

INSULATED WINDOW COVERS

FACTSHEET

WASHINGTON ENERGY EXTENSION SERVICE

April 1988

INTRODUCTION

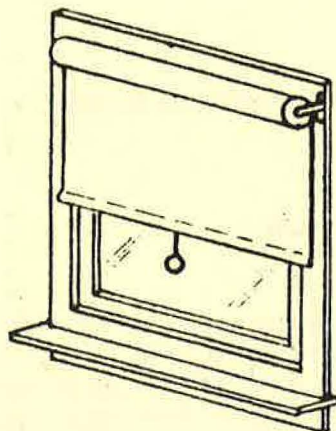
A typical house loses 25 - 30 percent of its heat through windows. Storm windows and insulated glass are the most common methods to reduce window heat loss. These options are discussed in WEES factsheets referenced at the end. Another way to reduce window heat loss is to install an insulated window cover. Insulated window covers are decorative shades or shutters designed for the purpose of reducing heat loss in the winter and/or heat gain in the summer. They come in many styles--roman shades, roller shades, and shutters. In addition, they offer high insulation value, shading potential and privacy.

This factsheet will discuss types of insulated window covers, suitable applications, important features -- edge seals, moisture control and ease of operation -- and maintenance requirements.

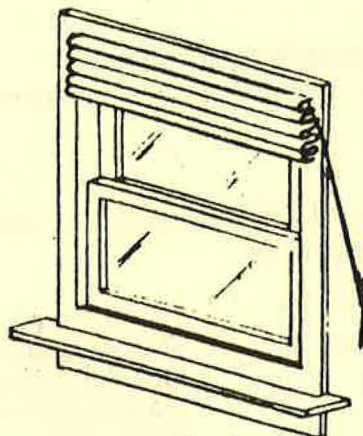
SURVEY THE HOME

It is probably unreasonable to put an insulated window cover on every window in the home. Usually some combination of storm windows, insulated glass units and insulated window covers will work best for reducing window heat loss.

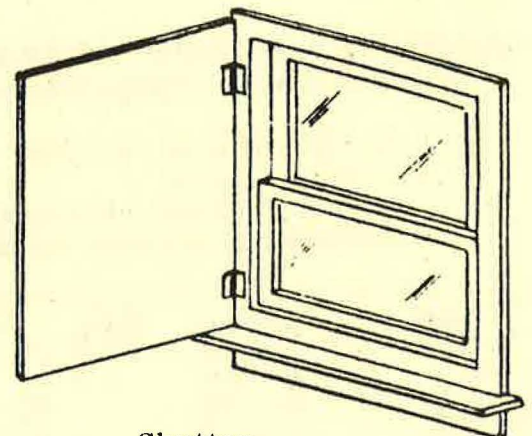
Figure 1
Insulated Window Cover Types



Roller Shade



Roman Shade



Shutter

The typical home has windows of many sizes located on all sides of the home. To determine the best applications, survey the home making note of the types, sizes and location. Note windows that are least comfortable, have moisture problems, or are drafty. Insulated window covers offer the most benefit where:

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- * Windows are large;
- * Heat loss is most noticeable (e.g., seating next to large windows or glass doors);
- * Windows don't receive a lot of sunlight (e.g., facing north);
- * Windows are easily accessible;
- * West facing windows overheat in summer; or
- * The cover can be left closed for long periods.

Insulated window covers offer the least benefit where:

- * A night view is desired;
- * Windows aren't easily accessible;
- * Windows have severe moisture problems (e.g., bathrooms); or
- * Insulated glass or storm windows are already in place.

Insulated window covers can be used on any window in the home, but the most common applications are in bedrooms, dens or rec rooms, sliding glass doors, and attached greenhouses or sunspaces.

Before installing a window cover, it is recommended that the existing window be caulked and weatherstripped. This reduces air leakage into the home and increases the effectiveness of the window cover. Techniques for sealing windows are discussed in WEES factsheets referenced at the end.

