

ABOUT

ADLUX HARMONY ARRAY ROOF WINDOWS

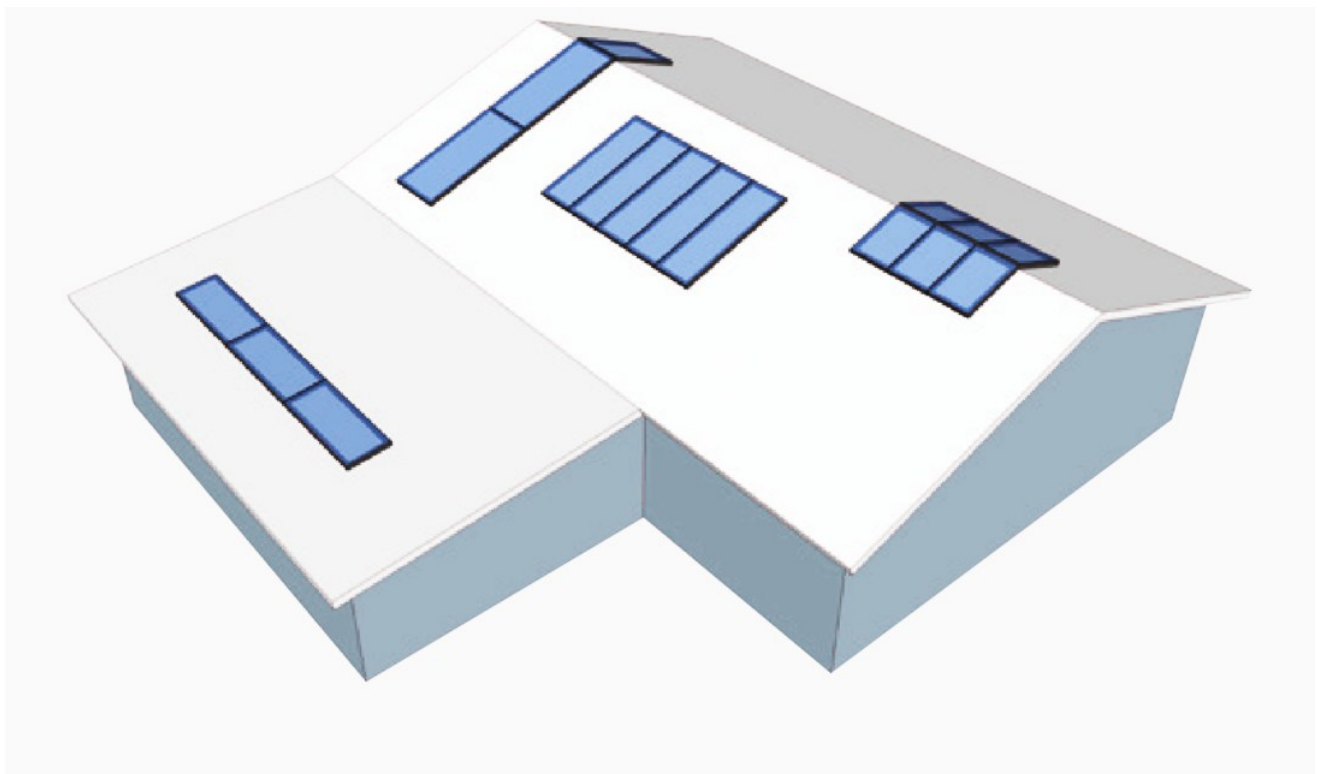
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DATE: 2/04/2026

OCULUS REFERENCE: J250519

PREPARED FOR

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Revision Control

Revision number	Date published	Reviewed by
1	02/04/2026	Peter Raimondo



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1 SUMMARY

Adlux Industries Limited has requested an engineering judgement for the compliance of **Harmony Array Roof Windows** with the following New Zealand Building Code clauses:

- B1 – Structure
- B2 – Durability
- E2 – External moisture
- H1 – Energy efficiency

This report sets out:

- the applicable building enclosure performance requirements, and
- the compliance evidence with the New Zealand Building Code.

Subject to installation and maintenance to the supplier's requirements and project-specific design, Oculus is satisfied on reasonable grounds that the Harmony Array Roof Windows will meet the relevant provisions of the New Zealand Building Code.

This evaluation must be read in conjunction with the supporting documentation that accompany this report.



2 CONDITIONS OF THIS REPORT

The compliance potential set out in this report for the Adlux Harmony Array Roof Windows has been evaluated using compliance documentation relevant to the proposed system.

This report and any building consent resulting does not guarantee it will achieve compliance with the New Zealand Building Code, only that it can achieve compliance as designed.

Assumptions and limitations of the compliance potential set out in this report are described in [Section 6](#).



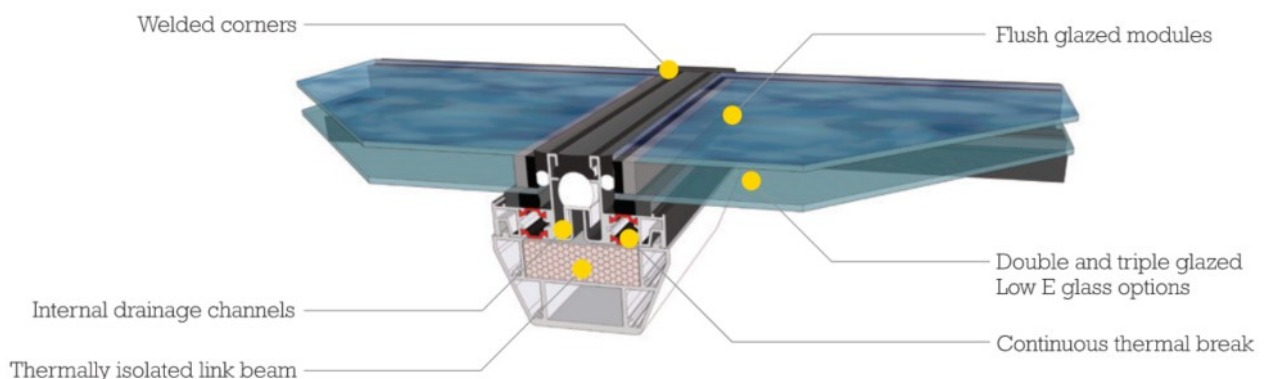
3 PRODUCT DESCRIPTION

Adlux Harmony Array Roof Window is a skylight system designed and developed in New Zealand. It features custom-manufactured modular units built to site-specific requirements and intended for use in buildings situated in all NZS 3604 Wind Zones.

Insulated double or triple glazed panes are argon filled, with options for low-E coatings. Framing is composed of aluminium alloy extrusions with polyamide thermal breaks and fully welded corners. Intermediate steel reinforced support link beams have internal drainage channels and are thermally isolated with a continuous strip of EPS rigid insulation. The flush glazed panes are set onto two lines of EPDM foam seal tape and sealed with one-part, neutral-cure structural silicone. Adlux Harmony Array Roof Window panes can be built to any length and are self-supported up to 3m span.

Field of application includes flat roofs, ridge lines and sloped roofs with pitch ranging 2° to 65°. All units are curb-mounted, with a minimum upstand of 110mm above the roofing material or profile. Units are side fixed through pre-drilled holes in the downturned framing flanges. Units are non-operable and are not intended for pedestrian traffic.

Adlux Harmony Array Roof Windows are suitable for use with all roof types. However, flashing design to adjacent enclosure assemblies will require project-specific considerations and are outside the scope of this report.



Compliance evidence for this system is set out in [section 5](#) of this report.



4 PERFORMANCE REQUIREMENTS

The NZBC Clauses and applicable Performance Requirements included within this review's scope are listed in Table 1 below. Demonstration that a product can meet the Performance Requirements of the clause ensures that the Functional Requirement and the Objective of the clause will be met.

Table 1: NZBC, Functional Requirements, and Applicable Performance Requirements		
NZBC	Functional Requirement	Applicable Performance Requirements within the scope of review
B1 Structure	B1.2 <i>Buildings, building elements, and site work</i> shall withstand the combination of loads that they are likely to experience during <i>construction or alteration</i> and throughout their lives.	B1.3.2 and B 1.3.3 a), h)
B2 Durability	B2.2 <i>Building materials, components, and construction methods</i> shall be sufficiently durable to ensure that the <i>building</i> , without reconstruction or major renovation, satisfies the other functional requirements of this code throughout the life of the <i>building</i> .	B2.3.1 b), and B2.3.2 a), b)
E2 External moisture	E2.2 <i>Buildings</i> must be constructed to provide <i>adequate</i> resistance to penetration by, and the accumulation of, moisture from the outside.	E2.3.1 and E2.3.2
H1 Energy efficiency	H1.2 Buildings must be constructed to achieve an adequate degree of energy efficiency when that energy is used for— a) modifying temperature, modifying humidity, providing ventilation, or doing all or any of those things (does not apply to assembly service buildings, industrial buildings, outbuildings, or ancillary buildings); or b) providing hot water to and from sanitary fixtures or sanitary appliances, or both; or c) providing artificial lighting (applies only to commercial buildings and communal non-residential buildings whose floor area is greater than 300 m ²) **Note see below	H1.3.1



5 COMPLIANCE EVIDENCE

This section sets out:

- Summary of the compliance with relevant clauses of the New Zealand Building Code, and
- Relevant documentation considered in establishing compliance is attached in the Appendices.

Supporting documentation

- SWTL-R0073 Test Report – Adlux Roof Window
- Adlux Harmony Joinery Calculator
- Adlux Roof Window H1 Summary Report
- Adlux Harmony Array Brochure
- Adlux Harmony Array Modular Roof Window Installation Instructions 2025
- Adlux Harmony Array Generic Details A101-A102-A103-A104-A105
- Adlux Harmony Array – Over Ridge with Joint Support Beam Details
- Adlux Harmony Array – Over Ridge on Structural Supports Details
- Adlux Harmony Array – Join Down Roof Fall Details
- Shin-Etsu SSG Sealant-90N Technical Data Sheet
- DOWSIL 795 SSG Technical Data Sheet
- DOWSIL Statement on silicone sealants



Table 2: Glazing compliance Pathway

NZBC Clause	Method of Compliance with Applicable Performance Requirements						
B1 Structure	Method of compliance: B1/VM1 and Alternative Solution - Previously, the single pane Adlux Harmony Roof Window was successfully tested to test AS/NZS4284:2008 standard, which was modified to allow for sloped installation. The sample passed with<table><tr><td>ULS</td><td>+ 2285 Pa</td><td>- 1975 Pa</td></tr><tr><td>SLS</td><td>+ 1625 Pa</td><td>- 1405 Pa</td></tr></table> - Testing was conducted by an IANZ accredited laboratory in accordance with ISO/IEC 17025. - The modular Harmony Array features a steel reinforced link beam between panes and engineered to support spans up to 3m. - If the proposed modular unit is designed and installed to the same quality as the previous Adlux Harmony Roof Windows, we are satisfied on reasonable grounds that the criteria for B1 will be met. Limitation of use: - Any site-specific wind load in exceedance of extra high wind load threshold will require project-specific engineering design. - Roof windows are generally not meant to be trafficked and should not be subject to point loads unless designed and tested accordingly. - For roof windows installed at higher pitches, verifications should be made regarding potential for seismic racking and how that can be accommodated within the frame. - The design of the roof structure to support the weight of the roof window is outside of this scope.	ULS	+ 2285 Pa	- 1975 Pa	SLS	+ 1625 Pa	- 1405 Pa
	ULS	+ 2285 Pa	- 1975 Pa				
SLS	+ 1625 Pa	- 1405 Pa					
B2 Durability	Method of compliance: B2/VM1 and Alternative Solution - In-service history: Earlier models of Adlux roof windows are BRANZ appraised with an expected serviceable life of not less than 15 years in accordance with section B2 of the New Zealand Building Code. - Comparable performance of similar building elements - The proposed Harmony Array Roof Windows are of similar composition to earlier models of Adlux roof windows and are expected to have a serviceable life of not less than 15 years. This relates specifically to the structural elements of the joinery. - The glazing system comprises aluminium and stainless-steel fasteners, which are widely recognised as sufficiently durable to achieve a 50-year design life. - If the proposed unit is designed and installed per the manufacturer documentation, using IGUs constructed in accordance with NZS 4223.2, we are satisfied on reasonable grounds that the criteria for B2 will be met. Limitation of use: - Durability of the product is conditional to general maintenance and periodic inspection per technical literature. Items such as sealants, gaskets, glazing splines, hardware, and glazing stops may require replacement if deteriorated.						



E2 External Moisture	Method of compliance: Alternative Solution ▪ Per Adlux drawings, thermal roof windows are to be curb mounted. This effectively removes the unit from the roof's catchment area. ▪ The framing to curb interface is made watertight with an internal air seal and an external weather seal. The framing downturn lap provides further protection from backsplash. ▪ The glazing is finished flush with the framing to prevent accumulation of rainwater. ▪ Frames are fully welded, preventing gaps at the mitres ▪ The single pane Adlux Harmony Roof Window unit was successfully tested to the AS/NZS 4284 standard (modified for sloped glazing). Profiles for the Harmony Array Roof Window are identical, with the addition of the link bar to form modular units. The link bars are similar to the framing profiles and include drainage channel. We would anticipate the array to perform similarly to the individual roof units in meeting E2 requirements. Limitation of use: ▪ The roof water management provisions to prevent pooling of water around roof penetrations is outside of this scope and will need project-specific consideration by the project designer.
H1 Energy Efficiency	Method of compliance: H1/AS1, H1/AS2, H1/VM1, H1/VM2 ▪ The standard glazing in Adlux Harmony Array Roof Windows is same as the previous Adlux Harmony Roof Window, and can produce glazing thermal transmittance (U_g) values ranging 0.809-1.742 W/m²K ▪ The link beam yielded a frame thermal transmittance (U_f) of 2.62 W/m²K ▪ U_g and U_f were respectively calculated to BS EN 673 and ISO 10077-2, in accordance with NZBC. Hence the data can be used to determine project-specific construction R-values (R_{skylight}). Limitation of use: ▪ The specific glass composition may vary based on project-specific requirements relating to comfort, overheating, aesthetics, acoustics and other. The project designer is responsible for obtaining accurate thermal transmittance data from the supplier.



6 ASSUMPTIONS AND LIMITATIONS

The compliance potential of each building enclosure component set out in [Section 5](#) of this report takes account of several assumptions regarding construction, quality assurance, and proper implementation of the design that would be expected. The following assumptions inform the compliance potential for this design:

- The design is implemented strictly per the drawings, details and specifications.
- Detailing of roof windows to adjacent building elements including seals and flashings are project-specific and excluded from this evaluation.
- Refer to the material data sheets and manufacturer's instructions with respect to compatibility between materials. Where data is unavailable, the designer must seek technical advice from the manufacturer, or their representative, and perform compatibility and adhesion testing prior to full application.
- Shop drawings will be produced to ensure design intent is maintained throughout the construction.
- Products are installed in accordance with the manufacturer's instructions or site-specific protocol. The manufacturer will periodically review installation and quality assurance procedures by the applicator as required to ensure the product is installed correctly and will be suitable for warranty coverage.
- All applicators are sufficiently competent to carry out the relevant installation and will issue PS3 statements and warranties for their relevant trade.
- This evaluation references the NZBC clause documents in force at the time of writing. The project designer is responsible for verifying alignment with the latest applicable code clauses.



7 COMPLIANCE STATEMENT

Subject to installation and maintenance to the supplier's requirements and project-specific design, Oculus is satisfied on reasonable grounds that the Adlux Harmony Array Rooflights will meet the relevant provisions of the New Zealand Building Code.

Prepared by:



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Appendix a. SUPPORTING DOCUMENTS



ADLUX INDUSTRIES LIMITED – AS/NZS 4284

Shelby Wright Test Report

Report Writer:
Mark Ashforth

Report Date:
13 February 2025

SWTL Reference:
J-24073

Client Information	
Client Name and Address	Adlux Industries Limited 30 Sistema Way, Mangere, Auckland 2022
Report Administered to	Adlux Industries Limited
Test Report Number	SWTL - R0073
Testing	
Test Location	Shelby Wright Test Labs – 515 Rosebank Road, Avondale Auckland 1026
Test Date	12-16 th December 2024
Test Number	T0252 – T0261
Report Date	13 th February 2025
Project Name	J24073 – Adlux Skylight - 4284
Test Procedure	SWTM-1.0 AS_NZS 4284 2008 Test Procedure v2
Testing Officer	Mark Ashforth
Observers	Mathew Church (Adlux Industries Limited), Mathew Lewis (SWTL), Jon Davies (Pro Clima)
Sample	
Sample	Adlux Harmony Roof Window 2.04m (W) x 2.54m (H)
Manufacturer	Adlux Industries Limited
Specifier	Adlux Industries Limited
Sample Designer	Adlux Industries Limited
Sample Installer	Adlux Industries Limited
IANZ	
IANZ Accredited KTP	Bernard Farrington
IANZ Accreditation No	1438

REVISION CONTROL

Revision number	Date published	Reviewed by
1	20 January 2025 (DRAFT)	BF
2	28 January 2025 (DRAFT)	BF
3	13 February 2025 (FINAL)	BF

Tested By Mark Ashforth

Report Writer Mark Ashforth
Authorised by Bernard Farrington

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1 EXECUTIVE SUMMARY

Testing of Adlux Industries Limited Harmony Roof Window was carried out at Shelby Wright Test Labs (SWTL) Avondale laboratory. The sample was prepared by the client and installed in the test booth by the client on 11 December 2024.

Because New Zealand does not have a standard for testing skylights, testing was requested using test methods adopted from AS/NZS 4284, and pressures aligning with NZS 3604 “Extra High” wind zone.

Structural tests were carried out with the sample fixed in the in the vertical orientation and pressures were adjusted for the sample weight and inclination to account for the self-weight of the operable sash.

Serviceability pressure (SLS) and subsequent self-weight adjusted pressures can be found in Table 1.

Table 1 Target Building Pressures

Serviceability Pressure
+ 1515 / 1625 Pa.
- 1515 / 1405 Pa

The test sample was found to have the following results for AS/NZS 4284:2008 compliance with any modifications as noted in this report:

Table 2 Summary of Results

Test Date	AS/NZS 4284:2008 Test	Result
12th December 2024	Clause 8.2 – Preliminary tests	Pass
12th December 2024	Clause 8.3 – Structural test as serviceability limit state	Pass
12th December 2024	Clause 8.4 – Air infiltration test	Pass
13th December 2024	Clause 8.5 – Water penetration by static pressure	Pass
12th December 2024	Clause 8.6 – Water penetration by cyclic pressure	Pass
16th December 2024	Clause 8.8 – Structural test at ultimate limit state	Pass

2 REQUEST FOR TESTING

Adlux Industries Limited requested testing of the sample to AS/NZS 4284:2008 with the test sequences as detailed in section 5 of this report. The completed test request form can be found in Appendix A.

3 METHOD

The tests were carried out in accordance with SWTL procedures:

SWTM-1.0 AS_NZS 4284 2008 Test Procedure v2

4 TEST SAMPLE

The test sample is as per the drawings in Appendix B of this report.

4.1 Description

The sample was comprised of the operable Harmony Skylight. The skylight was mounted on a 95mm upstand fixed to a structural timber wall frame of predominantly 140mm x 45mm SG8 H1.2 pine with 10mm structural ply sheathing and covered with Solitex Extasana Adhero adhesive membrane. The upstand had Extoseal flashing tape applied.

The structural timber perimeter frame of 140mm x 90mm SG8 H1.2 pine frame was fixed to the test booth opening. The sample wall with skylight mounted was able to pivot to the prescribed angles on two aluminium axles within the perimeter frame. Vertical supports and rigging supported the sample during test sequences.

The skylight sash was operable using three electric 500N actuator assemblies on three 100mm x 75mm x 2mm hinges with harmony IGU in accordance with NZS 4223.4.

The sample featured:

- One operable Harmony Roof Window Skylight

For this report:

- Reference to the “Exterior” side of the sample refers to the side of the sample facing inwards to the test booth and would normally represent the external faces of the building.
- Reference to the “Interior” side of the sample refers to the side of the sample facing outwards from the test booth and would normally represent the internal faces of the building.

Client supplied “As Built” drawings and details in Appendix B of this report.

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Table 3 Test Sample Setup

Photo/Figure Reference	Description
	Figure 1 – Overall view of the sample viewed from interior side. Note: cross bracing within skylight opening to support perspex for negative pressure enclosure.
	Figure 2 – Left hand side of sample with temporary deflection plastic accross top of skylight – Adlux Harmony Roof Window



Figure 3 – One of three
motors used to operate
skylight

4.2 Client Documentation

Test request and parameters form. Refer to Appendix A

Drawings. Refer to Appendix B

Worksheets. Refer to Appendix C

4.3 Components

The components of the sample are as listed in drawings. Refer to Appendix B

5 TEST PROCEDURE

The test procedure was carried out following SWTM-1.0 AS_NZS 4284 2008 Test Procedure v2 Test Sequence AS/NZS 4284:2008

- (a) Preliminary tests
- (b) Structural test at serviceability state
- (c) Air infiltration test
- (d) Water penetration test by static pressure followed by cyclic pressure test
- (e) Seismic test at serviceability limit state displacement: Not carried out
- (f) BMU restraint test – Not carried out
- (g) Strength test at ultimate limit state
- (h) Seismic test at ultimate limit state displacement – Not carried out
- (i) Seal degradation test: Not carried out

5.1 Deviation, variation, or exclusion to the test procedure

Variation:

There is no specific test standard for skylights in New Zealand. Structural tests were carried out with the sample in the vertical orientation, pressures were adjusted for the sample weight and inclination within the test booth to account for the self-weight of the operable sash.

The client requested additional static water penetration tests at 0.5°, 37.5° and 75° from the horizontal to simulate likely skylight installation applications.

At both 0.5° and 37.5° water was applied with a WGANZ 502 spray rack calibrated rate of > 3.0 lpm/m² with - 455 Pa (NZS 3604 “Extra High” wind zone) applied to the interior side of the sample.

At 75° the test booth water sprayer system calibrated rate of > 3.0 lpm/m² was used with - 455 Pa applied to the interior side of the sample.

Exclusion:

Following the preliminary water penetration test sequence, further static and cyclic water penetration tests were not undertaken in the vertical position as it was not considered relevant for the designed installation of the skylight.

The skylight was subject to further static water penetration tests at 0.5°, 37.5° and 75° inclination only.

6 Modification

Under negative pressure the SLS and ULS test pressures were not achievable due to deflection at the centre of the sides of the sash and the following modifications were made:

Adlux removed rubber bushes within the three electric motors to reduce play and applied PVC and Tescon Extora tape to seal the internal side of the operable sash to frame of the skylight due to leakage caused by non-permanent deflection at the centre of the sash.

During the static and cyclic water penetration test a temporary plastic film was placed along the top of the skylight to deflect water from the upstand and hinge side of the skylight. This was in part because the initial test was undertaken in the vertical position. This plastic film was removed for subsequent static water penetration testing undertaken in several inclinations' representative of the likely product installation (0.5°, 37.5° and 75°).

7 TESTING EQUIPMENT

Table 4 Testing Equipment

Item	Description	ID	Calibration
Manometer	DG 1000	SWTL - 068 (Serial No: 11040)	Date of next calibration: 04 November 2025
Anemometer	FLSchmidt	SWTL - 050 (Serial No: 000011234)	Date of next calibration: 17 January 2025
Anemometer	FLSchmidt	SWTL - 017 (Serial No: 000008907)	Date of next calibration: 27 May 2025
LDS	Bojke BLG-250N-485	SWTL - 108 (Serial No: SWTL-108)	Date of next calibration: 26 February 2025
LDS	Bojke BLG-250N-485	SWTL - 109 (Serial No: SWTL-109)	Date of next calibration: 26 February 2025
LDS	Bojke BLG-250N-485	SWTL - 110 (Serial No: SWTL-110)	Date of next calibration: 26 February 2025

8 ENVIRONMENTAL CONDITIONS

Table 5 Environmental Conditions

12 December 2024			
Temperature °C	Barometric Pressure hPa	Humidity	Calm / Windy
21	1007	87%	Light/East
13 December 2024			
21	1005	83%	Variable
16 December 2024			
18.5	1014	96%	Light/South

9 TEST RESULTS

9.1 Results

9.2 AS/NZS 4284:2008

(a) Preliminary tests:

Table 6: Preliminary Tests

Clause	Test Date	Applied Pressure	Result
8.2	12th December 2024	+ 1625 Pa	Pass
8.2	12th December 2024	- 1405 Pa	Pass
Comments	No damage noted. Deflection at approximately -900 Pa caused sufficient sash deflection and leakage that the operable sash required tape to the frame on the internal side to achieve SLS of -1405 Pa.		
Test	Applied Pressure		Result
Static Pressure	489 Pa		PASS
Cyclic Pressure	244-488 Pa		PASS
Cyclic Pressure	325-650 Pa		PASS
Cyclic Pressure	489-975 Pa		PASS
Comments	Temporary plastic was fitted to the top of the skylight to deflect water from the hinged/upstand side of the skylight.		

(b) Structural test at serviceability state:

Table 7: Structural test at SLS

Clause	Test Date	Applied Pressure	Deflection/Span Result	Successive Member Displacement Result
8.3	12th December 2024	+ 1625 Pa	Pass	Pass
8.3	12th December 2024	- 1405 Pa	Pass	Pass
Criteria	Clause 8.3.5, no framing members shall deflect by an amount greater than span/250 mm.			
Comments	No damage noted.			

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(c) Air infiltration test:

Table 8: Air infiltration tests at 150 Pa (vertical mount / 90° within test booth)

Clause	Test Date	Applied Pressure	Allowable Leakage l/s	Leakage l/s	Leakage l/s/m ²	Result
8.4	12th December 2024	+/- 150 Pa	8.38	+0.21 - 5.58	1.07	Pass
Criteria						
Clause 9.3 Air infiltration for airconditioned buildings shall not exceed 1.6 L/m ² s.						
Comments						
Air leakage area and result values are the combination of both samples.						

Table 9: Air infiltration tests at 75 Pa (45° inclination)

Clause	Test Date	Applied Pressure	Allowable Leakage l/s	Leakage l/s	Leakage l/s/m ²	Result
8.4	13th December 2024	+/- 75 Pa	8.38	+/- 0.01	0.002	Pass
Criteria						
Clause 9.3 Air infiltration for airconditioned buildings shall not exceed 1.6 L/m ² s.						
Comments						
Air leakage area and result values are the combination of both samples.						

Table 10: Air infiltration tests at 150 Pa (45° inclination)

Clause	Test Date	Applied Pressure	Allowable Leakage l/s	Leakage l/s	Leakage l/s/m ²	Result
8.4	13th December 2024	+/- 150 Pa	8.38	+0.01 -0.04	0.008	Pass
Criteria						
Clause 9.3 Air infiltration for airconditioned buildings shall not exceed 1.6 L/m ² s.						
Comments						
Air leakage area and result values are the combination of both samples.						

(d) Water penetration test by static pressure and cyclic:

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Report Writer Mark Ashforth

Undertaken in vertical position as part of the preliminary test (T0252).

Due to installation design < 75° inclination additional water penetration testing of the sample was undertaken to simulate most likely skylight installation scenarios of 0.5°, 37.5° and 75°. Only static water penetration tests were performed.

Table 11: Three additional static water penetration tests at different roof pitch installations

Clause	Test Date	Applied Angle (°) and Pressure (Pa)	Result
8.5 / 8.6	13th December 2024	0.5°, - 455 Pa	Pass
Criteria	Clause 9.4, Under static and cyclic pressures there shall be no leaks. For both the static and cyclic water tests, a leak is considered to occur when one or more of the following occur: (a) Water appears on any inside surface of the facade and is visible from an occupied space. (b) Uncontrolled water appears on any inside surface of the facade. (c) Water appears that is likely to wet insulation, fixtures and finishes. (d) Water appears in other locations specified as unacceptable by the Specifier.		
Comments	No leaks evident.		

Clause	Test Date	Applied Angle (°) and Pressure (Pa)	Result
8.5 / 8.6	13th December 2024	37.5°, - 455 Pa	Pass
Criteria	Clause 9.4, Under static and cyclic pressures there shall be no leaks. For both the static and cyclic water tests, a leak is considered to occur when one or more of the following occur: (a) Water appears on any inside surface of the facade and is visible from an occupied space. (b) Uncontrolled water appears on any inside surface of the facade. (c) Water appears that is likely to wet insulation, fixtures and finishes. (d) Water appears in other locations specified as unacceptable by the Specifier.		
Comments	No leaks evident.		

Clause	Test Date	Applied Angle (°) and Pressure (Pa)	Result
8.5 / 8.6	16th December 2024	75°, - 455 Pa	Pass
Criteria	Clause 9.4, Under static and cyclic pressures there shall be no leaks. For both the static and cyclic water tests, a leak is considered to occur when one or more of the following occur: (a) Water appears on any inside surface of the facade and is visible from an occupied space. (b) Uncontrolled water appears on any inside surface of the facade. (c) Water appears that is likely to wet insulation, fixtures and finishes. (d) Water appears in other locations specified as unacceptable by the Specifier.		
Comments	No leaks evident.		

(e) Seismic test at serviceability limit state displacement: Not carried out.

(f) BMU restraint test: Not carried out.

(g) Strength test at ultimate limit state:

Table 12: Strength test at ULS

Clause	Test Date	Applied Pressure	Duration	Result
8.8	16 th December 2024	+ 2285 Pa -1975 Pa	10 sec.	Pass
Criteria	Clause 9.7 Under structural test at ultimate limit state there shall be no collapse of the test sample. Collapse shall mean any one or any combination of the following: (a) Disengagement or partial disengagement of any framing member, facade panel or any part thereof. (b) Failure of any fixings that connect the façade to the building structure. (c) Failure of any stop, locking device, fastener or support which could allow an opening light to come open. (d) Repeated breakage of glass resulting in loss of chamber pressure. Glass may only be replaced once before the sample is deemed to have collapsed. (e) Repeated cracking of glass which does not result in loss of chamber pressure. Glass may only be replaced twice before the sample is deemed to have collapsed.			
Comments	Deflection at approximately -900 Pa caused sufficient leakage that the operable sash required tape to the frame on the internal side to achieve SLS of - 1975 Pa.			

Table 13: ULS to Failure

Clause	Test Date	Applied Pressure	Duration	Result
8.8	16 th December 2024	-4100 Pa	10 sec.	Pass
Criteria	Clause 9.7 Under structural test at ultimate limit state there shall be no collapse of the test sample. Collapse shall mean any one or any combination of the following: (a) Disengagement or partial disengagement of any framing member, facade panel or any part thereof. (b) Failure of any fixings that connect the façade to the building structure. (c) Failure of any stop, locking device, fastener or support which could allow an opening light to come open. (d) Repeated breakage of glass resulting in loss of chamber pressure. Glass may only be replaced once before the sample is deemed to have collapsed. (e) Repeated cracking of glass which does not result in loss of chamber pressure. Glass may only be replaced twice before the sample is deemed to have collapsed.			
Comments	Tape was required between frame on the internal side to achieve SLS and ULS under negative pressure. Signification deflection at mid span of sides of sash that tape was bellowed to allow for movement due to deflection. At approximately 4200 Pa the lower left corner of the glazing sealant failed, and two sides of the glazing released, ejecting the gasket and exposing the backer rod. No permanent deformation to the sash or glass breakage was noted.			

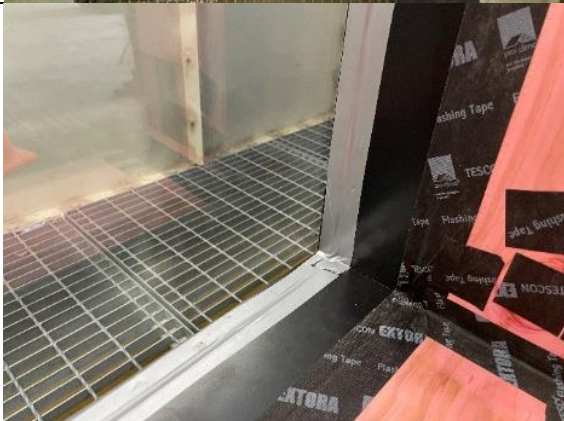
(h) Seismic test at ultimate limit state displacement: Not carried out.

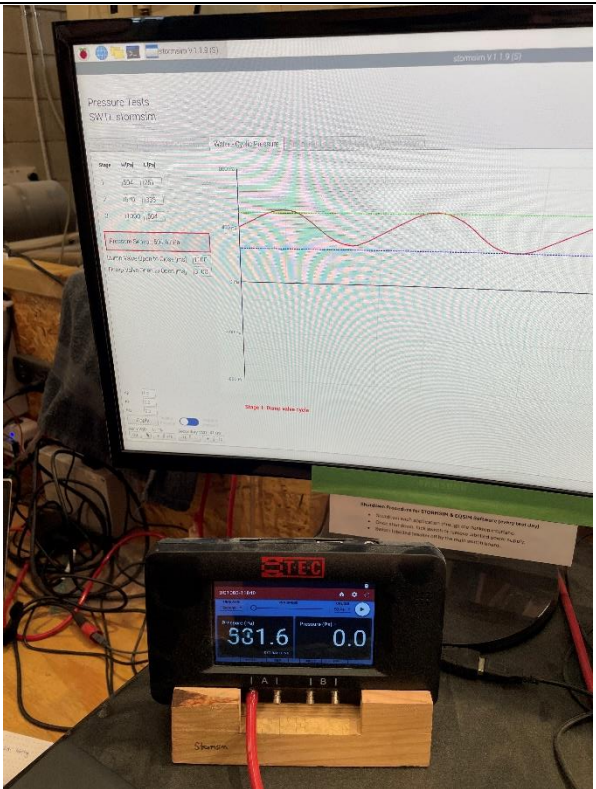
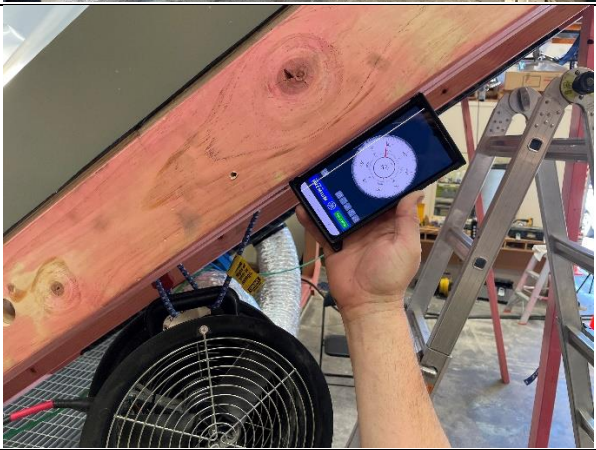
(i) Seal degradation test: Not carried out.

Report Number: SWTL R0073
Report Date: 13 February 2025

9.3 Observations

Table 14 Observations

Obs. No:	Test	Observation	Photo
1	Water testing – Static	No leaking or water penetration evident. Temporary plastic deflection sheet at top of skylight.	
2	SLS – Negative pressure (-1405 Pa)	Tape required between operable sash and frame to achieve negative SLS.	

3	Cyclic water test at vertical position within booth	Target pressure 244 Pa – 488 Pa	
4	Air infiltration test at 45° inclination	Perspex enclosure on inside of frame.	
5	Static water penetration test setup at 37.5° inclination		

6	Static water penetration test at 37.5° inclination	Setup uses (WGANZ 502) spray rack to apply > 3.0 lpm/m ² with negative 488 Pa applied to internal surface of the sample	
7	Static water penetration test at 75° inclination	Setup uses (WGANZ 502) spray rack to apply > 3.0 lpm/m ² with negative 488 Pa applied to internal surface of the sample at 75°	
8	Post Structural ULS Negative Pressure	Further to structural ULS testing (+ 2285 Pa, -1975 Pa), client requested test to failure (-4100 Pa achieved)	

10 DISCLOSURE/QUALIFICATIONS

On instruction of Adlux Industries Limited:

- Adlux Industries Limited Drawings attached to this report have been provided by the client and SWTL accepts no liability with regards to the accuracy of the drawings.
- SWTL has not be provided with any other test reports from the manufacturer or manufacturing instructions.
- This report has been prepared solely for the party of who it was addressed within the terms of the brief provided to this company. This report may not be used for any other context or for any other purpose without prior agreement.
- This report may not be read or reproduced other than a complete document.

11 IANZ ACCREDITATION

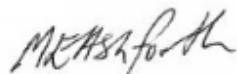
This testing has been produced under IANZ accreditation number: **1438**

12 TESTING OFFICERS

Name: Mark Ashforth

Date: 13 February 2025

Signature:



Matt Lewis Date:

Date: 13 February 2025

Signature:



M: +64 277173143
E: Bernard@swtl.co.nz
W: www.swtl.co.nz

Report Number: SWTL R0073
Report Date: 13 February 2025



All tests reported herein
have been performed in
accordance with the
laboratory's scope of
accreditation



Shelby Wright Test Labs
515 Rosebank Road
Avondale, Auckland
New Zealand, 1026

13 REPORT WRITER

Name: Mark Ashforth

Date: 13 February 2025

Signature:

A handwritten signature in black ink, appearing to read "Mark Ashforth".

14 PEER REVIEWED BY

Name: Bernard Farrington

Date: 13 February 2025

Signature:

A handwritten signature in black ink, appearing to read "Bernard Farrington".



