Get the Right Replacement

They're a big investment with a big potential payoff. Here's what you need to know about types, warranties, comfort, and installation.

BY DANIEL S. MORRISON

THREE OPTIONS FOR REPLACEMENT WINDOWS

OPTION 1

The cheapest:

REPLACE ONLY THE SASH

If the existing frame and sill are in good condition, you can swap the sash for an energy-efficient upgrade. Remove the sash and parting stops, then install jamb liners against the sides of the window frame. The liners form a tight seal with the new sash. Many manufacturers have replacement-sash kits designed for their older frames.

Windows

Almost 58 million windows are sold every year, and more than half of them are replacement windows. Thirty percent of the windows being replaced are less than 10 years old, and many are only two years old. Why are so many new windows being replaced? Many fail due to bad installation, but most windows being replaced simply haven't lived up to homeowners' expectations for comfort or durability.

Getting a window that matches your needs and expectations involves a series of decisions and trade-offs (see "Why replace," right). But among the many variables—such as materials, features, and warranties—good installation is essential. A poor installation practically will guarantee failure of even the most expensive high-performance window.

There's more than one way to replace your windows, and the most appropriate system depends on why you're replacing them in the first place. If the old windows are rotted out or show signs of water damage, it's critical to address the cause of the water damage in the replacement. If your old windows are merely cloudy, drafty, or hard to operate, the options widen.

Begin by choosing a type

The simplest, most common replacement-window systems leave intact the existing window frame along with the interior and exterior trim. When water damage isn't a problem, these systems offer excellent options, including sash replacement and complete window inserts.

Water-damaged windows indicate a leak and should be removed and replaced with new window units (Option 3, p. 56). This scenario entails removing the interior and exterior trim and possibly the siding and drywall. Fixing the leak and properly flashing, air-sealing, and waterproofing the new window are critical to avoid repeating the initial water damage.

QUICK GUIDE TO CHOOSING

First ask, "Why replace?"

- **Water damage:** The windows need surgery. See Option 3, pp. 56-57.
- **Early failure:** If no water damage, Option 1 or 2 will do; see pp. 52-55.
- **Comfort/energy-performance upgrade:** Option 1 or 2 will do; see performance expectations below.
- **Hate to paint.** Option 1 or 2 will do; see maintenance expectations below.

Next ask, "What are my priorities?"

Maintenance expectations
(See "Sash and frame options," pp. 56-57.)
- **Vinyl or fiberglass** (either clad or extruded) is best for coastal exposure.
- **Aluminum-clad** is durable but expensive.
- **Wood** windows can be durable and are less expensive.

Performance expectations
(Energy efficiency, comfort, structural)
- **Good:** An EnergyStar sticker guarantees minimum EPA energy-efficiency standards (NFRC-certified).
- **Better:** Shop for better NFRC ratings based on your climate (see "Energy-performance ratings," p. 54).
- **Best:** Use the Web to model windows for specific (north, south) walls in your house, (Web sites, p. 56).

Durability expectations
- **20+ years:** A solid warranty is most important. Other expectations will give way, particularly budget expectations.
- **10 years or less:** Comfort, maintenance, or aesthetics may trump warranty.

Cost: $260

National average list price based on a 3-ft. by 5-ft. opening; aluminum-clad sash; low-e, low-SHGC, argon-filled, double-hung replacement window.

Important installation details

Measure according to manufacturer's specifications.

Check that window frame is square.

Check that sill is flat, not crowned.

Jamb liners and sash must match slope of sill precisely; kinks allow air leakage.

Finish air-sealing with foam plugs at top and bottom of jamb liners.

Pros

- Easy installation.
- Energy-efficient upgrade.
- Maintains the window's original glass area.
- No need to disturb existing casings.
- Least-expensive replacement-window system.

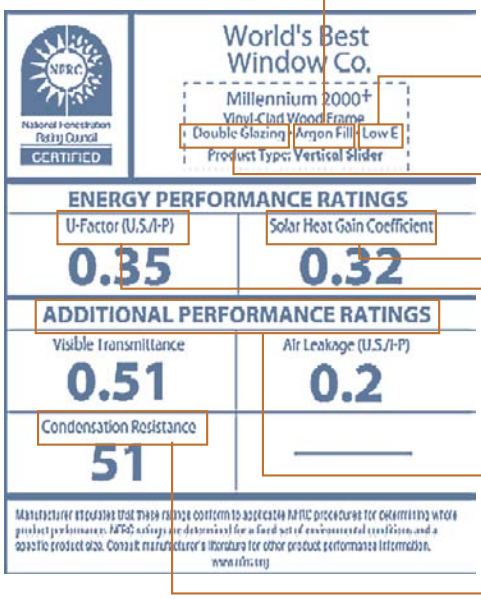
Cons

- The finished product may be leakier than Options 2 and 3.
- Hard to fit properly in old openings that may be out of square or crowned.

