NEW FACES for OLD PLACES

5

Renovating or Replacing Windows

One of the most effective ways to update the exterior of your house is to change the windows. This can be as simple as changing the color of the frame and adding trim. Or, it can be as extensive as replacing entire window units. How do you decide which window improvement is needed for your home? Consider the following questions before you decide.

What is the condition of the windows?

Problems: Look for signs of moisture problems — condensation, leaks or weather damage that have resulted in peeling paint, rotting wood on or around the window. Do the windows shrink or swell when temperature and humidity change?

Options: Remove old paint and repair any damaged wood on or around the window. Protect wood by applying a wood preservative/sealer. Add storm panels to single-pane windows. Add a drip cap or flashing around windows. Replace trim around windows. Replace severely damaged windows with new window sashes (fitted into the existing frame) or complete window units (replacement frame and sashes).

Problems: Is the window air-tight? Are there gaps around the outside window frame or loose-fitting windows parts that allow air leaks?

Options: Caulk and weatherstrip around windows.

Are windows easy to operate?

Problems: Can double-hung windows be raised and lowered easily? Do casement windows crank open and closed without sticking and fit snugly in the frame when closed? Do window locks latch securely and hardware operate smoothly?

Options: Smooth, sand or lubricate window edges. If needed, remove or scrape excess paint from around window edges. Apply a wood preservative/sealer to window edges and frame. Replace sashes or sash parts. Lubricate window hardware. Repair or replace locks or levers that won't close.

Problems: Are windows hard to open because of built-up layers of paint? Do hardware or moving parts stick or not operate smoothly?

Options: Remove or scrape excess paint from around window edges. Lubricate or clean hardware. Repair or replace locks or levers that won't close.

Do the windows fit the style or design of the house exterior?

Problems: Have you added a room or remodeled, using different style windows? Have you painted, sided, hidden windows with landscaping, or added new windows to part of the house? Do the windows look dated or out-of-scale?

Options: Re-paint or stain frames and trim to give the windows a new look. Contrasting or bright colors will make the windows stand out. Lighter colors or a tint/shade of the house color will tend to downplay window contrast. Use trim like shutters or window mantels (a decorative piece used above or below the window) to accent windows and to create a more pleasing proportion.

Trim shrubbery or remove plantings that are blocking windows. If permanent awnings are left in place over windows, consider replacing them with seasonal shading like solar screening or retractable awnings.

Consider specialty trim, like removable wooden grilles, that can change the appearance of the window unit. Specialty fixed glass, such as half-round or arched-shaped window toppers can update existing windows. A one-of-a-kind addition like a greenhouse window can add a new look outside and inside the house.

How much will I have to spend?

How much will you have to replace? If the window is in reasonably good condition, repairing damaged parts, painting or staining, and even adding trim will usually cost you less than replacement windows.

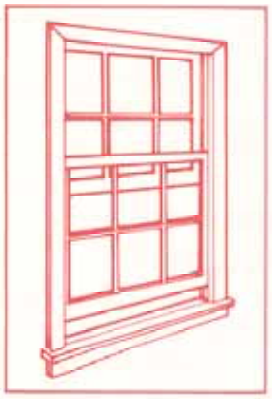
Replacement windows can cost thousands of dollars, but they have four benefits: they improve the appearance of the house; they are easier to clean and maintain; they reduce heating and cooling costs; and you may recover up to 50 percent of the cost when you sell the house. If you can install them yourself, you can save money.

REPLACEMENT WINDOWS

Let's say that you've decided to replace some or all of the windows in your house. Shopping for the right window can be overwhelming. There are about 60 different window makers in the United States, each offering a variety of styles and features. When you look at replacement windows, consider: window type, cost, frame material and construction, the glazing or glass, and special features.

Window Types

Double-hung are the most commonly used replacement windows. They have two sashes, one above the other, that slide up and down along a frame. Only half the window opens at a time, so you don't get as much fresh air as you would with crank windows.



SINGLE-HUNG

The *single-hung* window is a variation of the double hung. The upper section is fixed and only the lower sash raises or lowers. It gives even less ventilation than the double hung, but is more energy-efficient.

