

Replacement Window Options

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New windows offer the perfect opportunity to improve a home's aesthetics and energy efficiency, but too often this chance slips away with inadequate installation.

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"Remodelers are very meticulous, and they really try to get it right," says Cordell Burton, a senior installation engineer at Pella Windows. "But in remodeling, every circumstance is unique and remodelers have to be able to adjust to the situation."

When replacing a window, consider the condition of the existing flashing, the frame and the surrounding wall.

Installation gyrations

With every installation, you'll need to determine how much of the window assembly to replace. If the window isn't too badly damaged or if the customer wants to upgrade to a more energy efficient one, you may be able to do a partial replacement. Keeping some of the original materials, including surrounding trim and surfaces, can save on material costs and may take a lot less work. (See "Window Repair Options" on page 38 for general guidelines.)

One popular option is replacing the window sash and track, which often come in a kit with a counterbalance mechanism and hardware. This is a good way to preserve existing components and reduce waste. However, the existing frame must be dry and in good condition with no rot and relatively square parallel jambs.

When installing a new window within an existing frame, you are actually placing a unit within a unit. Even if the original frame is not square, the secondary frame may be able to accommodate that. However, this method reduces the size of the glass and the available opening, which may conflict with applicable building code egress requirements. Check your local code to be sure.

No partial replacement method will address air leakage at the existing frame's perimeter. Air leaks can lead to water damage. If there is a possibility or any evidence that the original frame is compromised, replace — or at least remove, investigate and rebuild — the original frame.

Rotten to the wall

If the original window was not properly sealed, flashed and maintained, the homeowner has a problem. It may be more serious than it first appears. Check carefully for damage to the frame, the sill and the surrounding wall.



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If window damage is minor and limited to the wood frames, they can usually be repaired with epoxy products after the frames dry out thoroughly. Epoxy consolidants penetrate and bind with the wood fibers while preventing further deterioration. Consolidants create a surface that may be worked as wood after curing.

The windowsill is the most vulnerable part of the frame, so check the sill and the surrounding wall carefully. A deteriorated windowsill can ultimately compromise the entire wall by providing an avenue for greater water infiltration. Signs of interior water stains below the window will indicate possible damage. Removing interior sill trim will also give you access to investigate water damage.

Replacement sills have been developed from materials such as wood composites and vinyl — and these will work if the damage stops at the sill. But if damage is more extensive, you should replace the whole unit.

The whole enchilada

Replacing the entire window assembly provides the best opportunities for investigating underlying problems, correcting damage and assuring proper installation. You can also improve the thermal performance of the frame.

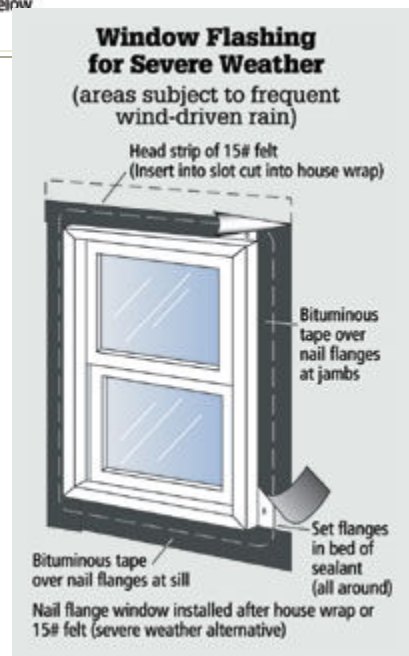
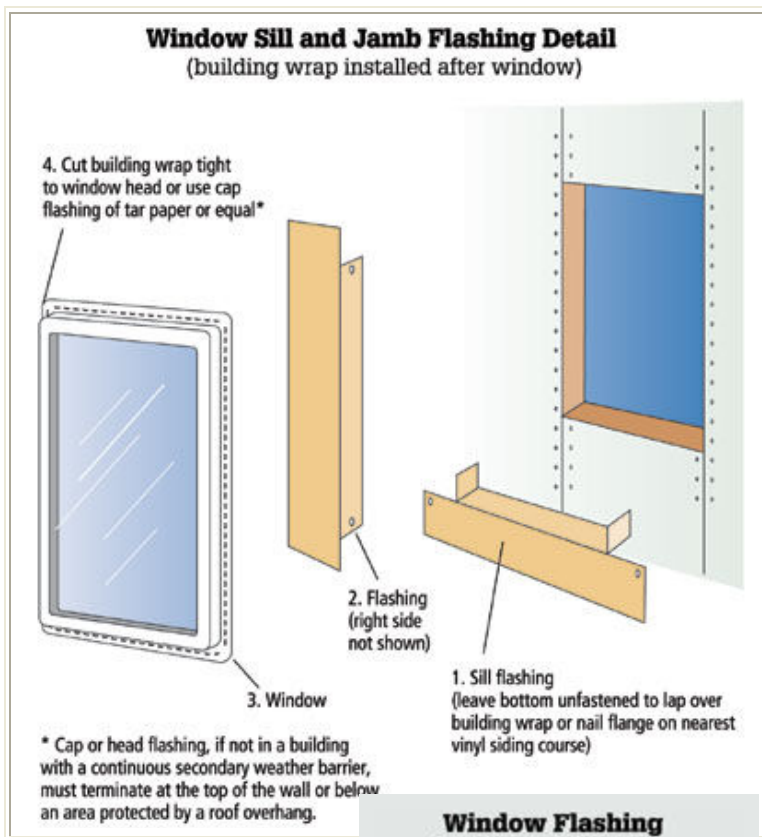
Frame materials are a key consideration. The frame can affect not only a window's appearance, but also its energy efficiency. On the whole, fiberglass is one of the better performers among window frame materials because manufacturers can hollow out the frames and fill them with insulation without sacrificing their strength or integrity. Wood windows are also efficient and may best match an older home's existing style. Vinyl frames are most affordable, while metal frames allow the maximum amount of glass.

