Ian Bennie & Associates

Test Report No. 2021-099-S1

Knotwood Shadowline Cladding - Cavity wall

Specimen tests by the methods of AS/NZS4284

To the requirements of NCC 2019 verification methods FV1.1 & V2.2.1

For

Knotwood Pty Ltd

September 2022

NATA

Accredited Laboratory No. 2371
Accredited for compliance with ISO/IEC 17025 - Testing

IAN BENNIE & ASSOCIATES PTY. LTD.
Building performance Testing
ACN: 007 133 253

Accredited
Laboratory
No.2371

TEST REPORT NUMBER 2022-031-S1

Test Client: **Knotwood Pty Ltd**
2/63 Burnside Rd, Stapylton, QLD 4207

Specimen identification:

A Knotwood Shadowline Cladding cavity wall test specimen measuring 2300 mm in height x 3600 mm in width was installed on a timber stud wall by the client. The sample consisted of 100mm, 150mm & 200mm Boards installed in both a horizontal and vertical configuration. The sample included a 600 mm recess, window, meter box, wall junctions, control joints, parapet and balcony drainage conditions. Sample drawings provided by the Client are given in Appendix C.

Construction:

For the purposes of the NCC the specimen was deemed to be a Cavity Wall utilising appropriate breather wrap to prevent water ingress to the stud framing. For the purposes of observations during the test, acrylic sheets were used as the internal lining on the stud frame. Holes were introduced through the internal lining to create an air infiltration of no greater than 1.6 L/s.m2 at 150 Pa of pressure on the sample, being the highest allowable infiltration rate specified in AS/NZS 4284.

Test Method:

NCC-2019 Weatherproofing Verification Methods V2.2.1 and FV1.1 with test procedures in accordance with Australian Standard AS/NZS 4284:2008, Testing of building facades.

Nominated Serviceability limit state pressures: +820 Pa and -1230 Pa / N4 Rating

Test Location: Ian Bennie & Associates, Dandenong South, Victoria

Test Date(s): 11th, & 27th April & 11th, & 26th May 2022

Sample received: 8th April 2022

Drawings Received: 17th August 2022

1 Luisa Avenue, Dandenong South, 3175, Victoria, Australia
Telephone: (03) 9768 3640 International: +613 9768 3640 Facsimile: (03) 9768 3642

Requirement:

The compliance requirements of the NCC-2019 Weatherproofing Verification Methods FV1.1 & V2.2.1 are given in Appendix B

Conclusions:

The Knotwood Shadowline Cladding – cavity wall passed all the compliance requirements of the NCC-2019 Weatherproofing Verification Methods FV1.1 & V2.2.1 at the nominated test parameters. Complete detail of all tests conducted are given in the body of this report

Disclaimer:

Sample information including material properties and detailing was supplied by the client and no verification of actual construction details or sampling of production stock could be performed. The test results contained herein apply to the sample as tested. Ian Bennie & associates accept no liability for claims of losses, expenses, damages and costs arising as a result of the use of product(s) referred to in this report.

Report distribution:				Checked by	
Ian Bennie & Associates	PDF	James maskiell	19th September 2022	Ian Bennie	19th September 2022
Knotwood Pty Ltd	PDF	Authorised Signatory		Authorised Signatory	

Water Penetration Test Results

Water Test 1 – 11th April 2022

Nominated Serviceability limit state pressures: +820 Pa / -1230 Pa

Static pressure water test: 300 Pa

Water appeared on the internal face of the façade at 2 location(s);

1. From the bottom of the sample air seal connection to the timber stud.
2. From the connection between the air seal and the window.

After WT1 rectifications were carried out on the sample. The air seal was taped to the timber stud frame to create an air tight seal. Around all penetrations the air seal was taped to the penetrations, around the window the flashings were sealed to the window and then the air seal was taped to the window.

Water Test 2 – 27th April 2022

Nominated Serviceability limit state pressures: +820 Pa / -1230 Pa

Static pressure water test: 300 Pa

Water appeared on the internal face of the sample at 1 location(s);

1. Water appeared on the internal face of the meter box connection to the air seal.

After WT2 rectifications were carried out on the sample. The tape joint between the meter box and the air seal was inspected and re affixed over.

Water Test 3 – 15th May 2022

Nominated Serviceability limit state pressures: +820 Pa / -1230 Pa

Static pressure water test: 300 Pa

No leakage through the cladding system was observed during the test.

Cyclic pressure water test: 245 Pa - 490 Pa

No leakage through the cladding system was observed during the test.

Static pressure water test with 6mm penetrations in cladding: 300 Pa

No leakage through the cladding system was observed during the test.

Cyclic pressure water test with 6mm penetrations in cladding: 245 Pa - 490 Pa

No leakage through the cladding system was observed during the test.

Static pressure water test with internal lining removed: 50 Pa

Water appeared on the internal face of the sample at 1 location(s)

1. Water appeared at the flashing connection at the wall down to balcony detail where water was spraying inside underneath the flashing

After WT3 rectifications were carried out to the sample. The seal between the flashing and the box gutter detail was inspected and a backing rod was used and then a tape from the flashing over the backing rod and onto the box gutter.

Water Test 4 – 15th May 2022
Nominated Serviceability limit state pressures: +820 Pa / -1230 Pa

Static pressure water test: 300 Pa
No leakage through the cladding system was observed during the test.

Cyclic pressure water test: 450 Pa - 900 Pa
No leakage through the cladding system was observed during the test.

Static pressure water test with 6mm penetrations in cladding: 450 Pa
No leakage through the cladding system was observed during the test.

Cyclic pressure water test with 6mm penetrations in cladding: 450 Pa - 900 Pa
No leakage through the cladding system was observed during the test.

Static pressure water test with internal lining removed: 50 Pa
No leakage through the cladding system was observed during the test. After the test the building wrap was cut away and there was evidence of water having penetrated cladding boards however there was no pooling of water on horizontal surfaces.

APPENDIX A TEST PROCEDURES & METHODS FOR AS/NZS:4284-2008 & NCC-2019 FV2.2.1

Test Sequence

NCC- 2019 Weatherproofing test procedures were conducted in accordance with Australian Standard AS/NZS 4284:2008, Testing of building facades, as detailed in Appendix A in the following sequence:

Static pressure Pre loading.
Apply 100% Positive and negative serviceability limit state pressures to the external face of the test specimen for a period of not less than 1 minute each.

Static pressure water test.
Apply a static pressure of 300 Pa or 30% of serviceability wind pressure, whichever is higher, in accordance with Clause 8.5.2 of AS/NZS 4284:2008 for a period of 15 minutes.

Cyclic pressure water test.
Apply cyclic pressure in accordance with stage 3 of table FV1.2; 30% -60% of serviceability wind pressure for 5 minutes. In accordance with Clause 8.6.2 of AS/NZS 4284:2008

Simulated failure of the primary weather defense.
To simulate failure of the primary weather-defense or sealing, the sample was subjected to inserting 6mm diameter holes in the external face of the specimen at the following locations:

Wall/window joint at 3/4 height of the window
Immediately above the window
Through the external sealing of the vertical and horizontal control joints
Above the meter box and the downpipe penetrations.

Water penetration tests were then carried out in accordance with Clause 8.5.2 & 8.6.2 of AS/NZS 4284:2008 at the Static and Cyclic pressures as detailed above.

Static pressure water test with internal lining removed.
Within 30 minutes of the completion of the final cyclic pressure as outlined above remove the internal acrylic lining of the sample and apply a static pressure test at 50 Pa for a period of 15 minutes in accordance with Clause 8.5.2 of AS/NZS 4284:2008

Test Equipment
Water was applied via sprays located 300 mm away from the outdoor face of the test specimen. Water flow rate to the sprays was measured with a calibrated pressure gauge to an accuracy of 2% and was maintained at a level of 0.05 l/s.m2 over the test area throughout the test. Water application was maintained continuously and water was observed to evenly cover the exterior face of the test specimen. All pressure transducers are calibrated against NATA certified manometers and may be taken to have a measurement accuracy of 1%.