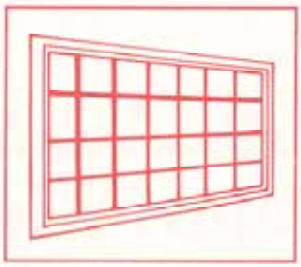
The *sliding* window is like a double hung window turned on it's side — only half the window opens at a time, but it slides instead of raising and lowering. Ventilation and energy efficiency are about the same as for the double hung window.

CASEMENT

Casement windows have sashes that are hinged on one side, so the window swings out. You open the window with a crank handle. These windows offer the best natural ventilation, because they can be opened completely to catch breezes that blow along the side of the house. These vertical, rectangular, outward-opening windows are not suited to all styles of homes.

Awning windows are like casement windows, but they are hinged on the top instead of the side. They give better ventilation than double hung or sliders since they open outward, but are less effective at scooping in a breeze than casements. Because of their horizontal, rectangular style, they can be useful in areas where wall space is limited and ventilation may not be adequate, like kitchens and bathrooms. They can also be used like a transom window over existing fixed glass windows, which will improve ventilation.

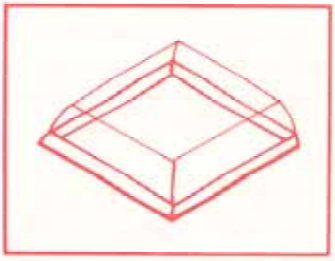
AWNING



FIXED

Fixed windows give a decorative look or accent. For example, beveled glass inserts can be used above or around a window to add a pleasing effect of sunlight. Fixed units provide light, but no ventilation.

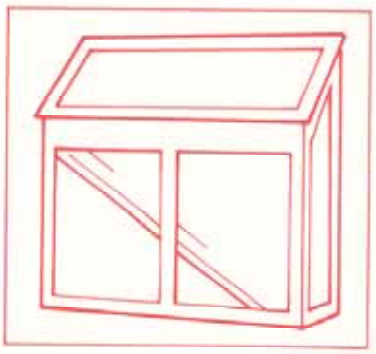
Skylights and roof windows provide overhead light and can even add solar heat to a room, if installed on the south side. They may be fixed or may open for natural ventilation. New designs are less likely to leak or have condensation problems. Consider features like insulated glass and weatherstripping, special coatings to reduce heat gain in the summer, shading screens or mini-blinds to control light and heat, automatic controls for opening and closing, and special flashing or gutters to reduce moisture problems. Since skylights or roof windows are installed through the roof, they should be precisely installed, weatherized and flashed to avoid leaks and excessive heat loss or gain.



SKYLIGHT

Greenhouse windows can add appeal to the inside and outside of a house. They can be built in any size and shape, but standard units are up

to 10 feet wide with projections ranging from 12 to 24 inches. As with other windows, you have a choice of framing materials and price ranges. For example, a 3' by 3' vinyl unit with insulated glass, operable casements, and screens may cost under $500, while top-quality wood units may be double or triple that cost.



GREENHOUSE

The materials and construction features affect how well the unit resists leaks and heat loss/heat gain. An unweatherized aluminum frame, for example, would be less expensive but also less desirable than an aluminum frame with thermal breaks between the metal and the glass.

Compare features, such as vents, energy-efficient glazing, plant shelves, lights, shades, heaters, and sliders to close off the window unit from the house.

