

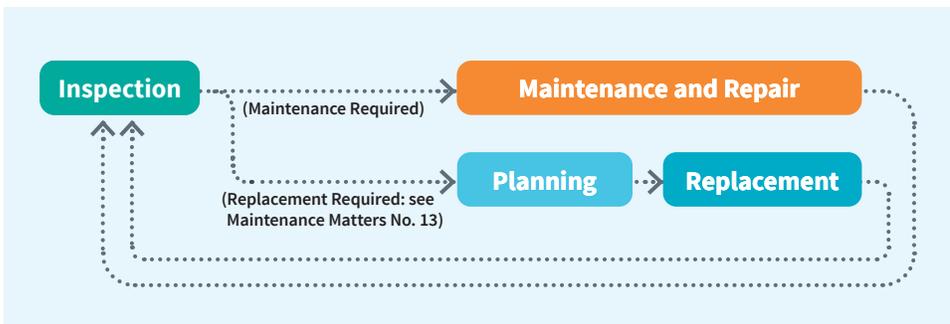
MAINTENANCE MATTERS



Window and Door Maintenance

Maintenance of windows and doors is part of regular building upkeep. It's also an essential part of the building's maintenance and renewals planning. Regular maintenance, including preventative maintenance, can increase the longevity of your windows and doors, improve energy performance, and reduce the cost of unplanned repairs.

This bulletin provides guidance on routine inspection and cleaning, regular maintenance to prolong the life of windows and doors, and coordinating with qualified professionals for refurbishment.



The focus of this Maintenance Matters bulletin is on windows in single-family and multi-unit residential buildings constructed with wood-frame, concrete, and steel-stud exterior walls. Maintenance processes may differ for small residential buildings (such as single-family homes, townhomes, or laneway homes) versus larger residential buildings (for example, low-rise or high-rise multi-units), however, there is a consistent need for ongoing inspection and planning.

Heritage windows have their own requirements for heritage conservation and are not included in the scope of this bulletin.

Maintenance Matters

This series of bulletins and companion videos is designed to provide practical information on maintaining residential buildings. Produced by BC Housing, this bulletin was prepared by RDH Building Science in collaboration with the Condominium Home Owners Association.

Understanding Your Windows and Doors

Functions of Windows and Doors

The main purpose of windows and doors is to provide a connection to the outdoors through natural light, views, and access and egress. There are several other important functions of windows and doors, including:

- allowing or limiting solar heat gains
- insulating from outdoor temperature and sound
- providing a watertight and airtight enclosure
- allowing natural ventilation
- security

Maintenance of windows and doors extends the lifespan of these products and ensures they are able to provide their intended functions.

Identifying Parts of Windows and Doors

Windows have many attributes which makes them difficult to categorize. However, they are typically defined by their frame material and installation method, their operability, and the characteristics of the glass. The illustration below shows a typical window cross section with the main parts of the window indicated. These parts are similar for glazed doors (for example, doors which include glass).

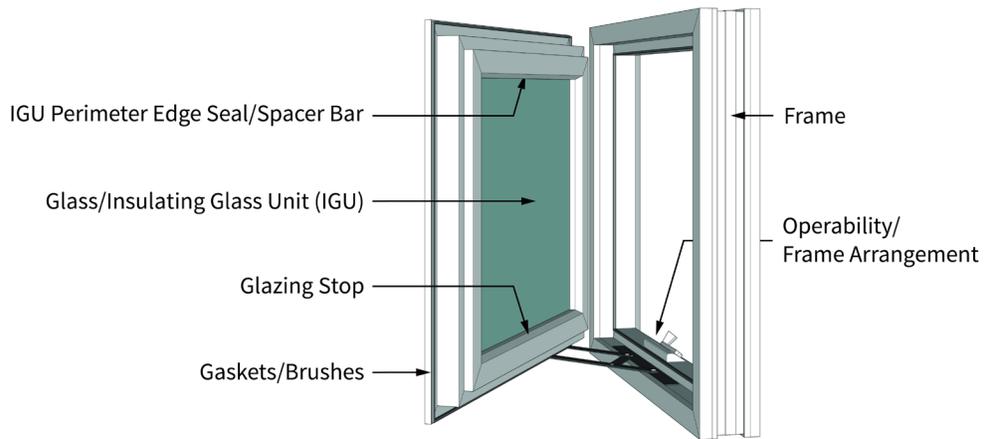


Figure 1 – Main parts of a window and characteristics that determine the window type

Examples of Window Frame Materials

Window frames are composed of various materials that provide different characteristics for durability, aesthetics, and cost. The main window frame types are highlighted below. This includes glass block windows as an example of a window type without framing.