Water Penetration Test Parameters as stated in AS/NZS:2484-2008

Test pressures:

Static 30% of Ws (at least 300 Pa) duration = 15 minutes

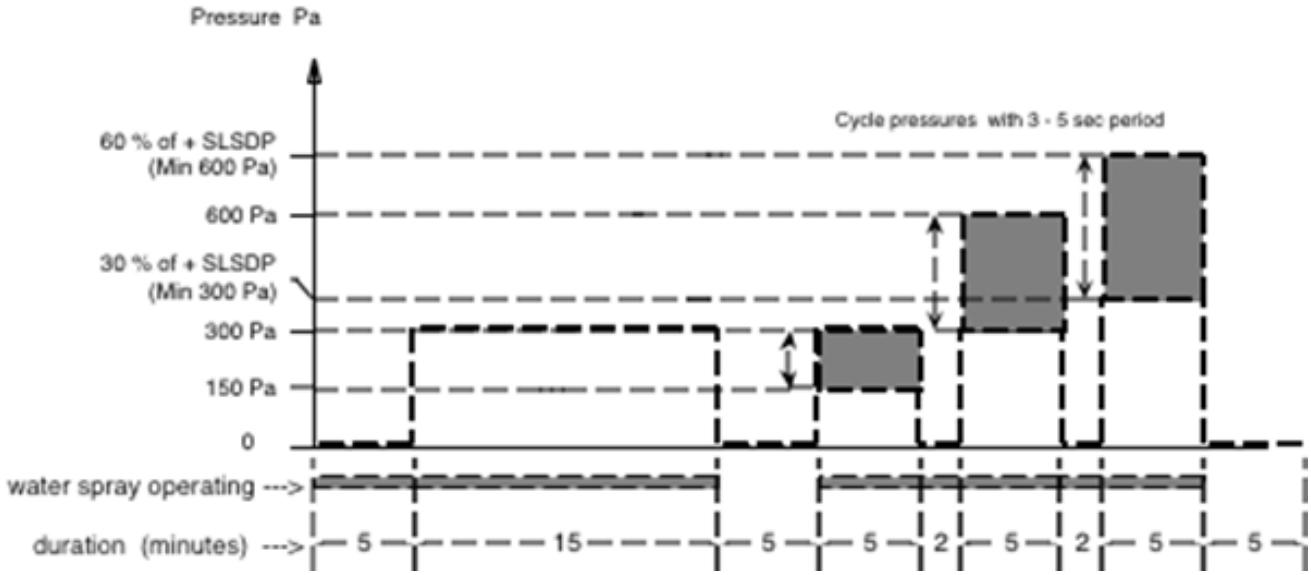
Cyclic 15% - 30% of Ws duration = 5 minutes

20% - 40% of Ws duration = 5 minutes

30% - 60% of Ws duration = 5 minutes

Water application rate: 0.05 L/m2.s

Water penetration test sequence



Test Requirement:

As per the Compliance requirements of NCC-2019 Weatherproofing Verification Methods V2.2.1 and FV1.1 that are given in Appendix B.

APPENDIX B – COMPLIANCE REQUIREMENTS
Applicability to be verified with specifier

These results are applicable for the weather proofing of an *external wall* that;

i.) Has a risk score of 20 or less (tables FV1 & V2.2.1 a)
ii.) Is not subjected to a ULS of more than 2.5kPa
iii.) Includes only windows that comply with 2047

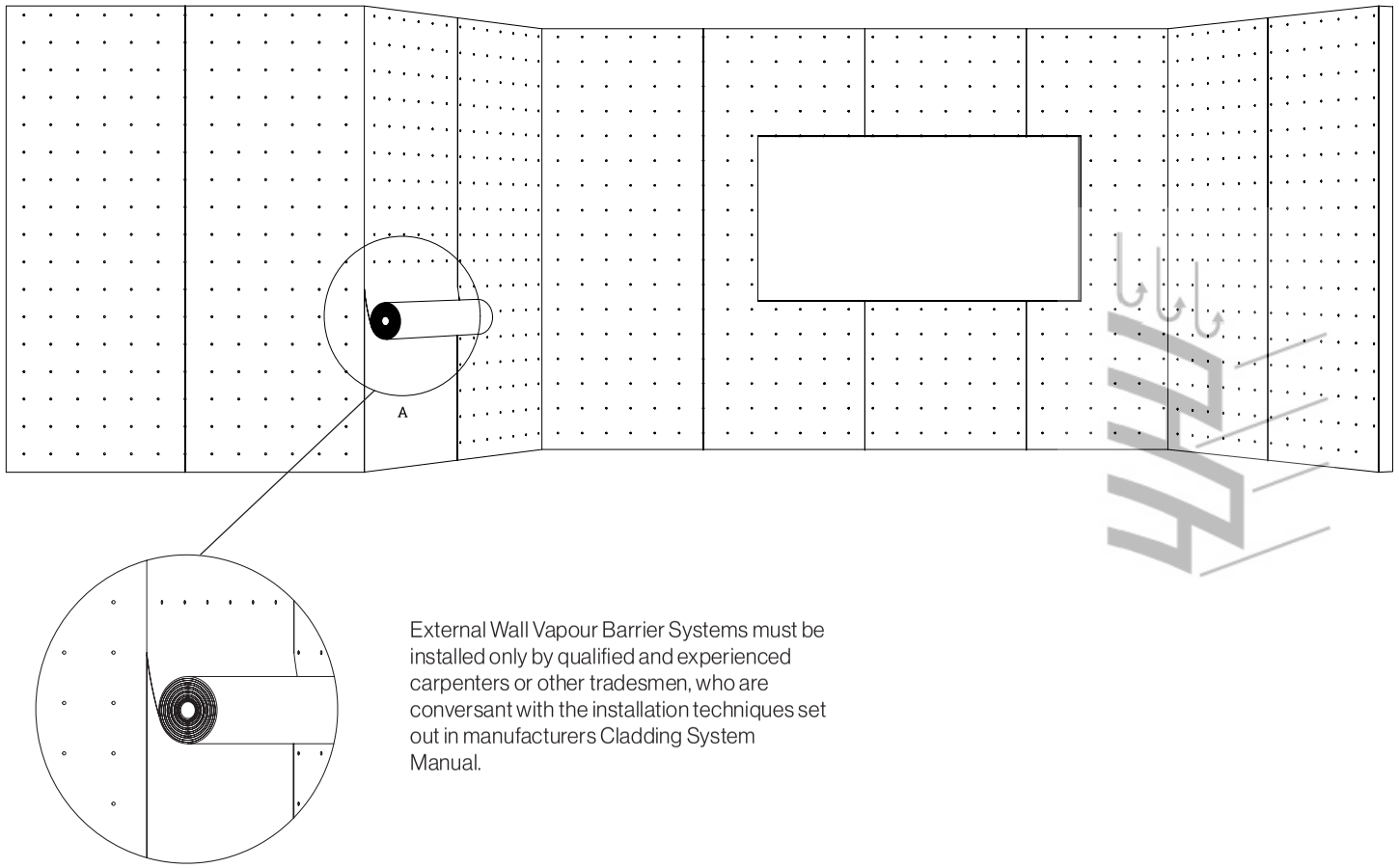
Compliance requirements:

(i) A direct fix cladding wall and unique wall are verified for compliance with FP1.4 if there is no presence of water on the inside surface of the facade.

(ii) A cavity wall is verified for compliance with FP1.4 if there is no presence of water on the removed surface of the cavity, except that during the simulation of the failure of the primary weather-defense or sealing, water may—
(A) transfer to the removed surface of the cavity due to the introduced defects (6 mm holes); and
(B) contact, but not pool on, battens and other cavity surfaces.

