

Replacement Windows

PERFORMANCE REVIEWS

Making the Right Choice to Fit Your Needs

The number of high-performance windows continues to increase because of tax credits for homeowners, which motivated manufacturers to develop more products that meet certain performance thresholds. But for many homeowners, buying a less expensive window that has basic performance ratings is often the smartest approach.

By Drew Vass

When it comes to picking replacement windows, it might seem like a no-brainer to look for models that have the best energy-performance ratings. After all, for at least the rest of 2010, you qualify for as much as \$1,500 in federal tax credits if you buy windows that do the best job of keeping heat from the sun out of your house and heat from your furnace in.

But even if cost were no problem, buying windows that

have the best performance ratings often isn't the best thing for your home or for your wallet. Making a decision that is based on the performance guidelines that are tied to the current tax credits unfortunately means that consumers rely on what amounts to a one-size-fits-all performance threshold that often steers consumers to make the wrong choices.

We interviewed independent energy-efficiency experts and examined annual energy costs that are related to the expected performance of the latest replacement windows. We concluded that depending on where you live you could pay a premium for performance levels that you'll never need. What's worse is that you could buy a replacement window that does as much harm

as good, because it keeps out the sun's heat when you want it most.

Even if the federal tax credits disappear after 2010—and at press time, it was uncertain what will happen—the consequences of performance ratings that are tied to those incentives could linger for years to come and distract consumers from making choices that are best for them.

RATINGS TRUTH. When it comes to performance ratings in 2010, the critical numbers to remember—and the combination to largely avoid—are 0.30 and 0.30. Windows that have a U-factor rating of 0.30 or less and a solar heat-gain coefficient (SHGC) of 0.30 or less qualify for the aforementioned credit.

Consequently, these numbers have created a misleading target. *U-factor* measures how well a window keeps heat in your home; *SHGC* measures how well it keeps out the sun's heat.

Experts say these two variables are the most important factors in measuring the energy efficiency of a window and that a rating of 0.30 or lower in each category is considered to be excellent. However, because different regions have different climates, homeowners generally will benefit from purchasing windows that have ratings that are excellent in one—but not both—of those categories. In other words, someone who is in sunny Florida would want a window that has an excellent SHGC rating (to keep the sun's heat out) but

Best Buys in Replacement Windows

Best Buy Categories

[P]—Premium selection
[M]—Midrange selection
[E]—Economy selection



Best Buys were selected based on performance ratings, quality of construction and materials, ease of operation and warranty.

We limited our Best Buy selections to vinyl and clad-wood units, which account for about 80 percent of the U.S. replacement-window market. We considered only manufacturers that have national distribution.

U-factor measures how much heat a window will retain. *SHGC*,

or solar heat-gain coefficient, measures how much heat from the sun the window will block.

Performance ratings are based on a standard configuration of an entire window (not just the glass) and are certified by National Fenestration Rating Council. However, windows that have the best performance ratings won't necessarily deliver the best benefits because of climate conditions. Fortunately, each selection might be available with lower or higher performance specs through the use of optional glass packages. We suggest that you consult an energy expert to determine which configurations are

best for you.

Colors for Best Buy vinyl replacement windows are standard interior and exterior options.

All Best Buys for vinyl replacement windows have a lifetime warranty that can be transferred to the next homeowner.

All prices and performance specifications were based on a 3-foot-by-5-foot, double-hung retrofit window, which is designed to be installed into an existing window frame and use existing jambs and trim. Prices do not include installation.

Best Price is a reflection of the lowest retail price that was available at press time and is subject to change.

VINYL WINDOWS

[P] *WeatherShield Series*
MSRP: \$480; Best Price: \$356

» The *WeatherShield* series' performance ratings are as high as those of any other vinyl replacement window. What sets this series apart from other models is that these windows have the best overall aesthetics and open, close and tilt better than all other vinyl models. When compared with other windows that we evaluated, the sashes on this series lift and lower with less effort. No other model's interior surface

has more seamless joint construction or does a better job of replicating the look of a wood-grain finish than this series does.

Features:

- * U-factor: 0.30
- * SHGC: 0.28
- * Colors: Beige, white
- * Additional styles: Bow/bay, casement, double-slider, geometric, picture, radius, single-hung, single-slider

[M] *WeatherShield Series*
MSRP: \$300; Best Price: \$245

» When compared with all other models that are in this price range, the *WeatherShield* has the best price and performance ratings, and is the only one that has single-latch hardware that controls both the lock and tilt-in functions. And it's the only model that we found that comes with a lifetime warranty that covers accidental glass breakage (think stray baseball). The identical *WeatherShield* series (\$300), which is sold at some retailers, is also a Best Buy.

Features:

- * U-factor: 0.30
- * SHGC: 0.25
- * Colors: Desert sand (beige), white
- * Additional styles: Awning, casement, picture, single-hung, single-slider



wouldn't need a window that has an excellent U-factor rating (to keep the heat from your home-heating system inside).

