

# Chapter 3. Windows

## Context & Character

Windows are character-defining features of most historic structures. They give scale to buildings and are an essential element in the architectural composition of individual facades. Distinct window designs and the pattern of windows (the fenestration) help to define many historic building styles.

Historic windows differ from contemporary ones in fundamental ways. One is their relationship to the wall plane of the building. Historic windows are often inset into relatively deep openings or reveals. Second, they have surrounding casings and sash components with substantial and complex profiles which cast shadows. These shadows then create even more complex patterns on the facade. The window proportion, profiles and details often help to define the age and style of the building.

Because windows so significantly affect the character of a historic structure, the treatment of a historic window and also the design of a new one, are consequently very important considerations.

## Design Objective

The character-defining features of historic windows and their distinct arrangement should be preserved. In addition, new windows should be in character with the historic building. This is especially important on primary facades.

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*Windows help to define the design composition, style and historic integrity of a building.*



*Ornamental trim around historic windows should be retained.*



### Window Features

The size, shape, proportions and profiles of a historic window are among its essential features. Many early residential windows in Salt Lake City were vertically-proportioned, for example. Another important feature is the number of “lights,” or panes dividing a window. Typical windows for many late nineteenth century cottages were “one-over-one” sash types, in which one large pane of glass was hung above another single pane. Other important features are the design of surrounding window casings, the depth and profile of window sash elements, and the materials of which they were constructed.

The majority of early residential windows use wood as a framing material. From the late 19th century steel became a window frame option, initially for commercial, industrial and civic buildings, and increasingly for residential structures. In both cases, wood or metal, the components of the frame have distinct roles, patterns, dimensions and profiles, arising from a combination of style and function.

The manner in which windows are combined or arranged on a building facade (the fenestration) also may be distinctly associated with a building style. For example, on some bungalows a large central pane of fixed glass was flanked by a pair of vertically-proportioned casement windows. This compound window frequently occurred on building fronts under broad porches. (See the discussion of individual building styles in the Historic Context and Architectural Styles, PART I Section 4, for additional information about specific window types.) All of these features are elements of historic window designs that should be preserved.

### Window Types

Windows types typically found in historic structures in Salt Lake City (see sketches) include:

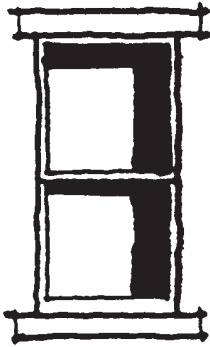
- Casement - Hinged windows that swing open, typically to the outside
- Double hung sash - Two sash elements, one above the other. Both upper and lower sash slide within tracks on the window jambs.
- Fixed - The sash does not move.
- Single hung sash - Two sash elements, one above the other. Only the lower sash moves.
- Ornamental or specialty windows - Unusual shapes, such as a circular window; or distinct glazing patterns, such as a diamond-shaped, multi-pane window subdivided with wood muntins or lead comes, which may be associated with a particular building style. These may be fixed or operable.

Windows are also defined and characterized by their materials. Wood frames are the common residential type, often combined with decorative leadwork. Steel frames become more popular for residential buildings with changes in manufacturing and style, usually in casement form and often for apartment buildings. Each material has a very distinctive character. Each is also strong and durable.

### Deterioration of Historic Windows

Properly maintained, original wood windows will provide excellent service indefinitely. Most problems that occur result from a lack of maintenance. The accumulation of layers of paint on a wood sash for example may make operation difficult. Using proper painting techniques, such as removing upper paint layers and preparing a proper substrate, can solve this problem. Repairs to restore the functionality and efficiency of a double-hung sash, for example, are usually relatively simple.

