

An **Around the House** White Paper



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Replacement Windows

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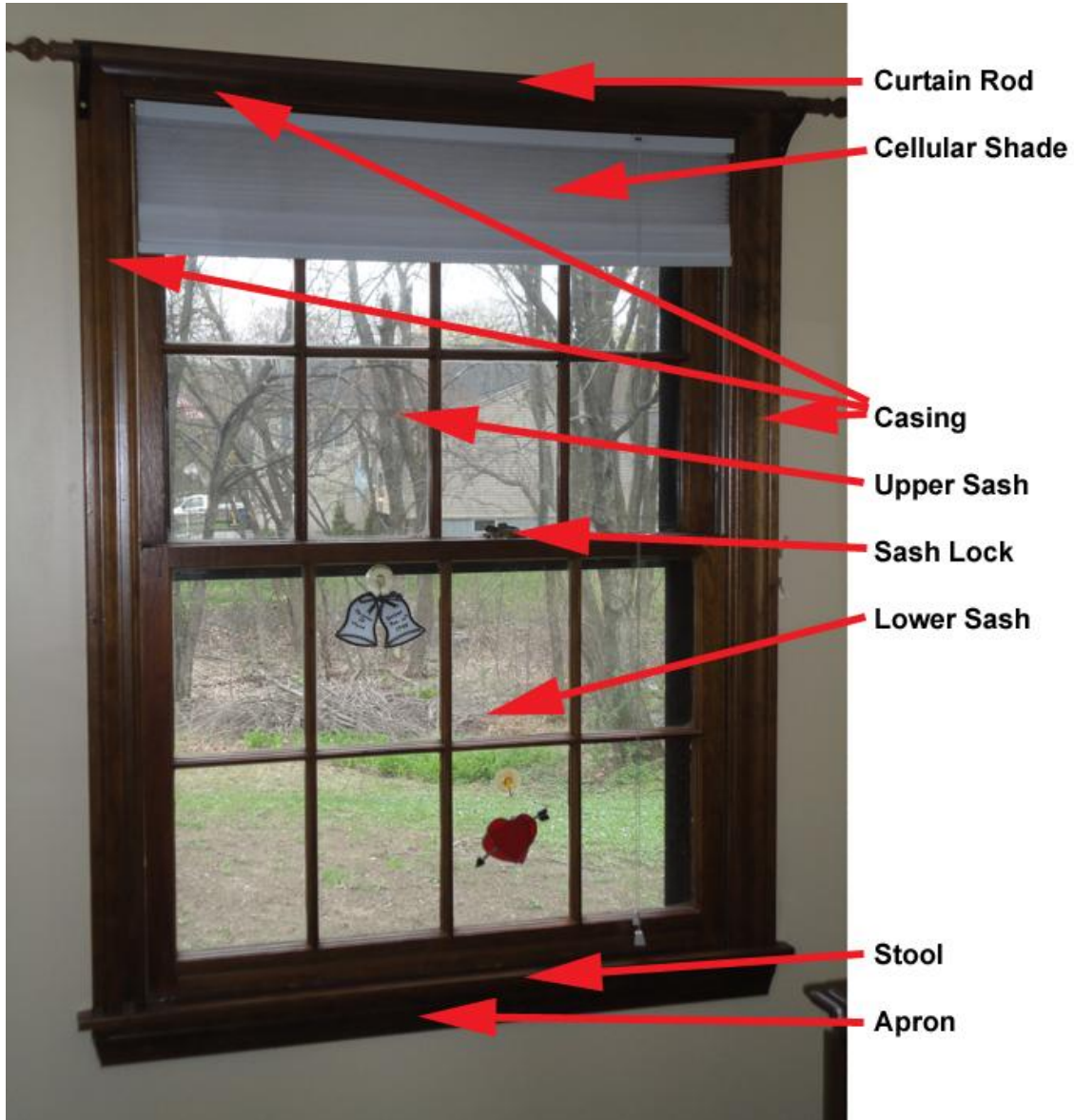
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Window Parts

So that we are all speaking the same language, here is a photograph of a double hung window with the various parts labeled:



This window would be described as an 8 over 8 lite double hung window as there are 8 panes of glass in both the upper and lower sash. Your window may not have a stool and apron. If the bottom of the window is trimmed out the same as the top, it is called “picture framed.”

