PARAPET AND ENCLOSED BALUSTRADE CONSTRUCTION

Buildings with poorly designed and built parapets and enclosed balustrades are at high risk of weathertightess failure. Careful design and construction is needed.

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Many designers incorrectly treat the top surface of a parapet or enclosed balustrade (that is, a timber-framed balustrade with a cladding to each vertical face) as another area of exterior wall cladding. Instead, they should be treated as a small roof, as using wall cladding details, materials and finishes on these flat or low pitched surfaces can cause significant failure. On top of this, the often complex junctions between parapets and balustrades and the main walls of a building, and the incorporation of top-mounted handrails in enclosed balustrades, increase the potential opportunity for water penetration.

Drained cavity wall recommended

E2/AS1, the compliance document for Building Code Clause E2 *External moisture*, gives a range of cladding material options for the design and construction of parapets and enclosed balustrades. Following E2/AS1, it is possible to design a building that has a weathertightness risk score (using the risk matrix calculation) that allows the use of direct fix cladding details for parapets and enclosed balustrades. However, it is more than likely that a drained and vented cladding system will be required.

Regardless of total risk score, BRANZ recommends designers specify drained cavity wall construction to both sides of all parapet and enclosed balustrade situations as a prudent safety feature.

Critical details

The critical aspects of parapet and enclosed balustrade design and construction are the:

- tops of the wall
- handrail connections
- complex junction between the horizontal tops of parapets and enclosed balustrades and the cladding of the vertical main walls of the building.

Parapet tops

The top of parapet walls designed to E2/AS1 are required to be finished with a metal or membrane (such as butyl rubber or EPDM) cap flashing. The rationale is that the owner is unlikely to regularly check the completed installation to determine its condition.

METAL CAP FLASHINGS

Metal cap flashings should have a minimum 5° slope and overlap the cladding down each face of the parapet by a minimum of 50 mm (70 mm in very high wind zones).

The metal cap flashing needs to be sized to overflash the parapet wall cladding and any saddle flashing and should incorporate a separation layer to prevent corrosion between the metal cap flashing and the sloped treated (H3.1 minimum) timber support packer.

All joints in a metal parapet cap flashing should be overlapped, riveted and sealed. Corners should incorporate preformed metal soaker flashings and also be riveted and sealed (see Figure 9 of E2/AS1). Allowance should be made at the joints for expansion of the metal.

MEMBRANE CAP FLASHINGS

Membrane flashings should have a minimum 10° slope and 55 mm cladding overlap. Joints in membrane cap flashings should be formed as per the manufacturer's recommendations and specifications.

Enclosed framed balustrade walls

The construction of enclosed balustrades to decks is similar to parapets, but there are differences with cap flashing options, handrail fixings, requirements for possible deck drainage through the balustrade and the finish at the junction of the bottom of the balustrade with the surface of the deck.

BALUSTRADE TOPS

While E2/AS1 requires that parapets must have an exposed metal or membrane cap flashing, extra options for enclosed balustrade walls are the use of stucco plaster, EIFS and flush-finished fibre-cement with a backflashing.

A plastered finish requires the slope to be increased from 5° to a minimum of 10°. Also, an applied waterproof membrane needs to be applied as a secondary under flashing – over the sloped balustrade top and under the final finished coating. This membrane should be as specified by the manufacturer of the actual finish coating being used.

Solid balcony or barrier wall construction sequence (cavity construction)

Step 1 – Install the wall underlay to the full height wall.

Step 2 – Construct the balcony wall framing.

Step 3 – Wrap the balcony wall framing in wall underlay, carrying it over the top plate. Fold underlay at the internal corner over the full height wall underlay.

Step 4 – Install sloped H3.1 treated timber top capping to balcony wall to provide support for the cap flashing.

Step 5 – Install cavity battens to balcony wall; set battens back from corners to create a drainage gap.

Step 6 – Install flexible flashing tape over the top capping and 50 mm down the face of the battens. Dress it onto the wall underlay of the full height wall.

Step 7 – Wrap capping to isolate timber from metal cap flashing.

Step 8 – Install cavity battens to the full height wall; set battens back from corners to create a drainage gap.

Step 9 – Install back flashing to the internal corners.

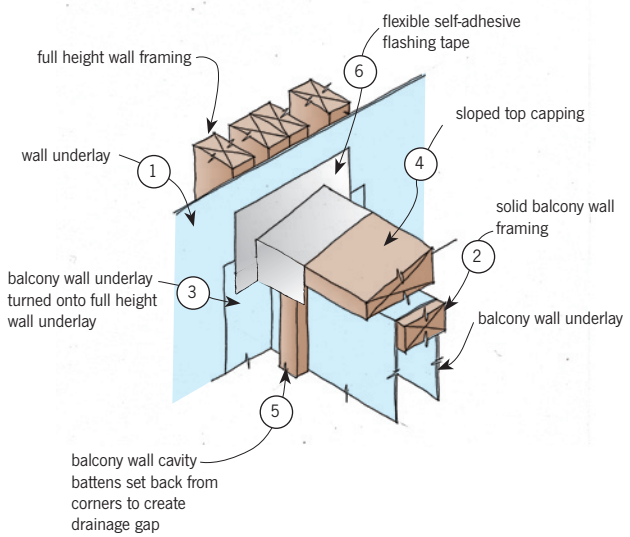
Step 10 – Install cladding to barrier wall.