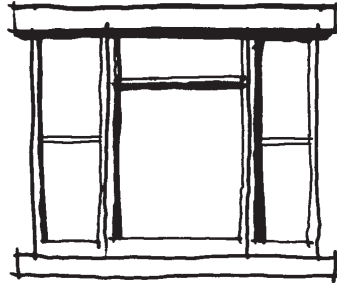
## Historic Buildings - Typical Window Types and Styles



### Double-hung Window

Characteristic of:

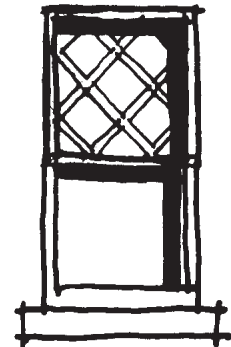
*All styles except Art Moderne or International Style.*



### Composite Window

Characteristic of:

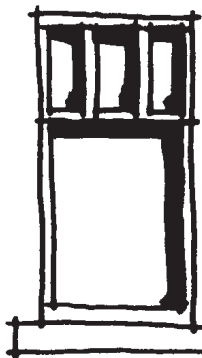
- *Classical Revival(simpler than above)*
- *Bungalow*
- *All Victorian styles*
- *Dutch Colonial Revival*
- *Four Square*



### Diamond Pattern Window

Characteristic of:

- *Tudor Revival*
- *Dutch Colonial Revival*



### Craftsman Window

Characteristic of:

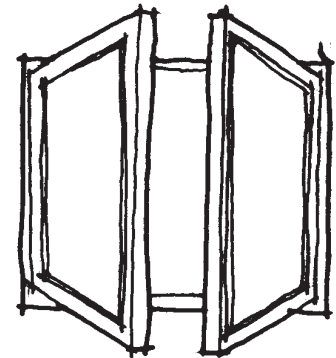
- *Bungalow*
- *Prairie Style*
- *Foursquare*



### Geometric Window

Characteristic of:

- *Queen Anne*
- *Italianate*
- *Second Empire*
- *Art Moderne*



### Casement Window

Characteristic of:

- *Tudor Revival*
- *Prairie Style*
- *International Style (with steel muntins)*
- *Arts & Crafts*
- *Ranch*



*Ornamental windows, such as these intricate stained glass designs, are character-defining features which contribute significantly to the historic and architectural integrity of the building.*

Safety concerns relating to handling lead-based paint should be borne in mind when working with paintwork dating from before 1978. There are a series of recommendations and/or requirements for lead-safe working which should be reviewed prior to any work. Lead-based paint should not be considered a reason to remove and replace historic, character-defining materials or features, including windows, doors details and trim. There are remedial techniques which can be used to either safely remove or encapsulate any lead-based paint. See the accompanying links for further information.

<http://blog.preservationnation.org/2010/07/20/new-rule-shines-spotlight-on-lead-paint/#.UbYa8p3nYXw>  
<http://www.nps.gov/tps/how-to-preserve/briefs/37-lead-paint-hazards.htm>

Often the appearance of peeling paint creates a visual impression of deterioration, when in most cases the wood frame may be structurally sound and stable, and may warrant only remedial maintenance or perhaps minor repair.

Water damage and the degradation caused by sunlight are concerns. If surfaces fail to drain properly, water may collect and eventually seep through. Condensation during winter months can also cause problems over time. Deterioration will gradually occur when the paint surface or the putty is cracked, peeling or loose. Decay may make operation of the window difficult and, if left untreated, can result in significant deterioration of window components. In most cases, historic windows are not susceptible to damage if a good coat of paint is maintained and the putty is sound.

Steel frames are vulnerable to the same processes, although they react differently. Moisture penetration to the frame will cause rust which will gradually expand and distort the surface of the frame section. The rusting of steel frames tends to be slow and in most cases the corrosion will be relatively superficial, with the original frame still structurally sound.