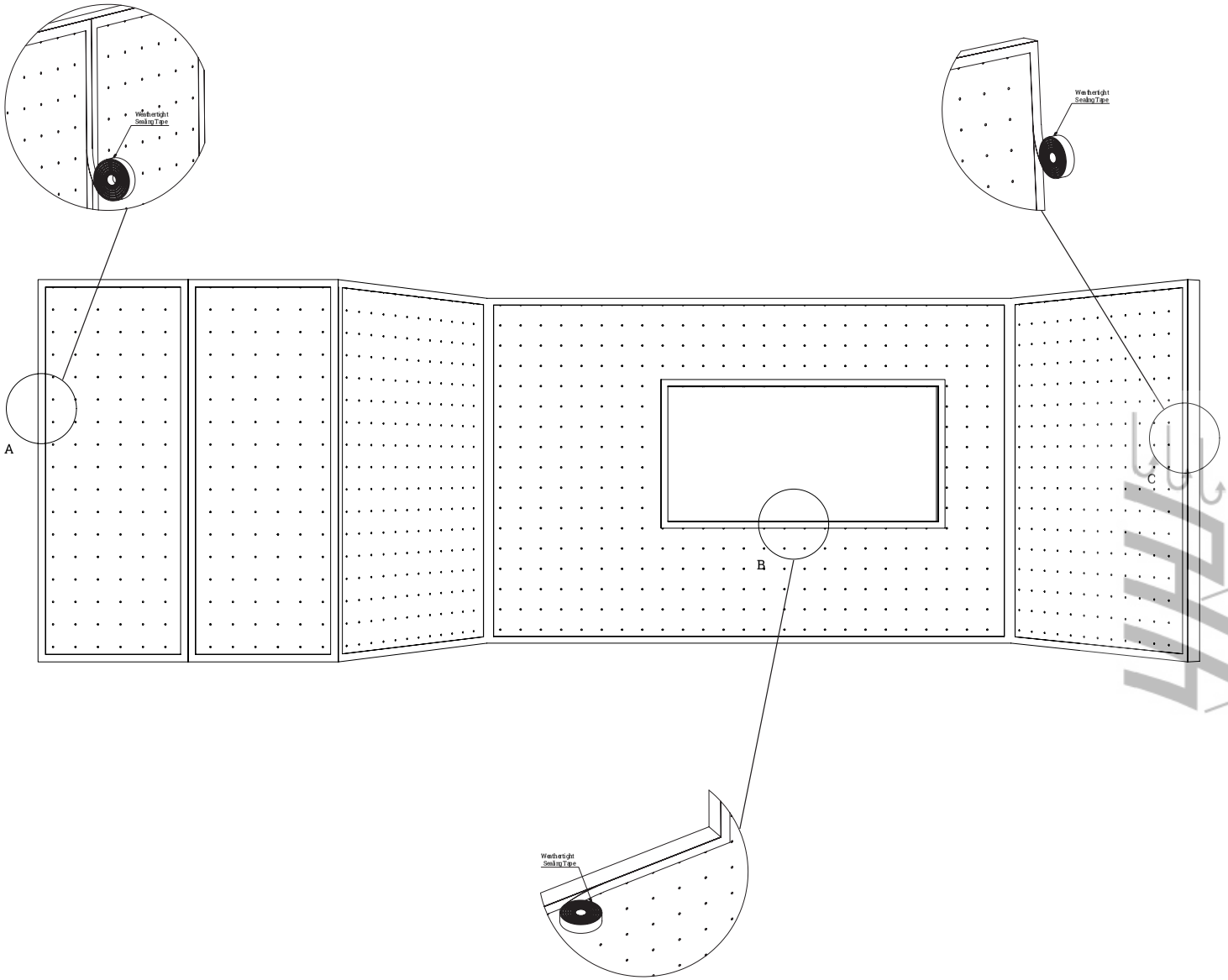
RECOMMENDED VAPOUR BARRIER

Thermakraft Watergate Plus



External Wall Vapour Barrier Systems must be installed only by qualified and experienced carpenters or other tradesmen, who are conversant with the installation techniques set out in manufacturers Cladding System Manual.

TAPING VAPOUR BARRIER



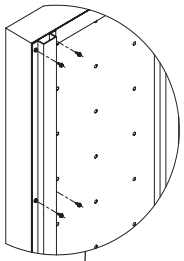
RECOMMENDED TAPE

TESCON EXTORA PROFIL is a UV stabilised, multi-purpose flashing tape which forms a valuable part of your weather resistive barrier (WRB) system. Made from polypropylene (PP) with acrylate it has excellent workability and adhesion for optimal resistance to driving rain at junctions in your WRB layer. The 10 mm split edge backing allows for application at edges and junctions where the tape can be aligned and then fully adhered on a second pass.

WEATHER EXPOSURE
This product is designed to withstand up to 180 days (6 months) direct exposure to UV and still fulfil the intended use for wind and water control for protection against driving rain. Exterior cladding should be detailed to prevent direct sunlight onto TESCON EXTORA in service.

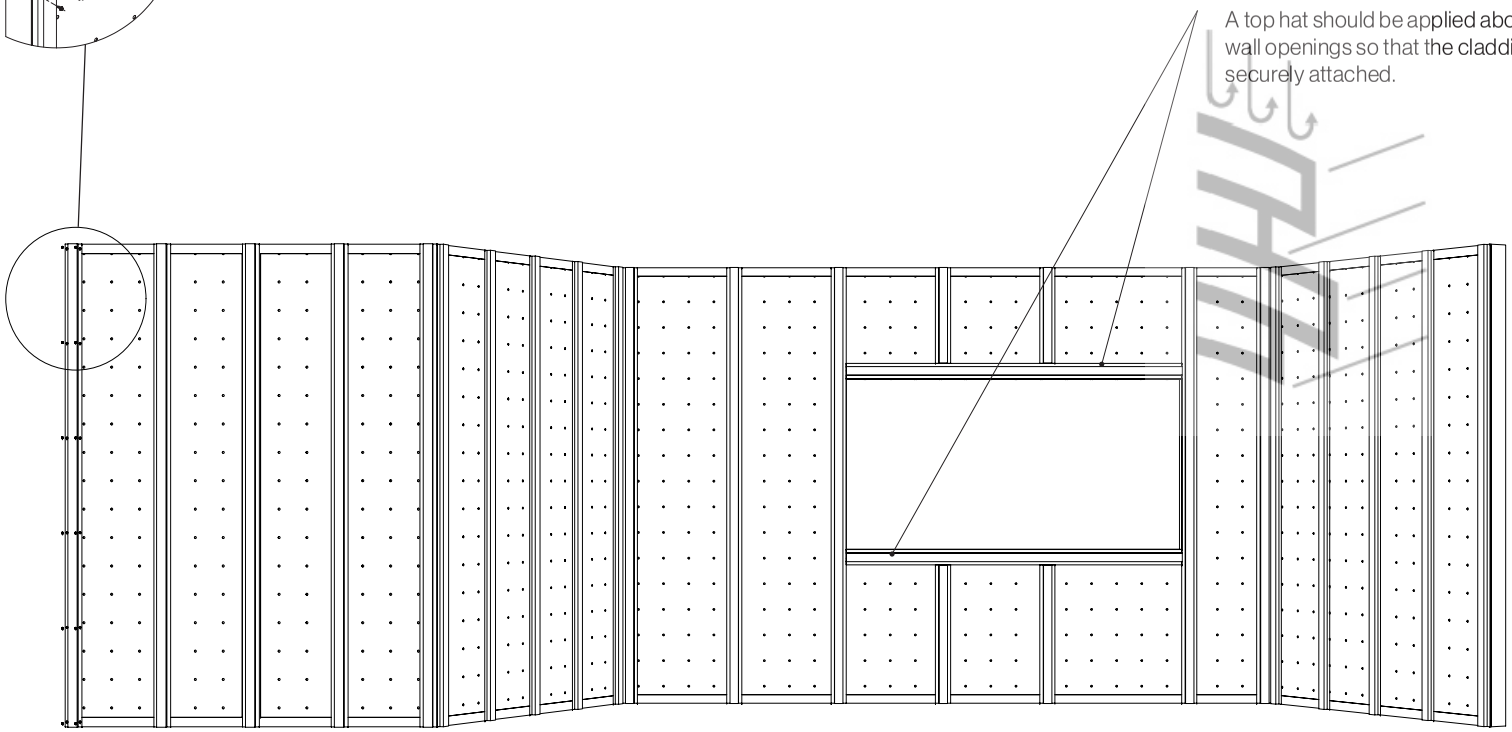
APPLICATION NOTES
This product should be applied using the pro clima PRESSFIX tool to activate the pressure sensitive adhesive and guarantee a long-term durable seal.

TESCON EXTORA PROFIL versions come with a 10 mm split backing for ease of application in corners and tricky junctions.

