Window Preservation Standards


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Contributors:
This publication is a collaborative effort. The many additional authors and contributors are identified throughout the text and are listed in the Collaborators section of the Appendix.

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The Window Standards project was started by the Founders in 2010. They raised the funds for the project with the help of the Donors and Summit attendees. The project includes many Advisers and Stakeholders who have helped develop and write the standards.

Partners:
Preservation Kentucky is a statewide non-profit organization supporting historic preservation. It is the fiscal partner of WPSC, handling and holding all the money for the project.

Kentucky Heritage Council is the state agency for historic preservation, which was instrumental in organizing the National Window Preservation Summit of 2011.

Preservation Trades Network. To empower the traditional building trades through network, good works, community, fellowship and education. Another PTN Partnered Education Initiative.
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Please Note

This is the first edition of the National Window Preservation Standards. The Window Preservation Standards Collaborative is already planning and developing the second edition, with many additions and improvements. If you find that something is missing from this edition, or that it does not meet your needs in any way, please join us in the good work of making this a truly useful and practical set of standards.

The best place to do this is at the WPSC website:

WindowStandards.org

http://windowstandards.org/
Window Preservation Standards

Introduction

Window Preservation Standards Collaborative (WPSC)

The Collaborative is a group of window preservation tradespeople, contractors, architects, planners, building owners, educators, homeowners and others involved in the famous craft of preserving historic windows. The WPSC is inclusive and is not exclusive. There are no memberships, dues or fees. Anyone can be a part of the WPSC by simply participating.

Vision and Mission

Mission Statement of the WPSC:
Create and distribute window preservation standards that include a catalog of proven methods used to maintain, repair and weatherize older and historic windows, including well-researched weatherization and energy conservation information.

Goals & Objectives of the WPSC:

Create, print and distribute standards for sustainable window repair, restoration and weatherization, including definitive energy testing information.

- Work with a broad cross section of professional advisers to create the best Standards document possible.
- Prove, once and for all, that older and historic windows are a better choice for energy efficiency, payback and sustainability than replacement windows in old and historic properties.
- Establish and operate a website (www.WindowStandards.org) to document the process of development and allow for comments throughout the standards development phase and after publication.
- Sponsor at least one National Window Preservation Standards Summit.

Develop formal standards to guide our work.

- Document best practice in window restoration and weatherization.
- Compare and contrast treatments, methods and materials.
- Propose standards and develop consensus at the Summit and website.
- Publish the Standards in printed book format.

Plan the next steps beyond this current project for the first edition.

- Share stories at the website telling how the standards are actually being used out in the field.
- Track how the standards are used and analyze their impact on our industry.
- Propose changes for the next edition.
- Publish the next edition in one to two years.
- Develop a national window preservation specialists’ organization.
Guiding Principles for Window Preservation Work

Author: Tim Reinders, contributions by John Leeke, John Lindtner, Martin Muller

1. Window making is a fine craft. Historic and older windows exhibit quality craftsmanship. This craftsmanship is a key component of historic buildings, our heritage and our history. These examples of the fine craft of window making must be retained. The care, maintenance and repair of fine old windows require craft knowledge and skill at a level that matches the original craftwork used making in them.

2. Existing window assemblies, when properly maintained, can function efficiently and effectively for the life of a building. Even when severely deteriorated, historic windows can typically be repaired or restored.

3. Existing windows can be upgraded to improve energy efficiency. Upgrading can be done in a way that limits damage and minimizes the impact on the durability, function and aesthetics of the window.

4. Existing windows can be effectively maintained and repaired with materials that closely match the original materials.

5. Preserving and retaining existing windows is more sustainable and environmentally sound than window replacement. It reduces waste sent to landfills, reduces the use of less environmentally friendly materials, and reduces the use of energy by eliminating the need for new high-energy materials like aluminum and glass.

6. The field of window preservation encourages safe work practices. Safe work practices protect the safety, health and well being of workers, occupants, the general public and the greater environment.

Purpose and Acceptance

These standards cover window preservation, which provides the alternative to replacement windows.

Replacement windows are factory made products that are aggressively marketed to the American consumer and contractors in the remodeling and renovation markets. Two key strategies are to produce the products at the absolute minimum cost and to install them with the minimum labor possible. A typical window replacement project includes removing all of the existing windows in a building, throwing them away and installing newly manufactured products. The emphasis is on making as much money as possible for the manufacturing and marketing corporations.