### Repair of Historic Windows

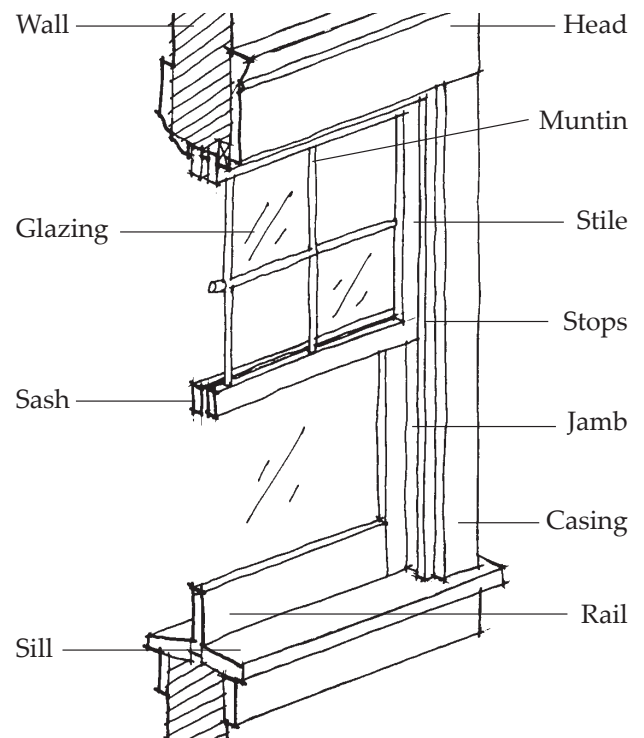
Whenever possible, repair a historic window, rather than replace it. In most cases it is in fact easier, and more economical, to repair an existing window rather than to replace it. In addition the original materials contribute to the historic character of the building. The materials and craftsmanship tend to be of very high quality, and even when replaced with an exact duplicate window, which is difficult to achieve, a portion of the historic building fabric is lost and therefore such treatment should be avoided. When considering whether to repair or replace a historic window, evaluate the following:



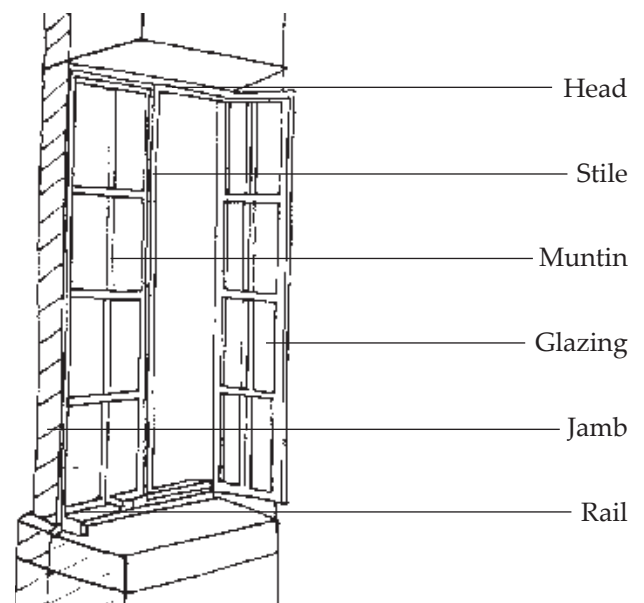
**First**, determine the window's architectural significance. Is it a key character-defining element of the building? Typically, windows on the front of the building, and on sides designed to be visible from the street, are key character-defining elements. A window in an obscure location, or on the rear of a structure, may not be. Greater flexibility in the treatment or replacement of such secondary windows may be appropriate.

**Second**, inspect the window to determine its condition. Distinguish superficial signs of deterioration from the actual failure of window components. Peeling paint and dried wood, for example, may be more superficial than serious problems, and often do not indicate that a window is beyond repair. What constitutes a deteriorated window? A rotted sill may require its replacement, but it does not indicate the need for an entire new window. Determining window condition should occur on a case-by-case basis. However, as a general rule, a window merits preservation, with perhaps selective replacement of components. If more than 50 percent of the window components can not be repaired, then consider replacement.

**Third**, determine the appropriate treatment for the window. Where the window is inoperable, remove excess paint and free or replace any mechanism components that don't work. Surfaces may require cleaning and patching. Some components may have deteriorated beyond repair. Patching and splicing in new material for only those portions that are decayed should be considered in such a case, rather than replacing the entire window. If the entire window must be replaced, the new one should match the original in appearance. (See "Replacement Windows" in following section.)



*Double-hung sash window components*



*Casement window components*



Historic window frames are well constructed and made from tough and durable wood. With minimum maintenance they will last as long as the building. Maintaining the glazing compound and sound paintwork, with minimal maintenance of opening mechanism and sliding surfaces, is usually all that is required. When weather-stripped, and with the addition of a storm window, they will match the energy efficiency of replacements and out-perform them in acoustic insulation. They are also maintainable, rather than having to be completely replaced when a component fails.

[www.nps.gov/tps/sustainability/research.htm](http://www.nps.gov/tps/sustainability/research.htm)

### **3.1 The functional and decorative features of a historic window should be preserved.**

- Features important to the character of a window include its frame, sash, muntins, mullions, glazing, sills, heads, jambs, moldings, operation, and the groupings of windows.
- Frames and sashes should be repaired rather than replaced whenever conditions permit.