WINDOW COVER STYLES

There are many varieties of insulated window covers. In addition to energy efficiency, a very important factor is appearance. The cover should fit the decor of the room, the style of the home and be easy to use.

The most common styles of insulated cover are the roman shade, roller shade, pleated shade and rigid shutter as shown in Figure 1. When selecting a cover style, it is important to look at samples on display at the store, and when possible to try it out on the window first. Sometimes, it helps to mount samples in your window and see how they look.

WHAT MAKES A WINDOW COVER ENERGY EFFICIENT?

To ensure maximum energy efficiency, a window cover should have the following features:

- * An edge seal on all four sides,
- * A moisture barrier,
- * A fabric or material with a relatively high R-value (R-3 or more), and
- * An operating mechanism that is easy to use.

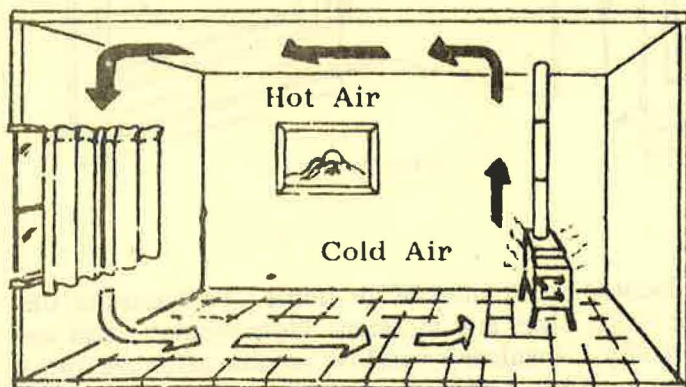


Figure 2
Curtain Without Edge Seals
Enhances Draft in the Room

Conventional window covers such as draperies, blinds, curtains, roller shades and louvered shutters do not have all of these features and consequently have poor insulating abilities. Furthermore, because they are often mounted several inches away from the window, they can enhance air convection in the room as shown in Figure 2, creating cold and uncomfortable drafts.

Many window treatments are advertised as "energy saving." These include pleated shades, mini blinds, reflective shades, bubble blinds, and drapery liners.

Mounted inside the frame and close to the window glass, these treatments offer some insulating value, but usually no more than an R-2.

For greater insulating value, window covers with good edge seals, moisture barriers, insulating fabric and a good operating mechanism must be sought.

Edge Seals

The edge seal prevents room air from leaking into the space between the cover and the glass. This air leakage causes heat loss and creates the uncomfortable drafts we associate with most windows.