Note that the photograph does not show the window sill. It is the part of the window that the lower sash rests on when closed and extends to the outside of the building.

What are replacement windows?

Replacement windows are designed to replace your window sash without requiring damage to either internal (drywall) or external (siding) damage. Your existing window frame, casing, stool, apron, and sill are nearly always reused. So, if your reason for replacing your windows is a damaged or rotten window sill, you will either need to replace the sill before installing the replacement window or install a “new construction” window.

You should also be aware that installing a replacement window nearly always results in less light coming through the window because the actual glass area is smaller than the original sash. This is due to the fact that the replacement window unit will have an additional frame around the window.

Choosing a replacement window

If you are in the market for a replacement window, you are probably already aware that there are many choices in manufacturers, materials, features, prices, guarantees, etc. Sometimes this overwhelming array of products, manufacturers, and installers causes the home owner to make his/her choice based on the only thing they understand – price. This is probably the worst way to choose. We recommend that your primary selection criteria be a combination of the manufacturer of your window and the company that will install your window.

Which manufacturer?

Much of what you hear advertised or presented by window installation companies is why you should go with their particular brand of window. We believe there are many good window manufacturers and many bad window manufacturers. We can obtain and install most of the brand-name windows being sold. We have a good opinion of Anderson, Harvey, and Marvin windows among others.

We should note that there is some controversy about whether the Anderson windows sold at Home Depot are the same as the Anderson windows ordered from a lumber yard and the Pella windows sold by a Pella dealer vs. Pella windows sold by Lowes. We have no evidence one way or another, but we avoid buying these products from those retailers as we do not want to find out the hard way.

We have installed many windows. We have removed many older replacement windows. We have repaired many windows that have broken parts. The windows that seem to have the most problems and are the most difficult to find parts for and repair if they do have problems are those whose manufacturer was not proud enough to put their name on the window. Yes, we have repaired Harvey windows (they even offered a free class, parts kit, and tools so that service could be done more smoothly) and Anderson windows among others. Both manufacturers can provide replacement parts for their windows, so you are less likely to get into a situation where you **MUST** replace the window once it has broken.

Recently, a friend called to ask about getting a couple of windows replaced in his home. A number of years ago, he had replacement windows installed by a contractor that went door-to-door in his neighborhood. Over the years, there have been small problems with the windows and the installation company has been back to repair them a number of times. This year, the owner of the company told my friend, “we don’t really do that anymore.” Since there is no manufacturer name on the windows, it can be very difficult to find parts and he was looking to get them replaced. If he had installed brand-name windows, it wouldn’t matter if the original installer refused to service them anymore. Someone else would have.

Which window model/line?

Every manufacturer has several lines of windows in order to have products at many different price points (just like Mercedes Benz has automobiles at several price points). We recommend that you select the best quality window model from a quality manufacturer.

For example, Anderson Windows has the following lines of windows:

- Silverline
- 100 Series
- 200 Series
- 400 Series
- A Series
- Eagle

Although each of these windows are made by Anderson (or a subsidiary), the quality (and price) is different on a Silverline window compared to a similar Eagle window. It is far more likely that you will be happier with the “top-of-the-line” window than the “budget” model. We recommend that you choose the best window model available that satisfies all your other requirements, including budget. It is better to do fewer, higher quality windows than more windows of a lower quality.

Which installer?

This brings us to our next criteria. My friend was lucky. He got service from the installer for several years for his broken windows. Often you won’t be able to get help from your installer even a few months afterward. If you can contact them, they will try to sell you a new window rather than service the old one. Windows are too expensive and too much trouble to replace to replace them every few years.

I don’t know how my friend’s windows were installed, but we have removed windows that were extremely poorly installed. For example, we have seen:

- Windows installed over rotten sills.
In a few cases, the sills weren’t even rotten before the window was installed. The outside of the sill was wrapped in aluminum that leaked (we suspect it was the window installer because the aluminum went under the window and was caulked in).