Wood frames can be made of various wood species, either painted or stained. Wood frame windows can also have aluminium or other metal cladding on the exterior. Wood windows are common in older buildings.



Vinyl frames are made of polyvinyl chloride (PVC), sometimes reinforced with steel within the frame depending on the size of the window. Vinyl frames look and feel like plastic, and are a common window frame type in newer single-family homes and low-rise multi-unit buildings. They are typically white, though may be coloured or painted.



Fiberglass frames are made of glass fiber strands and thermoset resin. They can be similar in appearance to vinyl frames but tend to have a harder surface and often a slimmer profile.



Aluminum frames are a common frame type and come in various colour finishes.



Steel frames have similar characteristics to aluminum frames, but are less common in residential buildings. The metal type can often be confirmed using a magnet. Steel frames may be used in certain areas of a building for fire code reasons (e.g. egress path).



Glass block windows are thick hollow blocks of glass that allow light to pass through, though inhibit clear vision through the glass. They offer greater privacy than windows with panes of transparent glass, and as such are typically used at ground level or in bathrooms. This type of glazing system is distinctly different from more typical frame systems.

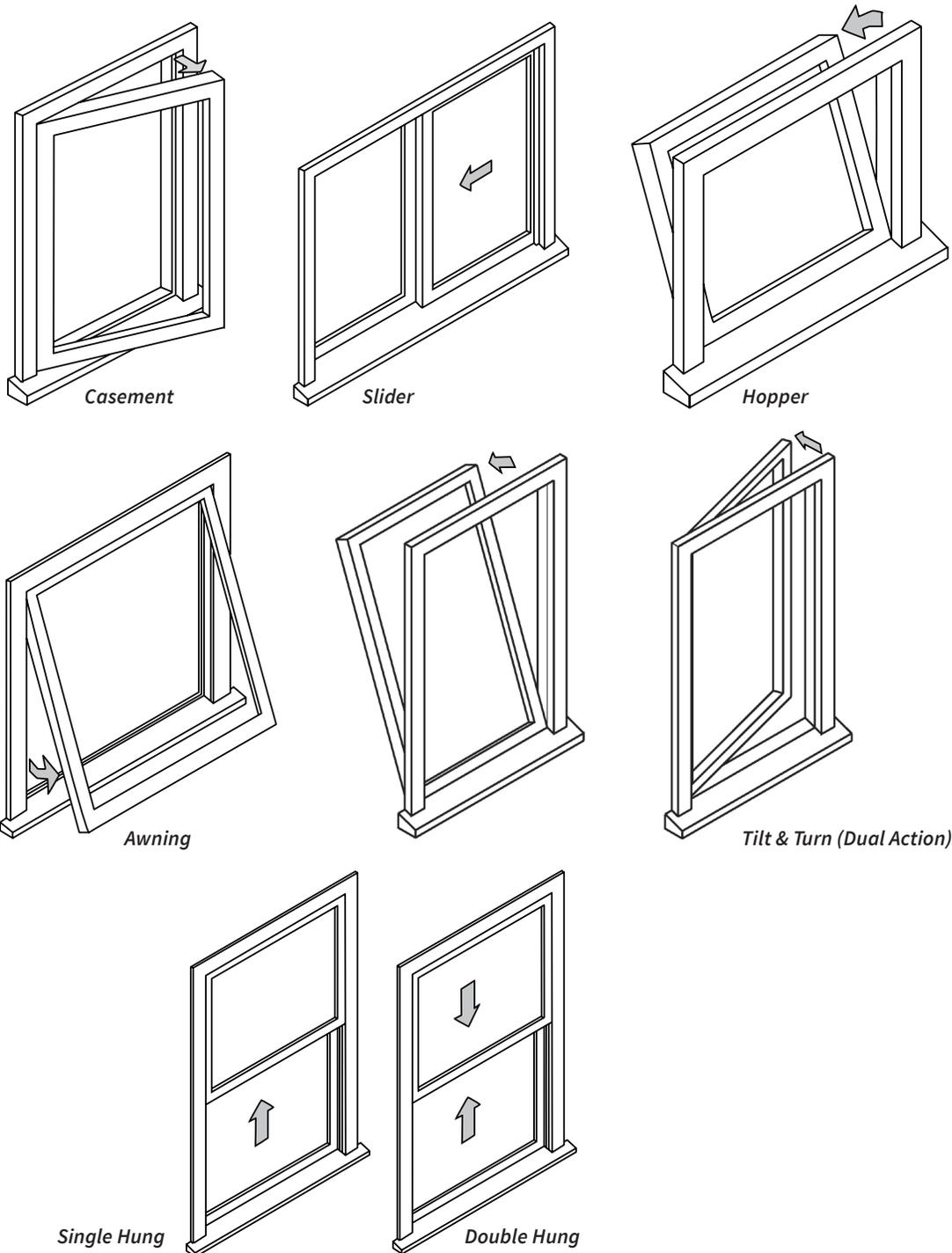
Metal frames, such as aluminum and steel, can also be storm windows.

