Cladding design

Although aesthetics are important in cladding selection, other factors need to be considered to ensure any water hitting the exterior is deflected, or can drain away or dry out.

BY ANNEMARIE CRAMPTON, BUILD EDITOR

Horizontal profiled metal.

ROOF AND WALL CLADDINGS play a key role in the weathertightness performance of a building. To perform properly, designers need to select exterior claddings that are relevant to the building design and location. These need to be correctly designed, detailed and installed.

Wall cladding selection

With so many claddings available to choose from, how should a designer select? As well as looking good, claddings need to be appropriate, so consider:

- the site's weather and environmental conditions, such as contours, nearby structures and contaminants
- building complexity
- durability
- E2/AS1 risk score requirements
- surface finish options for the in-use environment
- availability of specialist installers
- compatibility with other cladding systems on the building including junction details between dissimilar claddings
- accessibility for maintenance.

Wall cladding types and installation

Common residential wall cladding systems are:

- weatherboards - timber, fibre-cement, PVC-U or aluminium
- fibre-cement sheet - open-jointed flat or flush-jointed flat
- plywood sheet - open-jointed, vertical-lapped or batten-jointed
- EIFS
- stucco
- profiled metal
- aerated plastered concrete panel or blocks
- masonry veneer.

Many claddings are proprietary systems that incorporate specific installation and finish details to ensure the product will be warranted. These cladding systems must be installed and finished in accordance with the manufacturer's requirements.

Weatherboards

Timber weatherboards

Timber weatherboards are a traditional cladding system available in a range of timber species and profiles that can be installed horizontally or vertically. They can be vulnerable to thermal movement (especially if painted dark colours), moisture entry through unprotected end grain, swelling, shrinkage and face splitting.

Several types of timber weatherboards are available:

- Bevel-back and rebated bevel-back horizontal - good weathertight performance, allowing air to enter and water to drain or dry. When using E2/AS1 for compliance, they can be direct-fixed on buildings with a risk score up to 12. Above this, a nominal 20 mm cavity must be used.
- Rusticated horizontal - very air leaky but has less drainage and drying capacity than bevel-back. Can only be direct-fixed on buildings with a risk score of 6 and below when using E2/AS1 for compliance. Above this, install over a nominal 20 mm cavity.
- Shiplap vertical - very air leaky and less drainage and drying capacity. Can only be direct-fixed on buildings with a risk score of 6 and below when using E2/AS1, although some systems have been appraised for use on buildings with a risk score up to 20.
- Board and batten vertical - quite robust and weathertight with good drainage. When using E2/AS1 for compliance, they can be direct-fixed on buildings with a risk score up to and including 12.

Fibre-cement weatherboards

Usually proprietary systems, these are available in a range of compositions, thicknesses and profiles. More stable than timber weatherboards but usually have less drainage and drying capacity.

Fibre-cement is absorbent - boards need to be painted to be durable and weathertight. They can be vulnerable to thermal movement (especially if painted dark colours), moisture absorption and moisture penetration at board ends.

Generally, fibre-cement weatherboards can be direct-fixed for buildings with a risk score of 6 or below. Above this, they must be installed over a nominal 20 mm cavity when using E2/AS1 as a means of compliance, although some have been appraised as being able to be direct-fixed for buildings with a risk score up to 12.

PVC-U and aluminium weatherboards

These proprietary systems are available in a range of profiles and material compositions, are prefinished and come in various colours. They are usually a proprietary clip-together system that must be installed in accordance with the manufacturer's instructions. Because they are affected by temperature, thermal movement and fading through UV may be a problem.

> Many claddings are proprietary systems that ... must be installed and finished in accordance with the manufacturer's requirements.

Fibre-cement sheet

Usually proprietary systems, these incorporate a range of compatible components and must always be installed following the manufacturer's instructions.

Fibre-cement sheet is available in a range of sheet sizes, thicknesses and material compositions. The durability and performance of different systems varies - always check the specified system is fit for purpose.

Fibre-cement is an absorbent material, and the sheets must be painted or coated on the front and at least 100 mm around onto the back to be weathertight and durable.

Sheets can be direct-fixed under E2/AS1 up to a risk score of 6 if vertical joints between sheets have battens or jointers and horizontal joints are flashed.

Flush-jointed flat fibre-cement sheet

Used to create a monolithic finish, minimum 7.5 mm thick sheets have a rebated sheet edge to allow the joints to be taped and stopped with proprietary jointing and subsequent coating system that has been evaluated against the requirements of BRANZ EM4. Expansion or movement control joints must always be incorporated.

These systems are very high maintenance, and the coating system must be well maintained.

Flush-finished systems must be installed over a nominal 20 mm cavity when using E2/AS1 as a means of compliance.

These systems can be vulnerable to thermal movement (with dark finishes), building movement, poor installation, joint cracking, poor surface coating application, moisture absorption and lack of maintenance.

Plywood sheet

Plywood sheet cladding comes in various timber species, sheet thicknesses and sizes.

When not manufactured from a durable timber - such as cedar - exterior plywood needs to be treated to a minimum level of H3 and be a minimum of 5 ply and 12 mm thick.

Uncoated H3.2 plywood is absorbent but durable. A paint or stain exterior coating may be required by the manufacturer.

Horizontal joints require a durable metal Z flashing that underflashes the upper sheet and overflashes the lower. Internal and external corners must be backflashed or covered with cover battens (direct-fixed plywood sheet requires both of these).