Conversely, someone who lives in Minnesota would want a window that has an excellent U-factor rating but not an equally great SHGC rating. A low SHGC rating (lower meaning better performance) means that a Minnesotan would waste the sun's free energy, which can lower energy bills by reducing the amount of heat that a furnace must produce.

The notion that U-factor and SHGC ratings that are best for your home can vary by region is worth emphasizing now more than ever, because the one-size-fits-all performance guidelines that are attached to the tax credits have driven consumers away from considering

Blanket Equation

What's wrong with picking a window that has the best overall performance ratings? Plenty. Look at what happens if you have a 2,600-square-foot home that has 390 square feet of windows and natural-gas heating in different parts of the country:

City	U-factor	SHGC	Heating bill*
Miami	0.28	0.25	\$10,42
	0.47	0.25	\$13,75
Hartford, Conn.	0.28	0.25	\$2,111
	0.28	0.56	\$1,844
Richmond, Va.	0.28	0.25	\$946
	0.32	0.35	\$893

U-factor measures how much heat a window will retain. SHGC represents solar heat-gain coefficient, which measures how much heat from the sun the window will block.
* Annual cost based on one 3-foot-x-5-foot double-hung vinyl replacement window
Source: Lawrence Berkeley National Laboratory and U.S. Energy Information Administration

climate. After the American Recovery and Reinvestment Tax Act established new performance guidelines for tax-credit-eligible products in 2009, manufacturers made significant adjustments to their window lines (such as improved glazing) to produce more windows that are eligible for the tax credits.

Yet it is possible that the windows that qualify for tax credits will drive up your heating costs so much that the \$1,500 that you gain in tax credits will be erased by extra heating costs over the long haul. In one scenario of our analysis, a window that qualified for the credit added \$1,500 to the total cost of heating bills in a home in less than 6 years. (See "Blanket Equation.")

When we last wrote about replace-

[E] Encompass by Pella 68 Series

MSRP: \$220; Best Price: \$166

>> The Encompass series is a repeat selection, because it is the least expensive replacement window that we found that has low-emissivity, or Low-E, glass as a standard glazing feature. This means that it prevents more energy from passing through the glass than do windows that have glass with no glazing. That glazing helps give this model the best performance ratings among windows that are in this price range. The identical Encompass (\$220) window, which is sold at some retailers, is also a Best Buy.

Features:

- * U-factor: 0.33
- * SHGC: 0.28
- * Colors: Almond (beige), white
- * Additional styles: Awning, casement, radius, single-hung, single-slider

CLAD-WOOD WINDOWS

[P] Pella 68 Series Clad-Wood

MSRP: \$585; Best Price: \$427

>> We couldn't find another series that has a better combination of top performance ratings and desirable styling options than the aluminum-clad

delivers. You'd have to pay at least \$90 more to find a series that has as good of an SHGC rating. And you'd have to pay at least \$18 extra to get another window that has as many standard exterior colors as this series does.

Features:

- * U-factor: 0.31
- * SHGC: 0.20
- * Exterior colors: 41
- * Interior wood: Pine
- * Additional styles: Awning, bow/bay, casement, geometric, radius, single-slider
- * Warranty: 20-yr.

[M] Milled Aluminum 68 Series

MSRP: \$533; Best Price: \$468

>> The Milled Aluminum series is a repeat selection, because no other aluminum-clad window that is in this price range has a better warranty or a lower U-factor rating than this series does. This window also is the only window that we found that has a third pane of glass that's hinged, which allows homeowners to install or swap out such features as grilles and built-in blinds.

Features:

- * U-factor: 0.31
- * SHGC: 0.28
- * Exterior colors: Brown, tan, white



- * Interior wood: Pine
- * Additional styles: Awning, casement, single-slider, transom
- * Warranty: 20-yr. glazing, cladding; 10-yr. wood, other components

[E] Encompass by Pella 68 Series

MSRP: \$415; Best Price: \$256

>> The Encompass series is the least expensive aluminum-clad replacement window that we found in our review of the market, yet its performance ratings were comparable with those of clad-wood windows that cost at least \$100 more. No other window that is in this price

range has Low-E glass and argon fill as standard glazing features, as this series has.

Features:

- * U-factor: 0.32
- * SHGC: 0.33
- * Exterior colors: 6
- * Interior wood: Pine
- * Additional styles: Awning, casement, geometric, radius
- * Warranty: 20-yr. glazing, wood; 10-yr. cladding

For more information on the above Best Buys, contact the manufacturers of the products directly. See page 68.

What's New and What's Ahead?

You can expect to see plenty of new features being touted by manufacturers the next time that you shop for windows. In many cases, the added costs are not worth the benefits.

