VistaClad™

Cladding inspired by nature

VISTACLAD INSTALLATION GUIDE APEX AND INFINITY

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INSPIRED BY NATURE, DESIGNED FOR LIFE.

CONTENTS

CONTENTS

1.0 Introduction

Thank you for choosing a VistaClad cladding product. This guide aims to provide the essential information needed to successfully install the Cladding system. It is assumed, however, that the user of this document has a basic understanding of cladding building practices and pertinent building codes. Compliance with the requirements captured herein must be met for full warranty coverage.

VistaClad products are available in several Polymer-composite materials, please see the pertinent Technical data sheet (TDS) for information specific to these materials and their profiles. A list of profiles, fasteners and accessories have been captured in **Appendix A.**

1.1 Critical installation points

1.1.1 Plan

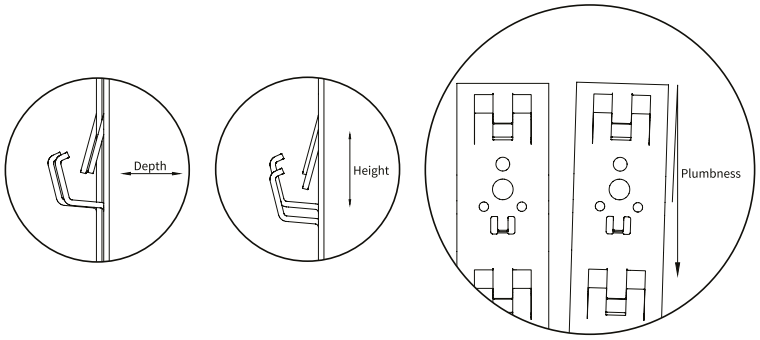
- Most regional standards prescribe the span between cladding supports. 600 mm (24") is common for typical residential installations, as is 450 mm (18") near corners of buildings or areas susceptible to higher-than-normal wind pressures. The VistaClad profiles have been developed with this in mind. Note that shorter the span, the more frequent the interaction between the boards and the strips. This improves the resistance of the boards to loads but can also increase the difficulty with which boards are installed.
- Most regional standards also stipulate minimum starting heights above the ground level (GL) for the cladding system. 20 mm is common for most typical applications.
- Many regional standards also require a minimum cavity depth behind the cladding profiles. 20 mm is common for most typical applications. The various clip strip profiles incorporated with the VistaClad system provides flexibility in satisfying this.
- Most fasteners into most substrates require a minimum distance from any substrate edge. The VistaClad trim system is designed from these guidelines. As a result, the outermost clip strip should be located 50 mm from the substrate edge, should additional bracing not be required along the edge for adaptors and flashing.
- The VistaClad system must be installed in front of a building envelope i.e. the back of the boards should not be exposed to direct sunlight or conditions that generate more heat than the ambient conditions of the site.
- The installation process requires the boards to be clicked into the clip strip and, as a result, a 10 mm clearance to allow the boards to pass over the springs of the clip strip before being clipped into place is required. This is at the top for horizontally orientated board installs and at either side for vertically orientated boards.
- The above 6 points provide an initial framework to guide a VistaClad installation. Planning for these constraints within the context of each project will provide the basis for the cladding system layout.
- Once the outermost clip strips are located, the spans of the intermediate clip strips can be positioned. If these satisfy span requirements (from a loading and installation difficulty perspective), can move to getting 'height' line dup. Then its depth.

1.1.2 Support

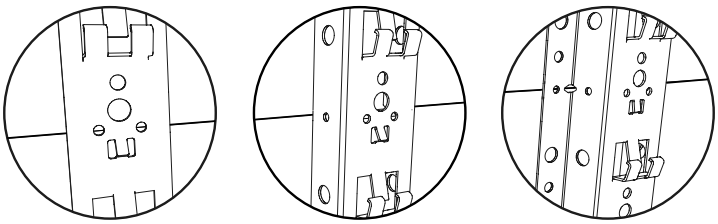
- Ensure that the substrate and fastener can support the load imposed by the added mass of the cladding system.
- Use appropriate spans. Typical regional centre-to-centre span of VistaClad profiles is 600 mm (24"). This span is suitable for residential and light commercial applications. Consult a qualified professional in areas with high wind loads and buildings taller than three stories.
- External corners and edges are more susceptible to damage from wind loads and may require reduced spans and bracing along edges. 450 mm (18") spans are typical at edges or corners of the structure
- Support the cut edges of boards with the use of clip strips.
    - When installing butt joins allow for a 125 mm (5") Centre to Centre span between clip strips.
- Use two clip strips on either side of the butt join so that both board edges are supported.
- Do not overhang boards more than 50 mm from the edge of the clip strip. Where overhangs are greater than 50 mm, additional bracing or battens should be used to support the edge of the board.

1.1.3 Clip strip alignment

- The alignment of clips strip hooks in both height, depth and plumbness is imperative for a swift and easy installation.



- Each clip strip version has its own reference marker, for quick alignment.



- Maintain a 76.3 mm (3") distance between clip hooks, when placing them end to end.
- Protect clip strip hooks during handling and transportation. Clip hooks may collapse under excessive loads. A small cross pein hammer or similar can be used to readjust any collapsed hooks.
- Channel and Top hat Clip strips may bow slightly, take note of any bowing when levelling profiles. As this may affect depth levels.

1.1.4 Fastening

- Specify fasteners that are appropriate for loads, substrate, wind loads and corrosion requirements.
- There are three different hole sizes 4 mm (M3.0 to M4.0), 6 mm (M5.0 to M6.0) and 9 mm (M5.0 to M6.0 for masonry screws or standard M8.0 Bolt). Use the correct hole size for the required fastener.
- When installing flat clip strips, fasten the clip from the topmost hole down to the bottom at the appropriate vertical spans to prevent buckling and hogging between fasteners.
- Ensure that the first and last hole is fastened.
- Ensure that the vertical fastening spans within the clip strip meet with standard requirements and can support the load imposed upon them by the cladding system.
- All fasteners must follow local standards and appropriately specified for atmospheric conditions.
- Maintain minimum edge distances as recommended by fastener manufacturers when fastening into substrates.

1.1.5 VistaClad clip strip and board interaction

- Align both feet of a 160 mm (6") board with the clip hooks before applying any force.
- Apply a straight downward force to the board until the board is fully engaged with the clip strip.
- The board should not be able to disengage once installed.
- Do not overdrive the board.
- Do not pull or hang off the boards during installation, as this may cause damage to the clip hooks.

1.1.6 Cutting

- Do not rip boards less than 70 mm.
- When ripping boards maintain at least two connection points between boards and clip strips, either two feet or one foot and a tongue and groove connection.
- Before cutting boards adjust the length to account for both expansion as well as for trim space.
- When cutting clip strips or any metal part, recoat the ends with an appropriate paint to ensure corrosion resistance.

1.1.7 Expansion

- To calculate the change in length (ΔL) per board, multiply the length of the board (L) by a coefficient of the material (α) and by the difference in temperature between the installation temperature and the *maximum possible* temperature of the boards: $\Delta L = L \times \alpha \times (T_{max} - T_{install})$
  Where:
    - ΔL = increase in board length due to temperature change, in mm.
    - L = initial length of board at installation temperature, in mm.
    - α = linear thermal expansion coefficient as per the material.
        - For Infinity, use α = 0.04
        - For Apex, use α = 0.07
    - T_{max} = the maximum temperature that the boards will reach, in degrees Celsius.
    - $T_{install}$ = the board temperature at time of installation, in degrees Celsius.
- Use the same method to estimate the shrinkage of the boards, where the maximum temperature is replaced with the minimum possible temperature.
- Combining these two changes in length will give the maximum possible change in length for your application.
- Ensure that the trim will cover the edge of the boards throughout this range of expansion and contraction.
- If the expansion and contraction of the boards is very high, consider the following:
    - Using lighter coloured cladding boards that would absorb less sunlight.
    - Use a backing board or film, when the backside of the cladding boards is exposed to UV rays either from direct or reflective sources.
    - Cut boards to shorter lengths and use more butt joints. Thus, there is less expansion and contraction per a joint.
    - Use longer trim and flashing to hide expansion gaps.

1.1.8 Ventilation and vapour barriers

- Provide a ventilation gap between the cladding boards and substrate of a minimum of 10 mm (0.4”), either with the use of a furring strip or top hat clip strip.
- Provide enough ground clearance beneath the first board to allow water to drain.
- Use ventilated flashing or grills to prevent insects from entering while simultaneously allowing moisture and debris to drain from behind the cladding system.
- In stud applications a water-resistant barrier should be used between the cladding system and the substrate.

1.1.9 Practical summary

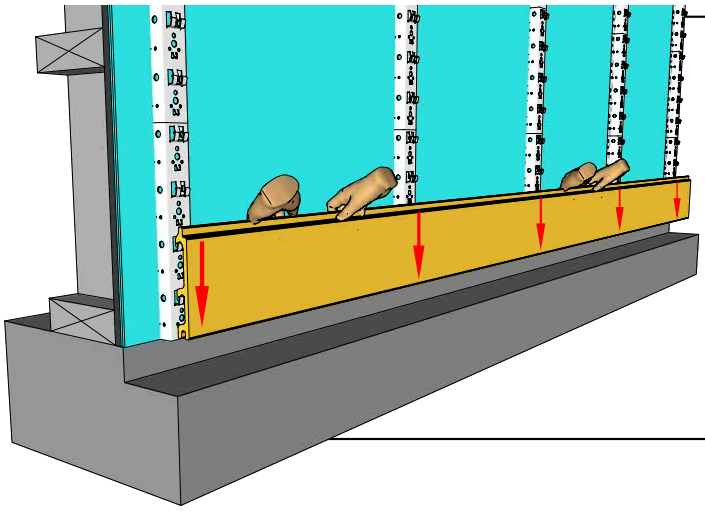
- Horizontal board orientation installations:
    - Chalk line the second from the top nail position at the following heights above GL:
        - Flat strip: 1 831.2 mm
        - Top hat and/or channel strip: 2 746.8 mm
    - Mark first and last clip strip locations 50 mm from the end of each end of the board or boards.

- Locate positions of intermediate strips by equally dividing remaining space, taking into consideration the following:
    - Allow for smaller spans where necessary for high pressure (micro or macro) environments.
    - Avoid using spans larger than 600 mm.
    - Avoid using very small spans as this will make installation of boards into clip strips more difficult and result in a higher cost for the project.
    - Allow for edge distances, ground clearance and trim and flashing clearance.
- Install 4 mm diameter nails at the intersection of the top nail chalk line and the clip strip span markings.
- Hang the clip strips on the nails and allow the clip strips to hang under gravity. Check that the clip strips are level.
    - If there is significant deviation between the clip strip and the substrate, then consider using spacers beneath strips to improve the level of the strips relative to the building.
- Fix the strip down to the substrate through the topmost available fixing hole (screw and substrate dependent).
    - For the flat strip this will be through the face of the strip.
    - For the channel strip this can be through the face of the strip onto a batten if the substrate is appropriately level, or through the side of the strip into a batten. This second option allows the depth of the strip relative to the building to be varied so that the overall level of the cladding system can be improved.
    - For the top hat strip this can be through the face of the strip onto a batten, or through the flanges ('feet') of the strip onto a batten, if the substrate is appropriately level, or through the side of the strip into a batten. This last option allows the depth of the strip relative to the building to be varied so that the overall level of the cladding system can be improved.
- Fix the strip down to the substrate through the bottommost available fixing hole (screw and substrate dependent) whilst tensioning the strip (pulling it against fixing in the above step), incorporating the same sub-steps as above.
- Install the rest of the fasteners at an appropriate frequency, incorporating the same sub-steps as above. The frequency of the fasteners will depend on the loads required to be tested, the type of fastener used, and the type and condition of substrate available.
- Install trim adaptors when required, refer to **section 5.**
- Install boards, refer to **section 1.2.**
- Install trim, refer to **section 5.**

- Vertical board orientation installations:
    - The boards will slide downwards if not supported as the clip strips do not provide an adequate support for boards in vertical orientation. A structural element (such as a angle iron) should be used to provide support. The structural elements should be perforated to allow for drainage and pest control.
    - Provide support to each butt joint.

1.2 Board installation

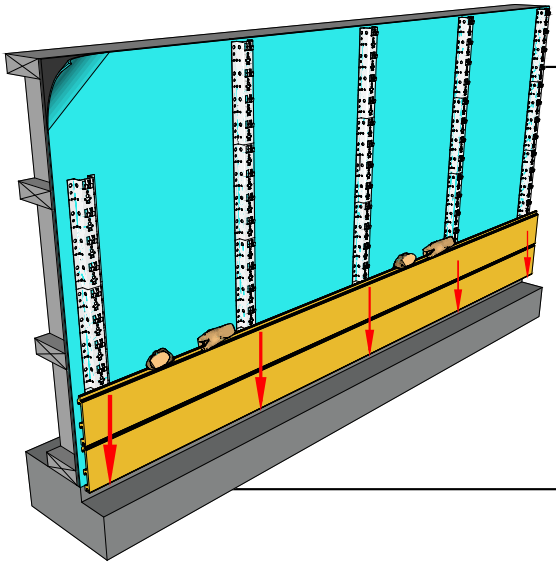
Horizontal Application



Push the first board into place

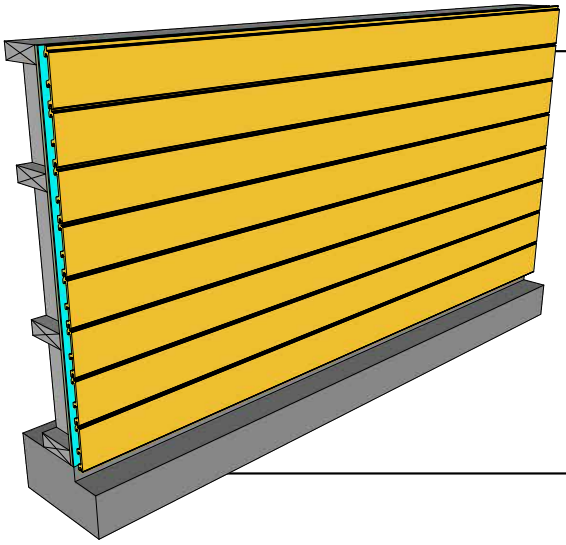
Hook the first board over the first set of clip hooks at the bottom of the structure, pushing down firmly until each clip hook engages with the board.

If necessary a soft mallet can be used to gently tap the board into place, but take added care not to damage the board.



Insert the next board

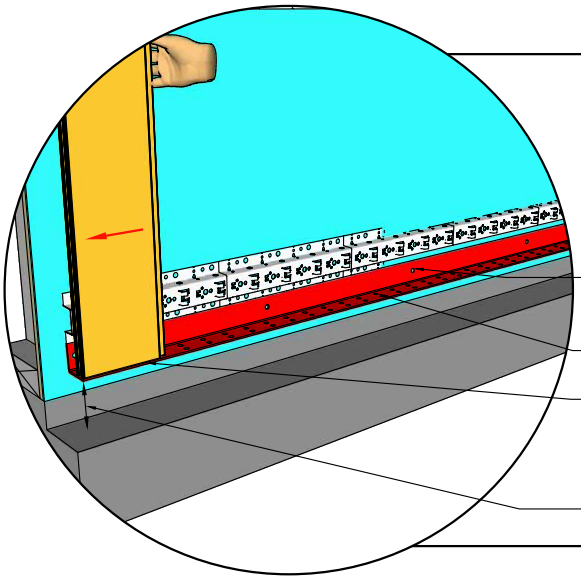
Aligning the next boards groove with the tongue of the previously installed board, press the board down firmly until the board engages with the clip hooks.



Repeat

Repeat the process until installation is complete. Ripping the last board to size as needed.

Vertical Application



Push the first board into place

Hook the first board over the first set of clip hooks at the bottom of the structure, pushing down firmly until each clip hook engages with the board.

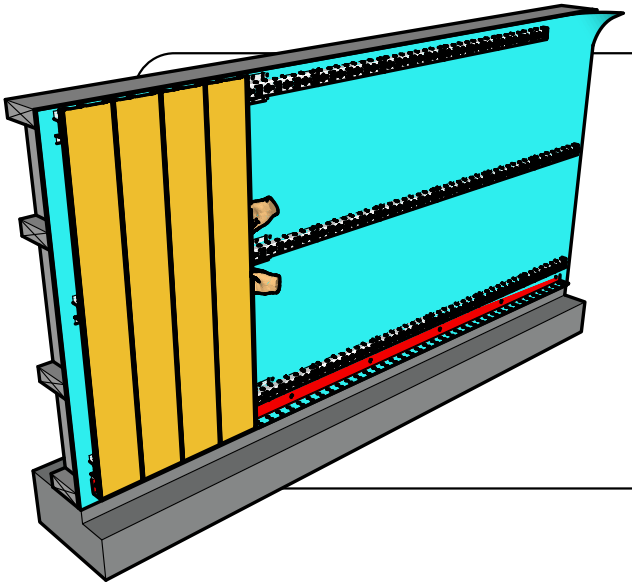
If necessary a soft mallet can be used to gently tap the board into place, but take added care not to damage the board.

Ensure appropriate fastener edge distances when fastening close to the edge of the clip strip. Alternatively overlapping fasteners

Structural element with 1500 to 2 500 mm²/m perforations (not bigger than 9.5 mm)

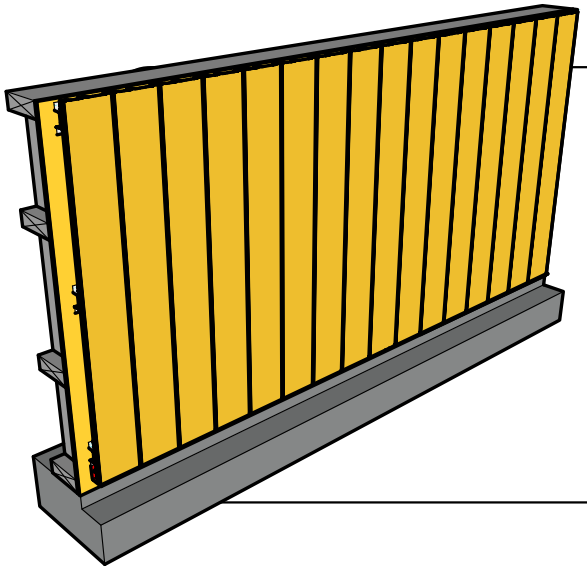
Seal trim edge of the board to the structural element with flexible fire rated external grade sealant or approved gasket along the full length of the element to insure water runoff.

Provide ground clearance for drainage.



Insert the next board

Aligning the next boards groove with the tongue of the previously installed board, press the board down firmly until the board engages with the clip hooks.



Repeat

Repeat the process until installation is complete. Ripping the last board to size as needed.

2.0 Pre-installation

2.1 Standards

Legislation may differ between jurisdictions. Before installing any Eva-Last product, ensure that the application is rational and complies with the local regulations and building codes. Wherever necessary, consult a suitably qualified professional. Be sure to comply with material manufacturer specifications. Where manufacturer's specifications and building codes differ, revert to the building code requirements. Check that your choice of product is suitable for its intended application. For further product specification and information visit **www.eva-last.com.**

2.2 Safety

Always wear appropriate Personal Protective Equipment (PPE) for the various activities involved in installing a cladding system. This includes, but is not limited to, equipment such as safety glasses, helmets (where necessary), gloves and boots, masks when cutting or similar, and harness systems when working at heights or similar, as dictated by the local occupational health and safety legislation.

Refer to the applicable Material Safety Data Sheet (MSDS) for additional information. Please do not hesitate to contact Eva-Last should you require any additional assistance.

When working with composite materials.

- Ensure to comply with the local occupational health and safety legislation.
- Wear appropriate PPE when working with boards.
- Store and dispose of off-cuts, dust and/or contaminated materials appropriately.
- Work in well-ventilated areas.
- Cut boards may have sharp edges (particularly mitered cuts).

2.2.1 Infinity

When working and processing Infinity materials be mindful of the following:

- Cutting (and similar processing activities) Infinity produces fine particulate matter, as a result, ensure to:
    - Work in well-ventilated areas.
    - Wear dust masks during cutting, drilling, and cleaning.
    - Wear safety goggles whilst cutting and installing.
- Clean up sawdust by vacuuming or wetting the area down and sweeping. Alternatively, capture particulate matter using a drop sheet where possible. Dispose of appropriately.

2.2.2 Apex

Refer to the applicable Material Safety Data Sheet (MSDS) for additional information.' Please do not hesitate to contact Eva-Last should you require any additional assistance.

Always wear appropriate Personal Protective Equipment (PPE) for the various activities involved in installing a cladding system. This includes, but is not limited to, equipment such as safety glasses, helmets (where necessary), gloves and boots, dust masks when cutting or similar, and harness systems when working at heights or similar, as dictated by the local occupational health and safety legislation.

Be mindful of the following:

- Ensure to comply with the local occupational health and safety legislation.
- Cutting (and similar processing activities) Apex produces fine particulate matter, as a result, ensure to:
    - Work in well-ventilated areas.
    - Use tools with vacuum attachments.

    - Wear dust masks during cutting, drilling, and cleaning.
    - Wear safety goggles whilst cutting and installing.
- Cut boards may have sharp edges (particularly mitered cuts).
- Clean workspace thoroughly. Wet-wipe, mop, or vacuum surfaces. Do not dry sweep as this can disperse the dust. Use of drop sheets may assist.
- Wear appropriate PPE when working with boards.

2.3 Storage and handling

Note the following:

- Ensure to comply with the local occupational health and safety legislation when lifting and handling boards.
- When handling lengths of boards greater than 4 m, ensure both ends are lifted simultaneously and evenly. Hold the boards 1 m from each end to provide better control.
- Handle the boards carefully. Dropping the boards (and all high impact loads in general) can result in damage to the profiles.
- During transportation use corner protectors where strapping is required.
- All components should be stored completely under cover.
- When storing boards, a pallet or flat surface should be used to support the board's full length.
- All components should be securely stored.
- No component should sit in water or similar.
- Avoid over-stacking and/or eccentric stacking.
- Take care when lifting, placing onto, or removing from raised pallets. Boards may be bundled for convenience. More than person may be required for lifting depending on the length of the boards and the number of boards. Ensure mass handled does not exceed safe limits as defined by applicable local legislation.
- Protect clip strip hooks during handling and transportation. Clip hooks may collapse under excessive loads.

2.4 Planning and site preparation

- Consult an appropriately qualified professional whenever necessary to ensure the product, this document and the intended application complies with all applicable legislation for that region.
- Assess the environment of the site and ensure the product is suitable for the intended application.
- Ensure that the intended structure will provide suitable support for the additional load of the cladding system.
- Identify aspects such as the corrosion category, loading class, etc. of the site and project that may influence the selection of the products or the application thereof.
- Determine appropriate spans for the selected material technology, dead loads, live loads, structure type, capacity, and suitable fasteners. This will depend on the application as well as the loading class as defined by the local legislation. Suggested spans are provided for typical residential scenarios **(refer to Section 4).**
- Develop a maintenance plan to ensure the longevity of the system. This should consider aspects such as drainage, vapor control, corrosion, accessibility to structure, cleaning, pest control etc.
    - With respect to drainage, ensure to provide adequate ventilation and vapour control. Allow for any water ingress and egress.
    - With respect to corrosion, ensure any exposed metals are coated whilst accessible. In areas of high corrosion classes, add additional coating layers and regularly check for signs of corrosion.
    - With respect to underlay and water barriers, fasteners will pierce underlay, ensure to repair any tears or cuts, and follow the underlay manufacturers guidelines.
    - Provide access points and ports for maintenance where necessary.

2.5 External moisture

The Eva-last cladding system provides a robust, durable outer membrane. However, the standard system is not designed to completely prevent water ingress. While the composite boards are highly water resistant – the metal and timber components of the installation may be more susceptible to the aesthetic and/or structural deterioration because of the presence of moisture. Care should be taken during both design and installation to always prevent pooling and/or condensation. Appropriate materials should be specified with respect to the environment of the intended application. Where water ingress is necessary and allowable, permit egress. Ensure that appropriate sublayers, such as vapour barriers and underlays, are installed correctly. Various regional standards pertaining to vapour barriers and wall underlays are available and should be adhered to.

In accordance with certain building codes, cavities are required for ventilation and to avoid capillary action. Specified ground clearances to the first board and/or trim may also be required to allow water to discharge. Refer to the applicable regional standards for further guidance.

Maintenance is important. It is advisable to regularly inspect and conduct proactive maintenance. Before the final steps of installing boards and trim, conduct a detailed inspection of areas that will have limited accessibility once boards and/or trim are installed and ensure there are no areas of concern. Pay particular attention to areas at risk of corrosion and ensure that all metal surfaces are appropriately coated. Regular cleaning of the cladding and/or surrounding roofing system is advised. Refer to the cleaning and care guide. Corrosion in an unwashed environment can be up to three times more than that of well cleaned areas.

The Eva-last Infinity composite boards come with a 25-year warranty, while Apex come with a 30-year warranty, it would be prudent to utilise supporting and ancillary components with similar design lifespans.

2.6 Loading

2.6.1 Cladding board dead load

The mass per square meter of the composite surface will differ slightly relative to the profile shape that has been utilised. Typical masses will range between 8.5 kg/m^2 and 14.5 kg/m^2, for specific mass distribution information please see the technical datasheet. The system is designed to be flexible in application. Fastening points are provided every 76.3 mm along the clip strips. Depending on the span employed, the mass per fastening point will vary. Depending on the number of fastening points used, the mass per fastening point will vary. The table below provides a summary of the board mass per fastening point as a function of the fastening point frequency and span. The selection of an appropriate fastener will depend on the information provided herein, the expected live loads for the application and the substrate available. Consult an appropriately qualified professional to ensure the correct fastening method with an adequate factor of safety is utilised for the application and the project location. Clip strips are available in lengths of approximately 1 830 mm and 2 747 mm and can be cut to length. A minimum of three fastening points should always be implemented. Clip strips must be installed plumb to ensure an even distribution of the dead load across all the clip strip interactions with the boards.

Profile ID	Material	Board width (mm)	Thickness (mm)	Linear mass (kg/m)	Cover width (mm)	Coverage (m/m^2)	Coverage mass (kg/m^2)
STGJ111	Infinity	159.5	22.5	2.2	152.6	6.6	14.5
STTHM202	Apex	163.0	24.5	1.3	152.6	6.6	8.5
STTHM203		163.0	24.5	1.4	152.6	6.6	9.2
STTHM204		163.0	24.5	1.5	152.6	6.6	9.8
STTHM205		86.0	34.5	0.9	76.3	13.1	11.8

Utilise spans appropriate for the substrate available and in accordance with the local building codes. Spans of 600 mm are suitable for the composite boards under typical applications, dependent on the live loads of the scenario.

Number of fasteners per square meter (units/m²)

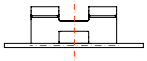
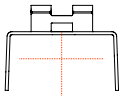
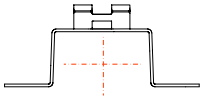
Vertical spans (mm)	Horizontal spans between clip strips (mm)				
	300	450	600	900	1200
76.3	57	43	35	28	25
152.6	29	22	18	14	13
228.9	19	15	12	10	9
305.2	15	11	9	7	7
381.5	12	9	7	6	5
457.8	10	8	6	5	5
534.1	9	7	5	4	4
610.4	8	6	5	4	4
686.7	7	5	4	4	3

Load (kg) on fasteners per square meters

15 kg/m² load	Horizontal spans between clip strips (mm)				
Vertical spans (mm)	300	450	600	900	1200
76.3	0.26	0.35	0.43	0.54	0.60
152.6	0.52	0.68	0.83	1.07	1.15
228.9	0.79	1.00	1.25	1.50	1.67
305.2	1.00	1.36	1.67	2.14	2.14
381.5	1.25	1.67	2.14	2.50	3.00
457.8	1.50	1.88	2.50	3.00	3.00
534.1	1.67	2.14	3.00	3.75	3.75
610.4	1.88	2.50	3.00	3.75	3.75
686.7	2.14	3.00	3.75	3.75	5.00

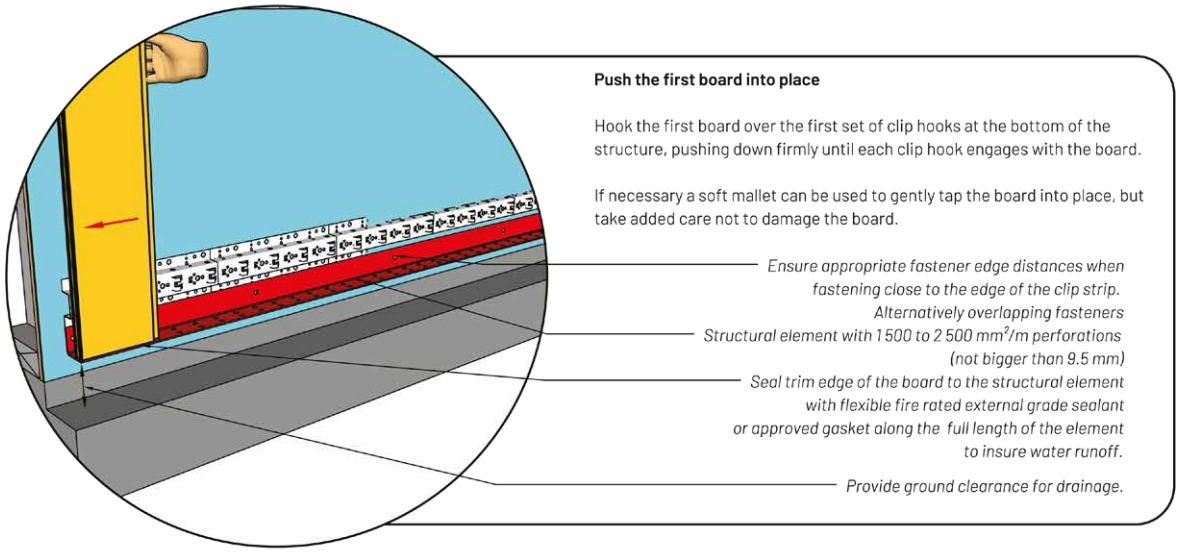
2.6.2 System dead load

The additional mass of the Z275 zinc galvanised clip strip is approximately 0.4 kg to 1.2 kg per meter. This should be incorporated with the applicable board dead loads (provided in the previous table) to determine the overall dead load of the system. An appropriately qualified professional must ensure the fasteners used and the substructure against which the cladding system will be installed is adequate for the various load cases and conditions of the application and site.