### **3.2 The position, number, and arrangement of historic windows in a building wall should be preserved.**

- Enclosing a historic window opening in a key character-defining facade would be inappropriate, as would adding a new window opening.
- This is especially important on primary facades, where the historic ratio of solid-to-void is a character-defining feature. Greater flexibility in installing new windows may be appropriate on rear walls or areas not visible from the public way.

## **Energy Conservation**

In some cases, owners may be concerned that an older window is less efficient in terms of energy conservation. In winter, for example, heat loss associated with an older window may make a room uncomfortable and increase heating costs. In fact, most heat loss is associated with air leakage through gaps around the frame sections of an older window, and is often the result of insufficient maintenance over time. Loss of energy through the single pane of glass found in historic windows is a very small proportion of the total. Glazing compound may be cracked or missing, allowing air to move around the glass. Sash members also may have shifted, leaving a gap for heat loss.

The most cost-effective energy conservation measures for most historic windows are to replace glazing compound, repair the wood members if necessary (usually the frame will be structurally sound) and install weather stripping. These steps will dramatically reduce heat loss, while preserving the character-defining historic features of the window. They will also improve acoustic efficiency.

Steel frames can be upgraded through attention to and removal of paint or rust accumulation, followed by weatherization. Paint and rust become common issues that result from deferred maintenance and that can inhibit the effective opening and operation of the window. Remedial work will restore the profiles of the opening and fixed sections of the frame and the precise fit of the original frame. The window can then be weatherstripped to enhance energy and acoustic efficiency.

Where additional energy or acoustic efficiency might be a concern, consider installing a storm window. It may be applied to the interior or the exterior of the window. A storm window should be designed to match the historic window divisions such that the exterior appearance of the original window is not obscured.

Research in recent years confirms that a weatherized historic window with an additional storm window (internal or external) will match or exceed the energy efficiency of a replacement window, at a small proportion of the cost. Acoustically, the original with a storm window will tend to be more efficient than a replacement window, as a result of the wider air gap between the two planes of glass. Refer to the Additional Information section at the end of this chapter, or the Appendix, for more information.



*When a window is to be replaced, the new one should match the appearance of the original to the greatest extent possible.*



*External wood-framed storm windows designed to fit the primary framework of the original.*

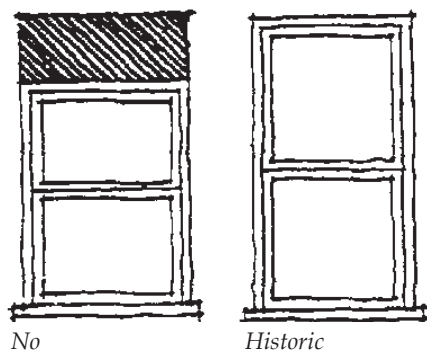
### Maintenance tips for Windows

- Maintain a good coat of paint on all exposed surfaces.
- Replace old glazing compound.
- Install new weather-stripping to reduce air leaks.

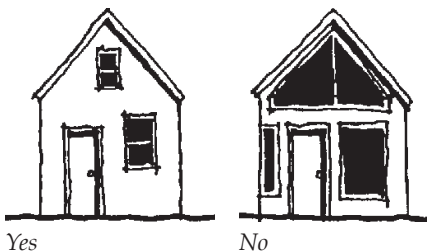




*The curved sash glass and frame in these windows are distinctive features that should be preserved.*



*A replacement window should match the original in its design. The new window (on the left) is smaller than the historic opening and would be inappropriate.*



*Preserve the historic ratio of window openings to solid wall on a primary facade.*

**3.3 To enhance energy efficiency, a storm window should be used to supplement rather than replace a historic window.**

- Install a storm window on the interior where feasible. This will allow the character of the original window to be seen from the public way.
- If a storm window is to be installed on the exterior, match the sash design of the original windows.
- A metal storm window may be appropriate.
- The storm window should fit tightly within the window opening without the need for sub frames around the perimeter.
- Match the color of the storm window sash with the color of the window frame; avoid a milled (a silver metallic) aluminum finish if possible.
- Finally, set the sash of the storm window back from the plane of the wall surface as far as possible.