Window preservation is maintaining, repairing and upgrading older and historic windows. This is a creative process that depends on knowledgeable and skilled workers. A typical window preservation project saves all of the existing windows. The emphasis is on craftspeople earning a living by doing best work, providing for the needs of the occupants and the building owner, while sustaining local economies.

These Standards are entirely voluntary. Anyone can do window work any way they want. The Standards only become mandatory when a tradesperson, contractor or building owner agree with each other that the Standards will be followed.

These Standards are inclusive and not exclusive. The Standards include a wide variety of approaches, methods and materials. Nearly anything that saves or preserves older and historic windows can be included in these Standards. They even include an exception classification to allow for work that is done above and beyond the Standards, and to ensure that the Standards do not limit effective innovations in the continuing development of traditional window design. (See Submissions in the Appendix for more on Exceptions.)
Reading and Using the Standards

Architects can reference the Standards to help achieve the goals of their project and control the work while underway. The Standards can serve as an aid to determine appropriate treatments and to provide criteria for a testing and inspection regimen on individual projects.

Window specialists, tradespeople and contractors who are experienced in window preservation work can use the Standards to help guide the development of their own knowledge and skills. Tradespeople not experienced in window preservation work can use the Standards to begin learning. Contractors just getting into window preservation may find the Standards especially useful as part of their employee training program to help bring their workers up to speed quickly.

Contractors and building owners can use the Standards to document recommended and selected treatments, demonstrating due diligence by the contractor and acceptability by the customer. The project documentation and the Standards can follow the ownership of the building. If new owners find a less than ultimate window repair, they will be able to see in the documentation that the repair is the one that was chosen and thoughtfully justified at the time.

Businesses can make the Standards a part of their marketing program to attract interest in their work, for example by stating that they do work that meets the National Window Preservation Standards. The Standards can be used in marketing to make it clear to potential customers that a business is different from others that do not follow the Standards.

Educators can use the Standards as part of their preservation trades training programs, to guide the development of their students’ knowledge of the general principles and the specific methods of window preservation.

Building owners can use the Standards to help direct their maintenance staffs in effective window maintenance and repairs.

Preservation commissions can use the Standards to educate their constituents and demonstrate that window preservation is indeed possible, and to document justifications for their decisions and actions. Commissions with an education initiative can keep multiple copies on hand to lend out.

Homeowners can use the Standards to guide their own do-it-yourself work and to judge the character and quality of the work done on their windows by others.
Assess and Document Conditions

Update: 12/21/2012
Author: Amy McAuley
References:
Contributors: John Leeke

Title of Treatment: Assess and Document Conditions
Class of Treatment: [x] Identify, [ ] Maintain, [ ] Stabilize, [ ] Repair, [ ] Upgrade, [ ] Exception
Type of Treatment: [ ] Traditional, [x] Contemporary, [x] Conservation

Condition to be Treated:
There is no clear record of the types of deterioration or extent of conditions.

Description:
Create a comprehensive document that shows the condition of each window including sashes, frame, casings and all trim. The documentation includes photo, dimensions and notes for both interior and exterior views.

Typical Procedure:

1. Prepare for efficient work. Draw and copy blank note forms in advance. The forms may contain a sketch of window type elevations, check lists of common conditions, a key to symbols used in note taking, etc. Assemble the note forms in a binder. Gather together assessment and documentation gear.

2. Sketch floor plans or elevations of the building and develop a window numbering system, if not already done.

3. Key each window to its location on the plans or elevations with a window number and fill the window number in on the form.
4. **Photograph each window** with interior and exterior views, in the numbering system sequence.

5. **Determine window size** by measuring the width and height of the sash space, and record that on the form.

6. **Document visually apparent significant details**, such as:
   - How the construction of the window may be different from the standard type
   - Details that indicate architectural character, such as glass types, muntin sections and moulding profiles
   - Historical significance, such as names and dates scratched on glass panes

7. **Inspect each window** to determine the types of deterioration and the extent of each deterioration. Write notes on the forms, describing the conditions. Consider exteriors first and then interiors. Take the time needed for accurate descriptions.

8. **Refine the notes** after the site visit; include afterthoughts and results from research.

9. **Process photos** and attach photos to the correct forms. Use archival tape.

10. **Ink in** all penciled comments and notes.