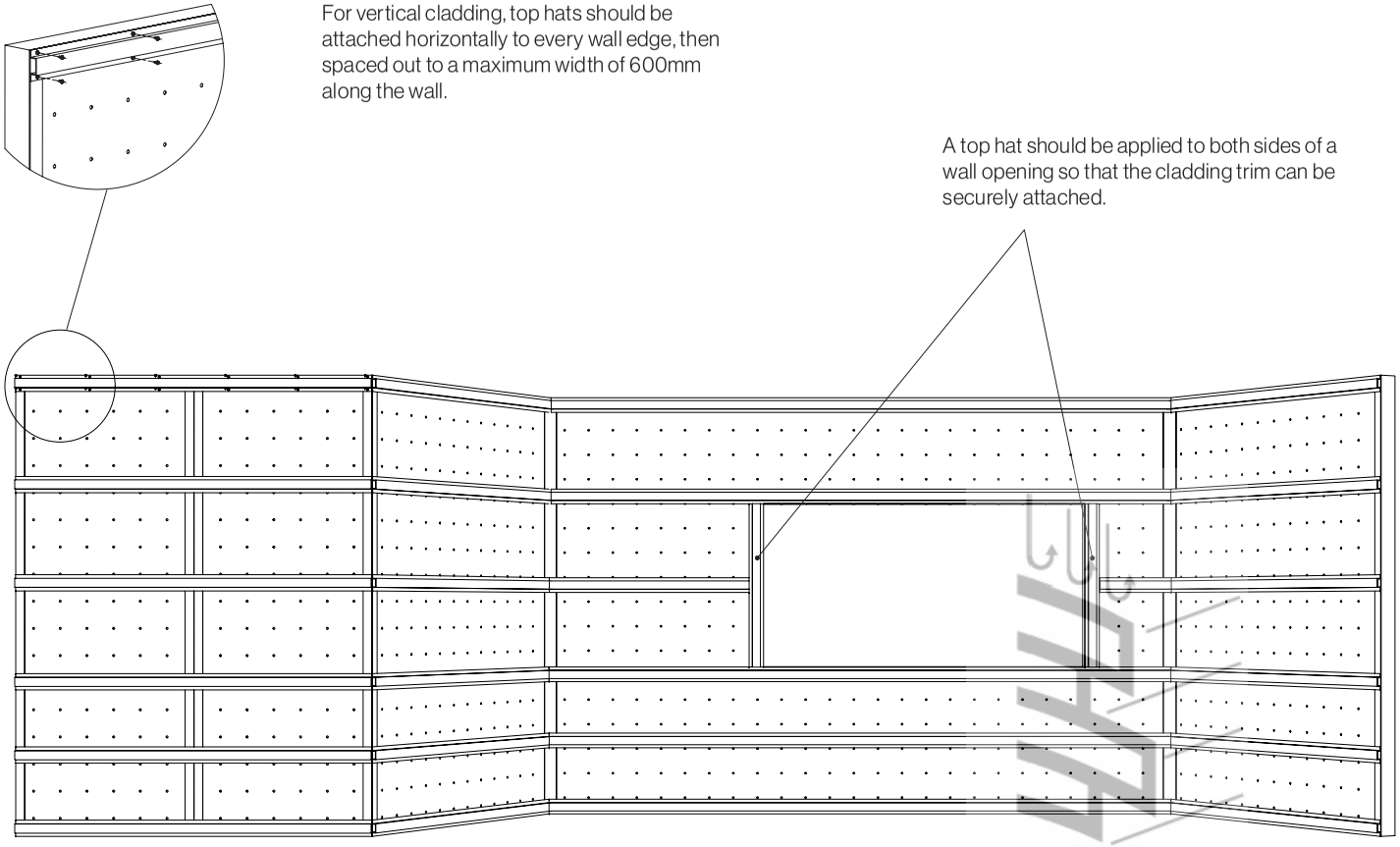


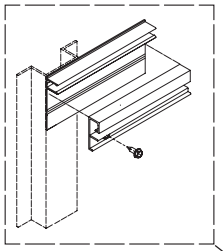
For horizontal cladding, top hats should be attached to every vertical wall edge, then spaced out to a maximum width of 600mm along the wall.

A top hat should be applied above and below wall openings so that the cladding trim can be securely attached.



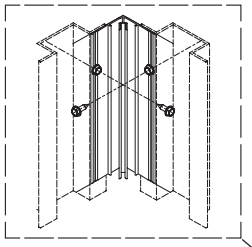
TOP HAT_VERTICAL CLADDING





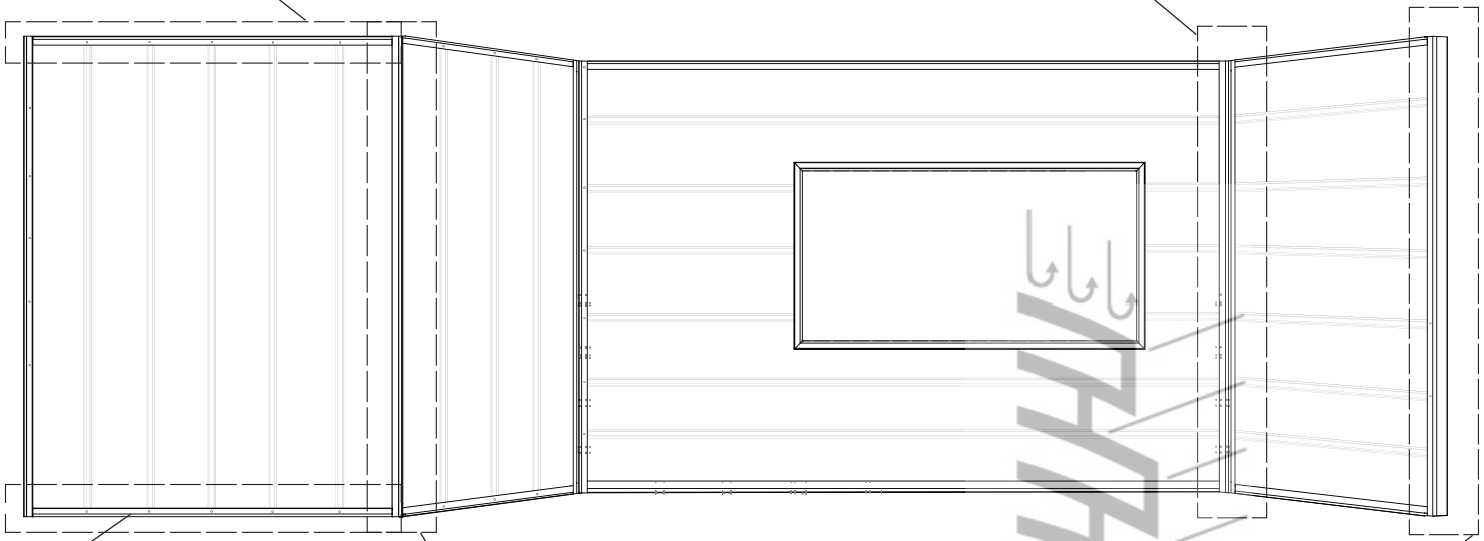
HORIZONTAL CLADDING STARTER DETAIL

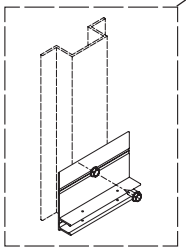
Starting with the top edge of the wall, secure the female end trim. Then secure the starter trim on top of the female end trim.



VERTICAL CLADDING INTERNAL CORNER DETAIL

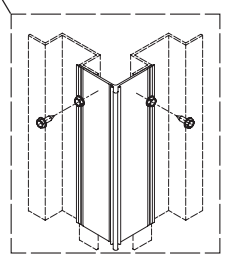
Secure the female corner trim where two cladded walls will meet.





HORIZONTAL CLADDING FINISHING DETAIL

Secure the female finishing trims along the bottoms edge of the wall.



HORIZONTAL CLADDING EXTERNAL CORNER DETAIL

Secure the male corner trim where two cladded walls will meet.

VERTICAL CLADDING FINISHING DETAIL

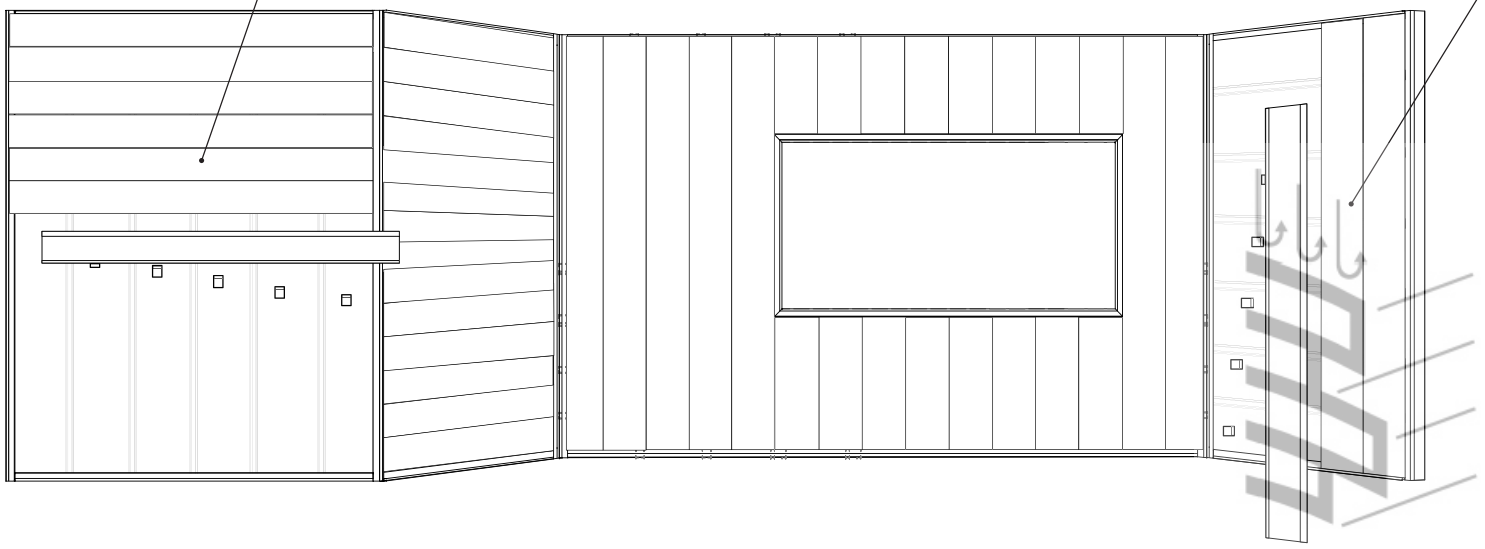
Secure the female corner trim to the wall edge.

HORIZONTAL CLADDING

Starting from the top, secure the starter piece by fixing a cladding clip onto the top hat frame.

Roll the cladding board into position. Butt it up against the starter strip if no space between the boards is desired.

Secure board with cladding clip. Screw clip into position.