### Replacement Windows

While replacing an entire window assembly is discouraged, it may be necessary in some cases.

When a window is to be replaced, the new one should match the appearance of the original to the greatest extent possible. To do so, the size and proportion of window elements, including glass and sash components, should match the original. In most cases, the original profile, or outline of the sash components, should be the same as the original. At a minimum, the replacement components should match the original in dimension and profile and the original depth of the window opening (reveal) should be maintained.



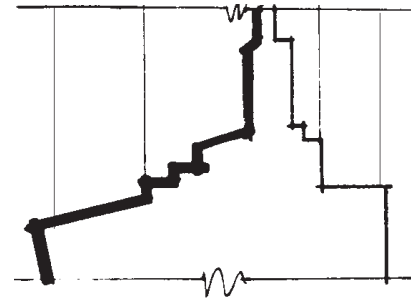
A frequent concern is the material of the replacement window. While wood was most often used historically, metal and vinyl clad windows are common on the market today and sometimes are suggested as replacement options by window suppliers. In general, using the same material as the original is preferred. If the historic window was wood, then using a wood replacement is the best approach.

However, it is possible to consider alternative materials in some special cases, if the resulting appearance will match that of the original, in terms of the finish of the material, its proportions and the profiles of the sash members. For example, if a metal window is to be used as a substitute for a wood one, the sash components should be similar in size and design to those of the original. The substitute material also should have a demonstrated durability in similar applications in this climate.

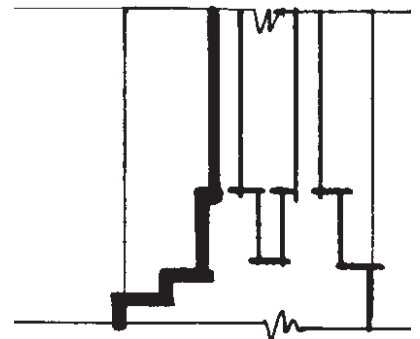
Finally, when replacing a historic window, it is important to preserve the original frame casing whenever feasible. This trim element often conveys distinctive stylistic features associated with the historic building style and may be costly to reproduce. Many good window manufacturers today provide replacement windows that will fit exactly within historic window casings.

### 3.4 The historic ratio of window openings to solid wall on a primary facade should be preserved.

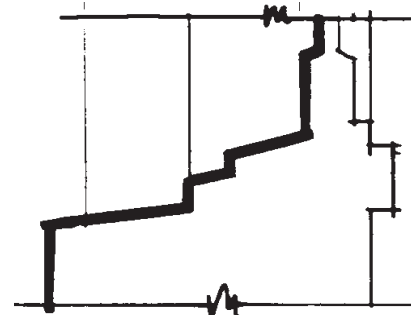
- Significantly increasing the amount of glass on a character-defining facade will negatively affect the integrity of the structure.



*When replacing a historic window, match the profile of the sash and its components, as closely as possible to that of the original window.*



*Unacceptable replacement profile*



*Appropriate replacement profile*



*Framing sections, profiles and materials define the type of window and add considerable detail to the facade.*

### **3.5 The size and proportion of a historic window opening should be retained.**

- An original opening should not be reduced to accommodate a smaller window, nor increased to receive a larger window, since either is likely to disrupt the design composition.

### **3.6 A replacement window should match the original in its design.**

- If the original is double-hung, then the replacement window should also be double-hung, or at a minimum appear to be so.
- Match the replacement also in the number and position of glass panes.
- Matching the original design is particularly important on key character-defining facades.

### **3.7 Match the profile of the sash and its components, as closely as possible to that of the original window.**

- A historic wood window has a complex profile within its casing. The sash steps back to the plane of the glazing (glass) in several increments (see illustrations of frame sections on page 3:9).
- These increments, which individually are measured in fractions of an inch, are important details.
- They distinguish the actual window from the surrounding plane of the wall.
- The profiles of wood windows allow a double-hung window, for example, to bring a rich texture to the simplest structure.
- These profiles provide accentuated shadow details and depth to the facades of the building.