Figure 3
Some Types of Edge Seals

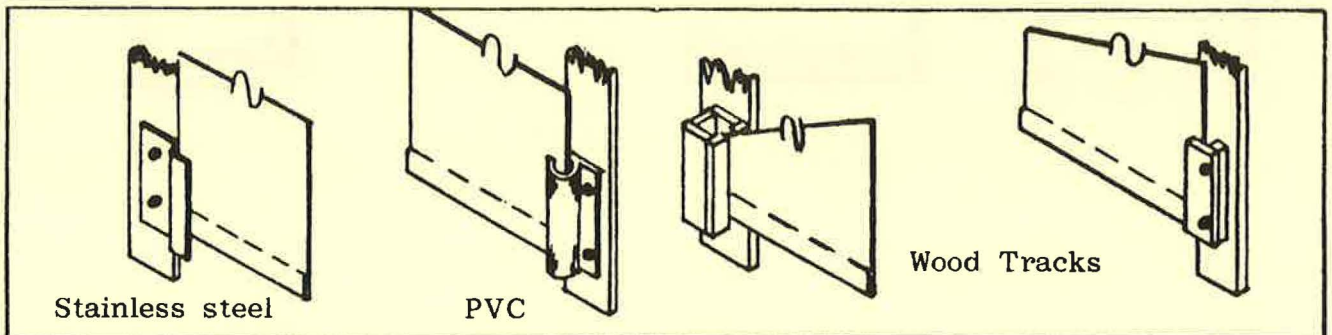
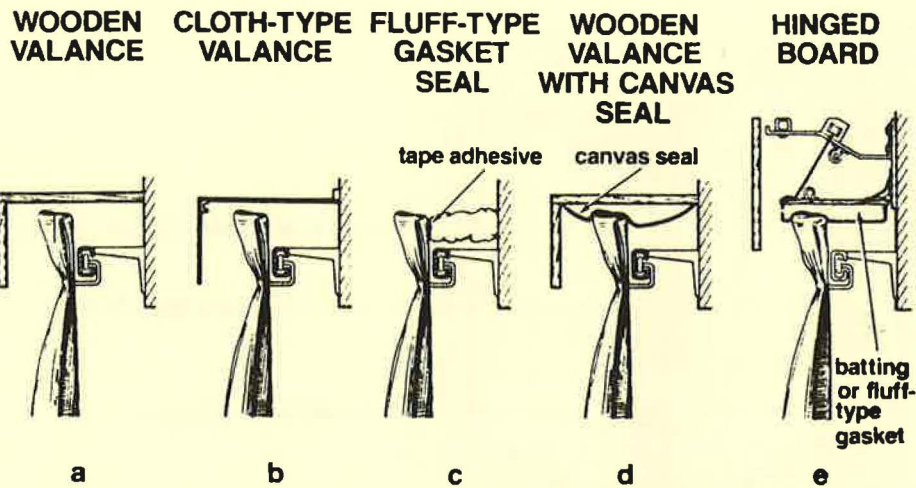


Figure 4
Top Seal Options for Drapes or Roller Shades



Without an edge seal, an insulated window cover loses up to 40 percent of its effectiveness. Edge seals can be provided by a valance bar, hinged board or roller box at the top of soft window treatments as shown in Figure 4. Along the sides, magnetic tape, "velcro" tape or plastic or wood track systems are commonly used as shown in Figures 3 and 5. At the bottom, weight bars are used to seal the cover against the frame.

Rigid shutters often utilize weatherstripping materials such as foam and vinyl gaskets to seal the edges as shown in Figure 6.

Figure 5
Edge Seals Using Steel and Magnetic Tape
 (Courtesy of *Energy Saving Decorating*. Lindahl)

