



WALL UNDERLAY INSTALLATION

Wall underlay plays an important role in the weathertightness of exterior wall assemblies in light timber-framed residential buildings, yet often it is poorly installed. Getting it right can be as simple as 1, 2, 3.

By Greg Burn, Structure Limited, Auckland

We often hear designers and builders say 'my buildings don't leak', but with wall assemblies, there needs to be a mind shift. At some stage, the exterior envelope of a building *may* leak and water will enter. All components within the wall assembly must be capable of managing, and ultimately draining, this unwanted water. The cladding is the first line of defence against water, the wall underlay may be the second.

What happens when water meets wall underlay

Where water comes into contact with the wall underlay, some of the water:

- will drain down the surface, hence the installed wall underlay must allow water to flow downwards across the surface and over or around any joints or penetrations without getting through to the vulnerable timber frame, insulation and interior linings
- may be absorbed and dry over time by evaporation
- may pass through the wall underlay into the framing and insulation behind – this will be slow to dry and may result in long-term damage.

Although wall underlays must not be relied on as a water barrier, the selection and accurate installation of the correct type of wall underlay is fundamentally important to the overall weathertight performance of the wall assembly.

Drainage paths

A drainage path is simply a surface that facilitates the gravity-assisted downwards flow of water across it. In all cladding construction types, the outer face of the wall is the primary drainage path.

DIRECT FIXED CLADDING

When water penetrates a direct fixed cladding it drains down the back of the cladding and the face of the wall underlay. The type and profile of the cladding dictates the amount of water contact with the underlay – flat claddings obviously having a greater contact area than profiled claddings. Bevel-backed weatherboards, for example, may allow some water to drain at the laps.

The majority of water should drain downwards over the wall underlay but water may be absorbed by the wall underlay and the back of the cladding. This will evaporate over time.

DRAINED AND VENTED CAVITY CLADDING

When water penetrates drained and vented cavity assemblies, it will again



drain down the back of the cladding, but because of the depth of the cavity, there will be less potential contact with the wall underlay. The back of the cladding may also absorb some of the water, but drying will be faster because of the air movement in the cavity.

In extreme situations, water may bridge the cavity and reach the face of the wall underlay. The water must be able to shed down the underlay and drain at the bottom, so laps must be correct and penetrations correctly taped.

Two main types of wall underlay

A wide range of wall underlays are available, but there are primarily two main types – kraft paper or synthetic.

PAPER-BASED

Paper-based underlays come in various types but are generally kraft paper treated with bitumen or fire retardant chemicals to improve performance. These underlays are generally:

- breather type and air permeable
- semi-absorbent
- seen as weaker and less durable than synthetics, particularly if they remain wet.

SYNTHETIC

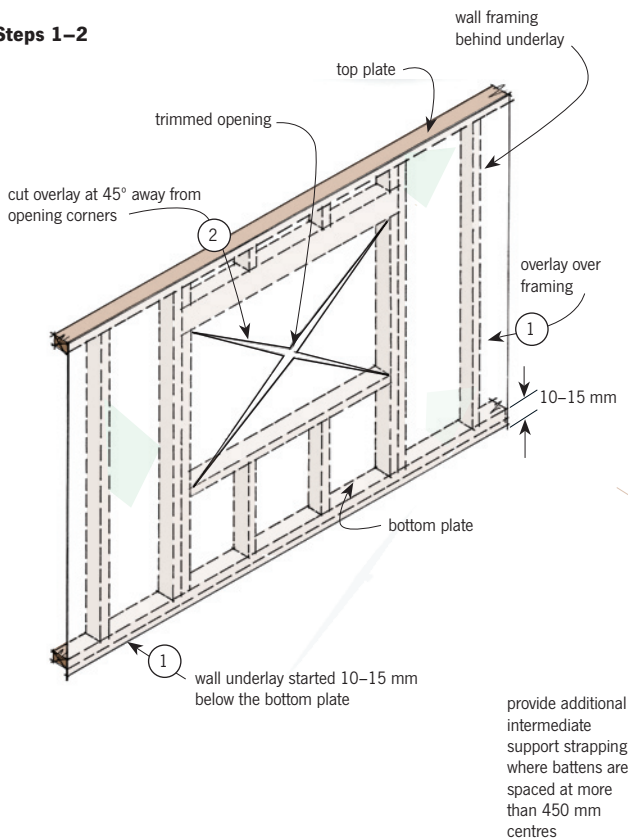
Synthetic wall underlays also come in a range of styles, compositions and performance characteristics. They may be absorbent or non-absorbent, and offer water vapour permeability performance similar to paper-based underlays and offer more durability. →

Wall underlay construction sequence (cavity construction)

Step 1 – Install the wall underlay over the framing starting from 10–15 mm below the bottom plate and carrying it up to the top of the top plate (lapping higher layers over the lower layer).

Step 2 – Trim openings by cutting at 45° away from the corners and folding the wrap around the framing.

Steps 1–2



Step 3 – Install flexible flashing tape to the opening (see Build 111, April/May 2009, page 15).

Step 4 – Fix vertical battens if installed (except above openings) as per E2/AS1 and a continuous horizontal closer batten across the top. Add a slotted cavity closure for drainage and ventilation along the bottom of the wall.