- In general, it is best to replace wood windows with wood on contributing structures, especially on the primary facades.
- Non-wood materials, such as vinyl or aluminum, will be reviewed on a case-by-case basis. The following will be considered:
  - Will the original casing be preserved?
  - Will the glazing be substantially diminished?
  - What finish is proposed?
  - Most importantly, what is the profile of the proposed replacement window?

### 3.8 In a replacement window, use materials that appear similar to the original.

- Using the same material as the original is preferred, especially on key character-defining facades.
- A substitute material may be appropriate in secondary locations if the appearance of the window components will match those of the original in dimension, profile and finish.
- Installing a non-wood replacement window usually removes the ability to coordinate the windows with an overall color scheme for the house.

## Historic Glass

**Historic glass is not a matter considered in design review in Salt Lake City.** An understanding of its role and origins however helps to inform decisions on maintenance, repair and alterations. Whether as a decorative feature window, or in the irregularities and reflective qualities of plain historic glass, it contributes significantly to the character of a building.

Glass is sometimes overlooked as a key building material, although it may comprise a significant proportion of the facades of a building, as the primary surface in the pattern and detail of windows and doors (fenestration). Decorative glass is widely used in older neighborhoods as a form of artwork embellishing and celebrating the building. Symbolism, pattern, color and texture are employed to great creative effect in windows and doors. The traditional skills used to create leaded and stained glass windows are many centuries old. Curved, convex glass is often used where a sash window is designed to reflect a curved corner or bay.



*The reflective ripple characteristics of early glass can be appreciated when compared to the regular surface of more recent replacement glass.*



## PART II Design Guidelines

Plain window glass, as well, until the middle of the 20th century contributed its own dimension in shaping light and reflection through the almost ‘organic’ figuring or ream in the glass. These characteristics derive from earlier manufacturing processes which were much more reliant on individual craft skills, ensuring that each sheet of glass has unique visual qualities. The result is a medium which contributes its own character to internal and external views and reflections. The sparkle and characteristics associated with historic glass directly affect the perception of windows as the “eyes of a building.”

To preserve these unique characteristics retain early glass wherever possible in the maintenance, rehabilitation and repair of a historic building. Once lost, early glass can not be replaced. If broken, reclaimed historic glass can sometimes be found to match the original. Reproduction glass, with historic glass characteristics can be found, but at some cost.

Retain and reuse original glass when carrying out repairs. Where energy and acoustic performance may be a concern, consider using an internal or external storm window, to retain the original glass and its individual qualities. See the Additional Information section for further reference material.



### Additional Information

#### Maintenance, Repair, Weatherization & Energy Efficiency

“How to Restore Sash Windows”, “Window Repair Tips”, & “Glass Replacement” *Old House Journal*  
[www.oldhouseonline.com/how-to-restore-sash-windows/](http://www.oldhouseonline.com/how-to-restore-sash-windows/)  
[www.oldhouseonline.com/window-repair-tips-from-john-leeke/](http://www.oldhouseonline.com/window-repair-tips-from-john-leeke/)  
[www.oldhousejournal.com/magazine/1506](http://www.oldhousejournal.com/magazine/1506)

National Park Service. Technical Preservation Services.  
<http://www.nps.gov/tps/sustainability/energy-efficiency/weatherization/windows-doors.htm>  
[www.nps.gov/tps/sustainability/research.htm](http://www.nps.gov/tps/sustainability/research.htm)  
[www.nps.gov/tps/sustainability/resources.htm](http://www.nps.gov/tps/sustainability/resources.htm)

National Trust for Historic Preservation. **Weatherization**  
<http://www.preservationnation.org/information-center/sustainable-communities/buildings/weatherization/windows/#.UbYdQp3nYXw>

Historic Scotland. *Managing Change in the Historic Environment - Windows*. 2010  
[www.historic-scotland.gov.uk/index/heritage/policy/managingchange.htm](http://www.historic-scotland.gov.uk/index/heritage/policy/managingchange.htm)

English Heritage. *Thermal Performance of Traditional Windows*. 2009  
[www.english-heritage.org.uk/professional/research/buildings/energy-efficiency/thermal-performance-of-traditional-windows/](http://www.english-heritage.org.uk/professional/research/buildings/energy-efficiency/thermal-performance-of-traditional-windows/)