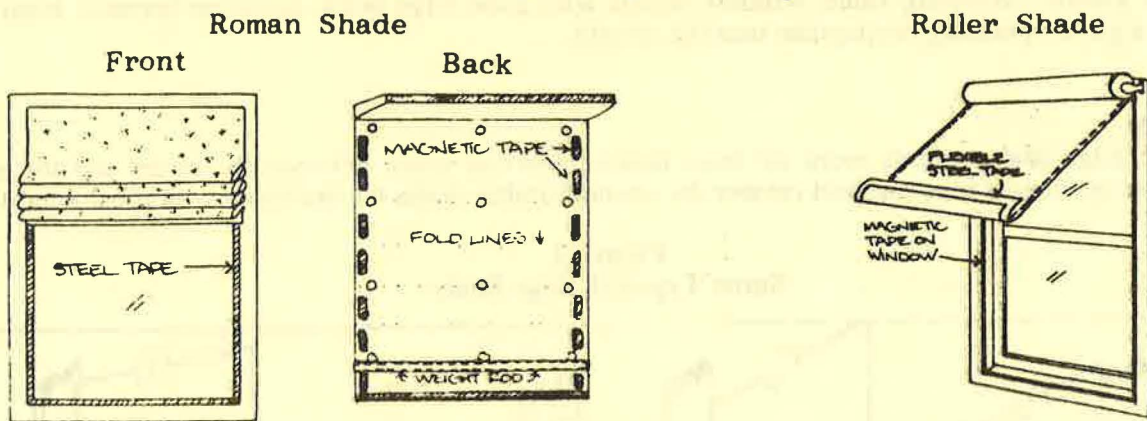
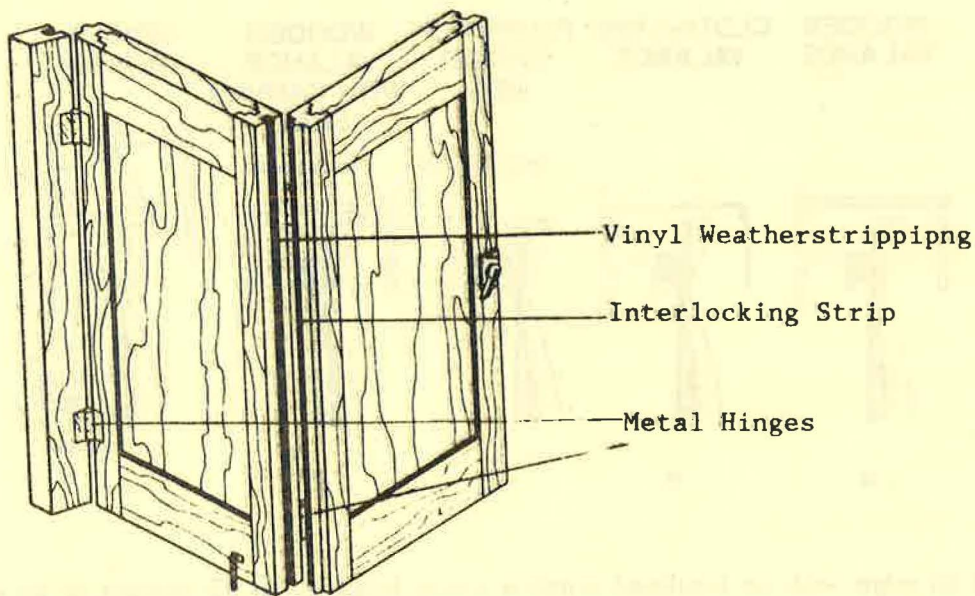


Figure 6
Edge Seal Using Vinyl Weatherstripping

Rigid Shutter



Moisture Barrier

A moisture barrier is another critical component of any insulated window cover. A moisture barrier prevents water vapor from diffusing through the insulating material and condensing inside the

fabric or inside the air cavity when the cover is in place. It should be placed on the room side of the insulation material next to the finish fabric as shown in Figure 7. If this is a multilayered fabric, it should be the layer just behind the decorative cover fabric. If it is a rigid foam board for a shutter, it should be sandwiched between the board and the decorative cover fabric.

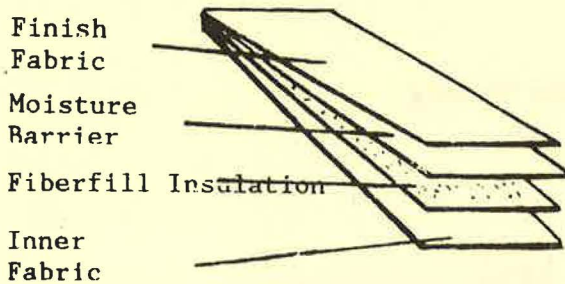
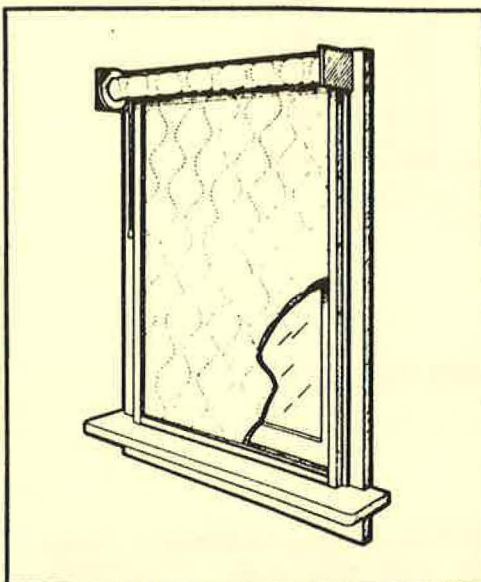