Item	Description	Width (mm)	Gauge (mm)	Depth (mm)	Ventilation gap (mm)	Length (mm)	Mass (kg/part)
Flat strip		40	1.2	12	0	1 831	0.7
Channel		45	1.2	34	>23.5	1 831	1.5
						2 745	2.2
Top hat		86	1.2	36	25.4	1 831	2.2
						2 745	3.2

2.7 Supporting boards in a vertical application

A structural element must be installed when the boards are installed in a vertical application, an example of such an element may be seen in the figure below. The clip strips do not provide an adequate support; hence the boards will slide downwards if not supported. This element must allow for drainage and pest control. Consult your local authority for the drainage and pest control requirements. Eva-Last recommends that the perforations should be between than 1 500 - 2 500 mm²/m and a single perforation no greater than 9.5 mm (3/8″). Consult an appropriately trained professional if the element is outside of these specifications.



The minimum requirements of the profile in the following table should be adhered to. The profile width is the width necessary to cover both the top hat clip and the board width.

Board thickness (mm)	Perforations (%)	Minimum thickness for aluminium profile (mm)	Minimum thickness for steel profile (mm)	Profile width (mm)
22.5	5 – 20 %	2.1	1.7	48
24.5	5 – 20 %	2.2	1.8	50
34.5	5 – 20 %	2.4	2.0	60

2.8 Structures

All elements of the cladding system should be specified in accordance with the required design life and loading conditions of the application. All applications should adhere to the applicable regional standards. See **Appendix C** for further information regarding corrosion resistance.

- **Pull-out & shear resistance**
    - The pull-out and shear resistance of a fastener is dependent on the substrate material and the fastener used. Ensure appropriate materials and fasteners are employed for both the clip strip and substructure connections.
- **Underlays and insulation**
    - Insulation and wall underlays should be implemented where required and be applied in accordance with the manufacturer's guidelines and any applicable regional standards. Be cautious when considering fastening in the proximity of any membrane to avoid impacting the intended performance of the system.
- **Ventilation and moisture control**
    - Provide a ventilation gap between the cladding boards and substrate of a minimum of 10 mm or 0.4", either with the use of a furring strip or top hat clip strip.
    - Provide enough ground clearance beneath the first board to allow water to drain.
    - Use ventilated flashing or grills to prevent insects and debris from collecting behind the cladding system.
    - A Water-resistant barrier should be used between the cladding system and the substrate board.

2.8.1 Timber

- **Timber treatment**
    - Timber should be treated in accordance with atmospheric conditions of the site. Ensure all applicable regional standards with respect to the type of timber and treatment that may be employed are satisfied.
- **Coating and priming**
    - Priming and additional paint treatment can extend the design life of timber elements where required. Cut faces of timber elements (including those that have been treated) are to be coated and exposure to moisture minimized.
    - Cut edges of other elements, including trim profiles and clip strips, are also to be coated with an appropriate protective layer, particularly in severe atmospheric environments.
    - Selected fastener for the clip strip is no longer than the depth of the selected substructure.
- **Composite battens**
    - Composite and/or plastic battens can be used to substitute timber as support members fastened directly to a wall or similar. The alternative provides improved water resistance to the system, but appropriate expansion gaps must be allowed for.

2.8.2 Steel

- **Corrosion**
    - Corrosion rates are dependent on the atmospheric conditions of the site and should be assessed to ensure an appropriate substructure material and coating is selected. An adequate maintenance program should be developed and implemented to ensure the longevity of the cladding system.
- **Coating and priming**
    - Cut edges of metal-based substructures, trim profiles and clip strips are to be coated with an appropriate protective layer, particularly in severe atmospheric environments.
- **Thermal breaks**
    - When fastening steel profiles atop building membranes, use a plastic packer or similar thermal break product to prevent unwanted heat transfer. Ensure the products and systems utilised comply with the required applicable regional standards.

2.8.3 Masonry and concrete

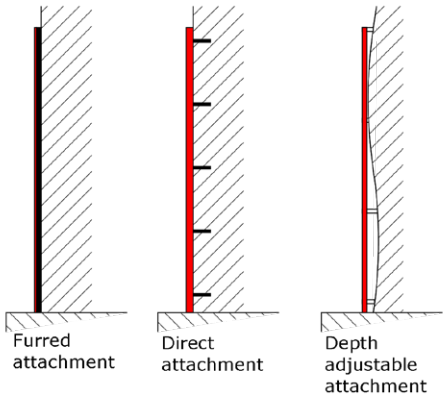
There is inherent variability in masonry and concrete constructions that must be catered for.

- Certain minimum substrate strengths are required for fastening or anchoring systems.
- Certain minimum edge distances are also required.
- These constraints are dependent on the intended fastener, consult the fastener technical data sheet to establish the minimum requirements and provide for this in the design of the system. In scenarios where the strength of the substrate is unknown or questionable, in situ tests may be required. Ensure all applicable regional standards are satisfied.
- **Plaster and paint**
    - Accumulated layers of plaster and/or paint can be misleading with regards to both the strength and the level of the substrate. Assess such scenarios during the planning phase and design accordingly to ensure an adequate support to the cladding system is provided.
- **Cavities**
    - The clip strip can be installed directly against a wall if the surface level is within acceptable tolerances. Spacers, plaster or grinding localized protrusions can be used to remedy minor unevenness. However, several regional standards require a minimum cavity size behind the cladding system for ventilation and moisture control. In these instances, the above-mentioned frame systems can be utilised.

2.9 Levels and clip strips

The Eva-last cladding system provides flexibility around façade structures and fastening.

- The flat clip strip can tolerate minor fluctuations in surfaces. Flat strips should be fastened to furring strips to provide for ventilation and vapour control. Furring strips must be completely level before flat strips are attached.
- When dealing with large deviations that cannot be filled or levelled, a top hat clip strip can be used. The top hat clip strip is rigid enough to allow for some deviation in the structure. Deviations must provide contact with the top hat strip at appropriate vertical spans.
- In cases of extreme deviation resulting in vertical spans greater than the top hat can accommodate for; curtain structures, battens or brackets can be used. A channel clip strip can be attached at regular spans to the secondary supports or structure to maintain consistent vertical spans.
    - Top hat clip strips may be used in a similar method but may not be as economical as using a channel.
- Surface deviations may require additional considerations around trim and flexible flashing solutions may need to be employed.
- Various regional standards pertaining to acceptable level tolerances are available and should be adhered to.



2.10 Clip strips

VistaClad clip strips are available in three profiles, made from steel with a variety of fastening points aimed at three specific application types. Furred cladding attachment, where cladding attaches to furring over a substrate. Direct attachment, where the cladding directly attaches to the substrate without the use of furring and depth adjustable attachment, where battens and brackets provide added depth variability where the substrate too unlevel or unable to provide support.

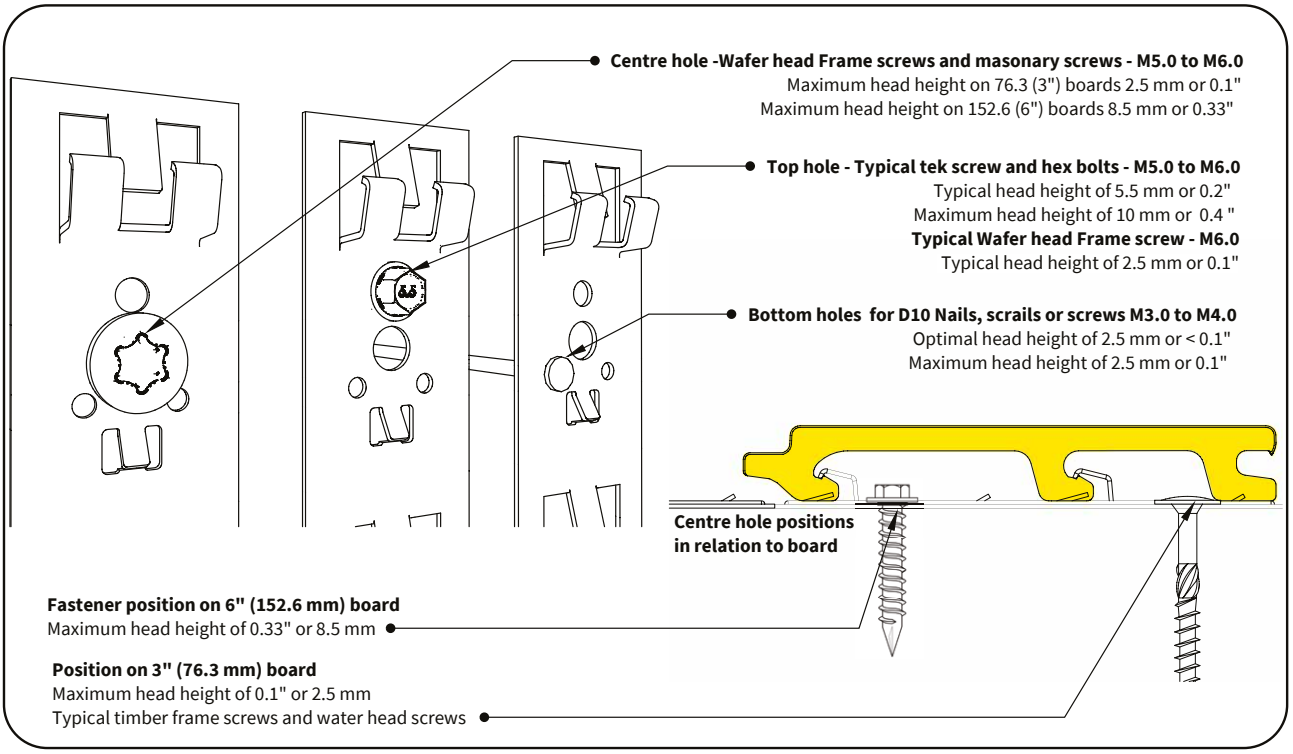
Application	Furred Cladding attachment	Direct attachment	Depth adjustable attachment	Allowable depth variation
Top hat	Yes	Yes	Yes, when used as a channel	+- 10 mm*
Channel	No	No	Yes, with battens or brackets	+- 10 mm with Bracket or battens to compensate
Flat strip	Yes	No	No	Surface must be flat

*Fastener length in relation to structural penetration requirements must account for depth variation.

2.11 Typical Clip strip Fasteners

Each clip strip provides a variety of fastening points, with three varied sizes of holes, designed for use with common fasteners available from any hardware store. Screw lengths are dependent on regional requirements, typical penetration depths require a minimum of 38 mm or 1.5" and dependant on local standards. Screw material types are dependent on-site conditions.

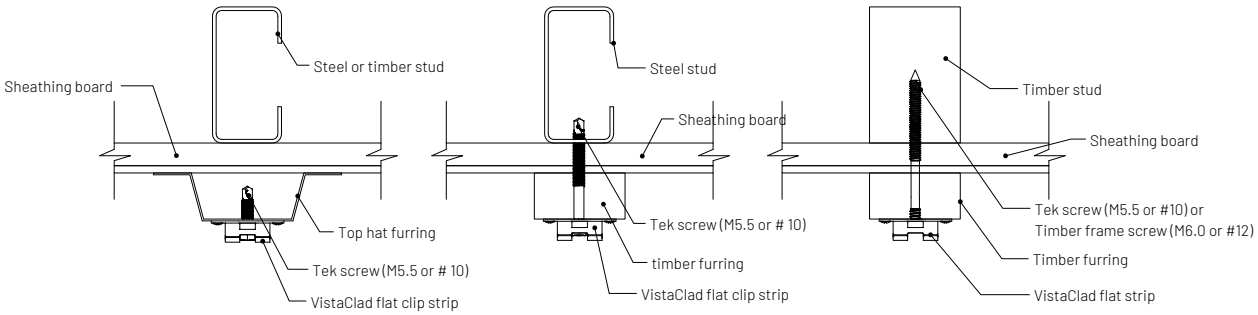
- Specify fasteners that are appropriate for loads, substrate, wind loads and corrosion requirements.
- There are three different hole sizes 4 mm (M3.0 to M4.0), 6 mm (M5.0 to M6.0) and 9 mm (M5.0 to M6.0 for masonry screws or standard M8.0 Bolt). Use the correct fastener for hole size.
- Always Fasten the first and last hole of an individual clip strip.
- Ensure that the vertical fastening spans within the clip strip meet with standard requirements and can support the load imposed upon them by the cladding system.
- All fasteners must follow local standards and appropriately specified for atmospheric conditions.
- Maintain minimum edge distances as recommended by fastener manufacturers when fastening into substrates.



Fastener hole	Diameter	Timber	Steel	Masonry
Small	4 mm or 0.16"	Nail 3.3 mm or 0.131"	N/a	N/a
Mitre hole	4 mm or 0.16"	Nail 3.3 mm or 0.131"	N/a	N/a
Medium	6 mm or 0.23"	Tek screw M5.5 or #10	Tek screw M5.5 or #10	Sleeve anchor M5.0 or #10
Large hole	9 mm or 0.35"	Frame screw M6.0 or #12	M8 Bolt and nut	Masonry screw bolt M5 or #10

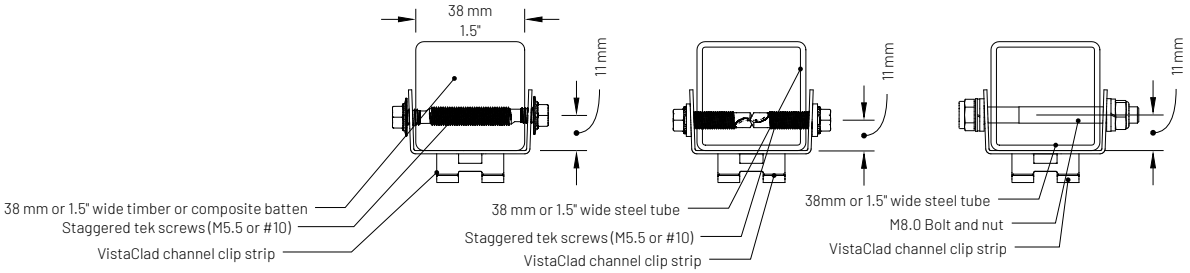
2.11.1 Typical VistaClad flat clip strip fastener installation

As detailed in section 2.11 flat strips are best suited to fastening directly to furring strips to provide a flat surface but also to provide a ventilation gap. Flat strips can be fastened to steel, timber, or composite furring strips. In this case ensure that the fastener used to attach the furring strip to the wall is recessed into the furring strip and does not interfere with the flat strip's levels in any way. Should the furring strip and the clip strip share a single fastener, ensure that embedment depths are adequate and penetrates the structure. When installing flat cladding strips, fasten the clip from the topmost hole down to the bottom at the appropriate vertical spans to prevent buckling and hogging between fasteners.



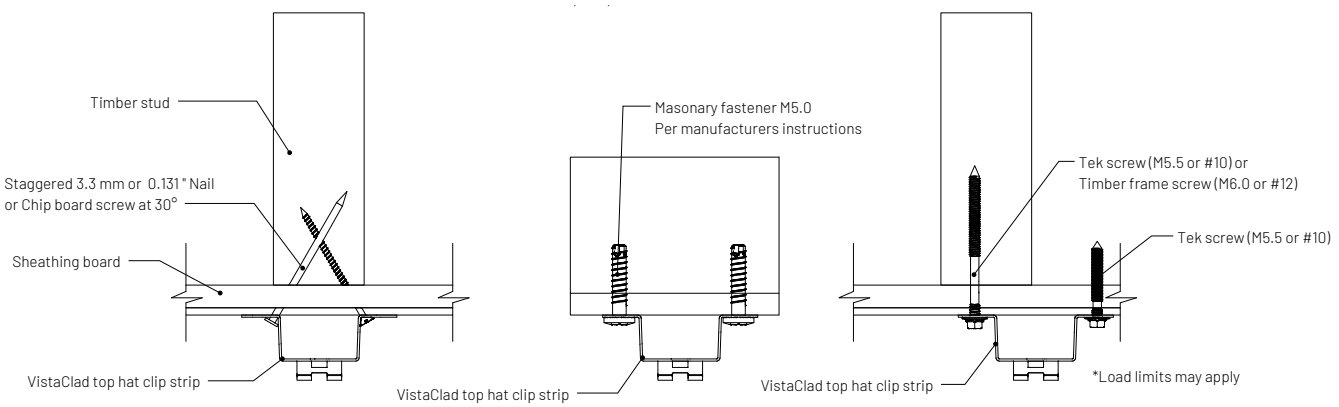
2.11.2 Typical VistaClad channel clip strip fastener installation

VistaClad Channel clip strips fit over a 38 mm or 1.5" wide batten, and are compatible with a variety of timber, composite, aluminium, or steel tubes of that size. The channel provides added allowances for depth variability in wall structure by providing fastening points along the sides of the profile, allowing for easy attachment to brackets or battens.



2.11 .3 Typical VistaClad top hat clip strip fastening installation

The VistaClad Top-hat clip strip is ideally suited to direct attachment to a variety of structures while simplifying the installation process by removing the need to use furring strips, by incorporating a traditional top hat furring profile into the VistaClad clip strip range. The VistaClad Top-hat provides a ventilation gap of 25.4 mm or 1" between structure and boards.



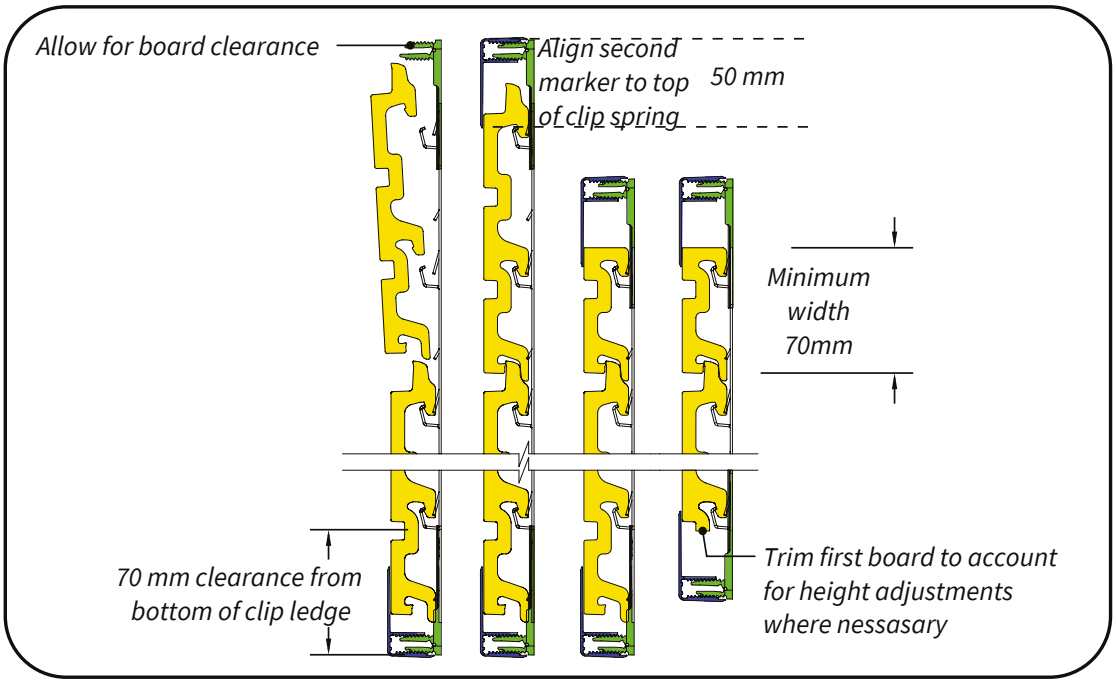
3.0 Cutting and Expansion

3.1 Cross cutting

- Please ensure that the appropriate PPE and safety precautions are adhered to whilst cutting composite material.
- Use a fine toothed, carbide tipped blade to cut composite material.
- Use an 80-tooth or finer, 260 mm diameter, cross-cut blade.
- VistaClad boards are provided as factory cut. Ends should be trimmed to carpentry cut.
- Boards can be mitred, angles less than 30° are to be avoided. Be sure to account for the additional length required in the joins when doing so.

3.2 Ripping

- For best results when ripping composite boards use a table saw or ripping jig.
- Before ripping boards account for board clearances, trim, ground clearances over and above trim clearances.
- Where trim and flashing do not provide for the final necessary board coverage, the first board can be trimmed should trimming the last board does not provide sufficient coverage.
- In the case where it would be necessary to cut a board to less than 70 mm wide, rip both the first and last board of the cladding footprint to balance the required widths instead.

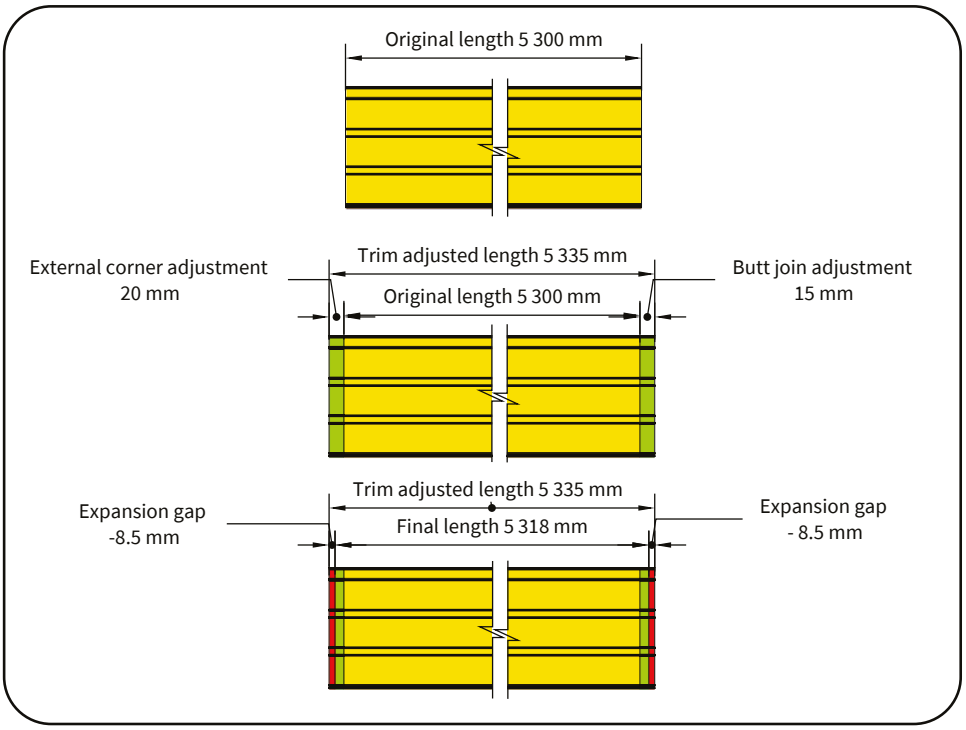


3.3 Cutting length

Before boards are installed, the final cut length of a board must take into consideration the possible changes in length of the board due to thermal expansion and contraction. Appropriate expansion gaps must always be maintained between boards and/or between boards and other obstacles for full warranty coverage. As well as the additional length required beyond the boundaries of the façade for trim coverage.

When calculating the final length of the board.

Final length = Coverage length + Trim adjustment for left side + Trim adjustment for right side – Expansion gap



3.4 Length adjustments for trim

The following table provides a typical length adjustment in relation to the facade edge from the back of the edge of the adaptor to ensure coverage behind trim before considering expansion.

Trim	Application	Adjustment (mm)
Universal trim	Edge	-20
T-trim	Butt joint	-15
External corner	Corner	+20 + furring thickness
Internal corner	Corner	-20 - furring thickness

3.5 Length adjustments for temperature changes

3.5.1 Fundamentals of expansion and contraction

- The expansion, and contraction, of a board is influenced by:
  - The material of the board,
  - The length of the board, and
  - The change in temperature the board experiences relative to the temperature of the board at installation.
- The linear coefficient of expansion for the Apex material technology is up to 70 x 10^{-6} mm/m/°C. This means that a board of this material can expand, and contract, up to 0.07 millimetres per meter length, per degree change in temperature. This is an expansion and contraction rate that is approximately 50% more than Infinity or Eva-Tech.
- A summary matrix of expansion gaps for different temperature and length conditions is captured in **Appendix C** for convenience.
- Check maximum expected contraction of a board to ensure large gaps do not develop at low temperatures.

3.5.2 Installation best practice for boards that expand and contract

- Allow boards to acclimatise on site before installation so that the movement of the boards across the installation is more uniform.
- Uniform board movement, similar board lengths, and consistent installation temperatures can make planning for expansion gaps easier.
- Care must be taken in environments susceptible to generating large changes in board temperature. In addition to sites with extreme ranges of temperature, this can include areas with large reflective surfaces, such as metal and glass, from rooves, facades, windows, doors, etc.
- For sites with extreme temperature ranges, consider the following:
    - Lighter board colours are advised to help mitigate against large board movements.
    - Use trim to hide expansion gaps.
    - Longitudinal boards can be cut in half and multiple breaker boards installed at butt joints.
    - Unobstructed clearance between the ground and cladding can assist with ventilation and decrease the change in board temperature.
    - Use a backing board where the backs of cladding boards are at risk to added UV and temperature exposure due to reflective surfaces.
    - Use longer trim and flashing to hide expansion gaps.

3.5.2 Determining expansion and contraction gaps

Below is a set of steps to assist with estimating the size of the required expansion gaps for an installation. It is necessary to install cladding boards with appropriate expansion gaps to avoid negative impacts on adjacent boards and trim.

These steps can be replicated to estimate the potential maximum contraction of a board. This is done using an estimated 'minimum board temperature' in replace of the estimated 'maximum board temperature' in Steps 1 and 4. Estimating the contraction is useful in establishing what the maximum gap between boards may be at low temperatures, and whether this will be acceptable to the client. In addition, gaps greater than the trim allowance listed **section 3.4** can result in disengagement from trim and exposure of the underlying substructure.

1. Estimate the historical maximum (or minimum) site temperatures. Use this to estimate anticipated board temperatures, making allowances for increased surface temperatures due to board colour and/or additional exposure to temperature/sunlight. Darker coloured boards can get up to 15 °C hotter than the ambient temperature. Site conditions such as reflective surfaces can further increase this estimate. For sites with anticipated high temperature ranges, it is advisable to use lighter coloured boards. **[Maximum (or minimum) board temperatures]**
2. Estimate, or measure, current install temperature of the boards, making the same allowances as above where applicable. This may have to be repeated for large sites where the installation time can extend over several hours or days. **[Install board temperature]**
3. Based off the planned cladding layout, determine the required board length. This will naturally have to be repeated for layouts where multiple board lengths are required. **[Board length]**
4. To estimate the **Change in board length** *(ΔL)*, multiply the **Board length** *(L)* by α and by the difference in temperature between the **Install board temperature** and the **Maximum (or minimum) board temperatures** *(ΔT):*

$$\Delta L = L \times \alpha \times \Delta T$$

Where:

- ΔT = **Maximum board temperature** minus **Install board temperature**
  ΔT = **Install board temperature** minus **Minimum board temperature**
- ΔL = increase in board length due to temperature change, in mm.
- L = initial length of board at installation temperature, in mm.
- α = linear thermal expansion coefficient as per the material.
    - For Infinity, use α = 0.04
    - For Apex, use α = 0.07

This is the possible increase in board length if the board were to experience the estimated maximum board temperature. It is also equivalent to the **expansion gap required** at the time of installation. This is shared at both ends of the board.