15 Appendix A – Test Request Form

J-24073 Adlux Skylight (2.05m x 2.54m) 12/12/24



SPECIFIC TEST REQUIREMENTS

Section	Test Name	Clause	Required parameters		
a	Preliminary test	8.2.1			
	SLS pressure	8.2.2/8.3	SLS(+) = Pa 1625 SLS(-) = Pa 1405		
	Water static	8.2.3/8.5	Static water test pressure = Pa		
	Water—Cyclic	8.2.3/8.6	Cyclic test pressure Stage 1 = 244 - 488 Pa		
		8.2.3/8.6	Cyclic test pressure Stage 2 = 325 - 650 Pa		
		8.2.3/8.6	Cyclic test pressure Stage 3 = 488 - 975 Pa		
b	Structural test at SLS	8.3.2	Location of transducers noted on drawings? Y/N		
		8.3.3	Pressure steps? Max. displacement? = mm		
Members or panels		Deflection/span limit ratio			
c	Air infiltration test	Test pressure	(+) = 150 Pa (-) = 150 Pa Air infiltration limit = (l/m²s)		
d	Water test (static and cyclic)	Pressure (Pa)	Duration (mins)	Duration and spray intensity	
	Static		5	15 min, 0.05 L/m² s	
	Cyclic 1		5	5 min, 0.05 L/m² s	
	Cyclic 2		5	5 min, 0.05 L/m² s	
	Cyclic 3		5	5 min, 0.05 L/m² s	
Additional water penetration requirements?					
e	Seismic at SLS	Water test repeated after Yes / No			
	Instructions for location and attachment of Seismic support beam:				
	Drawing reference for location of Seismic support beam attachment =				
	Support beam movement allowed =				
	Number of cycles =				
	Frequency of movement =				
f	BMU restraint test required Yes / No	Test load across face of sample = kN			
		Test load perpendicular to sample = kN			
g	Strength at ULS	Test pressure	(+) = 2255 Pa (-) = 1975 Pa		
h	Seismic at ULS	Support beam movement allowed = mm			
	Number of cycles =				
	Frequency of movement = Hz				
i	Seal degradation	10% air seal removal? Y/N			
Describe seals to be altered					

Client: Adlux Industries
Matthew Church

Date: 12/12/24

M: +64 277173143
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Report Number: SWTL R0073
Report Date: 13 February 2025

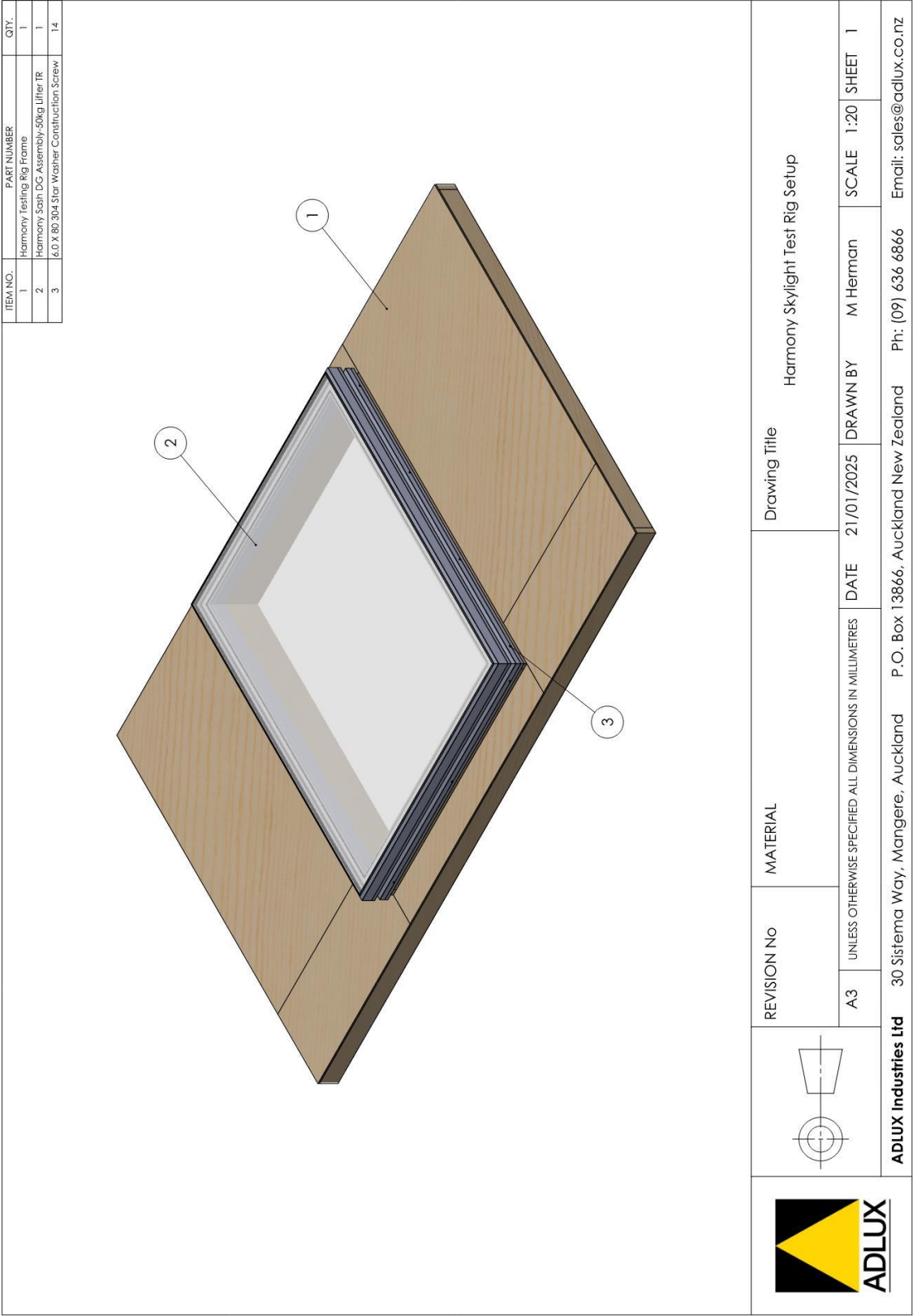


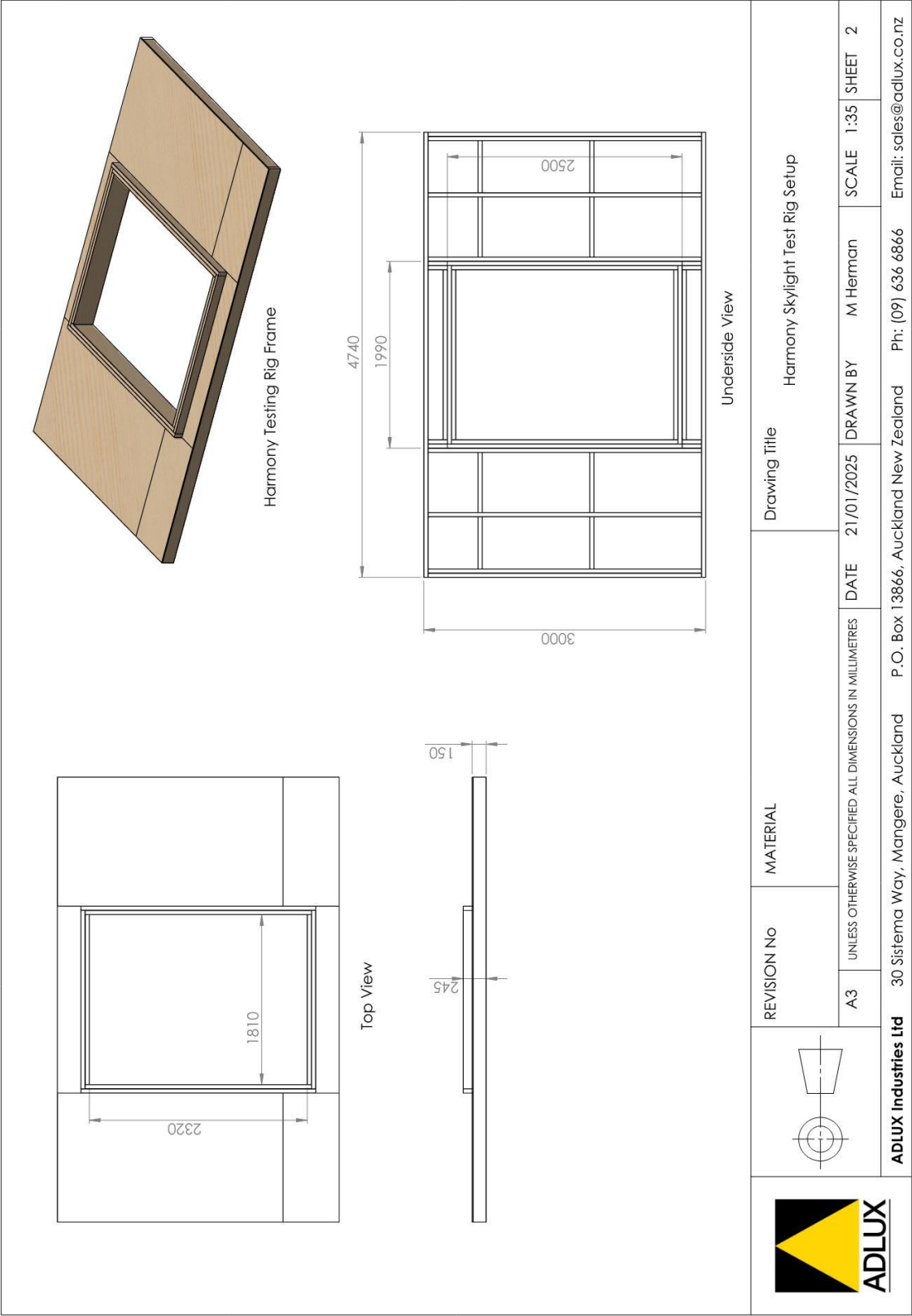
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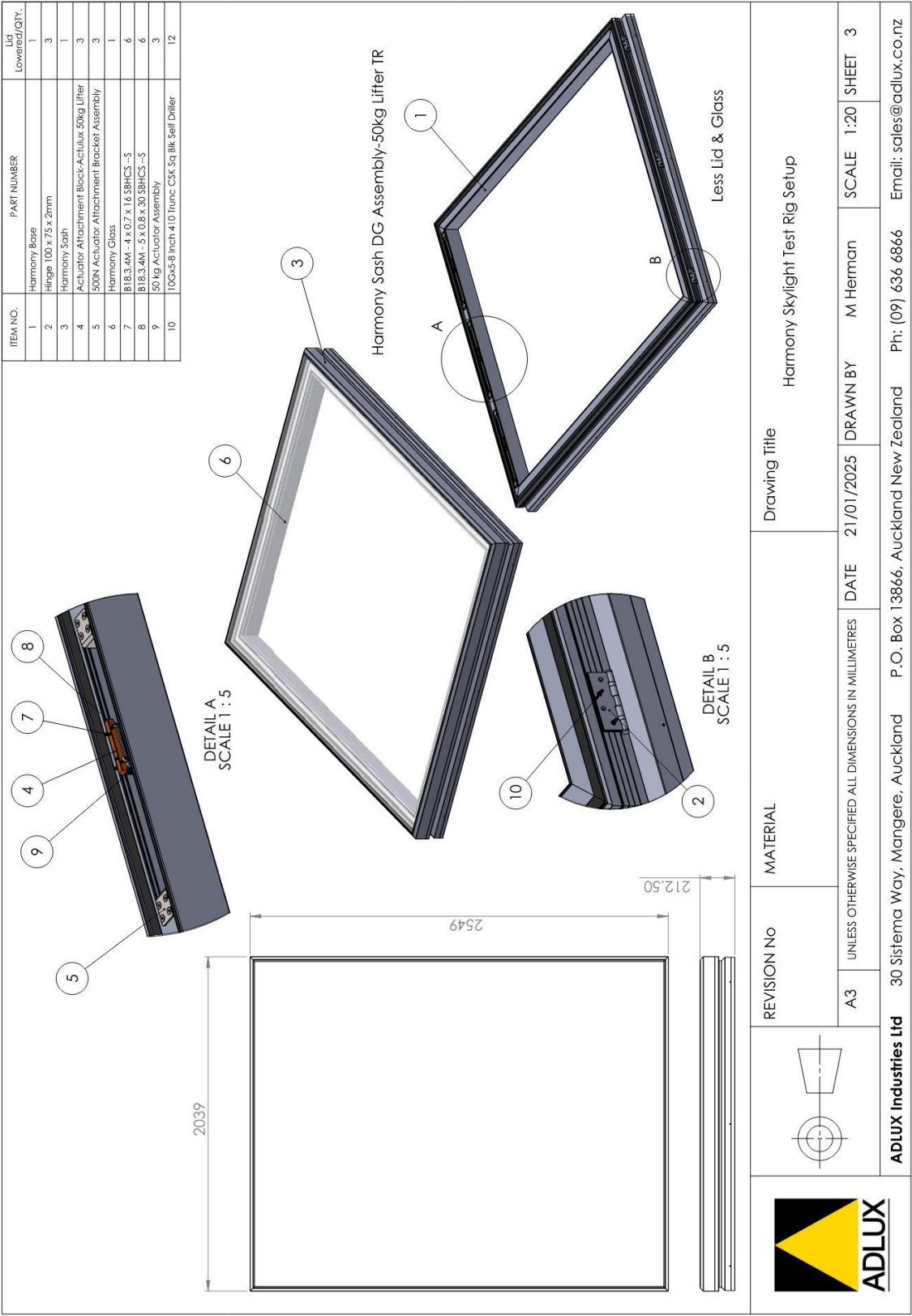


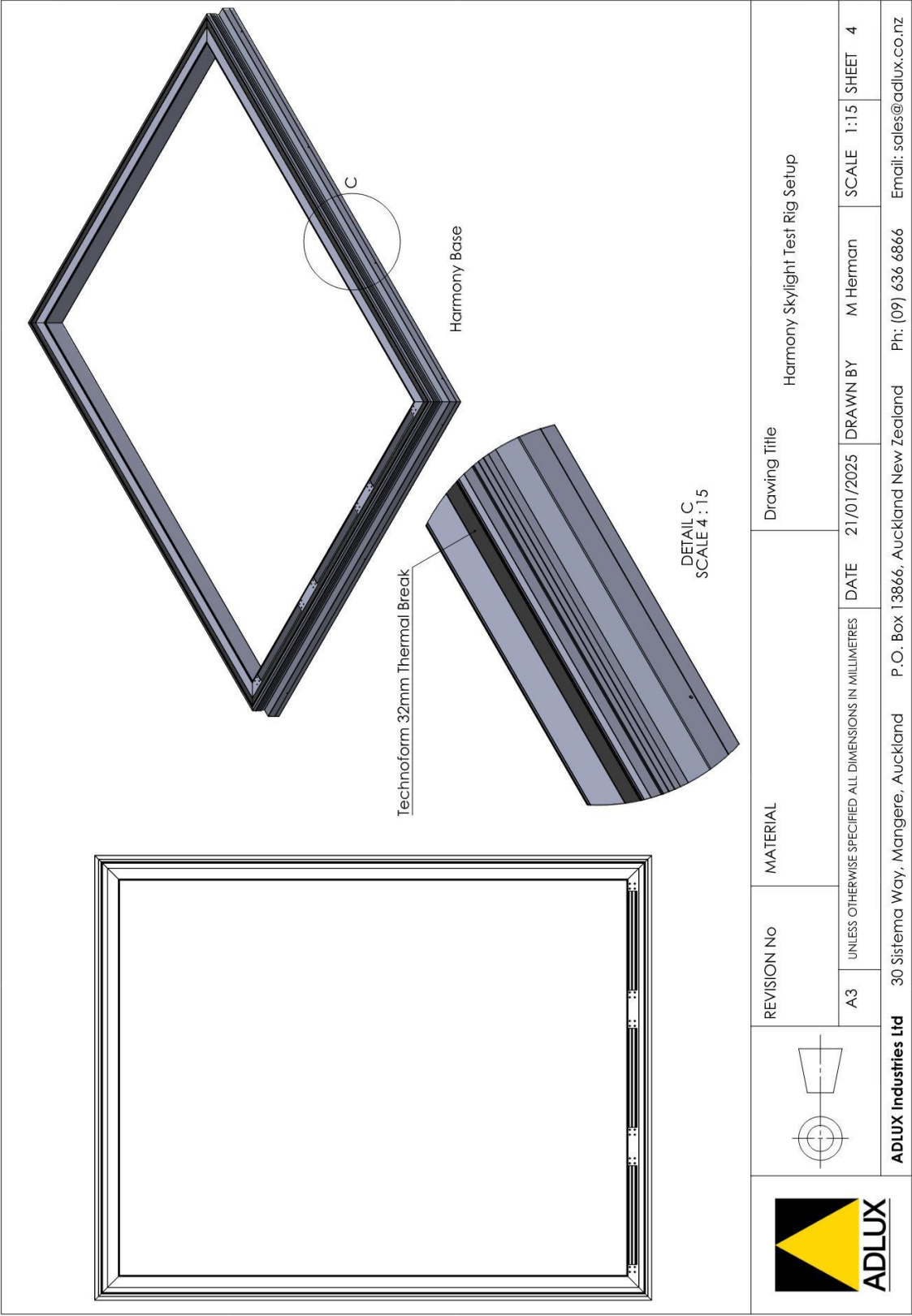
Shelby Wright Test Labs
515 Rosebank Road
Avondale, Auckland
New Zealand, 1026

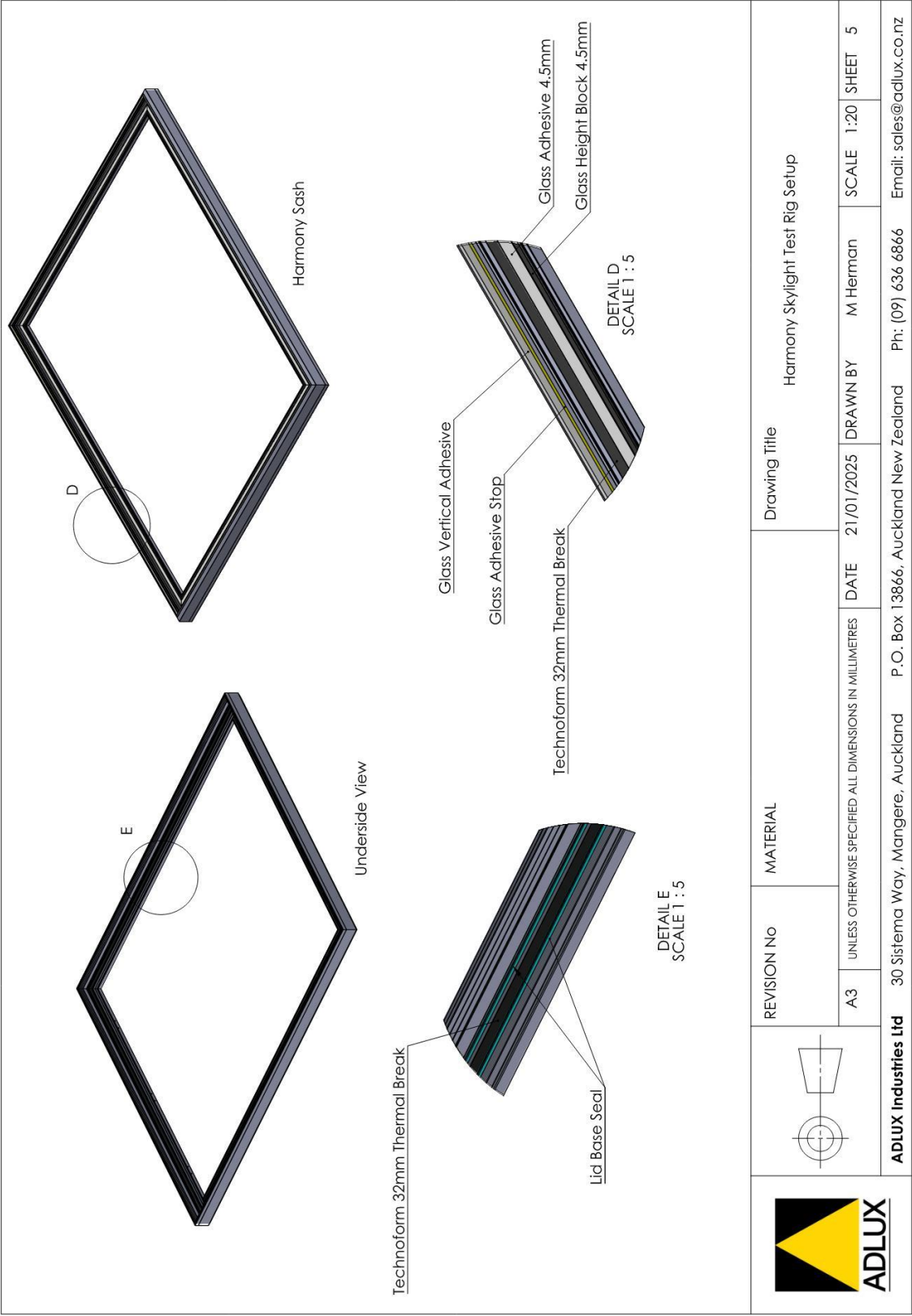
17 Appendix B – Drawings









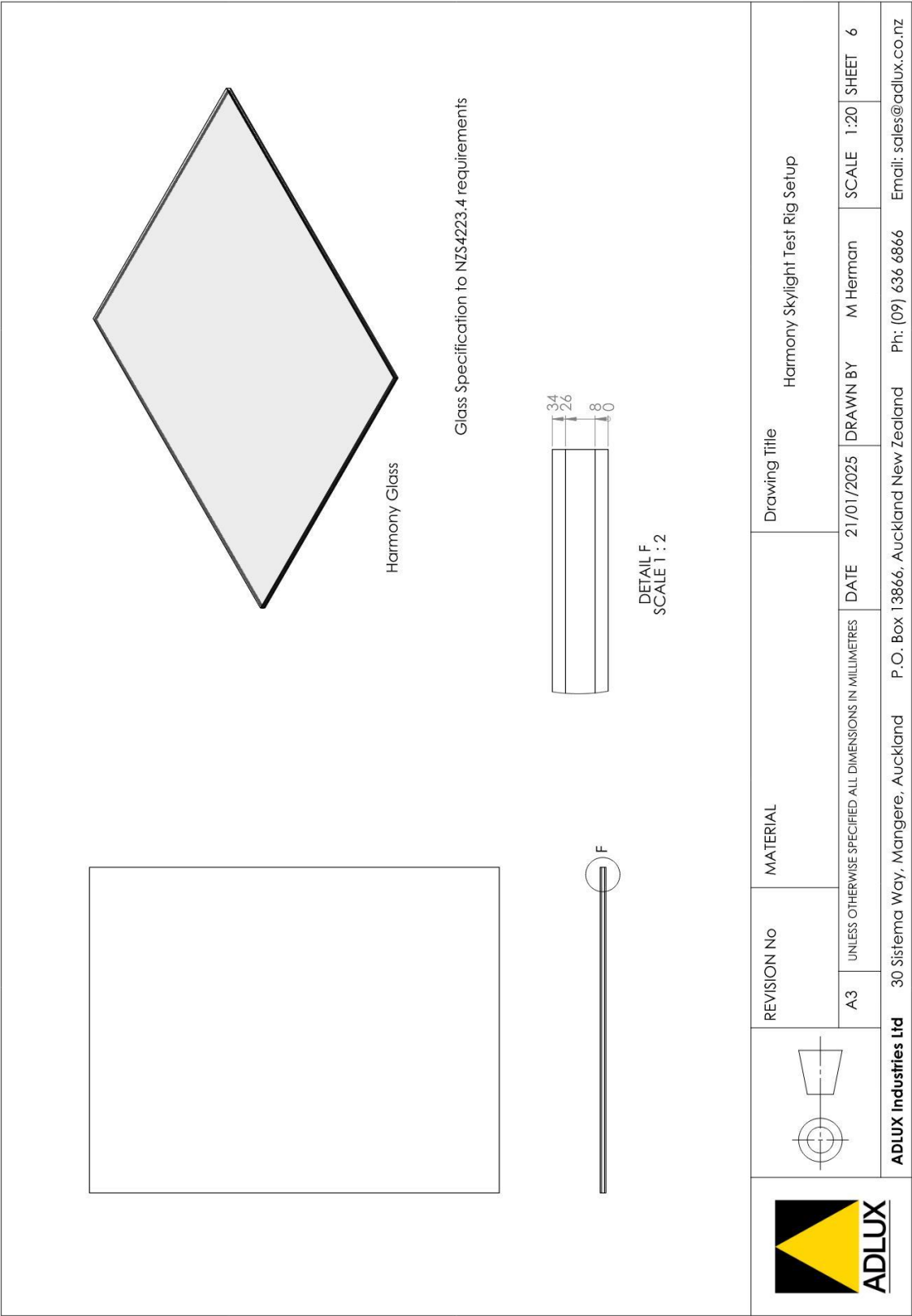


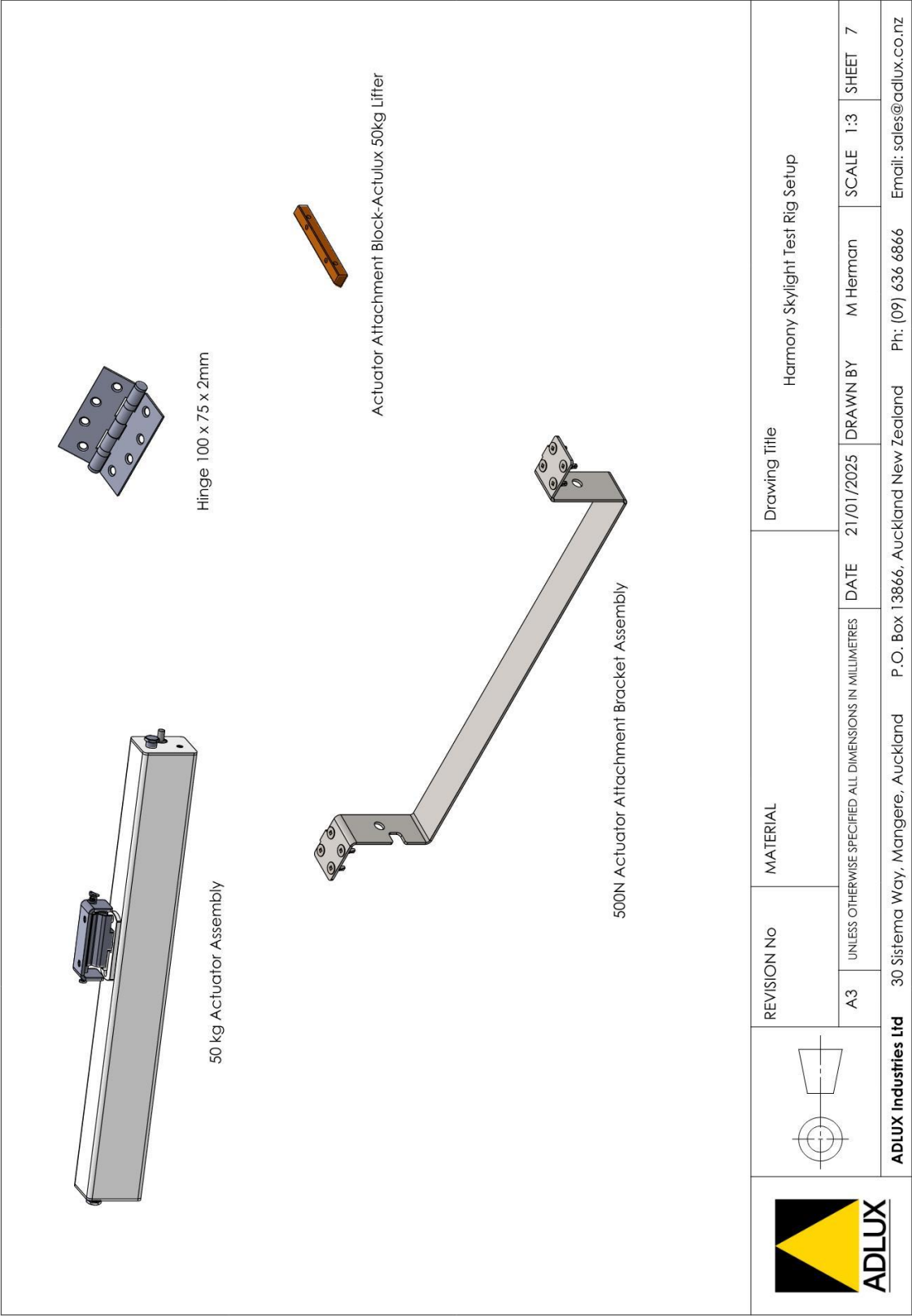


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515 Rosebank Road
Avondale, Auckland
New Zealand, 1026





 6.0 X 80 304 Star Washer Construction Screw				Drawing Title		Harmony Skylight Test Rig Setup		SCALE 2:1		SHEET 8	
 10Gx5-8 Inch 410 Trunc CSK Sq Blk Self Driller				MATERIAL		DATE 21/01/2025		DRAWN BY M Herman		Ph: (09) 636 6866	
 socket button head cap screw_am 5mm				REVISION No		UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES		P.O. Box 13866, Auckland New Zealand		Email: sales@adlux.co.nz	
 socket button head cap screw_am 4mm				A3				ADLUX Industries Ltd			

M: +64 277173143
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W: www.swtl.co.nz

Report Number: SWTL R0073
Report Date: 13 February 2025



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have been performed in
accordance with the
laboratory's scope of
accreditation



Shelby Wright Test Labs
515 Rosebank Road
Avondale, Auckland
New Zealand, 1026

18 Appendix C – Worksheets

Report Number: SWTL R0073
Report Date: 13 February 2025

CLIENT / DATE	Adlux Skylight 12/12/24 - 16/12/24		
TEST OPERATOR	Mark Ashforth		
DESCRIPTION OF SAMPLE	Harmony skylight, 2.544m x 2.052m		
CLIENT DRAWING REF(S)	Harmony Skylight Test Rig Setup		
4284 Cl.	TEST		RESULT
8.3	Structural Test at Servicability Limit State		
	SERVICEABILITY LIMIT STATE TEST	+	1625 Pa
	PRESSURE	-	1405 Pa
			Pass
8.4	Air Infiltration		
			150 Pa
		Airconditioned Building	Y
		Non-Airconditioned Building	
8.5	Water Penetration Test by Static Pressure		
	Specified Test Pressure		300 Pa or
	Test Pressure: 0.3 x SLS Pressure		487.5 Pa
			Pass
8.6	Water Penetration Test by Cyclic Pressure		
		243.75	487.5 Pa
		325	650 Pa
		487.5	975 Pa
			N/A
			N/A
			N/A
8.9	Servicability Seismic Displacement Test		
	Reverse cycles at SLS inter-storey displacement		
	Specified SLS displacement:		mm
	Cycle Frequency		Hz
			N/A
8.6	Water Penetration Test by Cyclic Pressure - Post Seismic SLS		
		243.75	487.5 Pa
		325	650 Pa
		487.5	975 Pa
			N/A
			N/A
			N/A
8.8	Structural Test at Ultimate Limit State		
	ULTIMATE LIMIT STATE TEST PRESSURE	+	2284.5 Pa
		-	1975.35 Pa
			Pass
8.9	Ultimate Seismic Displacement Test		
	Reverse cycles at SLS inter-storey displacement		
	Specified SLS displacement:		mm
	Cycle Frequency		Hz
			N/A

Tested By Mark Ashforth

Authorised by Bernard Farrington

Report Writer Mark Ashforth

Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-1.1 AS_NZS4284 Worksheet Preliminary Testing v3

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Version	3	TEST No: SWTL T-	T0252
Date Created	04-Apr-24 BF	Sheet #	1
Date Checked	23-Apr-24 BF	of sheets	

	+	1625 Pa	10 sec	
SERVICEABILITY LIMIT				
STATE TEST PRESSURE	-			Unable to reach - SLS pressure without taping between frame and operable sash on internal side.
		1405 Pa	10 sec	

STATIC PRESSURE TEST AS/NZS 4284:2008

Specified Test Pressure

300 Pa

Test Pressure: 0.3 x SLS Pressure

487.5 Pa

Note: Adjust water pump to meet noted spray nozzle calibration pressure

Pressure	Time	Comments
0 Pa	5 min.	water tests along top of skylight to deflect water from hinge/upstand side of skylight.
487.5 Pa	15 min.	No water evident
0 Pa	5 min.	No Water evident

CYCLIC PRESSURE TEST AS/NZS 4284:2008

5 MINS @ 0.15 - 0.30 +ve SLS Test Pressure Pa	Based on minimum +ve SLS of 1000 Pa. 2 minutes zero pressure between each stage.
5 MINS @ 0.20 - 0.40 +ve SLS Test Pressure Pa	
5 MINS @ 0.30 - 0.60 +ve SLS Test Pressure Pa	

Note: If Cyclic test is more than 30 minutes after Static test, then water must be turned on for 5 minutes prior to cyclic pressure.

Pressure	Water On/Off	Time	Comments
243.75 487.5 Pa	On	5 min.	Minor leak at base of wall where taped to booth. Outside of skylight test sample area.
0 Pa	On	2 min.	No leaks
325 650 Pa	On	5 min.	No Leaks
0 Pa	On	2 min.	No Leaks
487.5 975 Pa	On	5 min.	No Leaks
0 Pa	Off	5 min.	No Leaks

Result **Pass**

Checked **MA**

Tested By Mark Ashforth

Authorised by Bernard Farrington

Report Writer Mark Ashforth



Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-1.2 AS_NZS4284 Worksheet Deflection Measurements v3

G:\Shared drives\Shelby Wright Test Labs\Technical Records\2.0 Testing Procedures, Worksheets and Logs\Test Methods Worksheets

Version 3 TEST No: SWTL T- 53

Date Created 04-Apr-24 BF Sheet # 2

Date Checked 23-Apr-24 BF of sheets

Note: This worksheet is for use with laser distance measurement

CLIENT Adlux Skylight 12/12/24 - 16/12/24

TEST OPERATOR Mark Ashforth

DESCRIPTION OF SAMPLE Timber frame, Adhero membrane with operable skylight unit.

CLIENT DRAWING REF(S) Harmony Skylight Test Rig Setup

MEMBER TESTED Left side looking out of building. Using brackets temporarily fixed to jamb.

SERVICEABILITY LIMIT	+	1625 Pa	Overall length	2310 mm
STATE TEST PRESSURE	-	1405 Pa	Gauge length	2232 mm

*Specified maximum deflection ratio

Max defl. (1/	250
Max defl. Specified	8.93 mm
Max defl. Default	8.93 mm

SNZ TS 4284 default = span/250

Atmospheric Conditions

Temperature	21 °C
Barometric Pressure	1007 hPa
Relative Humidity	87 %

	Bottom	Middle	Top
Gauge #	108	109	110

POSITIVE PRESSURE											
SLS test pressure				Net centre deflection mm		Default Ratio Check	Specified Ratio Check	Successive Member Displacement			
Input Values											
Stage	Time	%	Pa	Direct Displacement				Mode	Value	Limit	Check
	0 min	0%	0	267.3	283.7	295.6		Take Up			
	2 min	100%	1625	261.0	271.0	278.3	-0.9		0.95	3	
Z1	2 min	0%	0	266.6	282.5	293.8	0.95	<= Zero Ref			
	1 min	20%	325	265.7	280.9	292.1	-0.3	-3%	-3%		
	1 min	40%	650	264.1	278.7	288.0	0.35	4%	4%		
	1 min	60%	975	262.7	276.7	285.9	0.1	1%	1%		
	1 min	80%	1300	262.6	273.8	281.9	-0.75	-8%	-8%		
	1 min	100%	1625	260.8	271.1	277.8	-0.5	-6%	-6%		
	2 min	0%	0	266.5	282.0	293.1	-0.1	-1%	-1%	-0.1	-0.1
	1 min	100%	1625	260.8	270.9	277.5	-0.55	-6%	-6%		
	1 min	80%	1300	260.8	272.2	280.0	-0.5	-6%	-6%		
	1 min	60%	975	262.5	275.1	282.3	0.4	4%	4%		
	1 min	40%	650	262.8	277.0	286.0	0.3	3%	3%		
	1 min	20%	325	264.5	278.7	288.2	0.05	1%	1%		
	2 min	0%	0	266.3	281.8	292.7	2.84217E-14	0%	0%	0	0
NEGATIVE PRESSURE											
	2 min	-100%	-1405	275.8	297.7	316.4	-0.7	-8%	-8%		
	2 min	0%	0	268.60	288.20	301.90	0.65	<= Zero Ref		0.65	3
	1 min	-20%	-281	270.00	288.90	302.80	-0.45	-5%	-5%		
	1 min	-40%	-562	271.20	291.50	307.30	-0.7	-8%	-8%		
	1 min	-60%	-843	272.20	293.20	309.10	-0.4	-4%	-4%		
	1 min	-80%	-1124	273.80	294.80	312.40	-1.25	-14%	-14%		
	1 min	-100%	-1405	275.60	296.60	316.00	-2.15	-24%	-24%		
	2 min	0%	0	268.90	289.30	301.90	0.95	11%	11%	0.95	0.95
	1 min	-100%	-1405	275.70	296.70	316.20	-2.2	-25%	-25%		
	1 min	-80%	-1124	274.80	295.00	314.90	-2.8	-31%	-31%		
	1 min	-60%	-843	273.80	293.80	312.00	-2.05	-23%	-23%		
	1 min	-40%	-562	272.30	291.70	309.10	-1.95	-22%	-22%		
	1 min	-20%	-281	270.50	290.70	306.50	-0.75	-8%	-8%		
	2 min	0%	0	269.10	289.80	301.90	1.35	15%	15%	1.35	1.35
POSITIVE PRESSURE											
	2 min	100%	1625	260.40	270.50	278.00	-1	-11%	-11%		
	2 min	0%	0	266.70	283.20	294.70	0.2	2%	2%	0.2	0.2

Note: Laser deflection sensor layout was 108 - bottom, 109 - middle, 110 - top. Drawing in appendices.

Tested By Mark Ashforth

Authorised by Bernard Farrington

Report Writer Mark Ashforth

Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-1.3 AS_NZS4284 Worksheet Air Infiltration Measurements v4

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Version	4	TEST No: SWTL T-	254
Date Created	04-Apr-24 BF	Sheet #	3
Date Checked	23-Apr-24 BF	of sheets	
CLIENT	Adlux Skylight 12/12/24 - 16/12/24		
TEST OPERATOR	Mark Ashforth		
DESCRIPTION OF SAMPLE	Harmony skylight, 2.544m x 2.052m		
CLIENT DRAWING REF(S)	Harmony Skylight Test Rig Setup		
Sample Width	2.052 m	Sample Perimeter Length	9.208 m
Sample Height	2.552 m		
Sample Area	5.236704 m ²		
AS/NZS 4284:2008 Maximum permitted air flow, l/s at		150 Pa booth pressure	
Overall Sample Area x 1.6		=	8.378726 l/s
Sample Perimeter Length x 0.6		=	5.5248 l/s
Atmospheric Conditions	Temperature	21 °C	
	Barometric Pressure	1005 hPa	
	Relative Humidity	83 %	
POSITIVE PRESSURE			
	Sample Unsealed		Sample Sealed
	Flow,		Flow,
	Δ P, Pa	m ³ /hr	Flow l/s
Reading 1	150	12.5	3.47
Reading 2	150	12.83	3.56
Reading 3	150	12.44	3.46
Average Air Flow			3.50
Net Air Leakage	0.21 l/s		
NEGATIVE PRESSURE			
	Sample Unsealed		Sample Sealed
	Flow,		Flow,
	Δ P, Pa	m ³ /hr	Flow l/s
Reading 1	150	35.81	9.95
Reading 2	150	36.43	10.12
Reading 3	150	36.02	10.01
Average Air Flow			10.02
Net Air Leakage	5.58 l/s		
Result	Pass		Checked MA

Tested By Mark Ashforth

Authorised by Bernard Farrington

Report Writer Mark Ashforth

Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-1.3 AS_NZS4284 Worksheet Air Infiltration Measurements v4

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Version	4	TEST No: SWTL T-	255
Date Created	04-Apr-24 BF	Sheet #	4
Date Checked	23-Apr-24 BF	of sheets	
CLIENT	Adlux Skylight 12/12/24		
TEST OPERATOR	MA & ML		
DESCRIPTION OF SAMPLE	Harmony Skylight, 2.544m x 2.052m		
CLIENT DRAWING REF(S)	Harmony Skylight Test Rig Setup		
Sample Width	2.052 m	Sample Perimeter Length	9.208 m
Sample Height	2.552 m		
Sample Area	5.236704 m ²		
AS/NZS 4284:2008 Maximum permitted air flow, l/s at		75 Pa booth pressure	
Overall Sample Area x 1.6	=	8.378726 l/s	
Sample Perimeter Length x 0.6	=	5.5248 l/s	
Atmospheric Conditions	Temperature	18.4 °C	
	Barometric Pressure	1012 hPa	
	Relative Humidity	78 %	
POSITIVE PRESSURE			
	Sample Unsealed		Sample Sealed
	Flow,		Flow,
	Δ P, Pa	m ³ /hr Flow l/s	Δ P, Pa m ³ /hr Flow l/s
Reading 1	75	1.81 0.50	75 1.43 0.40
Reading 2	75	1.81 0.50	75 1.98 0.55
Reading 3	75	1.85 0.51	75 1.98 0.55
Average Air Flow		0.51	0.50
Net Air Leakage	0.01 l/s		
NEGATIVE PRESSURE			
	Sample Unsealed		Sample Sealed
	Flow,		Flow,
	Δ P, Pa	m ³ /hr Flow l/s	Δ P, Pa m ³ /hr Flow l/s
Reading 1	75	1.9 0.53	75 1.64 0.46
Reading 2	75	1.67 0.46	75 1.73 0.48
Reading 3	75	1.66 0.46	75 1.72 0.48
Average Air Flow		0.48	0.47
Net Air Leakage	0.01 l/s		
Result	Pass		MA

Tested By Mark Ashforth

Authorised by Bernard Farrington

Report Writer Mark Ashforth

Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-1.3 AS_NZS4284 Worksheet Air Infiltration Measurements v4

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Version	4	TEST No: SWTL T-	256
Date Created	04-Apr-24 BF	Sheet #	5
Date Checked	23-Apr-24 BF	of sheets	
CLIENT	Adlux Skylight 12/12/24		
TEST OPERATOR	MA & ML		
DESCRIPTION OF SAMPLE	Harmony Skylight 2.5m x 2.05m		
CLIENT DRAWING REF(S)	Harmony Skylight Test Rig Setup		
Sample Width	2.052 m	Sample Perimeter Length	9.208 m
Sample Height	2.552 m		
Sample Area	5.236704 m ²		
AS/NZS 4284:2008 Maximum permitted air flow, l/s at		75 Pa booth pressure	
Overall Sample Area x 1.6	=	8.378726 l/s	
Sample Perimeter Length x 0.6	=	5.5248 l/s	
Atmospheric Conditions	Temperature	18.4 °C	
	Barometric Pressure	1012 hPa	
	Relative Humidity	78 %	
POSITIVE PRESSURE			
	Sample Unsealed		Sample Sealed
	Flow,		Flow,
	Δ P, Pa	m ³ /hr	Flow l/s
Reading 1	150	3.29	0.91
Reading 2	150	2.96	0.82
Reading 3	150	2.83	0.79
Average Air Flow			0.84
Net Air Leakage	0.01 l/s		
NEGATIVE PRESSURE			
	Sample Unsealed		Sample Sealed
	Flow,		Flow,
	Δ P, Pa	m ³ /hr	Flow l/s
Reading 1	150	2.96	0.82
Reading 2	150	2.58	0.72
Reading 3	150	2.73	0.76
Average Air Flow			0.77
Net Air Leakage	-0.04 l/s		
Result	Pass	Checked	MA

Tested By Mark Ashforth

Authorised by Bernard Farrington

Report Writer Mark Ashforth

Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-1.4.1 AS_NZS4284 Static Water Penetration v1

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Methods Worksheets

Version	1	TEST No: SWTL T-	257
Date Created	04-Apr-24 BF	Sheet #	6
Date Checked	23-Apr-24 BF	of sheets	

CLIENT	Adlux Skylight 12/12/24 - 16/12/24
TEST OPERATOR	Mark Ashforth
DESCRIPTION OF SAMPLE	Harmony skylight, 2.544m x 2.052m
CLIENT DRAWING REF(S)	Harmony Skylight Test Rig Setup

STATIC PRESSURE TEST AS/NZS 4284:2008

Specified Test Pressure 300 Pa or

Test Pressure: 0.3 x SLS Press 487.5 Pa

Note: Adjust water pump to meet noted spray nozzle calibration pressure

Pressure	Time	Comments
0 Pa	5 min.	Test pressures were reduced (-455 Pa) to allow for sample self-weight at 0.5° and tested using a calibrated 502 rain rack with negative pressure applied to the internal side of the skylight. No Leaks
487.5 Pa	15 min.	
0 Pa	5 min.	