Figure 7
Multilayered Insulating Fabric
for Roman or Roller Shades
(Insulating value is
approximately R-3)

Insulating Materials and Fabrics

Good insulating materials are another important feature to consider. Most drapery, curtain and shade fabrics offer an insulating value of less than R-1. Insulating fabrics and shutter boards offer insulating R-values of R-2 to R-8. Roman shades, roller shades, and window quilts should be made of multi layered fabrics with a fiberfill layer and tightly woven linen or cotton finish fabric as shown in Figure 7. The tight weave blocks air flow and the multiple layers trap air and provide an insulating effect.

Shutters are typically made of foam or fiberglass board insulation. The solid material blocks air flow and provides insulation of R-4 to R-8 per inch. All treatments should be installed 1 - 3 1/2 inches from the glass to maximize insulating value.



Ease of Operation

Unlike a storm window or insulated glass unit, an insulated window cover is designed to be operated on a daily basis. In its open position, an insulated window cover provides no insulating benefit. No matter how insulating the material is, no heat savings will occur if it is not covered at night. Ease of operation, therefore, is perhaps the single most important aspect of energy efficiency.

To make the window cover easy and convenient to operate, the operating mechanisms must be easy to reach, simple to use and not require movement of furniture when the cover is opened and closed.

A common operating mechanism is the cord and pulley system for the Roman shade. For quilted roller shades, two rollers -- the take up and seal roller--are commonly used (Figure 8). The cord can be tied off on a cleat. Metal hinges or sliding mechanisms work well for shutters as shown in Figure 6. Hinged shutters will need a hook and eye or cabinet clip to keep them open or closed.

Motorized mechanisms are available for windows out of reach. While they can be set on a timer to open and close the cover at the appropriate time of day, they tend to be unreliable in practice and should be avoided if possible. Using a long pole to raise and lower the cover is more reliable. When buying commercially made insulated window covers, ask to try out a variety of mechanisms in the shop before making a selection.

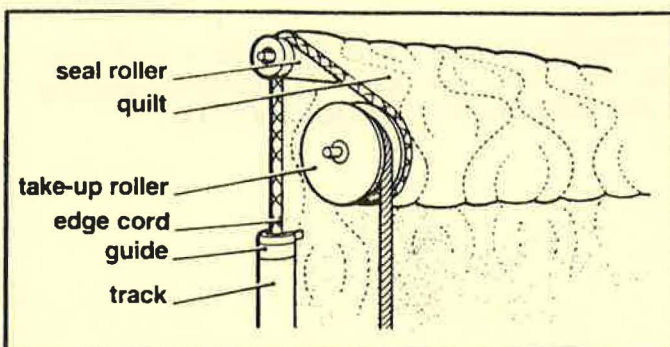
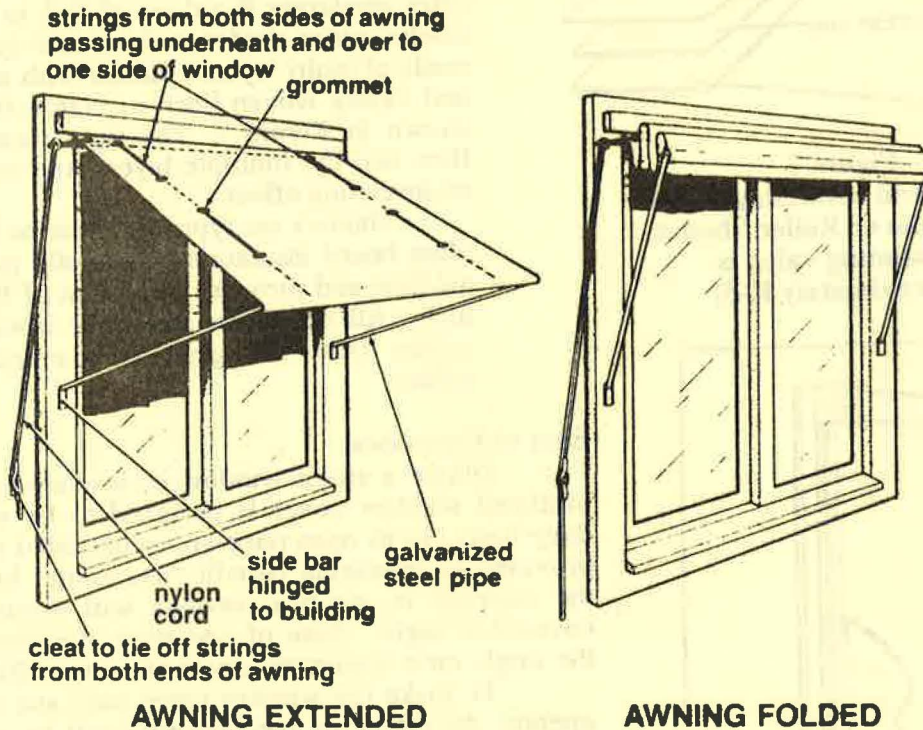