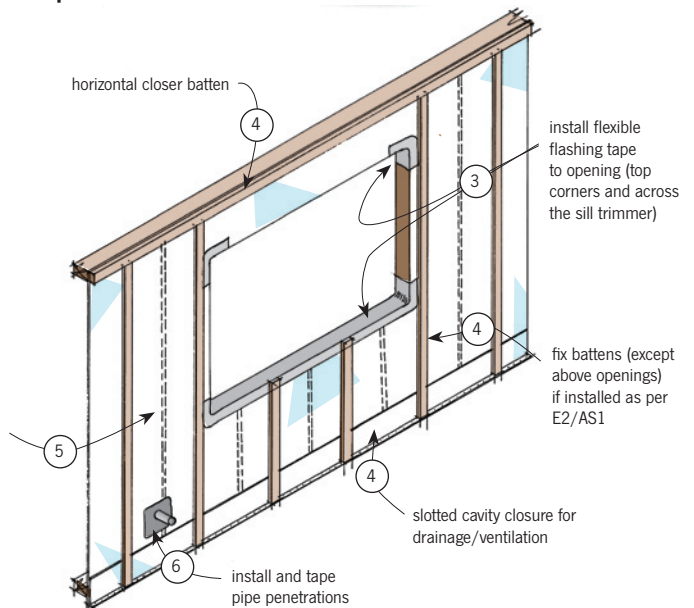
Step 5 – If battens are spaced at more than 450 mm centres, provide additional strapping support over the underlay to prevent it from bridging the cavity after the insulation is installed.

Step 6 – Install all penetrations and seal with flexible tape.

Step 7 – Repair any cuts and tears that may have occurred.

Step 8 – The wall is now ready to have windows, doors and cladding installed.

Steps 3–5



Select the right wall underlay

All wall underlays are definitely not the same. Performance characteristics vary across types, from absorbent to non-absorbent and air permeable to non-air permeable (classified as an air barrier when meeting the performance requirements for air barriers given in Table 23 of E2/AS1).

Selecting the appropriate wall underlay for the particular cladding assembly is critical, for example use:

- non-absorbent wall underlay directly behind absorbent claddings such as fibre-cement

board, timber weatherboards, brick or stucco ■ semi-absorbent wall underlay behind non-absorbent wall claddings in direct fix applications.

Some wall underlays are not guaranteed by the manufacturer when exposed to occasional wetting (including before the cladding is installed). Do not specify these underlays where they may be exposed to water, including leaks in the building envelope.

When using E2/AS1 as a means of compliance with the Building Code clause E2 *External moisture*, wall underlays must also

comply with the performance requirements in Table 23, especially when used as an air barrier, for example, in an unlined gable end wall.

Installation

Only one wall underlay product should be used on a building, but unfortunately many buildings are wrapped with a selection of underlays, often with different performance characteristics.

Install the wall underlay horizontally, running from the top of the top plate to 10–15 mm below the bottom plate, held tautly across the face of the frame and securely fixed to studs and noggs.



150 MM OVERLAPS

In 2-storey buildings, or situations where more than one width of underlay is required, the top layer needs to overlap the bottom layer by 150 mm at horizontal laps.

At the end of runs and other situations such as up gable walls, all laps should be made vertically with a 150 mm end lap over studs. Taping vertical joints with a suitable joint tape is recommended.

WIND AND UV DAMAGE

Loosely installed underlays with insufficient laps may allow water infiltration and are at increased risk of wind damage.

If the wall underlay is being used to partially protect the building during construction and could be left exposed for a length of time, it is important that it is installed to withstand wind pressure, rain and UV exposure during this period. Manufacturers also define maximum exposure times (some are 30 days, others up to 60 days) for underlays, and these should be followed, as any deterioration in the underlay will significantly reduce its in-service performance.

Any damaged underlay needs to be replaced before the cladding is installed.

INSTALL PLASTIC TAPES BEFORE INSULATION

In drained and vented cavity situations, there is potential when installing bulk insulation into the frame cavity to push the wall underlay across the cavity and into contact with the back of the cladding. To avoid this and maintain clear

drainage and ventilation paths within the cavity, plastic tape should be installed vertically from top to bottom plate at mid stud, to hold the underlay back against the frame.

OPENINGS, PENETRATIONS AND HOLES

At window and doors, the wall underlay needs to be cut and fixed into the frame around the entire framed opening and the opening prepared with flexible flashing tape (see *Build* 111 April/May 2009, page 15).

It is critical that components such as pipes and electrical wiring that penetrate the wall underlay and create a potential water leakage path from the building exterior to the interior, are installed before cladding installation. This allows the penetrations through the wall underlay to be taped with a sealing tape. To do this, some change to construction sequencing may be required, with the cladding fitted to the pre-installed components, but it is important that the wall underlay is as weathertight as possible before the building is closed in.

Any tears or holes in the wall underlay should also be taped before the installation of the cladding and exterior joinery, ensuring that the entire exterior of the building is completely wrapped and sealed, and that the wall underlay creates an effective drainage plane.

Correct selection and accurate installation of wall underlay will ensure that it provides an efficient extra line of weathertightness defence for a building exterior. ◀

Styrobeck's expanded polystyrene is light as a feather



...and tough enough to protect and insulate the most challenging jobs.



FORM~FLOW™
TAKES A LOAD OFF RETAINING WALLS

Styrobeck's Form Flow easy to handle panels are 100% recycled. They protect and take the pressure off the waterproof membrane of below ground walls and provide extra drainage.



Styrobeck's high strength underfloor insulation can be customized to suit the plans, will not rot, and substantially reduces heat loss.

Get the full story at

www.styrobeck.co.nz

or call free **0800 262 466**



polystyrene solutions that add value!