Or this is the expected **maximum contraction gap** if the board were to experience the estimated minimum board temperature. This is shared at both ends of the board.

5. Determine the length to which the supplied boards should be cut to satisfy the required board length and the required expansion gap. **[Final board length]**

Below is an example of implementing the above steps for a Cladded facade in Bloemfontein, South Africa. The intended colour of the boards will be one of the darker colours. The Cladding layout results in a typical board length of 5 300 mm with butt joints covered by a T-trim. Note that if boards were to be installed end-to-end the expansion/contraction gaps between consecutive boards would double.

Step	Parameter	Result	Unit	Note
1	Maximum historical site temperature	40	°C	Data from online search.
	Estimated **maximum board temperature**	55	°C	15 °C added for a darker board.
	Minimum historical site temperature	-10	°C	Data from online search.
	Estimated **minimum board temperature**	-10	°C	
2	**Install board temperature**	32	°C	Measured from the board on site.
3	**Board length**	5 300	mm	Based on site layout.
4	Positive **change in board length (L x α x ΔT)**	8.5	mm	**Maximum board temperature** less **install temperature.**
	Total **expansion gap required**	8.5	mm	
	Expansion gap required at either board end	4.5	mm	Half total **expansion gap required**. Rounded up.
5	Negative **change in board length (L x α x ΔT)**	15.5	mm	**Install temperature** less **minimum board temperature.** Rounded down.
	Potential total **maximum contraction gap**	24.0	mm	**Expansion gap** plus **negative change in board length**. Rounded down.
	Potential **contraction gap** at either end	12.0	mm	Half total **potential contraction gap**. Rounded down.
6	**Final board length**	5 291.5	mm	**Board length** minus total **expansion gap required**.

4.0 Board installation

4.1 Substructure planning and installation

Below are guidelines to consider during the planning and installation of deck substructure:

- Ensure the substructure members are appropriately sized. Ensure the installation thereof is sound and level. Consult an appropriately qualified professional wherever necessary.
- Support boards along all cut edges.
- Use double clip strips at all butts joins so that both board edges are fully supported.
- Do not overhang boards more than 50 mm from the edge of the clip strip. Where overhangs are greater than 50 mm, additional bracing or battens should be used to support the edge of the board.
- Allow for clearance between the ground and cladding, and between the facade and other potential obstructions, such as gutters and planters etc.
- Allow for drainage and water control. Consult a suitably qualified professional if required.
- Allow for penetrations and where necessary provide access points to utilities and ducts. Consult an appropriately qualified professional if required.
- Most regional standards prescribe the span between cladding supports. 600 mm (24") is common for typical residential installations, as is 450 mm (18") near corners of buildings or areas susceptible to higher-than-normal wind pressures. The VistaClad profiles have been developed with this in mind. Note that shorter the span, the more frequent the interaction between the boards and the strips. This improves the resistance of the boards to loads but can also increase the difficulty with which boards are installed.
- Most regional standards also stipulate minimum starting heights above the ground level (GL) for the cladding system. 20 mm (3/4") is common for most typical applications.
- Many regional standards also require a minimum cavity depth behind the cladding profiles. 25.4 mm (1") is common for most typical applications. The various clip strip profiles incorporated with the VistaClad system provides flexibility in satisfying this.
- The VistaClad system must be installed in front of a building envelope i.e., the back of the boards should not be exposed to direct sunlight or conditions that generate more heat than the ambient conditions of the site.
- The installation process requires the boards to be clicked into the clip strip and, as a result, a 10 mm clearance to allow the boards to pass over the springs of the clip strip before being clipped into place is required. This is at the top for horizontally orientated board installs and at either side for vertically orientated boards.

4.2 Cladding planning and installation

Below is a brief set of steps to assist with optimising a layout so that the site and environmental influences, client requirements, and material impacts are taken into consideration.

1. Macro environments: Determine site layout/footprint and establish any critical environmental parameters that may influence the installation or performance of the installation. Particularly aspects to consider extreme temperature ranges, high corrosion classes, large catchment areas, steep slopes, and wind loads.
2. Building assessment: Cladding is reliant on an existing structure to provide structural support. The building itself must be assessed by a suitably qualified professional to determine whether any additional interventions are required including additional supports and water flow directions.
3. Cladding assessment: Once the Building has been assessed, junctions, windows, doors, corners, and penetrations must be considered and accounted for before installation can take place.
4. Finishes and water proofing: Sealants, trim and supports must prevent water ingress and direct flow from cavities and openings.
5. Additional flashing, gutters, sealants etc, may be required and should be considered beforehand.

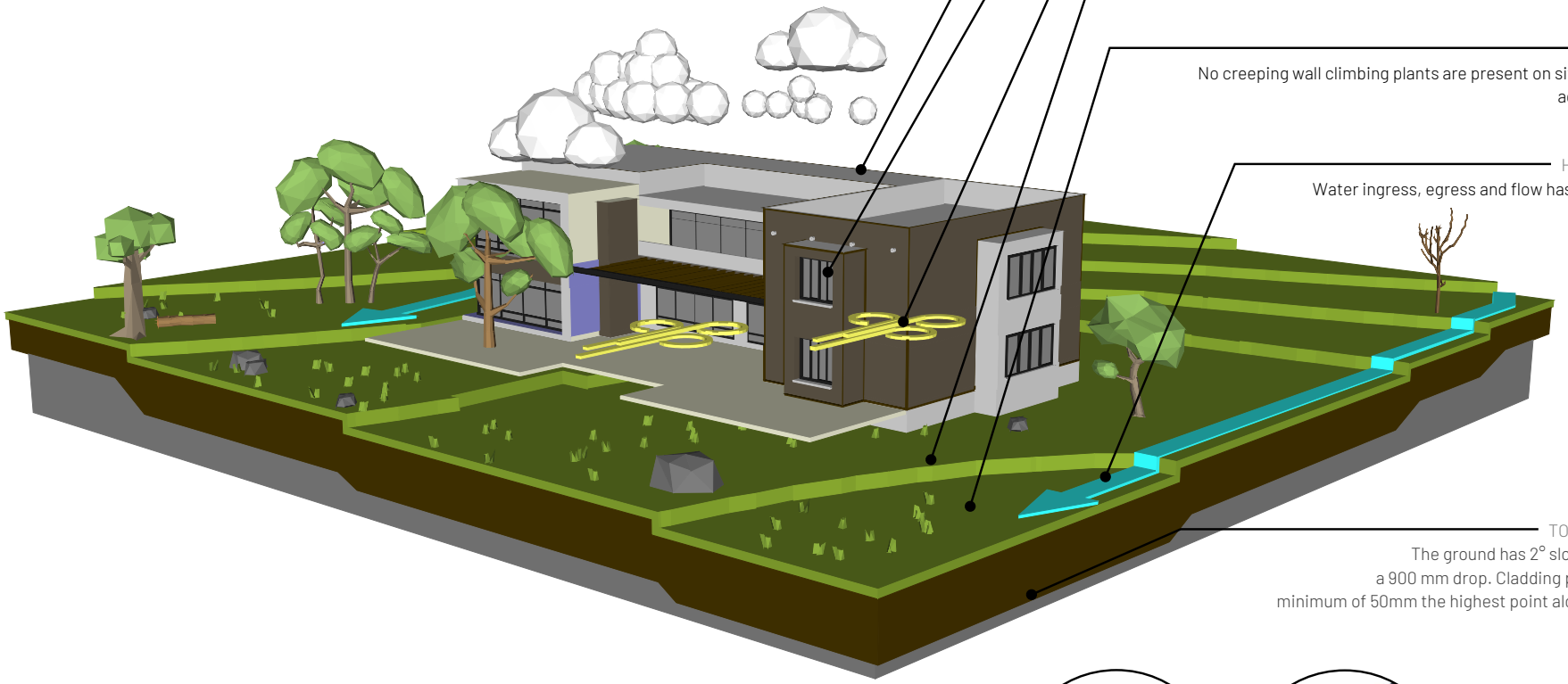
Below is an example that lays out the implementation of the steps suggested above. The same example cladding discussed in **Section 3** is incorporated.

LOCATION AND MACRO ENVIRONMENTS

Bloemfontien is located on the southern edge of the South African highveld with record temperatures ranging between 40 °C and -10 °C, while falling under a typical C3 Class (moderate) atmospheric corrosion category with low salinity and only moderate pollution. Hourly wind speeds at 10m heights within the built up have been measured at 22.7 m/s.

SITE ASSESSMENT OF THE MICRO ENVIRONMENT

A site assessment provided more specific details surrounding the building site and its environment.



PROPERTY TYPE
Residential

EXISTING FEATURES
Concider windows, doors, penetrations, finishes etc.

WIND LOADS
Wind loads that act on the frame and foundation of the building Aswell as components and cladding elements.

UTILITIES
Utilities have been considered and access points concidered

VEGETATION
No creeping wall climbing plants are present on site that may add additional loads.

HYDROLOGICAL
Water ingress, egress and flow has been assessed

TOPOGRAPHICAL
The ground has 2° slope resulting in a 900 mm drop. Cladding panels will be a minimum of 50mm the highest point along the façade.

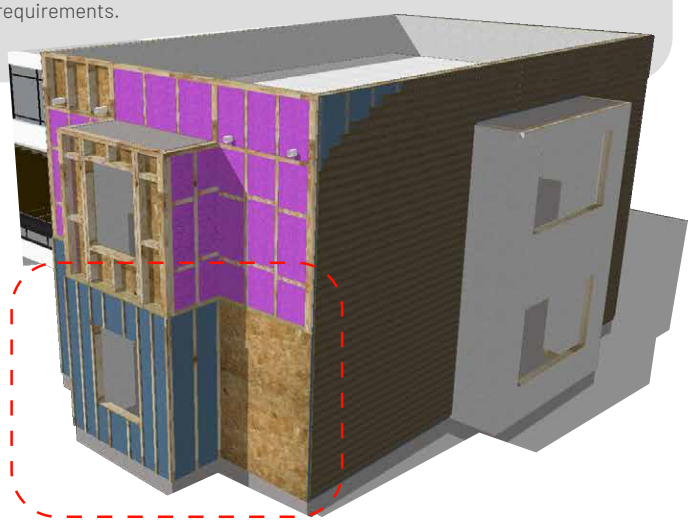
CUSTOMER PREFERENCES

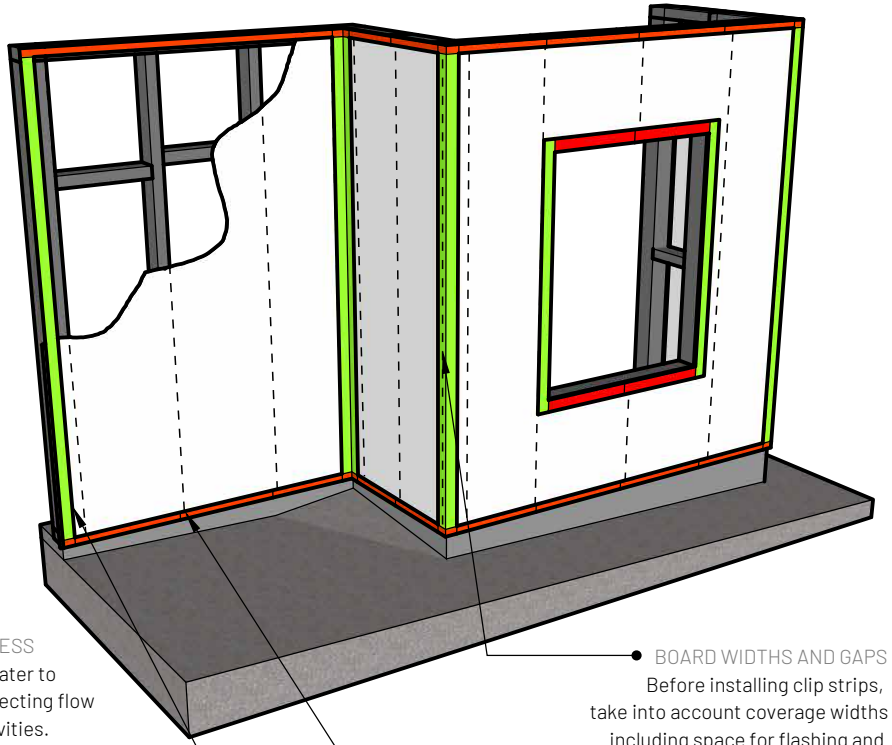
The client has specified Apex Cladding in the Carbonised black colour, with the boards horizontally installed.

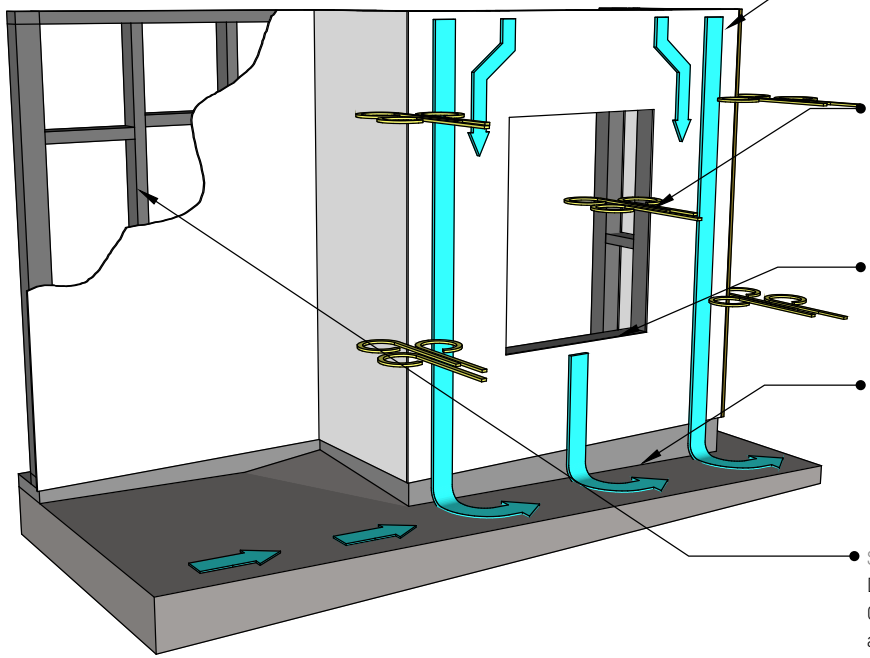
Profile
Apex Castellated family
Clip strip
Flat strip
Structure
Timber

BUILDING ASSESSMENT

It is necessary to perform a closer inspection of the site facades to create a summary of any additional requirements such as ground clearances and cavities, structures , utilities etc. as well as to determine final lengths, flashing and trim requirements.







WATER INGRESS AND EGRESS
Direct waterflow to allow water to escape as needed while directing flow away from windows and cavities.

WIND LOADS AND SPANS
Edges and corners are more suseptable to applied pressures and wind loads. Reducing spans and providing additional flashing and battens can assist in mitigating this risk.

CAVITIES AND PENETRATIONS
Windows, Doors and other cavities require additional thoughts and considerations for flashing and trim integration.

GROUND CLEARANCES
Different regions may have differing requirements for ground clearance. Ensure that water is able to run from the building freely, and no accumulating vegetative growth can prevent water egress.

STUDS AND FASTENER PENETRATIONS
Dependant on regional requirements and structure type
Clip strips must be fastened directly to studwork, with a minimum fastener penetration of 38 mm into the stud.
Additional stud work may be needed to support the cladding.

BOARD WIDTHS AND GAPS
Before installing clip strips, take into account coverage widths including space for flashing and ground clearances.

BOARD LENGTHS AND ADJUSTMENTS
Board lengths must account for additional length for trim coverage aswell as reductions for expansion.

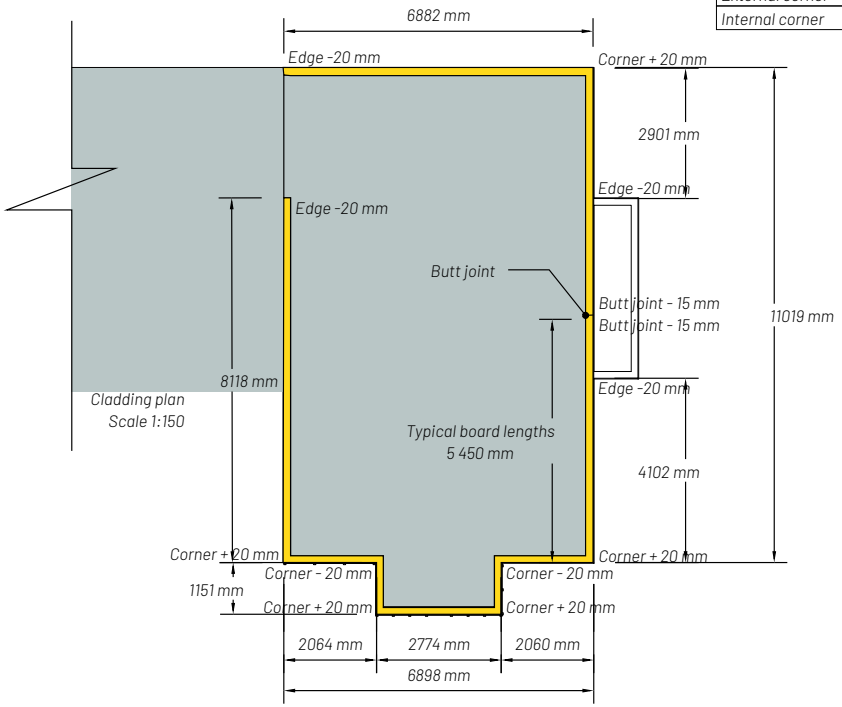
EDGE DISTANCES
Consider fastening distances before fastening near edges.

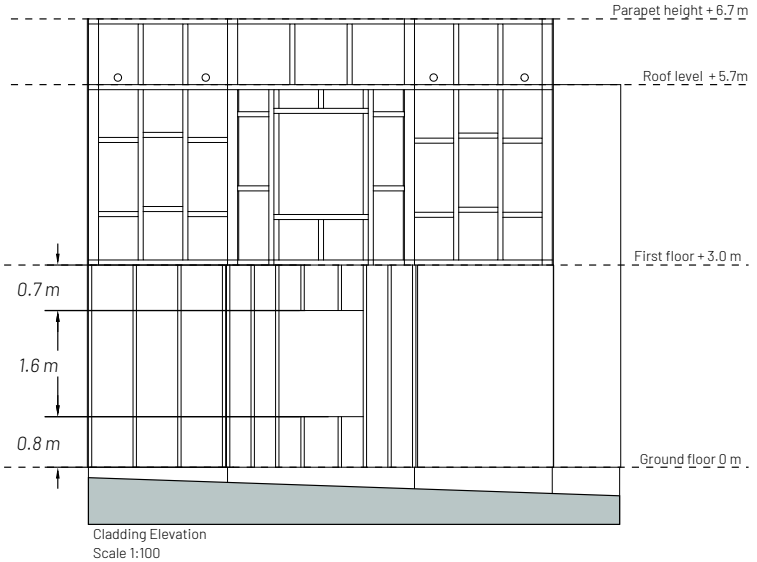
CLADDING ASSESSMENT

A appropriately qualified professional has specified the structure and fastener combination to meet the environmental and loading requirements for the cladding. In this example the professional has specified a flat clip strip, 25 mm furring strips , self tapping screws specific to this site. The facade has been assessed in relation to the dimensions of the specified Cladding board.

Final board length - Example
Board length + Left adjustment + Right adjustment - Expansion gap
=11 019 mm + 20 mm (External corner) + 20 mm (External corner) - 8.5 mm (Expansion)
Final board length= 11 050.5 mm

Trim adjustments for board lengths from façade edge		
Trim	Application	Adjustment
Universal trim	*Edge*	*- 20 mm*
T-Trim	*Butt*	*- 15 mm*
External corner	*Corner*	*+ 20 mm + furring thickness*
Internal corner	*Corner*	*- 20 mm - furring thickness*



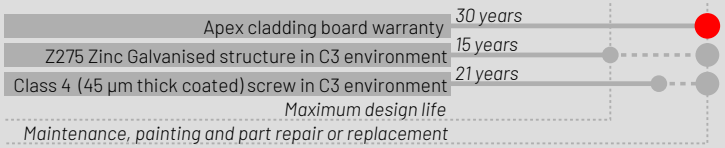


Cladding Elevation
Scale 1:100

Vertical coverage
(Final height - Trim gaps - Flashing gap - Ground clearance)/Board cover width
= (6 700 mm - 120 mm - 100 mm - 50 mm) / 152.6 mm
=6 430 mm/ 152.6 mm
= 42.13 Boards for full height.
Ripped board = 6430 - (152.6 x 42) = 20.8 mm
Rounded to 42 boards + 20.8 mm additional trim coverage

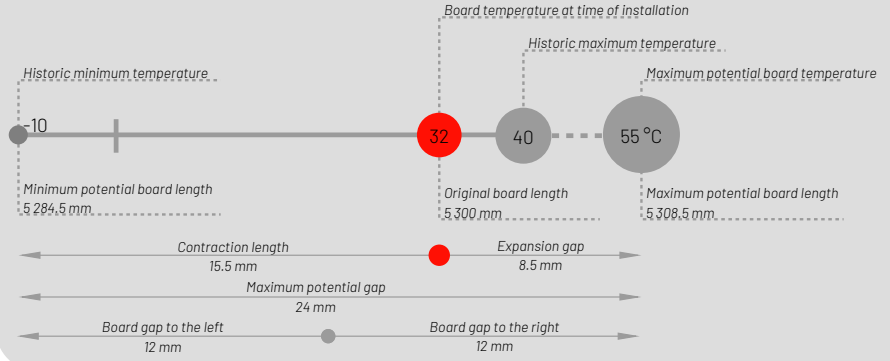
LIFESPAN DESIGN

The design life of a Cladding system requires balancing the lifespans of the individual components, to the part with the lowest life span. The system life expectancy can be extended with proactive maintenance, painting, and replacing parts once the part expires.

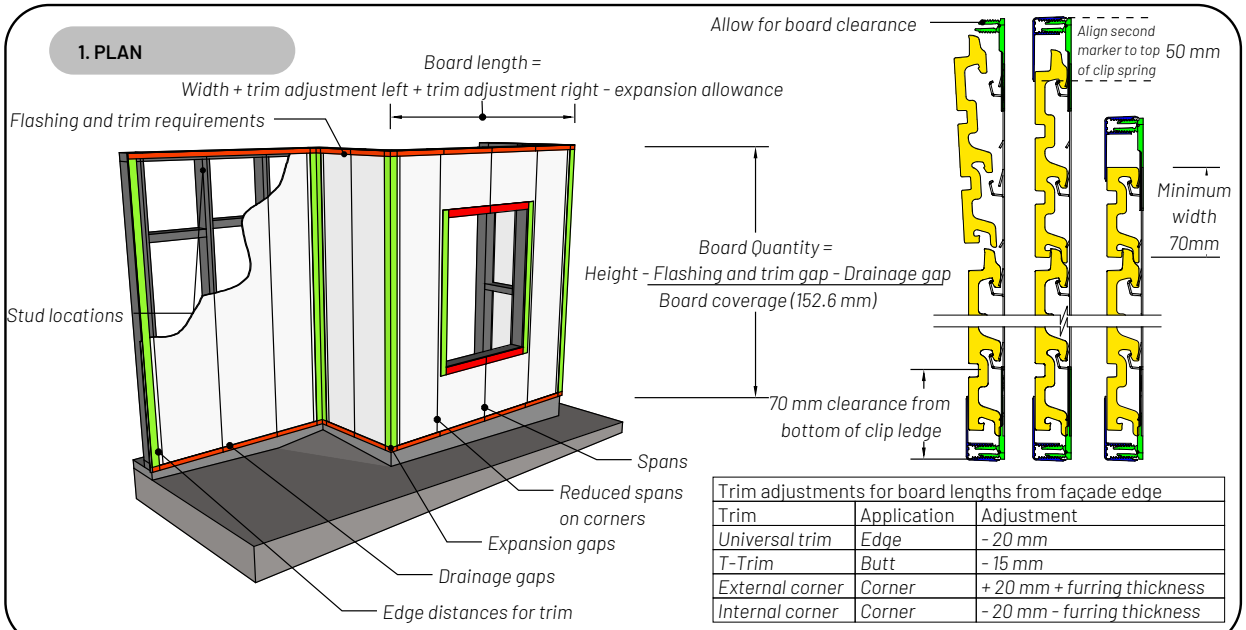


EXPANSION GAP CALCULATION

The final cut length of a board must take into consideration the possible changes in length of the board due to thermal expansion and contraction. The below infographic provides a summary of the example provided in section 3.5.2. as applied to the above deck example.

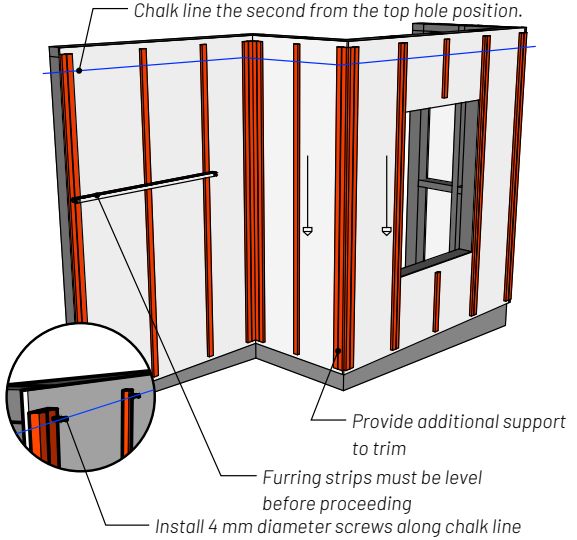


1. PLAN

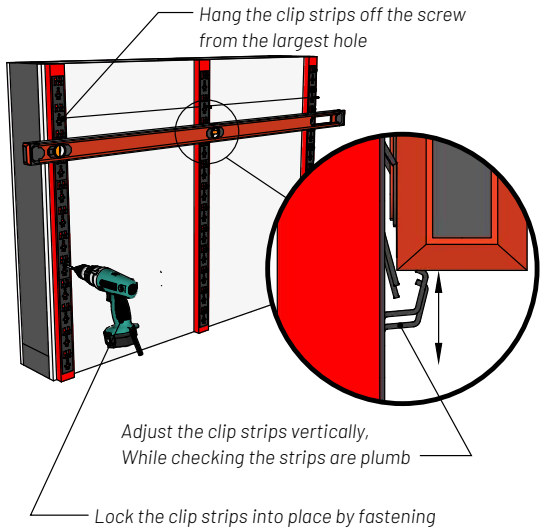


Trim adjustments for board lengths from façade edge		
Trim	Application	Adjustment
Universal trim	Edge	- 20 mm
T-Trim	Butt	- 15 mm
External corner	Corner	+ 20 mm + furring thickness
Internal corner	Corner	- 20 mm - furring thickness

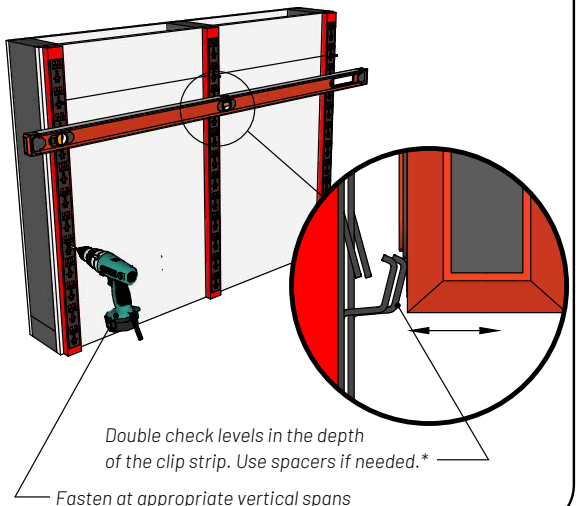
2. PREPARE



3.LOCK VERTICAL LEVELS

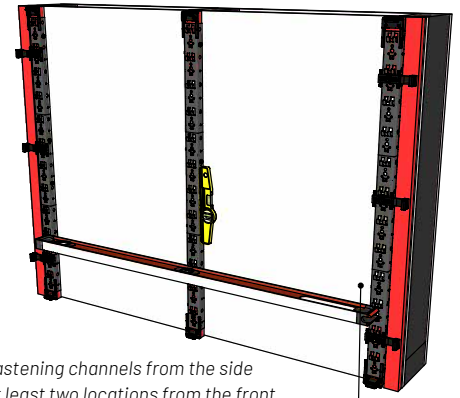


4.LOCK HORIZONTAL LEVELS



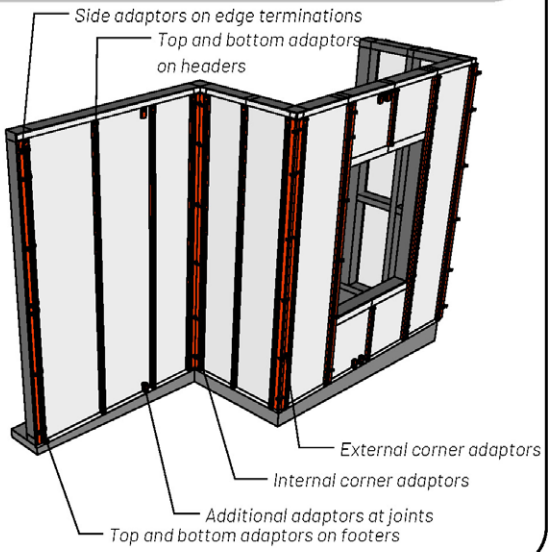
In substrates with large depth variations, a channel or top hat clip strip should be used

CHANNEL AND TOP HAT

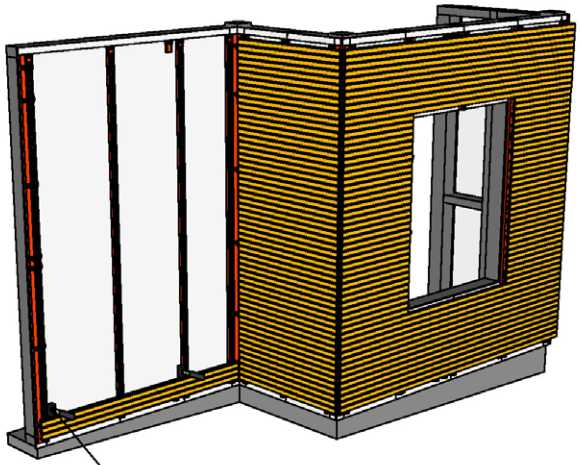


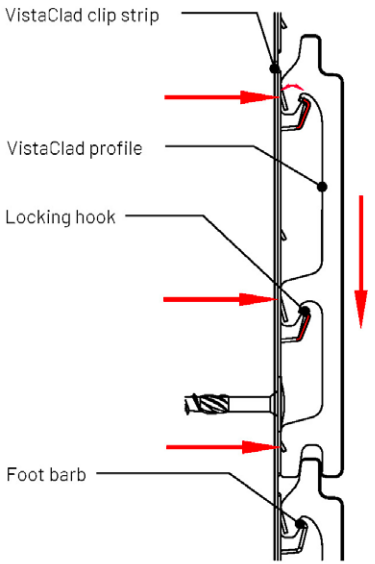
Note. Channel Clip strips will follow the batten or brackets alignment. Ensure that the all furring and brackets are plumb.