Figure 8
Detail of Roller and Track

SHADING

Preventing window heat gain in the summer can be just as important as reducing window heat loss in the winter. In general, exterior shades are more effective at reducing heat gain than interior shades since they block the sun before it gets into the room. Examples of good exterior shades are woven fiberglass roller shades, bamboo and canvas shades, and awnings. These products will block 70 percent or more of the solar gain.

Figure 9
Fold-Up Awning for Window Shading



Interior shades with high R-values and edge seals are also effective shading treatments. These include quilted roller shades, Roman Shades and rigid board shutters with edge seals. **CAUTION:** Avoid sealing interior window insulation tightly on windows that get a lot of sunlight. If air isn't kept circulating, temperatures in the space between the insulation and window glass can reach as high as 250°F, causing glazing seals to break and wood frames to crack.

Miniblinds and roller shades are popular interior shading devices. The most effective of these products are those with a reflective surface designed to reduce heat gain. Comparing shading coefficients is the best way to determine which products provide the most shade (see Table 1).

Table 1
Commercial Window Covers with Insulating,
Shading, and Cost Estimates

<u>Window Cover Type</u>	<u>R-Value*</u>	<u>Shading Coefficient**</u>	<u>Cost/Sq.Ft.***</u>
SHADES			
Pleated shade with effective backing	1.4 - 1.9	.45 - .65	\$7
Quilted roller shade	4.5 - 7.0	.15 - .25	\$6 - \$14
Roman shade	4.0 - 7.0	.15 - .25	\$8
Woven fiberglass shade	1.2 - 1.5	.35 - .70 (interior)	\$4 - \$20
BLINDS			
Venetian blind	1.2	.40 - .90	\$5 - \$18
Mini blind	1.2 - 1.4	.30 - .60	\$3 - \$6
Wooden slat blind	1.4	.44	\$16
Vertical blind	1.0 - 1.7	.22	NA
SHUTTERS			
Foamboard core bifold with wood veneer	8 - 10	.15	\$10 - \$20

- * The higher the R-Value, the better the insulation. Figures taken from independent test reports.
- ** The lower the shading coefficient, the less the heat gain.
- *** Cost includes installation.

Source: *Rodale's New Shelter*, January 1985.

COMMERCIALLY MADE WINDOW COVERS

Most commercial products are custom made to fit your window. The shop where the product is purchased will send someone to your home to measure the windows, fit the shades to the exact dimensions and install them.