Result Pass Checked MA

Tested By Mark Ashforth

Authorised by Bernard Farrington

Report Writer Mark Ashforth

SWTM-1.4.1 AS_NZS4284 Static Water Penetration v1

G:\Shared drives\Shelby Wright Test Labs\Technical Records\2.0 Testing Procedures, Worksheets and Logs\Test

Methods Worksheets

Version	1	TEST No: SWTL T-	258
Date Created	04-Apr-24 BF	Sheet #	7
Date Checked	23-Apr-24 BF	of sheets	

CLIENT	Adlux Skylight 12/12/24
TEST OPERATOR	MA & ML
DESCRIPTION OF SAMPLE	Harmony Skylight, 2.544m x 2.052m
CLIENT DRAWING REF(S)	Harmony Skylight Test Rig Setup

STATIC PRESSURE TEST AS/NZS 4284:2008

Specified Test Pressure 300 Pa or

Test Pressure: 0.3 x SLS Press: 487.5 Pa

Note: Adjust water pump to meet noted spray nozzle calibration pressure

Pressure	Time	Comments
		Test pressures were reduced (-455 Pa) to allow for sample self-weight at 37.5° and tested using a calibrated 502 rain rack with negative pressure applied to the internal side of the skylight. No Leaks
0 Pa	5 min.	
487.5 Pa	15 min.	No Leaks
0 Pa	5 min.	No Leaks

Result Pass Checked MA



Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-1.4.1 AS_NZS4284 Static Water Penetration v1

G:\Shared drives\Shelby Wright Test Labs\Technical Records\2.0 Testing Procedures, Worksheets and Logs\Test
Methods Worksheets

Version	1	TEST No: SWTL T-	259
Date Created	04-Apr-24 BF	Sheet #	8
Date Checked	23-Apr-24 BF	of sheets	

CLIENT	Adlux Skylight 12/12/24
TEST OPERATOR	MA & ML
DESCRIPTION OF SAMPLE	Harmony Skylight 2.5m x 2.05m
CLIENT DRAWING REF(S)	Harmony Skylight Test Rig Setup

STATIC PRESSURE TEST AS/NZS 4284:2008

Specified Test Pressure 300 Pa or

Test Pressure: 0.3 x SLS Press: 487.5 Pa

Note: Adjust water pump to meet noted spray nozzle calibration pressure

Pressure	Time	Comments
0 Pa	5 min.	Test pressures were reduced (-455 Pa to allow for sample self-weight at 75° and tested using a calibrated 502 rain rack with negative pressure applied to the internal side of the skylight
487.5 Pa	15 min.	No Leaks
0 Pa	5 min.	No Leaks
Result	Pass	Checked MA



Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-1.7 AS_NZS4284 Worksheet Structural ULS Pressure v3

G:\Shared drives\Shelby Wright Test Labs\Technical Records\2.0 Testing Procedures, Worksheets and Logs\Test Methods Worksheets

Version	3	TEST No: SWTL T-	260		
Date Created	04-Apr-24 BF	Sheet #	9		
Date Checked	23-Apr-24 BF	of sheets			
Note: This worksheet is for use with laser distance measurement					
CLIENT	Adlux Skylight 12/12/24 - 16/12/24				
TEST OPERATOR	Mark Ashforth				
DESCRIPTION OF SAMPLE	Harmony skylight, 2.544m x 2.052m				
CLIENT DRAWING REF(S)	Harmony Skylight Test Rig 0 0 0 0				
ULTIMATE LIMIT STATE TEST PRESSURE	+	2284.5	10 sec	Comments	
	-	1975.35	10 sec	Comments	Taped perimeter of sash to frame
Atmospheric Conditions		Temperature		18.8	°C
		Barometric Pressure		1013	hPa
		Relative Humidity		96	%
Result	Pass	Checked	MA		

Note: Minor over run in positive to 2400 Pa, reduced to 2285 Pa



Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-1.7 AS_NZS4284 Worksheet Structural ULS Pressure v3

G:\Shared drives\Shelby Wright Test Labs\Technical Records\2.0 Testing Procedures, Worksheets and Logs\Test Methods Worksheets

Version	3	TEST No: SWTL T-	261
Date Created	04-Apr-24 BF	Sheet #	10
Date Checked	23-Apr-24 BF	of sheets	

Note: This worksheet is for use with laser distance measurement

CLIENT	Adlux Skylight 12/12/24				
TEST OPERATOR	MA & ML				
DESCRIPTION OF SAMPLE	Harmony Skylight, 2.544m x 2.052m				
CLIENT DRAWING REF(S)	Harmony Skylight Test Rig Setup00000				

ULTIMATE LIMIT STATE TEST	+	2284.5 Pa	10 sec	Comments	
PRESSURE	-	1975.35 Pa	10 sec	Comments	

Atmospheric Conditions		Temperature	18.5 °C
		Barometric Pressure	1014 hPa
		Relative Humidity	96 %

Result	N/A	Checked	MA
--------	-----	---------	----

The client requested to increase negative pressure from ULS pressure to sample failure. The pressure was increased by 250 Pa increments and held for 10 seconds at each increase until sample failure. Failure occurred at 4,100 Pa when the glazing unit seperated from sash on two sides . Glazing , sash and frame appeaerd undamaged (not deformed).



19 Appendix D – Uncertainty of Measurement

Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-16.0 V1		Uncertainty of Measurement - Air Infiltration			
Date Created:		04-Dec-23		BF	
Date Checked:		12-Dec-23		BF	
G:\Shared drives\Shelby Wright Test Labs\Technical Records\12. Error Budget					
Client		Adlux			
Test Sample		Harmony Skylight - Vertical orientation in test booth, 150 Pa (T0254)			
Date		12-Dec-24			
Operator		MA & ML			
FLOW COMPENSATION FOR ATMOSPHERIC PRESSURE AND TEMPERATURE					
PARAMETER		UNITS		INPUTS	
Flow Reading		m³/h		36.09	
Temperature Actual		Degrees Celcius		21	
Pressure Actual (Metservice)		Hectapascals		1007	
Air Infiltration Pressure		Pascals		150	
Specimen Dimensions		Width (m)		2.052	
		Height (m)		2.552	
		Area (m²)		5.236704	
				RESULTS	
				Flow Compensated	
				294	
				100700 m³/h	
				35.945	
				Actual Flow per m²	
				l/m²/s	
				1.907	
UNCERTAINTY OF SAMPLE SIZE					
		Dimension measured in (m)		Tape Calibration UoM (%)	
Dimension (mm)		X-X (U _a)		Reading Accuracy +/- 0.001 m	
Dimension (mm)		Y-Y (U _b)		UoM of Sample Size %	
		2.052		0.5%	
		2.552		0.001	
				U _a	
				0.977%	
				U _b	
				1.237%	
$U_{m^2} = \sqrt{\left[\frac{U(A)}{A}\right]^2 + \left[\frac{U(B)}{B}\right]^2}$		0.006794823 %			
UNCERTAINTY OF AIR INFILTRATION FLOW RATE					
Daaks Certificate UoM for Schmidt SS.20.260		1.3%			
$U^2 [Flow] = \left[\frac{L}{S}\right]^2 U^2 m^2 + [m^2]^2 U^2 \left[\frac{L}{S}\right]$		10.087139%			
UoM Air Infiltration		31.760257%			

Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-16.0 V1		Uncertainty of Measurement - Air Infiltration					
Date Created:		04-Dec-23	BF				
Date Checked:		12-Dec-23	BF				
G:\Shared drives\Shelby Wright Test Labs\Technical Records\12. Error Budget							
Client		Adlux					
Test Sample		Harmony Skylight - 45 degrees, 75 Pa (T0255)					
Date		12-Dec-24					
Operator		MA & ML					
FLOW COMPENSATION FOR ATMOSPHERIC PRESSURE AND TEMPERATURE							
PARAMETER		UNITS	INPUTS	RESULTS			
Flow Reading		m³/h	1.82	Flow Compensated			
Temperature Actual		Degrees Celcius	21	294			
Pressure Actual (Metservice)		Hectapascals	1007	100700	m³/h	1.813	
Air Infiltration Pressure		Pascals	150				
Specimen Dimensions		Width (m)	2.052	Actual Flow per m²			
		Height (m)	2.552	l/m²/s			
		Area (m²)	5.236704	0.096			
UNCERTAINTY OF SAMPLE SIZE							
		Dimension measured in (m)	Tape Calibration UoM (%)	Reading Accuracy +/- 0.001 m	UoM of Sample Size %		
Dimension (mm)	X-X (U _a)	2.052	0.5%	0.001	U _a	0.977%	
Dimension (mm)	Y-Y (U _b)	2.552	0.5%	0.001	U _b	1.237%	
$U^2 m^2 = \sqrt{\left[\frac{U(A)}{A}\right]^2 + \left[\frac{U(B)}{B}\right]^2}$		0.006794823 %					
UNCERTAINTY OF AIR INFILTRATION FLOW RATE							
Daaks Certificate UoM for Schmidt SS.20.260		1.3% %					
$U^2 [Flow] = \left[\frac{L}{S}\right]^2 U^2 m^2 + [m^2]^2 U^2 \left[\frac{L}{S}\right]$		0.086190%					
UoM Air Infiltration		2.935808%					

Tested By Mark Ashforth

Authorised by Bernard Farrington

Report Writer Mark Ashforth

Report Number: SWTL R0073
Report Date: 13 February 2025

SWTM-16.0 V1		Uncertainty of Measurement - Air Infiltration					
Date Created:		04-Dec-23	BF				
Date Checked:		12-Dec-23	BF				
G:\Shared drives\Shelby Wright Test Labs\Technical Records\12. Error Budget							
Client		Adlux					
Test Sample		Harmony Skylight - 45 degrees, 150 Pa (T0256)					
Date		12-Dec-24					
Operator		MA & ML					
FLOW COMPENSATION FOR ATMOSPHERIC PRESSURE AND TEMPERATURE							
PARAMETER		UNITS	INPUTS	RESULTS			
Flow Reading		m³/h	3.03	Flow Compensated			
Temperature Actual		Degrees Celcius	21	294			
Pressure Actual (Metservice)		Hectapascals	1007	100700	m³/h	3.018	
Air Infiltration Pressure		Pascals	150	Actual Flow per m²			
Specimen Dimensions		Width (m)	2.052	l/m²/s			
		Height (m)	2.552	0.160			
		Area (m²)	5.236704				
UNCERTAINTY OF SAMPLE SIZE							
		Dimension measured in (m)	Tape Calibration UoM (%)	Reading Accuracy +/- 0.001 m	UoM of Sample Size %		
Dimension (mm)		X-X (U _a)	2.052	0.5%	0.001	U _a	0.977%
Dimension (mm)		Y-Y (U _b)	2.552	0.5%	0.001	U _b	1.237%
$U_{m^2} = \sqrt{\left[\frac{U(A)}{A}\right]^2 + \left[\frac{U(B)}{B}\right]^2}$			0.006794823	%			
UNCERTAINTY OF AIR INFILTRATION FLOW RATE							
Daaks Certificate UoM for Schmidt SS.20.260			1.3%	%			
$U^2 [Flow] = \left[\frac{L}{S}\right]^2 U^2 m^2 + [m^2]^2 U^2 \left[\frac{L}{S}\right]$			0.168327%				
UoM Air Infiltration			4.102765%				

Tested By Mark Ashforth

Authorised by Bernard Farrington

Report Writer Mark Ashforth

Adlux Harmony Joinery Calculator

This is to amend the report “Adlux Harmony Joinery Calculator” dated 24 June 2025 and the attached calculator after finding some modelling errors.

We have completed the U_f , Ψ_g and fR_{si} calculation of the mullion of the Harmony Array Roof windows and integrated it into the joinery calculator.

	U_f , W/m ² K	Ψ_g , W/mK	fR_{si}
Mullion	2.72	0.102 (for both spacers) 0.051 (for one spacer)	0.575
Fixed frame	0.841	Not calculated	Not calculated

The fixed frame which was sent to Sustainable Engineering Ltd. via email dated 28 Nov 2023 (file name 230712_Adlux.flx) is used for the head, sills and jamb in the calculator since its profile is similar to what is shown in the Harmony Array PDFs. Please note that this frame is using a 50mm panel. Additionally, for the “Harmony Array – Over Ridge” PDF, the mullion has a different profile than the one supplied to us. For this calculator, we have assumed that the mullion is the same in all Harmony Array windows.

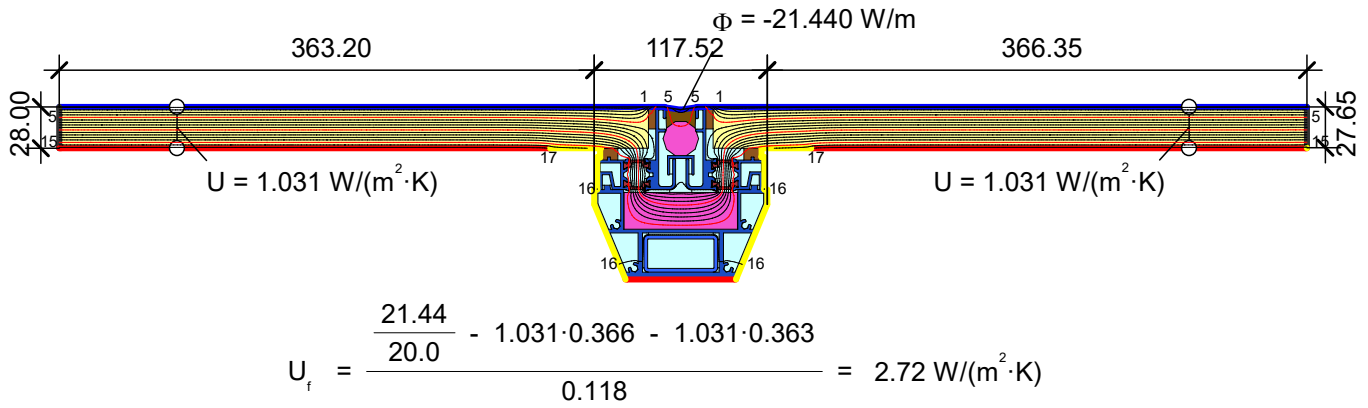
For a more accurate results of the calculator, we will need to calculate:

1. The fixed frame profile with the appropriate size of the glass panel
2. The exact profile of the Harmony Array – Over Ridge mullion

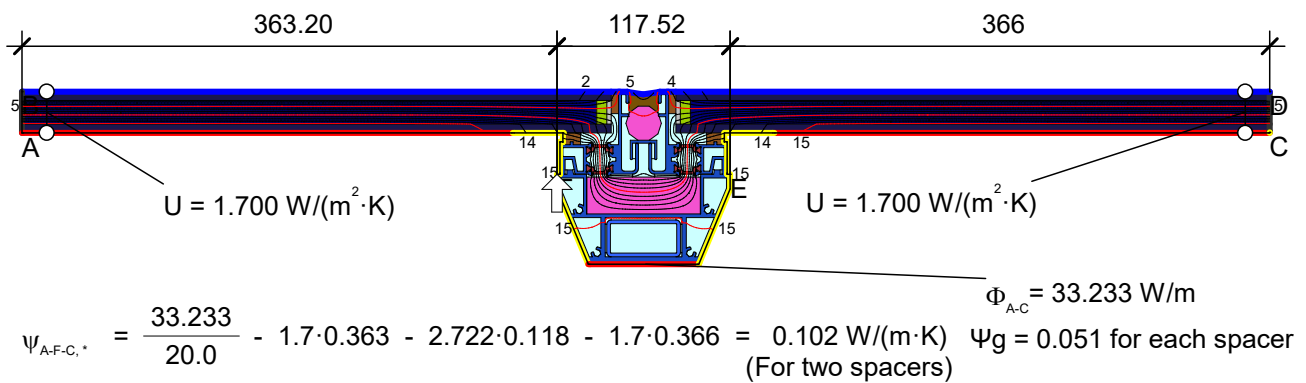
Please see the calculator “20250710_JoineryCalculatorDefault_Updated.xlsx”

Sustainable Engineering Ltd Joinery Calculator v2.1		
Window Assembly Name (Unique)	Total Window Area	R_w installed
	m ²	m ² K/W
Harmony Array - Join Across Roof	2.40	0.61
Harmony Array - Join Down Roof Fall	2.40	0.61
Harmony Array - Over Ridge	2.40	0.61

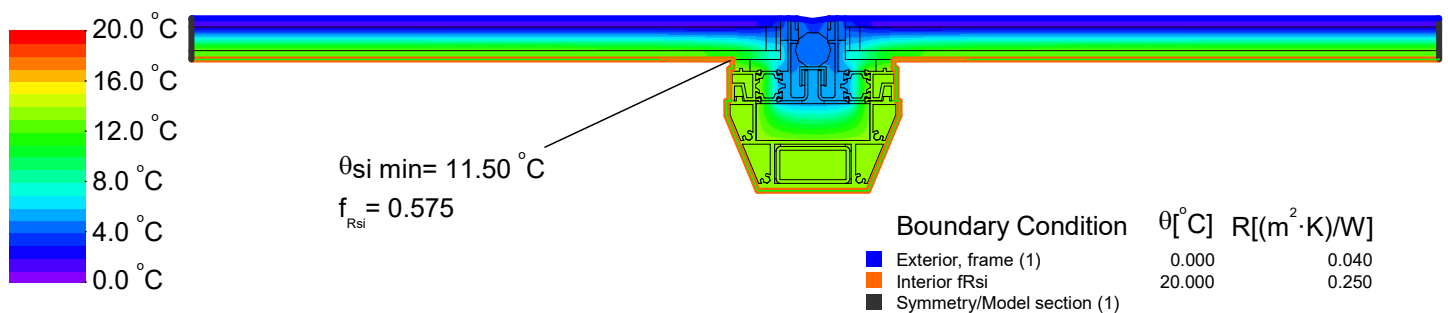
Total window area	Entire window order area and R-value
m ²	7.20
R_w overall	0.61

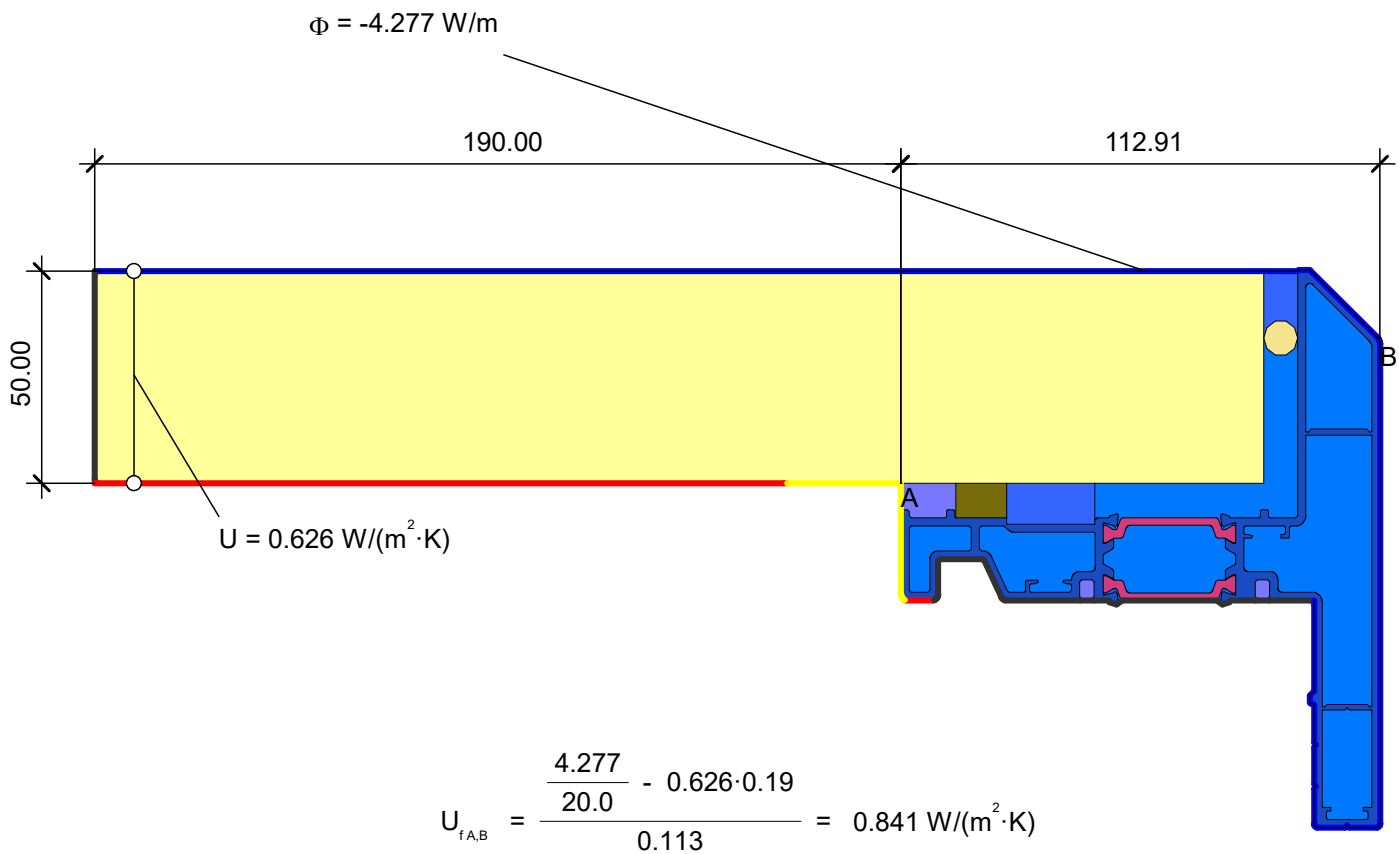


Material	$\lambda [\text{W/(m} \cdot \text{K)}]$
Aluminium (Si Alloys)	160.000
EPDM (ethylene propylene diene monomer)	0.250
Expandierter Polystyrolschaum Nennwert L=0.030	0.030
Panel	0.035
Polyamid 6.6 with 25% glass fibre	0.300
Silicone, pure (1)	0.350
Steel	50.000
Slightly ventilated air cavity *	
Unventilated air cavity *	
* EN ISO 10077-2:2017, 6.4.3/anisotrop	



Material	$\lambda [\text{W/(m} \cdot \text{K)}]$	Boundary Condition	$\theta [^\circ \text{C}]$	$R [(\text{m}^2 \cdot \text{K})/\text{W}]$
Aluminium (Si Alloys)	160.000	Exterior, frame (1)	0.000	0.040
EPDM (ethylene propylene diene monomer)	0.250	Interior, frame, normal	20.000	0.130
Expandierter Polystyrolschaum Nennwert L=0.030	0.030	Interior, frame, reduced	20.000	0.200
Gasfilling(15)	0.039	Symmetry/Model section (1)		
Gasfilling(16)	0.039			
Polyamid 6.6 with 25% glass fibre	0.300			
Silicone, pure (1)	0.350			
Soda lime glass	1.000			
Steel	50.000			
TwoBox1	0.400			
TwoBox2 Chromatech ultra S	0.320			
Slightly ventilated air cavity *				
Unventilated air cavity *				
* EN ISO 10077-2:2017, 6.4.3/anisotrop				





Frame model is from file "230712_Adlux.flx"

Material	$\lambda[\text{W}/(\text{m} \cdot \text{K})]$	Boundary Condition	$\theta[^\circ\text{C}]$	$R[(\text{m}^2 \cdot \text{K})/\text{W}]$
Aluminium (Si Alloys)	160.000	Exterior, frame (1)	0.000	0.040
Elastomeric foam, flexible	0.050	Interior, frame, normal	20.000	0.130
PVC, flexible (PVC-P) 40% softener	0.140	Interior, frame, reduced	20.000	0.200
Panel	0.035	Symmetry/Model section (1)		
Polyamid (nylon)	0.250			
Shin Etsu Sealant 90N Silicone	0.500			
Slightly ventilated air cavity (1) *				
Unventilated air cavity (1) *				

* EN ISO 10077-2:2017, 6.4.3/anisotrop

H1 SUMMARY REPORT

ABOUT

ADLUX ROOF WINDOWS

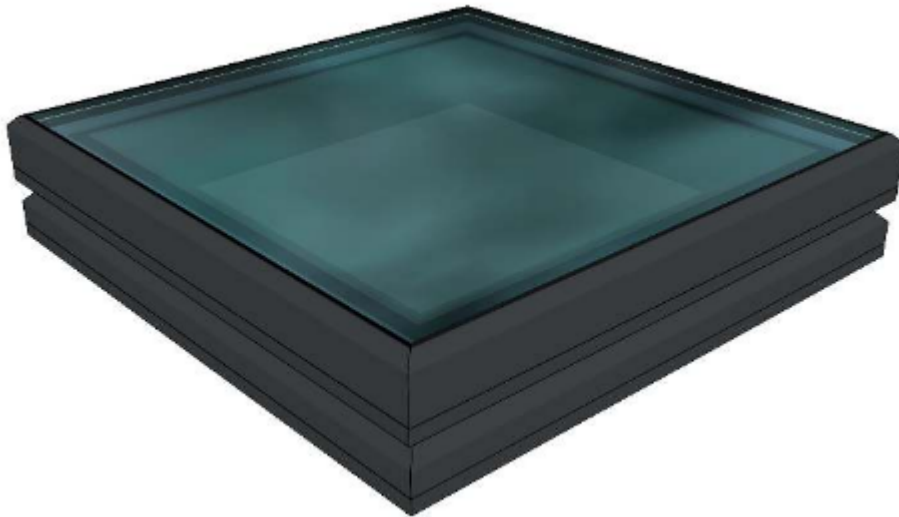
AUTHOR: Denise Martin

DATE: 24/11/2023

OCULUS REFERENCE: J230036

PREPARED FOR

ADLUX INDUSTRIES LIMITED



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REVISION CONTROL

Revision number	Date published	Reviewed by
2	24/11/2023	Margaret Amankrah



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2.	CONDITIONS OF THIS REPORT	2
3.	PROJECT SUMMARY	3
4.	PERFORMANCE REQUIREMENTS	4
5.	METHOD OF COMPLIANCE.....	5
	E3 External Moisture - Condensation Risk	6
6.	ASSUMPTIONS AND LIMITATIONS.....	7
7.	COMPLIANCE STATEMENT	8



1. PURPOSE

This report sets out:

- the applicable energy efficiency performance requirements for Adlux Roof Windows
- the compliance evidence of these components with the New Zealand Building Code Clause H1

This report constitutes documentation to convey the pathway for compliance of the proposed design with the New Zealand Building Code Clause H1. It should be read in conjunction with this project's corresponding architectural package.

2. CONDITIONS OF THIS REPORT

The compliance potential set out in this report for the Adlux Roof Windows has been evaluated using compliance documentation relevant to the proposed building enclosure design in relation to NZBC Clause H1.

This report and any building consent resulting does not guarantee the product will achieve compliance with the New Zealand Building Code clause H1; only that it can achieve compliance as designed.

The analysis contained within this report is based on the architectural drawings issued by Adlux, named Adlux Thermally Broken Rooflight.pdf and dated 13 July 2023.

Assumptions and limitations of the compliance potential set out in this report are described in [Section 6](#).



3. PROJECT SUMMARY

Adlux provide a range of roof windows and skylights for the residential and commercial market of New Zealand. The following table represents the system U-Values calculated to ISO10077-1 including frame U-Values calculated to ISO 10077-2 in accordance with NZBC Clause H1, Appendix E.2 using the glass specification to ISO 673 at 0° installation angle.

Table 1: Input glass

Glass types and resulting U-Values at 0° installation angle (horizontal)		U [W/m²K]
Type 1	4mm PerformaTech /20 Argon/ 4mm clear	1.673
Type 2	4mm Clear /20 Argon/ 4mm LightBridge	1.742
Type 3	4mm PerformaTech /20 Argon/ 4mm PerformaTech /20 Argon/ 4mm clear	0.809
Type 4	4mm PerformaTech /20 Argon/ 4mm Clear or Tint /20 Argon/ 4mm Clear or Tint	1.200
Type 5	4mm Lightbridge /20 Argon/ 4mm LightBridge /20 Argon/ 4mm Clear or Tint	0.854
Type 6	4mm LightBridge /20 Argon/ 4mm Clear or Tint /20 Argon/ 4mm Clear or Tint	1.238

The corresponding R-Values for installation angles to 50° are generally better due to the reduced upward heat transfer of the glass: The resulting R-Values hence will be compliant for all application angles (0°-50°) for the respective climate zone.

Below are sketches of the roof window types assessed in this report.

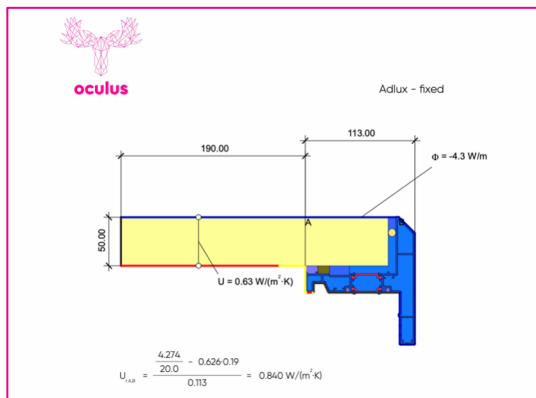


Image 1: Adlux roof window – fixed

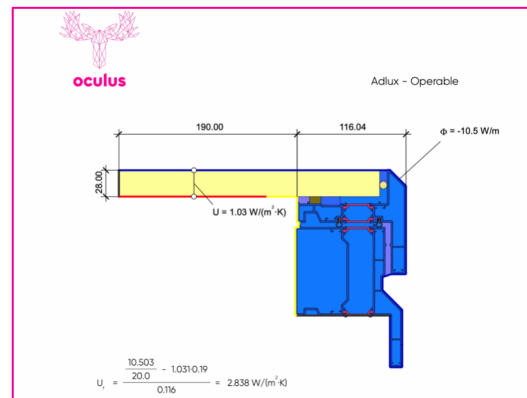


Image 2: Adlux roof window – operable

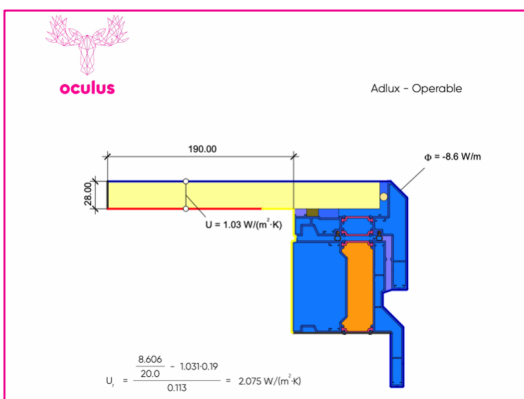


Image 3: Adlux roof window – operable with foam filled cavity



4. PERFORMANCE REQUIREMENTS

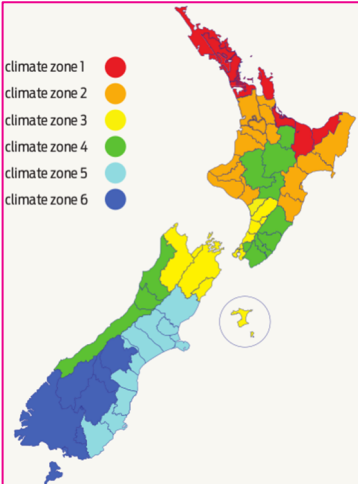
The NZBC Clause H1 and applicable Performance Requirements included within the scope of this report are listed in Table 2 below. Demonstration that a product or assembly can meet the Performance Requirements of the clause ensures that the Functional Requirement and the Objective of the clause will be met.

Table 2: NZBC, Functional Requirements, and Applicable Performance Requirements

NZBC	Functional Requirement	Performance provisions
H1 Energy efficiency	H1.2 Buildings must be constructed to achieve an adequate degree of energy efficiency when that energy is used for— a) modifying temperature, modifying humidity, providing ventilation, or doing all or any of those things (does not apply to assembly service buildings, industrial buildings, outbuildings, or ancillary buildings); or b) providing hot water to and from sanitary fixtures or sanitary appliances, or both; or c) providing artificial lighting (applies only to commercial buildings and communal non-residential buildings whose floor area is greater than 300 m ²)	H1.3.1 & H1.3.3

Table 3: New Zealand climate zones per NZBC

Climate Zone
Not Permitted
Climate Zone 1
Climate Zone 2
Climate Zone 3
Climate Zone 4
Climate Zone 5
Climate Zone 6



The roof windows must meet the following minimum construction R-values for building elements not containing embedded heating systems (m²K/W) in accordance with:

Table 4: AS1/VM1 – All housing and buildings up to 300 m²

Element	Climate Zone 1	Climate Zone 2	Climate Zone 3	Climate Zone 4	Climate Zone 5	Climate Zone 6
Skylights	R0.46	R0.46	R0.54	R0.54	R0.62	R0.62

Table 5: AS2/VM2 – Buildings greater than 300 m²

Element	Climate Zone 1	Climate Zone 2	Climate Zone 3	Climate Zone 4	Climate Zone 5	Climate Zone 6
Skylights	R0.42	R0.42	R0.46	R0.46	R0.49	R0.51



5. NZBC ASSESSMENT

H1 Energy Efficiency

The following tables list the calculated R_{skylight} values [m^2K/W] for each specimen size [mm] and can be used to determine in which climate zones the skylight is most applicable. Refer to Table 3 for color coding. Non compliant operables can be made to comply with added foam per Table 8.

Table 6: Adlux roof window – fixed

AS1/VM1	Glass type 1	Glass type 2	Glass type 3	Glass type 4	Glass type 5	Glass type 6
700 x 700	0.75	0.73	1.06	0.89	1.04	0.88
1000 x 1000	0.70	0.68	1.09	0.87	1.06	0.85
1200 x 1200	0.68	0.66	1.11	0.86	1.07	0.85
2400 x 1500	0.65	0.63	1.14	0.85	1.10	0.83
AS2/VM2						
700 x 700	0.75	0.73	1.06	0.89	1.04	0.88
1000 x 1000	0.70	0.68	1.09	0.87	1.06	0.85
1200 x 1200	0.68	0.66	1.11	0.86	1.07	0.85
2400 x 1500	0.65	0.63	1.14	0.85	1.10	0.83

Table 7: Adlux roof window – operable

AS1/VM1	Glass type 1	Glass type 2	Glass type 3	Glass type 4	Glass type 5	Glass type 6
700 x 700	0.41	0.41	0.49	0.45	0.48	0.45
1000 x 1000	0.45	0.44	0.58	0.51	0.57	0.50
1200 x 1200	0.46	0.45	0.63	0.54	0.61	0.53
2400 x 1500	0.50	0.49	0.74	0.61	0.72	0.60
AS2/VM2						
700 x 700	0.41	0.41	0.49	0.45	0.48	0.45
1000 x 1000	0.45	0.44	0.58	0.51	0.57	0.50
1200 x 1200	0.46	0.45	0.63	0.54	0.61	0.53
2400 x 1500	0.50	0.49	0.74	0.61	0.72	0.60

Table 8: Adlux roof window – operable with foam filled cavity

AS1/VM1	Glass type 1	Glass type 2	Glass type 3	Glass type 4	Glass type 5	Glass type 6
700 x 700	0.50	0.49	0.62	0.56	0.61	0.55
1000 x 1000	0.52	0.51	0.70	0.61	0.69	0.60
1200 x 1200	0.53	0.52	0.75	0.63	0.73	0.62
2400 x 1500	0.55	0.53	0.86	0.68	0.83	0.67
AS2/VM2						
700 x 700	0.50	0.49	0.62	0.56	0.61	0.55
1000 x 1000	0.52	0.51	0.70	0.61	0.69	0.60
1200 x 1200	0.53	0.52	0.75	0.63	0.73	0.62
2400 x 1500	0.55	0.53	0.86	0.68	0.83	0.67



E3 External Moisture - Condensation Risk

As requested, he have reviewed the submitted documentation against NZBC clause E3 with specific regards to condensation. Condensation can be reduced by maintaining an adequate interior temperature and good ventilation. A ventilation strategy increases drying capacity should condensation occur. However, per E3/AS1, this is only mandated for residential buildings. Where good ventilation and adequate interior temperature cannot be provided by a mechanical system, the condensation risk requires mitigation in the roof window units and their installation.

