

REPLACEMENT WINDOWS

A Guide to Choosing the
Right Window



Introduction

It's been said that, "Good judgment comes from experience, and experience comes from bad judgment." We hope to provide you with information that will help you make good judgment calls about window replacement even if you DON'T have any experience with windows.

When it comes to replacement windows for your home, there are a number of things you need to take into consideration before you sign a contract with anyone:

- Reputation
- Glass Options
- Window Frame Options
- Window Types
- Installation Details
- Warranty and Service
- Price

Exceed Your Expectations — Today — And Well Into the Future.



The EnergyQuest™ window system from Glass-Rite windows and doors is our state of the art design that utilizes multiple hollow chambers for increased insulation. The result is a thermally efficient window that offers superior resistance to heat and cold transfer. Glass-Rite's unique design is well suited for New Mexico's daily temperature swings. Our tight multiple weatherstrips lock out dust and dirt to keep your home cleaner, and more comfortable. The EnergyQuest™ windows by Glass-Rite offer a comprehensive solution to exceed your expectations today, and well into the future.

TILT SINGLE HUNG

WARM-EDGE INSULATED GLASS unit improves thermal performance and helps to reduce condensation. Argon gas provides additional thermal improvement.

HIGH PERFORMANCE LOW-E GLASS provides optimal solar heat gain control to improve interior comfort and energy savings.

EXTERIOR BEVELED FRAME DESIGN adds stylish elegance to the exterior appearance, capturing strong design appeal.

TILT LOWER SASH opens inward for easy cleaning access, while the upper sash remains fixed, and is fully perimeter weather-stripped to seal out dust and water when closed and locked tight.

CONSTANT FORCE COIL BALANCE SYSTEM operates sash with ease, holding sash open at any position and is not affected by dust.

NARROW SITE-LINE MEETING RAIL is designed to maximize daylight glass area while providing narrow, contemporary site line reveal.

ADVANCED INTERLOCK SASH DESIGN between operable and fixed sash creates an effective engineered air infiltration barrier, using multiple rows of weather stripping, combined with effective forced entry resistance.

COLOR-MATCHED LOCKING HARDWARE is recess-mounted for a cleaner, less intrusive appearance.

3-1/4" FRAME DEPTH is ideal for replacement applications. Optional nail fin has 1" setback. Flush fin available in flat and contour styles.




EnergyQuest™

Advanced Thermal Performance Vinyl Window System



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Chapter 1 - Reputation

You might think this one should come last, but you can save yourself a lot of time and grief if you make it a top priority. There are lots of ways to find good contractors. Qualified contractors will more than likely have a yellow pages ad, or a website. When someone looks good, you might want to check out what local associations they belong to, such as the Home Builders Association. Next, solicit two or three bids.

Do not deal with contractors who play the “today only price” card, or advertising special. Do not be pressured. Make sure that when you are comparing multiple bids that they all represent the same items and services. Talk with the contractors and make sure you really understand the reason for variations in prices.

How to Check a Company's Reputation

- Ask for references. Excellent companies are more than willing to give you the addresses of completed jobs and the names of customers you can call for a reference.
- Check with the Better Business Bureau and sites such as Angie's List. They can tell you if a company has a history of complaints.
- Make sure that the company carries both liability and workers compensation insurance. You don't want to end up with a lawsuit because the company you're dealing with does not have proper insurance.
- Ask around! Ask friends, family, or other contractors you may know if they have any recommendations.

Chapter 2 - Glass Options

You can spend a lot of money for the very best glass, but if it isn't the right kind of glass for your needs, it may still not do the job. In the following few paragraphs, we'll give you an idea of some of the different kinds of glass. Exactly which kind will be best for you can be determined by a Glass-Rite replacement window consultant.

What Exactly is Insulated Glass?

Insulated glass is made up of two pieces of glass that have been sealed together to keep out dust and moisture. There are a number of different types of spacers that separate these two pieces of glass from each other.