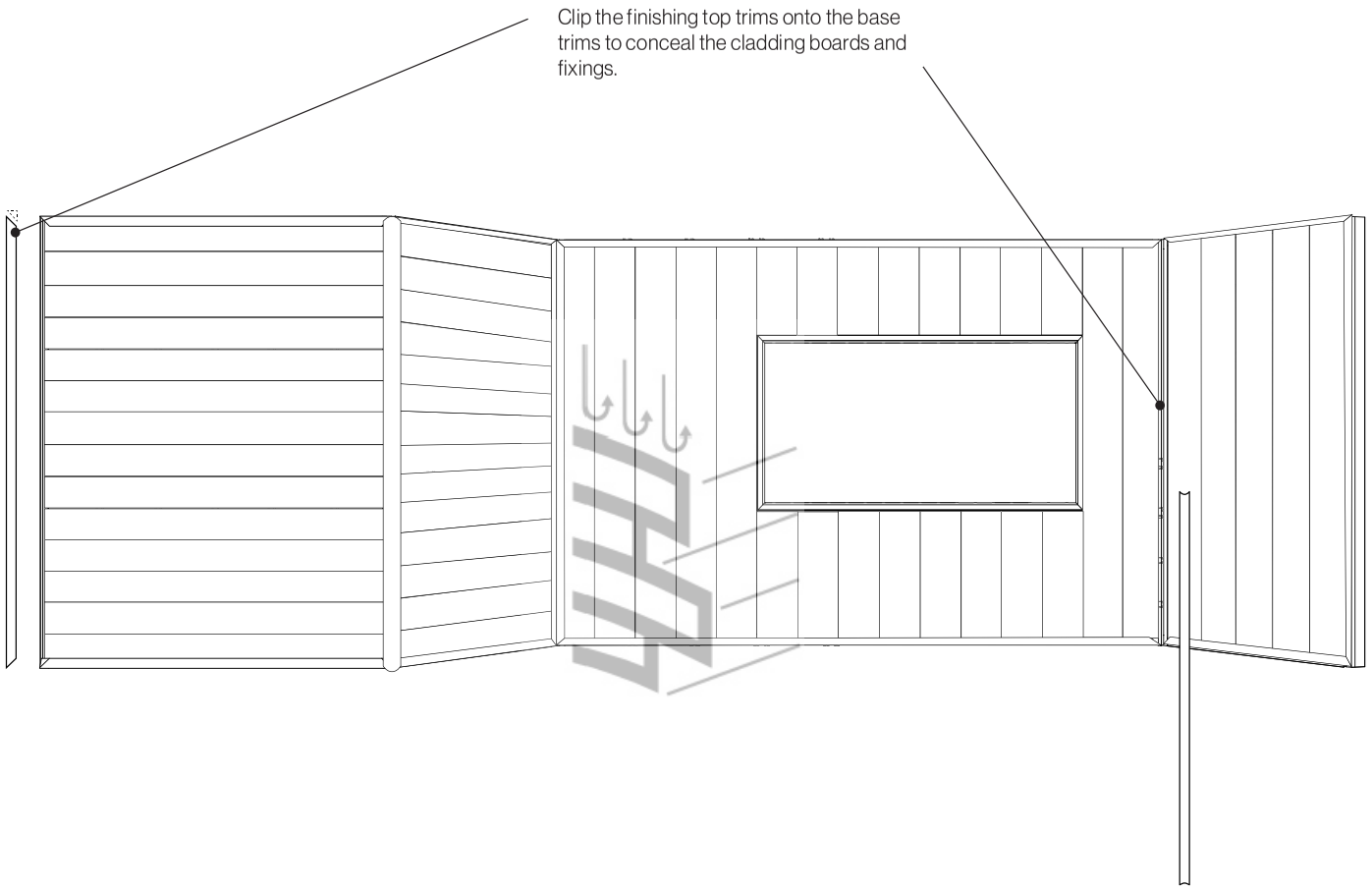


VERICAL CLADDING

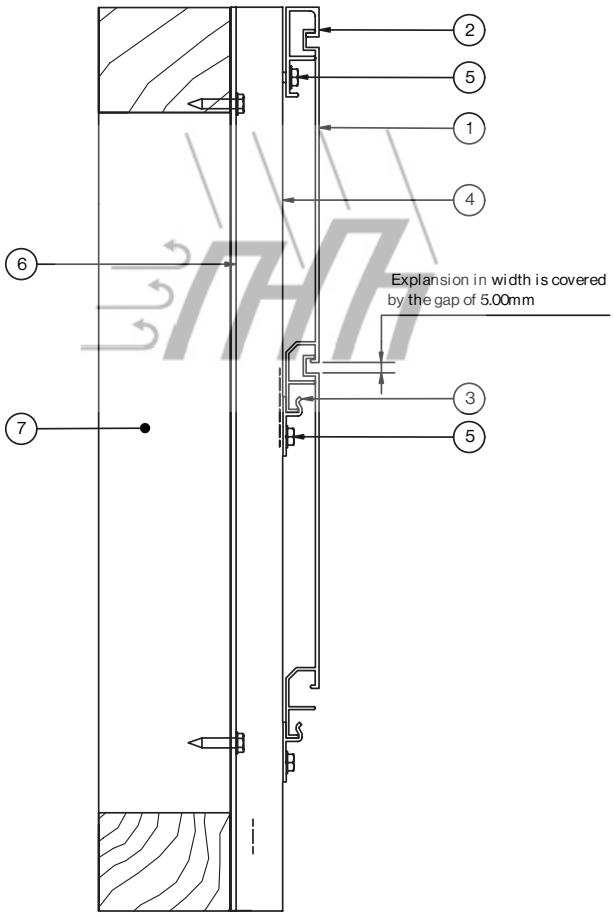
Secure the starter strip by fixing the cladding clip to the top hat.

Roll the cladding board into position. Butt it up against the starter strip if no space between the boards is desired.

Secure board with cladding clip. Screw clip into position.

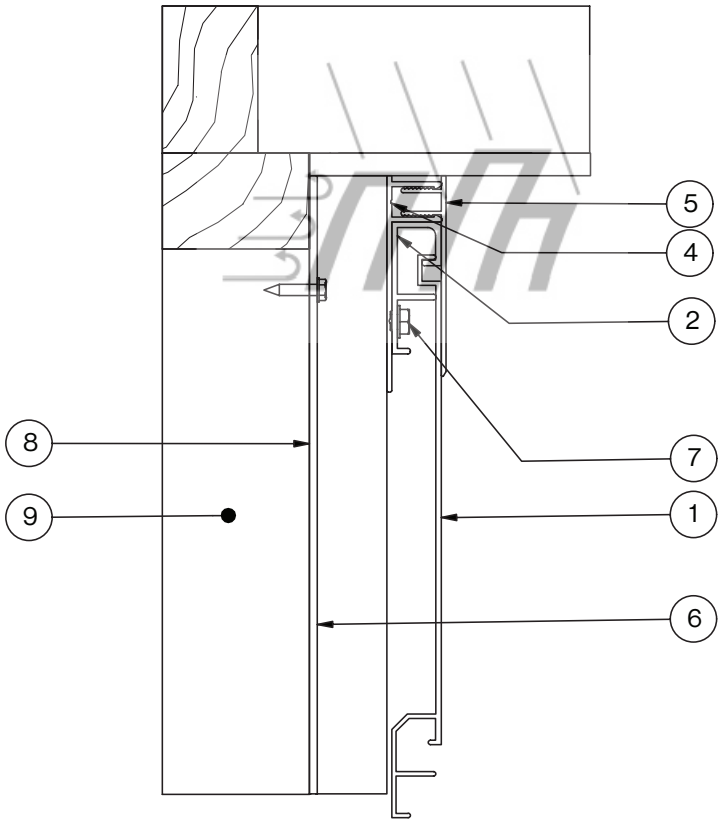

Clip the finishing top trims onto the base trims to conceal the cladding boards and fixings.

Horizontal Cladding A.1 STARTER DETAIL | CLIP



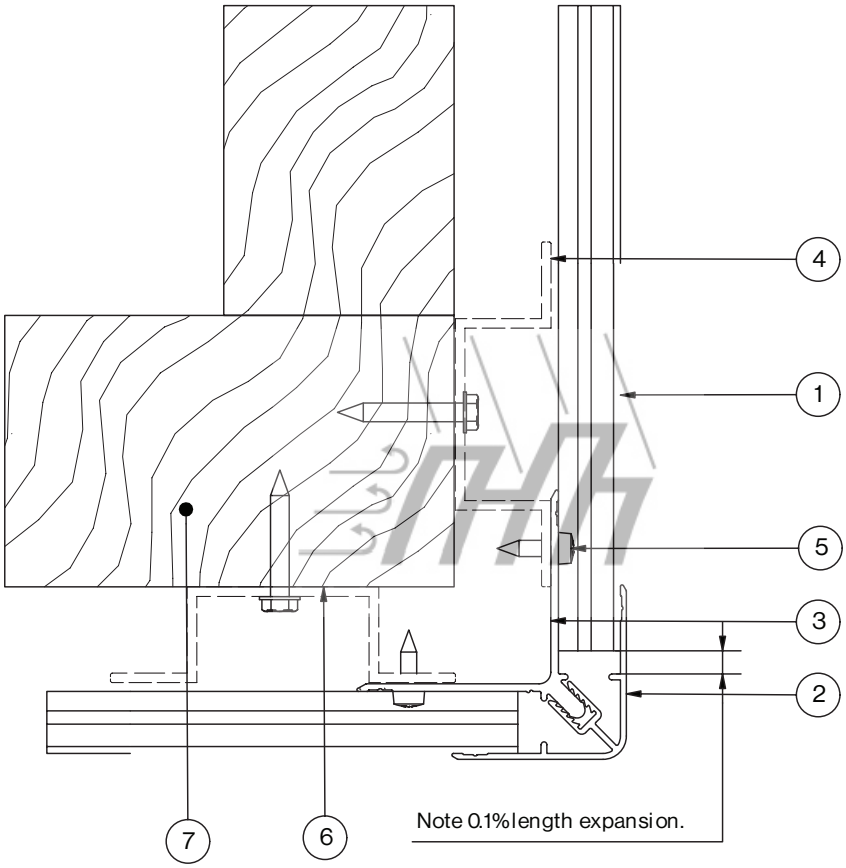
1. KEC150
2. KEDSTR
3. KAOCC45
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber Stud Frame