One strong and increasingly popular option is composite frames, which combine two or more materials, such as a wood foundation with vinyl or aluminum cladding. Composite frames can look like wood and are about as efficient, but are more resistant to warping, fading, denting, moisture and decay.

In a flash

Avoiding water infiltration is key to proper window installation. Window openings often allow water infiltration because they interrupt the waterproofing of the outside wall. Most leakage problems are related to improper or insufficient flashing details or the absence of flashing.

"One of the biggest mistakes remodelers make is not getting the new window tied into the existing walls' water-resistive barrier system," says Gary Mathes, Pella's residential architectural support services manager. "You have to get your flashing materials right. Make sure the head flashing is behind the water-resistive barrier and the sill flashing is lapped over the weather barrier to create a watershed effect."



Don't emphasize speedy window installation at the expense of good flashing techniques. The resultant callbacks will cost more in the long run.

The PATH booklet *Durability by Design: A Guide for Residential Builders and Designers* (available at www.pathnet.org, click on "Resources" and then "Publications") offers some important tips:

- Water runs downhill, so make sure flashing is appropriately layered with other flashings or the drainage plane material (i.e., tar, felt or housewrap).
- Water can be forced uphill by wind, so make sure that flashings have the recommended width overlap.
- Sometimes capillary action will draw water into joints between stepped flashing that is unsatisfactorily lapped. At this point, there's nothing you can do but take it apart and redo it properly.

Windows with nailing flanges can help make the transition from the window to the wall, and provide a way to seal the window to the wall's water-resistive barrier using flashing tapes.

Caulks and sealants provide additional water and air barriers. However, not all joints are meant to be caulked. Some provide an exit for air or moisture trapped within the wall assembly, so follow the window supplier's recommendations. No single product is suitable in all cases.

"It's a compatibility issue," says Larry Livermore, technical standards manager with the American Architectural Manufacturers Association. "The most expensive sealant might not be the right one either."

When in doubt, ask the manufacturer.

Manufacturer knows best

All windows require the same basic installation steps, but the specifics vary by type and manufacturer. Don't assume you or your crews know how to install one type of window because you've installed other types before.

Always refer to the manufacturer's installation instructions. If the situation is a little unusual, don't hesitate to give the manufacturer a call. Although a job's details may seem unique, odds are the window manufacturer has encountered something similar before. An extra 15 minutes on the phone now could save hours of repair time later.

"We've got a department that specializes in designing installations that are not covered in the standard guidelines," says Mathes.

Many manufacturers also offer installer assistance programs to help installers keep up with the rapidly changing window industry.

The Partnership for Advancing Technology in Housing (PATH, www.pathnet.org), is administered by the U.S. Department of Housing and Urban Development.



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Window Repair Options	Replace window glass, sash, track and/or sill	Install new secondary window (which includes thin retrofit frame) within existing window frame	Completely replace existing window assembly including frame	Rebuild/repair wall surrounding window so that opening is structurally sound, plumb and square
Some window components are damaged, but frame and surrounding wall are undamaged, plumb and square				
Window components and frame are damaged, but surrounding wall undamaged, plumb and square				
Window components, frame and surrounding wall are damaged				

Upgrade the Window, Improve the Efficiency

Single-pane windows are one of the largest sources of heat loss in winter due to their low insulating ability and high air leakage rates. They're also a major source of unwanted heat gain in the summer. As a result, single-pane windows are significant net energy losers, responsible for 25 to 50 percent of the energy used to heat and cool homes.

Since single-pane windows have become dinosaurs, almost any window will be an improvement.

A safe bet is to select a window with an Energy Star label. The National Fenestration Rating Council (NFRC) energy performance label will also help you compare windows based on five factors:

- *U-factor* measures how well a product prevents heat from escaping.
- *Solar heat gain coefficient* (SHGC) measures how well a product blocks heat caused by sunlight.
- *Visible transmittance* measures how much light comes through a product.
- *Air leakage* measures how much air will pass through cracks in the window assembly.
- *Condensation resistance* measures the ability to resist the formation of condensation on the interior surface.

The optimal combination of U-factor and SHGC depends on your climate zone. Products with the Energy Star label will include a map to help you determine the right window for your area.

In storm-prone regions and regions that require protection from flying debris, suggest an upgrade to impact-resistant windows. Impact-resistant assemblies have laminated glass and generally require longer screws (for deeper, more secure penetration) and more screws in more places (for added support). Check your local building code for requirements.

For more information, visit www.toolbase.org, www.energystar.gov and www.nfrc.org.



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