

WINDOWS



Installing Full-Frame Replacement Windows A recipe for speedy, painless, long-lasting installations

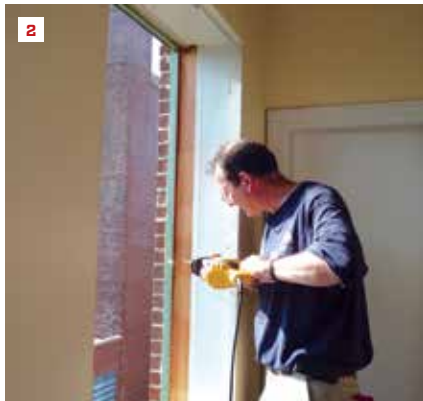
BY GREG BURNET

Replacement windows come in two flavors: insert, or “pocket,” windows (which I discussed in a previous *JLC* article, “Quick Wood Replacement Windows,” April/07) and full-frame units. Where to specify each type is something every remodeling contractor should know. We often replace windows less than 20 years old that have failed due to poor quality, improper installation, or both. On this particular job, a developer had converted a vintage YMCA structure into 35 condo units around 1990. The off-brand wood windows he installed were doomed to failure from the start, thanks to the manufacturer’s liberal use of untreated, finger-jointed pine, and the lack of care paid by the carpenters during the installation.

We start the replacement process by measuring each window and window opening. We always try to maintain historically accurate details, such as elaborate trim, so accurate measurements are important. With this particular brick building, we measured each masonry opening at several different spots because openings are often not true, especially in vintage structures. I also always check whether the opening is plumb and level. If it’s not, I may need to add blocking so that the window sits true in the opening, or I can add trim to mask the out-of-level or out-of-plumb condition. Either way, I want to be aware of any special requirements before ordering the window and attempting to install it.

Photo: Susan Burnet

INSTALLING REPLACEMENT WINDOWS



One lesson I've learned over the years is to always install top-quality windows. We usually specify clad wood windows for our projects, assuming they're permitted by local (preservation) codes. The Marvin Clad Ultimate Double Hung (marvin.com) units we use have extruded aluminum exteriors, which have very crisp profiles and a finish that mimics painted wood. The cladding is durable and minimizes the maintenance required on the exterior. The interior and exterior jambs on these "block-frame" units are in-plane and come without any exterior trim or sill; instead, a nailing flange is affixed to the perimeter for installation.

In many modern buildings, windows like these are often installed without additional exterior trim—something that just doesn't fly in the older, well-established areas where we typically work. So when ordering, we deduct 2½ inches from all four sides of the opening, which allows us to use standard 2-inch-wide brick mold on the sides and top, leaving about ¼ inch between the trim and the opening and the trim and the window. Leaving these gaps, which eventually will receive backer rod and sealant, greatly simplifies the installation. The space between the window and limestone sill receives a custom-fabricated sill nosing, which mimics

the appearance of a thick, traditional wood sill.

To speed installation, we order windows that have painted interiors—either primed or completely finished—directly from Marvin. This slightly increases the cost of the window but saves us the time and aggravation of painting all of the various nooks and crannies. For this project we had to match an existing color that was not available from Marvin, so we took delivery of the primed units at our shop and did the final painting there, including the PVC brick mold used for the exterior trim. While it was not as efficient as using pre-finished windows, we were able to paint several units at a time, and it eliminated the need to paint installed units from ladders.

For interior trim, we primed MDF sheets and added one coat of finish paint before ripping them into simple square-edge 1x3s. We then primed the exposed edges and applied a final finish coat to the sides that would be visible.

After the painting was done, we scheduled the installation. To use staging and site protection more efficiently, we generally try to work in one room or section of a building at a time. In this case, we worked on one condo unit at a time, completing the installation before moving on to others.

Photos: Susan Burnett



Tear Out Old Window

To remove the old window, first separate the trim from the opening by cutting through the old caulk with an oscillating tool (1). After taking out the sash, the quickest way to remove the old frame and exterior trim is by cutting through it with a reciprocating saw (2), then collapsing the frame into the opening (3). Clean all remaining paint and caulk from the opening with an oscillating tool or scraping by hand (4).

Install Window Buck

A window buck made from untreated 2-by stock provides a nailing base for the new window. Peel-and-stick flashing tape isolates the buck from the masonry sill (5). The preassembled buck slides into the opening (6) and attaches to nailers embedded in the masonry (7). A second layer of peel-and-stick tape goes over the sill section of the buck (8).