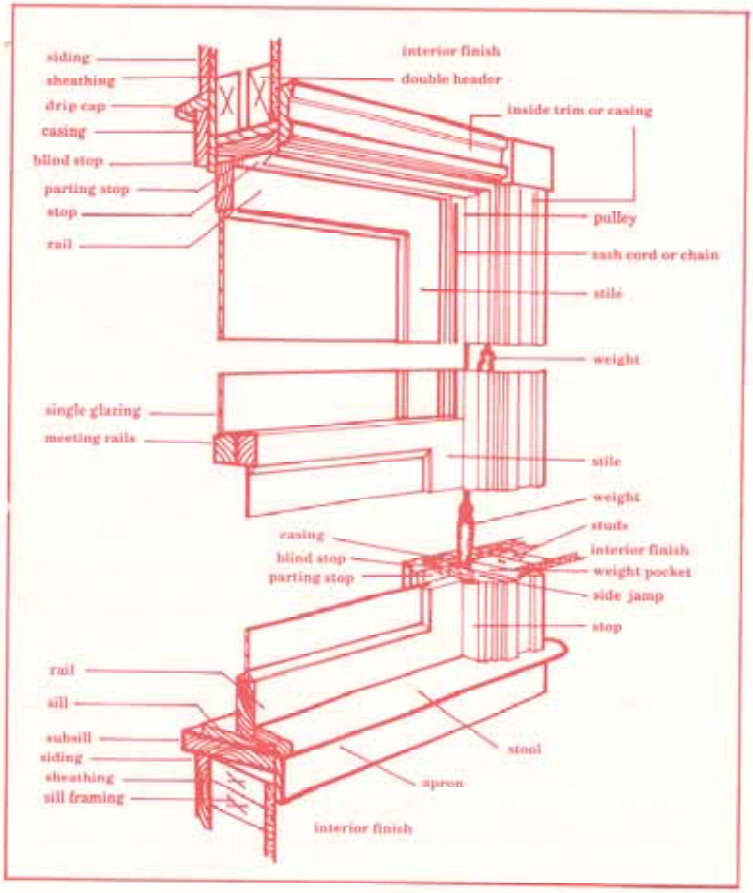
How Much of the Window Needs To Be Replaced?

If the window frame is in good shape, you may only need to replace the sash and window stops or some other part. For example, you can replace worn or non-operating parts, like sash weights, window channels and hardware, while keeping the old sash, frame and interior trim (see diagram of window parts on this page).

Sash replacement lets you keep the frame and interior trim while using a new sash and replacement channels. This generally costs less and involves little or no repair, since you don't have to take the entire window frame out of the wall to the rough opening. Replacement sashes let you add double pane or insulated glass sashes that are weatherized, but operate more easily, and that can even tilt in or out for easy cleaning. If you can't find a replacement sash that exactly meets the existing dimension, most companies sell filler strips.

A second method of window replacement involves taking out the whole window unit — the jambs, sills and sashes. If the window system is badly damaged or if you want to change the size or shape of the window, this is the method you will use. This will let you add insulation and waterproofing around where the new window will go. It will generally cost more than sash replacement because of carpentry and installation work. Some window manufacturers allow you to order replacement window units that are the same size as the old ones. Thus, the window is custom-built to fit the existing opening, and the opening doesn't have to be changed to fit the new window.

When you remove the window unit or change the size of the rough opening, you will have to make repairs to both the interior and exterior of the house. To avoid a "patched" look on the exterior when siding is removed, save the existing siding for re-use. Try to use the same type of trim around old and replacement windows on the same side of the house, since wood, vinyl and aluminum all have a different look.



Frame Materials and Features

Window framing is important because it affects the energy efficiency of the replacement window. Materials include all-wood, vinyl-clad wood, aluminum-clad wood, all-vinyl, vinyl-clad aluminum, all-aluminum, steel, and fiberglass.

All-wood is still the most common choice for replacement windows. Wood offers a traditional appearance and a variety of looks, from natural to stained and painted. It's available in custom sizes and shapes. It doesn't transmit much heat or cold, so it's considered an energy-efficient framing material.

On the minus side, wood windows require periodic maintenance (re-painting, staining, waterproofing) and can stick, warp and even crack if they're not protected from moisture damage. Wood takes up more space than other materials like aluminum or vinyl — about three times as much. This means that if you have a given opening size, a wood window will have less glass per window area and less solar gain.

Vinyl-clad wood windows offer the traditional wood appearance inside the house, while providing a low-maintenance exterior. Vinyl-clad wood windows are strong and durable. Stock sizes predominate, but a variety of trim types are available. Fitting kits are also available, to adapt the stock window to an existing opening. These windows provide the same energy efficiency as all-wood windows.