The thermal resistance of a glazing component is optimized by using thermally broken or improved frames, employing a non-metal glass edge spacer, adding a low-E coating and insulating the multipaned glazing with an inert gas such as argon, krypton or xenon, which have higher thermal resistance than air. These have been incorporated or are customisable in the design of Adlux thermal roof windows.

Similar to a glass spacer, a bad installation can increase heat loss and the condensation potential at the roof window perimeter. An ideal installation aligns the insulated glazing unit (as described above) with the thermal layer of the surrounding enclosure assembly. By reducing linear transmittance at those interfaces, interior surface temperatures of the frame are kept warmer. This pushes the dew point temperature further out in the assembly, thus reducing risk of cold surfaces, internal condensation, and moisture related issues.

Table 9: Comparison of different types of windows

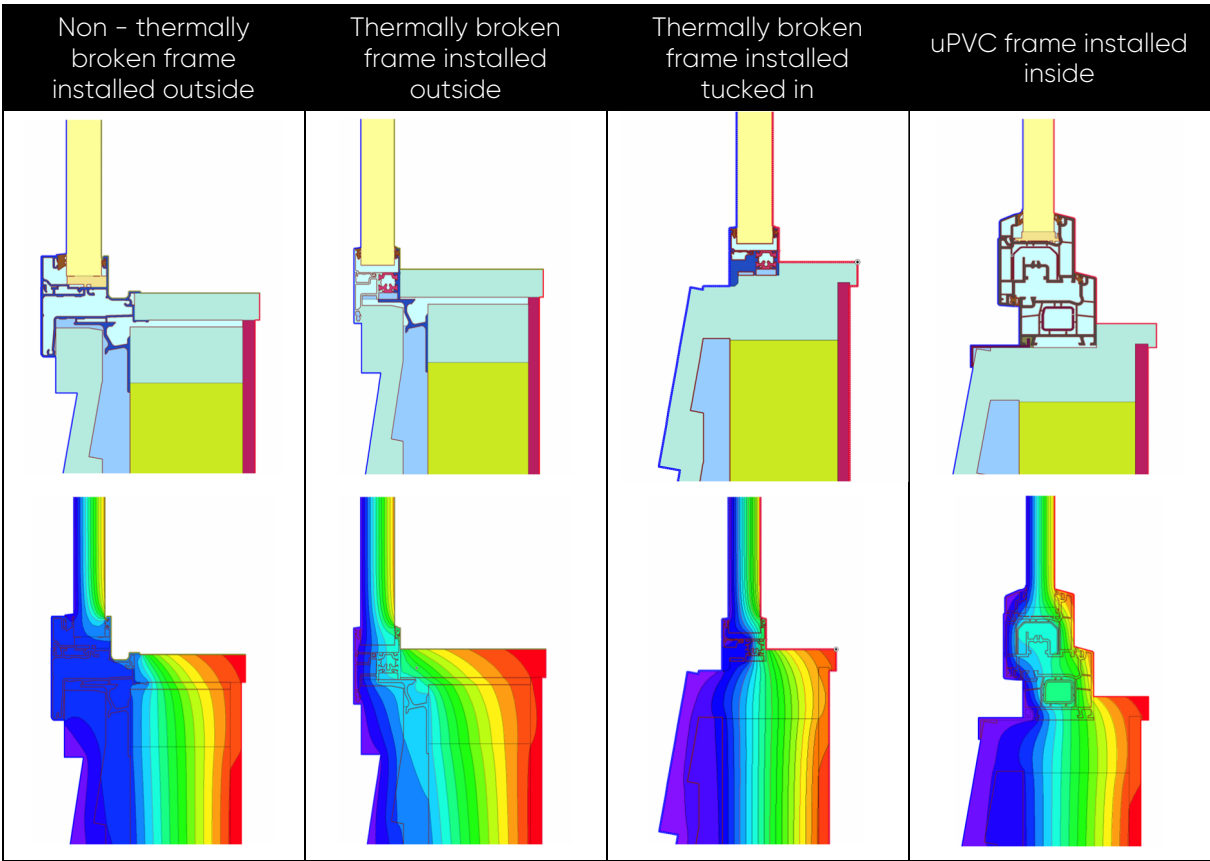


Table 9 shows thermal gradient of a various installations. Although shown with wall windows, the theory extends to roof windows and skylights as well.



6. ASSUMPTIONS AND LIMITATIONS

The compliance potential of the building component set out in [Section 5](#) of this report takes account of several assumptions regarding construction, quality assurance, and proper implementation of the design that would be expected. The following assumptions inform the compliance potential for this design:

- The design is implemented strictly per the drawings, details, and specifications.
- Products are installed in accordance with the manufacturer's instructions or site-specific protocol.
- R-value calculations were done in accordance with Clause H1, Appendix E.2:

E.2.1 Construction R-values

E.2.1.1 The *construction R-values* for *skylights* (R_{skylight}) shall include the effects of both the glazing materials and the frame materials and shall be calculated in accordance with Equation E.1. The *construction R-value* shall be rounded down to no less than two significant figures.

Equation E.1:
$$R_{\text{skylight}} = \frac{1}{U_w}$$

where:

R_{skylight} is the *construction R-value* of the *skylight* ($\text{m}^2\cdot\text{K}/\text{W}$); and

U_w is the thermal transmittance of the *skylight* ($\text{W}/(\text{m}^2\cdot\text{K})$), determined in accordance with Paragraph E.2.1.2.

E.2.1.2 The thermal transmittance (U_w) of a *skylight* shall be determined in accordance with ISO 10077-1, with:

- a) the thermal transmittance of the glazing (U_g) determined using BS EN 673, considering the effects of horizontal or angled glazing on the heat transfer; and
- b) the thermal transmittance of the frame (U_f) determined using ISO 10077-2.

- Thermal Spacer:

We used the typical value for linear thermal transmittance for glazing spacer bars with improved thermal performance according to table G.2, ISO 10077-1, for metal with thermal break frame types and double and triple glazing with air and gas fill ($0.06 \text{ W}/\text{mK}$).



7. COMPLIANCE STATEMENT

Following our assessment of the current design we have determined that the proposed building component complies with the minimum R-Values according to the respective sizes and glass configurations in accordance with the tables provided. Therefore, we deem the component compliant with the requirements of the NZBC Clauses H1 and E3 subject to the proposed design being constructed in accordance with the plans and specifications that accompany this report

Prepared by:



Denise Martin
Principal Analyst, Oculus Architectural Engineering Ltd

Reviewed by:



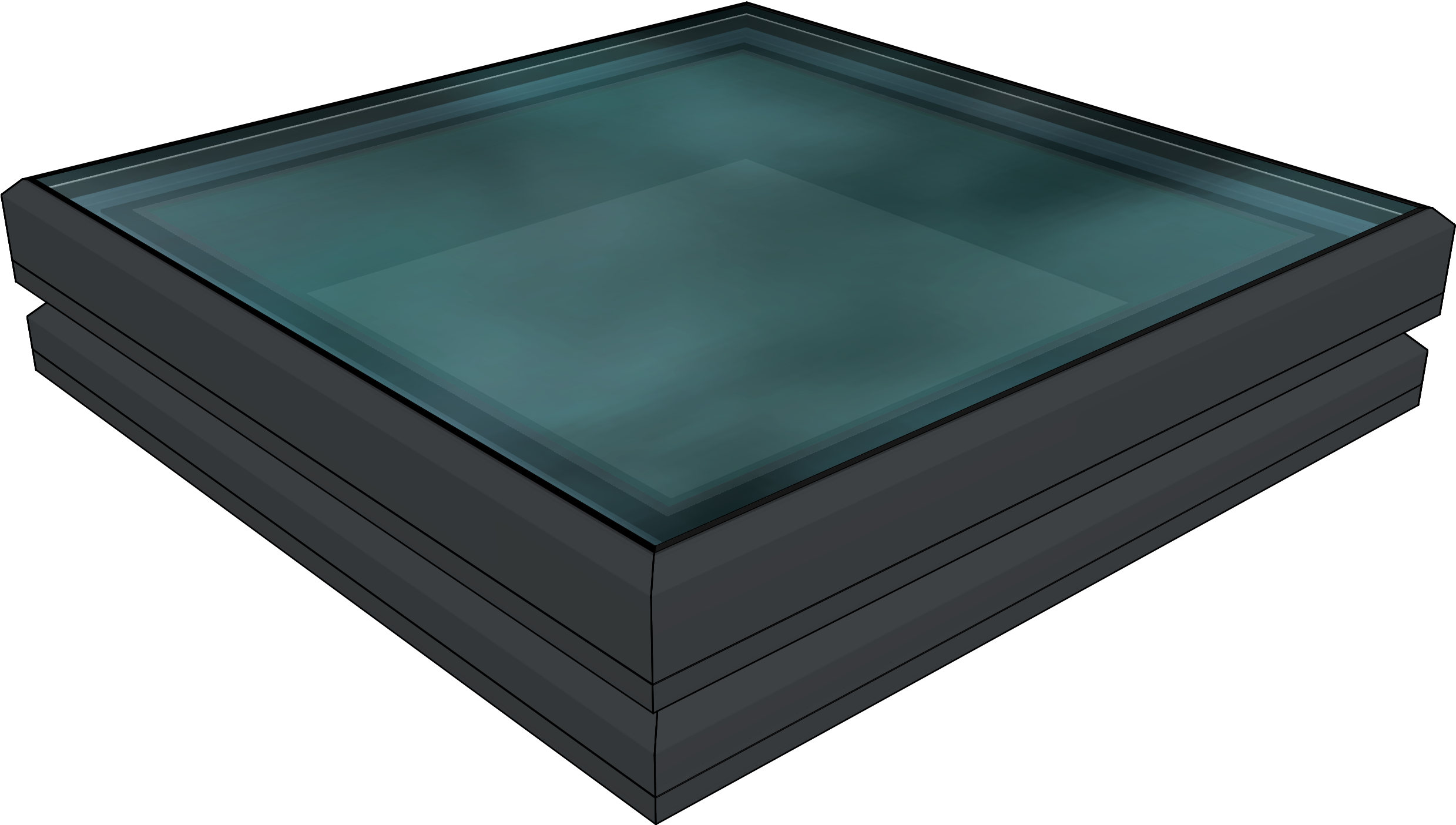
Margaret Amankrah
Building Enclosure Consultant, Oculus Architectural Engineering Ltd



Appendix a. SUPPORTING DOCUMENTS

- Adlux Drawings



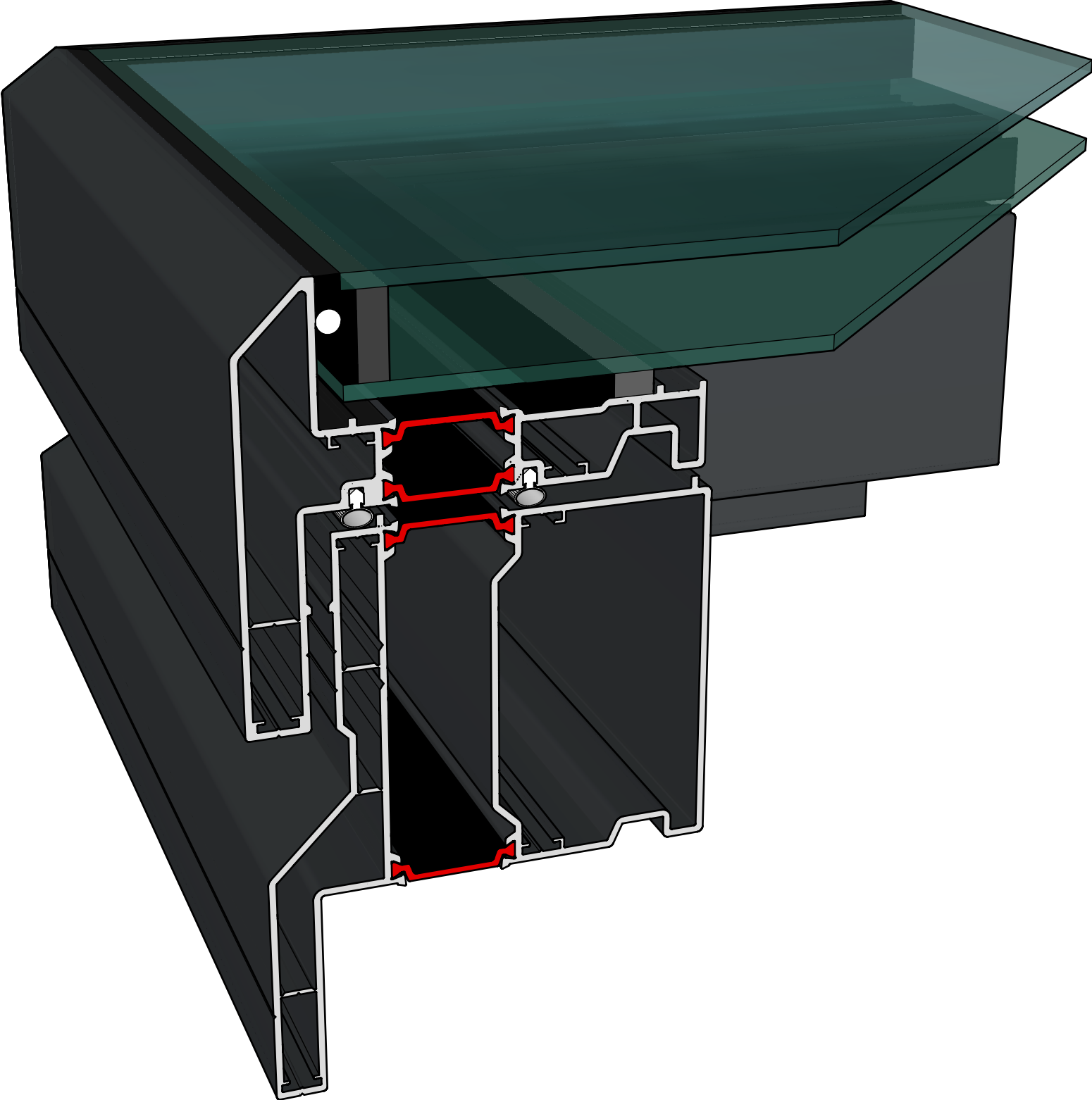


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ADLUX THERMAL ROOF WINDOW

AD-01

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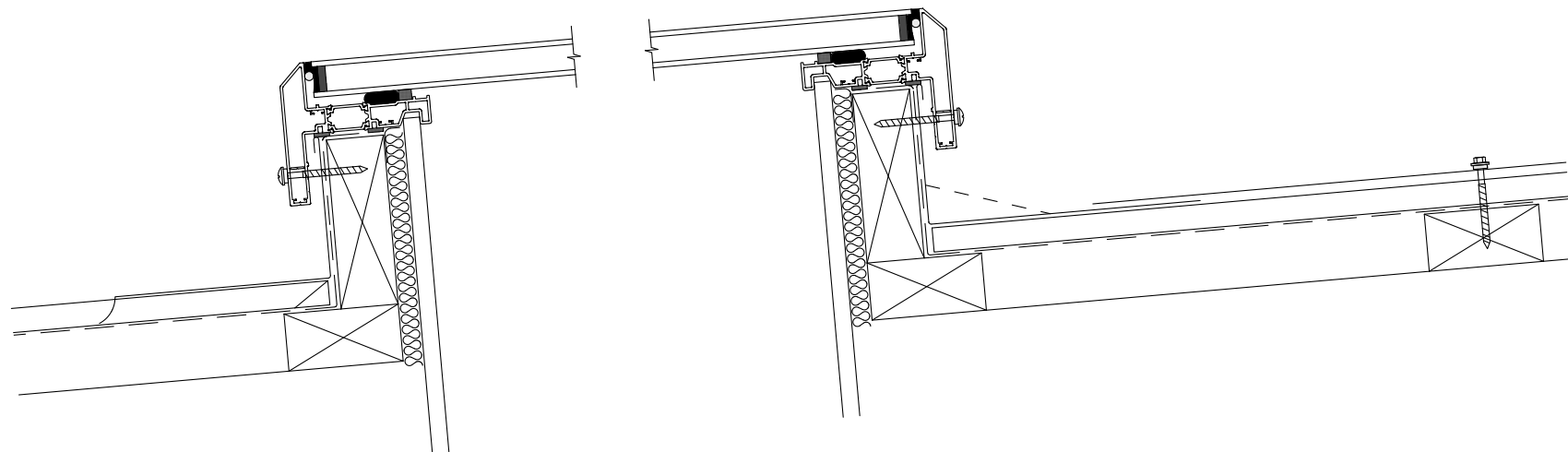
ADLUX THERMAL ROOF WINDOW

AD-01

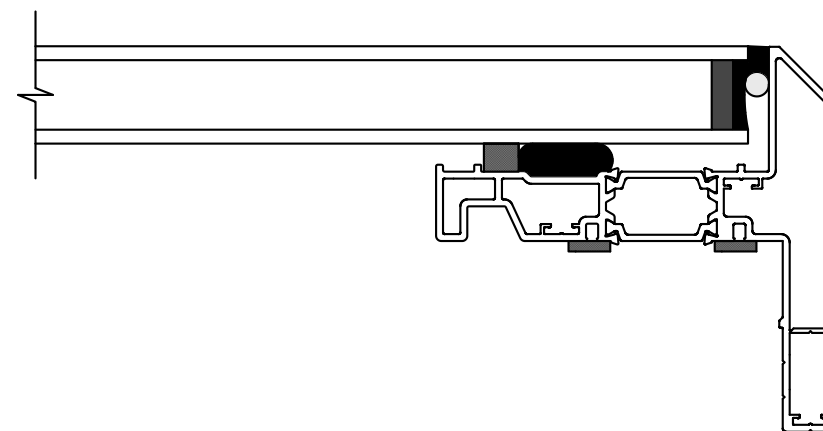
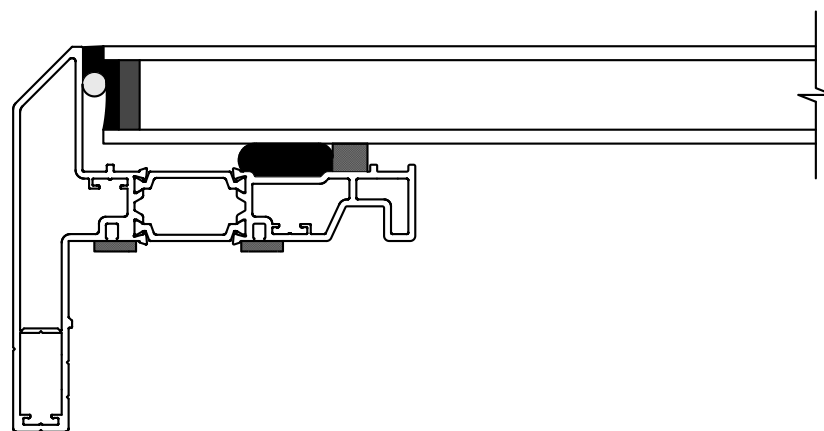
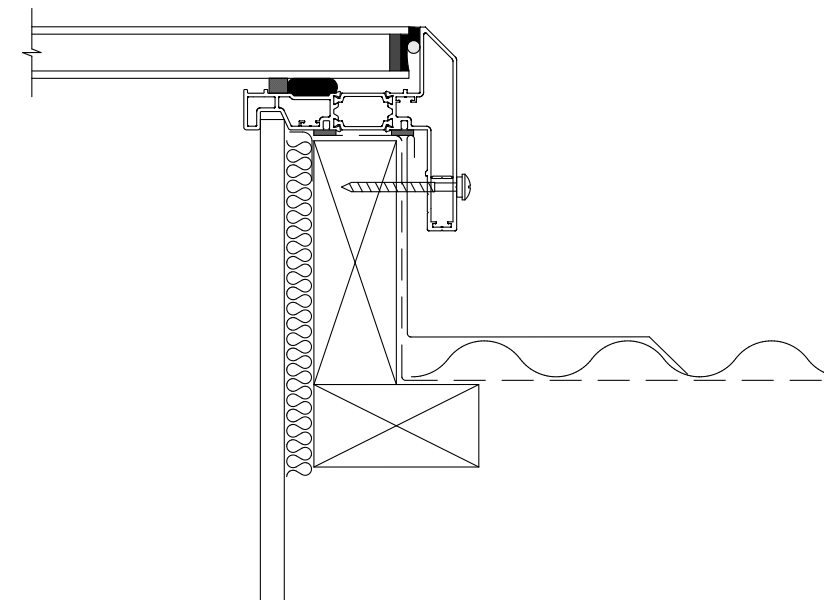


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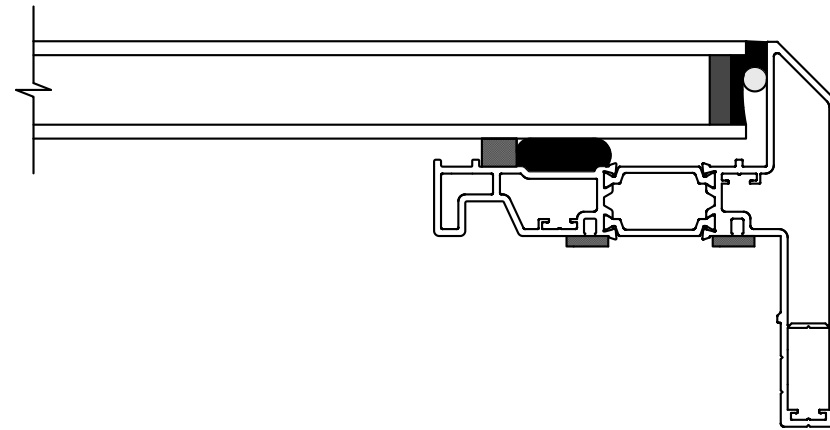
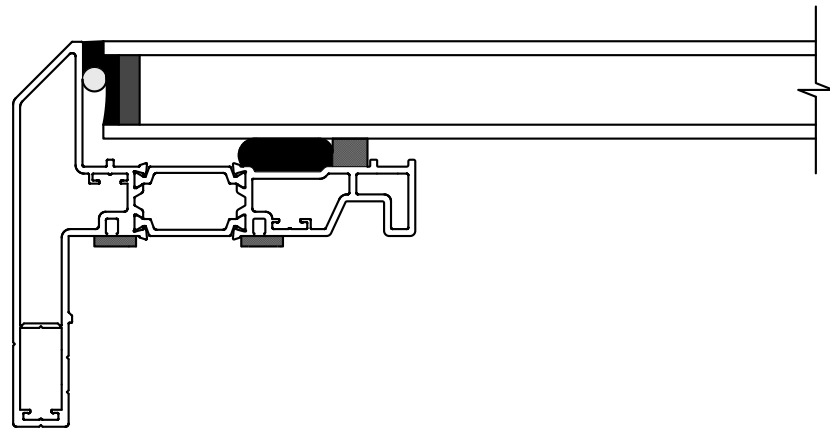
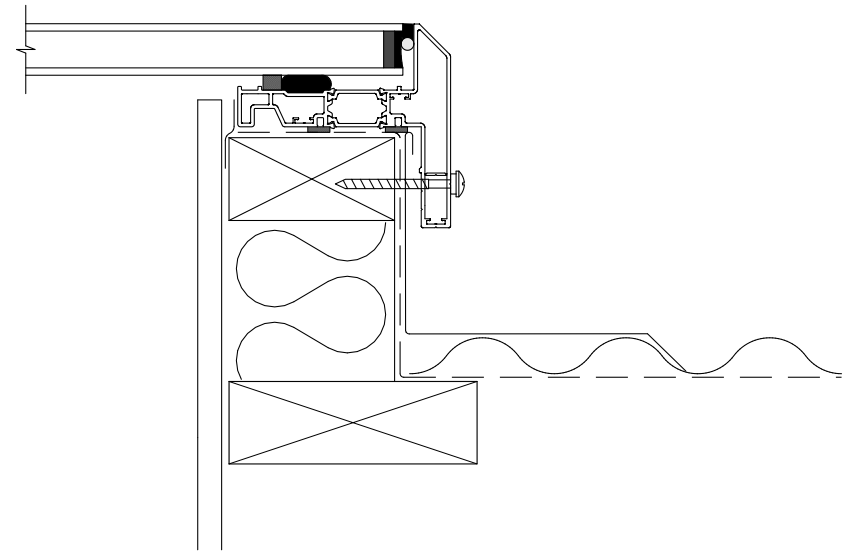
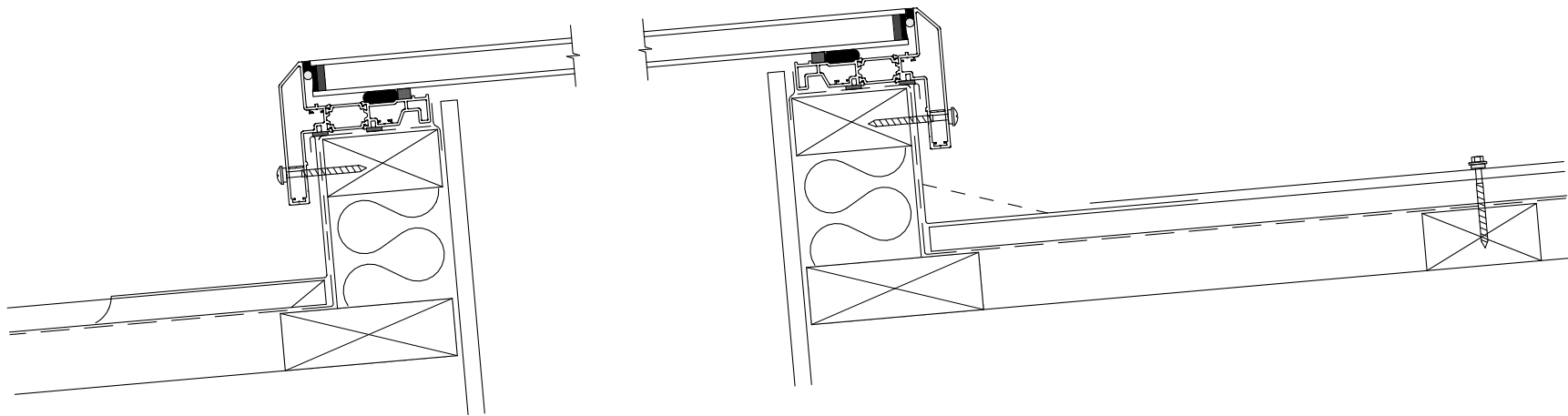
CORRUGATED ROOF 45MM UPSTAND

ADLUX HARMONY ROOF WINDOW - FIXED

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CORRUGATED ROOF 90MM UPSTAND

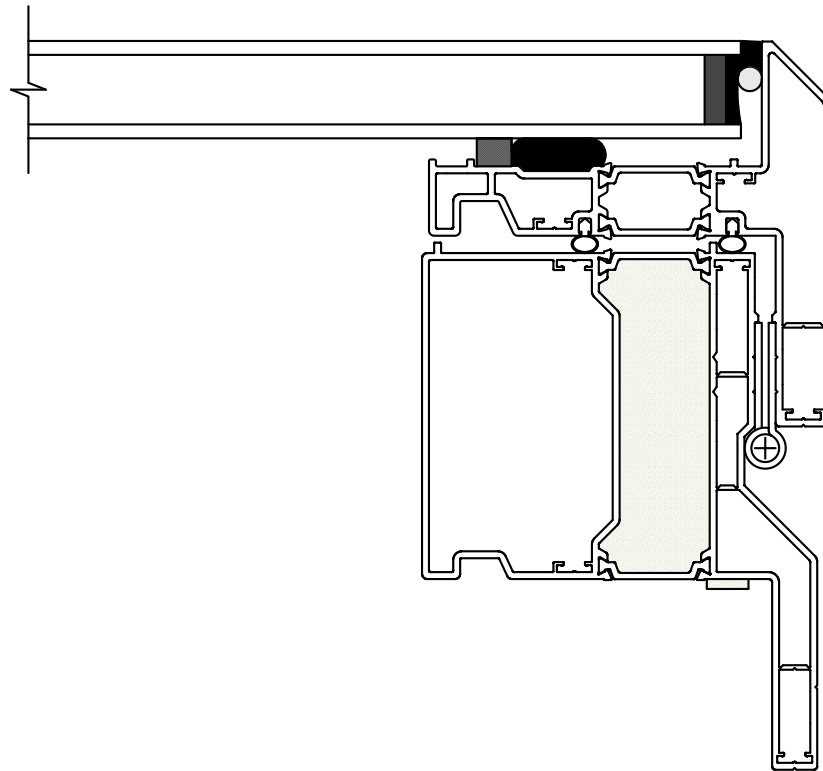
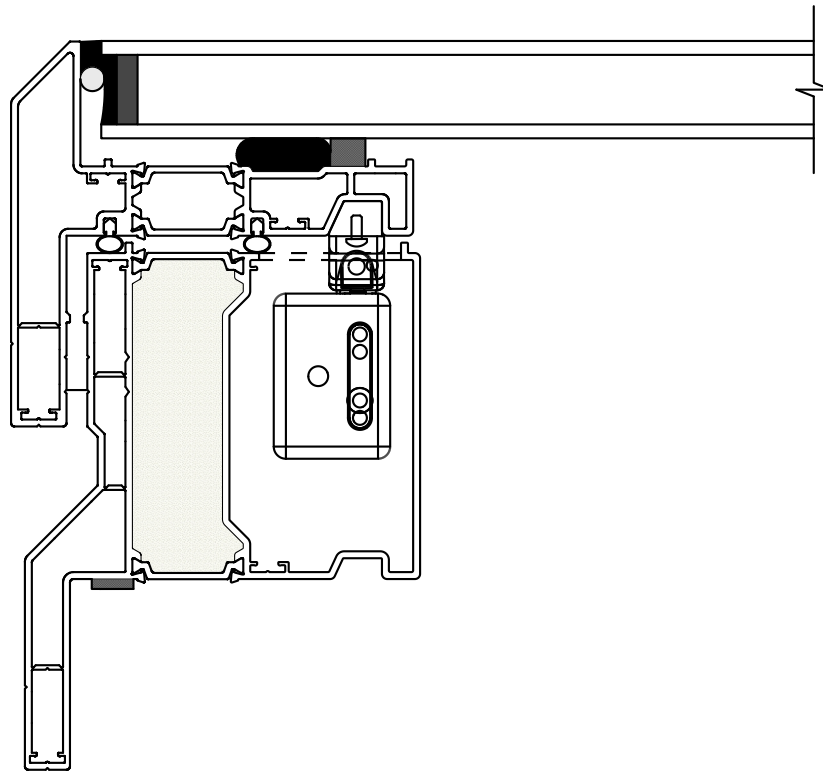
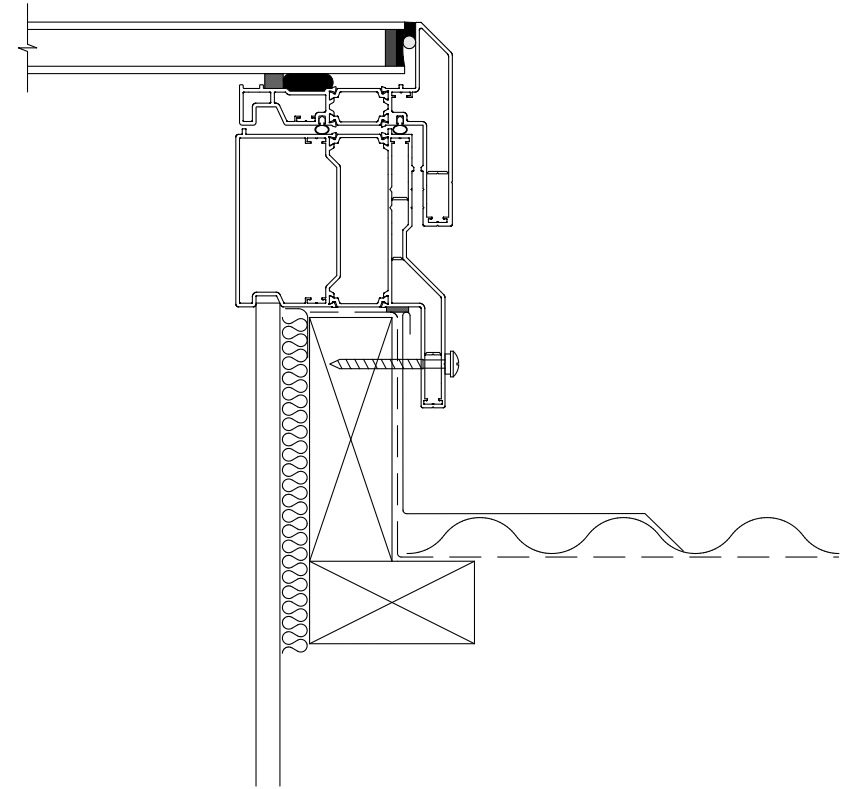
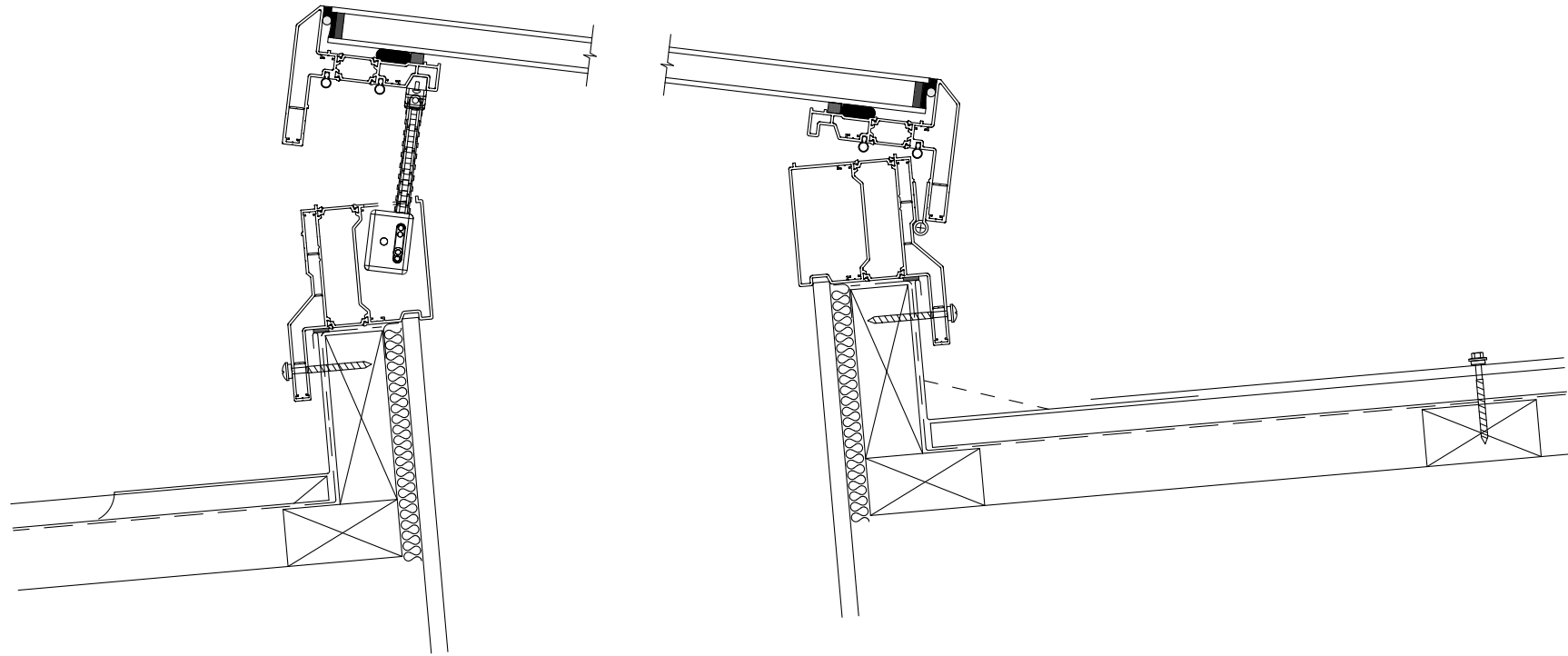
ADLUX HARMONY ROOF WINDOW - FIXED