Window samples courtesy of Jeld-Wenn, Loewen, and Marvin

ENERGY-PERFORMANCE RATINGS: LOWER IS BETTER

Because two windows that look exactly alike can perform differently, the National Fenestration Rating Council provides third-party performance ratings for windows and doors so that consumers can have an apples-to-apples comparison. The invisible parts of a window combine to boost performance, energy efficiency, and comfort.



Gas filling: Like air, argon is nontoxic, clear, and odorless, but it's a better insulator. The optimal gap between panes of glass is ½ in.

Low-emittance (low-e) coatings are nearly transparent metal films. All low-e coatings bounce radiant heat back to you in the winter. Most reflect the sun's radiant heat in summer, too.

Double-glazing improves U-factor: Two layers of glass are standard. Triple-glazing is a good idea in very cold climates. Impact-resistant storm glazing is required in many coastal areas.

Solar heat-gain coefficient (SHGC): Percentage of the sun's radiant heat getting into your house. Low numbers (0.4) mean low AC bills. Medium and high numbers (0.5-0.7+) can work in colder climates.

U-factor is the inverse of R-value: Sum of all U-factors (glass, frame, and sash) in the window unit. Smaller numbers (0.35 or less) mean greater energy efficiency and comfort.

Warm-edge spacers: Specialized rubbers, foams, and plastics that improve U-factor and reduce condensation.

Additional performance ratings such as air leakage, water leakage, and impact performance may be required by local codes.

Condensation resistance: Quantifies all of the above features to predict the likelihood of condensation. This 0-100 index is intended more for comparing different windows than as a performance guide.

Some companies even offer energy-efficient historic reproductions that closely match original windows (see "Historic houses don't need leaky windows," p. 57).

Frame and sash choices: Think aesthetics, insulation, durability

Whichever option you choose, you have to decide what materials best fit your needs. If you like wood windows but don't like scraping and painting every 10 years, exterior cladding of vinyl, fiberglass, or aluminum is an excellent choice (photos pp. 56-57). They're all durable and require no painting. Window manufacturers offer aluminum cladding in up to 50 stock colors with custom-color matching, whereas vinyl and fiberglass cladding are generally available in white and beige; fiberglass can be painted. Keep in mind that you can step down in price by choosing all-vinyl windows. They can be up to 40% less expensive than comparable aluminum-clad wood windows.

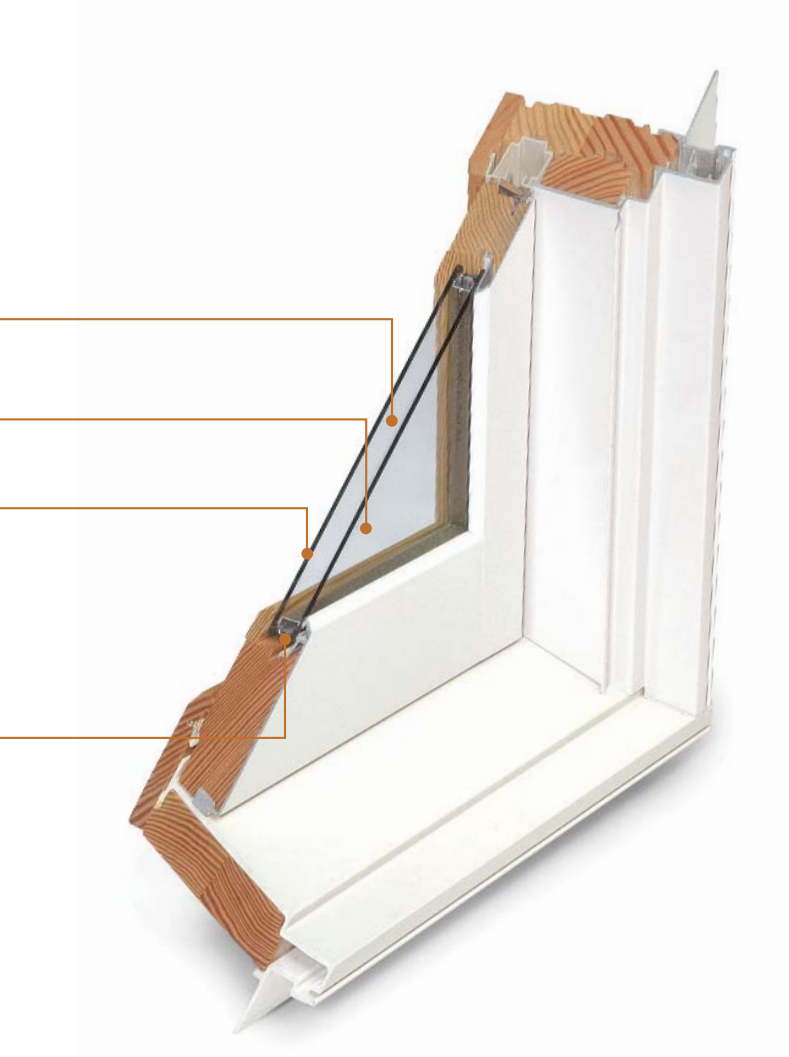
Because the frame and sash can make up almost a third of a window's total area, their materials play an important part in both comfort and durability. Insulating capacity (measured as U-factor; lower is better) is important in cold climates; in hot climates, keeping heat out of the house takes precedence. Because