There are still fewer color options available in the vinyl-clad woods. Custom sizes and shapes are usually difficult to get. While these windows require less exterior maintenance, there is a potential for wood rot to occur if the cladding leaks. Some manufacturers use a cladding process that encloses the wood in vinyl, reducing the chance for moisture damage. Generally, the vinyl-clad window surfaces inside will need periodic maintenance or refinishing. The exterior vinyl surface cannot be repainted.

Aluminum-clad wood has many of the same advantages as the vinyl-clad wood. It provides the same traditional look of wood inside, while offering low exterior maintenance. A wider range of colors, sizes and shapes may be available than for the vinyl-clads. Aluminum used in the frame should not touch the window glass. This "thermal break" gives the aluminum-clad wood windows the energy efficiency of all-wood.

The same drawbacks are found for these windows as for the vinyl-clad — that is, moisture damage can occur if the cladding breaks at the seams or joints. Also, inside maintenance is required.

All-vinyl windows are generally maintenance-free and rot-proof. A wider range of colors is now available in vinyl than a few years ago, including darker shades. Color in vinyl windows is virtually fade-proof. Vinyl is low-maintenance because it is colored through the whole material, and is not just a surface color that can chip or peel. The window sashes slide easily, since vinyl is a self-lubricating material.

Vinyl sashes, frames and trim has a slightly boxy or thicker appearance than the wood or wood-clad windows. They also cannot be repainted. Vinyl windows may vary in quality. Frames that are double-wall, hollow-core are usually stronger than single-wall frames. Welded frame corners or screw-attached corners can both be equally strong connections. Sash frames, however, should not be welded (it would be hard to replace broken glass).

Check for certification that the vinyl conforms to industry standards (ASTM or SPI certification labels).

Vinyl-clad aluminum windows are strong and durable. Using the vinyl cladding combines the strength of the aluminum window with the thermal characteristics of vinyl. The vinyl stops the transfer of heat and cold through the aluminum frame or glass.

The color choices have improved as the vinyl market has improved, but custom shapes and sizes are still difficult to get.

All-aluminum windows have the advantages of being light-weight and virtually rot-proof. They require little maintenance, they can be custom-made to various sizes and shapes and come in a wide selection of colors.

If an aluminum frame is to have any degree of energy-efficiency, it should be made with a thermal break. The thermal break is a barrier of a material like vinyl, located between the metal frame and the glass. This barrier or break stops the transfer of heat or cold from the metal to the glass. Look for frames with at least .050 thickness and be sure the window has been tested to industry air infiltration standards.

Fiberglass windows represent the newest entry into the replacement market. They are strong, rot-proof and generally maintenance-free. They have a good resistance to moisture and do not transfer heat or cold through the frame, so they get high marks for energy-efficiency. They can be painted and can be custom-made to fit various window openings. They are less likely to distort under high temperatures than some vinyl windows, even when painted dark colors.

Because of their relative newness, they are not as available as some of the other frames, and their long-term reliability is still unknown. Prices may also be substantially higher than for other frame types.

Glazings or Glass

Glazing is the term used for glass used in window units. For North Carolina's climates, double glazing or insulating glass is recommended for replacement windows. Double glazing refers to two layers of glass mounted in a window frame. The air between the layers of glass acts as an insulating space, reducing the transfer of heat and cold through the window surfaces.

Insulated double glazing is the use of two layers of glass, with the edges mounted with spacers and gaskets or seals. The edges are "sealed" to prevent condensation between the panes and to keep the air space between the windows intact. Some insulated double glazed windows have the air space filled with a gas, like argon, to improve the insulating value. Others may create a vacuum by pumping out the air between the panes of glass. These methods also let the manufacturer create a slimmer window glazing, by reducing the gap between the window panes to as narrow as 1/4 inch.

Most insulated, double-glazed windows are factory-sealed and have warranties of up to 20 years. If a leak occurs in the seal, usually signalled by condensation between the panes, the only remedy is to check your warranty and replace the entire glazing unit.

