



E2/AS1 – DRAINED CAVITY AND OPENINGS

Water penetration in and around windows and doors can cause significant damage. Following a few easy steps helps manage this risk and protect the vulnerable timber frame. We look at the E2/AS1 option.

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When incorporating a drained and vented cavity cladding system into timber-framed construction, the window and door openings need to be correctly prepared before installing the aluminium joinery.

E2/AS1, the compliance document for the Building Code Clause E2 *External moisture*, provides an Acceptable Solution for drained and vented cavity design and construction and incorporates details for the installation of aluminium fixed, hinged or stayed window and door joinery up to 5 m maximum square. The principles shown here can be applied to all windows and doors.

Water entry paths

One of the main considerations for weathertightness is ensuring that water on the exterior face of the building cannot enter around the head and jambs of windows or doors and that any water that has penetrated the cladding assembly and entered the cavity above the joinery can drain to the exterior of the cladding at the window or door head.

The joinery unit itself may also leak over the life of the building, allowing water to enter the trim cavity where it can damage the timber framing. These leaks may occur at the head and jamb junctions with the exterior cladding, or through the glazing seals or at the corner mitres in the joinery itself. Water assisted by gravity can then drain within the joinery unit into the sill extrusion, where it may eventually get onto the timber sill trimmer.

Consequently, window and door opening preparation focuses on providing drainage paths on the face of the cladding and within the cavity, and protecting the timber framed opening from leaks around and through the joinery, particularly at the corners and along the sill trimmer.

Take underlay into frame

Initial protection of the timber-framed opening is achieved by taking the wall underlay into the full depth of the frame and securing it around the perimeter of the opening (see Figure 1).

Flashing tape, not too much or too little

Next, use flexible flashing tape in the corners and across the sill trimmer of the opening as secondary protection. In drained and vented cavity installations, the majority of the sill window extrusion will be located out over the cavity. While most water that may enter the extrusion will drain down into the cavity, there is still a chance of water reaching the sill trimmer, hence the need for this secondary framing protection.

Stick the tape to the wall underlay covering the full depth of the framed opening running a minimum of 100 mm along the head and down the jamb at top corners, turn it out 50 mm over the face and adhere to the wall underlay (see Figure 2).

For the sill trimmer, install the tape over the entire width and again turn the tape up the jamb a minimum of 100 mm at each end and →



Figure 1: Make diagonal cuts in the wall underlay and turn into the full depth of the window opening.



Figure 2: Fit flashing tape in corners and along sill.



Figure 3: Head flashing with 10 mm high stop-ends and cavity closure device.

out 50 mm over the face and adhere to the wall underlay (see Figure 2). The tape doesn't need to run the entire width of the head or length of the jambs.

If the flashing tape isn't flexible enough, the tape may need to be cut at the four corners so it can be dressed out over the face of the wall underlay. If it is cut, cover the exposed area of wall underlay or any exposed framing with another layer of tape to ensure secondary protection to the entire corner.

Always take care to avoid a large build-up of tape. This can cause issues during window installation and may result in the tape being damaged, reducing its effectiveness, reducing the 5 mm minimum gap for the air seal or compromising flange cover. Also, overuse of tape may result in unnecessary timber sweating.

Head flashing installation

Incorporate a head flashing that extends across the full width of the cavity with a minimum cross fall of 15° and an upstand that fixes to the face of the wall underlay with a minimum of 35 mm cover behind the cladding (see Figure 3). This will ensure that the width of the head of the window or door is protected at the junction with the exterior cladding. Install the flashing at least 20 mm past each side of the jamb flange or any scribe or jamb protection device that is to be part of the cladding installation.

Pre-fix the head flashing to the wall in the correct position for the aluminium joinery finished height. Ensure the front downturn of the flashing gives 10 mm cover over the head flange of the joinery after installation.

Incorporate 10 mm high stop-ends in the head flashing. These should extend from the face of the upstand for the full depth of the cavity to the back of the exterior cladding – these are often left off and can result in water being blown along the flashing and into the cavity. These stop-ends must not pass through the cladding.

A layer of flexible flashing tape sealing the flashing to the wall underlay or another layer of wall underlay as BRANZ details show, should be installed across the width of the head flashing upstand. This allows any water draining down the cavity (on the underlay) to drain across the head flashing through the 5 mm gap to the exterior.

Complete the window or door opening preparation by installing a cavity base closure device in the cavity for the full width of the head flashing above the opening, at a height that allows a 15 mm minimum drip edge to the



Figure 4: Insert a backing rod before sealant to stop the sealant protruding into the cavity.

exterior cladding. The closure device facilitates drainage and ventilation, restricts vermin entry and stops water being blown up into the cavity.