They can be direct-fixed on buildings with a risk score of 6 or below, provided vertical joints between sheets have battens or jointers and horizontal joints are flashed. They need to be over a drained and vented cavity for higher-risk buildings when using E2/AS1 as a means of compliance.

Plywood systems can be vulnerable to sheet cupping, face splitting and moisture penetration at sheet edges.

Exterior insulation and finish system

EIFS claddings create a monolithic finish on a building. Most are proprietary systems installed by a licensed applicator with a fibreglass mesh-reinforced base coat applied over expanded polystyrene sheets, ➤

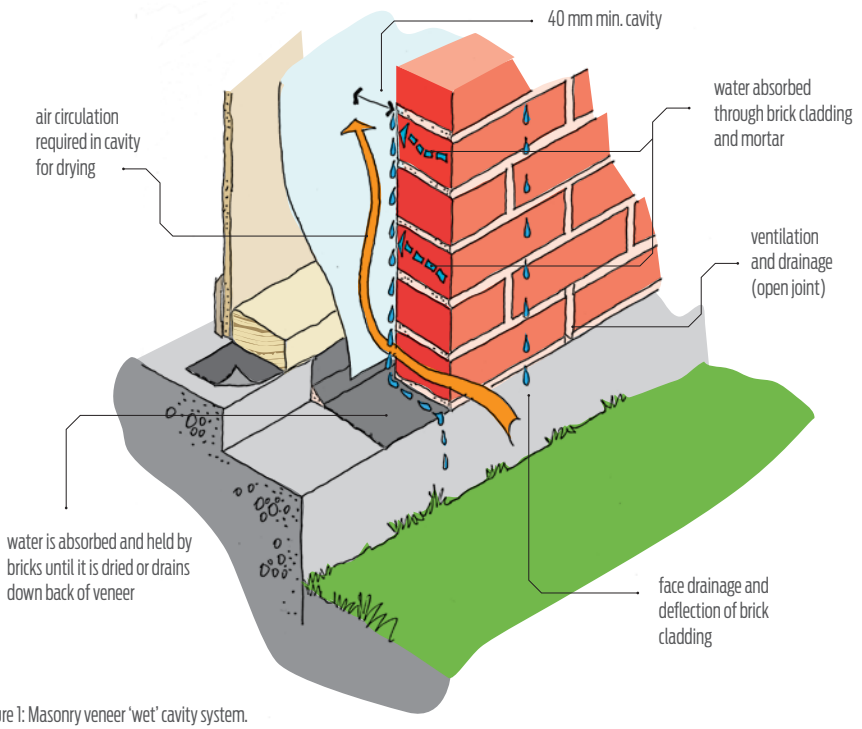

Figure 1: Masonry veneer 'wet' cavity system.

together with textured polymer or acrylic weathertight finish coats. They have some insulation value.

Under E2/AS1, direct fixing of EIFS cladding is not permitted.

The face seal coating system must be well maintained.

EIFS claddings can be vulnerable to building movement (if recommended control joints are not installed), poor installation and poor surface coating application.

Stucco

Stucco is a traditional cladding system used to create a monolithic finish. It incorporates a sand-cement plaster applied over metal lath or mesh reinforcing on rigid or non-rigid backing material and is best applied by an experienced tradesperson. The total system is either two or three coats and is finished with a weathertight exterior acrylic coating system.

Stucco claddings should always be installed on a drained and vented cavity to ensure a good level of secondary protection - the cavity provides good drainage and air circulation for drying. Direct-fixed stucco cannot be used under E2/AS1.

Stucco cladding must be comprehensively detailed to ensure a weathertight performance, and include movement control joints.

Stucco is vulnerable to incorrect mix proportions leading to excessive shrinkage and cracking, poor sand quality, poor installation or incorrect curing, ground movement, building movement, sealant failure in control joints and lack of maintenance.

Profiled metal

Profiled metal wall claddings are available in a range of profiles - corrugated or trapezoidal are the main ones - and finishes.

It comes in a variety of sheet lengths, widths and thicknesses manufactured in zinc/aluminium coated steel or galvanised steel with a factory-applied colour coating.

As a cladding, profiled metal can be installed horizontally (over a cavity) and vertically and is screw-fixed through the trough or crest to the framing.

When installed horizontally, under E2/AS1, it must be fixed over a nominal 20 mm drained and vented cavity.

When installed vertically, it can be direct-fixed on buildings with a risk score up to 20.

Profiled metal may be vulnerable to condensation damage, junction details that can trap moisture, poor detailing and installation.

Aerated concrete

Aerated concrete panels and blocks are proprietary cladding systems that are finished with a reinforced plaster system and waterproof coating.

Panels are generally installed over a proprietary batten system.

Systems require regular recoating and may be vulnerable to cracking from building movement unless control joints are correctly installed.

Masonry veneer

Masonry veneer claddings usually consist of a veneer - clay or concrete bricks and concrete blocks - with mortar joints installed on a foundation with a minimum 40 mm cavity (see Figure 1).

It is durable, requires minimal maintenance and has good weathertight performance but relies on open joints in the veneer at the bottom and top of the cladding and no mortar bridging the cavity.

The bottom of the cavity and concrete slab rebate must be waterproofed with a DPC, as water draining from the cavity can be absorbed by the slab.

Masonry veneer is vulnerable to cracking caused by movement, blocked or lack of drainage and mortar blocking the cavity.