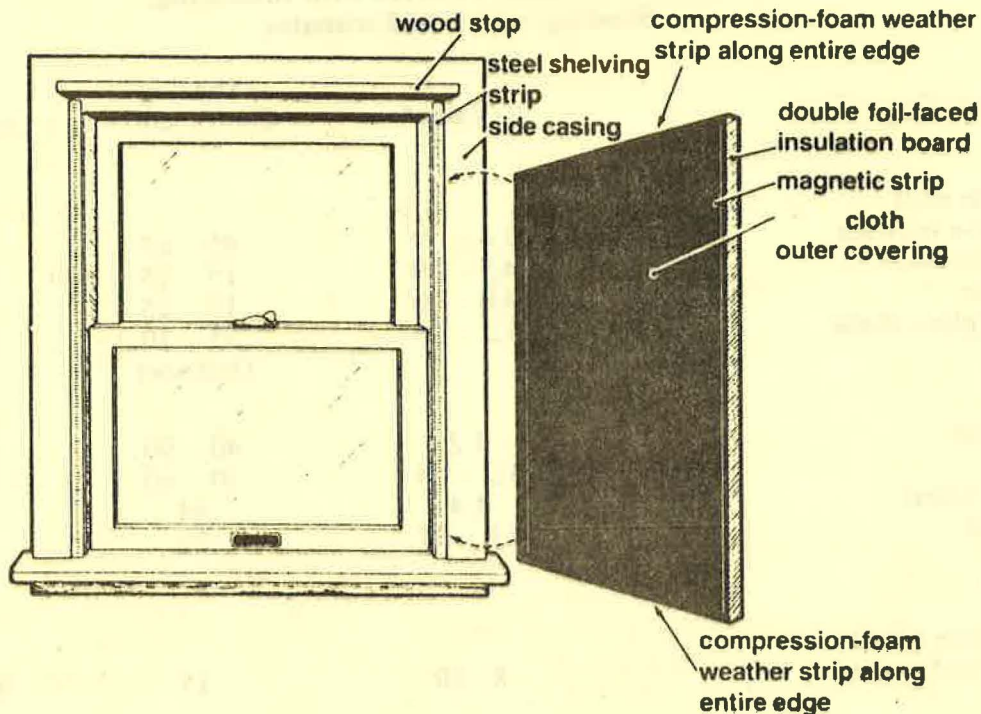
Before making a selection:

1. Ask for samples of different products to try at home.
2. Practice using the operating mechanism to try at home.
3. Get color and product samples and place them in your windows to see how they look.
4. Ask about cleaning and maintenance requirements.
5. Get two warranties. One for the product and one for the installation.
6. Compare prices.

HOMEMADE WINDOW COVERS

Homemade window covers come in two varieties: kits and do-it-yourself covers. Kits are sold commercially through some window products and home supply stores but are not always easy to come by. While many are less expensive than custom made products, not all are. It's well worth the trouble to compare prices before buying.

**Figure 10
Homemade Pop-In Shutter**



Also, when considering a kit, ask to read the instructions first. Be certain they are clear enough to follow, and that you have the necessary tools. Confirm that all of the components are provided including edge seals, vapor barrier, insulating material and cover fabric.

Do-it-yourself window covers offer the single greatest advantage of low cost. They can generally be made for less than half the cost of a commercially made unit.

A materials list, a list of necessary tools and a set of step-by-step assembly instructions are a must for a do-it-yourself project. Many fabric supply outlets carry patterns and materials for making quilted and roman shades. Before deciding to undertake the project, it's best to read the instructions carefully to ascertain your ability to complete it. Booklets and plans for do-it-yourself treatments are referenced in Table 2.