Storm windows have two sets of frames in parallel. This dual frame method was common several decades ago before window technology was able to withstand high rain and wind loads.

Frames composed of materials that easily conduct heat, such as aluminum or steel, may have a thermal break to inhibit the transfer of heat across the frame. Thermal breaks are typically made of an insulating material such as plastic and/or designed with air gaps.

Operability

Window frames may either be fixed or operable (capable of being opened). Operable products allow for natural ventilation to a space and may either slide or hinge open. Typical operator types used in residential window systems include sliders, casements, awnings, hoppers, and double or single hung. These operable vents rely on gaskets or brushes to provide the weather seal when the window is closed, and are essential for window function and performance. Consider window operation as an important part of window inspection and maintenance.



Frame Arrangement

The overall frame arrangement is also important to recognize. Many different frame arrangements are used in residential construction. The five major types are listed below:

- › **Punched windows** (framed windows) are what most people think of when they imagine a window. Punched windows are individual units that are installed into openings through exterior walls. They are most common in smaller residential construction such as houses and townhomes, and in low-rise wood-frame multi-unit residential buildings.



Figure 2 – Example of punched windows in a low-rise residential building

- › **Window walls** sit on each floor and are installed between the floors. Window walls can have opaque sections known as spandrel units that are usually covered on the interior by drywall and look like sections of the exterior wall. Window walls are less common in small residential construction and usually used in taller residential construction.



Figure 3 – Example of window wall glazing in a high-rise residential building

- › **Curtain walls** provide a combined window and wall system. They are similar to window walls, except that they are hung off the building and run continuously past each floor. Curtain walls are also less common in small residential construction and usually used in taller residential and commercial construction.



Figure 4 – Example of curtain wall glazing in a mid-rise residential building

- › **Strip windows** look like a continuous line of windows, and typically do not include opaque areas, but can in some cases. They are most common in low-rise commercial construction and can also be found in residential construction.



Figure 5 – Example of strip windows in a mid-rise residential building

- › **Storefronts** refer to a specific frame type, and can also be used more broadly to include a wide variety of frame types. A common location for these systems, and a defining characteristic for the broader use of the term, is at building entrances and ground floor lobbies or commercial retail units in mixed-use buildings.



Figure 6 – Example of storefront glazing on the commercial first floor of a mixed-use building

Glass/Insulated Glass Units

Insulated Glass Units (IGUs) consist of two or more panes of glass separated by a vacuum or gas-filled space, sealed together to resist heat transfer more than single paned glass.