11. **Make two photocopies** of the master document, one for the client; one for archiving at the local or state preservation office or library. Scan and burn a copy onto digital compact discs, for the digital archive.

**Materials:**
- Archival quality paper
- Archival quality binders
- Pencils and pens
- Archival quality double-sided tape
- Digital compact discs

**Quality of Results**
Best Work: Comprehensive inclusion of every window. Neat appearance, concise presentation, easy to read and understand, photos present and clear. Sketches or drawings are easy to view and able to discern important details.

Inadequate Work: Photos absent or not on correct form to accurately match window numbering. No measurements, no description of conditions.
Glaze and Paint Sash, Alt. D, traditional

Update: 4/15/13
Author: John Leeke
References: Save America’s Windows, pages 74-82.
Contributors: Amy McAuley

Title of Treatment: Glaze and Paint Sash, Alt. D, traditional
Class of Treatment: [ ] Identify, [ ] Maintain, [ ] Stabilize, [x] Repair, [ ] Upgrade, [ ] Exception
Type of Treatment: [x] Traditional, [ ] Contemporary, [ ] Conservation

Condition to be Treated: Bare sash needs to be glazed and painted.

Description:
The sash and glazing rabbet is pre-treated, the pane is set in a bed of putty and held in place with points. The front putty is placed, packed and tooled to form a neat bevel and miters. The sash is primed and painted with two topcoats. This procedure is suitable for double-hung sash that are new and unprimed bare wood, or old sash with all panes, paint and putty removed down to bare wood, all woodwork repairs done, and all wood surfaces smooth and clean.

Typical Procedure:
1. Pre-treatment. Apply a pre-treatment of linseed oil and turpentine to the glazing rabbets. This treatment may be extended to the rest of the sash if needed due to weathered wood surfaces. Apply a pre-treatment to the bare wood. Apply the pre-treatment to both faces of the sash, all muntin bars and muntins. Apply some extra at every joint, so it soaks into the joint treating the end-grain within the joint. The bottom edge of the lower sashes' bottom rail may need treatment if it shows signs of deterioration caused by water. If the bottom edge is in good condition it should not be treated since it has done well for so many years without treatment. Do not apply pre-treatment to the side edges of the sashes and the top edge of the upper sash. Allow to dry thoroughly.

2. Sand Wood Surfaces. If needed, lightly sand off any nibs or whiskers. All surfaces and arrises should feel smooth. Dust off with a HEPA vacuum and tack cloth.

3. Prime the Sash. Do not prime the side edges of the sash that run in the tracks. Do not prime the top edge of the top sash or the bottom edge of the lower sash. Prime all other surfaces of the entire sash, except the glazing rabbets if they were already pre-treated. Apply the primer by hand brushing, working the primer well into the surface of the wood. Wipe off edges of sash with a rag to remove any beads or drips of primer. Allow to dry thoroughly.

4. Sand Primed Surfaces. If needed, lightly sand off any nibs or whiskers. All surfaces and arrises should feel smooth. Dust off with a HEPA vacuum, or brush and tack cloth. If primer was sanded off to bare wood in any spots or areas, re-prime those spots.

5. Bed the Panes. Lay all panes into the sash to assure that they all fit. Remove the panes. Keep track of where each pane will go. Kneed the putty in hand to warm it up. Apply putty to glazing rabbets as bedding around all the rabbets in the sash. Place each pane of glass on the bedding putty and be sure the bottom edge of glass is actually resting on the neck of the lower glazing rabbet. Jiggle the pane slightly with your fingers along the edges so that it beds down into the putty, leaving at least 1/16", up to 1/8" of
back putty between the glass and the shoulder of the glazing rabbet, with some putty squeezing out all along the edges of the glass. Panes wider than 24” may require spacer blocks between the edges of the glass and the neck of the glazing rabbet.

6. Set Glazing Points. If the panes are smaller that 6” or 8” set at least one point on the short edge and two points on the long edge. On larger panes set points away from the corner of the glass at least one forth the length of the edge of the glass, and then set points every 8” to 10” in between.

7. Tool the Face Putty. Place and pack each line of putty around the entire sash. Tool the face putty. Tool the surface of the putty bevels on an angle so the edge of the putty at the pane is directly across from the arris of the shoulder of the glazing rabbet. Form neat miters at the corners where the bevels meet.