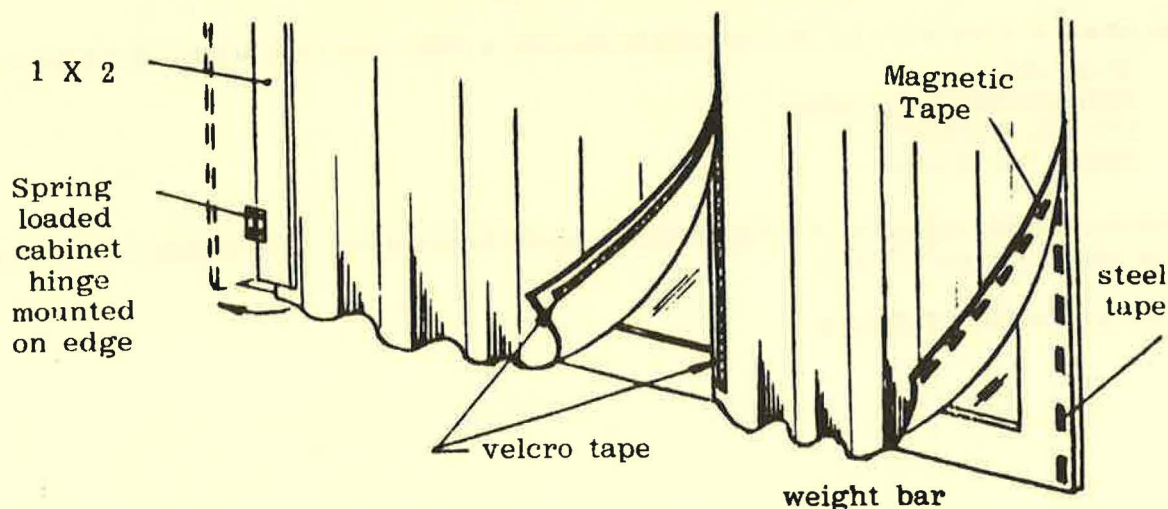
MODIFYING EXISTING TREATMENTS

If new window covers cost more than your budget allows, you can modify existing draperies, shades and shutters to reduce window heat loss.

Adding edge seals on all sides as in Figure 11, is one of the most effective ways to improve existing window covers. This can be done by installing cornices with gaskets above curtains or draperies, sewing magnetic tape into the edges and hems. If the drapes touch the floors, a weight bar in the hem can provide a good bottom seal.

Mounting a tape-up storm window or reflective shades behind existing draperies will help reduce conductive heat losses. Adding a layer of insulating fabric can be done, but will only be effective if edge seals are provided as well.

Figure 11
Adding Edge Seals to an Existing Drapery



MAINTENANCE

As with conventional draperies, shades and shutters, insulated window covers need periodic maintenance. If dirt, dust and grime is the problem, a cleaning may be necessary. This could be as simple as an occasional dusting or vacuuming or as complicated and expensive as finding a professional upholstery cleaner and dismounting the cover and bringing it to them.

Before purchasing a new product or buying a kit or materials to make your own, ask about the maintenance requirements. This is especially important for insulating fabrics as improper cleaning techniques can destroy their insulating abilities. Professional upholstery and carpet cleaning firms are the best resources for cleaning multilayer insulated fabrics.

In addition to cleaning, window shutters may need adjustments made to hinges and latching mechanisms and replacement of weatherstripping to insure a good fit.

SUMMARY

Insulated window covers offer decorative appeal and insulating values often two or three times that of a storm window or insulated glass. To be effective, however, they must be used consistently and kept in the closed position at night. While many window products are marketed as energy saving, only those with edge seals, a moisture barrier and insulating fabric offer the greatest reduction of window heat loss.

Written by: Chuck Eberdt and Cynthia Putnam.

SUGGESTED READING

Movable Insulation, Langdon, William K., Rodale Press, 1980, Emmaus, PA. Excellent Source.

Thermal Shutters and Shades, Shurcliff, William A., Brickhouse, 1980, Andover, MA.

Rodale's New Shelter, "Treat Your Windows Right", January 1985, page 96.
Excellent comparison of over 20 commercially-made window treatments.

WEES Publications:

- *Storm Windows*, FS-1103

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