Horizontal Cladding A.2 STARTER DETAIL | END TRIM



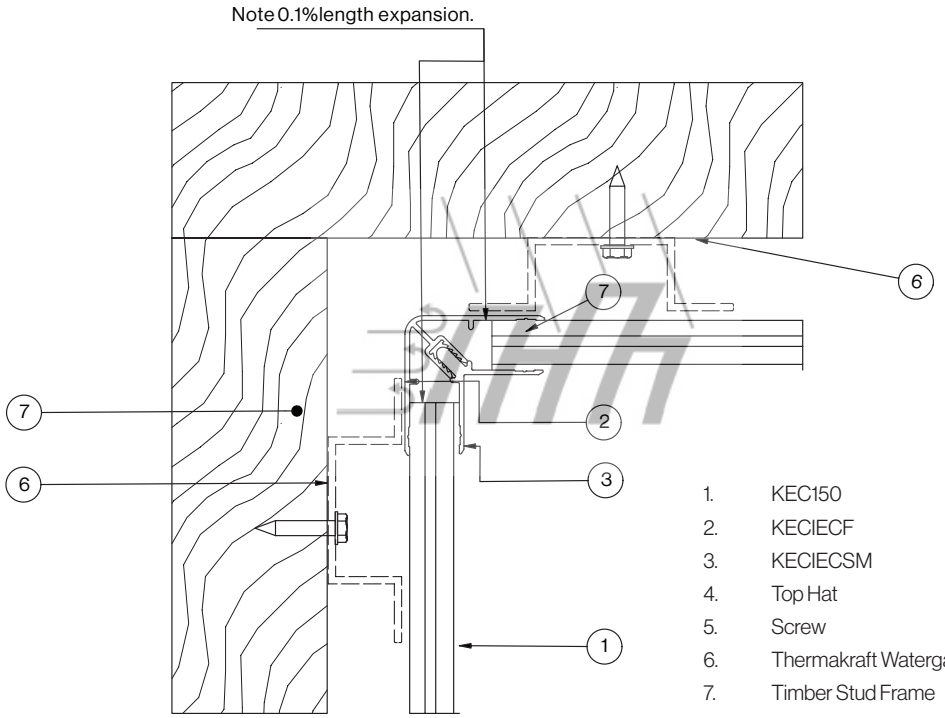
1. KEC150
2. KEDSTR
3. KAOCC45
4. KECFBF
5. KECFTTLM
6. Top Hat
7. Screw
8. Thermakraft Watergate Plus Vapour Barrier
9. Building Substrate

Horizontal Cladding B.1 EXTERNAL CORNER



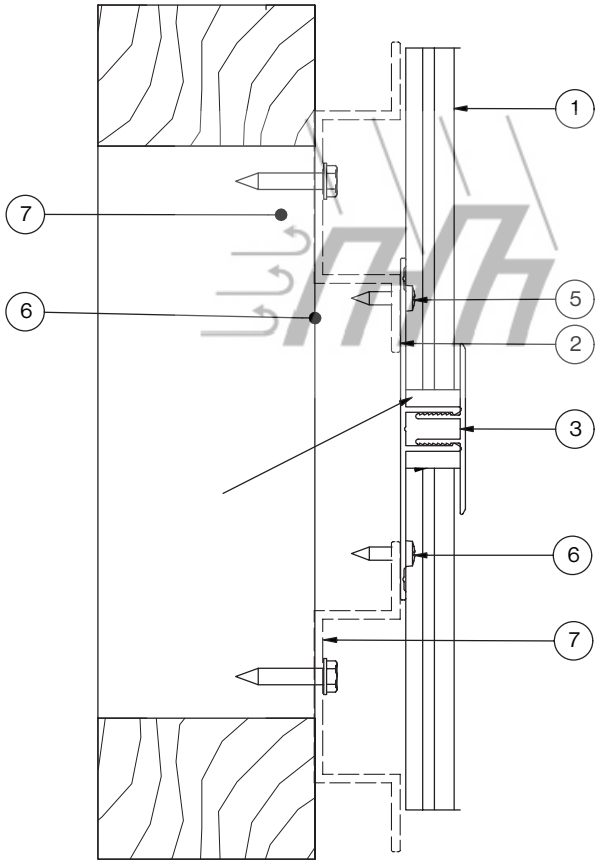
1. KEC150
2. KECIECF
3. KECIECM
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber Stud Frame

Horizontal Cladding C INTERNAL CORNER



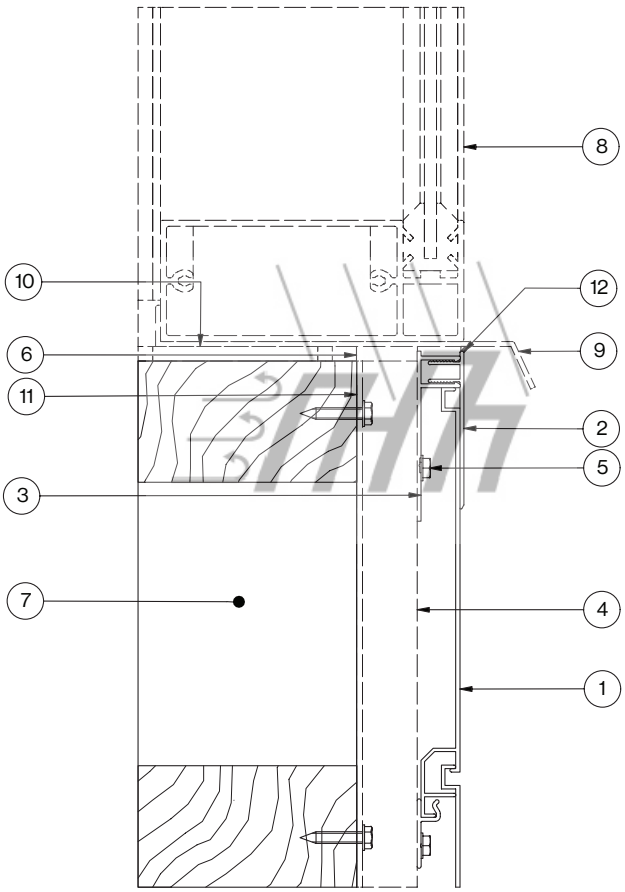
1. KEC150
2. KECIECF
3. KECIECSM
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber Stud Frame

Horizontal Cladding D JOINER



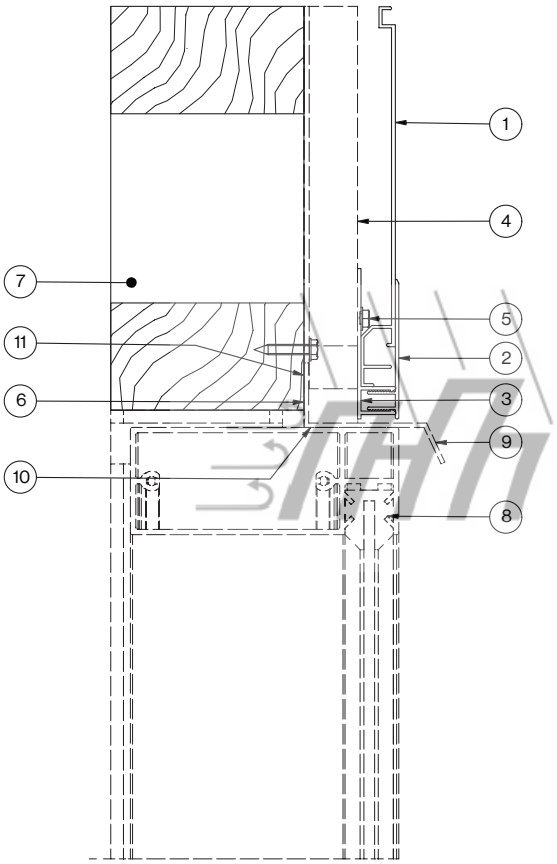
1. KEC150
2. KECJBF
3. KECTJM
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber stud frame