A non-conductive spacer is the best type for efficiency since it eliminates conduction at the edge of the glass.

Argon gas is an option that is used to improve the insulating ability of glass about 10%. When purchasing a window with argon gas, the way the insulated glass is sealed becomes crucial.

At Glass-Rite we use the Edgetech Superspacer system that provides a double seal and also has a non-permeable, Mylar backing that prevents the argon from leaking out.

Insulating Glass Performance

Here are some terms you should know when shopping for high-efficiency thermal windows:

U-Value – A measure of efficiency. The lower the number, the better the efficiency of the window.

Solar Heat Gain Coefficient – Abbreviated as SHGC. A measure of the heat added to your home via natural sunlight. A lower number means you will gain LESS heat.

UV Transmittance - Ultraviolet light (UV) is what fades your carpet, drapes and upholstery. The lower the % transmittance, the less UV light will get into your home.

Performance Specifications for Evaluating Energy Savings

1/8" Glass - 1/2" Air Space

Glazing	U-Value	SHGC	UV Trans.
Clear Single 1/8"	1.11	.85	73%
Clear Insulating	.50	.77	69%
SB60 Low E/Clear	.29	.39	16%
SB70XL Solar Low E/Clear	.29	.27	6%
SB60 with Argon	.25	.39	16%
SB70XL with Argon	.24	.27	6%

Glass Options for Different Needs

Glass options include:

- Argon Gas
- Low E glass SB60
- Solar Control Low E glass SB70XL
- Tempered glass for safety
- And several patterns of obscure glass

Choosing the right type of glass depends on factors such as

- Which direction a particular window faces
- Whether your home has a problem with heat gain or loss
- Various building codes

Some Facts about Types of Glass

High Performance Low E Glass

Low-E stands for “Low Emissivity”. Low-E glass has a thin, almost transparent, metallic coating on the inside of the outside pane of the insulated glass unit. The coating adds extra insulating power to the glass.

Low-E glass will not only keep your home warmer in the winter but cooler in the summer as well.

In addition, the Low-E coating reduces the amount of Ultra Violet light that comes through your windows. This is an added benefit to you because ultraviolet light is a major contributor to the fading of your drapes and carpet.

All Low E is not the same!

There are a variety of different manufacturers of Low-E glass. In addition there are many different types of Low-E coatings. When you are evaluating a window make sure you look at performance statistics for the specific type of Low-E that will be used in your windows.

U-Value - The U-Value for Low E glass can vary as much as 17% depending on the Type of Low E used.

UV Transmission - The amount of ultraviolet light that is transmitted can vary as much as 50%. Good Low E glass will have a UV transmission rate of about 30%. That means that 70% of the UV is blocked out.

Solar Heat Gain Coefficient – The Solar Heat Gain Coefficient measures how well a product blocks heat caused by sunlight. This coefficient can vary as much as 35% from one type of Low E to another. Good Low E will have Solar Heat Gain Coefficient below .30.

Insulated Glass Data

with ½" air space filled with argon

Low E

	PPG SB60	PPG SB70XL
U Value	0.25	0.24
UV Transmittance	16%	6%
SHGC*	0.39	0.27

* solar heat gain coefficient

Guide to Understanding the Figures

The lower the “U” value — the lower your heating costs.

The lower the UV transmittance — the less fading of your drapes and carpet.

The lower the SHGC — the lower your cooling costs.

Obscure Glass

Obscure glass is glass that is frosted or has a pattern that makes it difficult to see through. The standard obscure glass has a rough surface on the outside pane of the insulated glass unit. The inside pane is then either clear or Low-E glass. Consult with the window manufacturer on availability and prices for some of the more decorative obscure glass such as rain pattern, reed, and fern leaf (also called glue chip).

Tempered Glass

Tempered glass is glass that has been heated and then quickly cooled. This procedure not only strengthens the glass but it also creates surface tension so that the glass cannot shatter into large jagged pieces.

Instead, it will break into small pieces that are less dangerous. This type of glass is also called “safety glass.”