Step 11 – Install fabricated saddle flashing over cavity battens with upstand to go behind full height wall cladding.

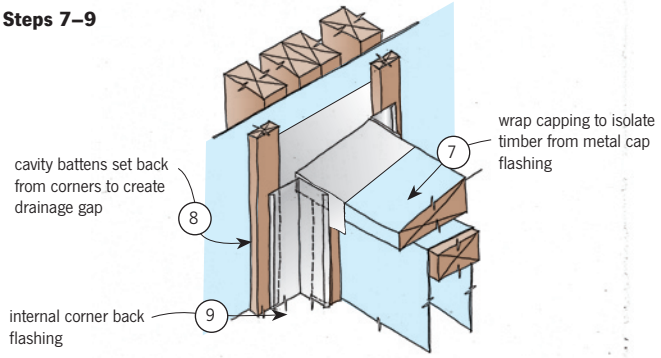
Step 12 – Complete cladding to full height wall.

Step 13 – Install cap flashing to barrier wall.

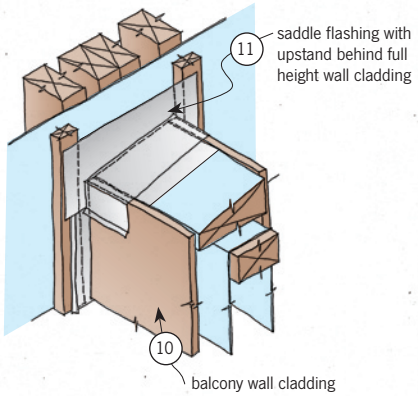
Steps 1–6



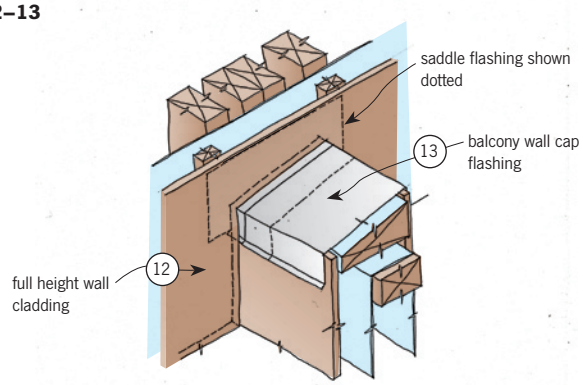
Steps 7–9



Steps 10–11



Steps 12–13



HANDRAIL CONNECTIONS

Any handrail fixings must be made through the *vertical* face of the balustrade cladding as there have been significant failures when handrail connections penetrate the horizontal top of enclosed balustrades, creating a vertical drainage path directly into the balustrade frame.

Handrail fixings should incorporate neoprene or EPDM washers and sealant at the cladding penetration. Use the minimum number practicable for support of the handrail. →

DECK DRAINAGE

Incorporate drainage outlets that meet the requirements for the deck size. Where the deck's primary drainage is through the enclosed balustrade wall, the outlet shall be at least 200 mm wide by 75 mm high. However, 300 × 100 mm is recommended to give the applicator space to form the outlet. Dress the deck waterproofing membrane through the base and up the sides of the opening and seal to the cladding. Terminate the cladding around the drainage opening, like a typical bottom of wall cavity termination.

Preformed drainage outlets are also available, and these should be installed as per the manufacturer's recommendations.

Where overflows are required, these should go through the balustrade wall. Construct as per a drainage outlet but at a minimum from E2/AS1 of 200 mm wide and 50 mm high (making them the same size as the outlet is recommended).

CLADDING AND MEMBRANE

The bottom edge of the enclosed balustrade cladding should be kept a minimum of 35 mm above the highest point of the deck surface, with a minimum 10 mm drip edge to the cladding from the cavity base closure.

The waterproof membrane to the deck needs to turn up a minimum of 150 mm as an under flashing behind the cladding and cavity battens (if installed) and should be adequately folded or over flashed at the corners of the deck.

Wall junctions

One of the trickier junctions to detail and build in the correct sequence is the intersection of the parapet or balcony wall at a lower level and at right angles with a main wall of the building. Where no saddle flashing has been used, or the flashing was poorly installed, water has penetrated the assembly at this junction and damaged the parapet framing.

To ensure primary and secondary drainage is provided, there are a number of key construction steps to follow (see construction sequence on previous page).

The preformed metal saddle flashing (installed in step 11) is formed with a 5° slope over the parapet frame and is sized to under-flash directly behind the main wall cladding and over-flash the parapet wall cladding by 50 mm (70 mm in very high wind zones). This protects the vulnerable parapet to main wall cladding junction and deflects water down over the sides of the parapet wall cladding.

Following these basic principles should keep parapets and enclosed balustrades waterproof and allow any water that penetrates the cladding to be managed by under flashings and the drained and vented cavity.