Low-emissivity or "low-e" glass is one of the more recent innovations in window glass. Low-e glass has a nearly transparent thin coating on the glass itself or suspended between layers of glass.

The term "low-e" refers to the emissivity of the coating. The lower the "e" the better the ability to reflect radiant heat back toward its source. Heat that's produced inside a home in the winter is reflected back toward the living space, instead of going out the window. In the summer, the primary source of radiant energy is the sun. The low-e coating helps reduce the amount of solar heat gain coming into your house as reradiated heat.

Low-e glass is slightly more effective at keeping winter heat in than at keeping summer heat out. In North Carolina, we have a higher cooling load than heating load in our homes (we air condition more days than we heat). But because the difference is not substantial, low-e glass is still a good investment for replacement windows in North Carolina. Most manufacturers now supply low-e glazing for nearly all stock windows.

Cost, Energy Factors and Special Features

Other factors to consider when selecting windows are cost, energy ratings and special features.

Pick the materials and features you like, then start comparing prices — they will differ by manufacturer or line, by type and features. Buy the best possible window (frame and glass) you can afford because you want it to be there a long time! Generally, the newer types of frames, like fiberglass, will be the highest in price. All-wood windows and aluminum windows will be on the moderate-to-low end of the scale, while the clad windows will be in the medium-to-higher price range. The same holds true for glazings or glass.

Double pane or insulating glass will cost more than single pane. Specialty glazings like low-e or heat reflective glass will also be more expensive than regular glass.

In addition to the window frame and glazing, you should also consider the air infiltration rating of the window. Windows should be tested according to an industry standard, usually ASTM (American Society for Testing and Materials). Generally, at a testing of 25 mph wind, the infiltration rate of the window should not exceed 0.50 cfm/ft. based on the linear feet of "crack" area of the window.

Windows can have the same infiltration rating, but for a given opening, those with more crack area will leak more. For example, casement and awning windows have a low "natural" infiltration rate (0.05 cfm/ft) while double hung and sliders have a higher rating (.15 to .30 cfm/ft). Thus, the double hung window, because of its edge area, can have ten times higher infiltration rate than the same size casement window. This information should be available from product literature or from the window salesperson.

Weatherstripping on windows should be considered along with the infiltration rating. Look for double or triple weatherstripping. Two or three parallel strips should be used on each sealing surface. Fuzzy or pile weatherstripping is common, but tubular or bulb stripping will give a tighter seal. The flexible plastic tube is filled with foam for stiffness. Polyurethane and EPDM rubber (ethylene propylene diene monomer) get top ratings. They stay flexible under temperature extremes and seal tightly.

Special features that you may want to compare across the windows being considered are:

- weatherstripping that compresses as the window closes.
- locks and levers with cam-action components — when the lock engages, the weatherstripping is compressed for a tight seal.
- single-lever locks — part of the lock is hidden in the frame and only one lever is required to lock the window.

- concealed sash locks, so that only the handle shows.
- matching clad trim for exterior parts of the window frame.
- counter-balanced windows that let you adjust the window. friction in the jamb — for ease of opening and closing the windows.
- tilt-out or tilt-in windows that rotate inward to let you clean both glass surfaces easily, and to replace the sash as needed.

As you improve your home, you may find ideas or information in other publications in the series, *New Faces for Old Places*, available from your county agricultural extension office.

Single copies of the following North Carolina Agricultural Extension Service publications are available free of charge:

New Faces for Old Places series:

Improving Your Home's Exterior, HE-346-1
Selecting Siding For Your Home, HE-346-2
Selecting Exterior Doors: The Pros and Cons, HE-346-3
Selecting a Roof: Pros and Cons, HE-346-4
Renovating or Replacing Windows, HE-346-5

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Published by
THE NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE

North Carolina State University at Raleigh, North Carolina Agricultural and Technical State University at Greensboro, and the U.S. Department of Agriculture, Cooperating. State University Station, Raleigh, N.C., Paul E. Dew, Interim Director. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. The North Carolina Agricultural Extension Service offers its programs to all eligible persons regardless of race, color, or national origin, and is an equal opportunity employer.

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HE-346-5