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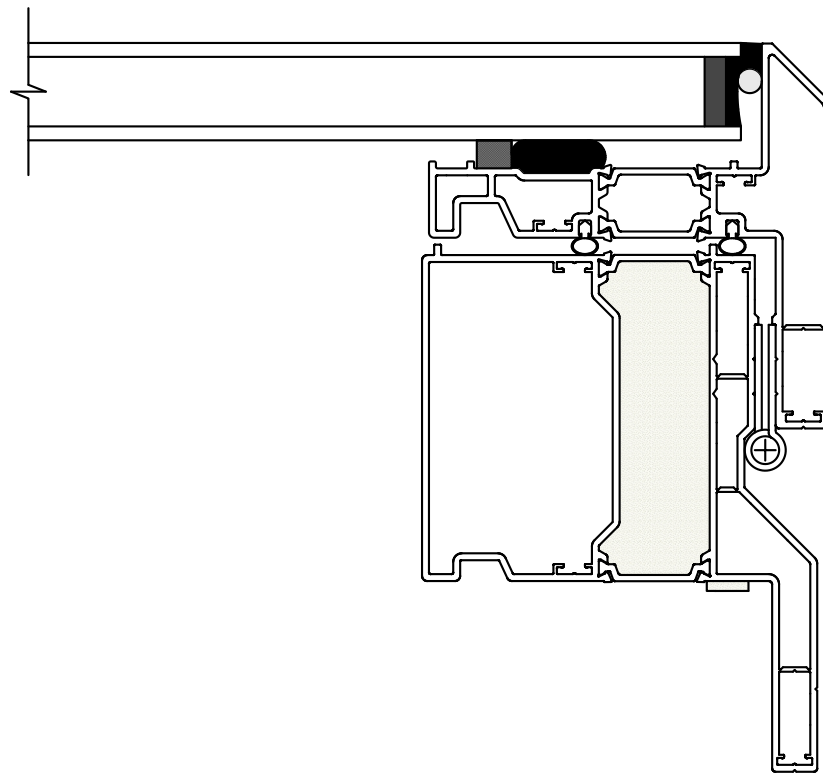
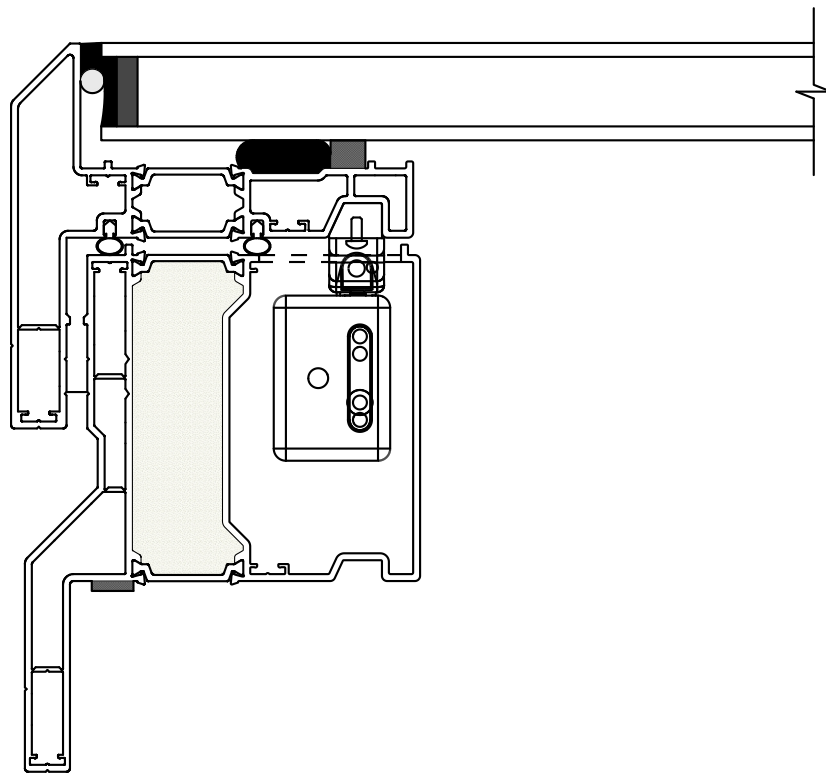
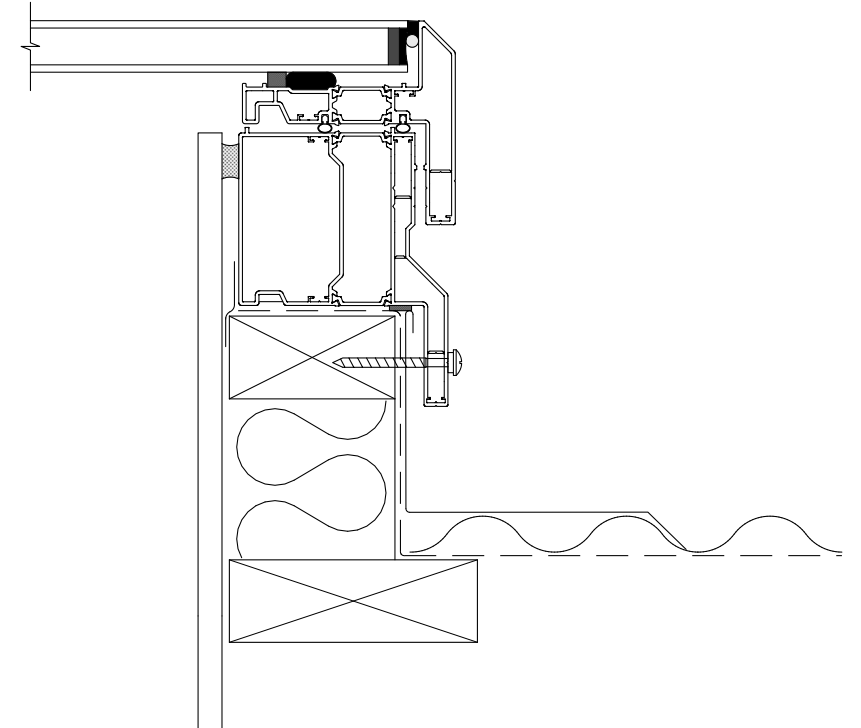
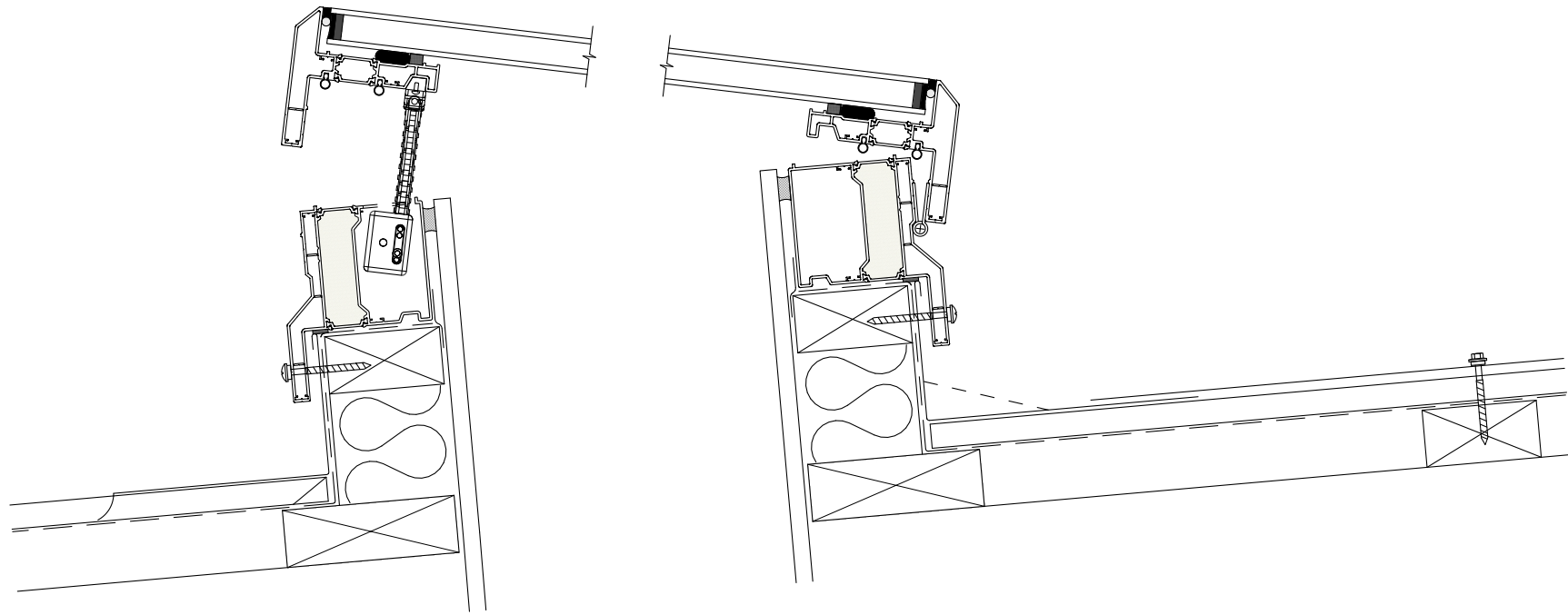
CORRUGATED ROOF 45MM UPSTAND

ADLUX HARMONY ROOF WINDOW - OPENING

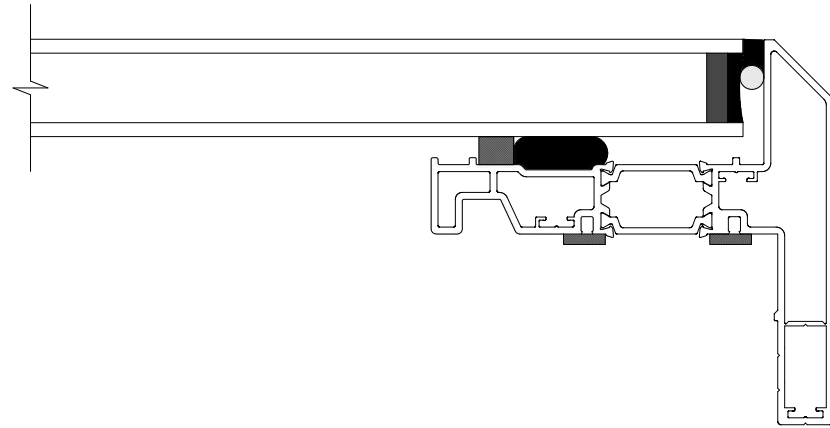
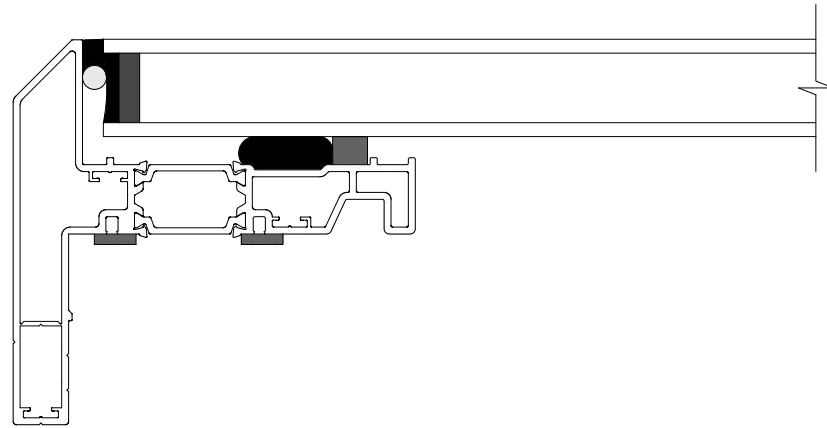
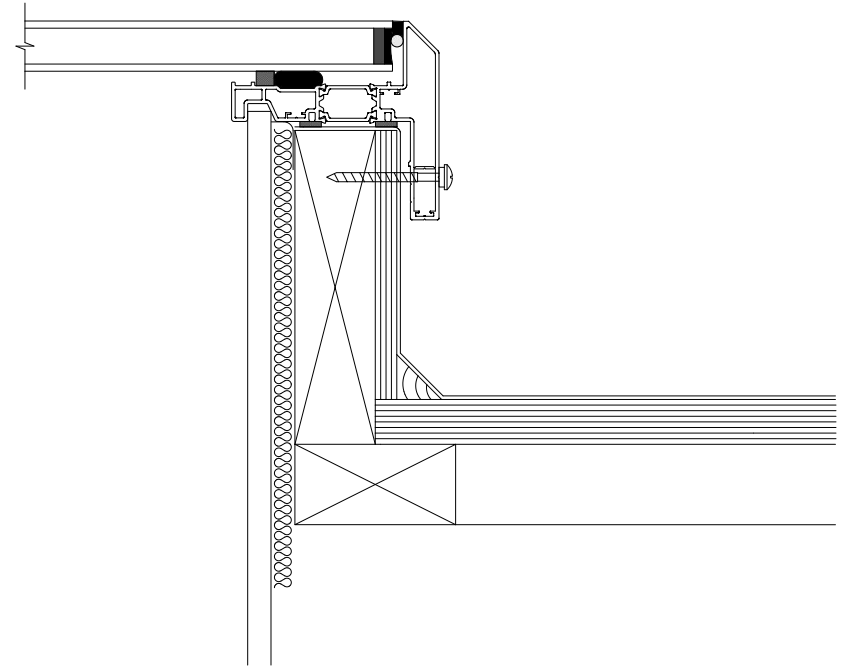
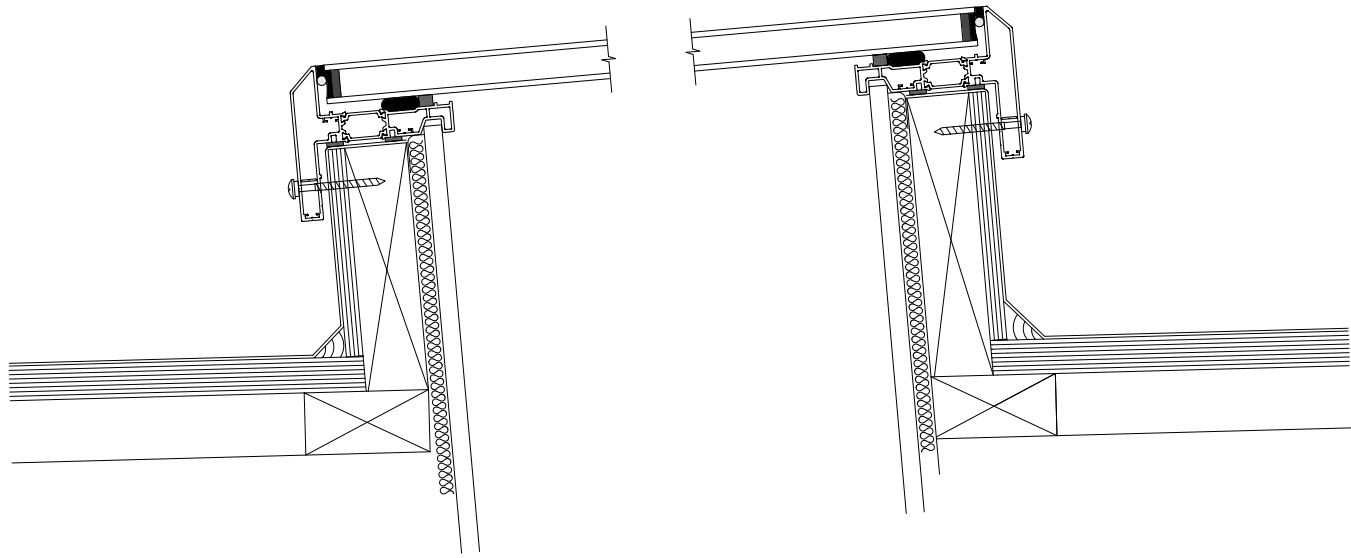
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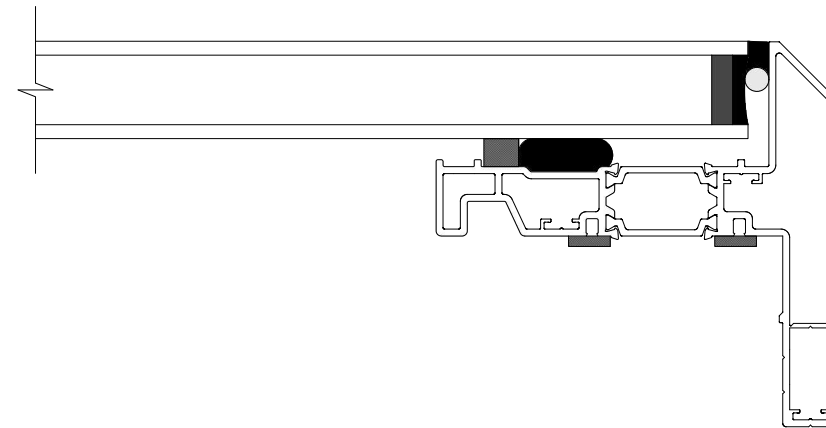
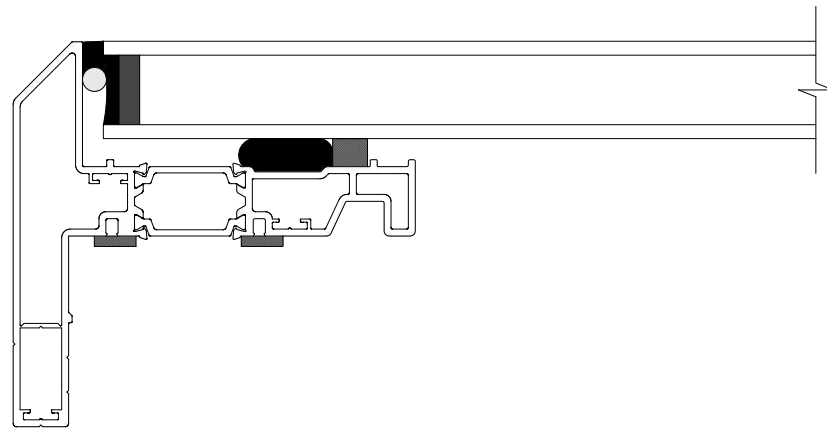
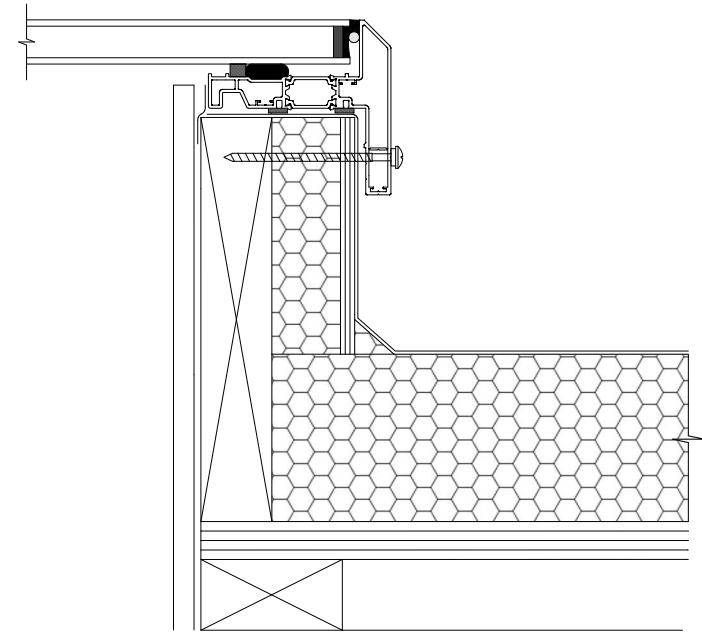
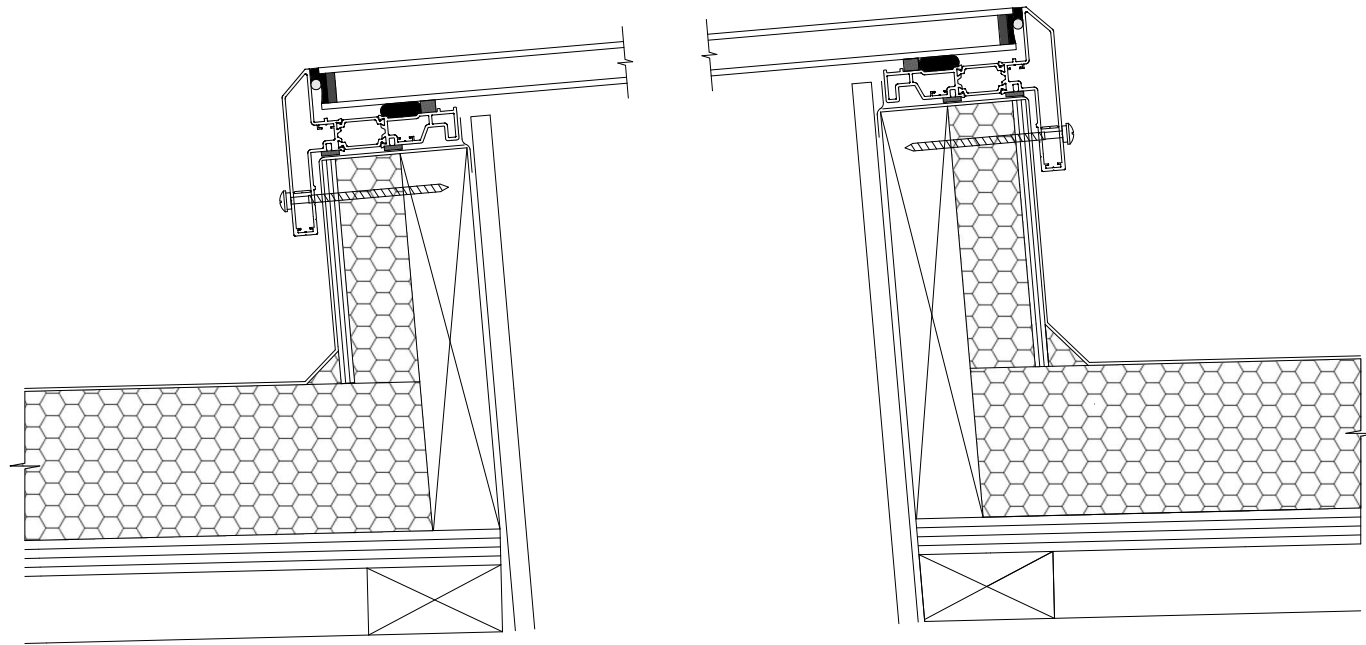


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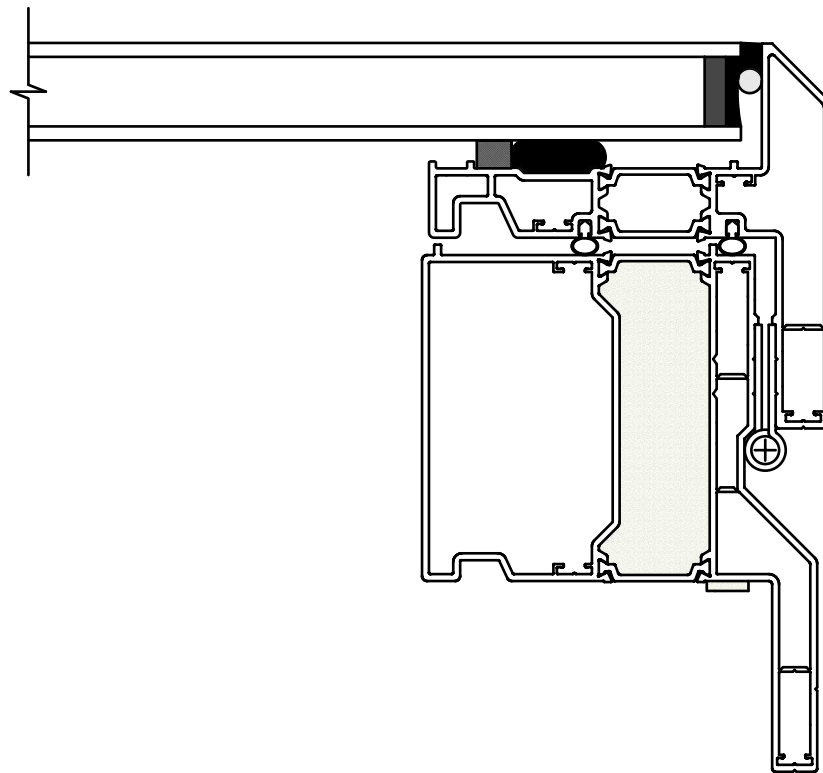
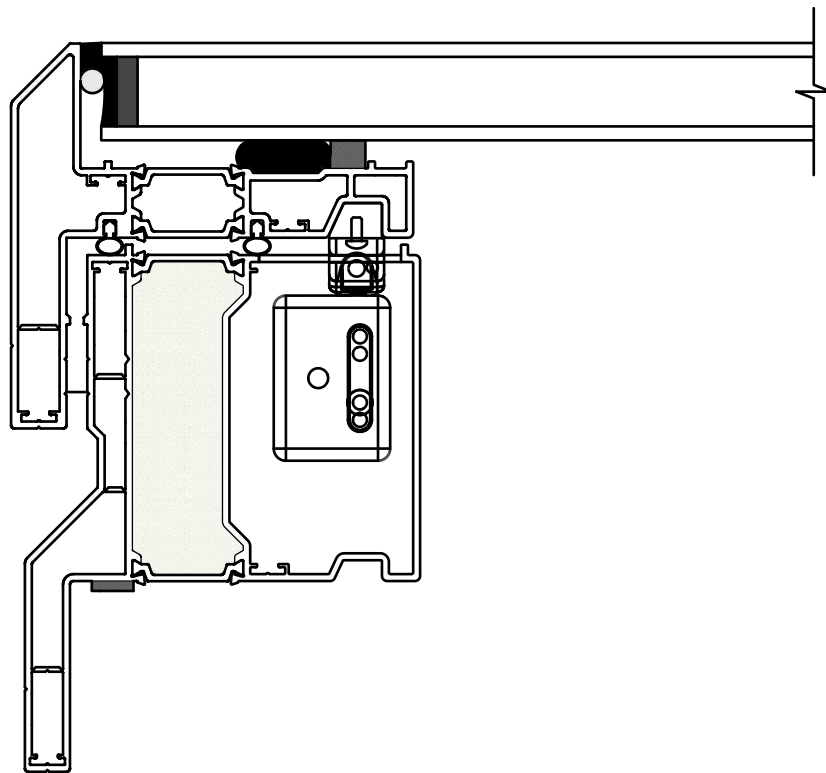
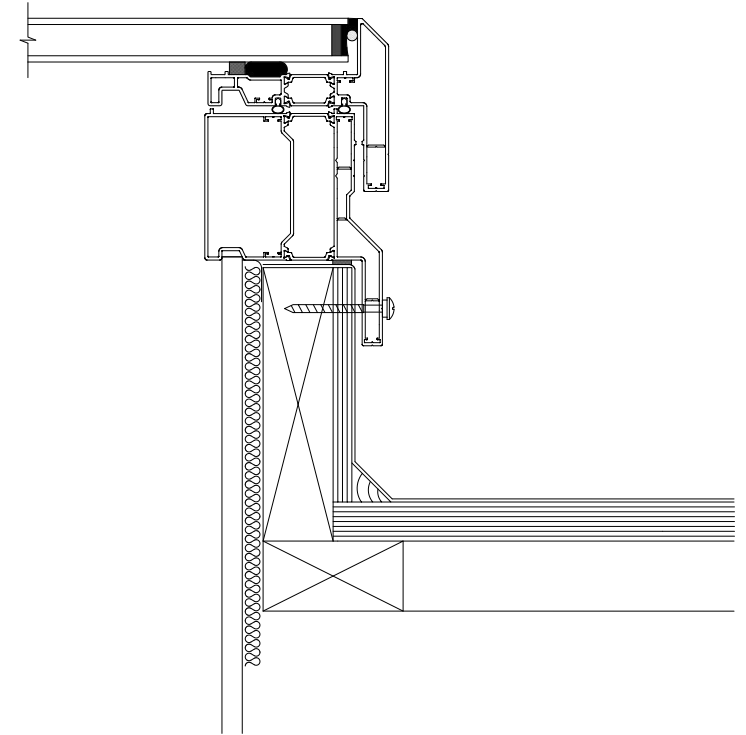
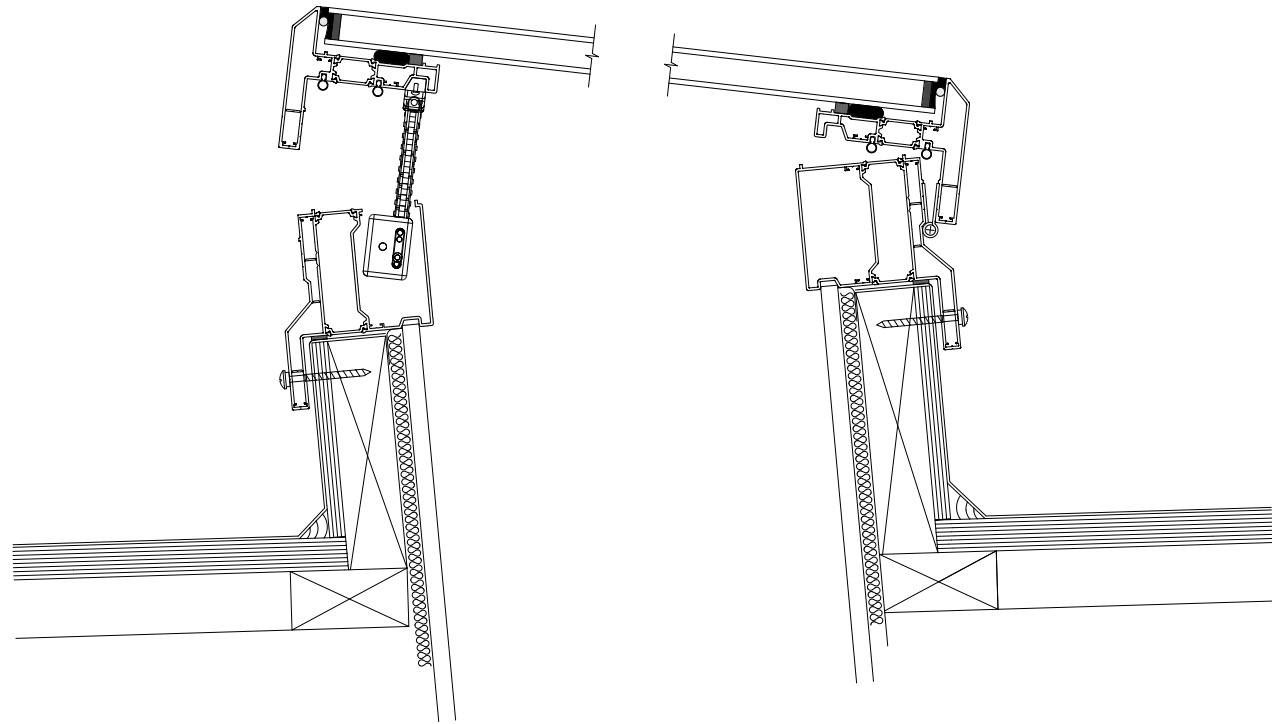
MEMBRANE ROOF 45MM UPSTAND

ADLUX HARMONY ROOF WINDOW - FIXED

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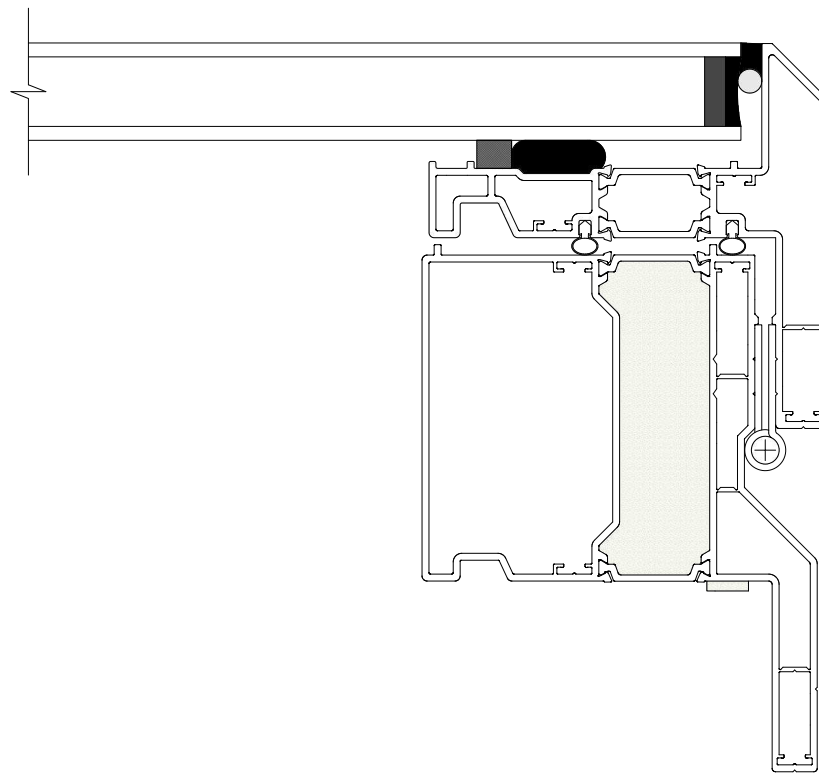
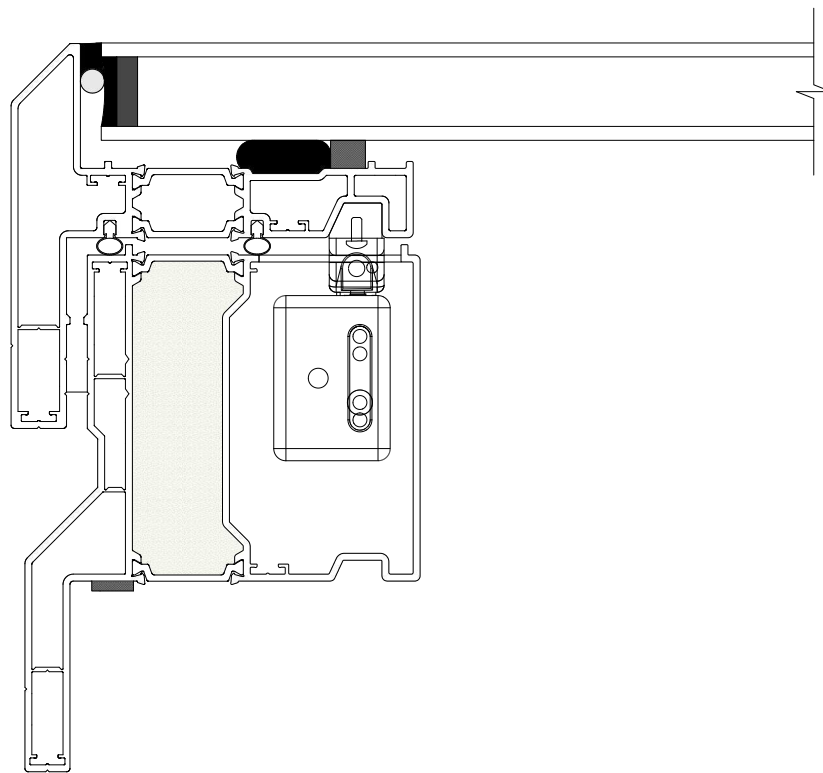
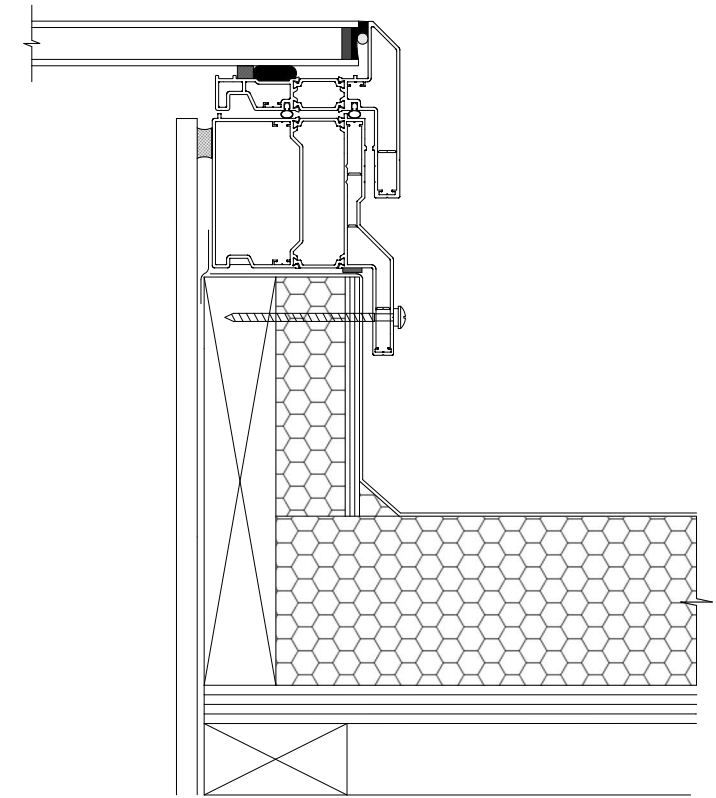
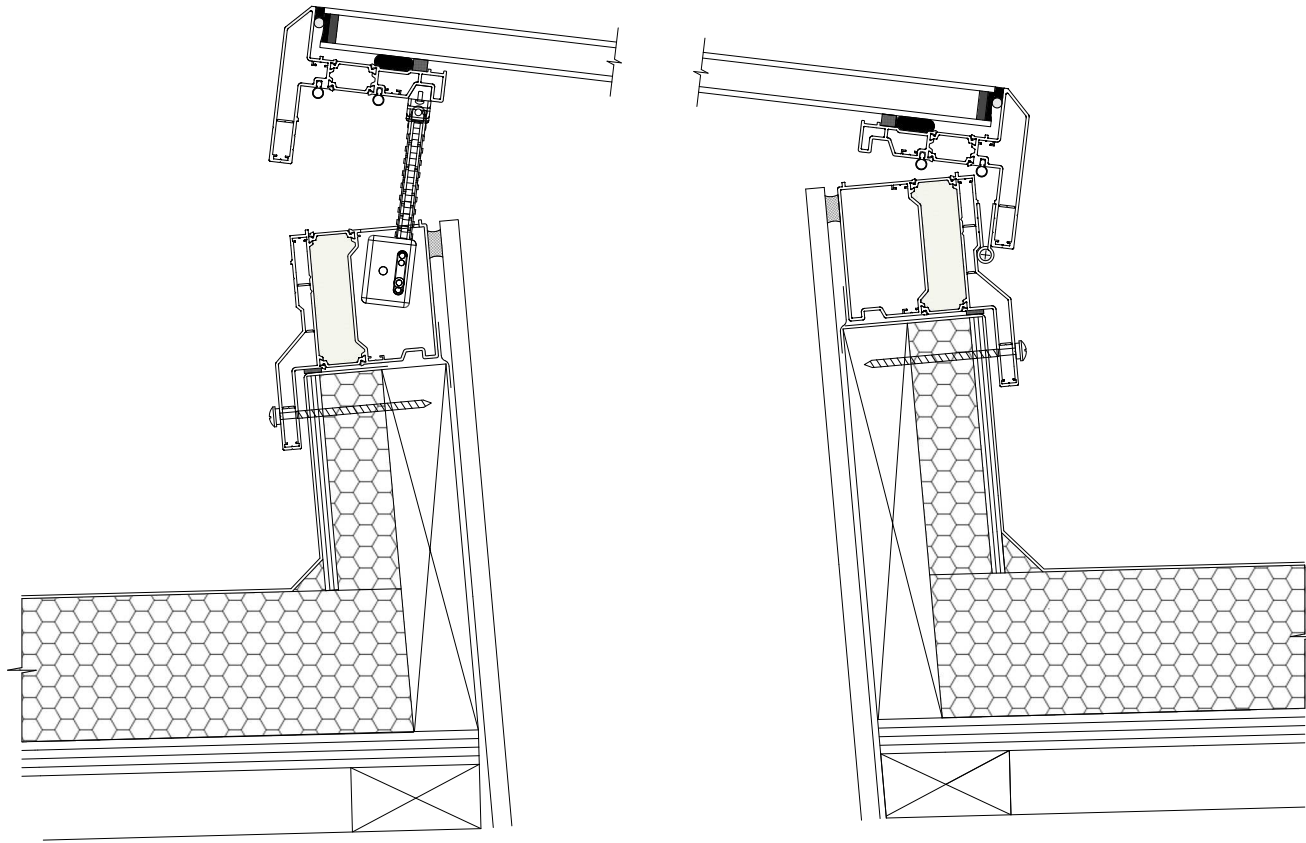
MEMBRANE ROOF 45MM UPSTAND

ADLUX HARMONY ROOF WINDOW - OPENING

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Harmony Array

The Next Generation in Overhead Glazing





Thermally
Broken



Double & Triple
Glazed Options



New Zealand
Made



Customisable



Pitch Range 2-65°



Full Powdercoat
Colour Range
Available

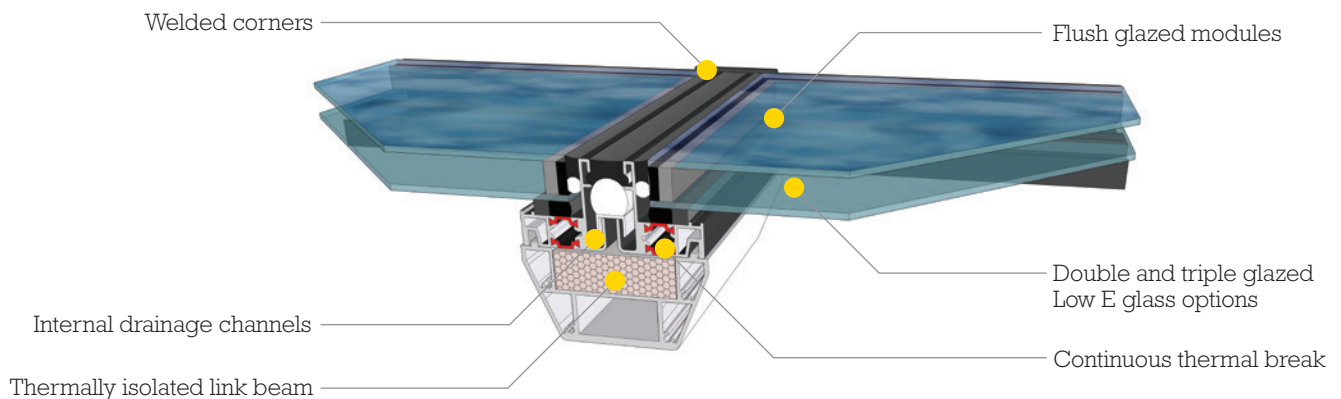
Harmony Array

Elevating Overhead Glazing Performance with Exceptional Thermal Efficiency

Harmony Array is a next-generation modular rooflight system from Adlux, designed and developed in New Zealand to meet the growing demand for large-scale, thermally broken roof glazing. With a fully welded frame and a continuous thermal break throughout, it delivers exceptional thermal performance without compromising clean lines, design flexibility, or architectural intent. Factory-glazed and custom-manufactured in modular units, Harmony Array allows for efficient on-site installation and can be configured to virtually any length, forming a flush, continuous rooflight tailored to your project needs. Built for performance and aesthetics, it's the ideal roof glazing solution for creating high-performing building envelopes across all climate zones—bringing in more natural light while maintaining energy efficiency, weather protection, and a contemporary style.