OPTION 2

The easiest:
INSERT A FRAME AND SASH

The most common system comes as a complete unit that slips into the existing window jambs against the exterior (or interior) window stops. Use low-expanding foam to seal the perimeter gap and ensure an airtight installation.

Photo bottom right: Randy O'Rourke



COMFORT COSTS LESS

I was sitting on the couch in the little window bay of my living room watching Norm on PBS like I do every Saturday. It was springtime at *The New Yankee Workshop*, but outside my windows, it was -10°F, and I was cold. I could have put on a sweater, as my wife does, but I did what most guys do: I reached for the thermostat. I was astonished to see that it read 70°F. How could that be? Seventy degrees is warm, so why was I uncomfortable?

Because heat loss from radiation is much more drastic than other types of heat loss, it gets worse as you get closer to the cold (or hot) object. Old or cheaply made windows can suck the heat from you in winter, or turn your living room into a microwave in summer. Effectively, this makes the comfortable portion of a room smaller because you're uncomfortable if you sit near the windows. And if you're uncomfortable, you reach for the thermostat.

> "Seventy degrees is warm, so why was I uncomfortable?"

Good windows enlarge a room's comfortable area, which means less reaching for the thermostat, less work for your furnace or air conditioner, and lower utility bills.

radiant heat is much more powerful than other forms of heat transfer, it's more important to keep radiant heat out with low solar-heat-gain coatings than to focus on U-factor.

Finally, consider how the frame and sash materials will stand the test of time. Some very good windows are made with vinyl, and some very bad windows are made with vinyl. The same goes for wood and aluminum. Your durability decision shouldn't be based solely on material; quality of manufacture is equally important.

Look for ratings, and buy for the warranty

It's important to realize that when you remove a window from a wall, you're left with a large hole in your house. You should plug that hole with something that will look good, perform well, and last long.

To increase the odds of meeting your comfort and durability expectations, you need to read the National Fenestration Rating Council's (NFRC) energy-performance label and shop for the best warranty. "You can't trust your eyes when you're shopping for windows," says R. Christopher Mathis, a building consultant and former NFRC director. "Two windows that look exactly alike can perform very differently." Different glass

Cost: $530

National average list price based on a 3-ft. by 5-ft. opening; aluminum-clad sash; low-e, low-SHGC, argon-filled, double-hung replacement window.

Important installation details

Verify opening for square; measure accordingly.

Air-seal the perimeter with low-expanding foam, not fiberglass batts.

Fill header and sill extensions with low-expanding foam insulation.

Protect against wind-driven rain with highest-quality sealant at exterior stops.

Pros

- More dependable energy ratings than Option 1 because the sash and frame are tested as a unit.
- Less invasive than whole-window replacement. The process takes one hour.
- Won't disturb existing casings, siding, or wall coverings.

Cons

- Reduced glass area and bulkier look due to an additional window frame.
- Smaller opening may violate fire-code egress requirements.
- The most expensive method, considering only materials.

SASH AND FRAME OPTIONS: CHOICES DEPEND ON COLOR, COST, AND DURABILITY

LEAST EXPENSIVE

Vinyl won't corrode

Clad or extruded, vinyl is a no-maintenance option for coastal areas where aluminum may corrode over time.
U-factor: 0.33; with insulated cavity: 0.27
Colors: Whites, beiges
Relative cost: Least-expensive option; roughly 40% less than aluminum-clad.

Wood requires a finish

Wood windows are available factory-primed, but you should scuff and reprime the surfaces before painting. With regular maintenance and good paint, wood windows ought to last a long time.
U-factor: 0.33
Colors: Any paint or stain color.
Relative cost: More expensive than vinyl.

Fiberglass is the most durable

Stronger than vinyl, fiberglass can be extruded into slimmer cross-sectional profiles, making it a good choice for option 2. Also available with wood interiors for a warmer look. No maintenance requirements, but fiberglass can be painted.
U-factor: 0.33; with air cavity filled: 0.27
Colors: White, but it can be painted any color.
Relative cost: Costs more than wood or vinyl.

