consumption. Heat loss in the winter and heat gain in the summer increase the cost of heating and cooling a home. Window treatments can be designed to block energy wasting heat passage through windows.

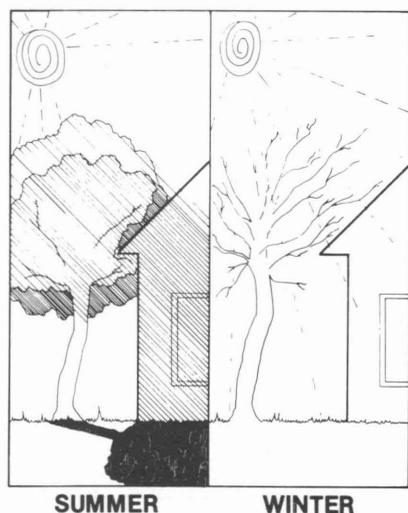
Exterior Plan

Protecting the inside of a house from solar heat gain can cut the summer cooling load. Exterior shading is most effective in preventing solar heat from getting to the glass area. Once heat is inside the glass area, the load on the cooling system will be increased.

Exterior shading devices include:

- trees
- trellises
- louvers
- awnings
- shutters
- solar screens
- solar films
- roof overhang

Trees that lose their leaves in the winter are called deciduous. These trees protect the house from solar heat gain in the summer but allow the

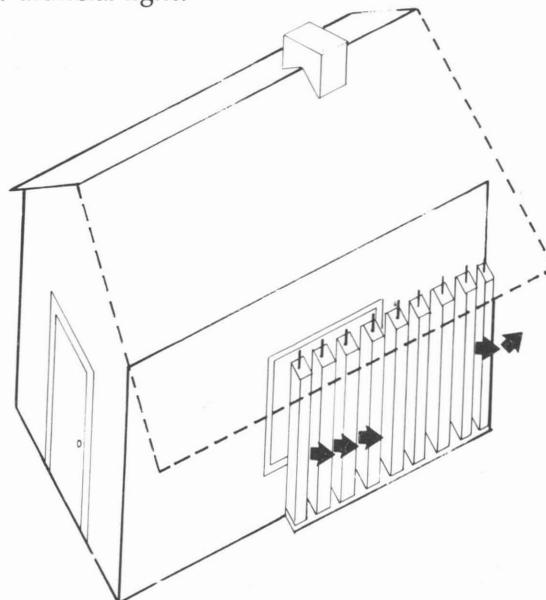


solar heat to warm the house in the winter. They also allow some natural light to enter the home.

Trellises can be designed to protect windows from heat gain while allowing ventilation. When a climbing plant is grown against the trellis, the protection is increased. Choose a plant that loses its leaves in the winter for heat gain advantages, particularly on the west side of the house. If the window is on the north, a plant that retains its leaves year round helps to insulate the window from the winter cold.

County Extension agents can recommend types of trees and climbing plants suitable for your area and advise on proper care procedures. Trees and plants should be planted and maintained properly to provide the maximum protection while enhancing the landscape.

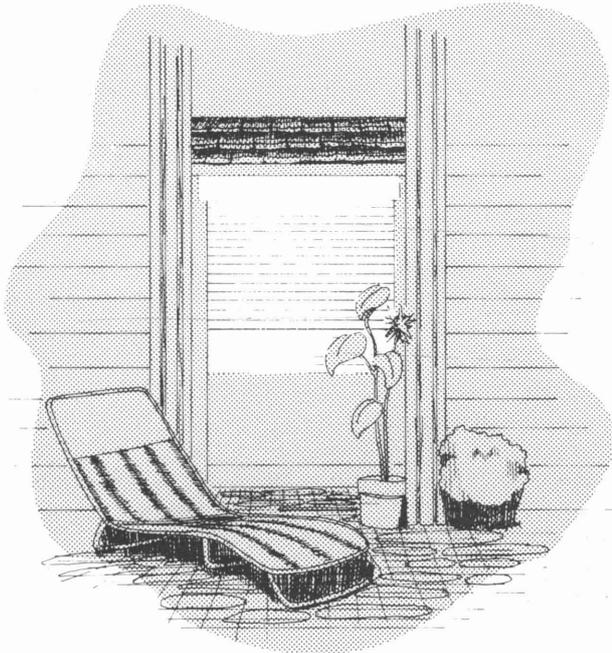
Exterior louvers also can be used to protect windows while allowing for ventilation. Vertically attached to the eave and the ground for the width of the window, the louver provides protection from solar heat gain during the summer and allows wanted heat in during the winter. It allows some light to enter year round to reduce the need for artificial light.