5. INSTALL ADAPTORS,FLASHING AND PEST BARRIERS

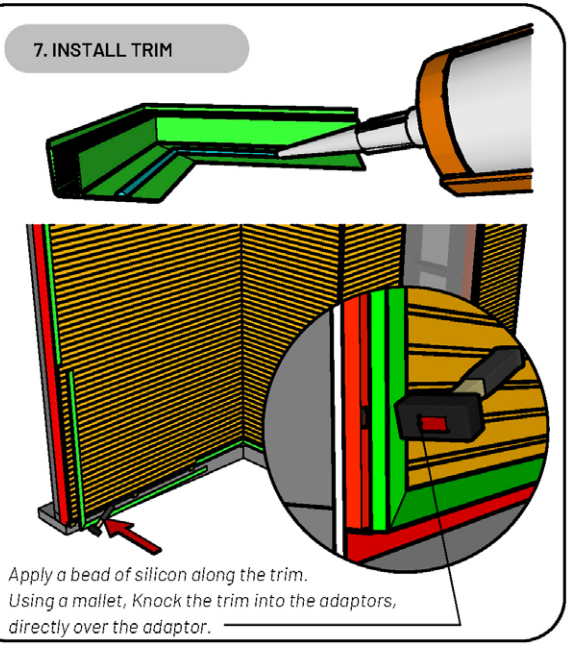


6. INSTALL BOARDS

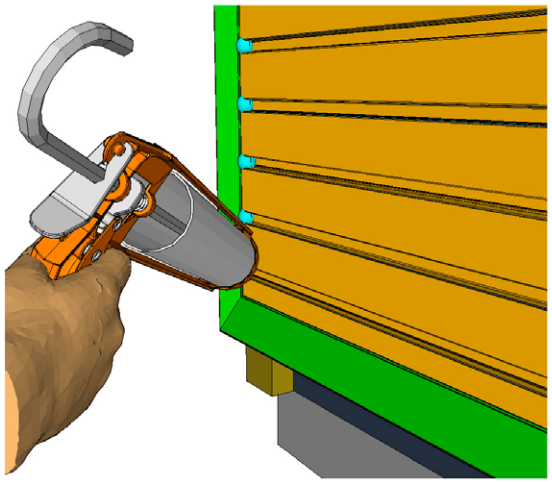




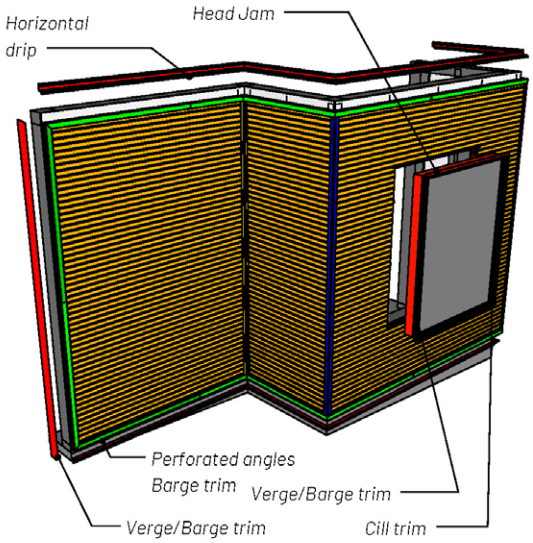
7. INSTALL TRIM



8. FILL GROOVES AND JOINTS WITH APPROPRIATE SEALANT



9.INSTALL FLASHING AND FINISHES



5.0 Parts and installation details

Given the complex nature of cladding, the following section provides installation details for specific applications. All details have been provided as guidance on system installations and are not suitable for all sites and conditions.

All details are of typical studwork construction, as there are added complexities when considering stud location, though the details can be adapted to suit masonry applications. Load requirements, fasteners, corrosion, water and ventilation management, edge distances etc. must be considered before any specification or installation takes place. All details are based on typical installation depths of a standard 1 inch or 25.4 mm flashing depth using a top hat clip strip. Flat strips and channels may be combined with varying depths of flashing and brackets. A suitably qualified professional must specify and determine what is appropriate for the site.

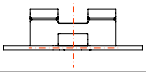
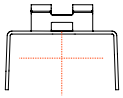
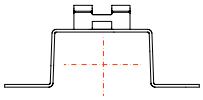
See **Appendix A** for a list of all components and accessories.

5.1 Cladding

CLADDING PROFILES

Profile ID	Material	Description	Board width (mm)	Thickness (mm)	Mass (kg/m)	Cover width (mm)	Coverage (m/m^2)	Coverage mass (kg/m^2)
STGJ111	Infinity		159.5	22.5	2.2	152.6	6.6	14.5
STTHM202	Apex		163.0	24.5	1.3	152.6	6.6	8.5
STTHM203			163.0	24.5	1.4	152.6	6.6	9.2
STTHM204			163.0	24.5	1.5	152.6	6.6	9.8
STTHM205			86.0	34.5	0.9	76.3	13.1	11.8

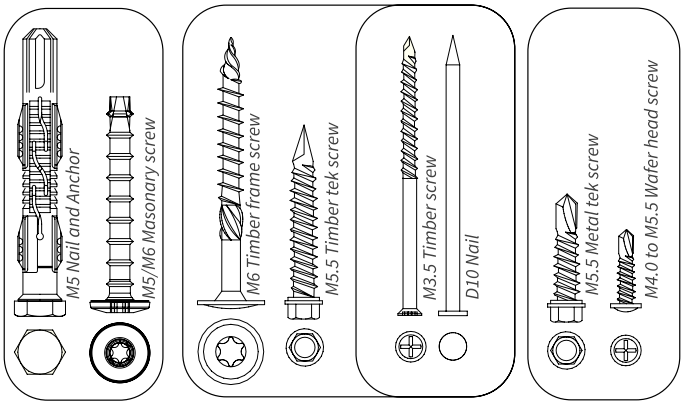
CLADDING CLIP STRIP

Item	Description	Width (mm)	Gauge (mm)	Depth (mm)	Ventilation gap (mm)	Length (mm)	Mass (kg/part)
Flat strip		40	1.2	12	0	1 831	0.7
Channel		45	1.2	34	>23.5	1 831	1.5
						2 745	2.2
Top hat		86	1.2	36	25.4	1 831	2.2
						2 745	3.2

5.2 Fasteners

TYPICAL FASTENERS

Fastener hole	Diameter	Timber	Steel	Masonry
Small	4 mm or 0.16"	Nail 3.3 mm or 0.131"	N/a	N/a
Mitre hole	4 mm or 0.16"	Nail 3.3 mm or 0.131"	N/a	N/a
Medium	6 mm or 0.23"	Tek screw M5.5 or #10	Tek screw M5.5 or #10	Sleeve anchor M5.0 or #10
Large hole	9 mm or 0.35"	Frame screw M6.0 or #12	M8 Bolt and nut	Masonry screw bolt M5 or #10



5.3 Trim

TRIM AND ADAPTORS

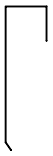
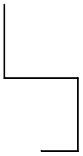
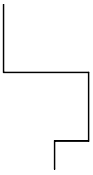
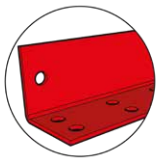
Item	Description	Associated trim	Application	Description	Board Length Adjustment	Adaptor Edge distances *
Top and bottom adaptor		Universal trim	Bottom trim		N/A	70 mm from bottom of clip strip ledge
			Top Trim		N/A	50 mm from top of clip strip ledge
Side adaptor			Edge trim		35 mm	70 mm from centre of clip strip
		T-Trim	Butt join		15 mm	62.5 mm overlap at centre
		U-trim	Butt join		N/A	70 mm from centre of clip strip
Internal corner adaptor		Internal corner trim	Internal corner		20 mm	50 mm from edge 40 mm from edge to fastener
External corner adaptor		External corner trim	External corner		20 mm	50 mm from edge 40 mm from edge to fastener

*Edge distances do not include ground clearances or space for additional flashing

5.4 Flashing

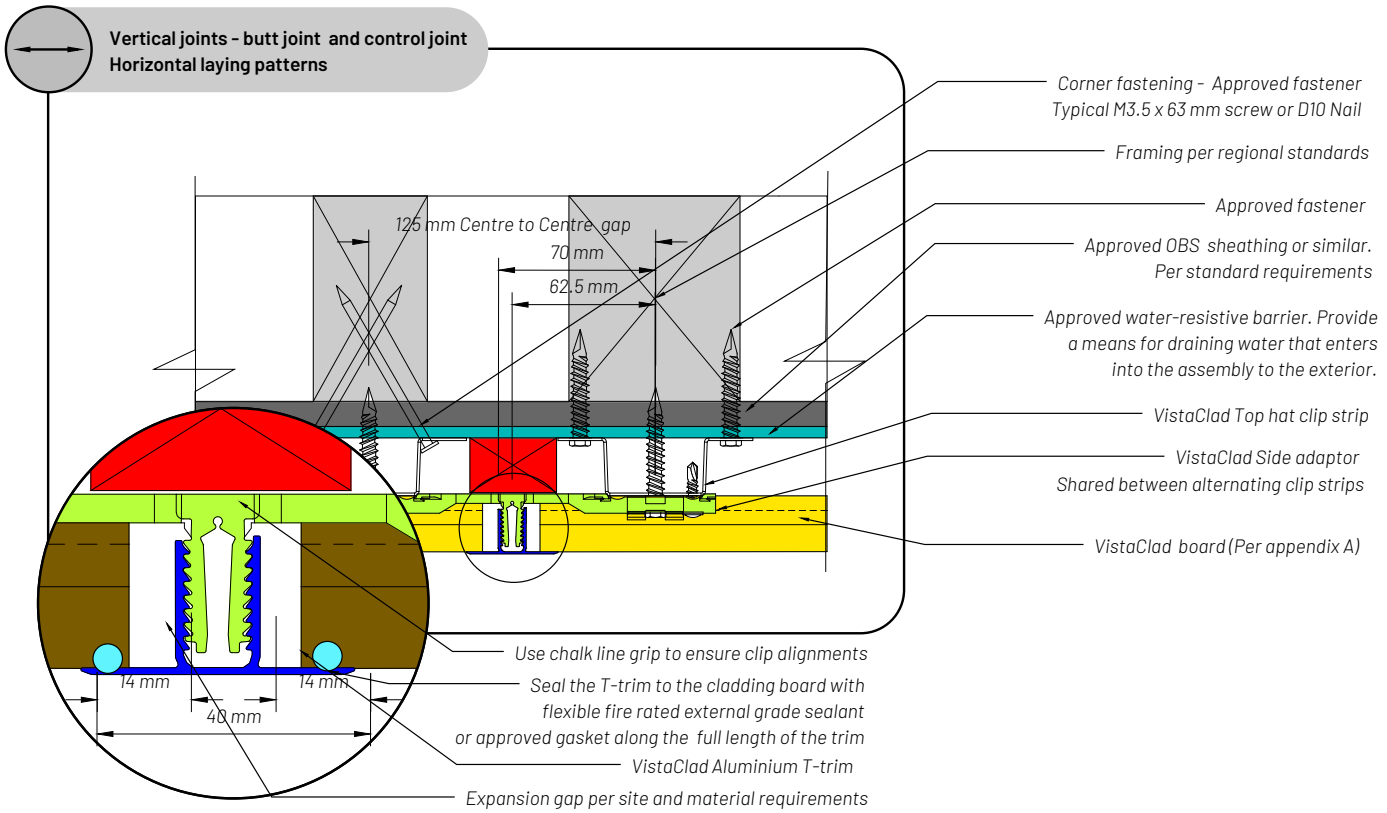
Below is a list of typical flashing profiles and the required combined cover depth. A flashing specialist should be consulted where necessary.

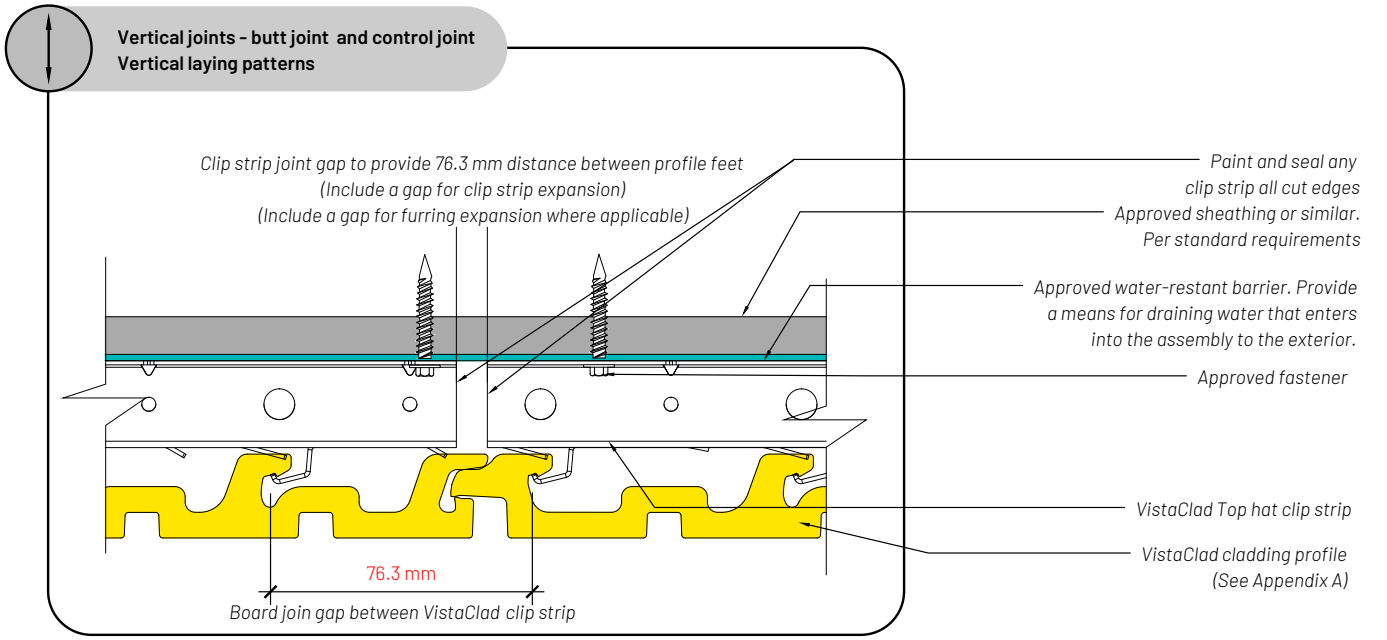
TYPICAL FLASHINGS

Parts			Cover depth (mm)		
Typical flashing types	**Description**	**Furring depth**	**STGJ111 22.5 mm board**	**STTHM202,203,204 24.5 mm board**	**STTHM205 34.5 mm board**
Side wall flashing		10 mm (3/8″)	32.5	34.5	44.5
		25.4 mm (1″)	48	50	60
		38 mm (1 1/2″)	60.5	64	73
Jam Flashing		10 mm (3/8″)	32.5	34.5	44.5
		25.4 mm (1″)	48	50	60
		38 mm (1 1/2″)	60.5	64	73
Counter flashing		10 mm (3/8″)	32.5	34.5	44.5
		25.4 mm (1″)	48	50	60
		38 mm (1 1/2″)	60.5	64	73
Sill Flashing		10 mm (3/8″)	32.5	34.5	44.5
		25.4 mm (1″)	48	50	60
		38 mm (1 1/2″)	60.5	64	73
Drip flashing		10 mm (3/8″)	32.5	34.5	44.5
		25.4 mm (1″)	48	50	60
		38 mm (1 1/2″)	60.5	64	73
Head wall flashing		10 mm (3/8″)	32.5	34.5	44.5
		25.4 mm (1″)	48	50	60
		38 mm (1 1/2″)	60.5	64	73
Load bearing perforated angle		10 mm (3/8″)	32.5	34.5	44.5
		25.4 mm (1″)	48	50	60
		38 mm (1 1/2″)	60.5	64	73
Pest control barrier angle		10 mm (3/8″)	10	10	10
		25.4 mm (1″)	25.4	25.4	25.4
		38 mm (1 1/2″)	38	38	38

5.5 Junction details

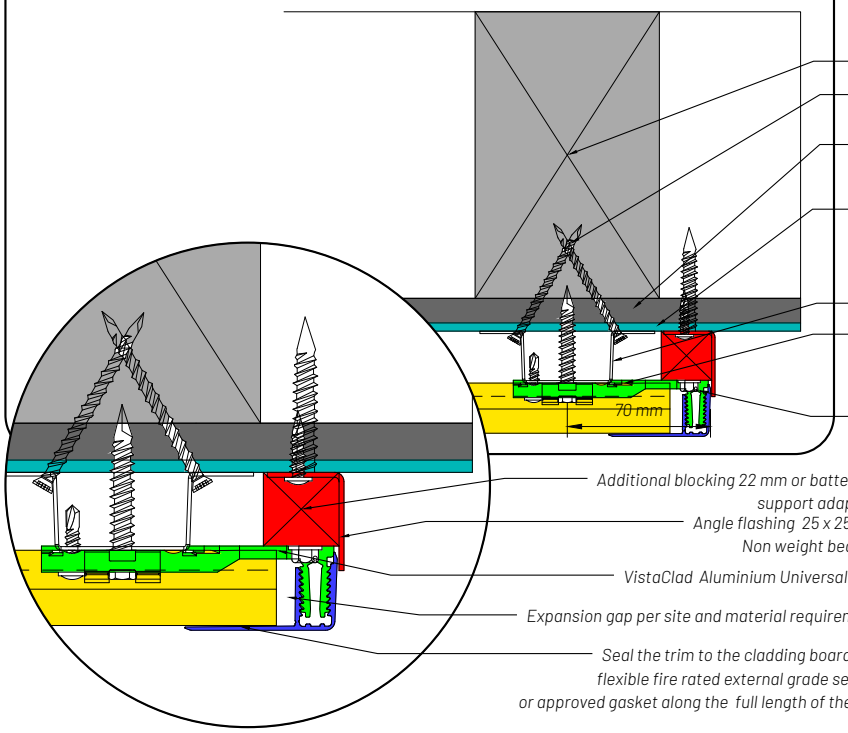
5.5.1 Vertical joint – butt joint and control joint



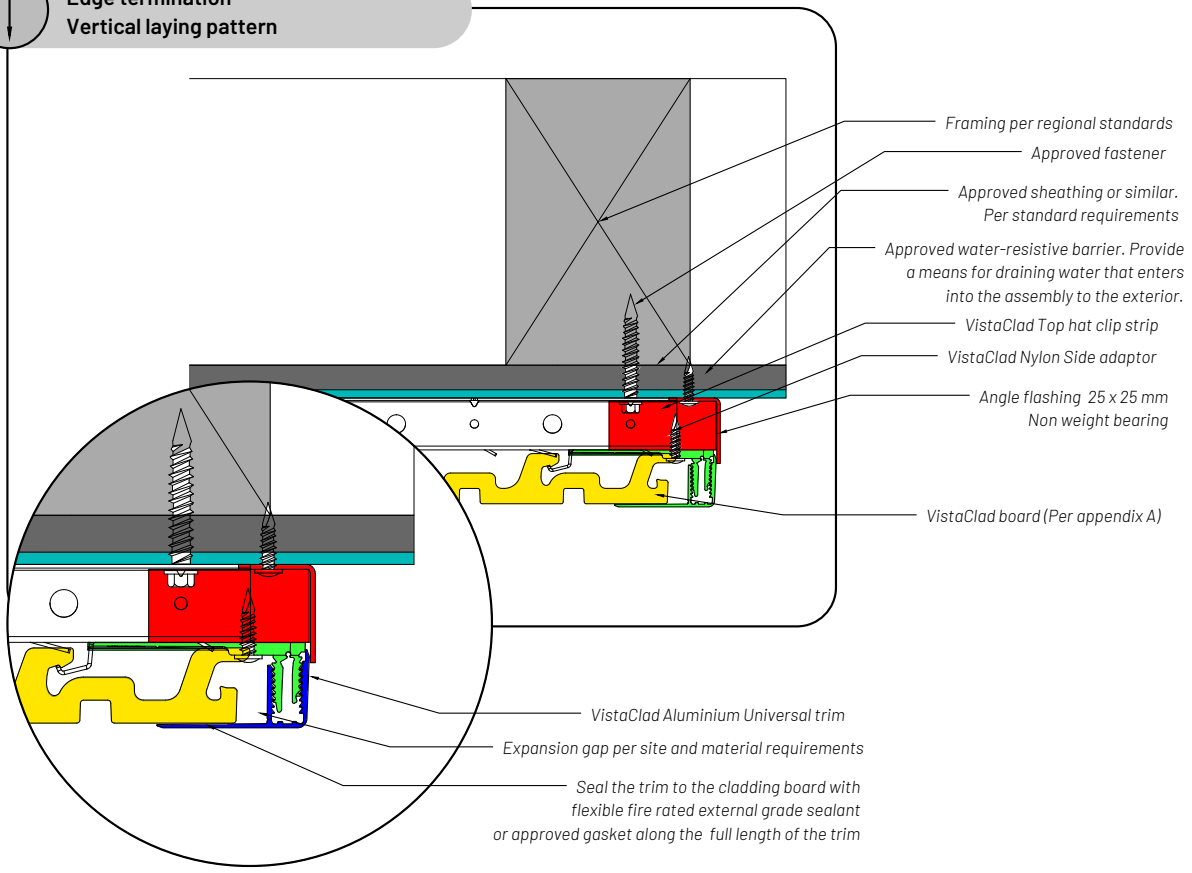


5.5.2 Edge termination

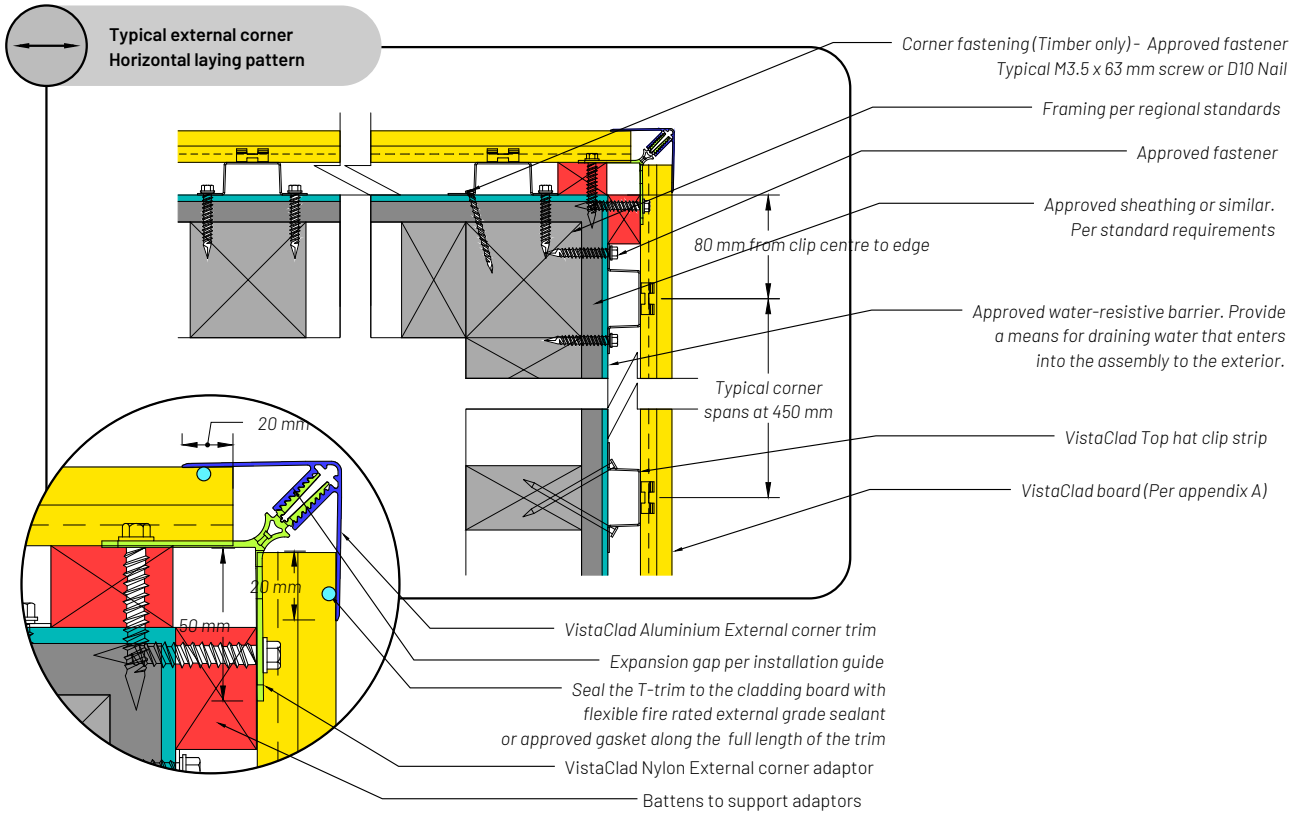
Edge termination
Horizontal laying pattern