In general, building codes call for safety glass to be used in large pieces of glass that are less than 18 inches from the floor, any glass within a 24 inch arc of a door, or any glass within 60 inches of the drain of a shower or tub.

Codes vary in different areas so you’ll want to make sure the window company is familiar with the codes for your home.

NFRC Label

 National Fenestration Rating Council® CERTIFIED	Glass – Rite 187021 – 6 ENERGY QUEST HORIZONTAL SLIDER FRAME WITH FLUSH FIN • FRAME WITH NO FIN • SOLARBAN 70 • ARGON Horizontal Slider Window GLR – K – 13 – 01006 – 00001	
	ENERGY PERFORMANCE RATINGS	
U – Factor (U.S./I – P) 0.27	Solar Heat Gain Coefficient 0.21	
ADDITIONAL PERFORMANCE RATINGS		
Visible Transmittance 0.50	Air Leakage 0.0	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>		



ENERGY STAR™ Qualified
In All 50 States

The National Fenestration Rating Council (NFRC) energy performance label can help you determine how well a product will perform the functions of helping to cool your building in the summer, warm your building in the winter, keep out the wind, and resist condensation. By using the information contained on the label, builders and consumers can reliably compare one product with another, and make informed decisions about the windows, doors, and skylights they buy. Energy codes in most states, including New Mexico, require NFRC certification of windows!

The most important piece of advice to consumers is to compare windows by comparing the NFRC labels!!!

Window sales people love to muddy the waters by using “R” values instead of “U” values and comparing values for insulated glass units only (which are better) to values for the windows themselves. If you simply compare the NFRC labels for the different windows, you automatically eliminate the confusion. Just be certain that the label is from the company you are buying windows from, and has the options listed that you want. If a window is not NFRC certified you have no idea what the real values are!

The NFRC adopted a new energy performance label in 2014. It lists the manufacturer, describes the product, provides a source for additional information, and includes ratings for one or more energy performance characteristics.

U-Factor

U-factor measures how well a product prevents heat from escaping. The rate of heat loss is indicated in terms of the U-

factor (U-value) of a window assembly. U-factor ratings generally fall between 1.20 and .20. The insulating value is indicated by the R-value which is the inverse of the U-value. The lower the U-value, the greater a window's resistance to heat flow and the better its insulating value.

Solar Heat Gain Coefficient

Solar Heat Gain Coefficient (SHGC) measures how well a product blocks heat caused by sunlight. The SHGC is the fraction of incident solar radiation admitted through a window and subsequently released inward. SHGC is expressed as a number between 0 and 1. The lower a window's solar heat gain coefficient, the less solar heat it transmits.

Visible Transmittance

Visible Transmittance (VT) measures how much light comes through a product. The visible transmittance is an optical property that indicates the amount of visible light transmitted. VT is expressed as a number between 0 and 1. The higher the VT, the more light is transmitted.

Air Leakage

Air Leakage (AL) measures how much air will enter a room through the product. AL rates typically fall in a range between 0.06 and 0.3. The lower the AL, the better a product is at keeping air as well as dust out. AL is an optional rating, so many manufacturers choose not to display it on label. The label itself only displays one decimal point so a window that has a 0.06 rating will display as 0.0. Glass-Rites Energy Quest windows have a 0.06 to >0.01 AL rating depending on the operation of the window

Chapter 3 - Window Frames

One of the important decisions you'll be making is determining the best kind of window frame for your home. Each type has its advantages and disadvantages.

The common types of frames used for replacement windows are vinyl, thermally broken aluminum, fiberglass, and wood.

Because choosing the right kind of frame is an important issue, you'll want to make sure the window company you deal with carries more than one type of frame.

In this way, you can be certain you will be advised on the type of frame that is best for you, not pressured to buy the only type sold by that company.

Now, let's take a look at each kind of frame.

Vinyl Frames

Some of the early incarnations of vinyl windows did not perform very well. As a result, vinyl windows have a negative connotation in some people's minds.