- Windows that were caulked in with silicone caulk.
Silicone caulk is great for areas that are not exposed, but there is a good chance that, sooner or later, someone will want to paint an area with exposed caulk and then you are in for a real chore to remove all traces so that you can re-caulk before painting.
- Windows without any insulation in the old sash weight pockets nor in the gap between the replacement window frame and the existing framing.
Replacement windows will have a small gap around the unit. Most installers, particularly those who are interested in how fast they can install a window will not install insulation in this gap. Apparently, they think that the caulk that makes the outside weather tight is sufficient to reduce drafts around the window. If they don't fill that gap, they certainly don't try to insulate any weight pockets that aren't being used any longer.
- Trim pieces missing, broken, etc.
- Screws through the top and bottom of the window.
As with doors, windows should never be fastened through the top or the bottom of the framing. You may not even notice the screws in the top, but the screws through the bottom of the window are sure to leak at some point.

For more information on how we recommend a window should be installed and why, see further ahead.

Window Features

We hope that you now have a better understanding about why we think you should base your selection of a replacement window primarily on the manufacturer of the window and the installation company. If you have a particularly tight budget, we suggest you consider doing your windows in stages rather than skimp on the quality. Now we'll move on to the more fun part of selecting a window the appearance, features, etc.

Appearance

We start with appearance because it can be the easiest to decide upon. Some of your choices:

- Construction Material

If all your existing windows are stained on the inside of your home and you'd like to match them, you'll have to get a wooden window and finish the inside to match. Higher end windows may have a choice of wood species. Less expensive windows may only be available in pine (which can be finished to match fairly closely with the rest of your woodwork).

Just because the inside is wood doesn't mean the outside will be. The outside of wooden windows is often covered with an aluminum covering that has a factory color applied (more on color later).

If you want a very low maintenance product you probably will want to choose a

vinyl window.

If your window is very large, you may not want to choose vinyl as it is not as strong as other materials, although often the window will have an aluminum frame for strength.

- Color

In years past, choosing a vinyl window meant that it had to be white. These days, vinyl windows are available in other colors (a large color selection may mean that it is painted on). Some manufacturers are working on other choices including a simulated wood made from vinyl.

It is likely that a wooden interior will need to have the proper finish applied after the window is installed.

Exterior aluminum cladding is available in a number of factory applied colors.

You'll have to choose the color of the hardware on your window as well. Sash locks, sash lifts, and the like are available in several painted colors as well as several metallic "colors" (like brass, nickel, and bronze).

- Hardware

All windows will have some hardware to close (i.e., cranks on casement windows) or lock the window sash.

Nearly all modern windows are designed to tilt in for easy cleaning. Very inexpensive windows just rely on you yanking the window toward you to accomplish this. Most have some sort of button(s) or lever(s). Marvin windows have a separate lever on the sash lock that accomplishes the same function so the windows look more like an original (i.e., non-tilt) window, but still are able to be tilted in for cleaning.

Depending on the style you are looking for and the size of the window, you may want some hardware to make the window easier to open. Often windows will have a simple channel cut in the lower sash that you use to grab onto to raise the window. You can get additional "lifts" that can look like loops, bars, or hooks to make it easier to operate the sash.

- Sash Design

Older windows sometimes had several small, individual panes of glass on each sash (called lites). If you are looking to install replacement windows that will look similar to your existing windows, you have several options. Nearly all new windows will have double or triple panes of glass. To make a large pane look like

it is divided into lites, many manufacturers will apply grids. Some will apply the grids only to the inside. Some will apply the grids to the inside and the outside. Some will apply the grids to the inside, outside, and between the glass as well to make it look more like a “true divided lite” sash.

Note that you may have regulations in your community, particularly if you live in an historic community that may dictate the design of the windows you will have to install. In fact, these regulations may be strict enough that you may not be able to install replacement windows at all. You may have to find a craftsman who will refurbish your existing sash so as to not alter the look of your home from the street.

Grids can also be installed in patterns other than even rectangles. Diamond patterns as well as “prairie” patterns that evoke a Frank Lloyd Wright style are some of the patterns we have seen in window literature.