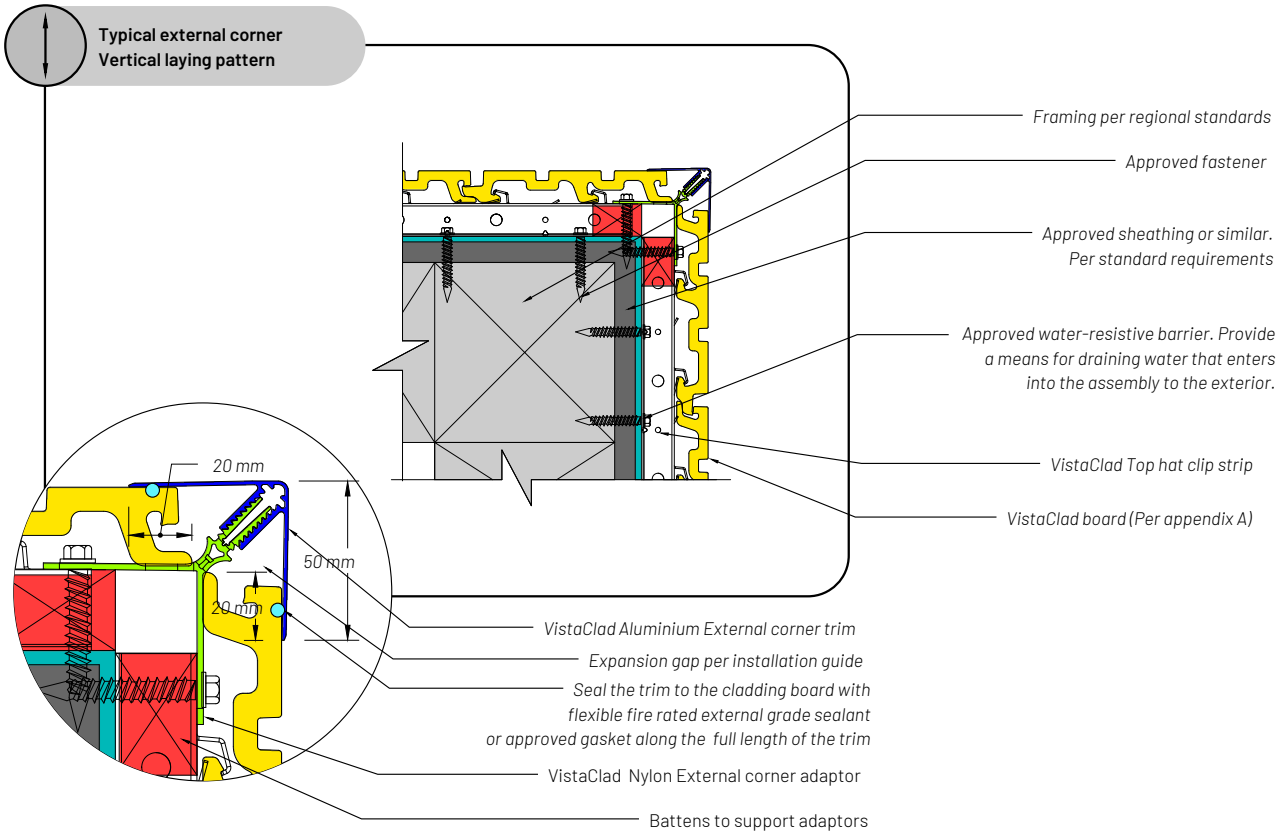


Edge termination
Vertical laying pattern

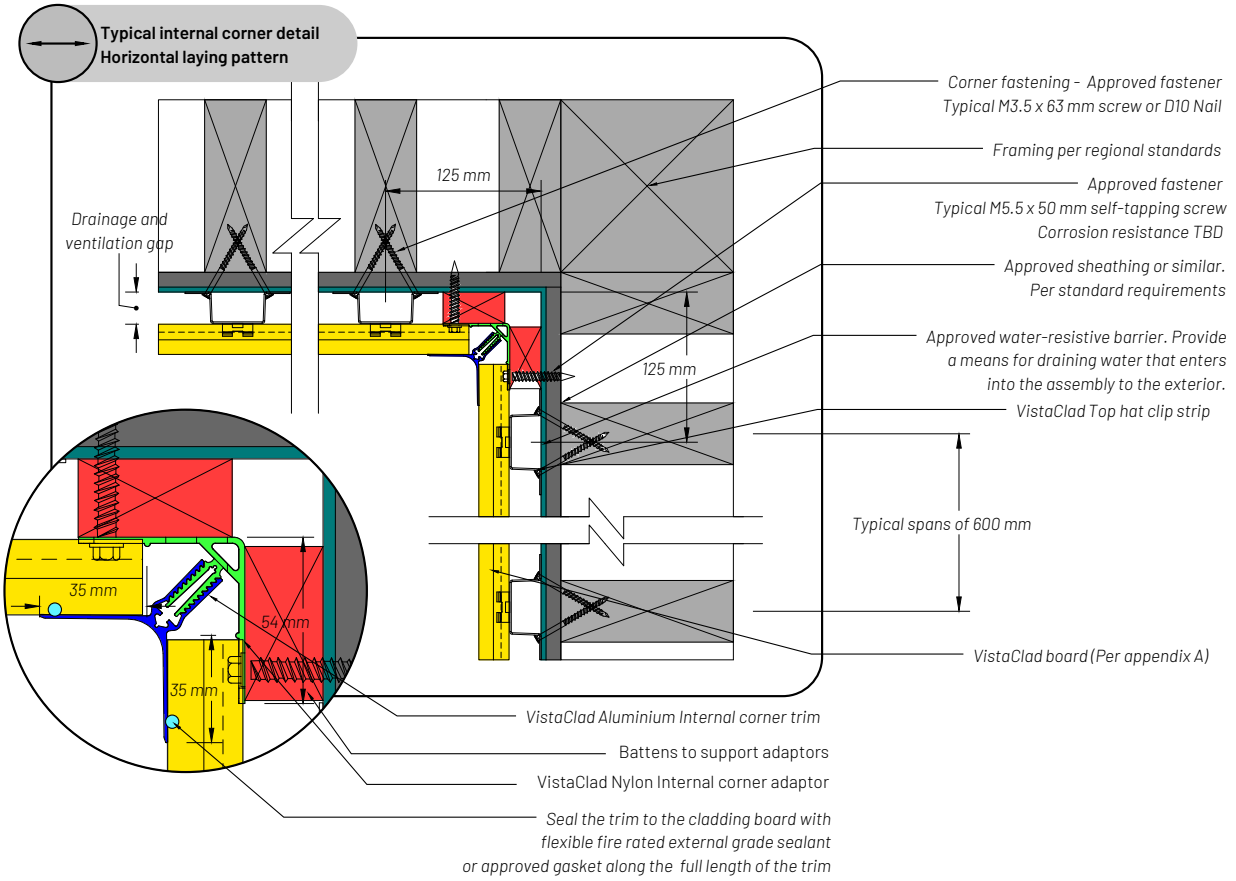


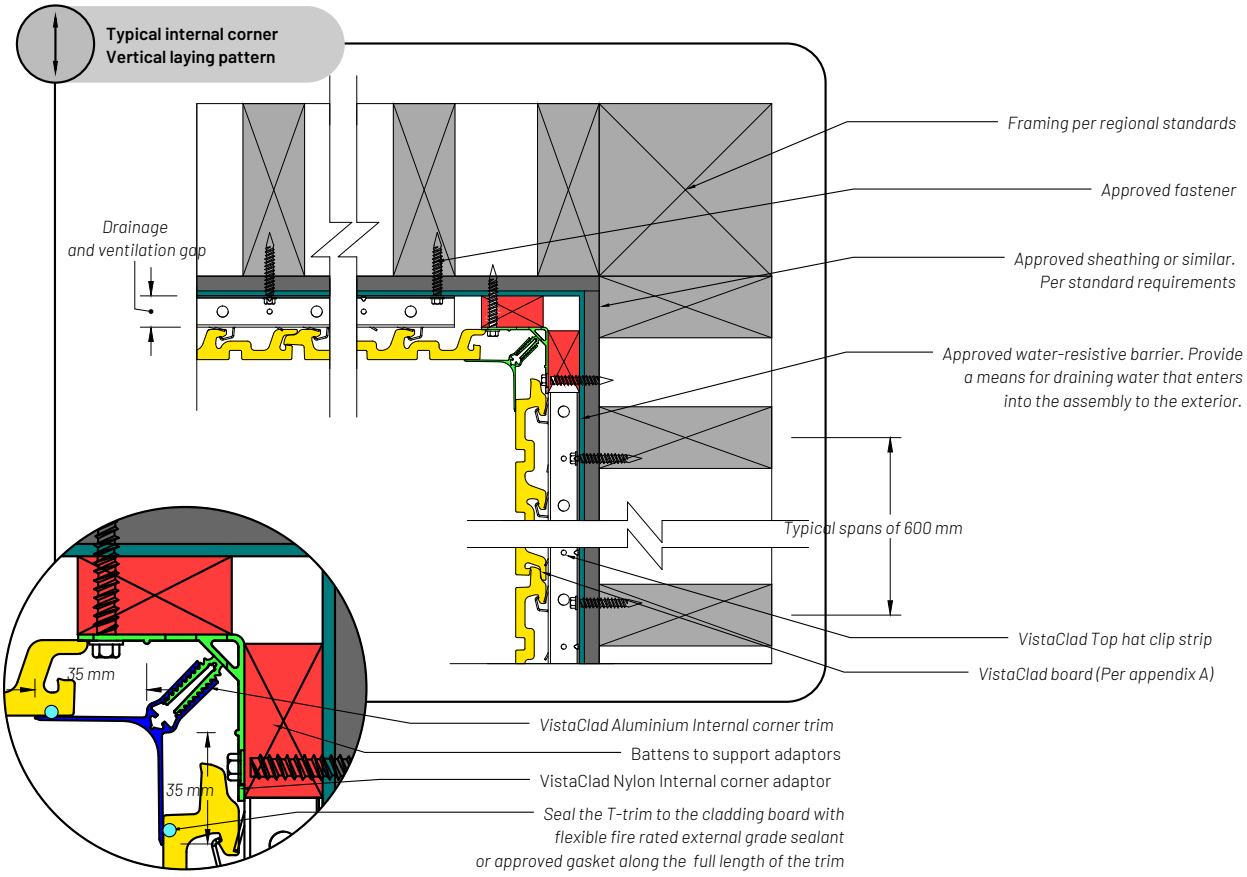
5.5.3 Typical external corner



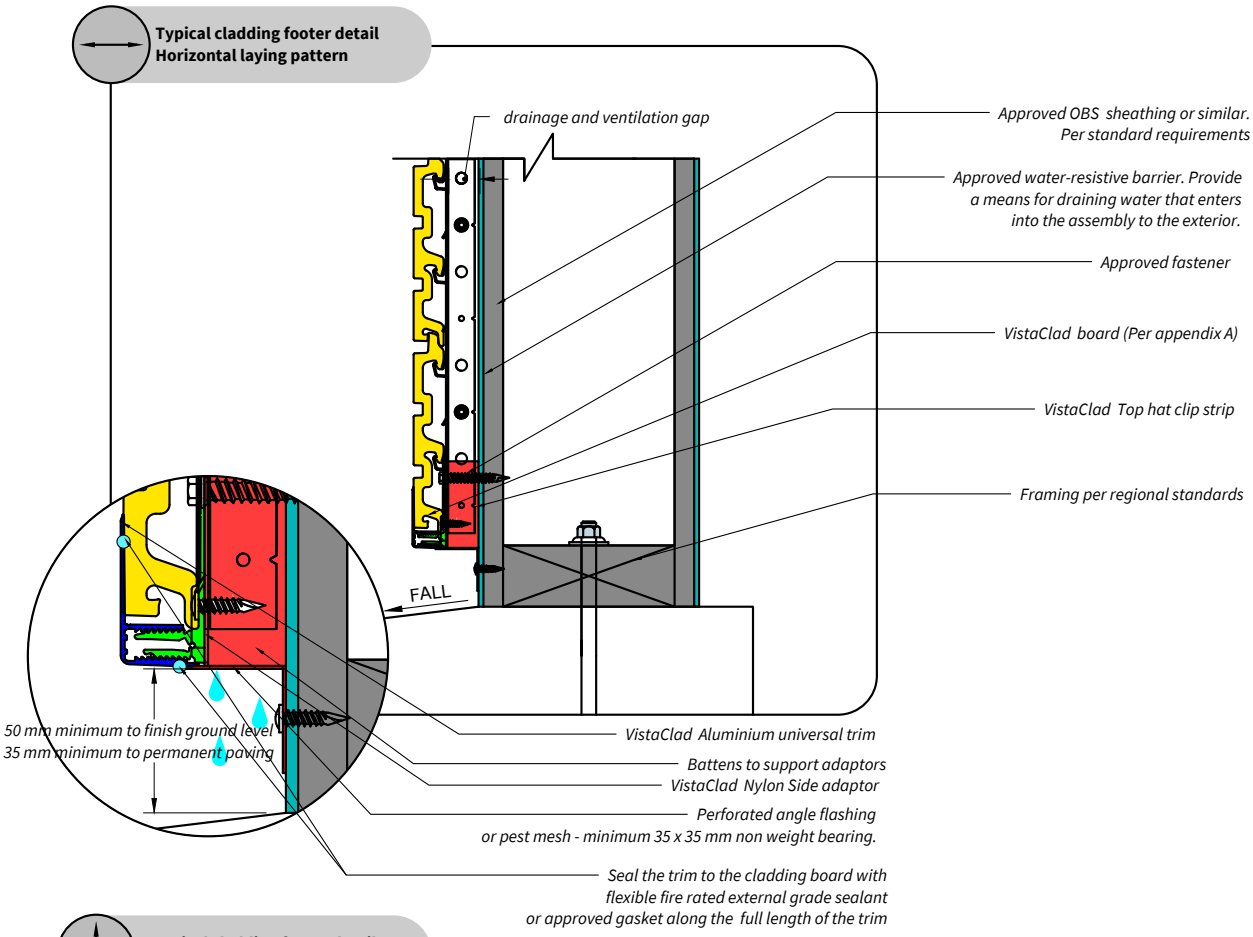


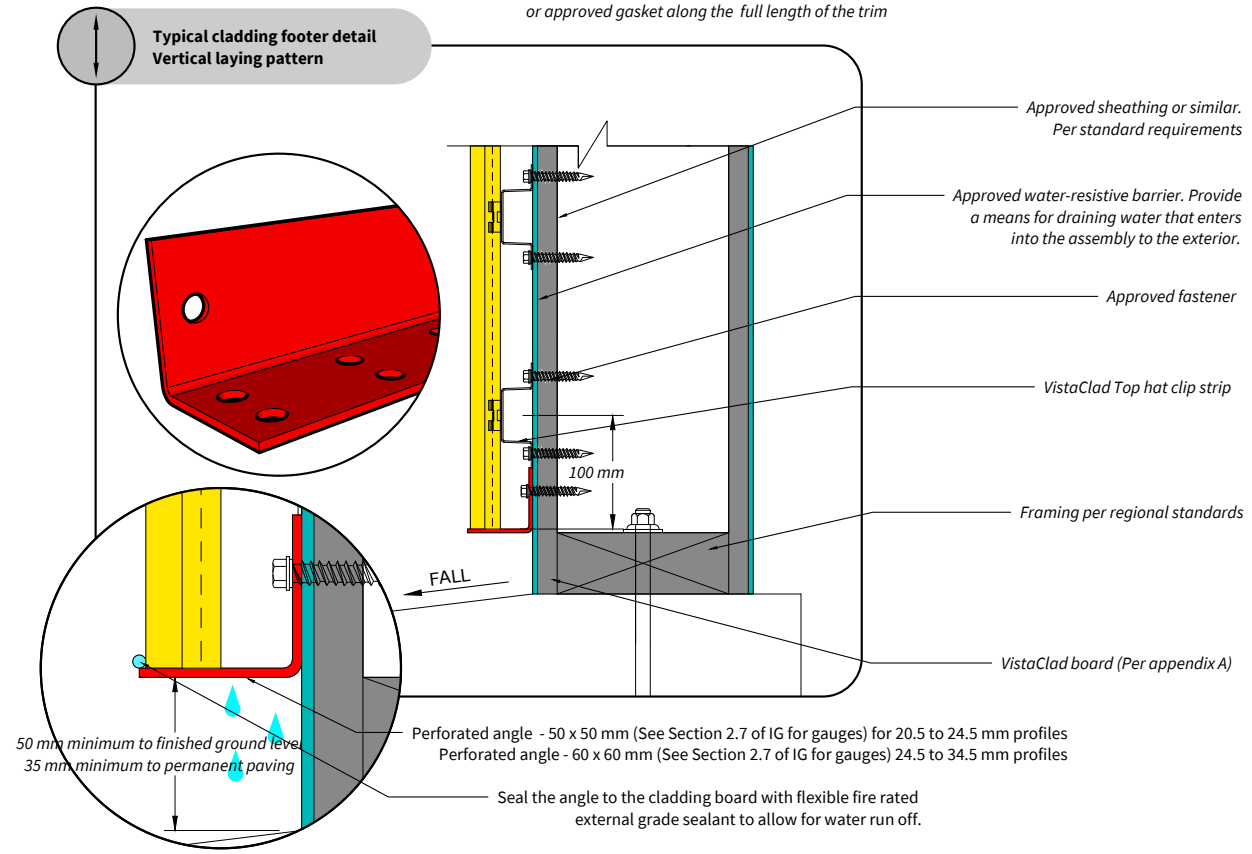
5.5.4 Typical internal corner



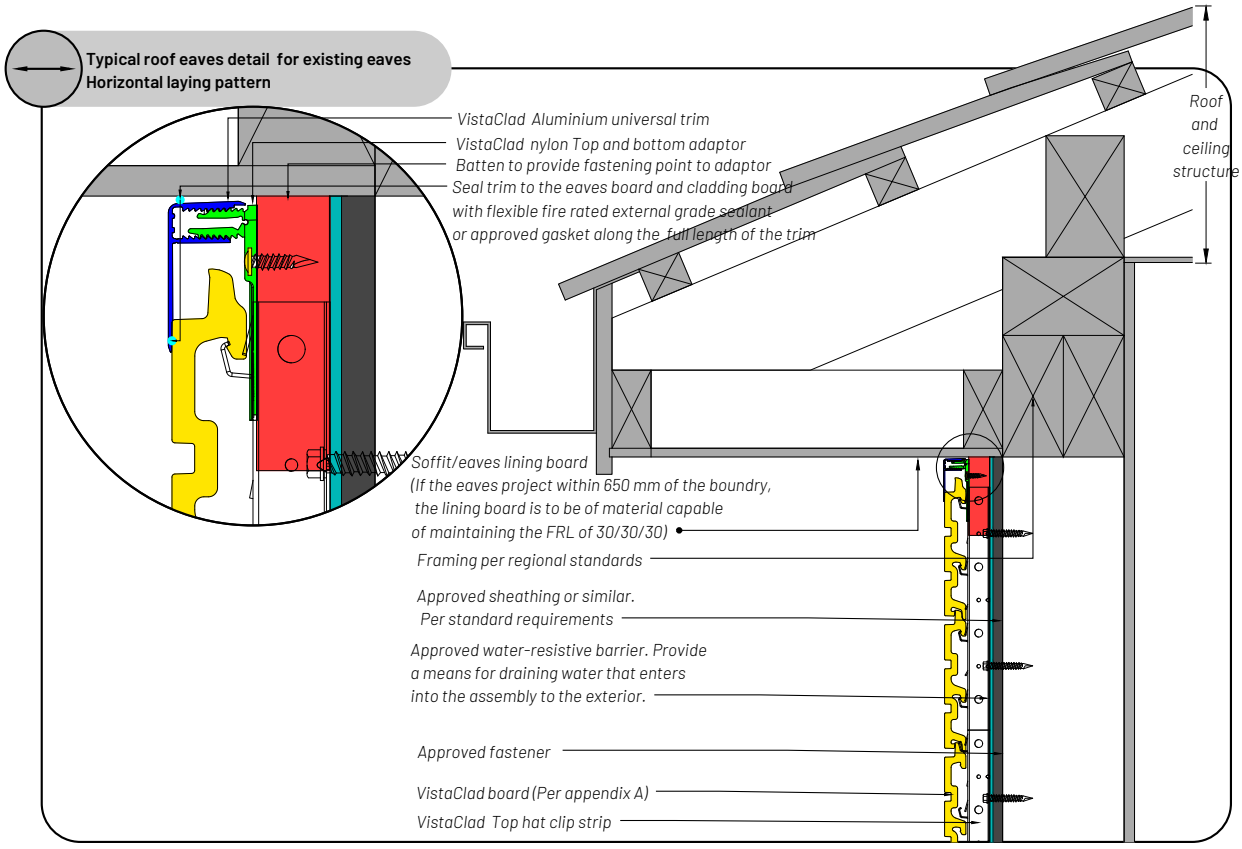


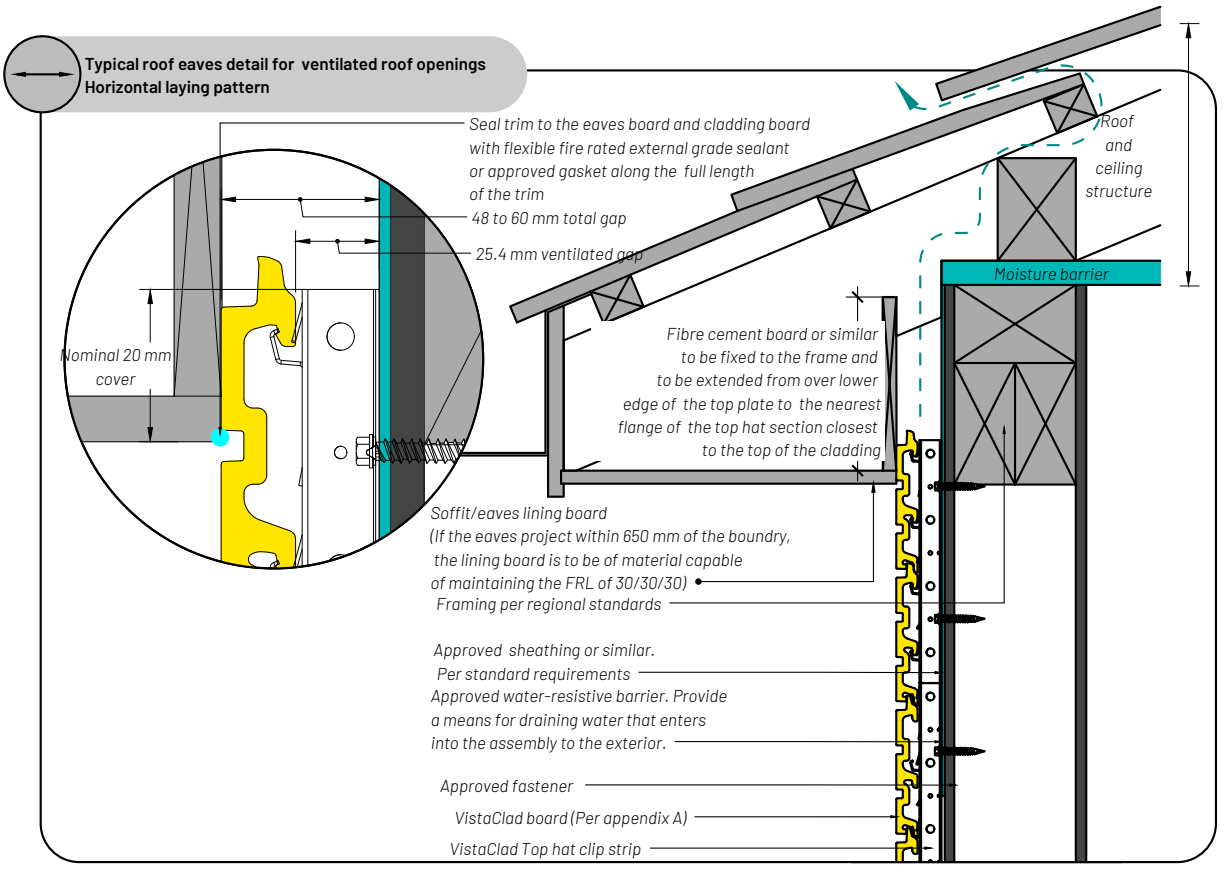
5.5.5 Typical footer detail



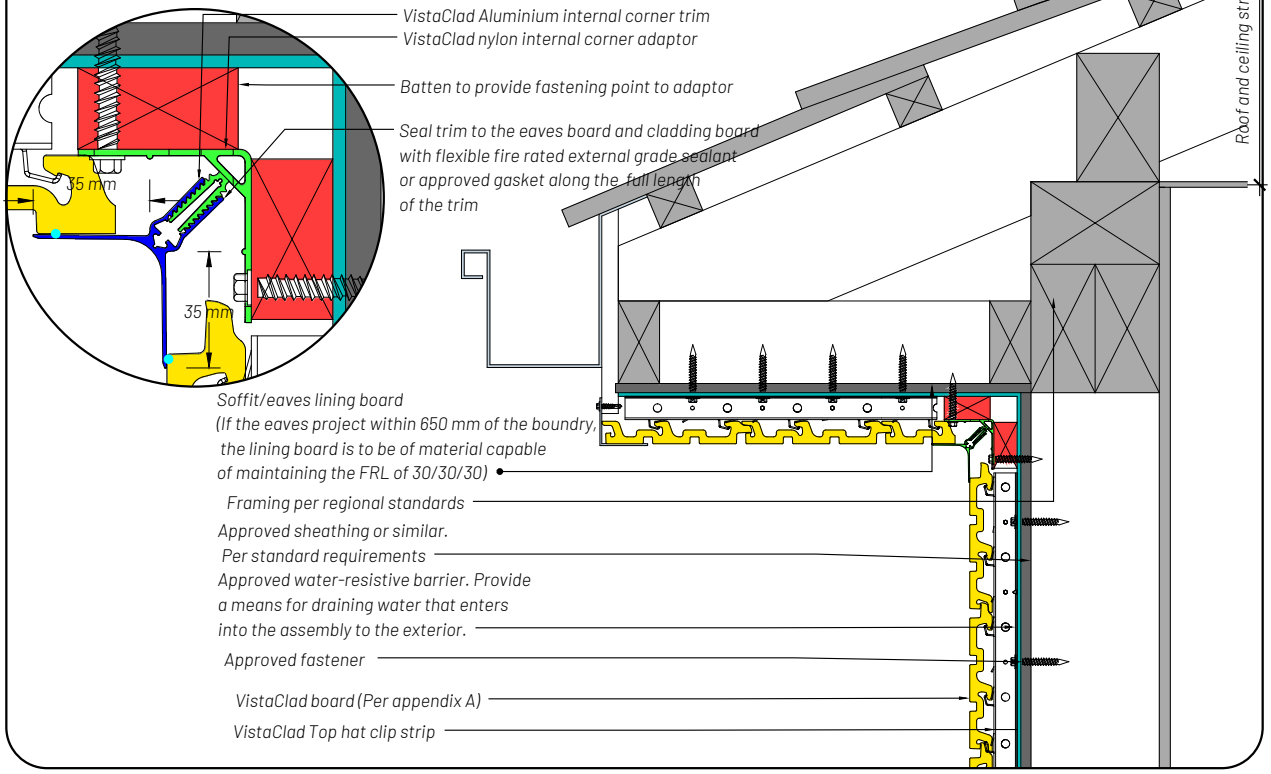


5.5.6 Typical roof eaves

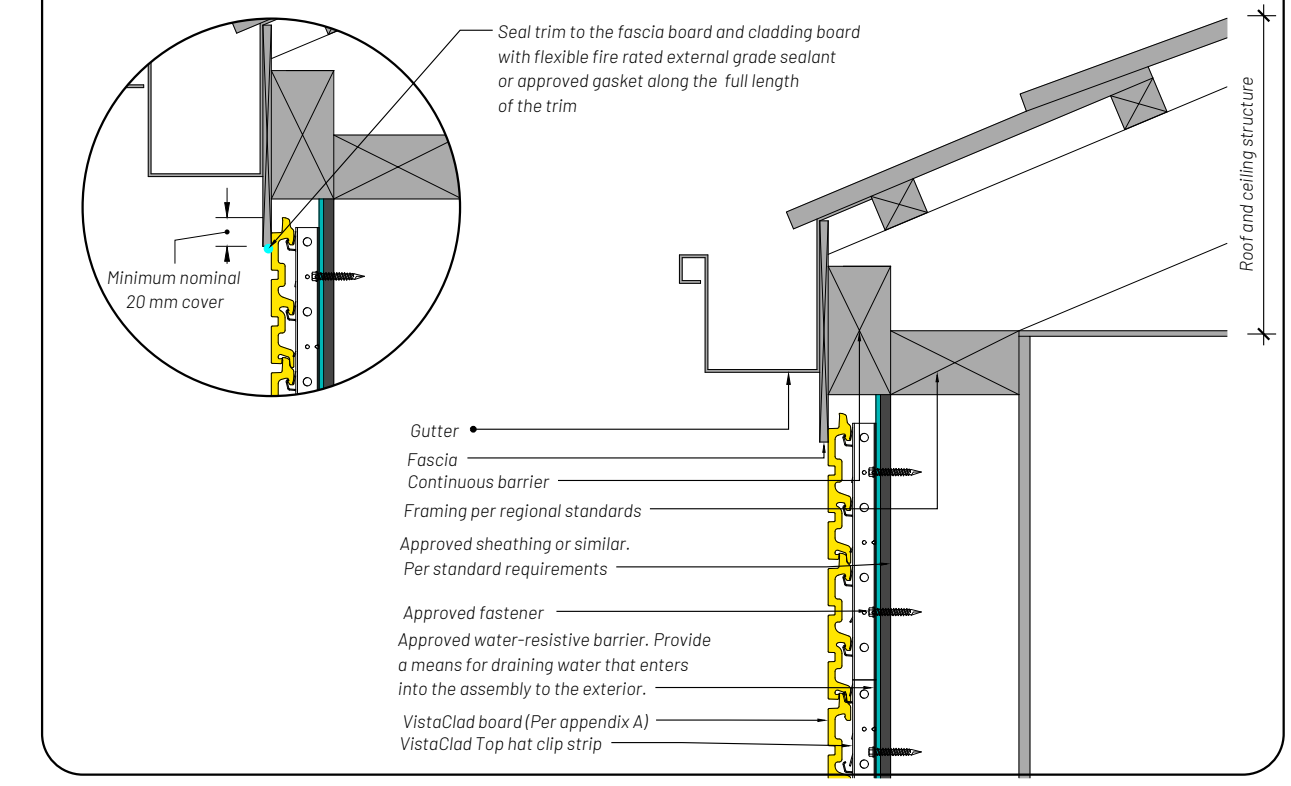




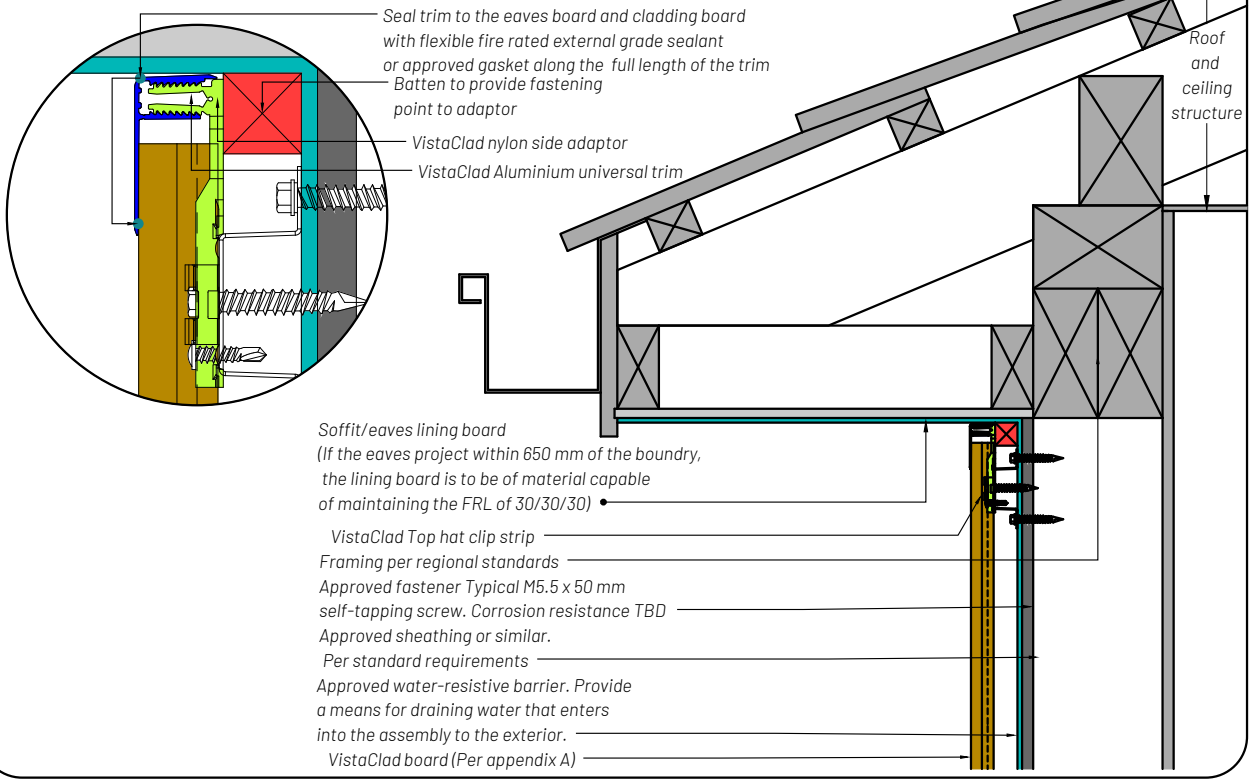
Typical roof eaves detail for matching ceiling
Horizontal laying pattern