However, all of that has changed. In fact, vinyl frames are actually more efficient than thermally broken aluminum, and in many cases, even more efficient than wood or fiberglass.

Here are some other pluses:

- Vinyl never needs painting and is guaranteed not to peel, chip, or warp.

- Because vinyl is the same color throughout, scratches are virtually unnoticeable.
- Good quality vinyl windows are welded together not held together with screws.
- Because screws tend to pull out of vinyl, good quality vinyl windows will have metal reinforcements in the parts of the windows where hardware (such as a lock) is screwed in.
- Vinyl windows are generally available in two colors: white or beige.

Other Important things to look for in vinyl windows are:

- 1) The window should be certified by the National Fenestration Rating Council.
- 2) Air space between the panes of glass should be at least $\frac{1}{2}$ inch.
- 3) Sashes should be interlocking.
- 4) High quality extrusions using vinyl that exceeds ANSI / AAMA specification 101-93.
- 5) Vital parts, such as the handle pulls, should be a molded part of the frame and not an add-on, “snap in part”.
- 6) Metal reinforcement in parts where hardware is screwed into.

Thermal Break Aluminum Frames

Good quality aluminum windows have a thermal barrier that prevents the frame from conducting heat or cold. However, even with the thermal barrier, these windows are not as efficient as a vinyl or wood window. Glass-Rite's thermal break aluminum windows are available in dark bronze. Other important things to look for in a Thermal Break aluminum window are:

- 1) The window should be certified by the National Fenestration Rating Council.
- 2) Air space between the panes of glass should be at least $\frac{1}{2}$ inch.
- 3) Interlocking sashes.
- 4) Good quality roller systems on sliding windows.
- 5) Double locks on all windows over 30 inches.
- 6) Variety of glass options.

Wood Frames

Good quality wood windows will use treated wood that is resistant to water saturation, insects, and deterioration. Interior finishes on wood windows can be time consuming and expensive to apply. Be sure to find out if the interior finish is included in the price you are quoted. For our New Mexico climate we do recommend you get a clad unit instead of full wood inside and out.

If you choose to use wood windows for your home, you'll want to look for the following features:

- 1) The window should be certified by the National Fenestration Rating Council.
- 2) Airspace between the panes of glass of at least ½ inch.
- 3) Metal or vinyl clad exterior to reduce maintenance and eliminate painting.
- 4) High quality hardware and locks.
- 5) Uses good quality wood that won't warp or twist.

Chapter 4 – Window Types

There are as many different configurations of windows as you can imagine. Here we'll go over the most common

1) Fixed; non-operable picture window



window

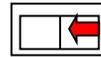
2) Single-Hung; a window where the bottom sash slides up.



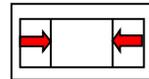
3) Double-Hung; a window where the bottom sash slides up and the top sash slides down.



4) Horizontal slider; a window that slides open to the side.



5) Picture slider; a window that has three sections: a fixed center panel, and two end vents that slide open to the middle.



6) Casement; a window that cranks open and is hinged on the side.



7) Awning; a window that cranks open and is hinged on top.



The type of operation for your windows depends on a variety of factors including the type of look you want for your home, fire codes, and cost or design constraints. You will want to discuss your options with a knowledgeable consultant that can advise you on what will work best for your circumstance.

If the space for the window is wide and short, then a sliding window will usually work the best. Because of the slider's construction (having a center support) they are usually the best choice for wide openings. This is also where you can use a style called a picture slider or an XOX. These windows work especially well in openings that are 5 feet wide or more.

If you like the operation of an up-and-down window, or hung window, you can still use them but it is wisest to use a double or twin unit, or even a triple unit. If you make a hung window too wide, they will not operate properly and may eventually start to sag in the middle due to the weight of the glass.

For this reason, most companies have maximum sizes they won't exceed when building a hung window. Keep in mind that when you start putting separate windows into the same space, like a twin or triple unit, you are paying for separately framed windows. A slider or a picture slider will be less expensive than a twin or triple unit.