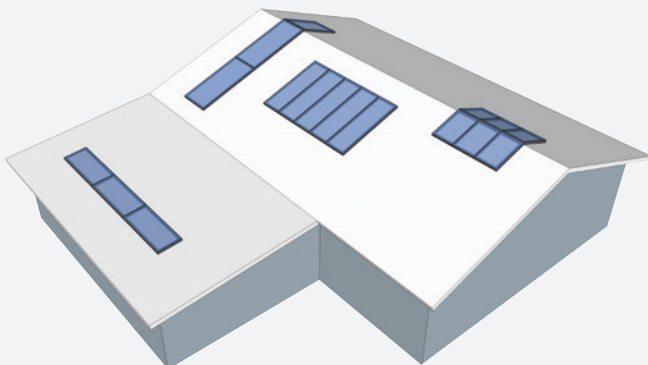
Features

- › Thermally Broken Perimeter Frame – $U_f 0.84$
- › Thermally Broken Array with Link Beam – $U_f 2.67$
- › Double & Triple Glazing Options
- › Fully Welded Corners
- › Flush Glazing
- › No limit to the length achievable
- › Self supported spans up to 3.0M
- › Larger spans with structural support
- › Suitable for all climate zones



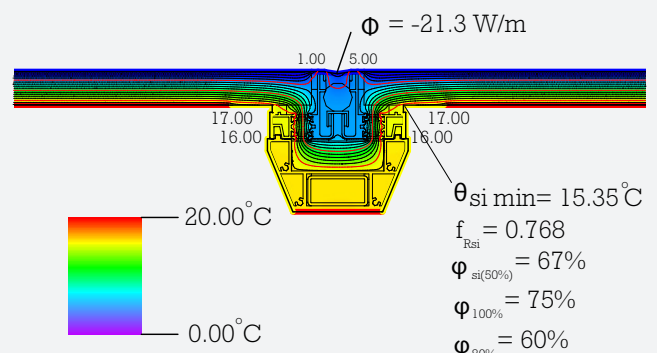
Field of Application

- Flat Roof
- Ridge Lines
- Pitched Roof



Designed for Thermal Performance

Harmony Array's thermal efficiency is ensured by isolating external and internal profiles with thermal breaks, eliminating cold bridging. Frame performance (U_f) is validated using the latest software to ISO 10077-2 standards.





At Adlux, we believe there's life to be found in every home. Our joy is in bringing yours to light.

As a family business with a friendly and capable team, we specialise in the design, supply, and installation of a range of window, lighting, outdoor, and roofing solutions for residential and commercial projects.

With a bespoke approach, we'll work with you to find the best solution for your project.

Whether locally produced or sourced internationally, we'll help you access and choose from a range of world-class, contemporary products that combine style with seamless function.

All of our products are rigorously tested for quality and New Zealand living conditions.

They are designed to enhance your environment for years to come.

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www.adlux.co.nz

let life in 

22/05/2025





ADLUX HARMONY ARRAY

MODULAR ROOF WINDOW

INSTALLATION INSTRUCTIONS

2025

Adlux Industries Ltd
30 Sistema Way
Mangere, Auckland 2022
New Zealand

P.O. Box 13-866
Auckland 1643
New Zealand

0800 500 557

sales@adlux.co.nz
www.adlux.co.nz



All Adlux Roof Windows are fixed to a timber frame upstand which must be flashed professionally to the relevant roofing material. The height of this upstand frame should be a minimum of 110mm above the roofing material profile.

Each Adlux Harmony Array is custom built for site specific requirements. When the actual size and roof position of a Adlux Harmony Array has been decided you must contact ADLUX Industries with the exact dimensions. Adlux will send a shop drawing for approval which must be signed and returned before fabrication commences.

Handling & Storage

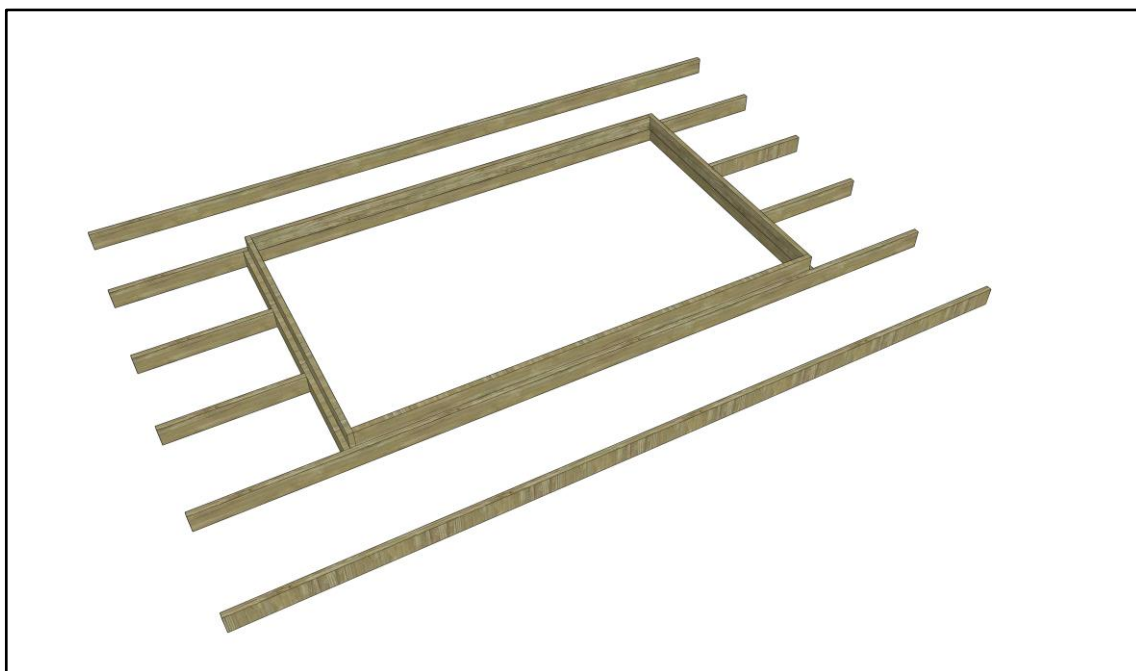
While all Harmony roof windows and associated products are suitably packaged to avoid damage, you should take care when handling them. Always ensure there's an appropriate number of people available to move larger items.

All roof windows, and accessories must be stored on a flat, dry surface under cover if they aren't going to be installed immediately. Please also ensure that heavy items are not stored on top of the units

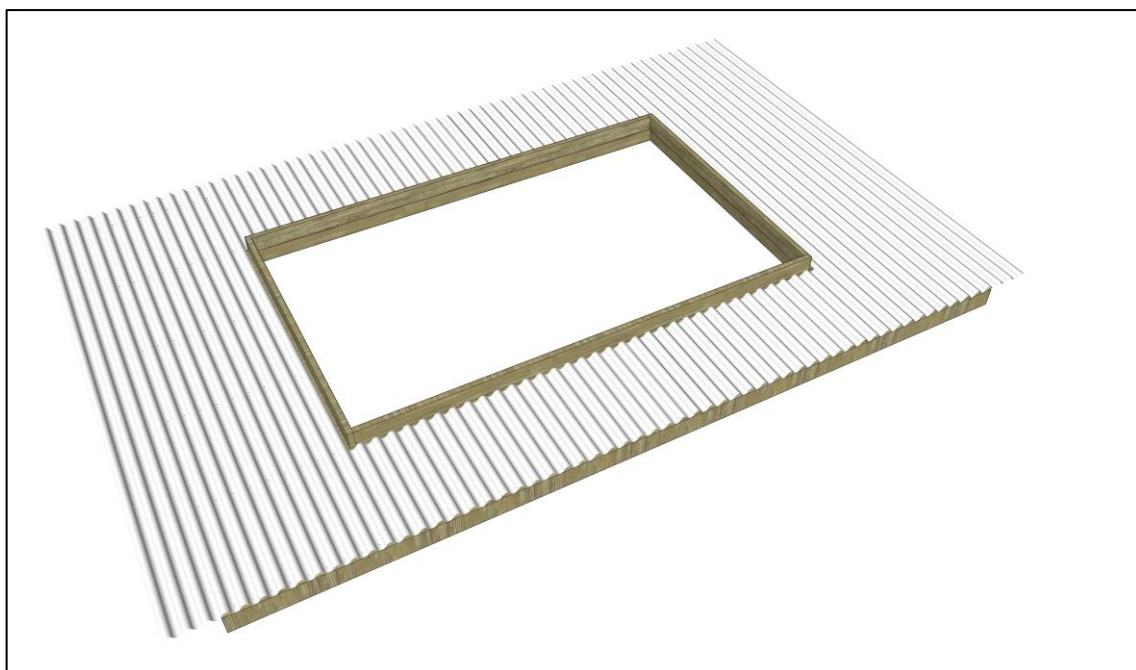
Harmony roof windows should not be stored on edge at any time. This could cause detrimental damage to the silicone seal and create latent stresses within the glass.

Harmony flat glass components should not at any time be left in direct sunlight until installation is complete. Heavy items should not be placed on top of them as this can lead to damage or distortion.

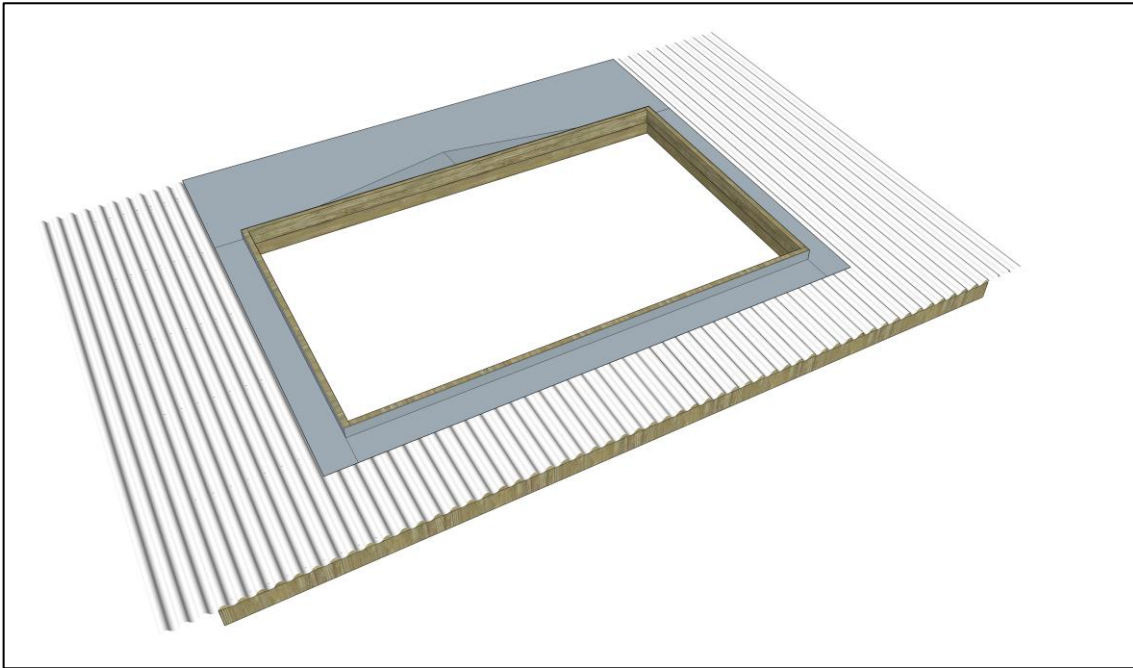
The Worksafe good practice guidelines give good advice on the necessary precautions, safe working practices and procedures that need to be adopted when working on roofs.



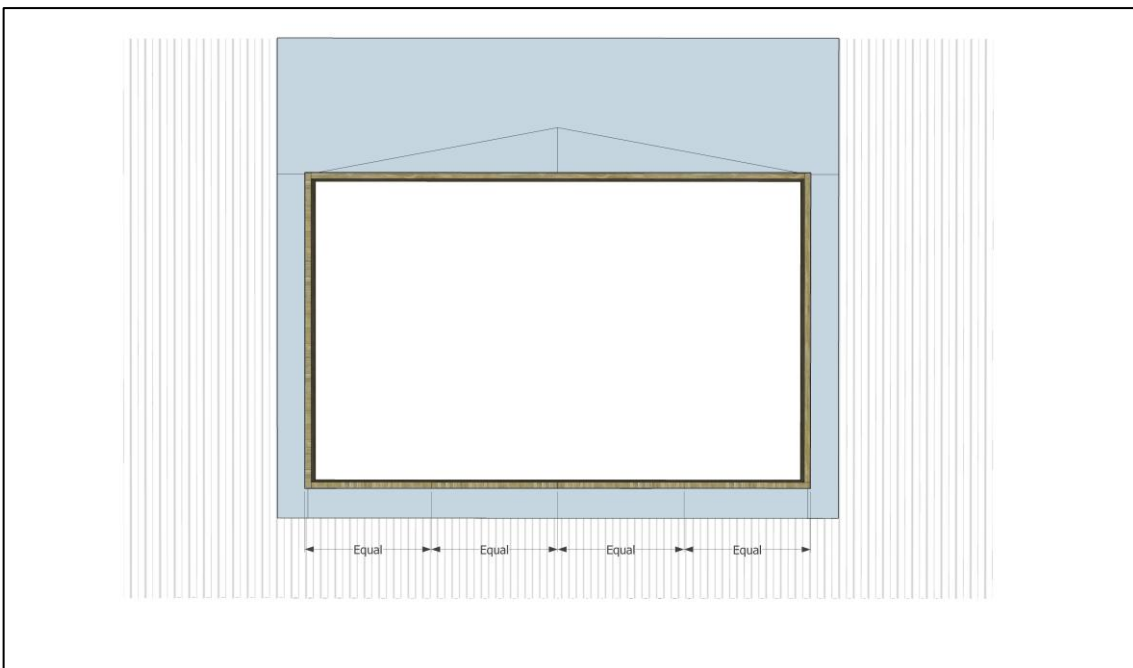
Trim a rough opening and form a suitable upstand



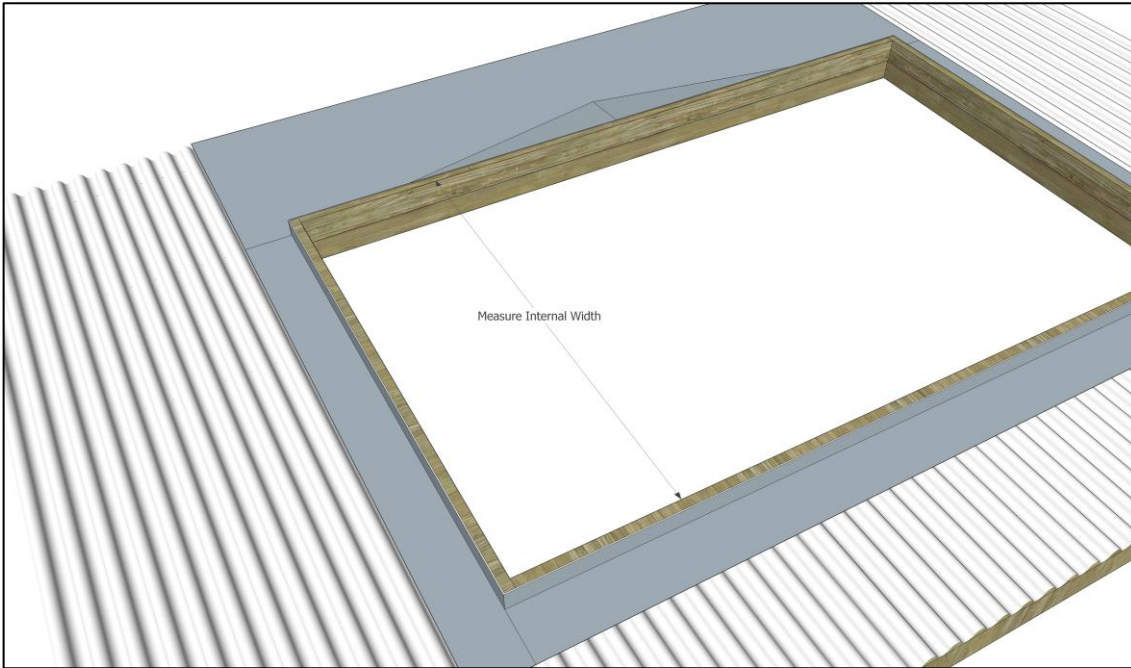
Lay the roofing around the upstand



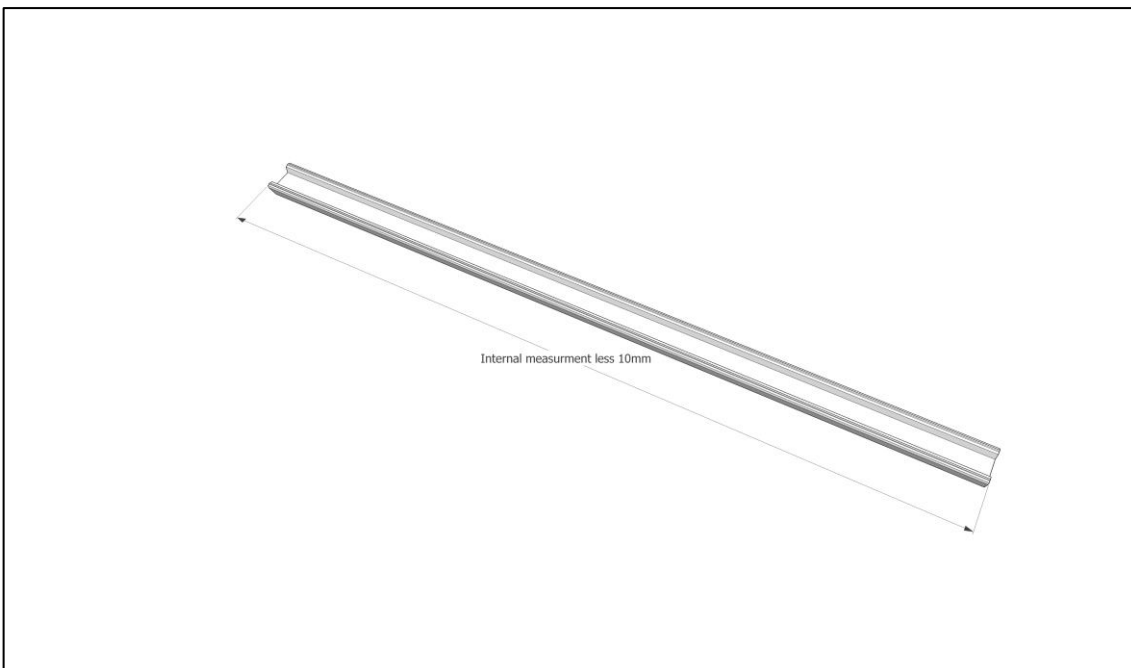
Flash the upstand with suitable flashings for the relevant roofing



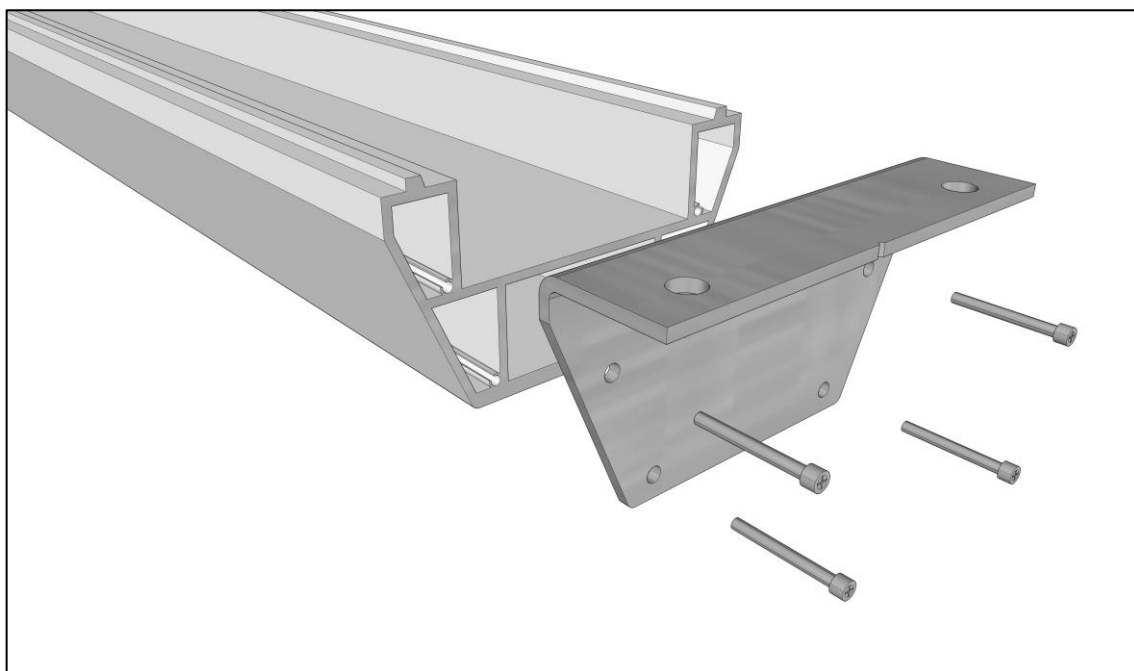
Check the spacings of the support rafters and mark the center points



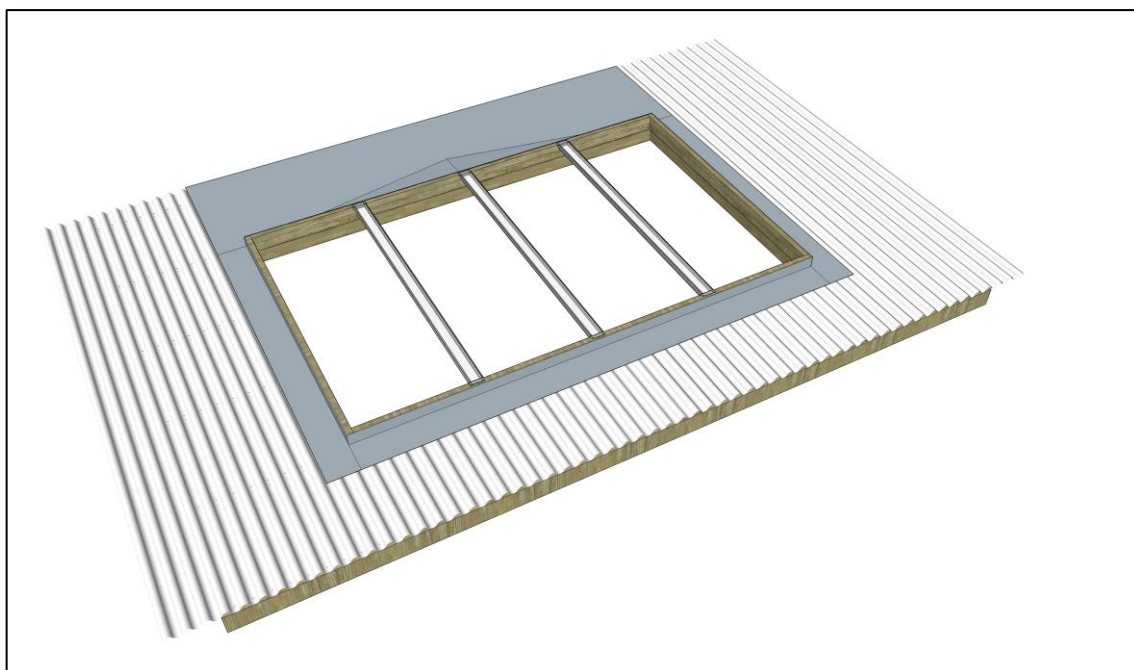
Measure the internal width of the upstand



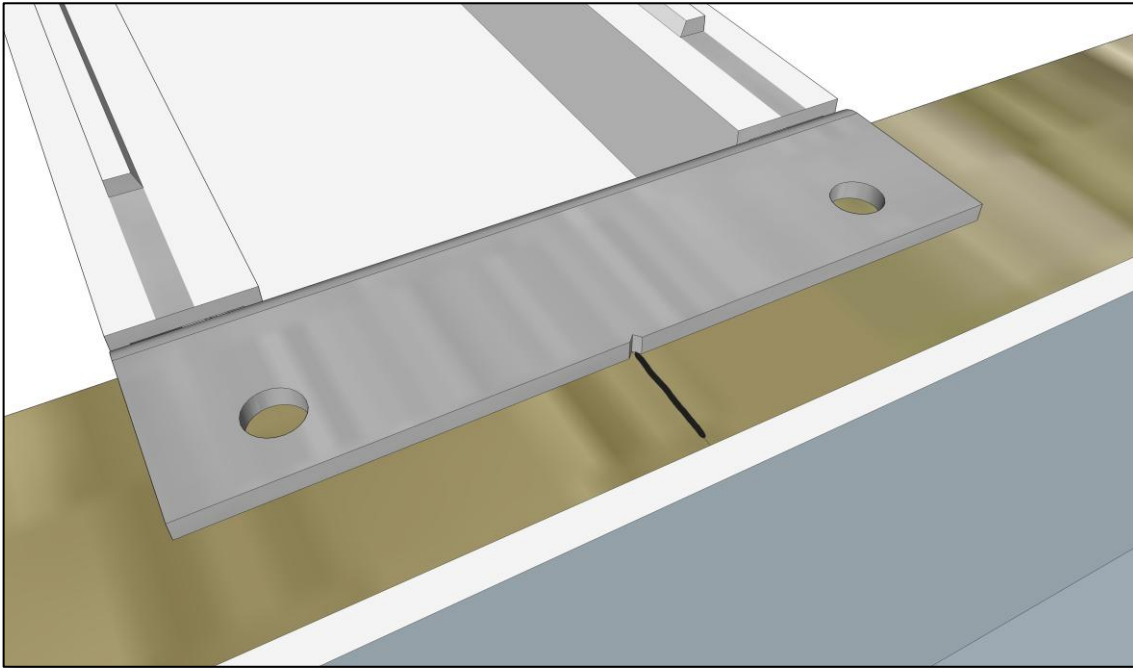
Trim the Adlux Link Beam to the internal measurement less 10mm



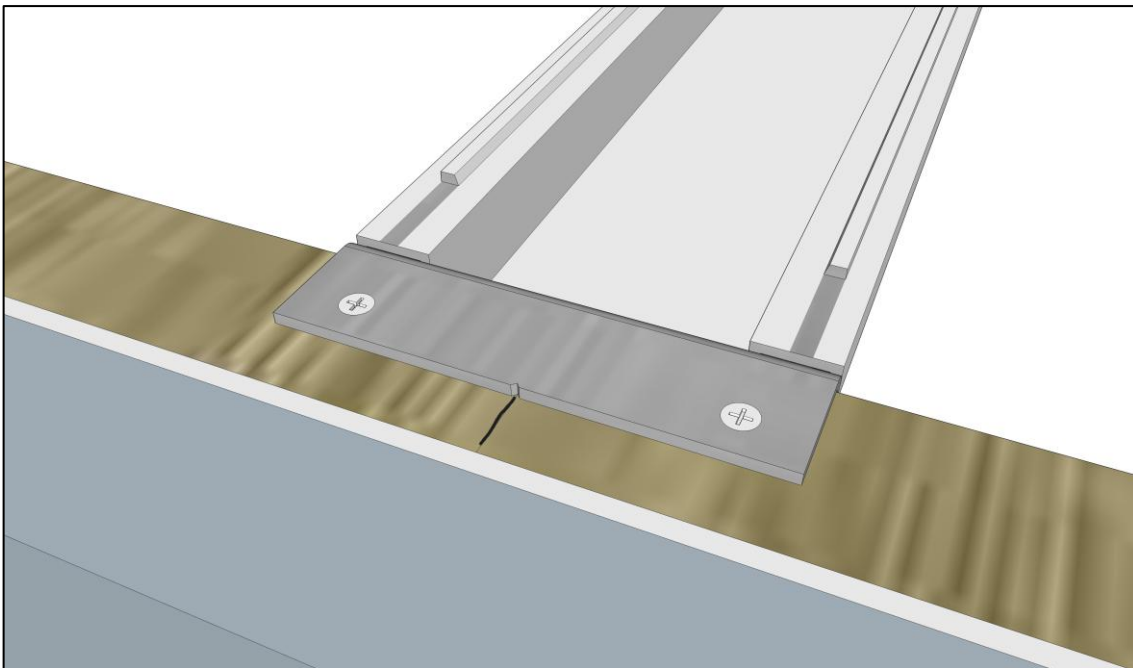
Fit the end fixing plates to the link beams



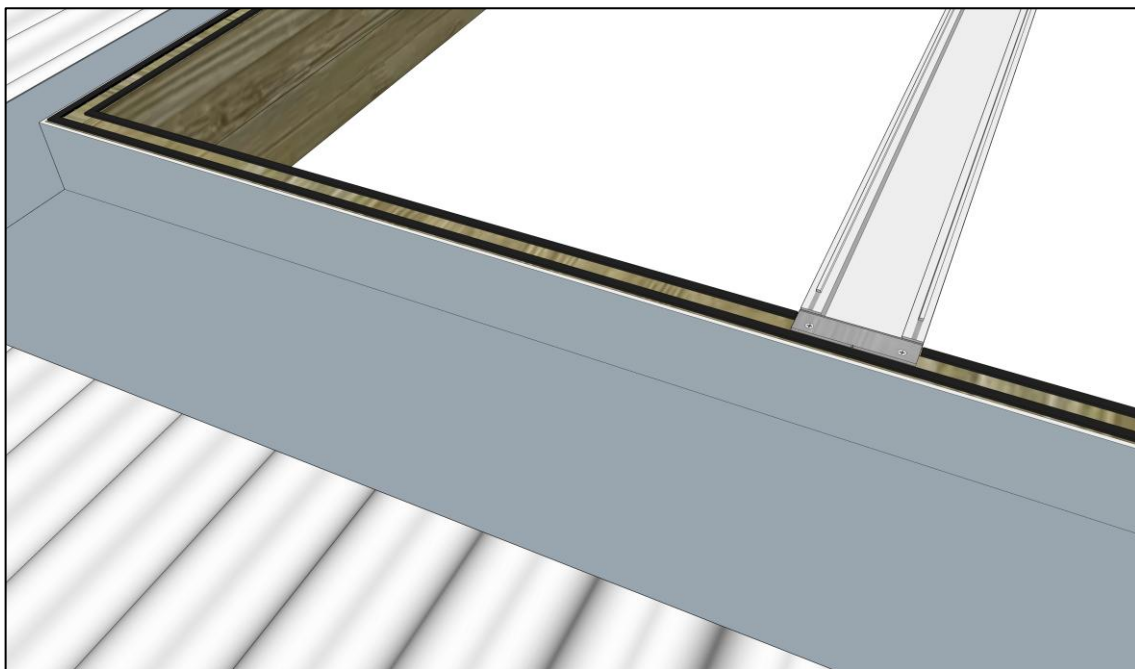
Lay the link beams in the upstand opening



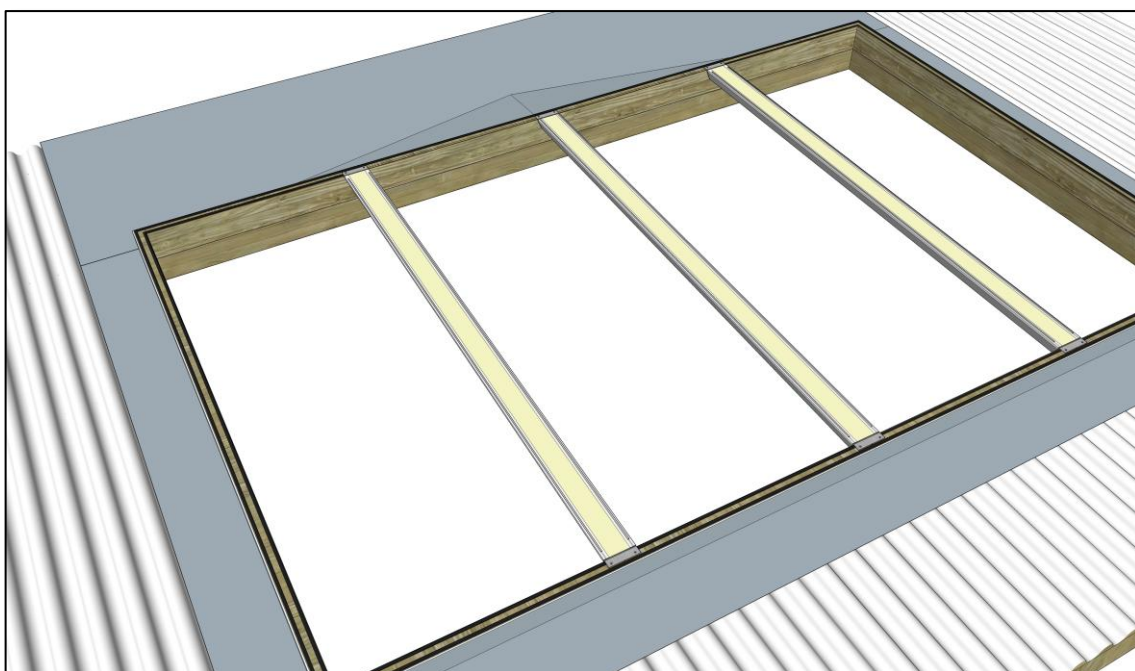
Line the centre point in the fixing plate up with the pre marked centre line



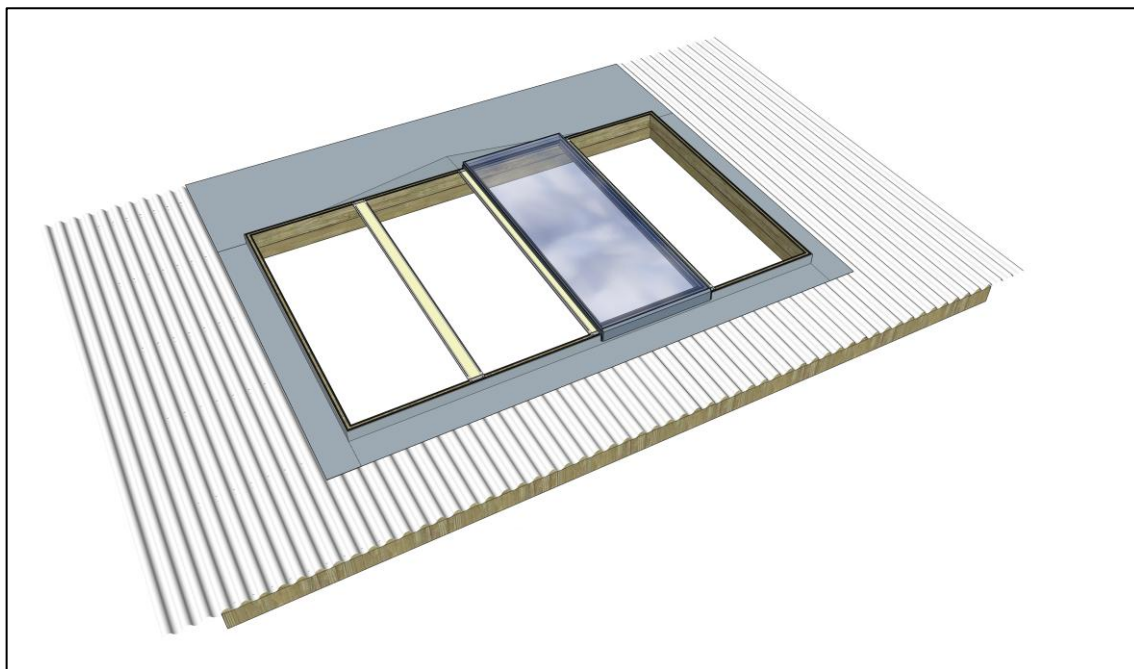
Screw the fixing plates in place through the predrilled holes



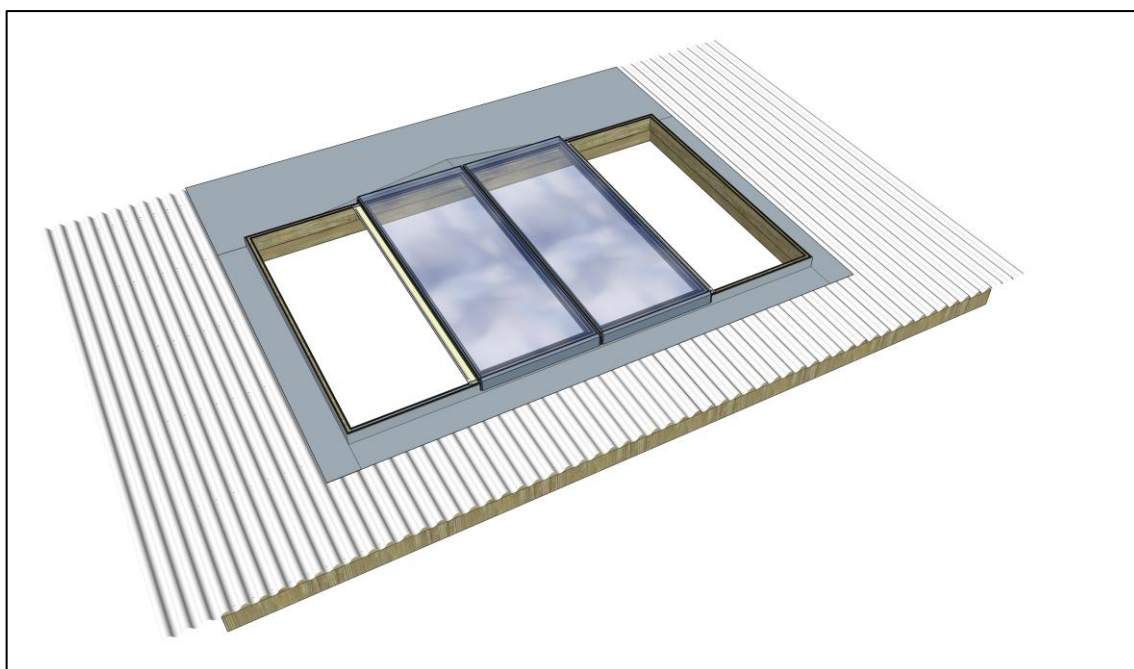
Lay 2 lines of foam seal tape on the top of the upstand



