

# BPA Best Practice Guidelines – Replacing Windows In Moisture Prone Walls

## Objective Of These Guidelines

When windows in moisture-prone walls are being replaced the objective is to manage the path of exterior water flow at window/wall joints so that water does not remain on the inside of walls.

## The “Deflect & Drain” Strategy

These best practice guidelines address the objective by using strategies to “deflect and drain” water from window areas on moisture-prone houses. The deflect and drain strategy involves:

- Deflecting water away from window opening at top of window opening
- Providing unobstructed pathways for water to drain from top of window opening down to sill
- Draining water from window opening to outside at sill of window

## Format Of These Guidelines

These guidelines are written in “objective” format and contain recommendations on “what-to-accomplish” (objectives) rather than specifically “how-to-do” (methods). Installers can meet these objectives in various ways depending on circumstances found on each jobsite. Any procedures, product references, or drawings provided in these guidelines are considered acceptable solutions to meeting an objective, rather than the only method of meeting that objective.

Each installation step is organized in the following format, similar to that being proposed for the new Objective Based British Columbia and National Building Code;

**Objective:** States in broad terms what that step of the guideline is intended to achieve

**Acceptable Solution:** Provides one or more possible solutions to meeting the objective

## Guidelines - Step 1 Wall Moisture Assessment Procedure

**Objective:** Determine if house is considered moisture-prone based on pre-existing conditions

**Acceptable Solution:** Perform the following Wall Moisture Assessment Procedure of BPA

### **Assessment #1: Is house location and structure likely to be exposed to wind driven rain?**

- Is the local area known to be excessively windy?
  - Some examples are Abbotsford/Sumas, Ladner, Campbell River
- Is the location of the house highly “exposed” to wind-driven rain?
  - Is the south and/or east side of the building open to the weather?
  - Is it unprotected by surrounding trees, houses, buildings etc.?
- Is the structure such that rain is likely to enter the walls?
  - Are roof overhangs inadequate (1 foot for every 4 feet between window and roof)
  - Are there no flashings installed where required?
  - Does the height of the house increase its exposure (2-stories or more)
  - Is the siding/cladding the vertical channel type?

**Action: If “yes” to any of above perform Moisture Measurement Test (Assessment #3)**

### **Assessment #2: Are there visual signs of moisture problems?**

- On the exterior check the south and east sides for visual signs of excessive weathering
  - Are fascia boards, wood trim, or cladding more weathered than on the other sides?
  - Does the siding/cladding have cracks, broken joints/miters, staining or mold?
- On the Interior check for visual signs of excessive moisture
  - Is there any mold, staining, discolouration, “punky” drywall, etc. around the windows?

**Action: If “yes” to any of above perform Moisture Measurement Test (Assessment #3)**

### **Assessment #3 – Does the moisture measurement test show signs of moisture problems?**

- Use an intrusive type (with probes) moisture measurement meter that rates moisture content of wood by percentage, such as;
  - Delmhorst - J4 Analogue unit
    - Salton Fabrication at 604-888-0122, or Coe Manufacturing at 602-276-1722
  - Protimeter – Mini BLD2000
    - Alternative Inspection Products at 604-931-8428
- Perform test on a window that is considered to be most moisture prone by;
  - Accessing bottom window sill/jamb joints at approximately center of wall cavity
    - If window is fully removed this area will be easily accessible
    - If old frame is in place provide access by drilling holes in corners of old frame
  - Checking framing members to determine if they are “punky” or show signs of rot
  - Inserting probes of moisture meter as per manufacturers instructions
  - Take measurement and document moisture content readings

**Action: If signs of rot are visible, or if moisture measurement is over 19% (as per BC Building Code), document results and notify homeowner (Assessment #4)**

### **Assessment #4 – Have documentation, notification, and recommendations been provided?**

- Documentation at this stage is necessary to demonstrate that due diligence was performed by the contractor and should be completed in the following way;
  - Document results of moisture measurement test on company’s work order for that job
  - Notify homeowner of pre-existing conditions that signify a moisture-prone wall
  - Recommend windows be installed according to best practices for water management
  - Inform homeowner of additional costs or issues associated with installation methods

**Action: Install windows according to following best practice guidelines**

### **Guidelines - Step 2 Removing Old Window And/Or Components**

**Objective:** Provide clear access for proper installation of new window

#### **Acceptable Solutions:**

- Full removal of old frame using “collapsing” method, or
- Full removal of old frame using “cutout method, or
- Removal of components to “piggyback” new window over old frame

### **Guidelines - Step 3 Ensure Structural Soundness Of Building Components**

**Objective:** Ensure no visible adjacent building materials are in a state of deterioration

#### **Acceptable Solutions:**

- Check for signs of moisture damage, rot, or deterioration
- If found, document results and notify homeowner
- Replace defective materials using kiln dried lumber