Egress codes are important for windows in bedrooms (see appendix). In case of fire, a bedroom that does not have a door to the outside must have a window large enough for a fully equipped fireman to enter through. Make sure the style of window you choose for your bedroom will meet the egress codes. Sometimes choosing a style like an XOX for a bedroom is not a good idea as it restricts the net clear opening of the window.

Talk with a knowledgeable consultant on whether or not a room requires an egress window. You can also go to the National Fire Protection Association (NFPA) website for complete lists of codes and standards at www.nfpa.org



National Fire Protection Association

The authority on fire, electrical, and building safety

Chapter 5 - Installation

Quality installation is as important as a quality window!

Proper installation of replacement windows is a job that even seasoned contractors often fail to perform adequately.

There are as many different types of installation as there are types of homes. As a consumer, the important thing is to make sure the company you choose to install your windows gives you detailed information on how your windows will be installed.

When the company that installs the windows also manufactures them (as in Glass-Rite's case) you never get caught in the middle. You know, the old "It's not our fault, it's theirs" routine.

Here are some questions that will help you evaluate the installation company:

- Will subcontractors be used on the job? It is usually better if the windows are installed by employees and not subcontractors. Since employees are paid by the hour and not by the job, they will generally take the time to do the job right.
- Will your stucco be damaged in the process? If so, is patching repair included in the price?
- What type, if any, trim will be used? How will it be attached? How will it look?
- Will solid shims be used under the sills of vinyl windows? If not the windows may not operate properly a year from now.

- Will installers use tarps and clean up broken glass?
- Will the old windows be hauled off?
- What type of caulking and insulation will be used around the windows?
- Does the company specialize in windows? Can the salesperson explain the installation process to you?

The way your window is installed is critical to how well it performs. Poor installations may lead to water leaks in stucco if not properly handled. You don't want to go through our monsoon season with leaking windows! At Glass-Rite we do not subcontract out our installations—all installations are done by our own crews. Glass-Rite has been performing window replacement in the Albuquerque and Santa Fe area since 1984. We know how to replace those old steel casement and aluminum windows on stucco homes and have developed methods of removing window frames that leave little or no damage to the stucco in most cases.

Instead of trying to make standard sized windows fit, Glass-Rite will custom size each window so you can be assured that your new windows will fit properly. In addition, because we are a local Albuquerque manufacturer, if something is not just right, we can correct it right away.

Chapter 6 -Warranty/Service

Warranties are always difficult to interpret. But in general, the simpler and more straightforward the warranty, the better.

Usually warranties are only as good as the company that issues them. So, make sure that you are dealing with a reputable company (see chapter 1).

In addition, it's better if the same company that manufactures the windows also installs them. That way you won't get caught in the role of deciding if a problem with the windows is a result of a manufacturing defect or an installation problem.

Don't ask a salesperson a specific question about the warranty; ask to see a written copy of the warranty. This way, you are evaluating the warranty itself and not a salesperson's "interpretation" of it.

When evaluating warranties, keep in mind that many warranties make great claims about lifetime guarantees but neglect to mention that you have to pay inflated prices for labor or shipping.

In addition, free repairs don't help if you have to wait two months for a simple service call. Check references regarding how the company handles service work for other customers. Remember, the most critical problems are with window installation (such as leaks), and not with the windows themselves. These are often not included in the warranty. A good company will cover all installation-related problems (including labor and materials) for at least 3 years.

Chapter 7 - Price

You want the best price, right? We all want that. But smart buyers know you can get a low-ball price and **still get less than you paid for**. By the same token, you can get a price that seems high and end up **getting more than you paid for**.

Here's the problem. Unless you really know a lot about a product or service, it's hard to determine exactly when you are getting a fair price.

A price that's too cheap means corners are going to be cut and you will pay the price later. A price that's too high means you're being taken for a ride. What you really want is a quality product *and* a fair price!