DEMOLITION

Before new windows can go in, the old ones have to come out. This operation is generally straightforward and takes 10 to 15 minutes per window. We start by removing the sash, then use an oscillating tool with a straight blade to cut the sealant between the trim and the masonry (see photos, facing page).

The easiest way to remove an old window is to leave as much of the frame and exterior trim intact as possible and collapse the frame onto itself. First, we cut through the trim and jamb with a reciprocating saw midway up each side jamb. Then, using a large pry bar, we pull each section of frame away from the masonry. The frame will hinge at the corners and fold into the opening. With the old sash and trim removed, we scrape off any residual lumps of paint or caulk in the opening and give the masonry a thorough sweeping.

INSTALLING THE WINDOW BUCK

The next step is to install the window buck—blocking that provides a nailing base for the new window (photos, above). In most masonry buildings we see, nailers are embedded around the window openings during construction for attaching the bucks.

If those nailers are in good shape (as was the case here), we just nail our new bucks to them, taking care to level and plumb them as needed. If necessary, we replace any bad nailers with 2x4s attached to the masonry with Tapcon screws (tapcon.com).

To determine the thickness of the window buck, we measure the opening again and subtract the window dimension from the smallest measurement in each direction. Because of the deduction we made when we first measured the openings, we usually have enough room for a 2-by on all sides. If the masonry is irregular or the opening is way out of square, it's easy to rip 2-by stock to the thickness needed on a table saw.

The bottom of the window buck is usually in direct contact with masonry, so we install a piece of peel-and-stick flashing between the two elements to prevent any moisture in the masonry from wicking into the buck, which is untreated lumber. A word of caution here: I avoid using treated lumber for the buck unless it's required by local ordinance. Treated lumber often has a moisture content in the 20% range and, as it dries, this moisture can migrate to drier material—usually the new window or wood trim. This moisture migration can cause the drier wood to swell, potentially causing

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problems with the appearance and operation of the window. If treated lumber is required, we use material that's been kiln dried after treatment. Sourcing KDAT is often problematic, however; few suppliers around here carry it and there's often a lead time. But if we do use it, we take care to isolate the window from the treated lumber with flashing tape.

We cut and assemble the buck as a unit, then attach it to the nailers in the opening with galvanized nails. As it goes in, I try to make sure that the sill of the buck is dead level, which eliminates the need to shim the window level during installation. After the buck is nailed in place, we install a separate piece of peel-and-stick flashing on top of the sill portion.

INSTALLING THE REPLACEMENT WINDOW

With the buck secure, we turn our attention to installing the window (photos, above). The process is fairly straightforward. First, we center the unit in the buck, then check level and plumb, shimming if necessary. When we have the window where we want it, we secure the corner of the bottom flange to the buck with a 2-inch hot-dipped galvanized roofing nail. Next, we plumb the side

jamb and nail the adjacent top corner. Finally, we double-check all sides for level and plumb, and take diagonal measurements to confirm that the window is square. When the window is set, we drive nails every 6 to 8 inches around the perimeter, taking care not to ding the aluminum cladding. The nailing process is complicated by having to swing your hammer between the side of the opening and the vulnerable window cladding. If you have trouble with hammer accuracy, it might be best to use a hammer with an extended head, such as a Japanese-style "duck" hammer or an electrician's hammer.

FLASHING THE FLANGE

The window manufacturer provides precut pieces of peel-and-stick to bridge between the horizontal and vertical flanges at the corners (photo 12, above). We cut additional peel-and-stick flashing tape and apply it over the side and top flanges of the window. We leave the bottom flange without any tape, because any water that may make its way under the window has to be able to drain back out. We install the peel-and-stick flashing tape first on the sides, where it laps slightly onto the window

Photos: Susan Burnett



New Window Goes In

Slip the full-frame replacement sash into the opening. If the sill of the buck was installed level, shimming should not be necessary. Check the head jamb for level (9), shim if necessary, then nail one bottom corner (10). Check the side jambs for level and tack the adjacent corner. After taking diagonal measurements to check the window for square (11), nail off the rest of the flange every 6 to 8 inches.

Flashing the Flange

Corner flashing provided by the manufacturer joins the nail flanges at the corners (12). The sides are flashed next with the peel-and-stick flashing tape overlapping slightly onto

the window frame (13).