### **Guidelines - Step 4 Provide For Water Deflection At Top Of Window Opening**

**Objective:** Prevent water from above window draining down cladding and onto window/wall joints

**Acceptable Solutions:** Install drip cap (header flashing) on wall above window opening

- Building code (Sec 15.1.9) states header flashing is not required if distance from top of window opening to overhang is less than ¼ of eave overhang depth.
- Flashing material to be appropriate for exterior use:
  - Galvanized Steel: With minimum thickness of .38mm, or
  - PVC: With minimum thickness of 1mm
  - Profile to be sloped to ensure water drains off of surface (angled to 10° or more)
  - Shaped “dams” at ends to prevent water from running over edge
  - Width to extend at least 1” beyond edge of new window flange

### **Guidelines - Step 4 (cont.)**

- **Note:** Cutting kerf into cladding is not recommended as it weakens cladding material
- Placement Option A: Onto sheathing behind building paper:
  - Attachment to sheathing by nail, screw or “blind seal” caulking is acceptable
  - Apply bead of caulking on underside of flashing at sheathing/flashing joint
- Placement Option B: On surface of cladding:
  - Apply “blind seal” bead of caulking to attach flashing to cladding
  - Apply bead of caulking at top and bottom of flashing/cladding joint

### **Guidelines - Step 5 Provide For Water Drainage At Sill Of Window Opening**

**Objective:** Provide method of draining water to outside of window opening at sill area

**Acceptable Solutions:**

- Install “pan flashing” to cover sill from inside of new window to outside of cladding:
  - Type of material to be appropriate for use (membrane, metal, vinyl)
  - Sloped downwards to ensure water drains to outside of wall
  - Shaped “dams” at ends to prevent water from running over edge
  - Shaped “dam” at inside edge to prevent water from running to inside
  - Width to extend across sill and approximately 6” up each jamb
- Attach to wall materials as per manufacturers instructions

### **Guidelines - Step 6 Provide Moisture Barrier At Jambs Of Window Opening**

**Objective:** Prevent moisture from entering wall cavity

**Acceptable Solutions:**

- Install building paper or house wrap:
  - Height to extend from top of window opening down to overlap pan flashing
  - Placement to cover jambs from inside of new window to outside of cladding
- Attach to wall materials as per manufacturers instructions

### **Guidelines - Step 7 Provide Drainage Path At Header Of Window Opening**

**Objective:** Allow water that enters wall above window opening to drain into window opening

**Acceptable Solutions:**

- If old frame has been removed, clear area between sheathing and cladding:
  - Remove or cut slot in building paper or other obstructions
- If old frame has been left in place, provide method for water to drain through old frame
  - Drill drain holes of at least ¼ inch into inside channel of old frame
  - Provide “dam” at ends of old frame to ensure water drains through new drain holes
    - Drill hole in each corner and fill (caulk) cavity between old frame and wall

### **Guidelines - Step 8 Ensure Drainage Path Around New Replacement Window**

**Objective:** Allow water that enters window opening to drain down to pan flashing on sill

**Acceptable Solutions:**

- Install window as per manufacturers instructions:
  - Provide proper shimming and ensure window is square, plumb, and level
- Provide air barrier and insulation at interior joints of new window and wall at head/sill/jambs
  - Use of rod & caulk or foam is acceptable
  - **Note: Depth of foam/caulk not to exceed 1” from inside of new window**
    - Allow path for water to drain down new window frame and onto pan flashing
- Seal air leakage pathways (fastener holes) between window frame and wall

## **Guidelines - Step 9 Provide Exterior Weather Sealing of New Window**

**Objective:** Prevent exterior water from entering window cavity by reducing pressure differentials

**Acceptable Solutions:**

- Seal exterior window/cladding joints at header and jambs
  - **NOTE- On sill ensure water drainage pathways are not obstructed**
  - Use only exterior grade caulking, installed as per manufacturers instructions

## **Guidelines - Step 10 Provide Interior Air Sealing of New Window**

**Objective:** Prevent exterior water from entering window cavity by reducing pressure differentials

**Acceptable Solution:**

- Seal full perimeter of new window at interior joints of window and wall
  - Seal sill at joints of new window and back dam of pan flashing
  - Seal header and jambs at joints of new window and interior trim

## **Guidelines - Step 11 Provide Maintenance Recommendations To Homeowner**

**Objective:** Homeowner understands purpose and procedures of maintenance

**Acceptable Solution:**

- Explain window operation procedures
  - Opening, closing, hardware operation, etc.
- Review warranty policy, procedures, and limitations
- Review maintenance requirements
  - Inspect and replace caulking, cleaning, vent removal, etc.

# FULL REMOVAL METHOD