Here are some things to look for:

- Does the company have "repeat" business? In other words, do customers buy from them time after time?
- Has the company been in business for at least ten years?
- Do their consultants help you make a good decision or do you feel you're being high-pressured into buying?

- Is the price clearly spelled out in writing?

Finally, if all the things we've talked about in this booklet are being delivered, chances are, the company you're dealing with will be giving you a fair price.

Conclusion

The reason we wrote this booklet is because we felt there was a great need for customers to have a better understanding of how to buy replacement windows.

After all, if you're doing a house full of windows it's going to cost you some money. We believe that you have a right to expect honesty, integrity, quality, and service from whatever company you've been good enough to spend your money with.

We do ask that, when you're looking for replacement windows, you consider calling Glass-Rite and have one of our consultants come to your home and go over the project with you. You will find that we will NOT pressure you into buying windows or bore you with a three hour presentation. We simply explain our products, make our recommendations, answer your questions, and leave you with a solid quote on the cost of your project.

Appendix

(for those who want the really technical stuff!)

There are two different types of window testing: **Structural** testing and **Thermal** testing. **Structural** testing is where air and water infiltration, forced entry, wind loads and Operating force are evaluated. **Thermal** testing is where the window is evaluated for “U” values and Solar Heat Gain Coefficients.

Both types of testing are done by independent laboratories that specialize in window testing. Test results will include a description of the test window.

Structural test standards should be AAMA / NWWDA 202/I.S.2-97 Voluntary Specification for Aluminum, Vinyl and Wood Windows and Doors. AAMA is an abbreviation for “American Architectural Manufacturers Association”. NWWDA is an abbreviation for “National Wood Window and Door Association”. Test results should identify the laboratory where the tests were conducted.

Thermal test standards should use NFRC (National Fenestration Rating Council) Test procedure for Measuring the Steady State Thermal transmittance of Fenestration Systems (April 1997) edition.

Structural Testing:

Performance classes for structural testing are Residential (R), Light Commercial (LC), Commercial (C), Heavy Commercial (HC), and Architectural (AW). Performance is designated by a number which follows the type and class designation. For example a Double-Hung residential window may be designated H-R15. The “H” stands for “hung window”, the “R” for Residential, and the 15 is the design pressure (DP), in this case 15 psf. The structural test pressure for all windows and doors is 50% higher than the design pressure which, for the example H-R-15 window would be 22.5 psf.

<u>Class</u>	<u>Design Pressure</u>	<u>Test Size Single-Hung</u>
Residential	15	44" X 60"
Light Commercial	25	44" X 77"
Commercial	30	54" X 90"
Heavy Commercial	40	60" X 96"
Architectural	40	60" X 96"

Glass-Rite Energy Quest Vinyl Window

Single-Hung:	LC-PG35
Slider :	LC-PG35
Fixed :	LC-PG50

Glass-Rite Aluminum Window

Single-Hung:	H-C-40
Slider :	HS-C-45
Fixed :	F-C-60

In addition to increasing the design pressure on windows as the performance class moves from Residential to Architectural, the AAMA standard also requires a larger window be tested. A larger window is inherently more susceptible to failure in the test chamber. In fact, in the higher class, the test sizes exceed the maximum sizes that most manufacturers would make. Moving to a higher design class means both higher test pressure and a larger test window so it means you can expect big differences in overall performance between windows from the varying design classes.

Structural testing of windows follows a set sequence. First windows must pass a maximum operating force test. After that will be an air infiltration test, a water resistance test and then a uniform structural load, forced entry, and deglazing test. In general, the water resistance test is often the determining factor of the windows test limits.