Vertical exterior louvers provide protection while allowing ventilation.

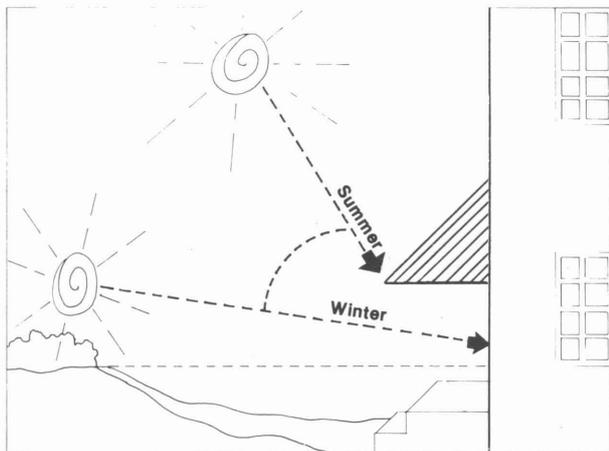
Exterior shutters also can protect windows from heat gain during the summer. During the winter, they can increase the insulative value of windows and protect from cold winter winds.

Some new exterior rolling shutters made of metal provide protection from solar heat gain while some insulated shutters also are available to reduce winter heat loss. Some of these exterior shutters can be controlled from inside the house.



Exterior rolling shutters can provide protection from solar heat gain.

Other awnings and shutters are designed to protect glass areas during the summer only. Fabric, wood or metal awnings can be attached to the



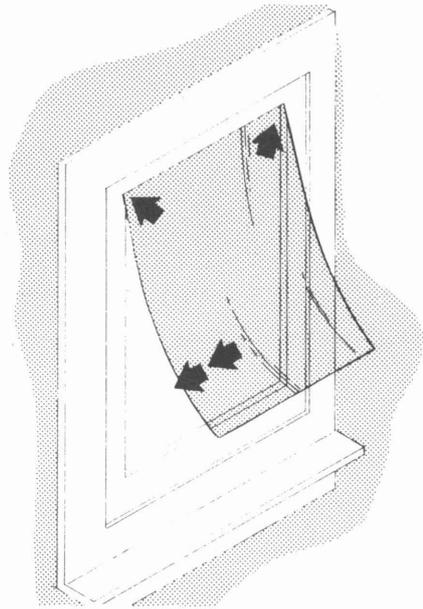
Awnings can protect from summer heat gain without interfering with winter sun rays because of change in direction of the sun's rays during different seasons.

top and sides of windows and can be raised or lowered, depending on the need.

The most frequently used solar screens are made of metal and plastic. They are placed in regular window screen frames and used over the entire window when needed. If the roof overhang protects the upper portion of a window, the screen need cover only the lower half of the window. Two sets of screens may be desired, a reflective one for summer shading and a mesh one to allow for winter heat gain.