Horizontal Cladding E WINDOW DETAIL | SILL



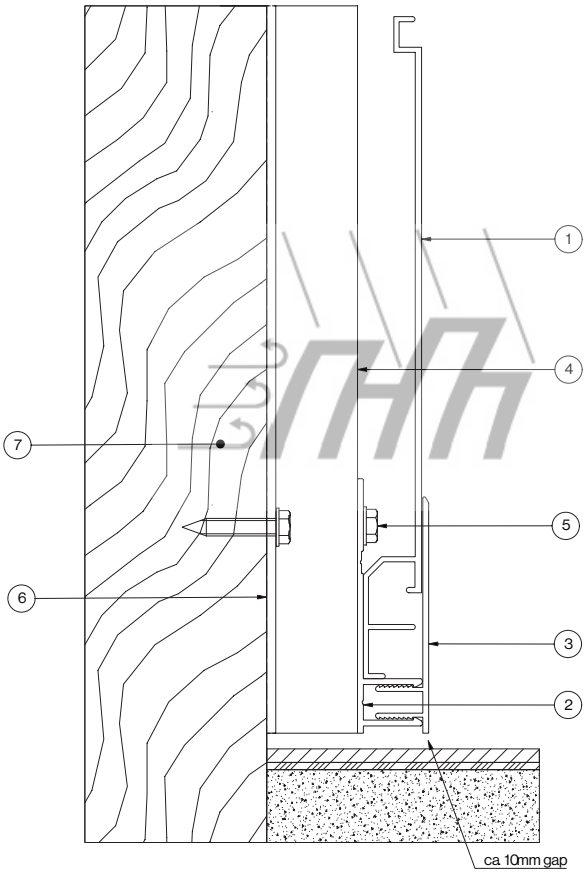
1. KEC150
2. KECFTTLM
3. KECFBF
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber stud frame
8. Window
9. Window Flashing
10. Flashing Seal
11. Tescon Extora Profil Vapour Barrier Tape
12. Silicon Seal

Horizontal Cladding E WINDOW DETAIL | HEAD



1. KEC150
2. KECFTTLM
3. KECFBF
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber stud frame
8. Window
9. Window Flashing
10. Flashing Seal
11. Tescon Extora Profil Vapour Barrier Tape

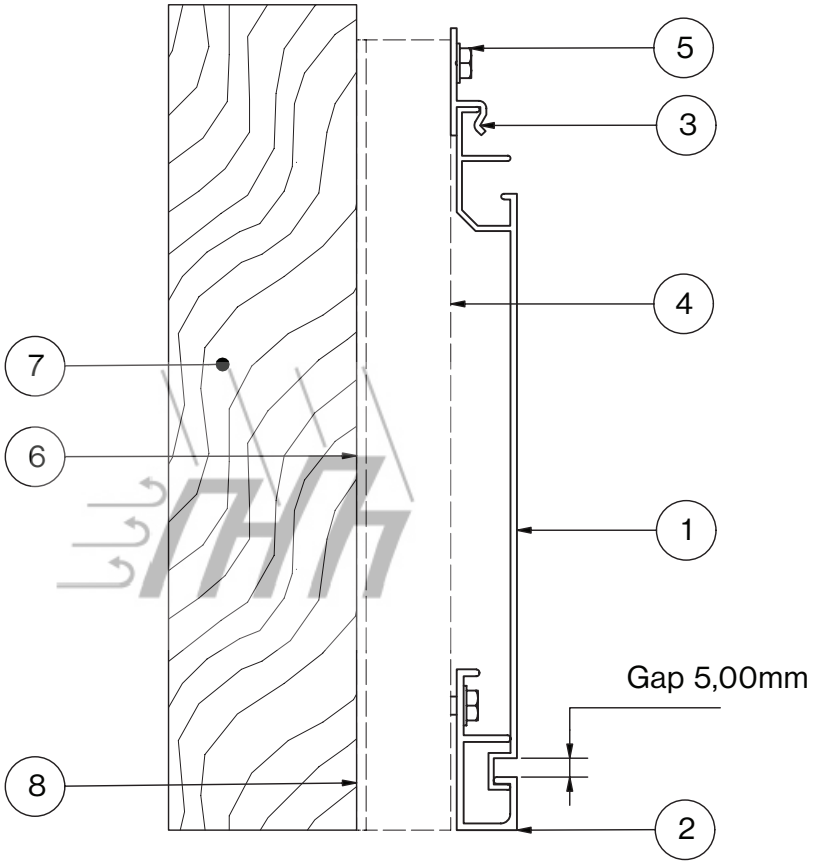
Horizontal Cladding F.1 STOP END DETAIL | FULL BOARD



Note: 0.1% Aluminium length expansion

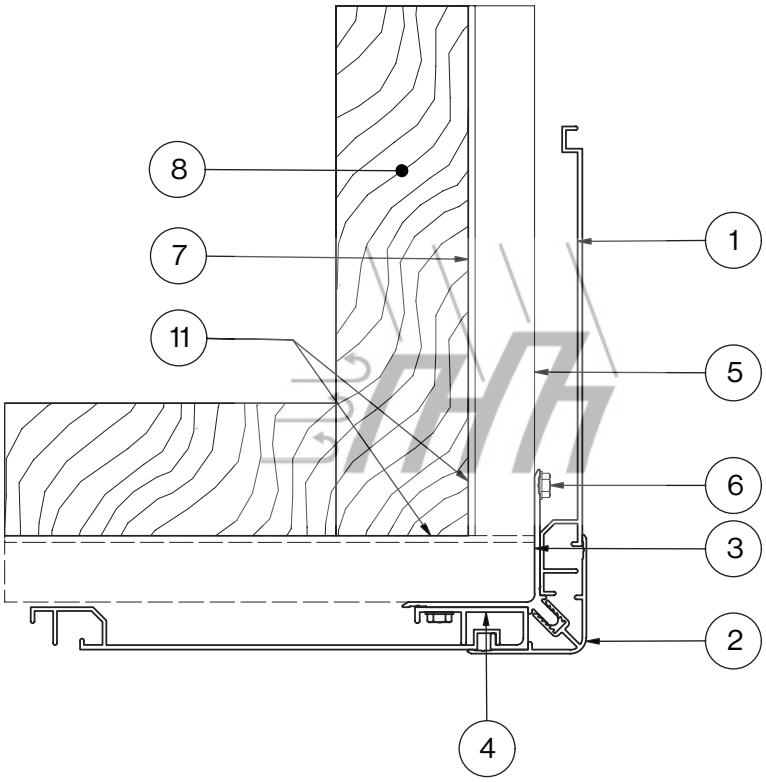
1. KEC150
2. KECFBF
3. KECFTTLM
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber stud frame

Vertical Detail A STARTER DETAIL



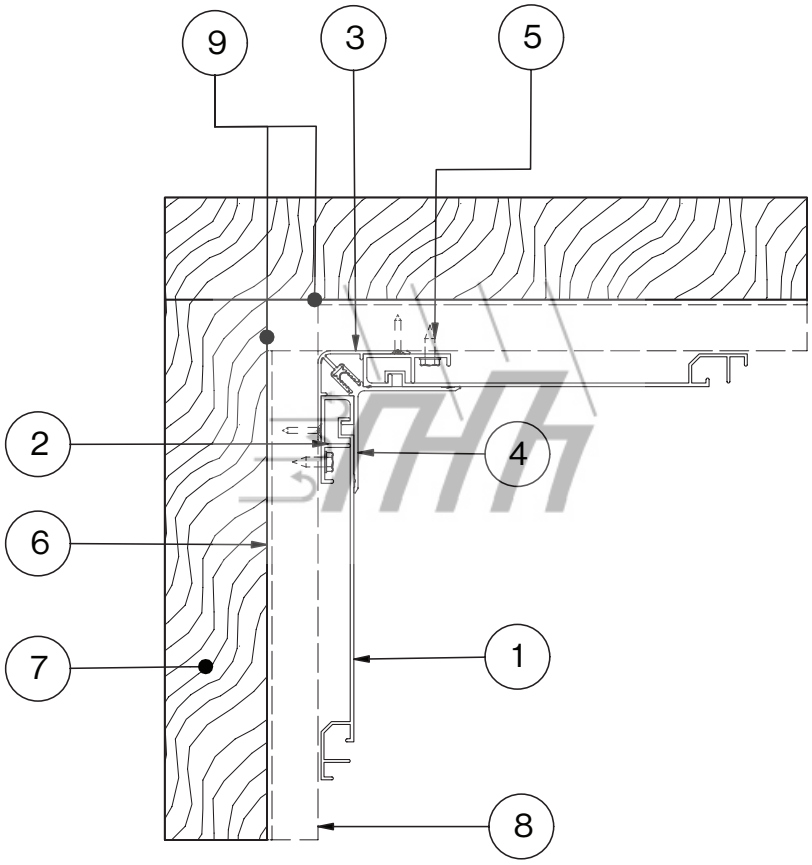
1. KEC150LW
2. KEDSTR-SQ
3. KAOCC45
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber Stud Frame
8. Tescon Extora Profil Vapour Barrier Tape