Thermal Testing:

Thermal testing results are shown on the NFRC label on the window or are available by manufacturer, or the NFRC website www.nfrc.org Look in the certified products directory. It is important to use NFRC values as opposed to values for glass only when making comparisons. NFRC values take into account the entire window including frame, while values for glass usually use the “center of glass” as a value and are generally much different. (See comparison below)

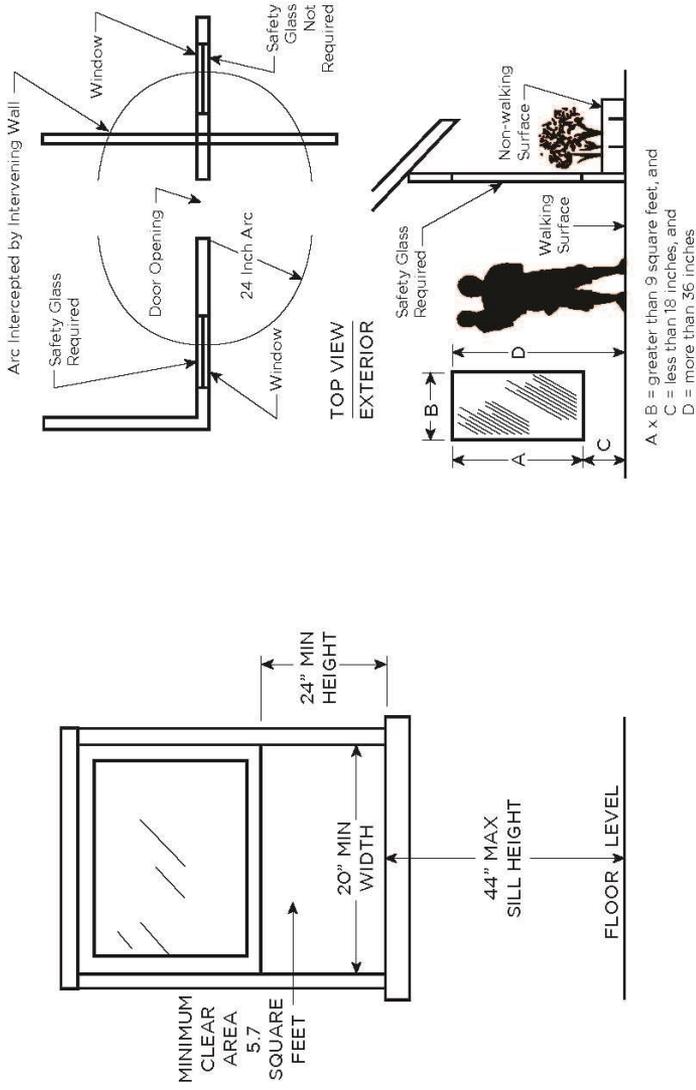
Three Options, All with PPG SolarBan 70 Low-E Glass

	Glass Only	Glass-Rite Aluminum	Glass-Rite Vinyl
U-Value	.24	.44	.27
SHGC	.27	.38	.21
Visible Transmittance	.64	.55	.49

The NFRC tests for three items: U-Value, Solar Heat Gain Coefficient, and Visible Transmittance. To be added by 2015 as a required value will be an Air Infiltration test that will measure the windows air leakage. The lower the U-Value, the better the efficiency a window will have against heat loss & gain. U factor ratings for windows generally fall between .25 and .75. The Solar Heat Gain Coefficient (SHGC) measures how well a window blocks heat from the sun. SHGC is expressed as a number between 1 and 0. The lower the SHGC, the better a window is at blocking unwanted heat gain. Visible Transmittance measures how much light comes through a window. It is expressed as a number between 0 and 1. The higher the visible transmittance, the higher amount of daylight is allowed inside.

The U-Value is the standard way to quantify overall heat flow. For windows it expresses the total heat transfer coefficient of the system (in Btu/hr-sf-°F), and includes conductive, convective, and radiative heat transfer. It represents the heat flow per hour (in Btus per hour or watts) through each square foot of window for a 1 degree Fahrenheit temperature difference between the indoor and outdoor air temperature.

Egress and Tempered Glass Code



Local codes may vary. Please be sure and check!



REPLACEMENT WINDOWS & DOORS

You can reach **GLASS•RITE** at:
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Or, visit our website at
www.glass-rite.com