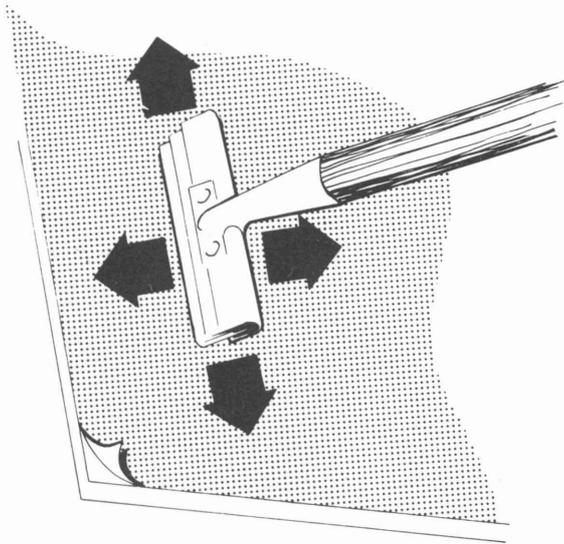
The metal solar screen consists of vertical strips of metal formed to make an angle opening. This angle opening allows ventilation through windows but reduces solar heat gain through the glass. Color choice is limited. The screen can be reversed, bottom to top, to allow for winter heat gain.

Plastic screening material has small holes that allow for ventilation but reduce heat gain. The surface facing the inside of the house is black while the exterior surface is available in a variety of colors such as bronze, blue, copper, gray, green, silver and white. The plastic screening material can be glued to the inside of the window, rather than placed in a frame. Adhesives are recommended by screen manufacturers.



Plastic screening material can be attached to the inside of the window or made into separate screens.

Solar films are made of metal, usually aluminum, sandwiched between thin sheets of polyester or polyester with a metallic coating. They are available in a variety of colors and degrees of reflectance — up to 80 percent for residential installations.



Move a sponge mop in vertical and horizontal directions to water out from the center of a solar film. Trim the film to fit the window before pressing down along the edges.

The films are attached to the interior window glass with either a water-activated or pressure-sensitive adhesive. Solar films reflect the sun's rays away from the interior of the house. Films are available for installation by the do-it-yourselfer. Professional installation of large sizes and difficult jobs reduce the possibility of bubbles and peeling.

Solar films usually are left in place year round, although some "strippable" films are available. In addition to protection from heat gain, the films provide reduction in winter heat loss by reducing the amount of heat radiated through the glass and by reflecting some heat back into a room. The films also reduce glare and fading problems and can prevent glass from shattering if broken.

Both solar screens and films reduce the amount of natural light in a room and change the exterior view. During the day, the film appears to be a mirror on the exterior surface, providing for privacy. At night, the mirror surface reverses and is on the interior where the light is, preventing any sight of the exterior. Solar screens and film are available as roller shades to be installed within the interior opening of the window.

When remodeling a house or building a new house, consider a wide roof overhang. The sun's angle changes with the season, moving at a higher angle in the sky during the summer than in the winter. Therefore, wide roof overhangs can protect windows from summer solar heat gain but allow for winter sun exposure.

Interior Plan

Draperies, blinds, shades and cornices can provide insulative protection inside the house. Blinds, shades and white or specially coated draperies or linings reflect most of the sunlight back outside the house rather than allow it to heat a room.

Some examples of shading devices and the percentage they reduce solar heat gain are:

Shading devices	Percent of solar heat reduction
White opaque roller shades	50
White translucent roller shades	44
White lined drapery	33
Closed venetian blind	29
Venetian blind (slats at 45° angle)	18

The roller shade and blind should be installed inside the window opening close to the glass for maximum benefit.