Panes of glass: Windows and doors can have single or multiple panes of glass (IGUs). Typical IGUs for residential buildings have two panes of glass (double-glazed), though triple-glazed or even quadruple-glazed products are becoming more common for their higher insulative properties. Some products have an optically clear film separating the cavity between panes of glass.

Perimeter seal: The panes of glass in IGUs are separated by a spacer and sealed around the perimeter. Good quality perimeter seals incorporate a dual perimeter seal. Warm edge technology (WET) IGUs do not typically use a metal spacer bar and replace it with more thermally efficient materials like polymer.

Gas fill: The panes of glass in IGUs are separated by a gas-filled space, which has an impact on overall insulative properties. This space is typically filled with argon, an inert gas that reduces the heat transfer more effectively than air. High-performance products may use krypton instead of argon to further reduce heat transfer between the glass panes. Older windows often used air.

Coatings: Low-emissivity (low-e) coatings may be present on some surfaces of the IGU, which control both infrared radiation (heat) and short-wave radiation (solar heat gain). Low-e coatings can also help to reduce fading of indoor carpets, fabric, and artwork from ultraviolet (UV) radiation.

Door Types

Exterior doors generally come in two varieties, hinged or sliding, which is commonly used for access to balconies or patios. In addition to suite entry, doors may also provide access to service and common spaces in multi-unit buildings. Exterior hinged doors can be inswing or outswing, opaque or glazed. Opaque hinged doors are generally made of metal, wood, or fiberglass over a foam core. Some are mostly opaque with a glass panel or IGU

inset, having characteristics of both opaque and glazed doors. The frames of glazed hinged and sliding doors usually resemble large casement or horizontal sliding windows.

Exterior doors are available with a range of fire ratings and performance characteristics, the requirements of which depend on the intended use and location of the door, as well as the type of building and exposure.

Maintaining Your Windows and Doors

Windows and doors require ongoing maintenance for effective long-term performance. Ensure that your building has a window and door maintenance plan that includes regular inspection of exposed sealants and weather seals, cleaning, adjustments, and minor repairs and replacement of materials. The operable portion of the window often requires careful inspection to confirm the sliding or hinged mechanism is functioning properly, and that the gaskets are fully engaged. Weep holes should be checked to ensure they are not blocked. Window misalignment and dislodged or worn seals are common maintenance items. Regular use, building movement, and expansion and contraction of the window are among the causes of these issues (for example, regular wear and tear).

General Maintenance Guidance

Consult with window manufacturer's printed instructions for details and clarifications regarding operations and maintenance requirements. In general, avoid applying films to glass surfaces or drilling holes for alarms, locks, burglar bars, weather strip, bug screens and window coverings. Avoid excessive force to open doors, and make sure doors or windows do not slam shut in order to increase the longevity of window and door products.

Window Cleaning

Accessible parts of windows can be cleaned by individual owners/residents, while hard to reach, exterior glazing requires a contractor's help. Use a mild soap and water for cleaning windows and clean surfaces of glass with regular or ammonia-based cleaning products, or water with vinegar. Avoid cleaners that leave a film or residue on the glass after cleaning. It's also important to avoid the use of high pressure water and aggressive or abrasive cleaning compounds and solvents. They can damage the window frame, glazing and joints.

When contracting for window washing, ensure that window cleaners do not stand on metal flashings or use shoes that leave marks on glass or framing. For high-rise buildings, where windows cannot all be accessed from ground level, ensure that swing stages are equipped with bumpers to prevent damage such as scratches or dents to the windows.

Lubrication

The requirements for lubrication oil varies by window type and manufacturer. In general, avoid lubricant that contains silicone, graphite, cleaning agents, or solvents, as these can permanently damage the hardware. High-quality machine oil (often referred to as sewing machine oil) is usually suitable.



Moisture Management

The presence of moisture and damage related to moisture is not necessarily indicative of a window or door leak. Moisture can be related to a leak between the window or door and the wall, or may indicate a condensation problem. It may also indicate failure of a roof or other element that is not related to windows and doors at all. If signs of moisture persist, consult a building enclosure specialist to inspect the issue. Monitor and report any moisture between the panes of glass (failure of IGUs), as well as any suspected leaks.