Lastly, it is possible to get windows that look as if they are leaded glass with brass or lead-tone grids as well as decorative glass inserts.

- Screens

Your window manufacturer may offer a choice between half screens and full screens. Since most people really only open or close the bottom sash, a half screen may be all you need. Also, if you intend to install a window air conditioning unit in the window, a half screen that can be raised may mean you don’t have to store the screen in the summer. Full screens are useful if you like to open the top sash to allow hotter air to exit the room in a fashion similar to traditional transom windows.

Screens typically are made of fiberglass, although you may also have a choice of aluminum, bronze, or other materials. In addition, you may be given a choice between silver or charcoal. The choice is all up to you and whether you need to match other windows on your home.

There are also new screening materials that are less visible. This can be a real benefit if your view is more uniform, like the ocean rather than the forest.

- Storm Windows

Since your new windows will be either double or triple paned, they will not come with a storm window. Whether you can even install a separate storm window (and operate it properly) will depend on the design of your existing window frame. You will really not gain much in efficiency by trying to reuse (or install new) storm windows. We would recommend that you not even consider storm windows unless there are some other extenuating circumstances.

Performance

One of the reasons for replacing windows may be because you would like a window that is more energy efficient or improves the comfort level in your home. Often, old windows can be drafty or even rattle in their frames noisily.

Your state building code may have a minimum performance guideline that must be met on all newly installed windows. If there is such a regulation, you will undoubtedly need a building permit and will need to supply the specifications for your new windows in order to get the permit.

- Low-E coating

Low-E stands for “Low Emissivity.” The purpose for this coating is to not transfer the heat to the second pane of glass, thereby not transferring the heat out of the house in a cold climate or into the house in a hot one.

- U-factor

The lower the number, the more energy efficient the window is.

Be careful if comparing windows from multiple manufacturers that they measure U-factor the same way. Some report only the data for the glass, others use the National Fenestration Rating Council’s method and include the entire window (including frame and spacer material).

- Solar heat gain coefficient

The lower the SHGC, the less heat is transferred through the window and the greater its shading ability. A window with a low SHGC is better for a hotter climate (where it would affect the air conditioning costs inside a building).

Installation

So far, we have concerned ourselves with the windows themselves. While the construction, appearance, etc. of the windows is important, the installation is equally so. Even the best choice for a window will be disappointing if the installation is done poorly. We don’t intend this document to be a “how-to” manual so that you can do your own replacements. It is intended to teach you enough about the process that you can ask the right questions of your installation company.

Permits

In many areas, you will need to get a building permit to install replacement windows. In our fair state of Massachusetts, the building inspector wants to make certain that the windows conform to the requirements for energy efficiency.

Dust Containment

If your home was built before 1978, there are new lead paint regulations that must be dealt with. Windows are specifically mentioned as needing the proper containment and cleanup. You need to make certain that your installer has the proper certificates and training.

We recommend you make sure that your installation company is certified for lead dust containment even if your home was built after 1977 and ask if they will be using the same dust containment techniques. This will mean less cleaning for you and less chance of breathing in dust kicked up by the construction process.

Remaining Parts

As mentioned earlier in this paper, a replacement window replaces only some of the parts of your window. The sill, stool, jambs, interior and exterior trim, generally all are reused. This means that all of those parts must be in good condition. If you have a rotten sill, you should not install a replacement window over it. There will never be a better time to replace that damaged piece than now. Even if the paint on the sill is in rough shape, now is the time to scrape and put a new coat of paint on it.

Caulk

We all know windows should be caulked in to keep air and water on the outside of your home. If there is anything painted around your window (or might be painted sometime in the future), you should not use silicone caulk. The best quality paintable caulk should be used instead.

Insulation

Many window installation companies don't bother to insulate. They will say that the caulk that makes your window weather tight is sufficient. We believe that the real reason is that insulation takes time and once the trim has been replaced, you'll never see the empty cavities they've left. Unfortunately, you may "feel" them if air somehow gets around the small bead of caulk they've applied. Either way, an uninsulated cavity will certainly transmit the heat you've spent your hard-earned money on to escape more easily.