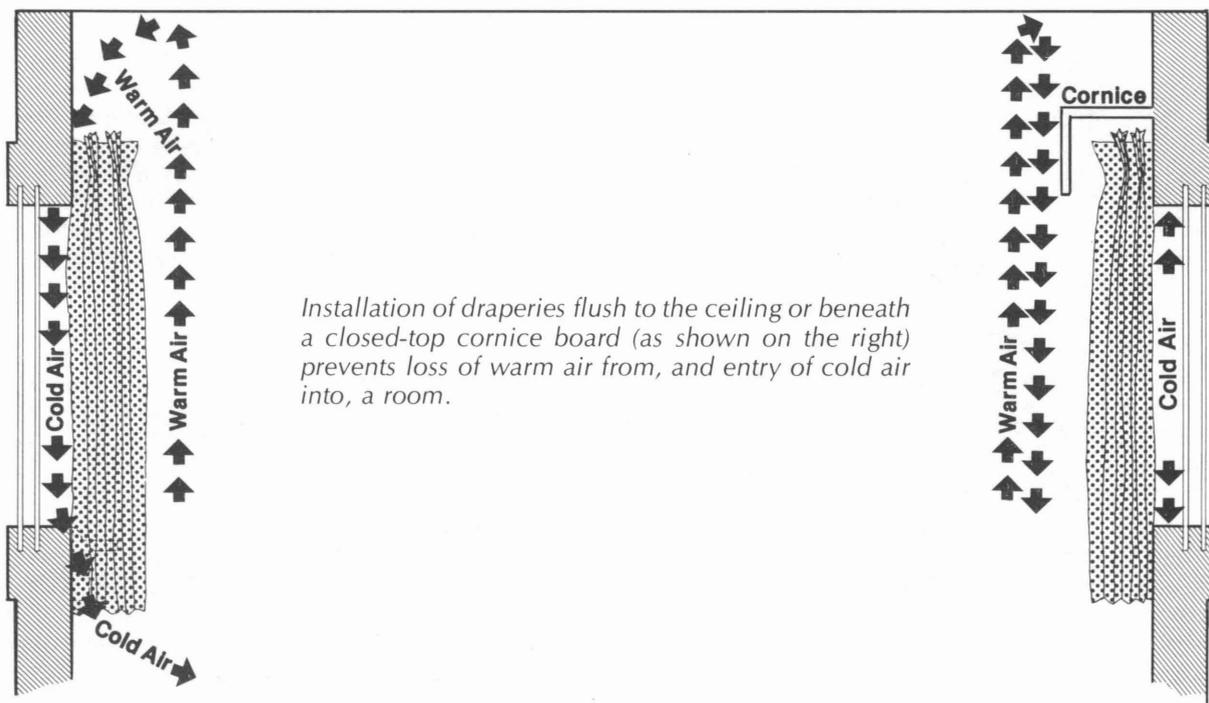
Interior window treatments are useful because they can be closed to prevent summer heat gain and opened to allow winter heat gain. However, unprotected windows conduct heat faster than a typical insulated wall. (Glass has an R rating of .089 compared to insulated walls with an R rating of 13.) Therefore, solar heat gains in the winter are generally not enough to compensate for interior heat loss.

A tightly woven drapery lined with a separate white lining can improve the insulation value of a window. White lining or a metallic coated lining reflects the radiant heat while the air held between the drapery and the added lining affords more insulation than a single drapery.

Some linings are more effective than others. Plain weave, thermal-coated linings increase effectiveness. Acetate fibers increase insulative value over polyester rayon lining. Acrylic foam-backed draperies afford better insulation than woven acetate-backed ones; however, they weigh about an ounce more per square yard.

Linings also prevent color fading from the sun. Deterioration of the drapery fabric is lessened with the addition of a separate lining.

To be most effective, the drapery should be installed flush to the ceiling or beneath a closed-top cornice board. The installation to the ceiling or cornice board prevents warm air at the ceiling from moving behind the drapery, forcing cold air at the window into the room. Also, draperies should be installed with a tight closure at the center and side openings of a window for maximum insulative protection.



Installation of draperies flush to the ceiling or beneath a closed-top cornice board (as shown on the right) prevents loss of warm air from, and entry of cold air into, a room.

Window size and placement can have a major effect on utility consumption. Glass areas allow for natural ventilation and illumination. They also allow summer solar heat gain and winter heat loss through radiation, conduction and infiltration. Infiltration can be controlled with caulking and weatherstripping. Exterior shading devices such as trees, trellises, louvers, awnings, shutters, reflective screens and films, and roof overhangs are the most effective solutions to minimize heat gain through radiation. Interior treatments such as shades, blinds, lined draperies and closed-top cornice boards improve the insulative value of windows and minimize heat loss from radiation and conduction.

Insulated glass, storm sashes and storm windows also can reduce heat loss and gain. For information about energy saving windows, refer to L-1675 *Insulating Windows and Other Glass Areas*.

References

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