Northern Ireland Environment Agency. *Windows. A Guidance Booklet on Openings*. Technical Note 4A. 2010  
[http://www.doeni.gov.uk/niea/windows\\_a\\_guidance\\_booklet\\_on\\_openings\\_tn\\_4a.pdf](http://www.doeni.gov.uk/niea/windows_a_guidance_booklet_on_openings_tn_4a.pdf)

Department of Arts, Heritage and the Gaeltacht. Ireland. *Windows. A Guide to the Repair of Historic Windows*. 2007  
[www.ahg.gov.ie/en/Publications/HeritagePublications/BuiltHeritagePolicyPublications/Windows%20-%20A%20Guide%20to%20the%20Repair%20of%20Historic%20Windows%20\(2007\).pdf](http://www.ahg.gov.ie/en/Publications/HeritagePublications/BuiltHeritagePolicyPublications/Windows%20-%20A%20Guide%20to%20the%20Repair%20of%20Historic%20Windows%20(2007).pdf)

Myers, John H. *Preservation Briefs 9: The Repair of Historic Wooden Windows*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1981  
<http://www.nps.gov/tps/how-to-preserve/briefs/9-wooden-windows.htm>

Park, Sharon C., AIA, *Preservation Briefs 13: The Repair and Thermal Upgrading of Historic Steel Windows*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior. 1984  
<http://www.nps.gov/tps/how-to-preserve/briefs/13-steel-windows.htm>

Park, Sharon C., AIA, and Douglas C. Hicks. *Preservation Briefs 37: Appropriate Methods of Reducing Lead-Paint Hazards in Historic Housing*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 2006  
<http://www.nps.gov/tps/how-to-preserve/briefs/37-lead-paint-hazards.htm>



Randl, Chad. *Windows 19: Repairing Steel Casement Windows*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior. 2002

[www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows19.pdf](http://www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows19.pdf)

Staveteig, Kaaren R. *Windows 22: Maintenance and Repair of Historic Aluminum Windows*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior. 2008

[www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows22.pdf](http://www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows22.pdf)

Vogel, Neal A. and Rolf Achilles. *Preservation Briefs 33: The Preservation and Repair of Historic Stained and Leaded Glass*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 2007

<http://www.nps.gov/tps/how-to-preserve/briefs/33-stained-leaded-glass.htm>

New York Landmarks Conservancy. *Repairing Old and Historic Windows: A Manual for Architects and Homeowners*. Washington, DC: National Trust for Historic Preservation, 1992

<http://www.barnesandnoble.com/w/repairing-old-and-historic-windows-new-york-landmarks-conservancy/1112114773?ean=9780471144182>

Fisher, Charles E. *Windows 2: Installing Insulating Glass in Existing Steel Window*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior. 1984.

[www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows02.pdf](http://www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows02.pdf)

Fisher, Charles E. *Windows 11: Installing Insulating Glass In Existing Wooden Sash Incorporating the Historic Glass*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior. 1984.

[www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows11.pdf](http://www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows11.pdf)

### Storm Windows

Trissler, W. & Fisher, C.E. *Windows 3: External Storm Windows: Casement Design Wooden Storm Sash*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior. 1984

<http://www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows03.pdf>

Fisher, Charles E. & Muckenfuss, Laura A. *Windows 5: Interior Metal Storm Windows*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior. 1984

[www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows05.pdf](http://www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows05.pdf)

Park, Sharon C. *Windows 8: Thermal Retrofit of Historic Wooden Sash Using Interior Piggyback Storm Panels*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior. 1984

[www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows08.pdf](http://www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows08.pdf)

Fisher, Charles E. *Windows 9: Interior Storm Windows: Magnetic Seal*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior. 1984

[www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows09.pdf](http://www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows09.pdf)

Fisher, Charles E. *Windows 15: Interior Storms for Steel Casement Windows*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior. 1986

[www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows15.pdf](http://www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Windows15.pdf)

### Replacement Windows

*Replacement Windows That Meet the Standards*. Preservation Technical Notes. Washington, DC: Technical Preservation Services, National Park Service, US Department of the Interior

[www.nps.gov/tps/standards/applying-rehabilitation/successful-rehab/windows-replacement.htm](http://www.nps.gov/tps/standards/applying-rehabilitation/successful-rehab/windows-replacement.htm)