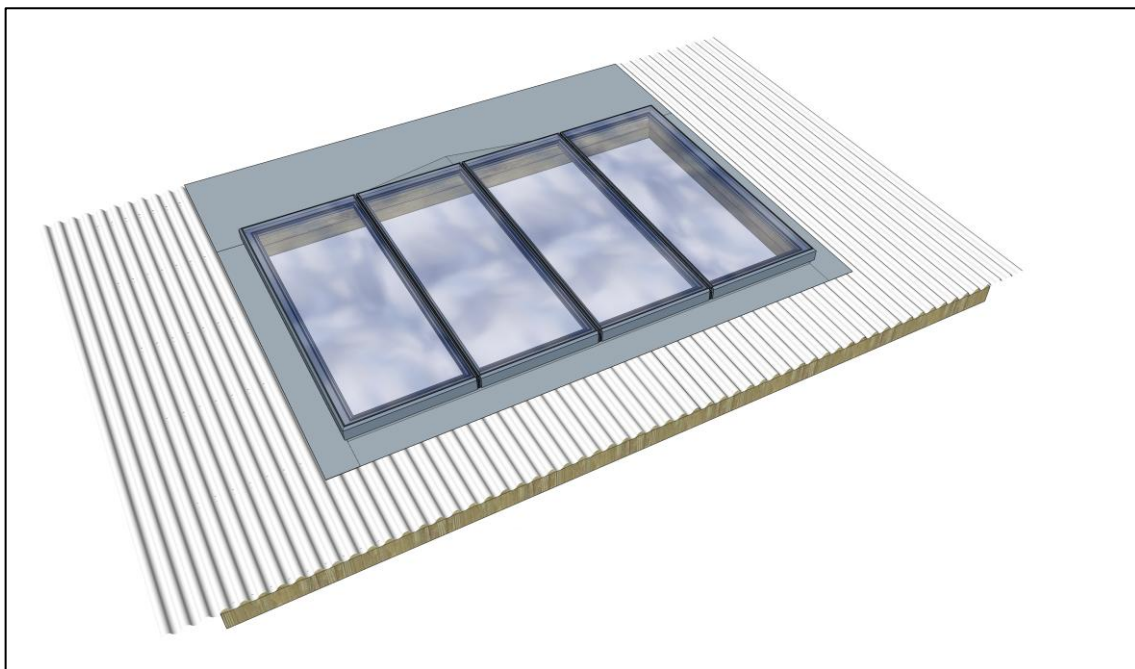
Fit the supplied PIR foam board strips into the link beam recess



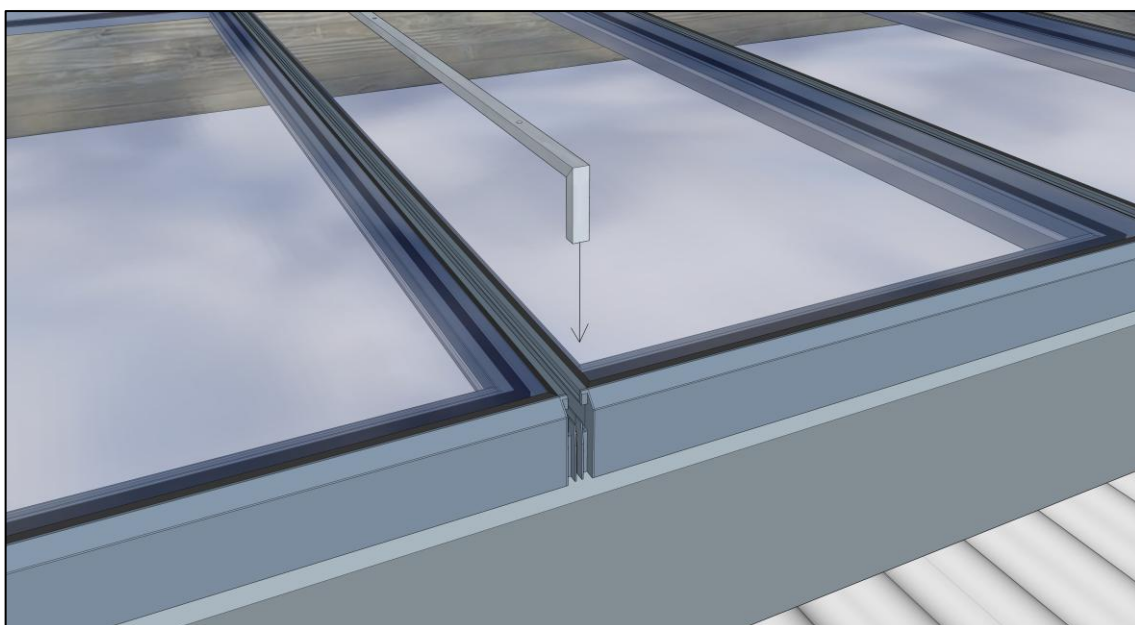
Begin with laying the centre panel Array modules (no fixing in place yet)



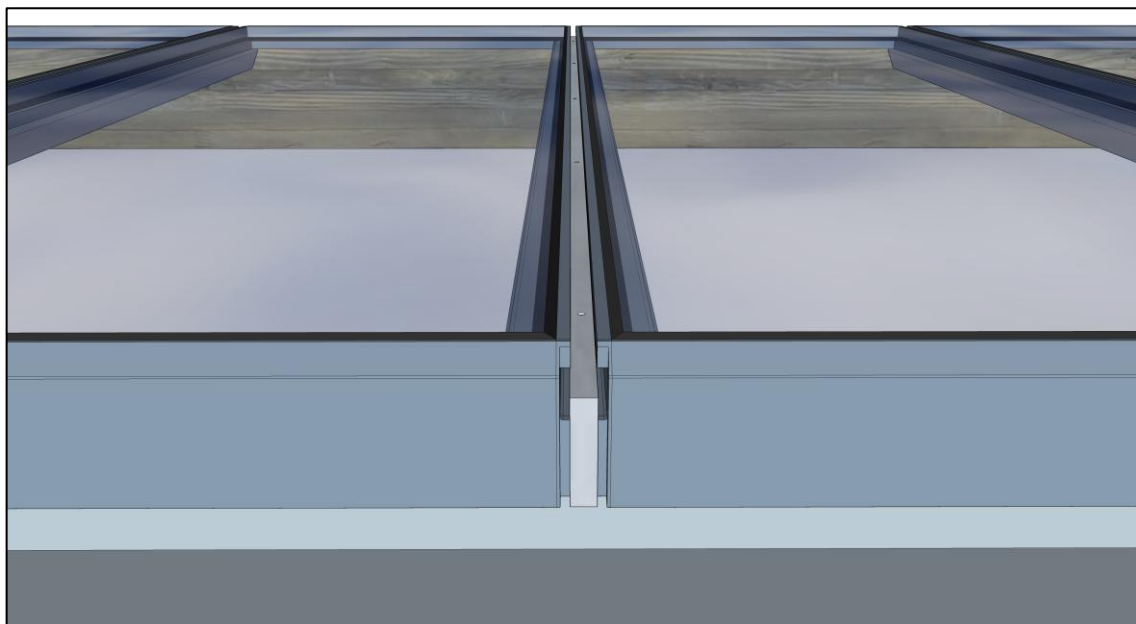
Continue laying all centre Array modules (no fixing in place yet)



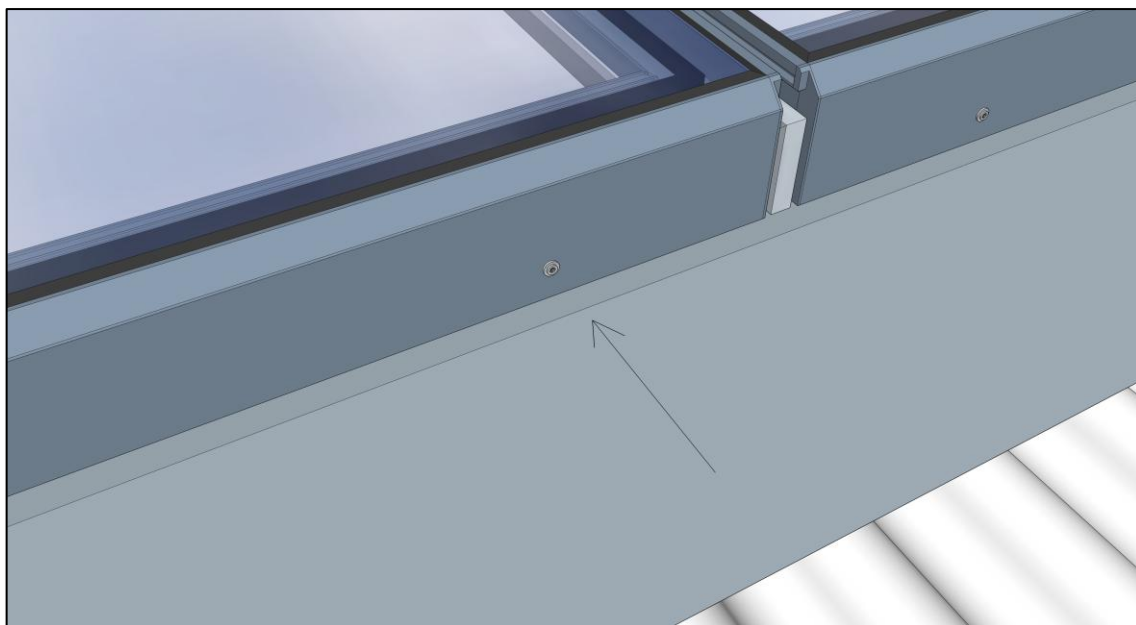
Lastly fit the end Array modules (no fixing in place yet)



Insert the centre cap between the Array modules



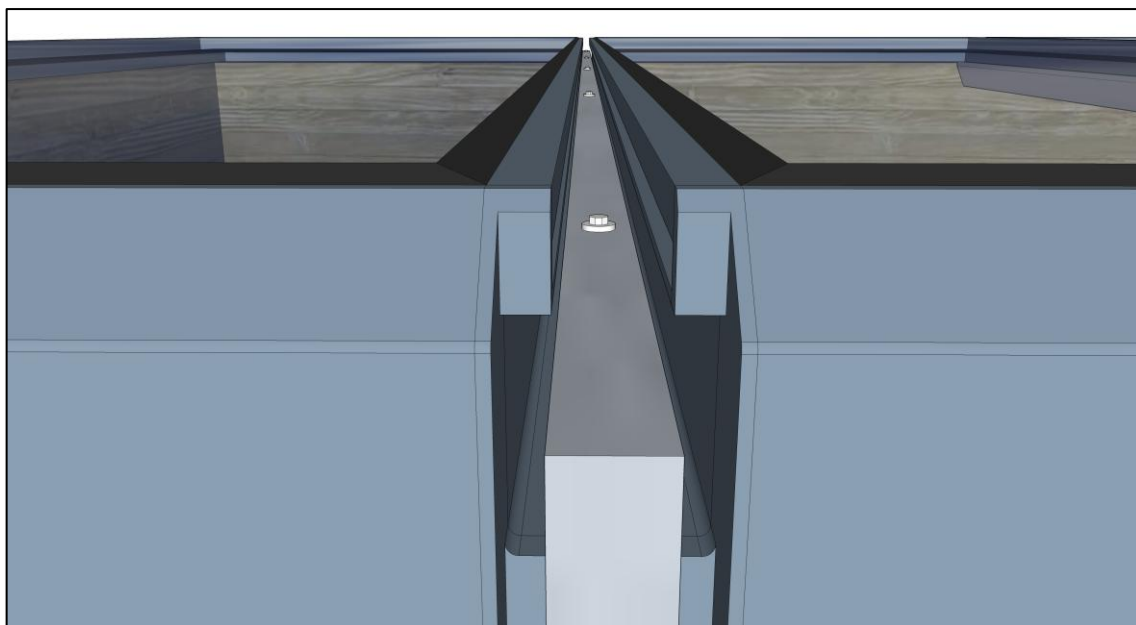
Make sure the cap is fully pressed down (some panel shuffling may be required)



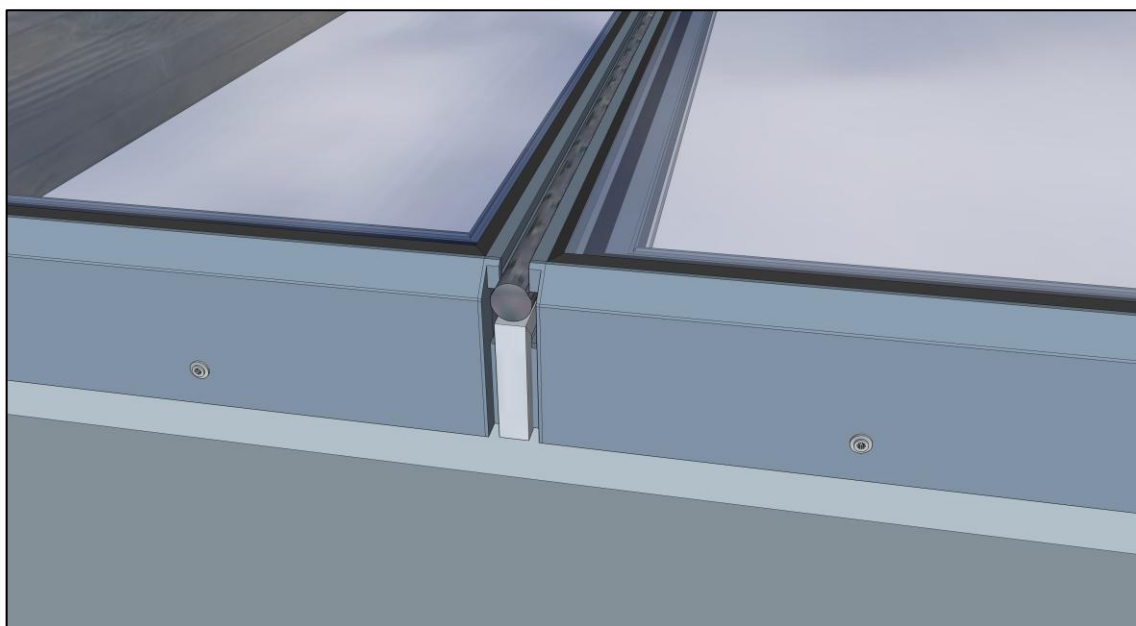
Once all lined up screw in the side fixings provided through the predrilled holes



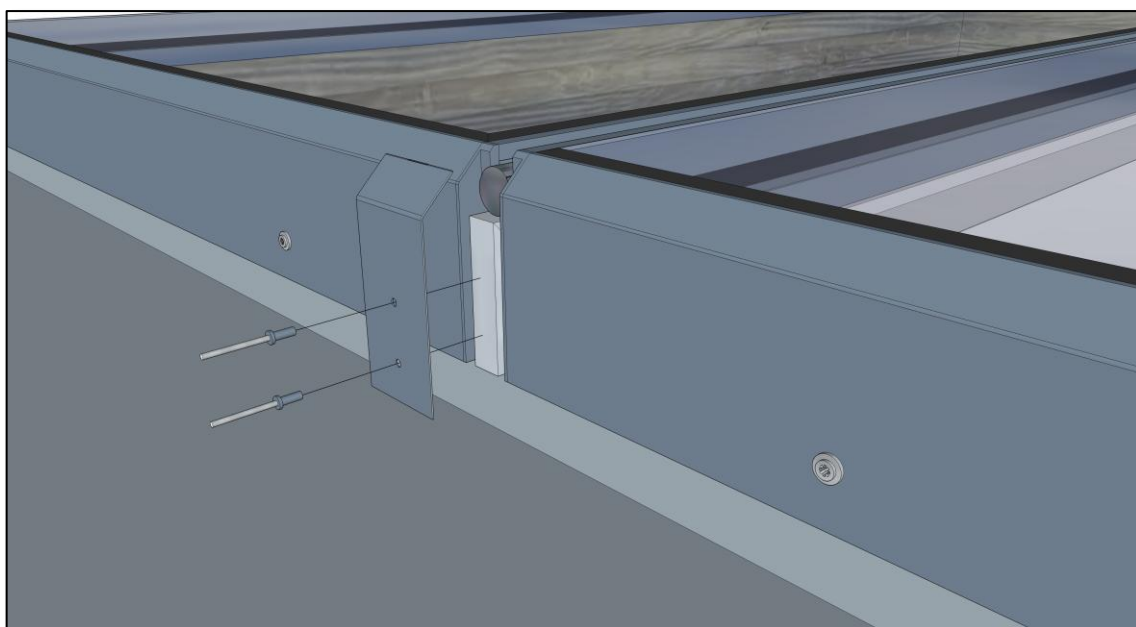
Fix the centre caps down with the provided fixings through the predrilled holes



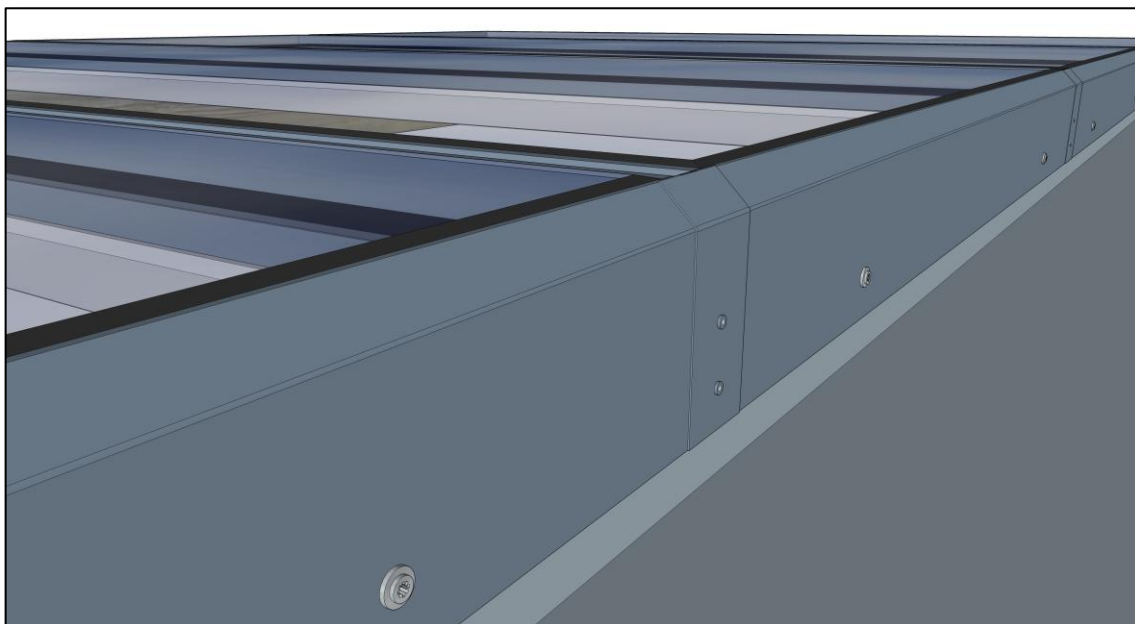
Ensure all fixings are down tightly



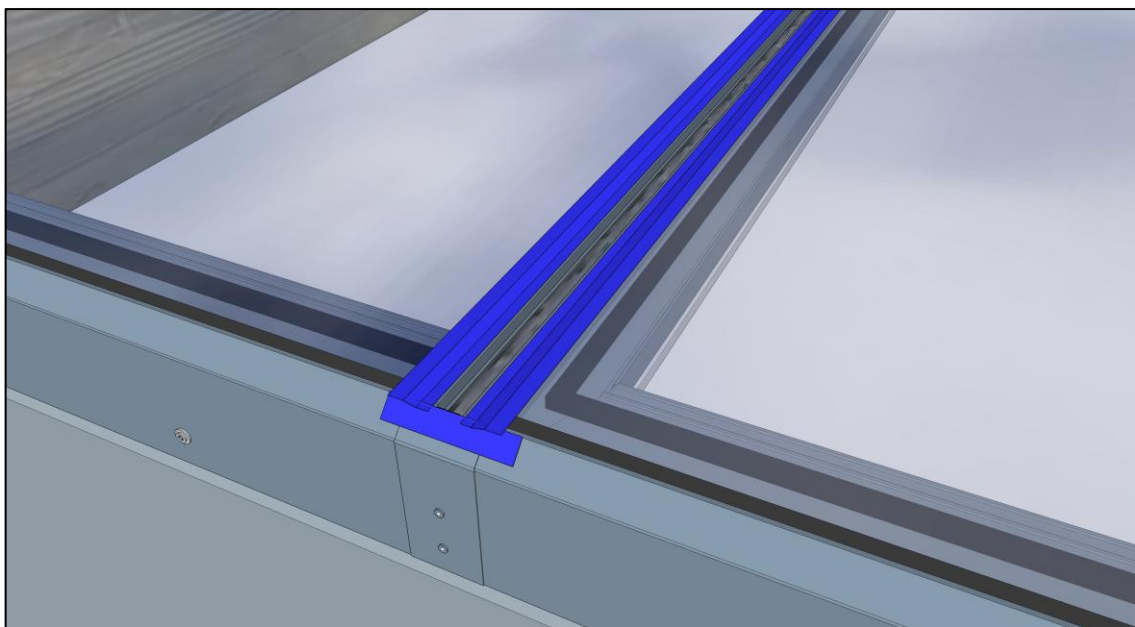
Insert the supplied 25mm PEF rod between each unit and firmly press down



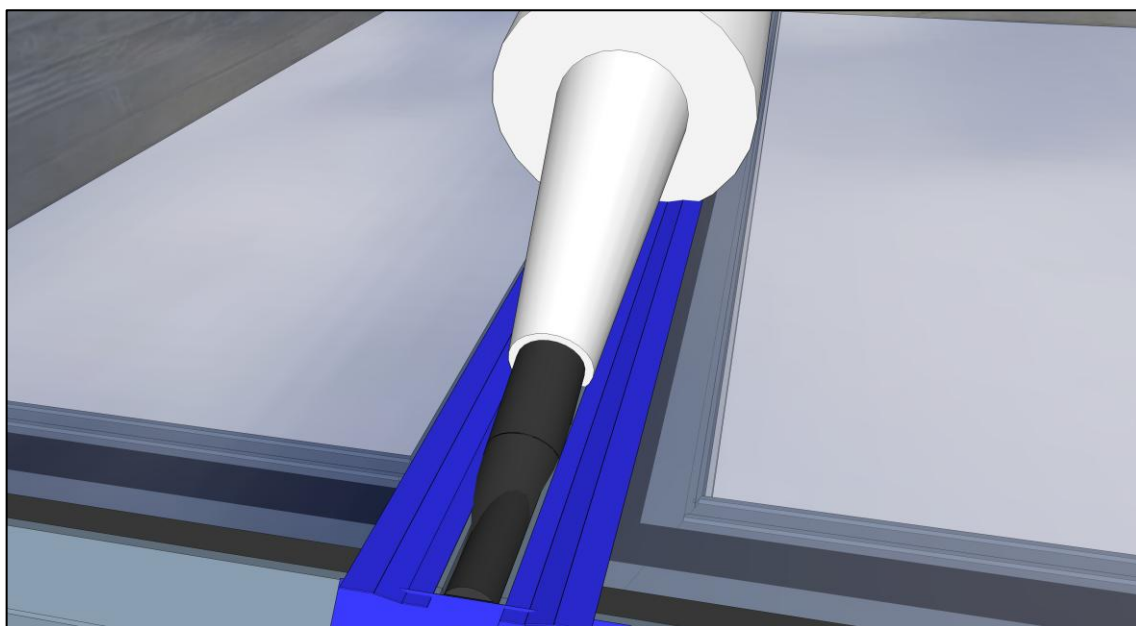
Revit on the end caps



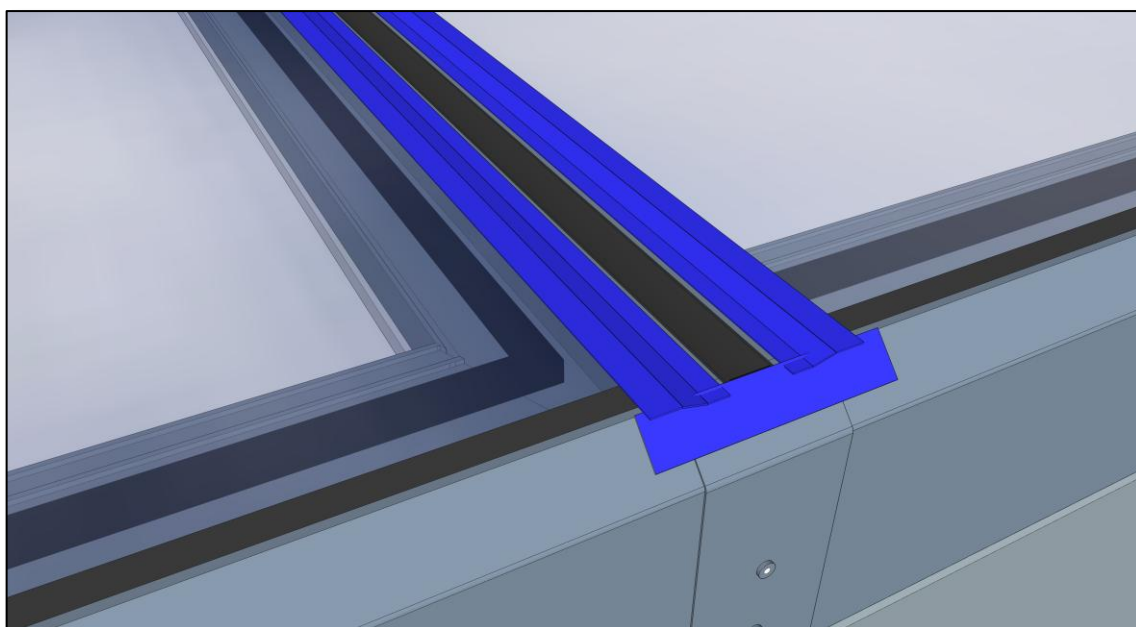
Clean the frames between the joints with Isopropyl Alcohol (or similar) to remove finger marks and allow to dry



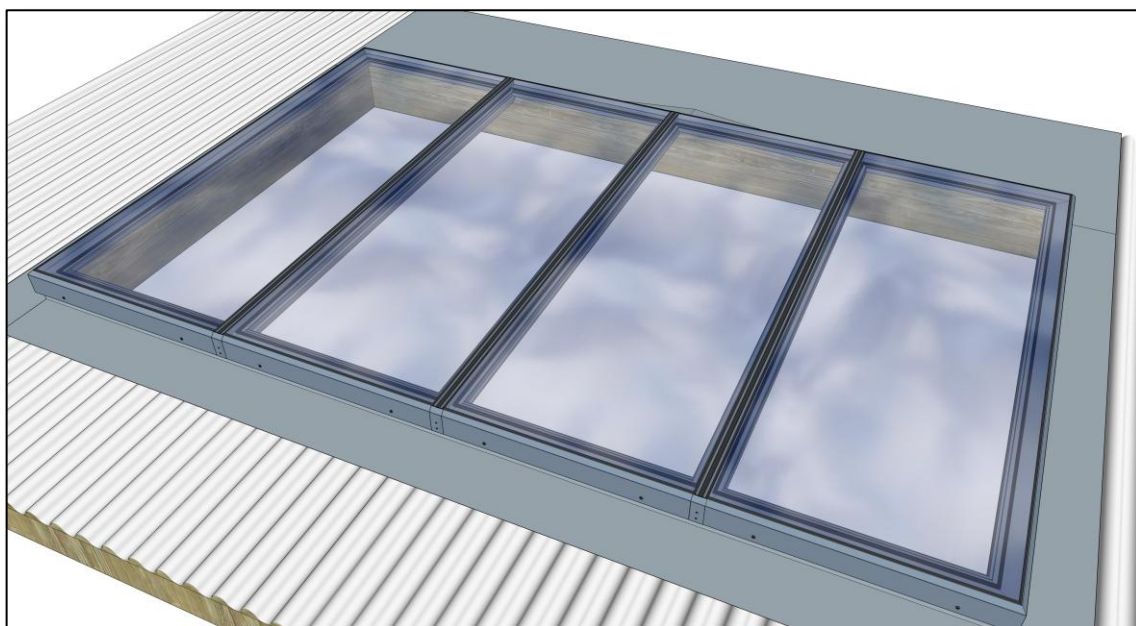
Mask the frames with masking tape



Apply the supplied glazing sealant between the frames covering the PEF rod

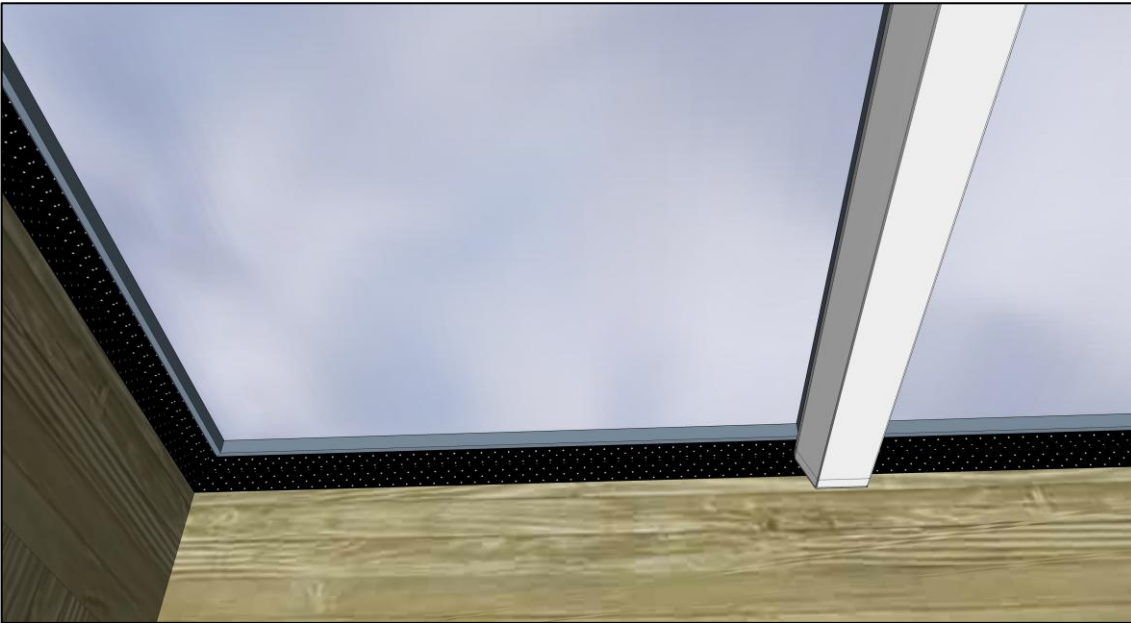


With a plastic or rubber scraper tool off the sealant to a flat finish

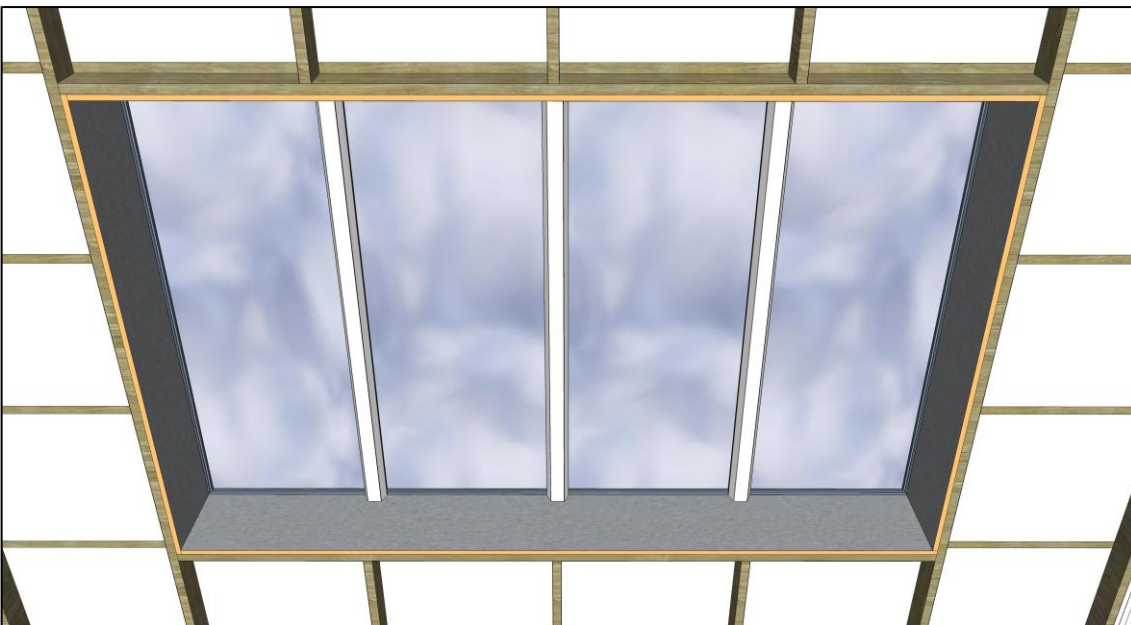


Remove the masking tape and carefully clean off any excess sealant.

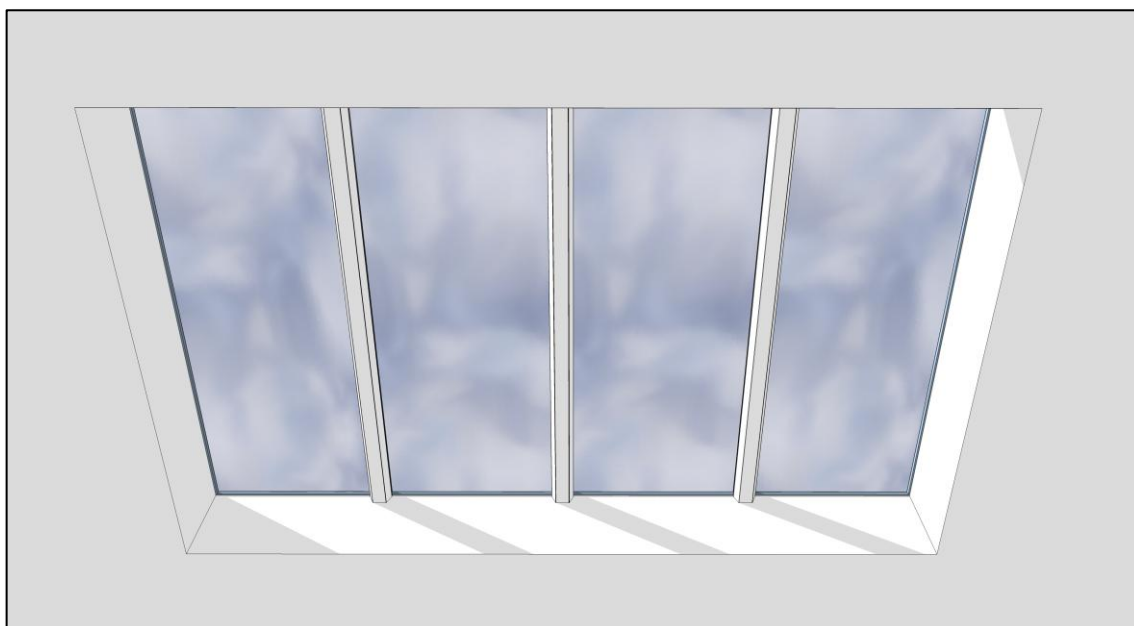
The extremal part of the Harmony Array installation is now complete.



On the inside use self-adhesive tape to provide an airtight barrier



If a 45mm upstand construction has been used, line the internal faces with 25mm insulation prior to Gib finishing



Install linings, plaster and paint as required to complete the installation.

Congratulations, installation is now finished

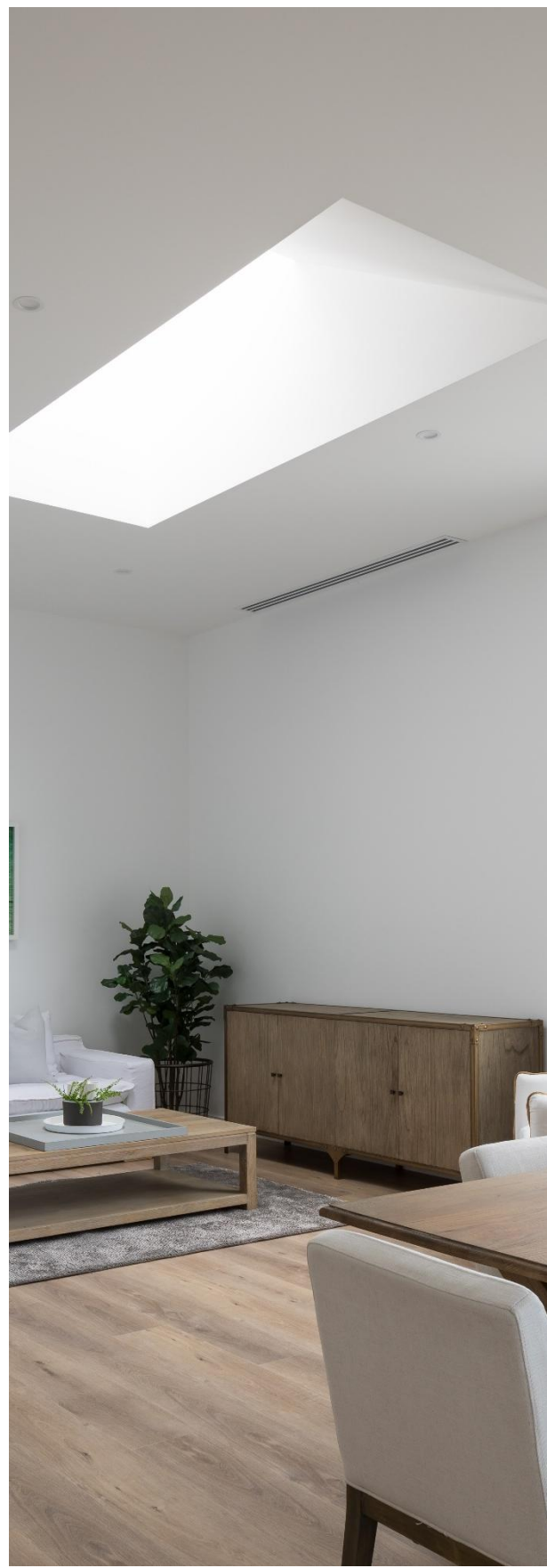


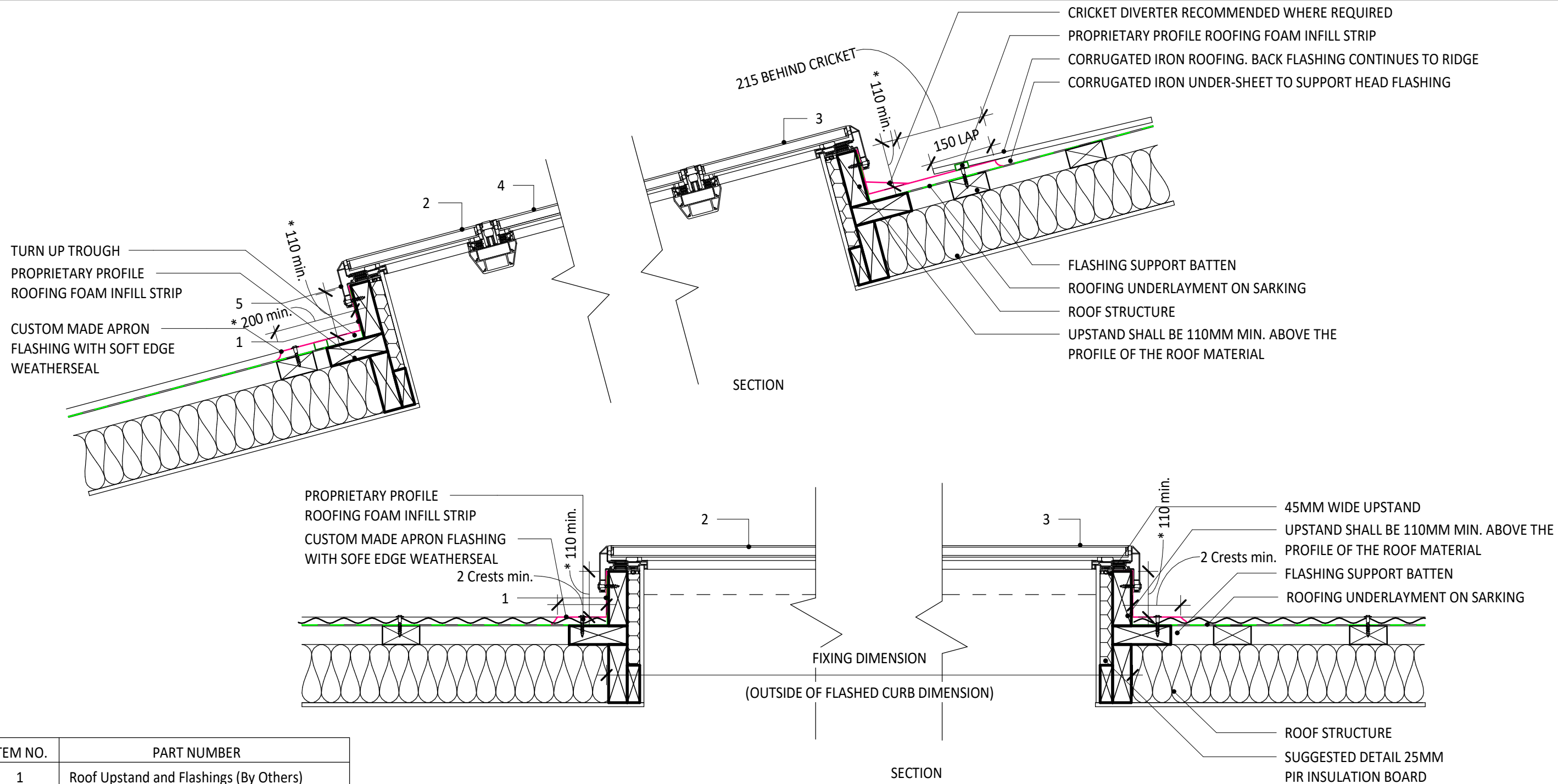


At Adlux, we believe
there's life to be found in
every home.