Vertical detail B EXTERNAL CORNER



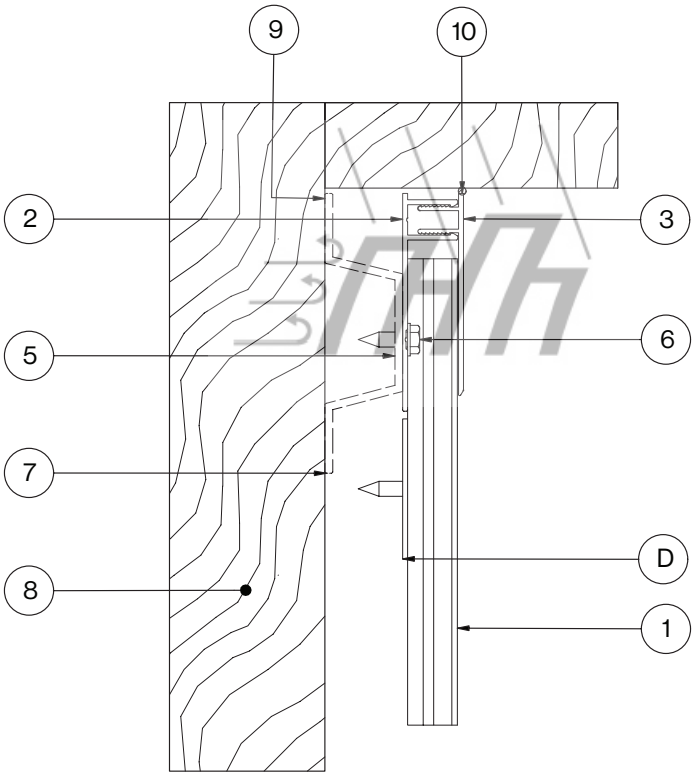
1. KEC150LW
2. KECIECF
3. KECIEM
4. KEDSTR
5. Top Hat
6. Screw
7. Thermakraft Watergate Plus Vapour Barrier
8. Timber Stud Frame
9. Tescon Extora Profil Vapour Barrier Tape

Vertical detail C INTERNAL CORNER



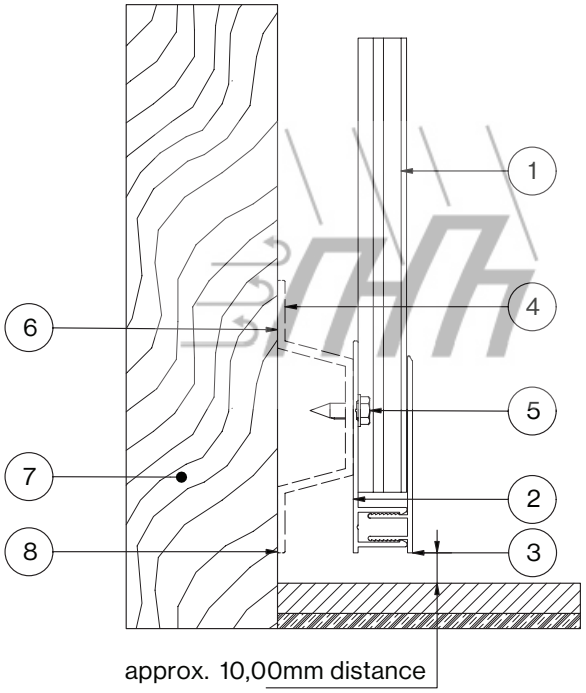
1. KEC150LW
2. KEDSTR-SQ
3. KECIECF
4. KECIECM
5. Top Hat
6. Screw
7. Thermakraft Watergate Plus Vapour Barrier
8. Timber Stud Frame
9. Tescon Extora Profil Vapour Barrier Tape

Vertical detail D TOP END DETAIL



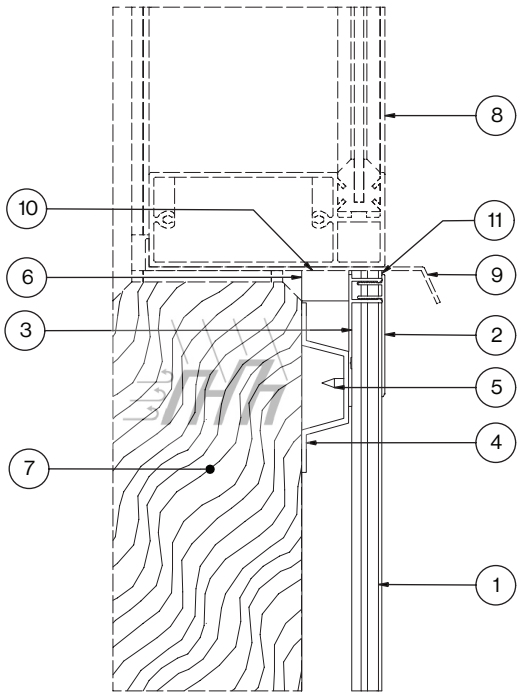
1. KEC150LW
2. KECFBF
3. KECFTTLM
4. WACC
5. Top Hat
6. Screw
7. Thermakraft Watergate Plus Vapour Barrier
8. Timber Stud Frame
9. Tescon Extora Profil Vapour Barrier Tape
10. Silicon Seal

Vertical detail E BOTTOM END DETAIL



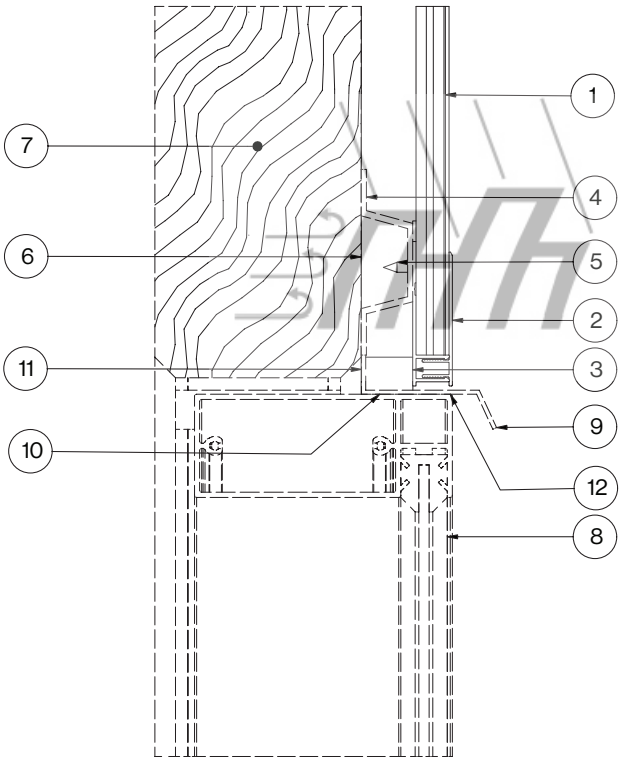
1. KEC150LW
2. KECFBF
3. KECFTTLM
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber Stud Frame
8. Tescon Extora Profil Vapour Barrier Tape

Vertical detail F.1 WINDOW DETAIL | SILL



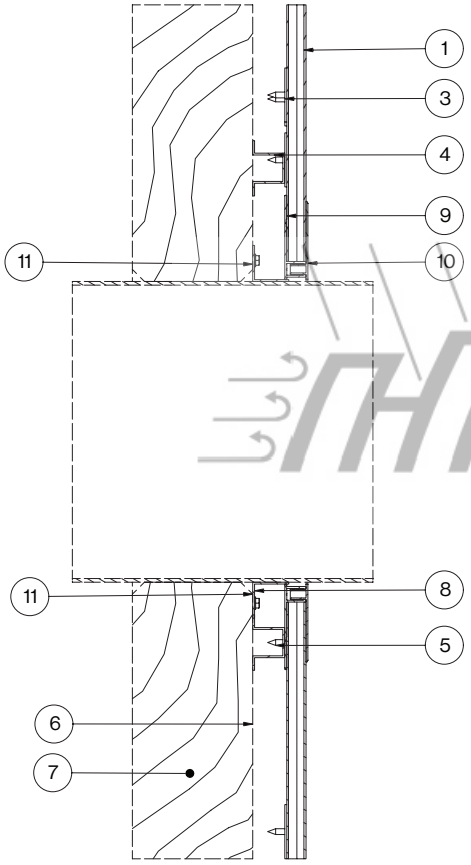
1. KEC150LW
2. KECFTTLM
3. KECFBF
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber Stud Frame
8. Window
9. Window Flashing
10. Tescon Extora Profil Vapour Barrier Tape
11. Silicon Seal

Vertical detail F.2 WINDOW DETAIL | HEAD



1. KEC150LW
2. KECFTTLM
3. KECFBF
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber Stud Frame
8. Window
9. Window Flashing
10. Tescon Extora Profil Vapour Barrier Tape
11. Silicon Seal

Vertical detail G SERVICE END PENETRATION



1. KEC150
2. KEDSTR
3. KAOCC45
4. Top Hat
5. Screw
6. Thermakraft Watergate Plus Vapour Barrier
7. Timber Stud Frame
8. Angle
9. KECFBF
10. KECFTTLM
11. Tescon Extora Profil Vapour Barrier Tape