We like to use spray foam insulation as it can fill in the odd shapes of the cavities. Not only should the cavities around the new replacement windows be insulated, but also any unused weight pockets. You will have these weight pockets if your windows ever had sash weights, pulleys, and cords. Fiberglass insulation is better than nothing, but its effectiveness is reduced if it is compressed (as it has to when shoved into these tight spaces). In addition, fiberglass insulation does not act as a vapor barrier (spray foam does) and moisture from inside your home can condense in the insulation or on the outside envelope of your house and develop mold or further reduce the effectiveness of the insulation.

At least once, we encountered replacement windows that the contractor attempted to insulate using silicone caulk. Yes, he/she squirted at least a tube of the stuff in the cavities, making a softball-sized glob. Not only was it the expensive way to try to solve

the problem, it did a very poor job as he would have had to squirt at least two more tubes to have filled the cavity even partially.

Trim

Once the window is installed (level, plumb – both ways, and square), the interior and exterior trim needs to be dealt with.

The exterior usually needs little more than some caulk and paint.

The interior often just needs to be reinstalled. Sometimes, however, things don't fit very well and some new pieces need to be cut and fit. If the trim and window are painted, there is some leeway and small gaps can be caulked. If the window or trim are stain grade, they must fit more exactly.

We have encountered windows that were never trimmed out properly to start. In these cases, if the client wants it, we take the time to do the interior trim carpentry over completely.

In any case, nail holes must be filled, perhaps caulk applied, and paint or other finish touched up. You will need to make sure this is included by your installer. It doesn't take much time, but many installers will skip this step in order to move on to the next window in your home or the next customer.

Cleanup

As mentioned in the "Dust Containment" section, there are new regulations regarding lead paint. Proper cleanup is necessary as well.

Conclusion

We hope that it is clear that choosing a replacement window based primarily (solely?) on price can be risky. This criterion is what is used if you don't know what else to base your decision on and assumes that all windows and installers are identical.

Since it is nearly impossible to know how windows are constructed, the quality of the window should be based upon the reputation of the manufacturer. Choosing a premium window from a well-respected manufacturer is, perhaps, the best way to select the replacement window for your home.

Perhaps even more important than the manufacturer of the window is the care taken in installation. A less expensive window that has been installed meticulously is likely to satisfy you more than an expensive window that has been installed haphazardly. To help choose your installer, you can ask for referrals and try to determine if others have been happy with their work. In addition, you can read through the installation section of this paper to come up with some specific questions that can be used to evaluate how carefully they will install your replacement windows and service them should you have any trouble in the future.

Glossary

Apron

The trim piece (usually made of the same material as the window casing) installed underneath the window stool on the interior of the window.

Awning

This may be a covering over a window, but we use the term as a window that moves in a hinged manner such that the opening is at the bottom. Typically used in basement application. See, also, Hopper.

Bay window

A series of windows that form a projection (“bay”) outside a building envelope. Typically, this projection is three sided.

Bow window

A curved bay window.

Brick molding

A specific profile of molding on the outside of the window to trim the sides and top of the exterior of the window.

Building permit

Official permission from your local building regulatory agency to undertake a construction project.

Casement

A window style that uses a crank mechanism to move a sash in a hinged manner.

Casing

The decorative trim that surrounds the interior of the window top, sides, and, sometimes, the bottom (see Picture Framed).

Caulk

A sealant that, when cured, creates a water and air-tight seal between two surfaces.

Double-Hung

The window contains two sash that each may slide up and down in the frame.

Double pane

A unit of two pieces of glass with a gas (usually argon or krypton) between them.

Drywall

The material used to make the surface coating of your interior walls. This may be plaster or some other material, but we use the term “drywall” to indicate the interior finished surface of your walls.

Frame

A rectangular “box” that contains the sash and is affixed to the framing of your house to hold the window unit securely in place.

Full screen

A screen that covers the entire outside of a window, allowing you to open either the top or bottom sash and still be protected against insect intrusion.

Grid

The system of horizontal and vertical pieces that divides a sash into lites.