The sill is not flashed to provide a drainage path, but the head flashing overlaps the side flashing to complete the weather seal of the window (14).

Exterior Trim and Seal

The fastest way to apply the exterior trim is to preassemble it and install it as a single unit (15). Nail through the trim into the buck, but avoid going through the nailing flange, which can damage the window (16). Foam backer rod fills the gap between the trim and the opening (17). A bead of color-matched caulking completes the seal between the window and the trim, and between the trim and the opening.

frame. The head flashing goes on last, extending over flashing tape on both sides. Once the flashing tape is installed, the window is weathertight.

EXTERIOR TRIM

Because masonry openings are rarely true, we usually use PVC or engineered-wood trim, which is easier to work with than the extruded-aluminum panning systems that are available from the manufacturers. Whenever possible, I preassemble the trim so that it can be installed as a unit (photos, above). We make the decision to preassemble the trim based on how square each individual opening is. While installing a preassembled unit is usually faster than building it in place, we find it more difficult to scribe and fit an assembled frame to an irregular opening. So if the opening looks like it will require scribing, we opt for the one-piece-at-a-time approach.

A quick note about preassembly: We try to take advantage of our shop to fabricate and preassemble as much of the trim as possible ahead of time, both interior and exterior. Working in a controlled environment lets us be more productive, and all of our machinery is set up and ready for whatever operation is required. Plus, the shop

gives us more space to spread out, and all of the materials we need are readily accessible. Finally, working in the shop keeps a lot of the mess away from the job site, so clean up is easier and the time spent on site is minimized.

Whether preassembling a trim unit or installing the trim on site, we always start with the sill, which is actually a piece of stock that measures about 1¾ inches square, with a slight bevel milled on its top surface. This sill stock mimics the profile of traditional window sills and provides a landing place for the vertical legs of the brick mold, which are angled to match the bevel on the sill. The header trim completes the assembly.

To attach it, we shoot 15-gauge galvanized finish nails through the trim and into the bucks, taking care not to drive nails through the window's vinyl nailing fin. (Nailing through the flange can cause it to crack in cold weather.) Next, we install foam backer rod between the trim and the masonry, as well as between the trim and the window frame if necessary. Don't skip this step; it increases the life of the sealant.

To seal the exterior of the window, we use a polymer sealant with a high solids content. These types of sealants are more expen-



Interior Sealing and Trim

The last step is sealing the inside of the window and applying trim. Low-expanding foam fills the gap between the window and the drywall to create an air seal (18). With the drywall returns on this project, the interior trim is thin 1x3 stock that cover the gap between the window jamb and the drywall (19). Beads of caulk between the trim and the drywall and along the reveal created at the jamb complete the interior finish (20).

sive than their latex or silicone counterparts, but they remain flexible and retain their color much longer. And they're available in hundreds of different colors, so matching the cladding on most windows is easy. In this application, we used OSI Quad (osipro.com).

INTERIOR SEAL AND TRIM

We seal the interior of the window with low-expanding spray foam, which fills the void between the jamb and buck, and creates an effective air barrier (photos, above). I've removed countless windows over the years where this step was omitted, or where fiberglass insulation was used instead of spray foam. The end results were windows that were always drafty around their perimeters because fiberglass by itself without an effective air barrier is practically useless.

The low-expanding foam we use is specifically formulated for window and door installations and, unlike other spray foams, it's unlikely to cause jambs to bow when installed correctly. We opt for a professional spray gun because it accepts larger cans of foam, which are more economical and produce far less waste than the

individual "straw cans" that you get at big-box home centers. The professional spray gun also makes it possible to use just part of a can and save the rest for use at a later date. And they offer much greater control than the individual straw cans.

Once the foam has cured, we remove any excess with a knife or scraper and install the interior trim. In most cases, we preassemble the interior casing as well as any necessary jamb extensions ahead of time in our shop. If we are dealing with drywall-return openings, as we were in this case, we just install transition trim to cover the small gap between the drywall and the window on all four sides. This trim is simply thin 1x3 or 1x4 stock cut to length and attached to the wall returns with 16-gauge finish nails, leaving a small reveal on the window jamb.

Because the trim stock is prefinished, we use color-matched putty to fill the nail holes. Then we run a bead of caulk in the joint between the trim and the drywall and along the corner created by the reveal. The last step is to put sash lifts on each window.

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Photos: Susan Burnet