8. Polish and Clean the Pane. Safety: wear goggles and a respirator when polishing with whiting to keep it out of your eyes, nose, mouth and lungs. Polish the outside of the pane with whiting in a dry soft paintbrush immediately after tooling. It is good to get whiting on the surface of the putty. Sweep out any remaining buildup of whiting from the lower corners. This cleans oil from the putty that got on the pane during the glazing process off of the glass and "dusts up" the surface of the putty to promote drying and skinning.

9. Tool the Back Putty. Flip the sash over and trim out excess putty that squeezed out from the bedding with a putty knife. Do not push too hard against the pane, or the pane may move and disturb the face putty on the other side of the pane. Tool down the back putty to form a watertight seal at the joint between the glass and the wood. Make the putty flush with the wood.

10. Polish and Clean the Panes. Polish the inside of glass panes with whiting, the same as Step 8. Set sash aside in correct vertical position, leaning slightly back, to avoid settling of glass and distortion of the putty bevel. Allow enough time for putty to cure or skin over.

11. Prime the putty, if needed. Some putty and paint combinations need to be primed, others do not. Check with the putty and paint manufacturer to determine if the combination in use should be primed. If needed, apply primer to face putty bevels and interior seals. Lap primer 1/32" onto the glass, painting "to the line" and allow to dry.
12. **Topcoat the sash and putty.** Brush on by hand, two topcoats of paint to entire sash except side edges and top and bottom edges if they are not being painted. Begin by lapping paint 1/16” onto to glass while painting the line of putty, then paint the rest of the stile, rail or muntin, then move on to the next line of putty. Wipe off the edges of the sash with a rag to remove any beads or drops of paint. Set sash aside in correct vertical position to avoid settling of glass and distortion or wrinkling of putty and paint. Allow enough time for paint to dry and cure thoroughly.

**Materials:**
- Rags
- Sandpaper, 100 grit
- Tack cloth
- Pre-treatment, mix of linseed oil and turpentine
- Primer, oil-based linseed oil or alkyd resin
- Turpentine
- Linseed oil
- Putty or glazing compound
- Glazer’s points
- Whiting
- Paint, oil-based topcoat house paint or exterior enamel

**Quality of Results**
Quality of results are judged by touching the glazing and painted surfaces and by visually standing three feet from the window on the interior and ten feet from the window on the exterior.

**Best Work:** Before priming or painting check to see that the bedding putty is tightly sealed to the pane and interior arris of the moulded profile. Putty must be firmly packed into the glazing rabbet, in and around the edge of the pane, with the face putty showing an even bevel, neat miters at the corners and a tight seal all along the glass and wood. After painting, all painted surfaces feel smooth to the touch. DO NOT press the surface of the putty with a finger or dent it with a fingernail when touching the surfaces. Visually, all the painted surfaces have an even sheen, with no gaps at the edges of the putty or at the sash joints. A slight variation is acceptable in the line of paint as it meets the glass, since painting to the line is a hand technique. Glass is clear of oily smudges and fingerprints, dust on the surface of the glass is acceptable.

**Adequate Work:** Before priming or painting check to see that the bedding putty is tightly sealed to the pane and interior arris of the moulded profile. Putty must be firmly packed into the glazing rabbet, in and around the edge of the pane. The face of the putty can show a slight to moderate unevenness and the miters can be slightly irregular, there must be a tight seal all along the glass and wood. After painting, all surfaces feel smooth to the touch. DO NOT press the surface of the putty with a finger or dent it with a fingernail when touching the surfaces. Visually, all the painted surfaces have an even sheen, with no gaps at the edges of the putty or at the sash joints. A moderate variation in the line of paint as it meets the glass is allowed. If the line of paint varies by more than 1/8”, straightening it by cutting it with a razor blade and straight edge and scraping off the extra is allowed. Glass may have localized spots of dried putty oil or specks of paint, which must be cleaned off.

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Inadequate Work: Surfaces feel rough, arrises feel sharp. There are gaps at the edges of the putty or at the sash joints. Fingerprints show in putty and on painted surfaces, and there are holidays (areas without a coating of paint) on painted surfaces. Dirty glass.
Appendix

Collaborators
The Window Preservation Standards Collaborative is a group of people dedicated to preserving windows. The Collaborative is not a membership organization; anyone with an interest in preserving windows can participate. There are no fees or dues, although many Collaborators have contributed minor and major dollar donations. All have contributed a significant amount of time and shared their knowledge freely for the benefit of the greater field of historic preservation, and our corner of that field, the preservation of older and historic windows.