Half screen

A screen that covers only half of the outside of a window. Sometimes the screen can be moved up to cover the upper sash. Other times it is fixed to the lower sash.

Hopper

A window that moves in a hinged manner such that the opening is at the top. Typically used in basement applications. See, also, Awning.

Insulation

A material that fills a gap and prevents heat (or cooling) loss. In many instances this material is a fluffy fiberglass mass. We prefer to use spray foam insulation that is squirted into the gap and expands on its own to fill all the tiny nooks.

Lead dust containment

When lead based paint is disturbed during construction, lead dust can be disbursed and ingested. This is a serious problem, particularly for children and is now regulated by many states (and the federal government for those states that have not taken over regulation).

Level

Parallel to the horizon.

Lite

The term for each individual opening in a window sash. A sash with a “+” grid would be a “four lite” sash.

Low-E coating

A Low-E (i.e., Low Emissivity) coating is used to inhibit heat transfer from one pane of glass to the adjacent pane.

Paint grade

The term used to describe materials that will ultimately be painted. Paint grade materials may be primed by the manufacturer, made up of smaller pieced of material that have been joined together, etc.

Picture widow

A picture window has a fixed sash.

Picture Framed

The term for a window whose interior trim is comprised of casing on all four sides instead of casing on sides and top and a stool and apron on the bottom.

Plumb

Perpendicular to the horizon.

RRP

See “Lead dust containment.”

Sash

A framework that has the glass panes set in it.

Sash cord/chain

A rope or chain that attaches each side of a window sash to a sash weight.

Sash crank

A handle that, when turned, opens a window in a hinged manner.

Sash lift

An aid for opening a sash. A sash lift may be as simple as a routed portion on the upper part of an upper sash or the lower part of a lower sash. It may be a part that resembles a drawer pull.

Sash lock

A mechanism that locks a sash so that it does not move. Usually, they are mounted on the top of the lower sash of a double-hung window. They may have an actual keyed lock.

Sash pulley

The pulley that the sash cord or chain travels over before it reaches the sash weight.

Sash weight

A weight that is concealed in the wall cavity next to the window frame and attaches to the side of a window sash. A sash weight on each side balances the window so that it stays open and doesn't slam shut.

Screen

A fine mesh used to keep out insects when a window is open. It may be made of one of several materials. Depending on the material, it may be one of several colors.

Siding

The material used to make the surface coating of your exterior walls. This may be a siding material (wood, cement, vinyl, etc.), stucco, or many other types of material, but we use the term "siding" to indicate the exterior finish of your walls.

Sill

The ledge at the bottom of the window on the exterior of the window.

Single-Hung

The window contains one sash that slides up and down in the frame. A second sash is fixed in the frame and doesn't move.

Single pane

A single thickness of glass in the sash.

Sliding window

A window that slides from one side of the window frame to the other.

Solar heat gain coefficient

A rating of the efficiency of the window to resist heat transferred through the window from the sun.

Spray foam insulation

See "Insulation."

Spring balance

The mechanism that replaces the sash cord/pulley/weight system on older windows. These mechanisms vary by manufacturer, but all contain a spring of some sort to balance the sash and keep it from slamming shut.

Square

The angles at the corners of the window frame are all 90 degrees.

Stain grade

The term used to describe materials that will ultimately be stained. Stain grade materials will not have a finish on them at installation time and will, generally, have the most even and visually appealing grain patterns, etc.

Stool

The ledge at the bottom of the window on the interior of the window (often mistakenly called the window sill).

Storm window

A single pane window system that is attached to the outside of another window to provide protection from the elements and increased energy efficiency.

Tilt

The ability of a single or double hung window to be opened into the room to more easily clean the exterior glass on the sash.

Trim

A term encompassing casing, stool, apron, and exterior molding.

Triple pane

A unit of three panes of glass with a gas (usually argon or krypton) between them.

True divided lite

A collection of three (or more) grid systems to divide a sash into lites ... one on the exterior of the glass, one on the interior of the glass, and one (or more) between the panes of glass.

U-factor

A measurement of the energy efficiency of a window. Lower is better. Your local building code may require a minimum U-factor on all windows installed in your home.