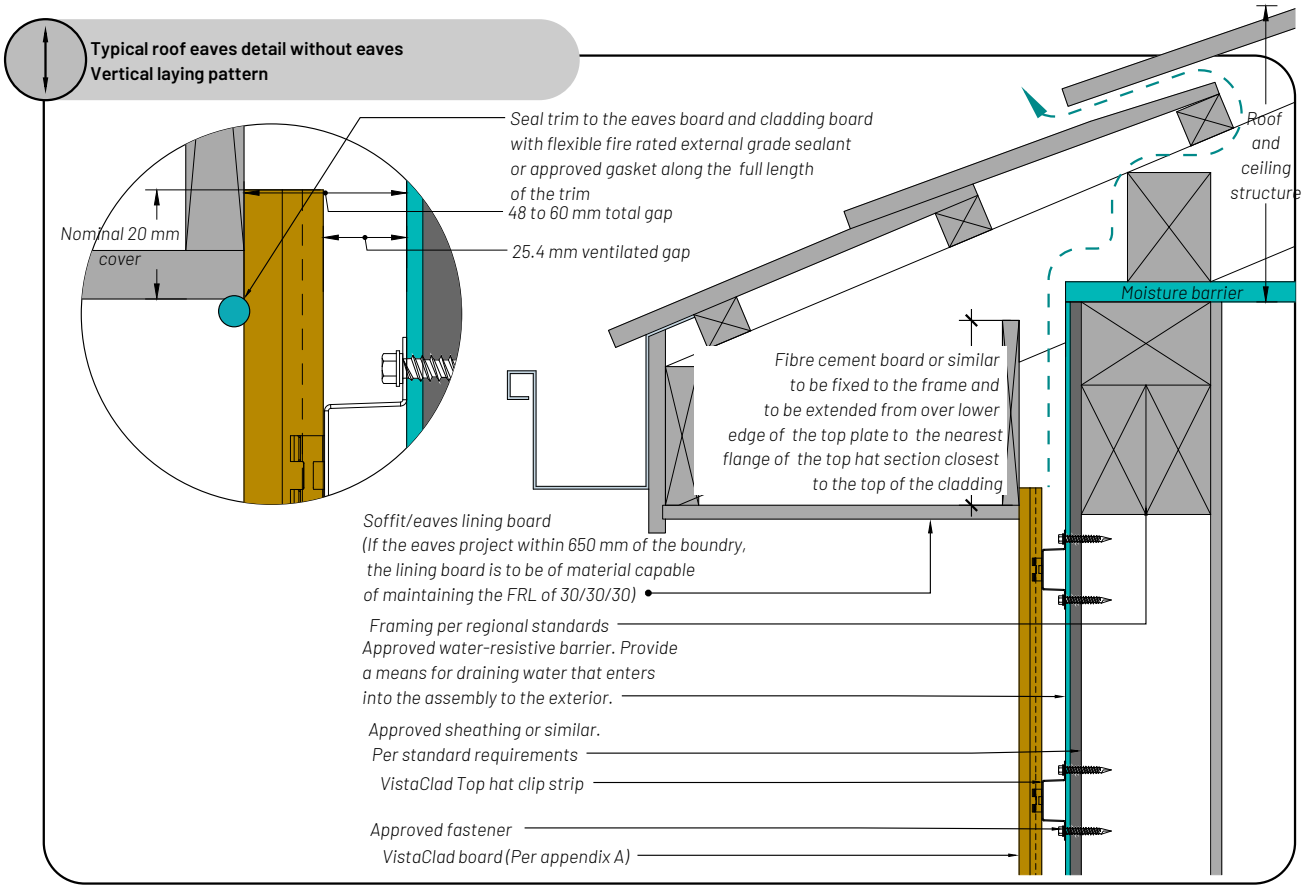
Typical roof eaves detail without eaves
Horizontal laying pattern



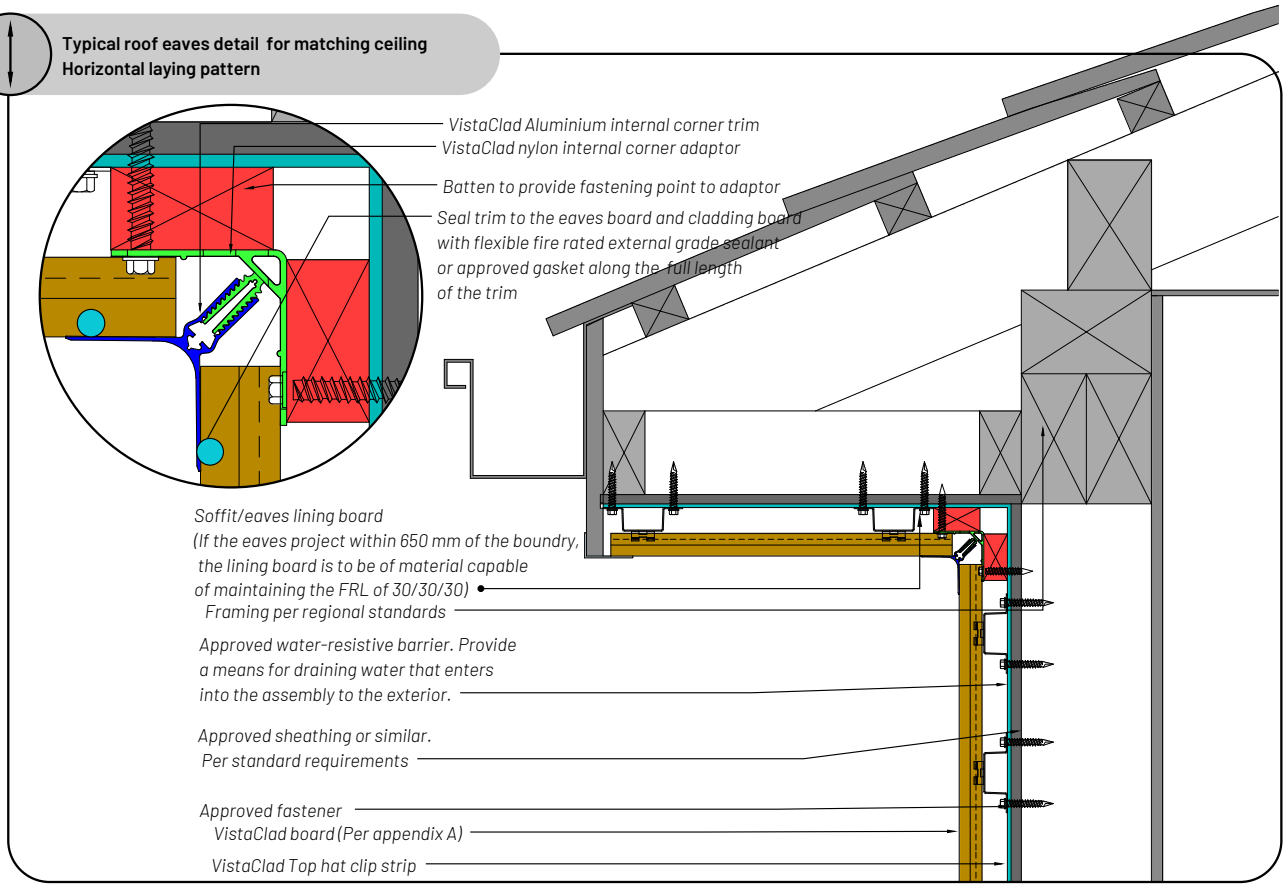
Typical roof eaves detail for matching ceiling
Vertical laying pattern



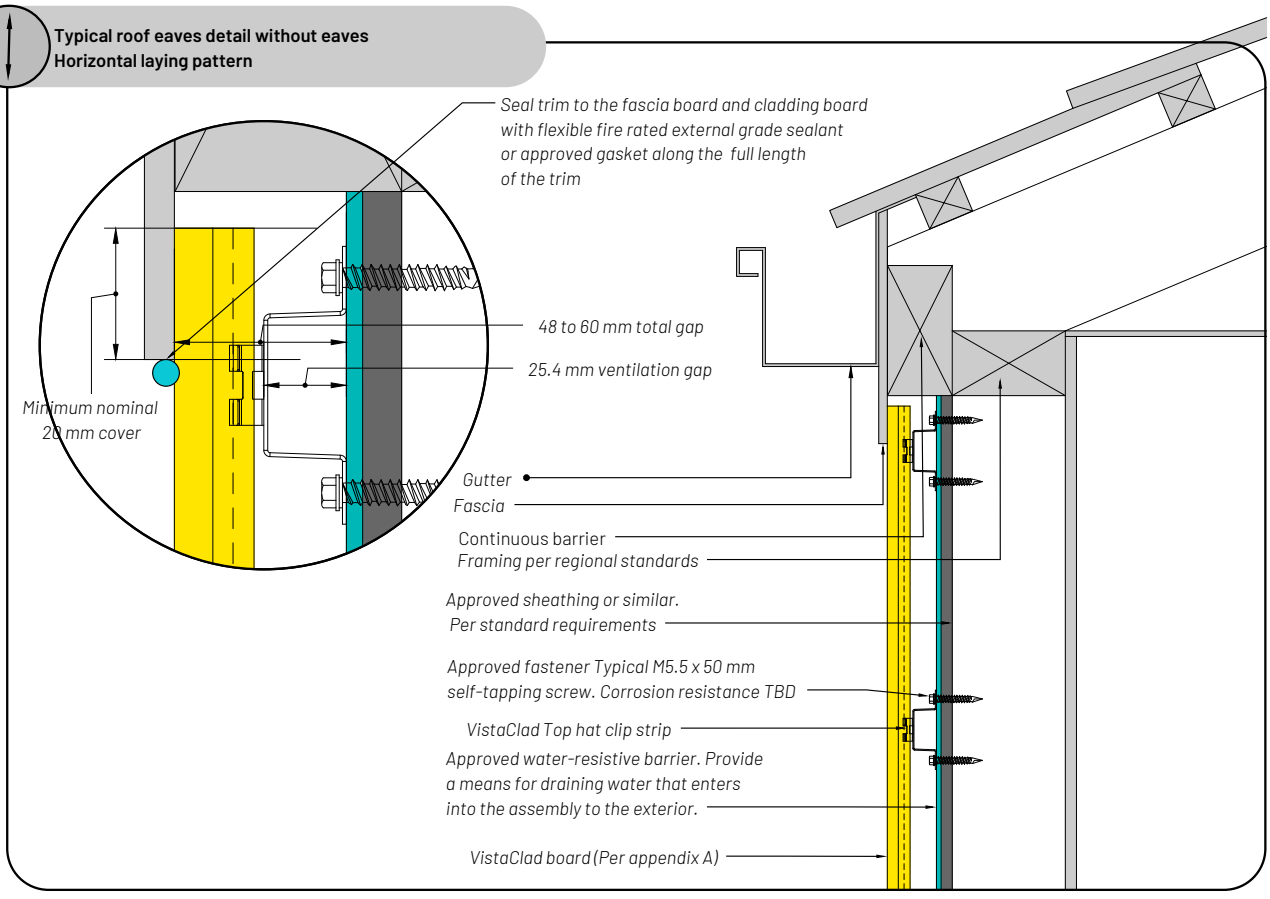
Typical roof eaves detail without eaves
Vertical laying pattern



Typical roof eaves detail for matching ceiling
Horizontal laying pattern

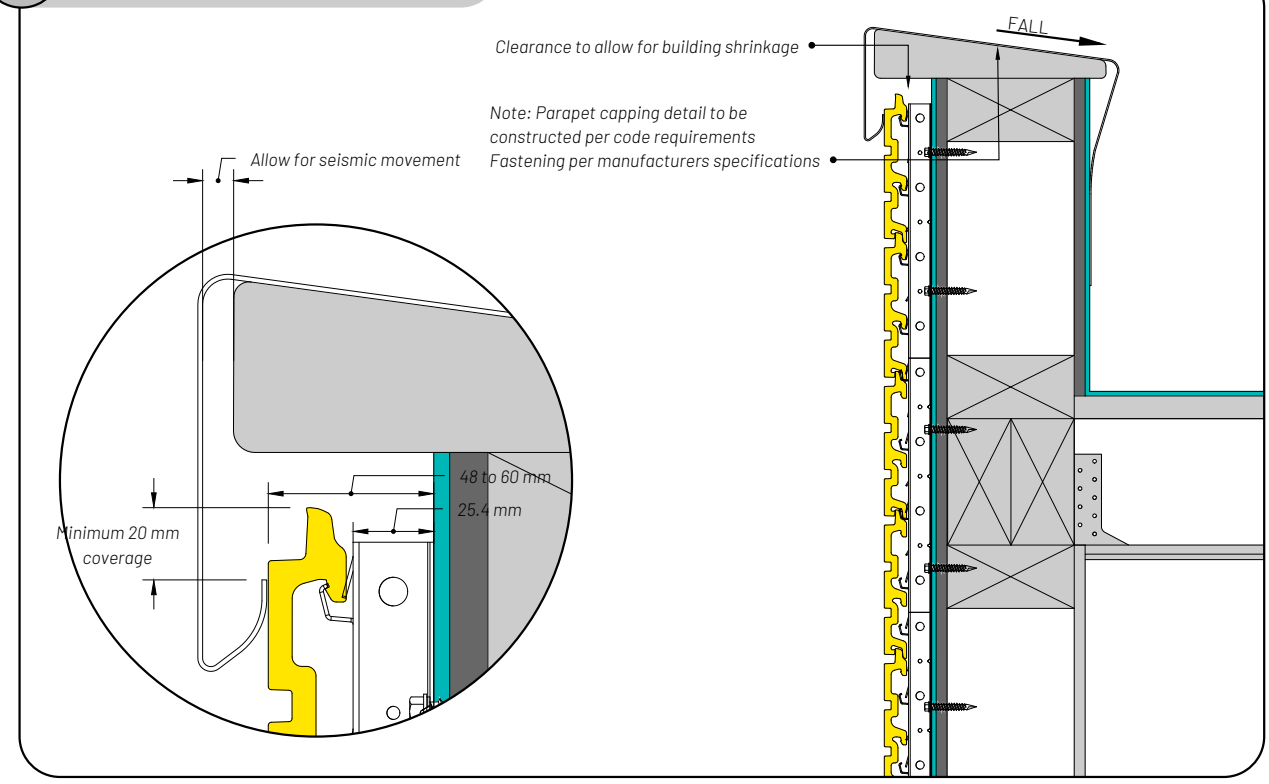


Typical roof eaves detail without eaves
Horizontal laying pattern

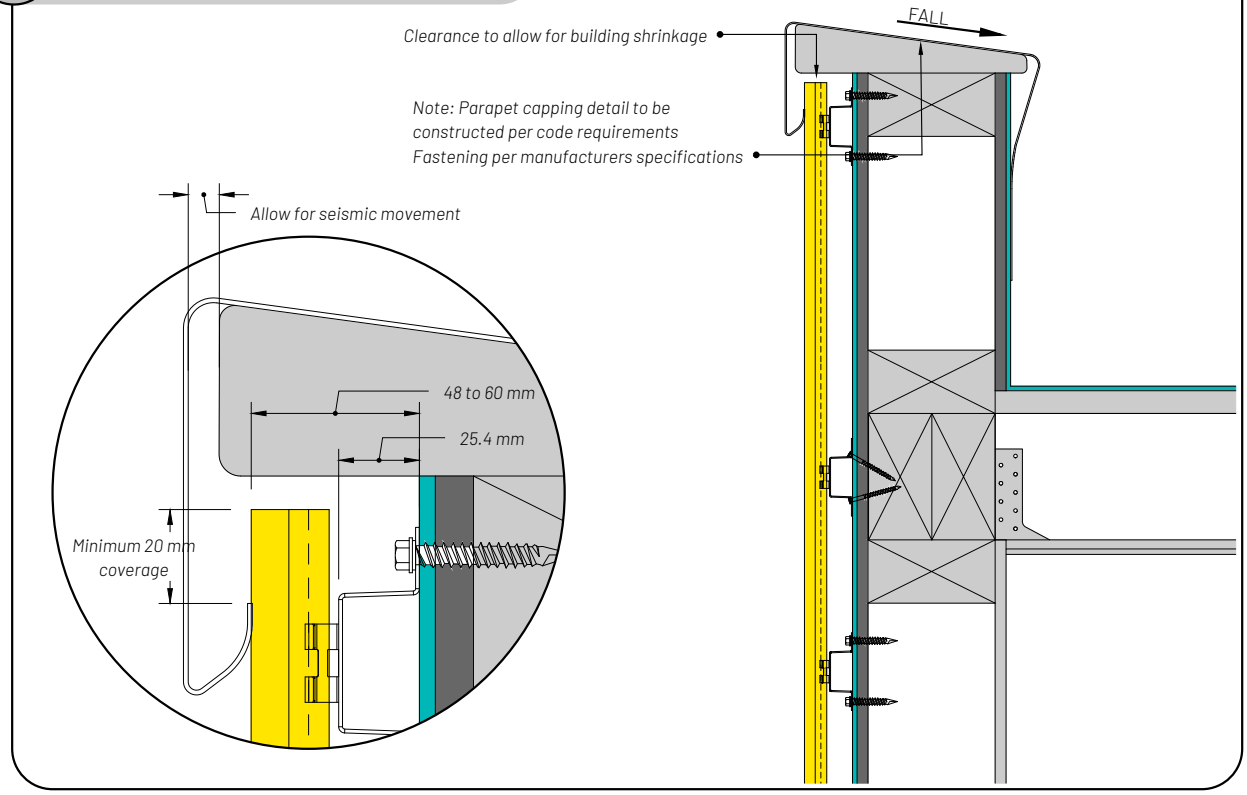


5.5.7 Parapet details

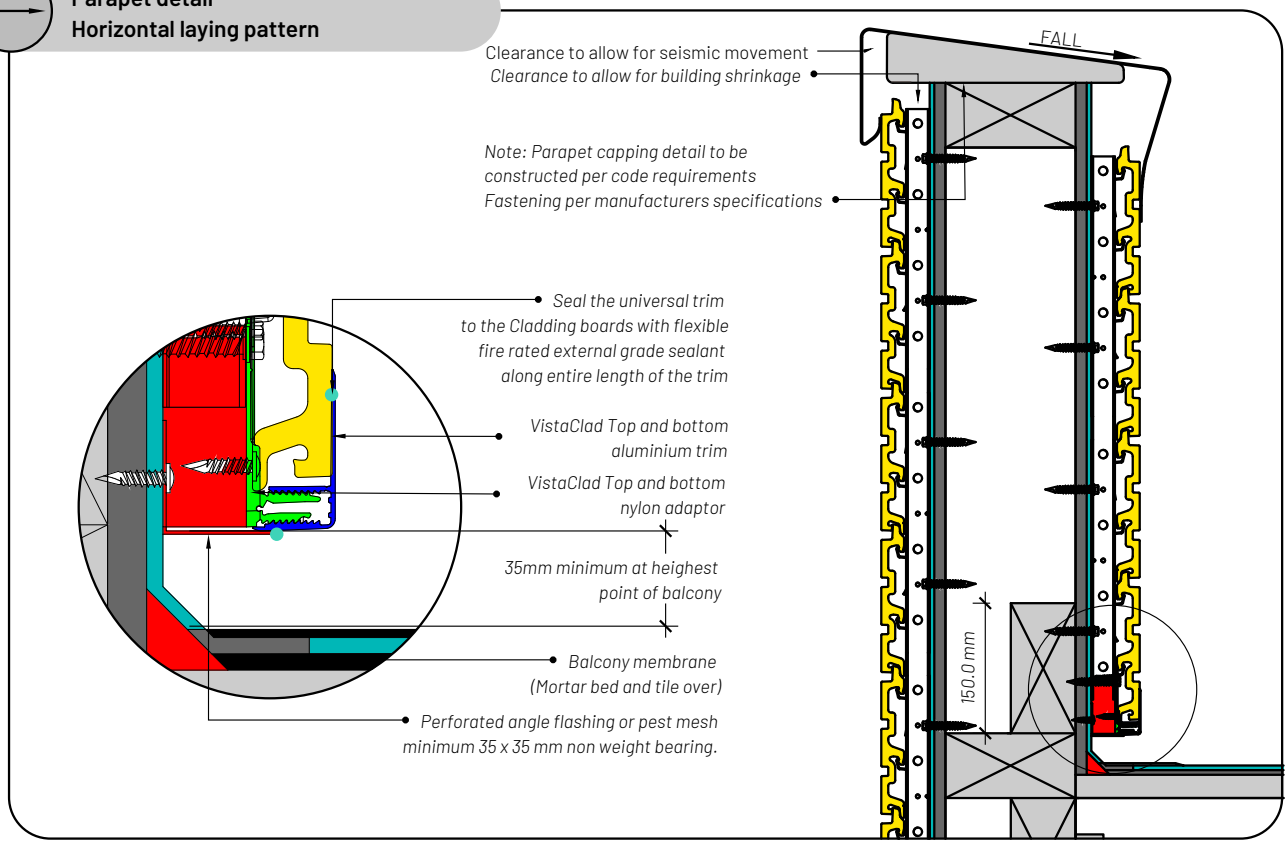
Parapet detail
Horizontal laying pattern



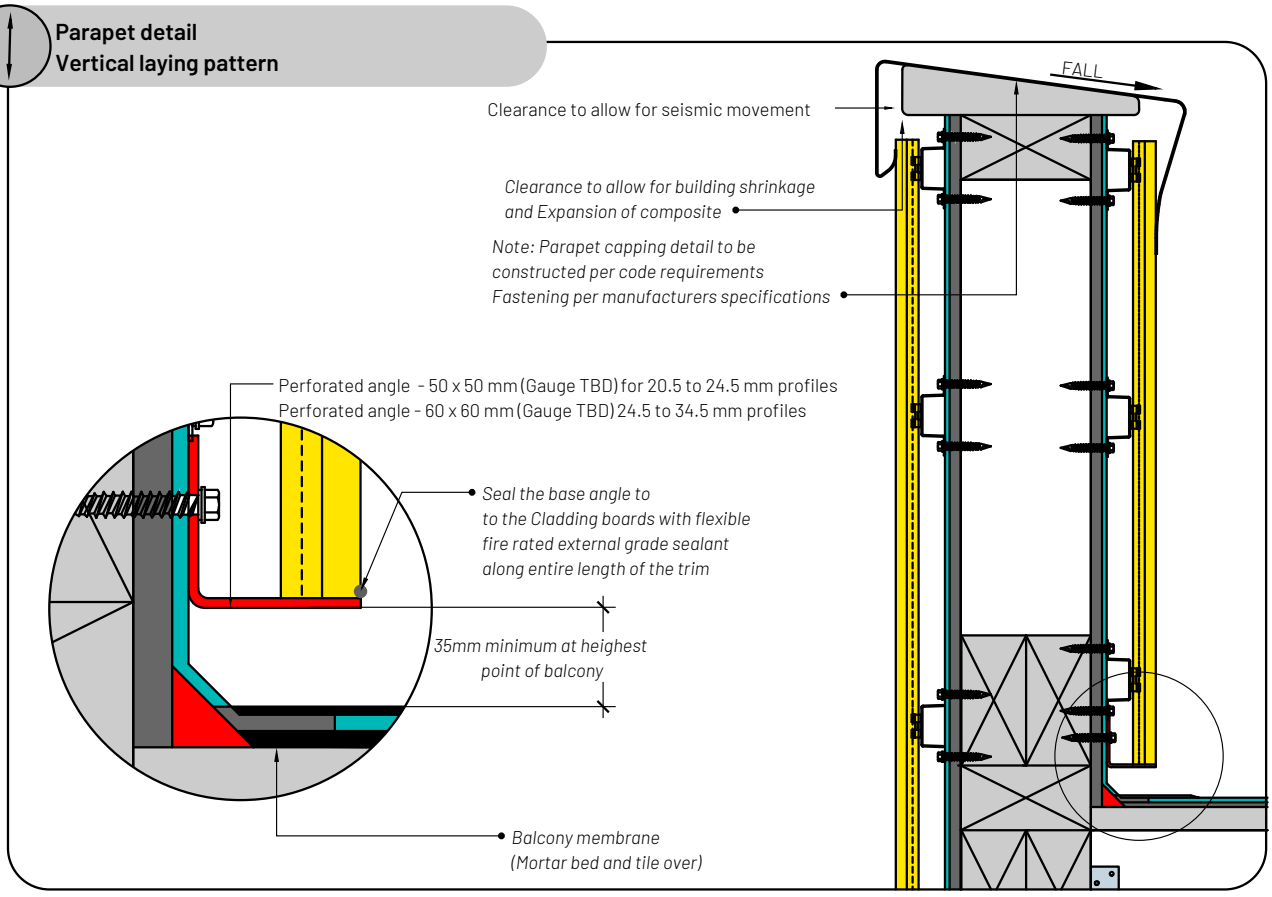
Parapet detail
Vertical laying pattern



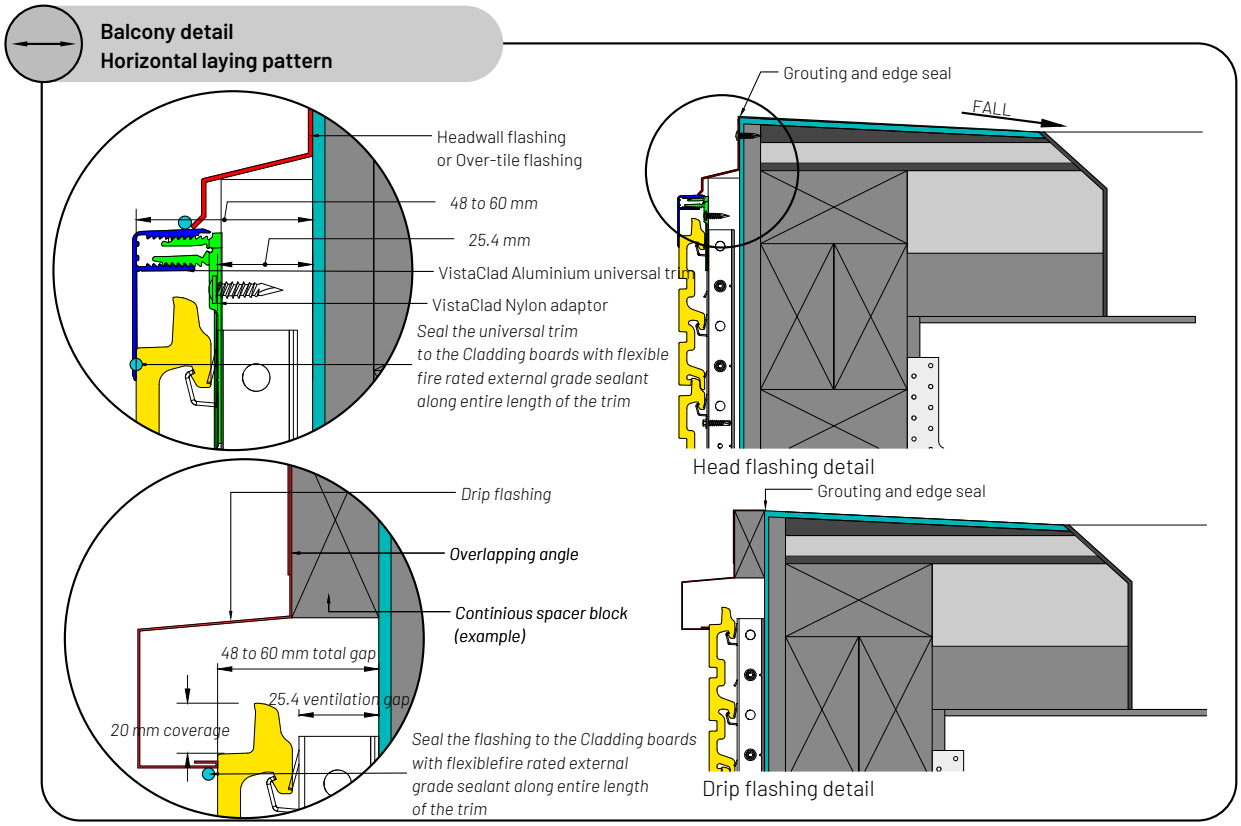
Parapet detail
Horizontal laying pattern