To reduce potential damage from condensation, wipe any condensation from glass, frames, and ledges/sills to prevent mildew growth. Open drapes and/or blinds daily to allow warmer air to reach walls and windows. Keep blinds 1-2" off window sills to allow warm air to flow over glass. Keep furniture away from exterior walls and windows to allow airflow over wall and window surfaces.

Incorporate inspections for moisture damage as part of the condition assessment of windows and doors. Typical symptoms of moisture damage are shown in Figure 7 and Figure 8.

Sealant

Sealant helps make windows airtight and watertight. Review the adequacy of maintenance checklists and activity frequencies for sealant annually. For example, update the maintenance plan based on environmental conditions, experiences over the preceding year, and feedback from service contractors. Every two years, a maintenance contractor or consultant should review the condition of sealant at all locations and undertake localized repairs as required. Sealants may need to be replaced about every ten years, depending on the specific conditions and the type of sealant. Developing a renewals plan based on the current condition of various sealants at ten year intervals is recommended. Consider current condition, exposure conditions, sealant types, and other tasks that can be bundled with the sealant work, such as painting.



Figure 7 – Decay of exterior wood trim board under door



Figure 8 – Staining on interior surface of existing wood windows

Specific Maintenance Guidance

The following section outlines specific maintenance activities required for various types of windows and doors. It describes who is responsible for performing each level of the recommended maintenance and inspection activities.

Who is responsible for the maintenance and inspection activities?		
Type of Activity	Description	Performed by
Maintenance Level 1	Relatively basic maintenance activities can typically be carried out by building personnel. In situations where Level 1 activities require special safety provisions, hire independent contractors or people who are properly skilled, and have the necessary equipment.	Unit Owner and/or Custodian and/or Maintenance Contractor (depending on circumstances)
Maintenance Level 2	Some maintenance activities require moderate skills and/or equipment. Depending on the training, skills, and equipment available to homeowners or multi-unit building staff, Level 2 activities may need to be done by independent contractors and/or consultants. The building manager assigns Level 2 activities to appropriate parties.	Maintenance Contractor and/or Renewal Contractor and/or Consultant (depending on circumstances)
Maintenance Level 3	Some maintenance activities require specialized training, skills and/or equipment. These services are always provided by approved contractors and/or professional consultants.	Renewal Contractor and/or Consultant (depending on circumstances)
Assessment	Routine assessments include reviewing and evaluating conditions and/or maintenance plan of the asset.	Consultant and/or Custodian
Warranty Review	When new assets are installed in a building, reviews are performed by a qualified consultant at intervals specified by the product and installation warranties (2-year, 5-year, 10-year).	Consultant

Maintenance and Inspection Activities for Windows

All windows have similar maintenance and review procedures, regardless of frame material. Activities are provided in the table below.

Maintenance and inspection activities for windows		
Maintenance/Inspection Item (Always refer to Window Manufacturer's Maintenance Instructions)	Maintenance Level	Frequency
Clean accessible vision glass.	Maintenance Level 1	Semi-annually
Clean all weep holes.	Maintenance Level 1	Annually
Clean all exterior surfaces of windows, including frames.	Maintenance Level 1	Annually
Lubricate and adjust operable vent hardware.	Maintenance Level 1	Annually
Swing windows: check cranks and hinge hardware for wear or stripping of gears, lubricate stiff components.		
Sliding windows: clear sliding track of debris, lubricate frame sliding/contact areas.		
Dual action/multi-point locking: carefully apply lubrication to hinges and cams around the whole operable window perimeter.		
Review adequacy of maintenance checklists and activity frequencies for windows. Update the maintenance plan based on environmental conditions, experiences over the preceding year, and feedback from service contractors.	Assessment	Annually
Glass block windows only: re-apply sealer at grout joints on the interior and exterior of glass block windows.	Maintenance Level 2	3 Years
Replace or repair gaskets and weatherstripping as required.	Maintenance Level 2	2 Years
Check for failed IGUs and replace IGUs with condensation or misting between panes of glass and damaged glass blocks, as required. After 15 years, when IGUs fail more often, check IGUs annually and create a more holistic plan.	Maintenance Level 3	2 Years
Wood frame windows only: re-paint or stain wood frame and associated wood trim.	Maintenance Level 1	6 Years
Glass block windows only: re-point mortar joints as required.	Maintenance Level 2	5 Years