Joinery sizes and tolerances

Joinery needs to be sized so there is:

- a 10 mm minimum flange cover of the unit over the cladding at the jamb and sill
- a 5 mm minimum clearance between the back of the timber reveal and the prepared opening to create a trim cavity.

Often these tolerances are not allowed for, and the result is flashing tape damaged during installation or insufficient trim cavity.

The joinery unit will also need to be supported by packers or proprietary support brackets, particularly at the sill. These should be installed as per the joinery manufacturer's requirements.

Now install the aluminium joinery and complete the exterior cladding. Include a gap of at least 5 mm from the bottom edge of the installed cladding to the top face of the head flashing. This allows any water that has entered the cavity above the window or door to drain down the back of the cladding and out over the head flashing. If this gap is not provided, water may dam behind the cladding and cause damage.

Unlike direct fixed cladding systems, which need an allowance for drainage at window sills, the joinery in a drained cavity can be fitted tight back against the cladding, with the jamb to cladding joint sealed or covered with a protection device, such as a scribe, to ensure water does not penetrate behind the jamb flange. Under E2/AS1 sill flashings are not required for windows or doors installed in a cavity system.

Air seal

Once the joinery has been accurately fixed in place, complete the window installation by installing an air seal to the entire perimeter of the trim cavity opening. This air seal is fundamental to the performance of the drained and vented cavity – it works with the plasterboard interior lining to create an air pressure barrier that allows air to enter the cladding assembly. This moderates the pressure within the drained cavity and the trim cavity to a level similar to the outside air pressure and negates the potential for water to be driven towards the lower pressure interior of the building through the cladding assembly, especially when wind drives rain against a building.

E2/AS1 window head detail construction sequence for weatherboards

Step 1 – Install wall underlay, cut and fold back around opening.

Step 2 – Tape top corners with flexible flashing tape and across the sill trimmer with a 100 mm turn-up at each end.

Step 3 – Install cavity battens up each side of window and install cladding up to the bottom lintel edge.

Step 4 – Fix head flashing to wall framing. Ensure there are 10 mm stop-ends at each end that stop at the back face of the cladding line, and that there is a minimum 15° fall to the exterior.

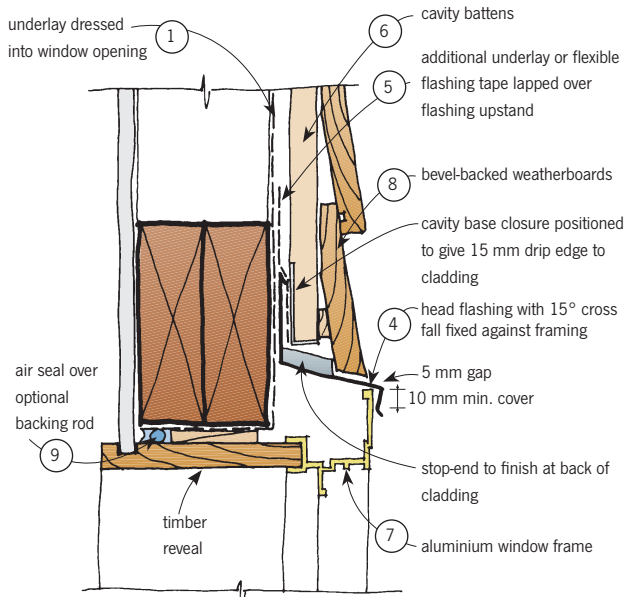
Step 5 – Install second layer of wall underlay or tape lapped over the head flashing upstand.

Step 6 – Install cavity battens and vented cavity closure over head flashing above window.

Step 7 – Install window. Temporarily fix in place. (Window may be installed after the cladding completed.)

Step 8 – Complete cladding above window.

Step 9 – Complete fixing of window with required packers and install air seal.



E2/AS1 detail of window head flashing with cavity-fixed, bevel-backed weatherboards. Steps 2 and 3 not shown in this view.

First, insert a PEF backing rod (see Figure 4). Then form the air seal by installing a continuous bead of waterproof expanding foam sealant against the backing rod around the entire perimeter of the opening on the inside line of the frame, to the minimum 5 mm trim cavity between the window or door reveal and the frame. Ensure the sealant adheres to both the wall underlay/flexible flashing tape and the timber reveal to create an airtight seal. The sealant needs to be installed against the backing rod so the foam forms a bead and does not expand into the trim cavity.

Too often, foam has incorrectly expanded to fill the entire trim cavity. This restricts air circulation within the trim cavity and potentially exposes the foam to moisture from the drained and vented cavity.

Following these basic principles will ensure that the finished window and door installation will manage water on the outside of the building and within the drained and vented cavity. ◀

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