Founders & Assistants
The founding members of the Window Preservation Standards Collaborative have over 170 years combined experience repairing, restoring and weatherizing historic wood windows. When you add up the years they have taught these techniques, it's over 100 years.

Founders:  David Gibney, Duffy Hoffman, John Leeke, Jim Turner, Bob Yapp

The Founders’ Assistants put in days and weeks of skillful labor at the National Window Preservation Summit in 2011, and many hours of thoughtful contributions and significant help since then.

Assistants:  John Bales, Angel Corrales, Patrick Kennedy, Jim Nelson, Andrea Sevonty

Advisors
Advisors have helped the Founders in their various fields of knowledge related to window preservation. Advisers reviewed and commented on the drafts of the standards at the website. Many Advisers attended the 2011 Summit.

Advisers include:
- Independent Tradespeople who are working to meet these standards
- Contractors who are working to meet these standards
- Educators and trainers
- Specifiers
- Architects
- Facilities managers
- Homeowners and building owners who hire contractors and tradespeople
- Staff and officials from several government agencies and nonprofit organizations


Summit Observers
Observers attended the 2011 Summit to witness the testing and demonstration and to carry that experience back home to pass along the word about window preservation. Observers are helping to promote and implement the use of the Standards. Observers attended the Summit to:
• Learn about the project and the Standards firsthand
• Learn about window preservation work by watching demonstrations
• Meet the key people involved in the project
• Develop strategies for bringing the Standards to the people back home who need them most

Many Observers have also reviewed and commented on the drafts of the standards at the website, especially in the Marketing and Summit sections of the Forum at the website. Observers are:

• Writers, journalists or publishers
• Staff and officials from government agencies or nonprofit organizations at any level from local, state or national
• Anyone with an interest in window preservation and skills in marketing and promotion

Catherine Brooks, Wayne Doolittle, Douglas Jones, Kathy Morgan, Eric Nichols, Tim Reinders, Joy Sears, Lisa Sheppard, Nathalie Wright

Stakeholders
Stakeholders have been helping the Founders and Advisers by providing their unique regional and local insights about window work. Stakeholders have reviewed and commented on the drafts of the standards at the website.

Stakeholders include:
• Independent Tradespeople, who have detailed hands-on knowledge about window work
• Contractors who will be working to meet these standards
• Educators and trainers
• Specifiers
• Architects
• Facilities managers
• Homeowners and building owners who do their own work and hire contractors and trades people
• Staff and officials from government agencies and nonprofit organizations

Jerry Berggren, Joe Bodkin, Steven Burr, Thomas Clark, Eli Cohn, Jim Derby, Richard DeWolf, David Dick, Tom Francis, Matt Hankins, Larry Johnson, Bill Hepburn, David Garner, Michael George, Matthew Kendall, Marsha Lance, James Maddigan, Martin Muller, Stephen Ortado, David Ottinger, John Poole, David Reusch, Wayne Robinson, Amy S. Rybacki, Jan Scopel, Jason Asher Sealy, Corey Thomas, Jay Treiger, David Wadsworth, Jason Whipple, Jen Spangler Williamson

If you would like to be a Stakeholder, all you have to do is go to the website Forum:


And let us know who you are, tell us about your work, how it relates to window preservation and then participate in the discussions at the website Forum.
Partners and Donors

Partners:

Preservation Kentucky, Inc.  Kentucky Heritage Council  Preservation Trades Network

Donors:

Up to $100
Richard T McGrath, Paula Mohr, John Leeke, Lisa Sasser, Melanie Ratliff, Robert & Amy Hill, Alexander White

$100 to $499
Thomas Bullis, Douglas Jones, Catherine C. Brooks, Karen Baxter, Anonymous Donor, Lou Linden, Robert A Schneider

$500 to $1,999
National Center for Preservation Technology and Training (NCPTT), McCormick School Museum, James Nelson, Yolita Rausche

$2,000 to $5,000
State of Oregon, Parks & Recreation, Ohio Historical Society, National Trust for Historic Preservation, Illinois Historic Preservation Services, Iowa Dept. of Economic Dev. & Iowa Mainstreet, Community Foundation of West Kentucky