- **Triple-layer film:** This glazing advancement can produce a U-factor rating (how much heat can escape through a window) of an eye-popping 0.09 when it is coupled with a xenon-gas fill. That's an attractive but incredibly expensive option for someone who lives in a cold climate. Expect to pay roughly a whopping \$3,800 for one replacement window that uses triple-layer film.
- **Vacuum-sealed insulating glass (VIG):** It could be years before U.S. manufacturers incorporate VIG into their windows. But according to Guardian Industries, which is the company that is developing the technology, using VIG as part of the glazing of the window will produce U-factor ratings of as low as 0.083. VIG also is designed to reduce the overall thickness of the glazing to around three-eighths of an inch, compared with (at least) the one-half of an inch that is in most double-pane windows today. That will make it an ideal product for older homes that have single-pane glass windows, says Andy Russo of Guardian. Of course, it also will make windows expensive. The company suggests that the cost of VIG glazing will be in line with products that have triple-pane glass. If that's true, you can expect to pay at least \$450 for a vinyl window that uses VIG glazing and perhaps \$900 for an aluminum-clad version.
- **Wireless security sensors:** The first replacement windows that have built-in wireless sensors that work with your home-security system were introduced in January and could show up in products that are sold by Anderson in the months ahead. You can expect to pay about \$70 extra per window. However, you can pay as little as \$30 per sensor to have security companies add this feature to existing windows. The only benefit of paying extra to have built-in sensors is that you won't see the sensor or the wiring. Another problem: At press time, the window was compatible with less than half of all security systems that were on the market.
- **Radiant glass:** In the next year or two, window glass that generates radiant heat could arrive on the mainstream market. Already, you can retrofit your current windows with glazing that has radiant glass, but it's possible that window manufacturers will begin to offer this technology as an option in new windows. Generating radiant energy via window glass would complement existing heating systems by eliminating the cold spots that are caused by typical window glazing. But independent experts tell us that that's not a significant benefit—particularly at what's expected to be an outrageous cost. You'll have to hire an electrician to install an accompanying electrical circuit, so you can expect to pay around \$50 to \$80 per square foot for radiant-glass windows. That adds up to \$9,000 more than what you'd pay for standard-glass windows if you installed radiant glass in 20 regular-size windows. Shocking!

ment windows 3 years ago, only one model that had national distribution had U-factor and SHGC ratings that met or exceeded 0.30. At press time, at least seven models met or exceeded those two rating standards, and 19 can be upgraded to meet or exceed those standards. Those numbers do not include products from the roughly 100 U.S. manufacturers who have limited or regional distribution. At press time, there were 5,836 models nationwide that qualified for the tax credits, which is 1,652 more than what qualified in October 2009.

We only can hope that those numbers reverse in the next few years. With or without tax-credit requirements, all of the window manufacturers that we interviewed say they will continue to produce models that have U-factor and SHGC ratings at or below 0.30 even

though virtually no one needs a window with such a combination of performance ratings. Why do manufacturers continue to produce windows that have these ratings even though there's no benefit to consumers? No manufacturer that we interviewed could provide a satisfactory answer, beyond the excuse that the separate companies that make the glass for windows remain focused on glazing combinations that result in low U-factor and low SHGC ratings.

If there's good news, it's that manufacturers plan to shift their marketing and advertising focus away from models that have U-factor and SHGC ratings that are at or below 0.30. Ideally, that means that consumers are less likely to be steered toward buying a window that performs better (but costs more) than they need in the years ahead.

HELPING HAND. Believe it or not, a better approach to determining which windows will perform the best in your home include looking at Energy Star ratings. Manufacturers that we interviewed say their marketing shift will steer consumers toward models that are Energy Star-rated. There remain plenty of problems with the Energy Star program, which we've documented in previous issues, but at least the newest Energy Star requirements for windows account for climate-based variations in each region.

None of the four climate zones that were established as part of Energy Star's latest ratings calls for a window that has U-factor and SHGC ratings at or below 0.30. Three of the four zones call for a rating of 0.30 or below in U-factor or SHGC, but never both. For instance, in the Southern region, which covers areas that surround the Gulf of Mexico, an SHGC rating of 0.27 or lower is necessary for Energy Star status, but U-factor ratings in that same region are required to be only 0.60 or lower. A U-factor of 0.30 or lower is prescribed for the Northern region, which encompasses roughly one-half of the United States, but there is no SHGC requirement.

Another step that you should take to determine which windows are best for your home is to have a home energy audit. You'll pay at least \$250 to have such a procedure performed by a contractor who is certified by Department of Energy. If the energy audit indicates that a less expensive window that has less impressive performance ratings is a better fit for your home, that could be the difference between paying, say, \$6,000 for a set of economy vinyl windows and paying at least \$9,000 for premium models. The difference—\$3,000—is twice as much as you'd get from any tax credit.

Don't get us wrong: We hope tax-credit incentives for replacement windows continue. But we also want to make sure that these incentives lead you to see clearly which window is the right one for *your* home. ●

Drew Vass has covered the glass industry and window products as an editor and writer at several glass- and energy-related magazines, including Window Film, US Glass and Shelter.