Maintenance/Inspection Item (Always refer to Window Manufacturer's Maintenance Instructions)	Maintenance Level	Frequency
Perform detailed condition assessment of windows, associated components and interfaces. Repair or include in refurbishment plan as required.	Assessment	6 Years
Vinyl windows: check for signs of fading or peeling paint, bowing or cracking of frames.		
Wood windows: check for mould growth or wood decay, peeling paint, cracked or separated frame sections.		
Metal windows: check for signs or rust or oxidization (white powder on aluminum).		
IGUs: check for signs of condensation within the glass unit, test samples for failed perimeter seals using a frost-point tester.		
Operability: check for dislodged gaskets or misaligned frames where the gaskets are not in full contact upon closing.	Maintenance Level 2	15 Years
Install cap bead over glazing tape on exterior of windows if applicable to window type.		

Maintenance Activities for Doors

Swing doors and sliding doors have similar maintenance and inspection activities, with small variances for their hinges and tracks, respectively. Maintenance and inspection procedures are also similar regardless of the frame material, with some differences noted in the table below.



Figure 9 – Example of an aluminum frame swing door



Figure 10 – Example of a vinyl frame sliding door

Maintenance and inspection activities for doors		
Maintenance/Inspection Item (Always refer to Door Manufacturer's Maintenance Instructions)	Maintenance Level	Frequency
Clean vision glasses.	Maintenance Level 1	Semi-annually
Clean all exterior surfaces of doors, including frames, flashing and threshold tracks.	Maintenance Level 1	Annually
Lubricate and adjust door hardware as required. Check rollers, hinges, locksets, strike plates and closing devices for loose attaching screws, wear or other notable defects. The door should slide or swing freely without obstruction and latch without requiring additional force.	Maintenance Level 1	Annually
Review interior sealant. Repair as required.	Maintenance Level 1	Annually
Repair swing doors, sliding doors, and associated components as required.	Maintenance Level 3	Annually
Review adequacy of maintenance checklists and frequencies for doors. Update the maintenance plan based on environmental conditions, experiences over the preceding year, and feedback from service contractors.	Assessment	Annually
Replace or repair gasket and weatherstripping as required.	Maintenance Level 2	2 Years
Replace insulating glazing units (IGUs) with condensation or misting between panes of glass as needed.	Maintenance Level 3	2 Years
Perform condition assessment of door and associated components.	Assessment	6 Years
Re-paint wood door and frame finish for wood frame doors.	Maintenance Level 2	6 Years
Re-paint steel door finish for steel frame doors.	Maintenance Level 2	8 Years
Replace/upgrade lobby door hardware along with inter-phone for multi-unit buildings.	Maintenance Level 2	10 Years
Install cap bead over glazing tape on exterior of sliding glass doors.	Maintenance Level 2	15 Years

Planning for Replacement

Where the existing operable mechanisms and seals cannot be adjusted or repaired to function properly, consider more substantial refurbishment and replacement of these parts. Window and door replacement may also address other issues such as thermal comfort, sound penetration, energy performance, and condensation. The work to complete a substantial window refurbishment project follows similar steps to those discussed in the Maintenance Matters Bulletin No. 13 on Residential Window and Door Replacement.



More Information

- › Consumer Guide to Window and Door Replacement
- › Maintenance Matters No. 3: Avoiding Condensation Problems
- › Maintenance Matters No. 5: Sealants
- › Maintenance Matters No. 11: Creating and Implementing a Building Envelope Maintenance and Renewals Program
- › Maintenance Matters No. 13: Residential Window and Door Replacement
- › Maintenance Matters No. 18: Repairing and Replacing Window Wall Systems
- › Best Practice for Window and Door Replacement in Wood-frame Buildings
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