ENERGY-EFFICIENT WINDOW INFO

- www.efficientwindows.org
- http://windows.lbl.gov
- www.eere.energy.gov/consumerinfo/energy_savers/windows.html
- www.rehabadvisor.com
- www.nfrc.org

coatings, gas fillings, and spacers between glass panels are impossible to differentiate visually; they can be verified only through laboratory tests. If you want the assurance of energy efficiency from an independent third party, you need to look for the NFRC label.

NFRC ratings make comfort expectations predictable; a solid warranty makes a window's service life predictable. Warranties reflect how confident a company is in the durability of its product. The top window companies offer 20/10 warranties: 20 years on the window seal and 10 years on everything else (frame, sash, and hardware). That's a good benchmark.

Prorated warranties and exclusions such as nontransferability make it hard to judge how long even NFRC-rated windows will perform well.

And beware of a lifetime warranty. If name brands such as Andersen, Marvin, and Loewen can give you only a 20/10 warranty, how can a no-name window company offer more? The answer: exclusions.

Can Mom and Pop compete with Marvin and Pella?

There are thousands of window manufacturers in North America. Smaller companies can produce a less-expensive product that rivals

OPTION 3

The best:

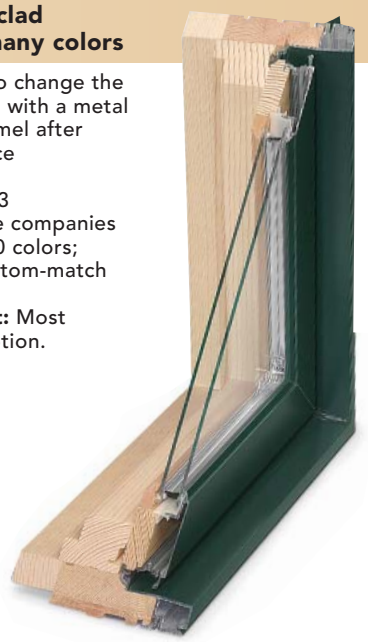
COMPLETE WINDOW REPLACEMENT

When water damage is occurring, the window and rotten framing should be replaced and the source of the leak tracked down and stopped. A rotted window may be the symptom, not the source, of the leak. Complete replacement is best because it allows you to integrate the new window fully into the wall with new head and pan flashings, low-expanding foam, flexible flashing membranes, and high-quality sealants.

MOST EXPENSIVE

Aluminum-clad comes in many colors

If you want to change the color, repaint with a metal bonding enamel after proper surface preparation.
U-factor: 0.33
Colors: Some companies have up to 50 colors; many will custom-match colors.
Relative cost: Most expensive option.



the windows made by big manufacturers, but they usually can't provide the same warranty. Small companies don't have the same risk-management resources that the name brands have, so some risk is passed to the consumer.

When shopping for the warranty, make sure that the window manufacturer will be there when you need it to be. Ask how long the manufacturer has been in business. Is a two-year-old manufacturer offering you a 20-year warranty? Does the company have a toll-free telephone number, and if so, is there an actual human being to answer your call?

You may decide that a prorated warranty is worth the gamble for the lower price, but stay away from nontransferability clauses; they don't make sense. How can the transfer of homeownership affect the service life of a building component?

Replacement windows are a big investment in money, energy efficiency, and personal comfort. It's not worthwhile to skimp on untested or falsely warrantied windows. If the window company won't bet on its product, why should you? □

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HISTORIC HOUSES DON'T NEED LEAKY WINDOWS

Many window manufacturers offer historic retrofits (as illustrated in this display by Marvin) that will be more likely to pass the historic commission's review panel. Andersen's Woodwright series of replacement windows features wood jamb liners and traditional sash details to blend gracefully into a historic house. For more information on preservation guidelines, visit the National Park Service Web site at www2.cr.nps.gov. (Also, see *FHB* #161, "Restoring Window Sashes," pp. 84-89.)

Cost: $446

National average list price based on a 3-ft. by 5-ft. opening; aluminum-clad sash; low-e, low-SHGC, argon-filled, double-hung window.

Important installation details

Protect against wind-driven rain with head flashing and high-quality sealant along top and side flanges; uncaulked bottom flange allows water to escape.

Ensure against rot with pan flashing.

Integrate flashings shingle style into building paper.

Maintain air seal with low-expanding foam along inside perimeter.

Pros

- Most versatile because you can change the window's size.
- The most energy-efficient system because the window is fully integrated into the wall.
- Most durable because you can upgrade the flashing details.

Cons

- The most invasive method.
- The most difficult method.
- The most expensive method, considering labor.

Photo facing page, bottom left: Randy O'Rourke; photos this page, right: Daniel S. Morrison