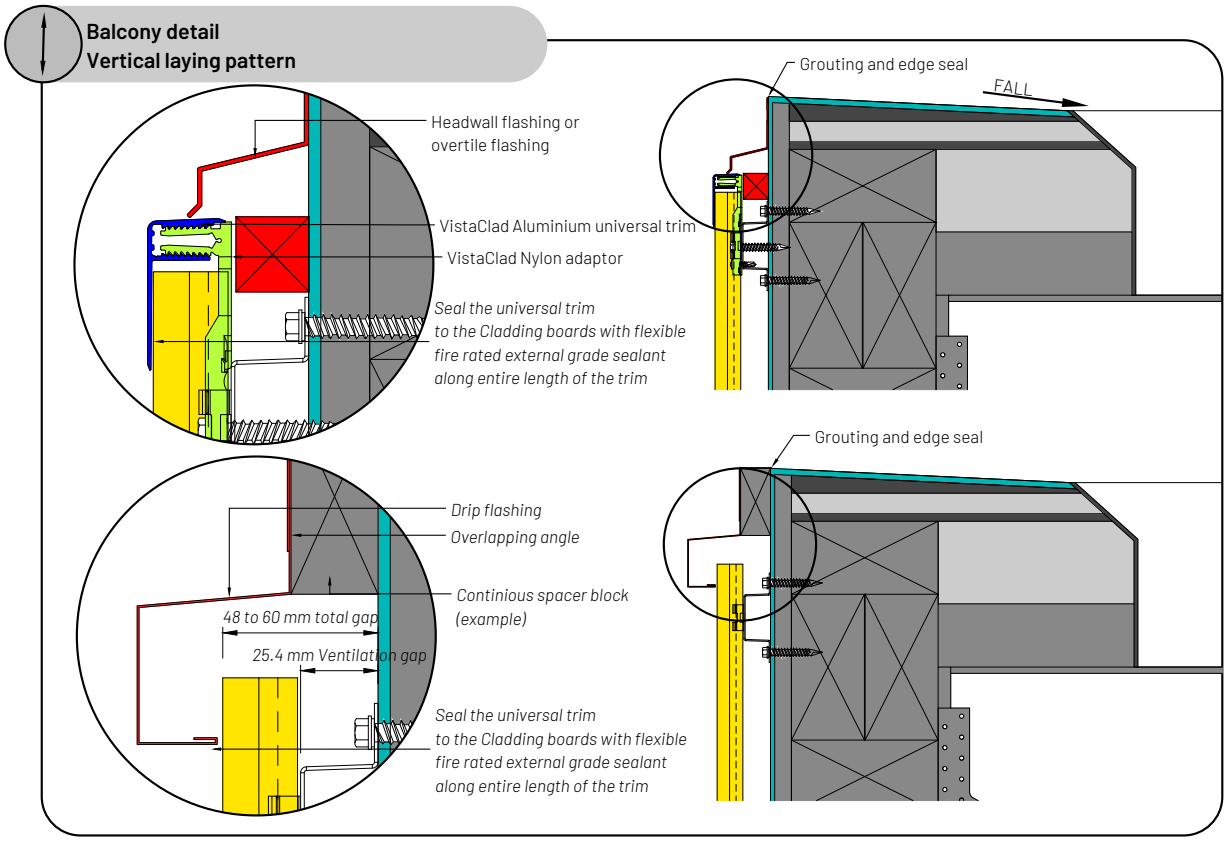


Parapet detail
Vertical laying pattern



5.5.8 Balcony detail

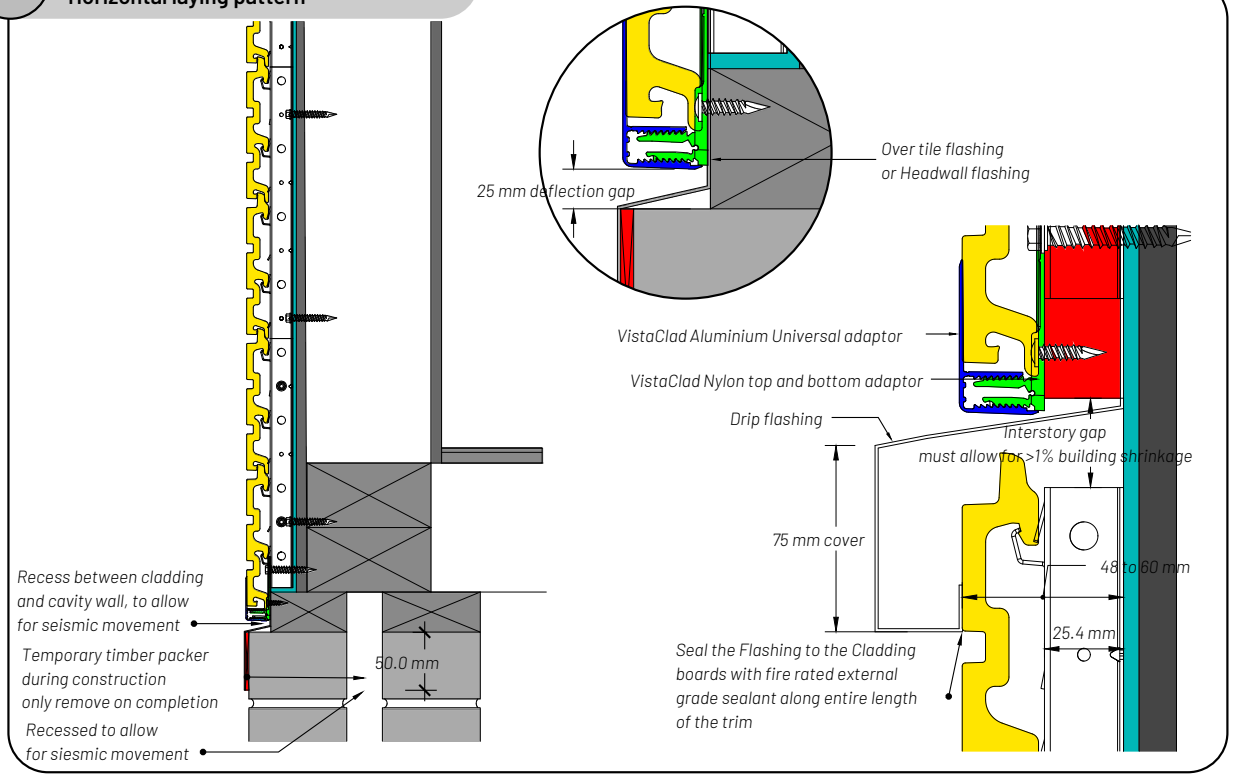




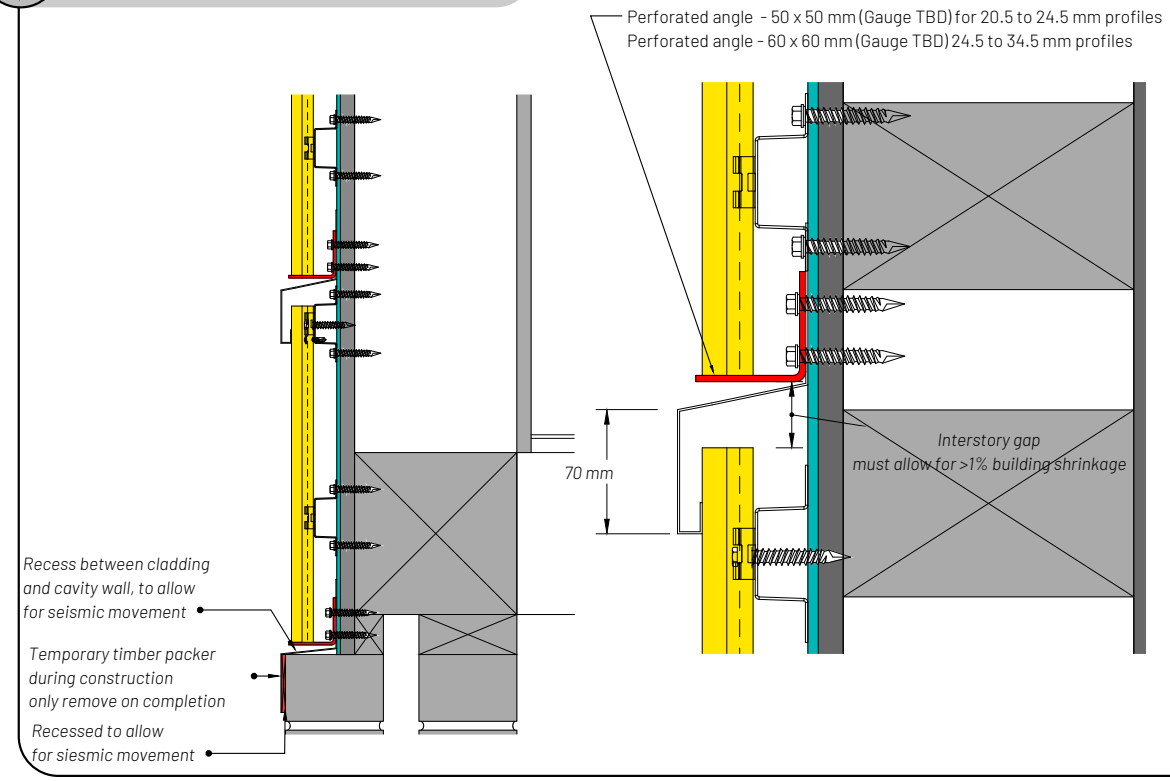
Note. All details provided are indicative and are provided for guidance on system installations and are not suitable for all sites. The following section provides details of typical stud work construction, as there are added complexities when considering stud location, though the details can be adapted to suit masonry applications. Load requirements, fasteners, corrosion, water and ventilation management, edge distances etc. must be considered before installation. All details are based on typical installation depths of a standard 1 inch or 25.4 mm flashing depth using a Top hat clip strip, Flat strips and Channels may be

5.5.9 Inter-story control joints

Interstory control joints
Horizontal laying pattern

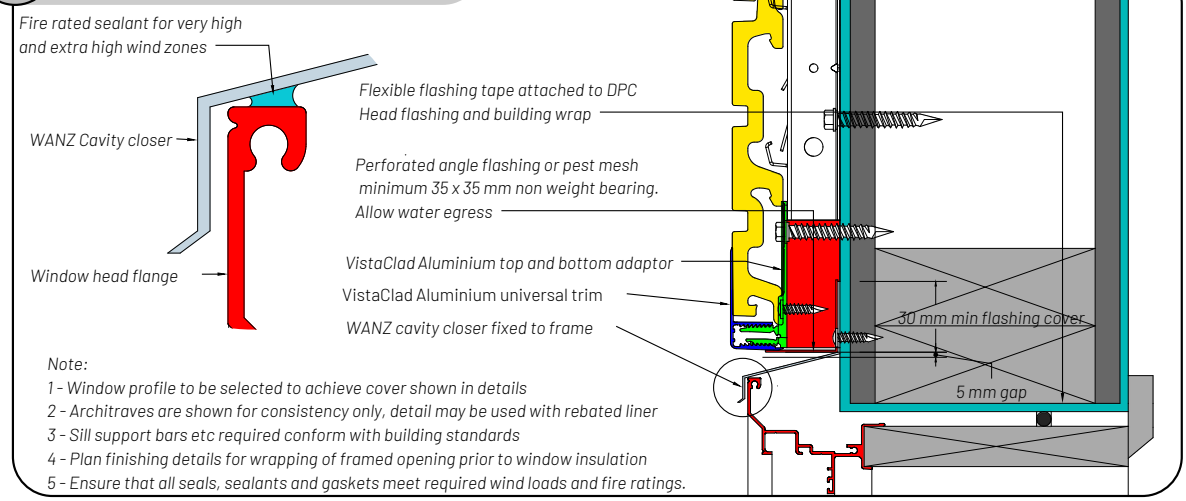


Interstory control joints
Vertical laying pattern



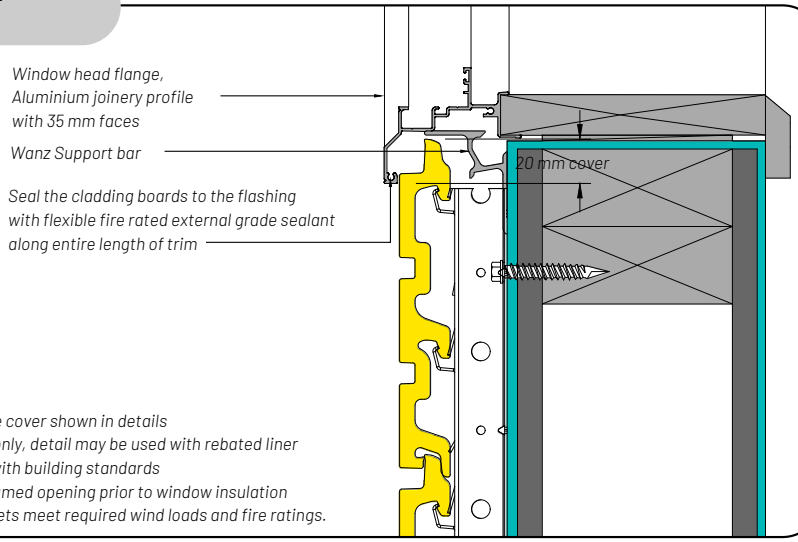
5.5.10 Integrated window detail

Integrated window head detail
Vertical laying pattern



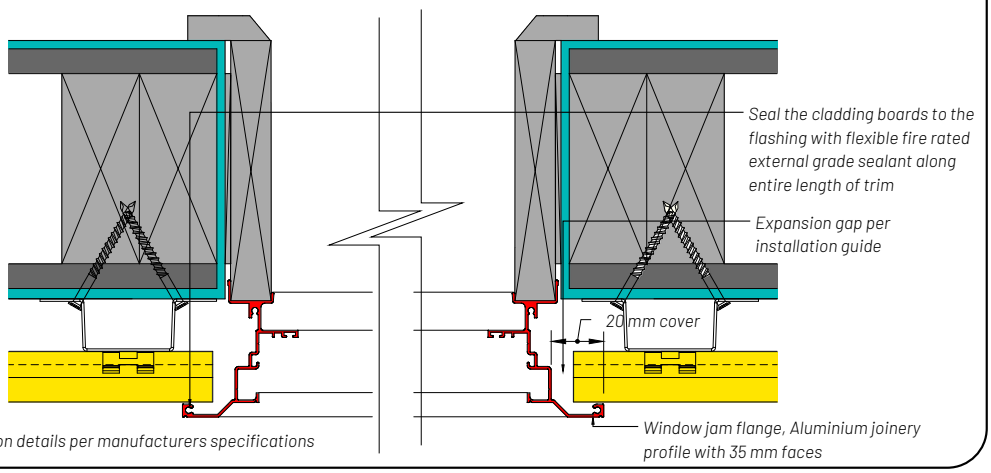
Note:
1 - Window profile to be selected to achieve cover shown in details
2 - Architraves are shown for consistency only, detail may be used with rebated liner
3 - Sill support bars etc required conform with building standards
4 - Plan finishing details for wrapping of framed opening prior to window insulation
5 - Ensure that all seals, sealants and gaskets meet required wind loads and fire ratings.

Integrated window head detail
Vertical laying pattern



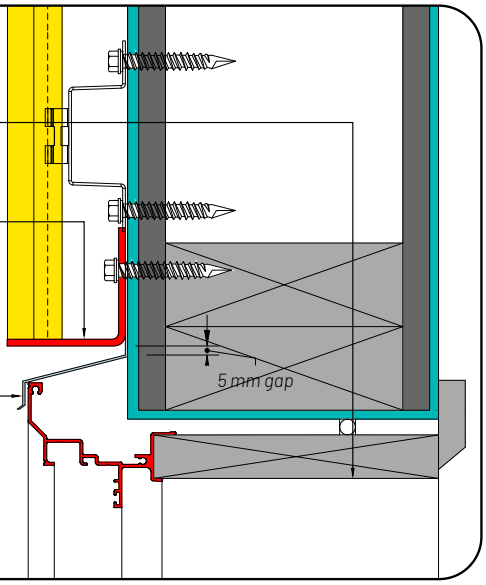
Note:
1 - Window profile to be selected to achieve cover shown in details
2 - Architraves are shown for consistency only, detail may be used with rebated liner
3 - Sill support bars etc required conform with building standards
4 - Plan finishing details for wrapping of framed opening prior to window insulation
5 - Ensure that all seals, sealants and gaskets meet required wind loads and fire ratings.

Integrated window sill detail
Vertical laying pattern



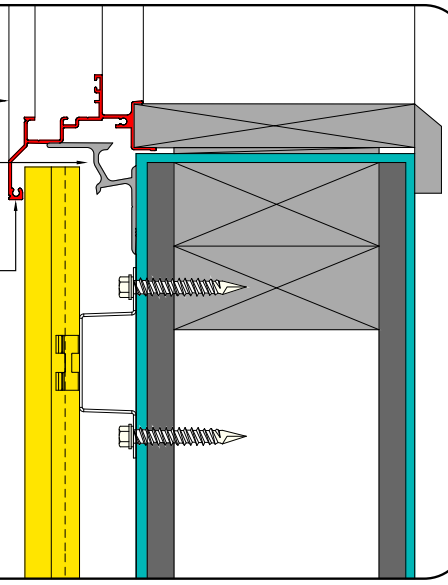
*Window installation details per manufacturers specifications

Integrated window head detail
Vertical laying pattern



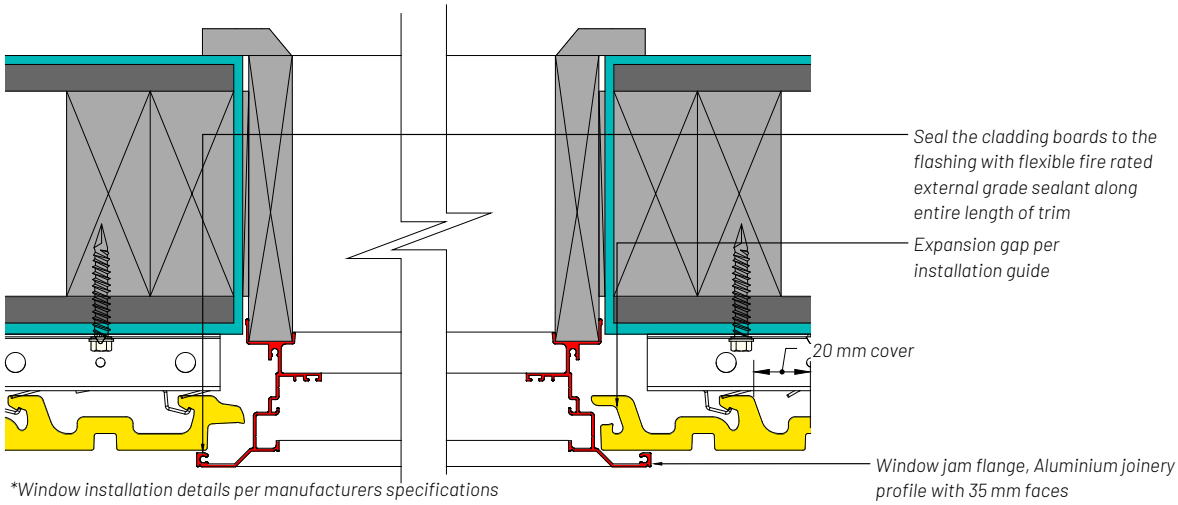
Note:
1 - Window profile to be selected to achieve cover shown in details
2 - Architraves are shown for consistency only, detail may be used with rebated liner
3 - Sill support bars etc required conform with building standards
4 - Plan finishing details for wrapping of framed opening prior to window insulation
5 - Ensure that all seals, sealants and gaskets meet required wind loads and fire ratings.

Integrated window sill detail
Vertical laying pattern



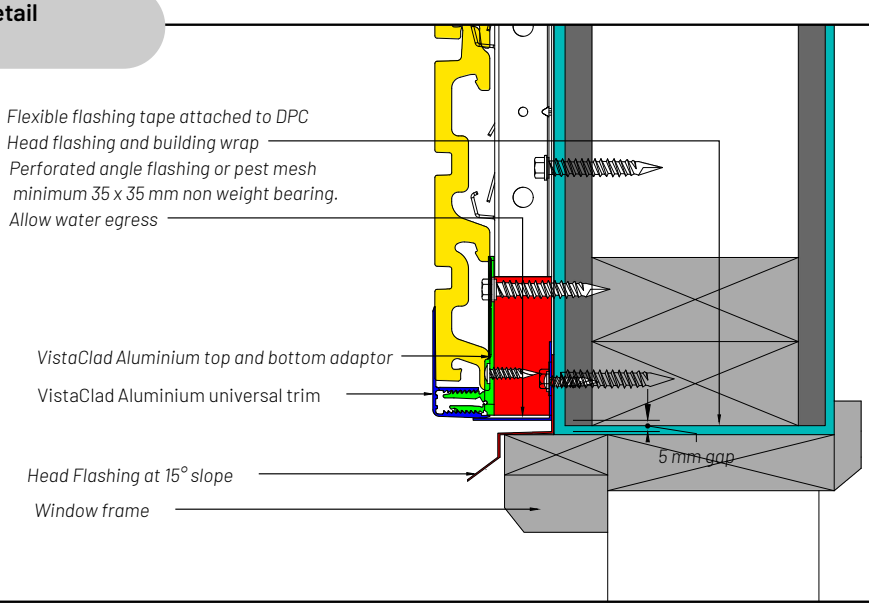
Note:
1 - Window profile to be selected to achieve cover shown in details
2 - Architraves are shown for consistency only, detail may be used with rebated liner
3 - Sill support bars etc required conform with building standards
4 - Plan finishing details for wrapping of framed opening prior to window insulation
5 - Ensure that all seals, sealants and gaskets meet required wind loads and fire ratings.

Integrated window jam detail
Vertical laying pattern

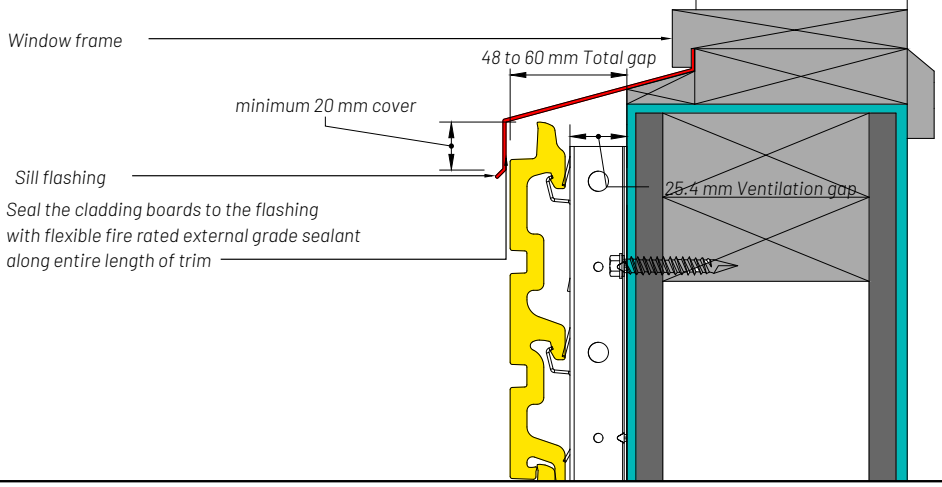


**Window installation details per manufacturers specifications*

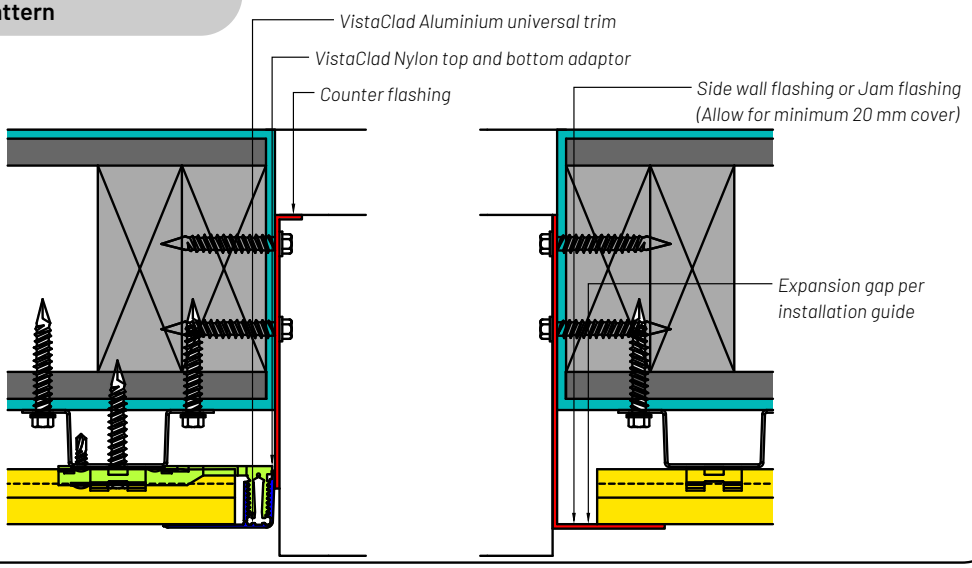
Integrated window head detail
Horizontal laying pattern



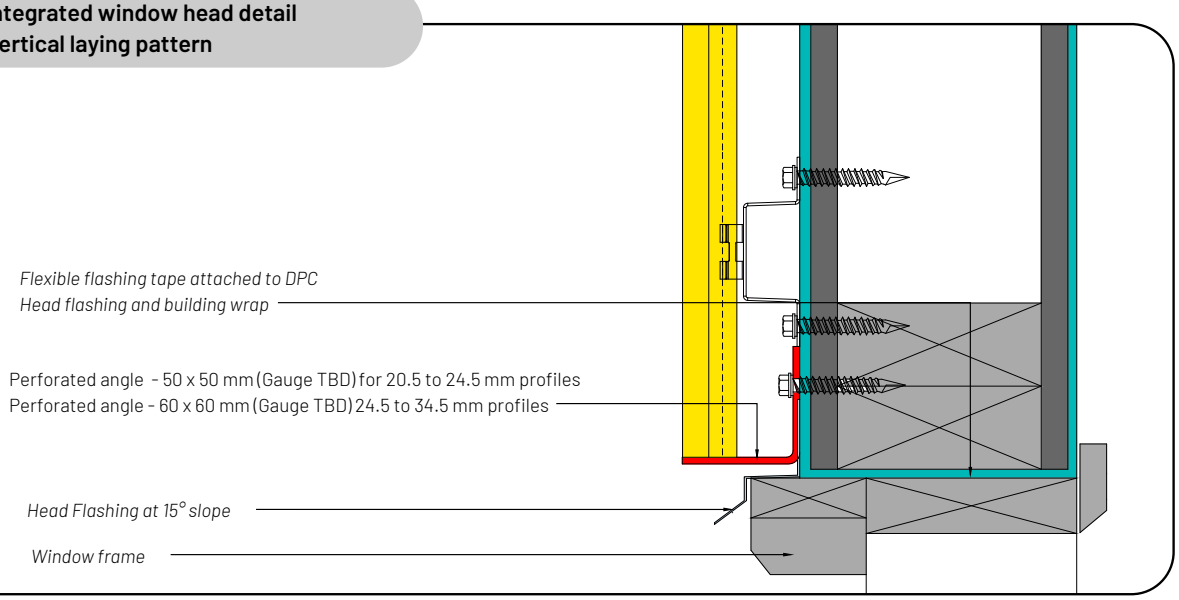
Integrated window sill detail
Horizontal laying pattern



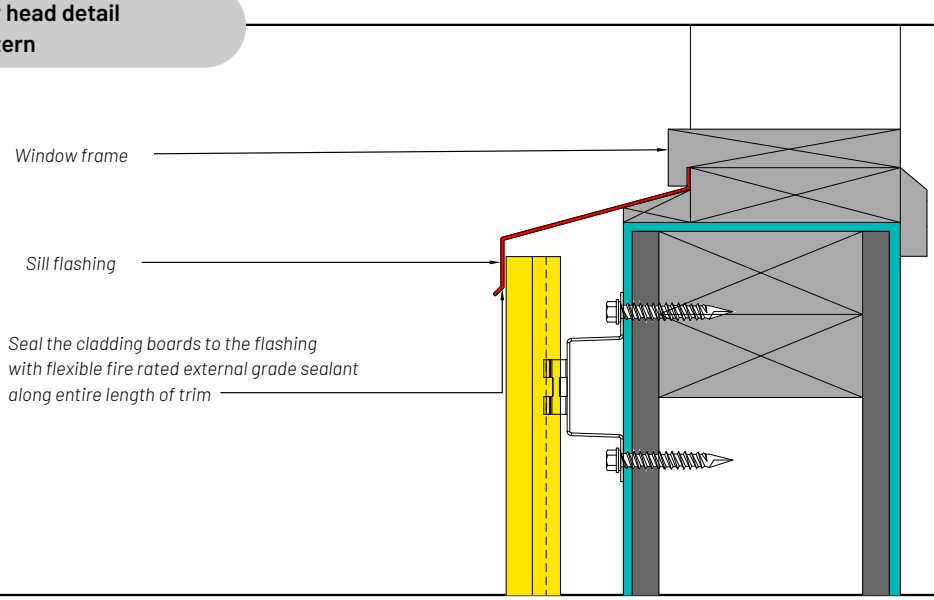
Integrated window jam detail
Horizontal laying pattern



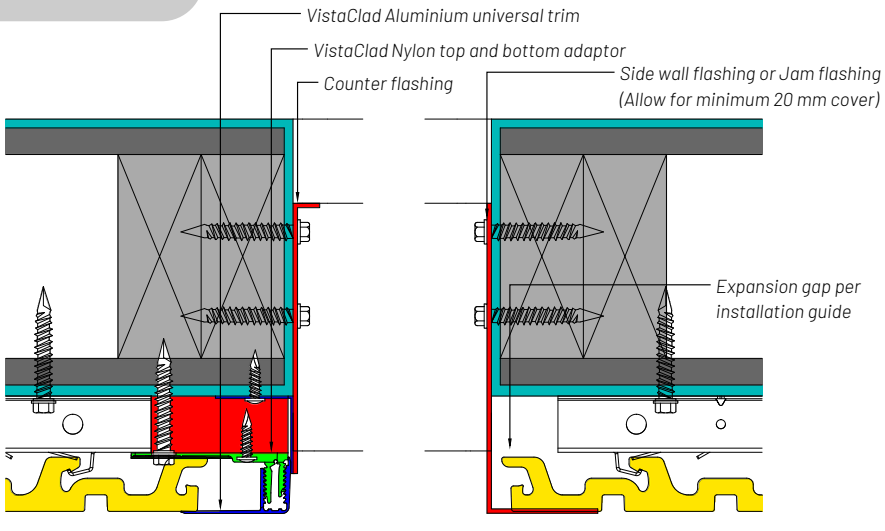
Integrated window head detail
Vertical laying pattern



Integrated window head detail
Vertical laying pattern

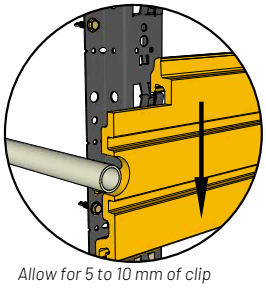


Integrated window sill detail
Vertical laying pattern

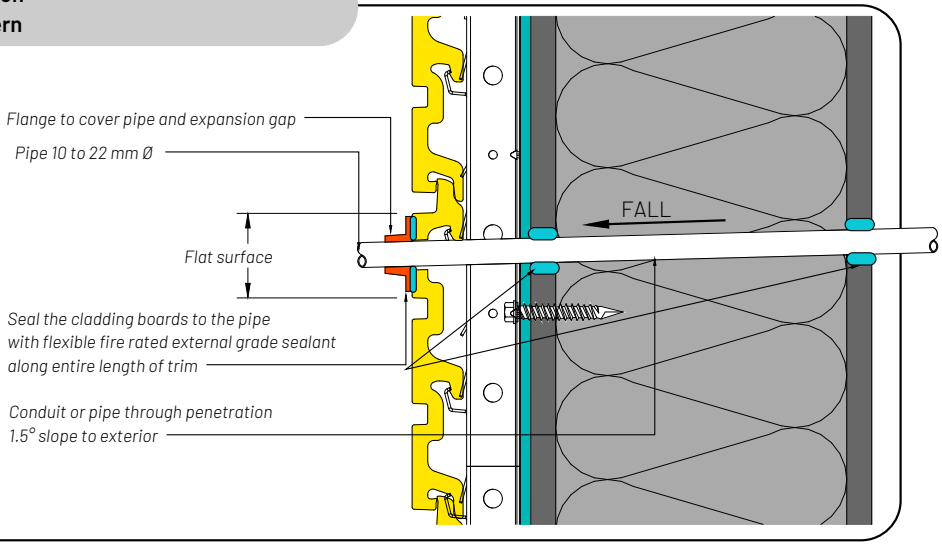


5.5.11 Service pipe penetration detail

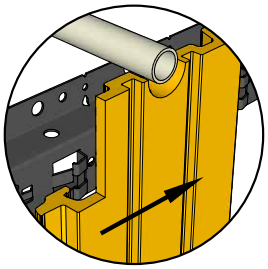
Service pipe Penetration
Horizontal laying pattern



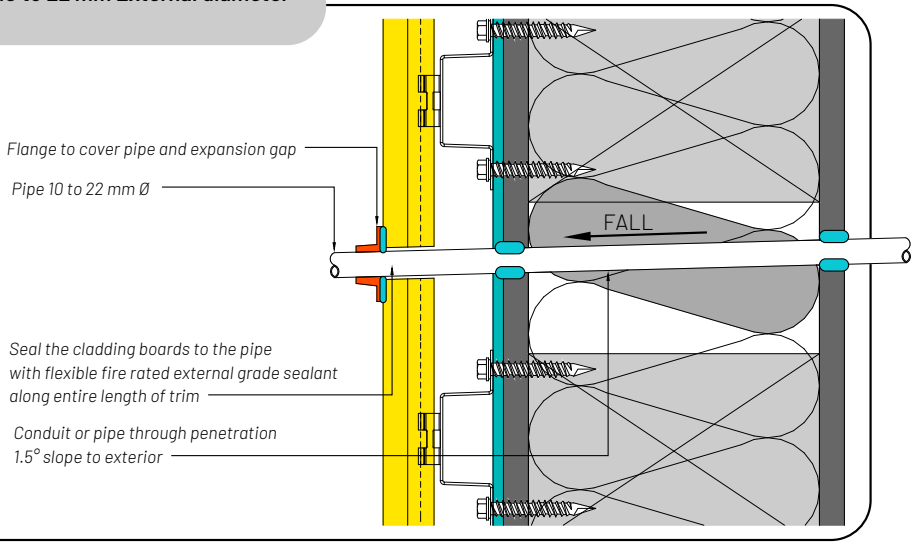
Allow for 5 to 10 mm of clip hook clearance in vertical movement for board insertion.



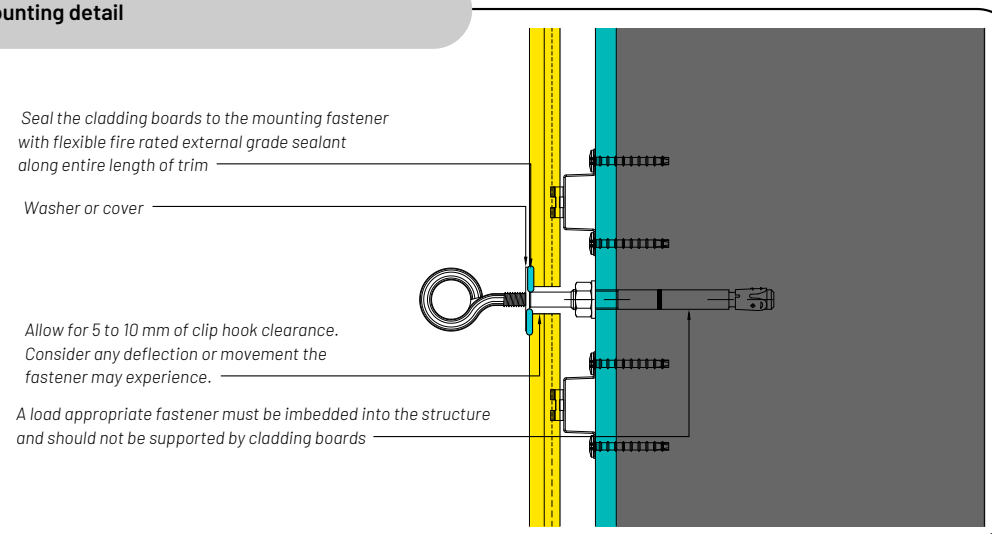
Service pipe penetration 10 to 22 mm External diameter
Vertical laying pattern



Allow for 5 to 10 mm of clip hook clearance in horizontal movement for board insertion.

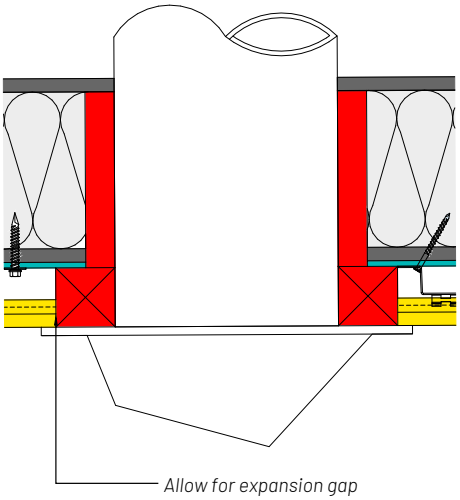


Typical mounting detail



5.5.12 Duct penetration detail

Duct penetration detail 140 to 240 mm
Horizontal laying pattern



Allow for expansion gap per installation guide

Housewrap with all seams taped and edge sealed, applied over existing wall sheathing to form continuous air control layer
OR
Fully-adhere or liquid applied air control membrane applied over existing wall sheathing to form continuous air control layer

Tape all seams of outermost layer of insulating sheathing with compatible sheathing tape to form water control layer

Apply sheating tape flashing around penetration through insulating sheathing

Wood furring strip attached to existing wall framing

Apply caulking around duct pipe

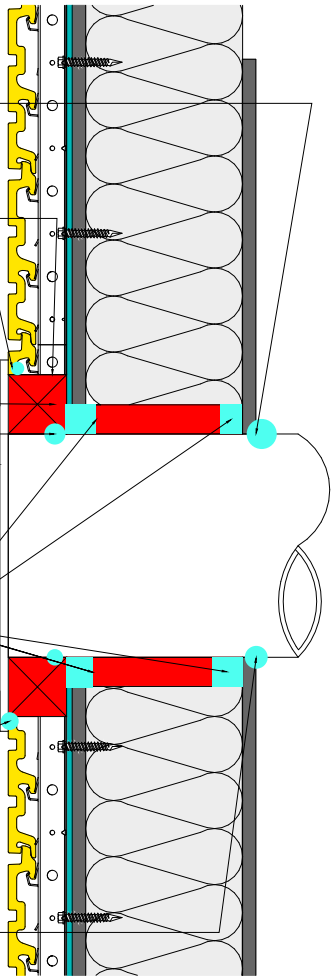
Metal cap flashing

Vent hood

Apply urethane foam sealant around duct/pipe penetration at insulation sheathing

Seal the Flange to the Cladding boards with flexible, fire rated external grade sealant

If wall air control layer is not a fully-adhered material, bed in a continuous bead of sealant around the perimeter of the sheathing penetration



**Duct installation details per manufacturers specifications*

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Contact information
Eva-Last
Room 1203, 12/F Tower 333 Canton Road,
Tsimshatsui, Hong Kong, China
Email: info@eva-last.com
Website: www.eva-last.com

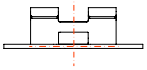
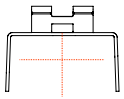
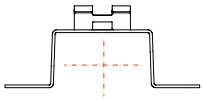
Appendix A – Profiles and parts

See TDS for additional information where required.

CLADDING PROFILES

Profile ID	Material	Description	Board width (mm)	Thickness (mm)	Mass (kg/m)	Cover width (mm)	Coverage (m/m^2)	Coverage mass (kg/m^2)
STGJ111	Infinity		159.5	22.5	2.2	152.6	6.6	14.5
STTHM202	Apex		163.0	24.5	1.3	152.6	6.6	8.5
STTHM203			163.0	24.5	1.4	152.6	6.6	9.2
STTHM204			163.0	24.5	1.5	152.6	6.6	9.8
STTHM205			86.0	34.5	0.9	76.3	13.1	11.8

CLADDING CLIP STRIP

Item	Description	Width (mm)	Gauge (mm)	Depth (mm)	Ventilation gap (mm)	Length (mm)	Mass (kg/part)
Flat strip		40	1.2	12	0	1 831	0.7
Channel		45	1.2	34	>23.5	1 831	1.5
						2 745	2.2
Top hat		86	1.2	36	25.4	1 831	2.2
						2 745	3.2

TRIM AND ADAPTORS

Item	Description	Associated trim	Application	Description	Board Length Adjustment	Adaptor Edge distances *
Top and bottom adaptor		Universal trim	Bottom trim		N/A	70 mm from bottom of clip strip ledge
			Top Trim		N/A	50 mm from top of clip strip ledge
Side adaptor			Edge trim		35 mm	70 mm from centre of clip strip
		T-Trim	Butt join		15 mm	62.5 mm overlap at centre
		U-trim	Butt join		N/A	70 mm from centre of clip strip
Internal corner adaptor		Internal corner trim	Internal corner		20 mm	50 mm from edge 40 mm from edge to fastener
External corner adaptor		External corner trim	External corner		20 mm	50 mm from edge 40 mm from edge to fastener

*Edge distances do not include ground clearances or space for additional flashing

Appendix B – Expansion and contraction tables

See TDS for additional information where required.

Expansion coefficients

Per section 3. When a material is heated or cooled, its length changes by an amount proportional to the original length and the change in temperature. The following table provides the expansion coefficient of common materials.

Material	Expansion coefficient (mm/mm/°C)	Expansion per meter per degree change. (mm/m/°C)
Infinity (HDPE)	40.1×10^{-6}	0.040
Eva-tech (HDPE)	45.3×10^{-6}	0.050
Apex (PVC)	70.0×10^{-6}	0.070
Apex plus (PVC + GFR)	35.0×10^{-6}	0.035
Lifespan (Aluminium)	24.0×10^{-6}	0.020
Galvanised steel	12.5×10^{-6}	0.010

Infinity

Summary matrix of estimated expansion gaps (to the nearest 0.5 mm) for Infinity material technology at different board lengths and different increases in board temperature relative to the installation temperature.

Board length (m)	Required expansion gap (mm) estimate per increase in temperature relative to the installation temperature (°C)												
	0 (°C)	5 (°C)	10 (°C)	15 (°C)	20 (°C)	25 (°C)	30 (°C)	35 (°C)	40 (°C)	45 (°C)	50 (°C)	55 (°C)	60 (°C)
1.0 m	0.5	0.5	0.5	1.0	1.0	1.5	1.5	2.0	2.0	2.5	2.5	3.0	3.0
2.0 m	0.5	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
3.0 m	0.5	1.0	1.5	2.5	3.0	4.0	4.5	5.5	6.0	7.0	7.5	8.5	9.0
4.0 m	0.5	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
5.0 m	0.5	1.5	2.5	4.0	5.0	6.5	7.5	9.0	10.0	11.5	12.5	14.0	15.0
5.45 m	0.5	1.5	3.0	4.5	5.5	7.0	8.5	10.0	11.0	12.5	14.0	15.0	16.5
5.8 m	0.5	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	14.5	16.0	17.5

Apex

Summary matrix of estimated expansion gaps (to the nearest 0.5 mm) for Apex material technology at different board lengths and different increases in board temperature relative to the installation temperature.

Board length (m)	Required expansion gap (mm) estimate per increase in temperature relative to the installation temperature (°C)												
	0 (°C)	5 (°C)	10 (°C)	15 (°C)	20 (°C)	25 (°C)	30 (°C)	35 (°C)	40 (°C)	45 (°C)	50 (°C)	55 (°C)	60 (°C)
1.0 m	0	0.5	1.0	1.5	1.5	2.0	2.0	2.5	3.0	3.5	3.5	4.0	4.5
2.0 m	0	1.0	1.5	2.5	3.0	3.5	4.5	5.0	6.0	6.5	7.0	8.0	8.5
3.0 m	0	1.0	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	12.0	13.0
4.0 m	0	1.5	3.0	4.5	6.0	7.0	8.5	10.0	11.5	13.0	14.0	15.5	17.0
5.0 m	0	2.0	3.5	5.5	7.0	9.0	10.5	12.5	14.0	16.0	17.5	19.5	21.0
5.45 m	0	2.0	4.0	6.0	8.0	10.0	11.5	13.5	15.0	17.5	19.0	21.0	23.0
5.8 m	0	2.5	4.5	6.5	8.5	10.5	12.5	14.5	16.5	18.5	20.5	22.5	24.5

Appendix C – Corrosion references

Fastener Life expectancy

Screw corrosion classification

The following table provides a summary of typical fasteners, their coating thicknesses, and respective lifespans in different corrosion zones. In all cases consult an appropriately qualified professional.

Red – the fastener is not suitable

Orange – The protective coating is suitable for some composite product systems. See appropriate TDS document for more information.

Green – The coating is suitable for the given environment and most composite systems

Tick (✓) – The material itself is suitable for the given environment and most composite systems

Fastener category	ISO 9223 corrosion category			C3	C4	C5	C5+
	Material	Coating	Zinc corrosion rate	0.7 to 2.1 (µm/annum)	2.1 to 4.2 (µm/annum)	4.2 to 8.4 (µm/annum)	8.4 to 25 (µm/annum)
			Coating Thickness	Expected lifespan of fastener coatings (years)			
Carbon clip screws	C1022	Magni 599 (full coat)	20 µm	10 to 28	5 to 10	2 to 5	< 1 to 2
Carbon deck screws							
Carbon frame screws							
Carbon trim screws	10B21		20 µm	10 to 28	5 to 10	2 to 5	< 1 to 2
Tek screw	C1022	Class 3	25 µm	12 to 35	6 to 12	3 to 6	1 to 3
		Class 4	50 µm	24 to 72	12 to 24	6 to 12	2 to 6
		Zinc plated	8 µm				
Stainless Steel S clips	SS430	Enamel		✓	✓		
Stainless clip screw	SS316	Magni 599 (full coat)	20 µm	10 to 28 + ✓	5 to 10 + ✓	2 to 5 + ✓	< 1 to 2 + ✓
Stainless deck screw		Enamel head coating	N/a	✓	✓	✓	✓
Stainless trim screw							
Stainless chain clip	SS316	Polypropylene (PP)	600 µm	✓	✓	63 to 130 ✓	✓

Material corrosion rates

The following table provides typical corrosion rates (µm / annum) for common materials seen in composite building systems. Not all materials are published in relation to ISO 9223 corrosion rates but are indicated by source material as suitable for certain environments. It has been assumed that references to a marine environment would be equivalent to a C5 environment.

Please see table on the next page.

Material Category	Corrosion rates (µm/annum) of constituents in different corrosion zones					
	ISO 9223 corrosion category	C3	C4	C5	C5+	Note
	Equivalent category	Rural	Urban	Marine	Marine Industrial	
Zinc		0.7 to 2.1	2.1 to 4.2	4.2 to 8.4	8.4 to 25	Per published ISO 9223 rates
Copper		0.6 to1.3	1.3 to 2.8	2.8 to 5.6	5.6 to 10	
Aluminium					negligible	
Steel	Carbon	25 to 50	50 to 80	80 to 200	200 to 700	
Stainless steel	SS410	✓	x	x	x	Per ASKzn website. Unrelated to ISO 9223
	SS430	✓	✓	0.0381	0.0406	
	SS316	✓	✓	0.0051	0.0076	
Plastics	Polypropylene (PP)	✓	✓		4.6 to 7.5	Per online sources. Unrelated to ISO 9223
	Polypropylene (PE)	✓	✓		4.3 to 9.5	

Corrosion Classification Macro versus microenvironments

The following table provides a brief overview of the generalised environmental classifications of macro environments based on ISO 9223 standards. Without considering Microenvironments on sites, that may affect the corrosion rate, such as temperature, wind direction, exposure, rain wash, pollutants, humidity, material etc.

Macro environments as classified by ISO 9223

Class	Degree of corrosivity	Exterior
C1	Very low	Dry indoors
C2	Low	Arid/Urban inland
C3	Medium	Industrial
C4	High	Coastal
C5- I	Very high industrial	Surf sea shore
C5 – M	Very high marine	Ocean/offshore

ISO 9223 Atmospheric Environmental classes are based on measurements of Time of wetness (TOW) and pollution depositions. Airborne Chloride (Salinity) and Sulphur dioxide (Acid rain) are considered to provide good enough coverage to define rural, urban, industrial, and marine environments. There are other pollutants that may affect corrosion. TOW is defined as hours where the Relative humidity (RH) is greater than 80% with temperatures above 0 °C. While both Chloride and Sulphur dioxide are measured in deposition rates of mg.m-2.day-1. Corrosion classes are classified based on material loss µm per year in a in environment. The following table aims to provide insight into how pollutants and humidity within a microenvironment impact these categories and loss rate. A relatively dry environment may share the corrosion rate of a humid one with enough pollutants in the air.

Humidity	Pollutants		Corrosion class per material		
Time of Wetness TOW (hours per year)	**Chloride ($mg.m^{-2}.day^{1}$)**	**Sulphur dioxide ($mg.m^{-2}.day^{-1}$)**	**Steel**	**Zinc**	**Aluminium**
T1 (<10)	S_1 (3 to 60)	P_1 (10 to 35)	C_1	C_1	C_1
		P_2 (36 to 80)			
		P_3 (81 to 200)	C_2		
	S_2 (61 to 300)	P_1 (10 to 35)	C_1	C_1	C_2
		P_2 (36 to 80)			
		P_3 (81 to 200)	C_2	C_{1-2}	C_3
	S_3 (301 to 1 500)	P_1 (10 to 35)	C_2	C_1	C_2
		P_2 (36 to 80)		C_2	C_3
		P_3 (81 to 200)			
T2 (10 to 250)	S_1 (3 to 60)	P_1 (10 to 35)	C_1	C_1	C_1
		P_2 (36 to 80)	C_2	C_2	C_2
		P_3 (81 to 200)			C_4
	S_2 (61 to 300)	P_1 (10 to 35)	C_2	C_2	C_3
		P_2 (36 to 80)	C_3		C_4
		P_3 (81 to 200)		C_3	
	S_3 (301 to 1 500)	P_1 (10 to 35)	C_4	C_3	C_4
		P_2 (36 to 80)			
		P_3 (81 to 200)		C_4	
T3 (250 to 2500)	S_1 (3 to 60)	P_1 (10 to 35)	C_3	C_3	C_3
		P_2 (36 to 80)	C_4		
		P_3 (81 to 200)			C_4
	S_2 (61 to 300)	P_1 (10 to 35)	C_4	C_3	C_4
		P_2 (36 to 80)		C_4	
		P_3 (81 to 200)	C_5		C_5
	S_3 (301 to 1 500)	P_1 (10 to 35)	C_4	C_4	C_4
		P_2 (36 to 80)	C_5		C_5
		P_3 (81 to 200)			
T4 (2 500 to 5 500)	S_1 (3 to 60)	P_1 (10 to 35)	C_3		
		P_2 (36 to 80)	C_4		
		P_3 (81 to 200)	C_5		
	S_2 (61 to 300)	P_1 (10 to 35)	C_4		
		P_2 (36 to 80)			
		P_3 (81 to 200)	C_5		
	S_3 (301 to 1 500)	P_1 (10 to 35)	C_5		
		P_2 (36 to 80)			
		P_3 (81 to 200)			
T5 (> 5 500)	S_1 (3 to 60)	P_1 (10 to 35)	C_4		
		P_2 (36 to 80)	C_5		
		P_3 (81 to 200)			
	S_2 (61 to 300)	P_1 (10 to 35)	C_5		
		P_2 (36 to 80)			
		P_3 (81 to 200)			
	S_3 (301 to 1 500)	P_1 (10 to 35)	C_5		
		P_2 (36 to 80)			
		P_3 (81 to 200)			

Duplex factors

Stainless steel are alloy metals containing a minimum of 10.5% chromium. The chromium and nickel contents have a direct impact on the class of material. Ferritic stainless (400 Series) steels rely on chromium to provide corrosion resistance and are magnetic. Austenitic stainless (300 series) contains high levels of both Chromium and Nickle for superior corrosion resistance and have good mechanical properties, while are nonmagnetic. Duplex grades of stainless contain higher levels of chromium than Austenitic, but lower levels of nickel, creating stainless materials that are a combination of Austenitic and Ferritic. Which are stronger than either Austenitic or Ferritic while having similar corrosion resistance if not slightly better than 300 series materials. Super duplex materials (2507) that are superior in both strength and corrosion resistance. Below is a summary of typical stainless-steel grades and their Pitting resistance equivalency number (PREN).

Stainless steel grades			Constituents					PREN
Stainless class	Family	Grade	Chromium Cr	Molybdenum Mo	Nickel Ni	Manganese Mn	Nitrogen N	
Martensitic	400	410	12	0	0.75	1	0	11
Ferritic		430	17	0	0	0	0	17
Austenitic	300	304L	18	0	9	1	0	18
		316L	17	2	11	1	0	24
Duplex	Duplex	2102	21	0	2	5	0.2	24
		2204	23	0	4	1	0.13	25
		2205	22	3	6	1	0.17	35
		2507	25	3.5	7	1	0.25	41

Finishes and protective coating

Full coating

Dependant on the application and material the entire body of the fastener may be coated and coloured to match the aesthetics of the application and to provide additional corrosion resistance. When the protective layers provided by the coating are destroyed by aggressive environments, the surface will begin to corrode. This material loss can be expressed as µm / annum. It is therefore necessary to ensure that the correct thickness of coating is applied to the fastener for any given environment.

Passive layer

As indicated above, Stainless steel contains various constituents that provide inherent corrosion resistance, as a result Stainless steel develops a passive layer around the material as it oxidises (corrodes). Repairing itself as it corrodes. It is therefore not always necessary to fully coat the fastener. In cases where the aesthetic requirements of the application, require a colour matched screw, only the visible parts of the screw will be coated. Typically, the head.

Appendix D – Citations

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