Our joy is in bringing yours
to light.

let life in 





Not to scale, do not scale from drawing. All details are generic in nature and should be read in conjunction with the roofing manufacturers' standard penetration details.

Note:
All flashing joints / laps
to be riveted & sealed

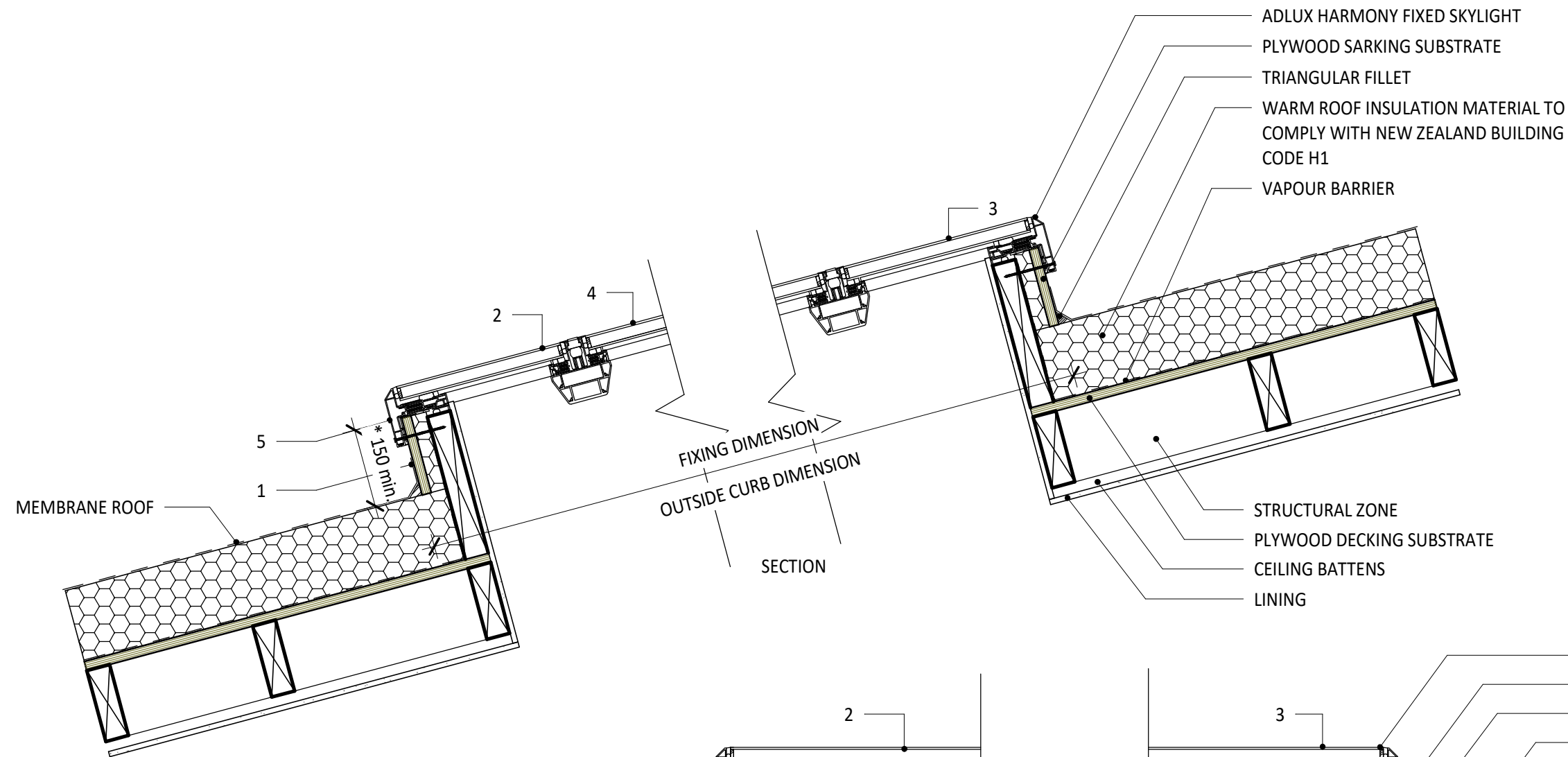


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Ph: (09) 636 6866
Email: sales@adlux.co.nz

Harmony Array - Double Glazed - Horizontal Link Beam Configuration Longrun Metal Roofing (Generic Detail)

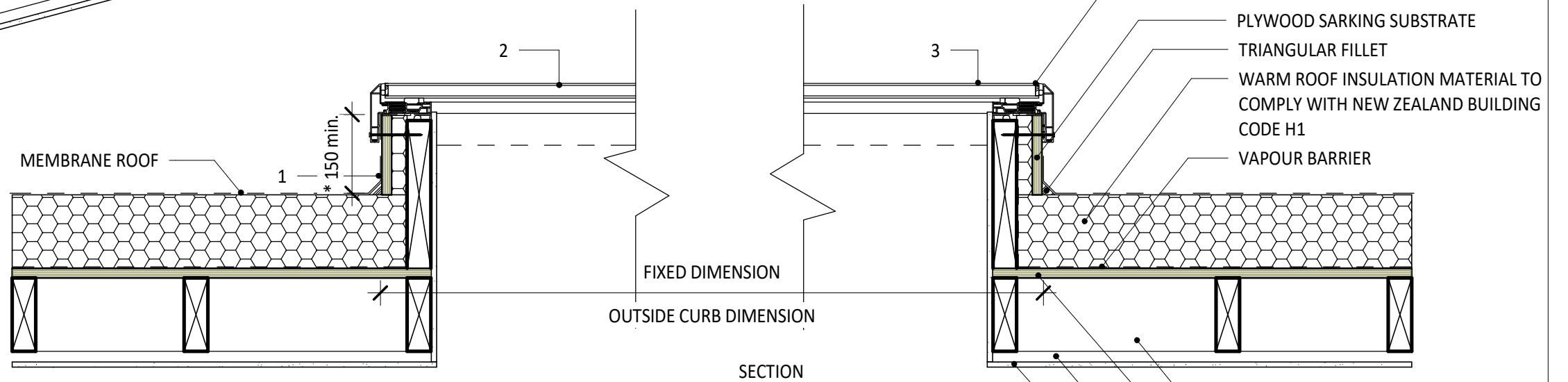
DATE: 06/07/25

DWG No: A101



ADLUX HARMONY FIXED SKYLIGHT
PLYWOOD SARKING SUBSTRATE
TRIANGULAR FILLET
WARM ROOF INSULATION MATERIAL TO
COMPLY WITH NEW ZEALAND BUILDING
CODE H1
VAPOUR BARRIER

STRUCTURAL ZONE
PLYWOOD DECKING SUBSTRATE
CEILING BATTENS
LINING



ADLUX HARMONY FIXED SKYLIGHT
PLYWOOD SARKING SUBSTRATE
TRIANGULAR FILLET
WARM ROOF INSULATION MATERIAL TO
COMPLY WITH NEW ZEALAND BUILDING
CODE H1
VAPOUR BARRIER

STRUCTURAL ZONE
PLYWOOD DECKING SUBSTRATE
CEILING BATTENS
LINING

ITEM NO.	PART NUMBER
1	Roof Upstand and Flashings (By Others)
2	Harmony Array - End Unit L
3	Harmony Array - End Unit R
4	Harmony Array - Intermediate Unit
5	6.0 X 80 304 Star Washer Construction Screw

Not to scale, do not scale from drawing. All details are generic in nature and should be read in conjunction with the roofing manufacturers' standard penetration details.

Note:
All flashing joints / laps
to be riveted & sealed

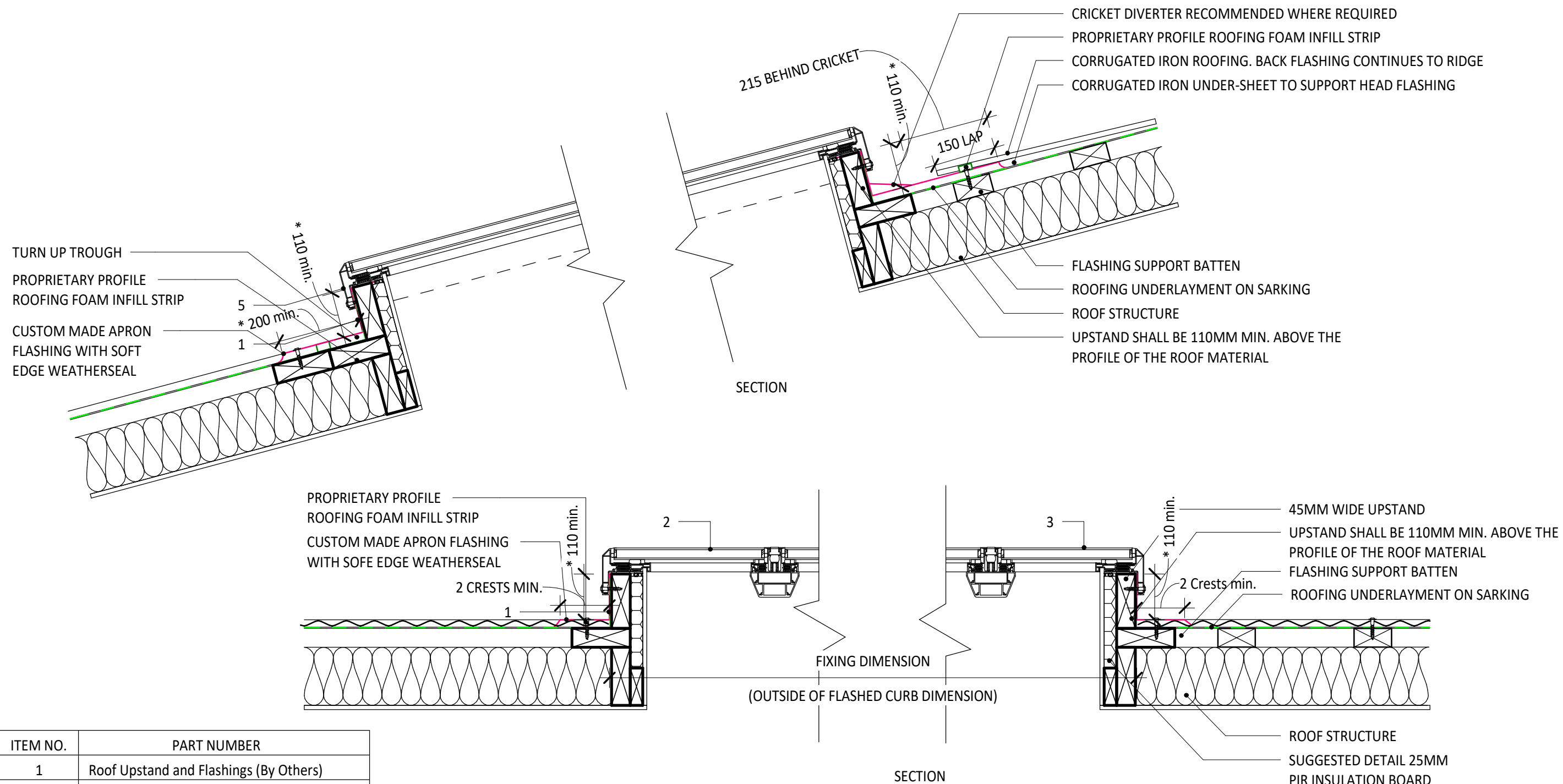
Harmony Array - Double Glazed - Horizontal Link Beam Configuration Membrane Roofing (Generic Detail)

DATE: 06/07/25

DWG No: A102



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ITEM NO.	PART NUMBER
1	Roof Upstand and Flashings (By Others)
2	Harmony Array - End Unit L
3	Harmony Array - End Unit R
4	Harmony Array - Intermediate Unit
5	6.0 X 80 304 Star Washer Construction Screw

Not to scale, do not scale from drawing. All details are generic in nature and should be read in conjunction with the roofing manufacturers' standard penetration details.

Note:
All flashing joints / laps
to be riveted & sealed

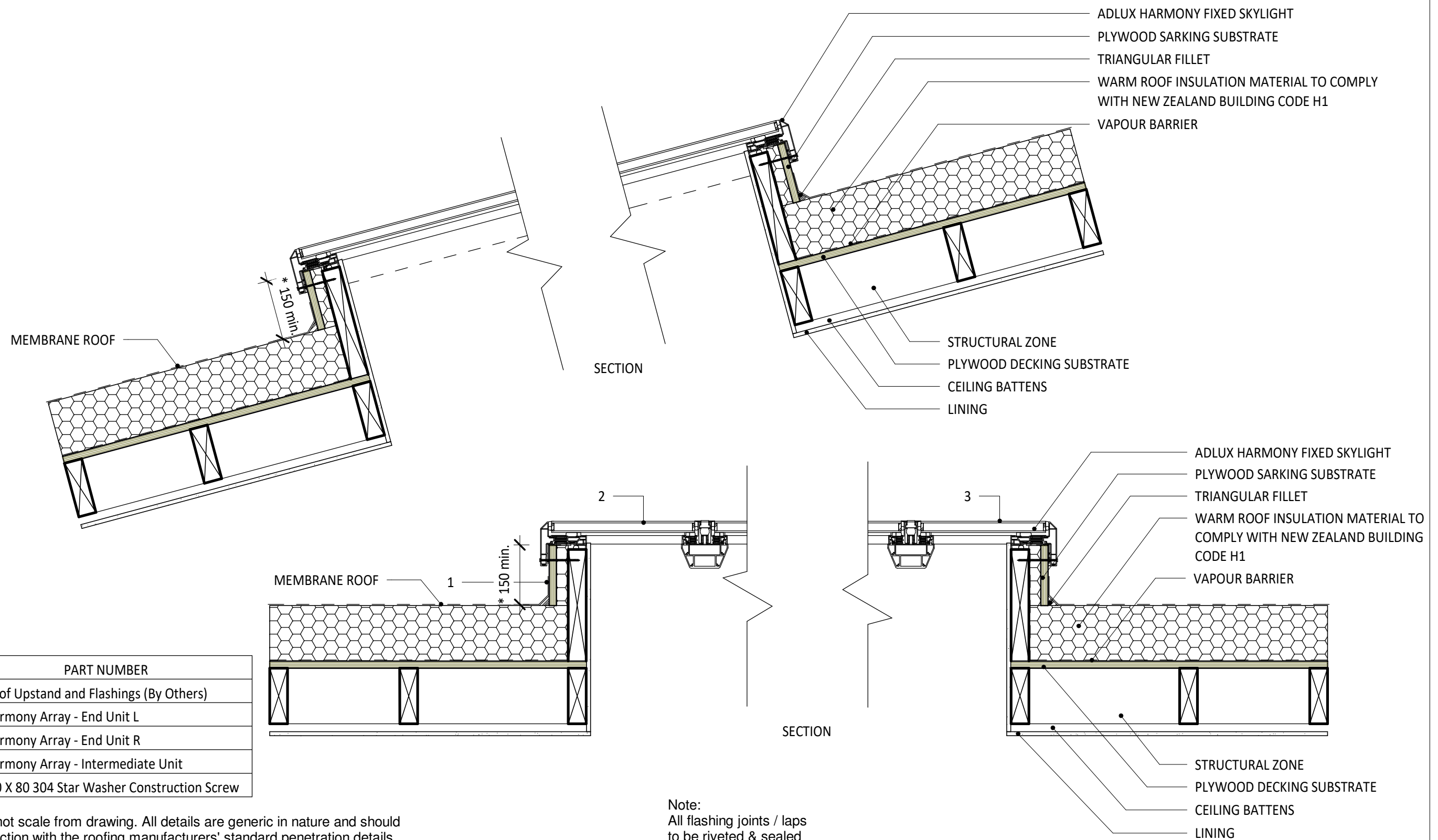


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Harmony Array - Double Glazed - Vertical Link Beam Configuration Longrun Metal Roofing (Generic Detail)

DATE: 06/07/25

DWG No: A103



ITEM NO.	PART NUMBER
1	Roof Upstand and Flashings (By Others)
2	Harmony Array - End Unit L
3	Harmony Array - End Unit R
4	Harmony Array - Intermediate Unit
5	6.0 X 80 304 Star Washer Construction Screw

Not to scale, do not scale from drawing. All details are generic in nature and should be read in conjunction with the roofing manufacturers' standard penetration details.

Note:
All flashing joints / laps
to be riveted & sealed

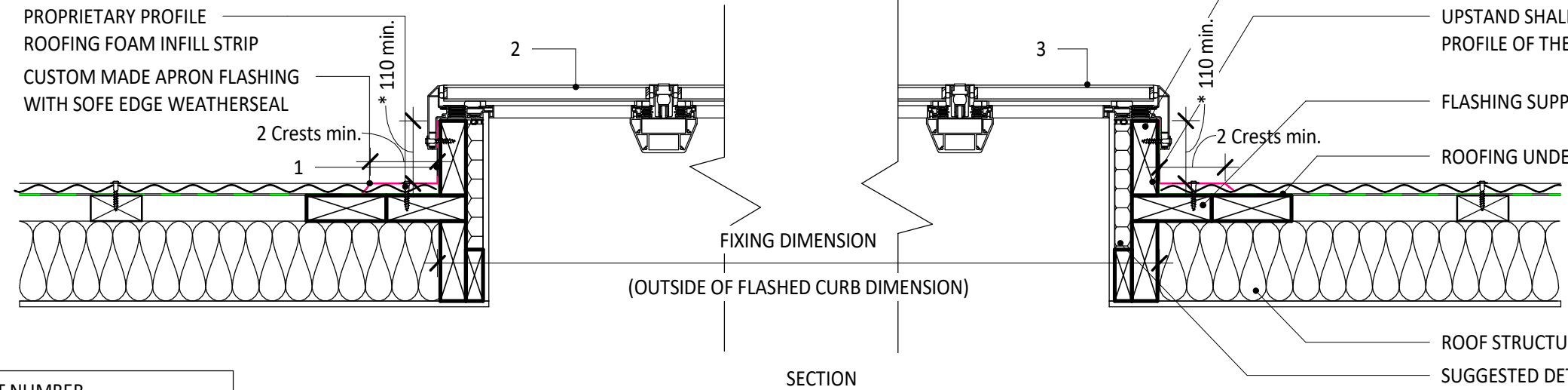
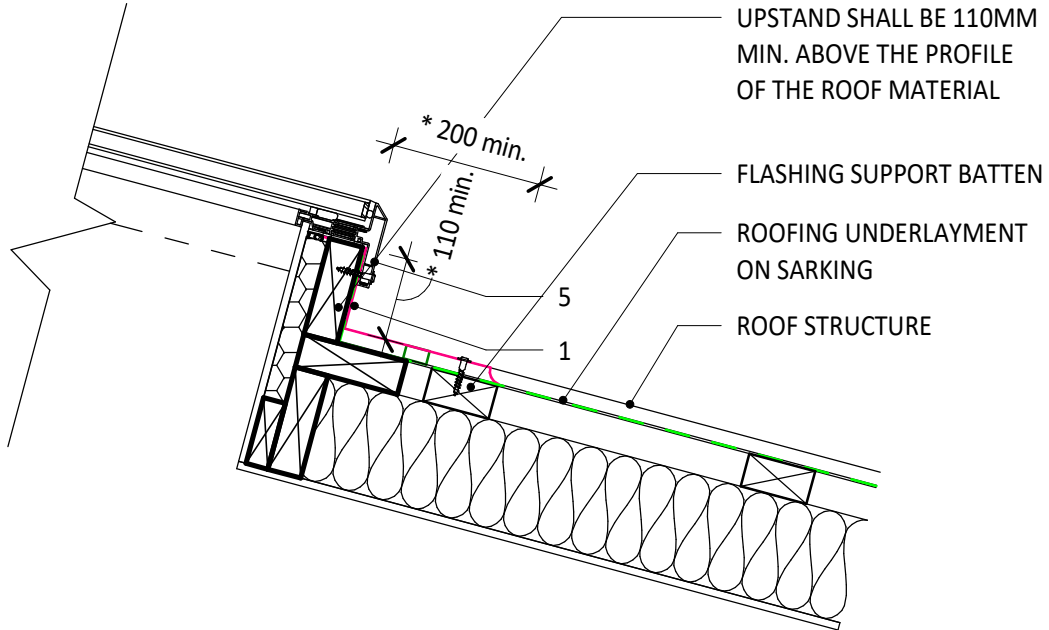
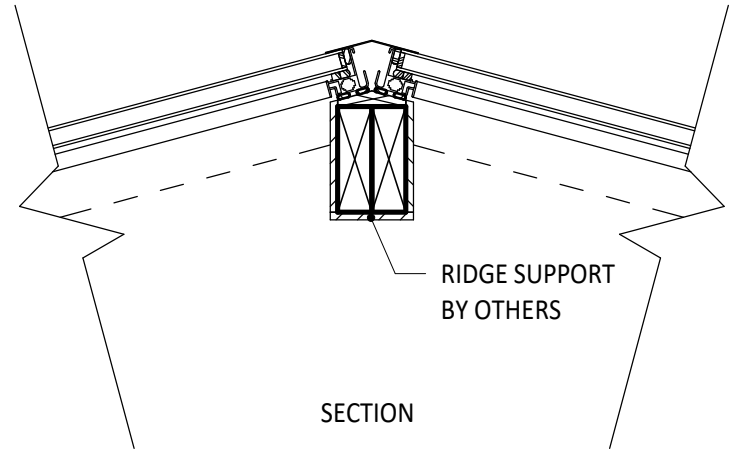
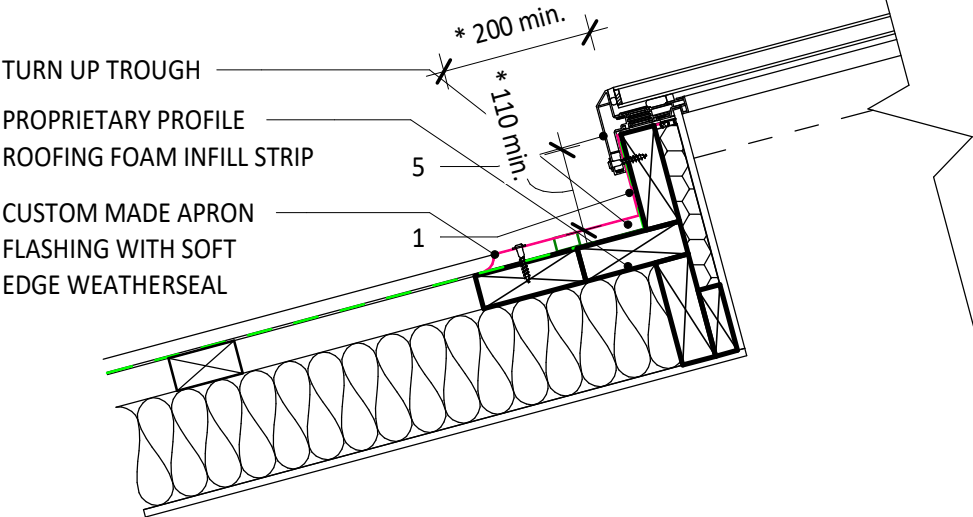


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Harmony Array - Double Glazed - Vertical Link Beam Configuration Membrane Roofing (Generic Detail)

DATE: 06/07/25

DWG No: A104



ITEM NO.	PART NUMBER
1	Roof Upstand and Flashings (By Others)
2	Harmony Array - End Unit L
3	Harmony Array - End Unit R
4	Harmony Array - Intermediate Unit
5	6.0 X 80 304 Star Washer Construction Screw

Not to scale, do not scale from drawing. All details are generic in nature and should be read in conjunction with the roofing manufacturers' standard penetration details.

Note:
All flashing joints / laps
to be riveted & sealed



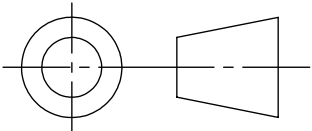
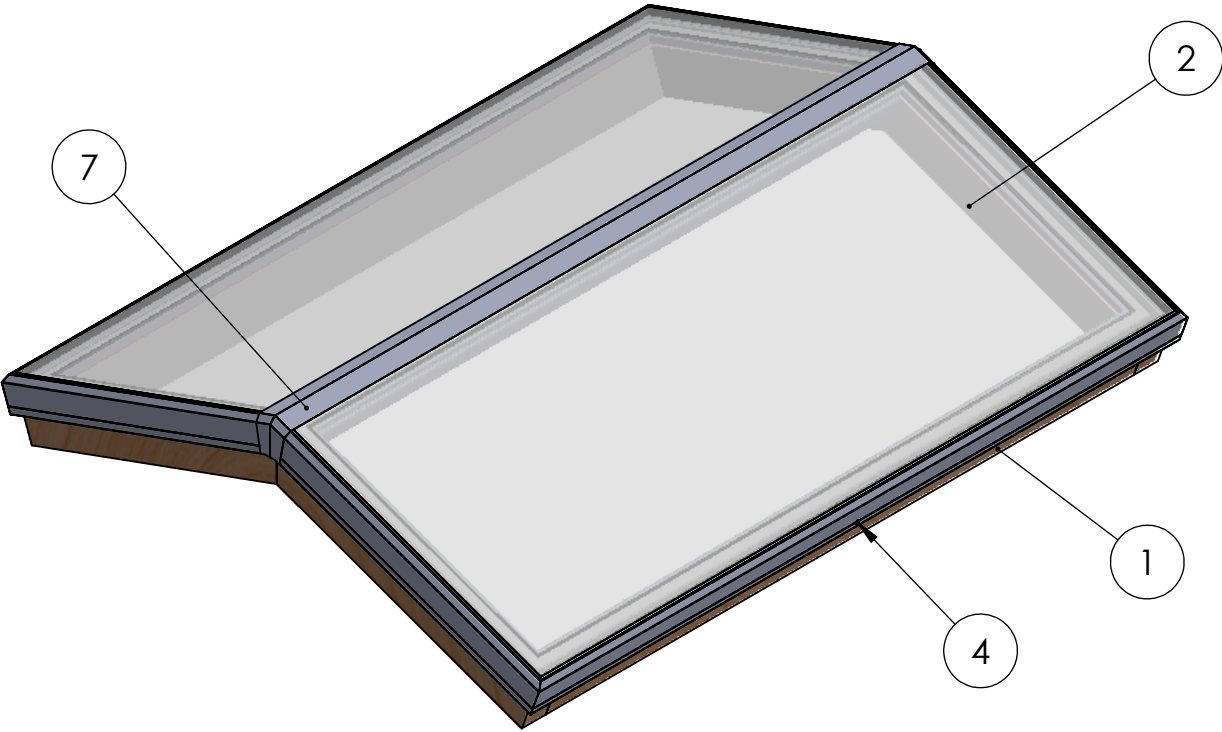
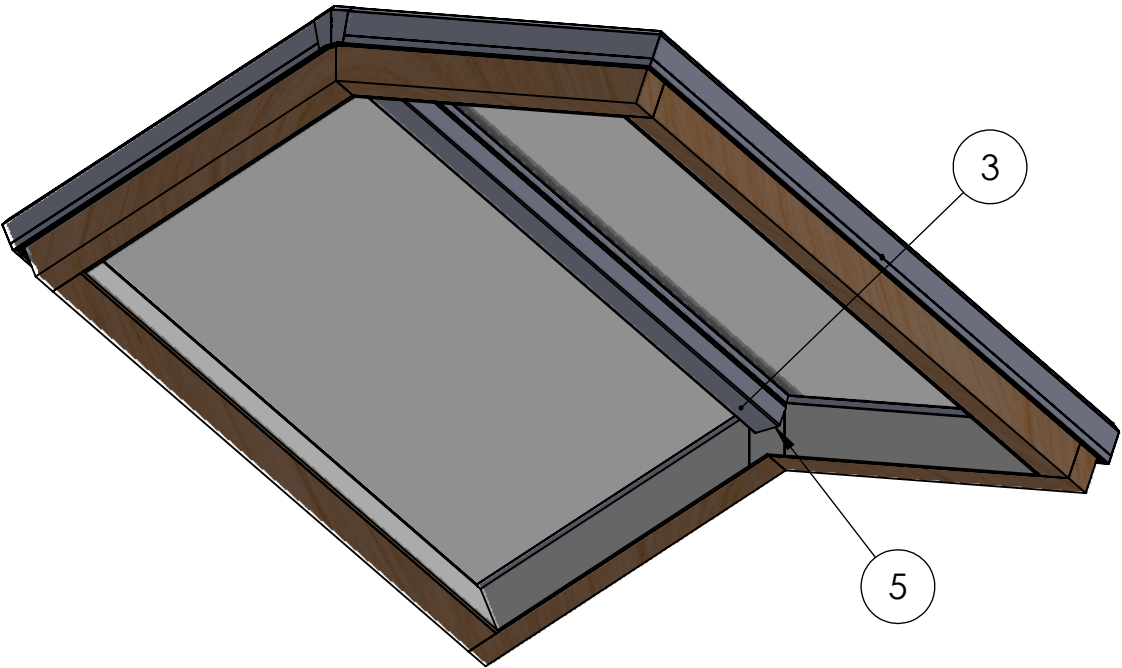
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Onehunga, Auckland, New Zealand.
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Email: sales@adlux.co.nz

Harmony Array - Double Glazed - Dual Pitch Configuration Longrun Metal Roofing (Generic Detail)

DATE: 06/07/25

DWG No: A105

ITEM NO.	PART NUMBER	QTY.
1	Harmony Array Ridge Upstand - for Joint Support Beam (By Others)	1
2	Harmony Array - Ridge - for Joint Support Beam	2
3	Harmony Array - Ridge - Joint Support Beam	1
4	6.0 X 80 304 Star Washer Construction Screw	2
5	Adlux TBR - End Cap	2
6	12G-14X65 Hardtec SS HWF Self Drill Screw	1
7	Harmony Array Ridge Main Capping - with Support Beam	1



REVISION No

MATERIAL

Drawing Title
Harmony Array - over ridge - with Joint Support Beam

A3

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES

DATE

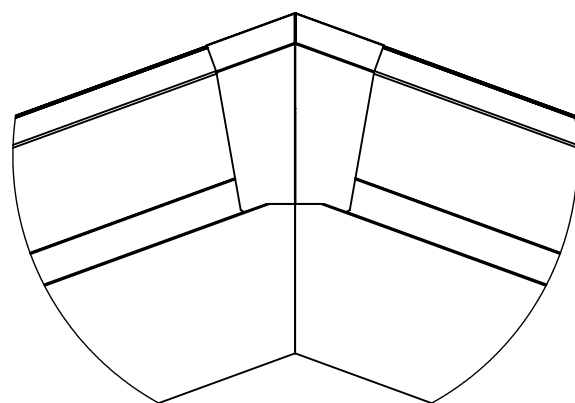
29/05/2025

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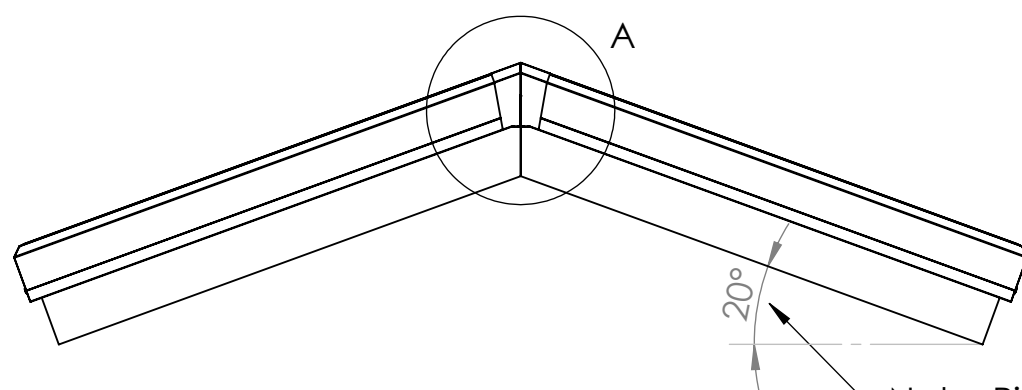
M Herman

SCALE 1:20

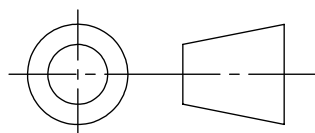
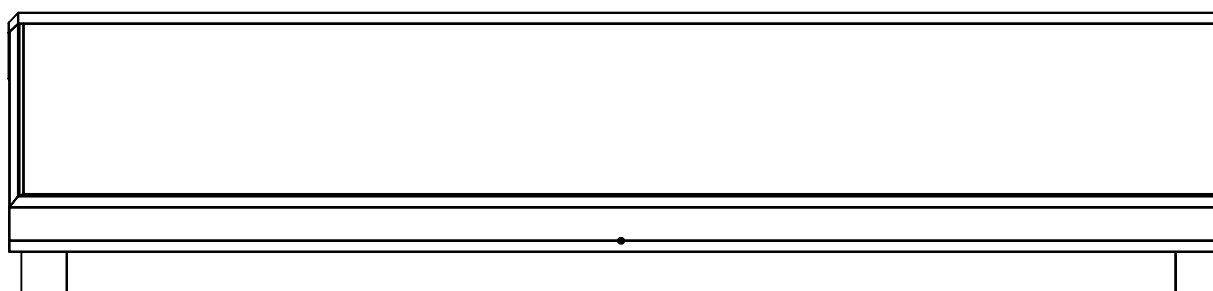
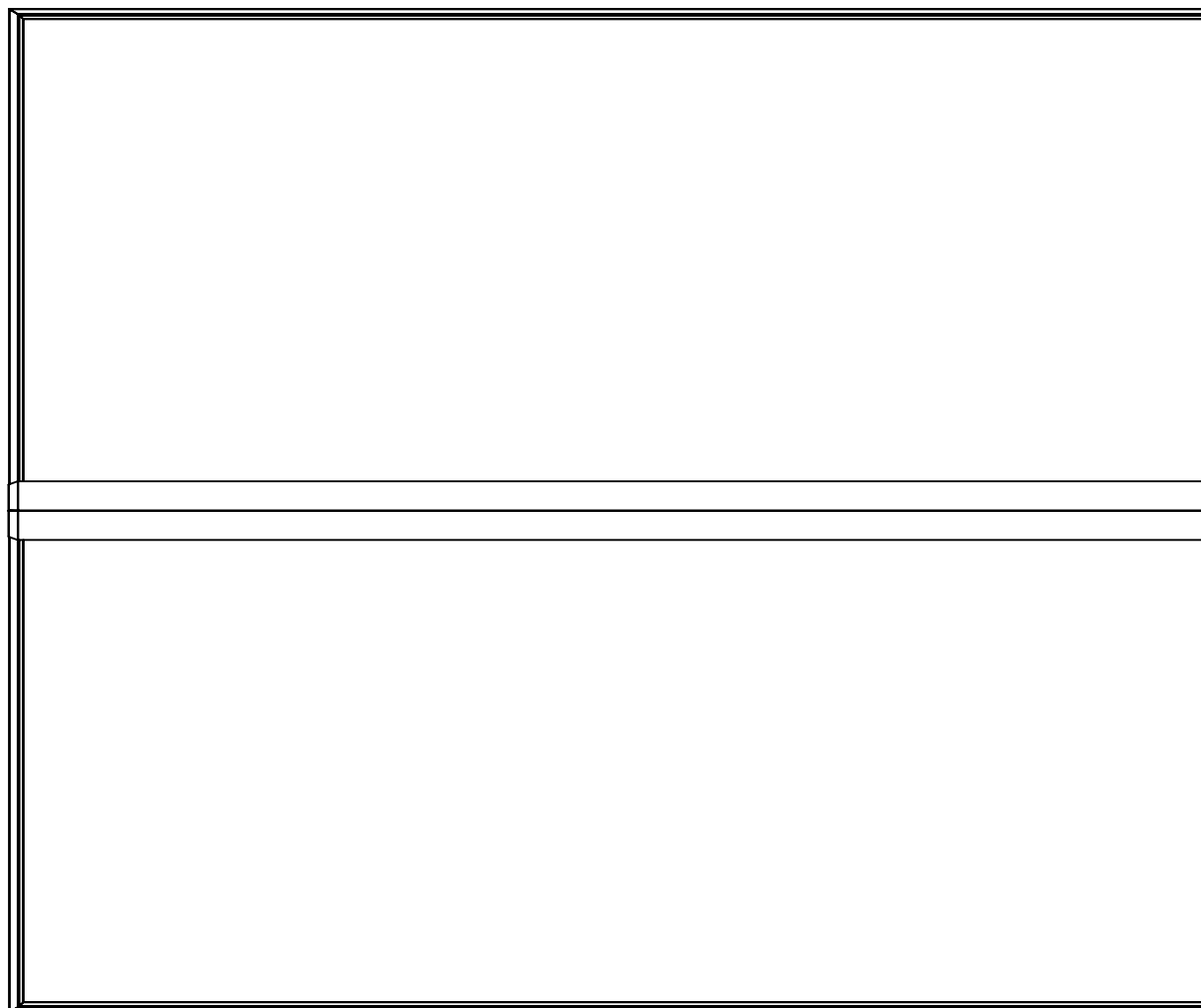
SHEET 1



DETAIL A
SCALE 1 : 5



Note: Pitch range 2° - 65°



REVISION No

MATERIAL

Drawing Title

Harmony Array - over ridge - with Joint Support Beam

A3

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES

DATE

29/05/2025

DRAWN BY

M Herman

SCALE 1:15

SHEET 2

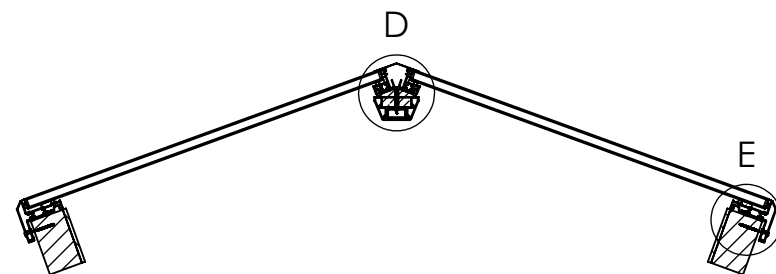
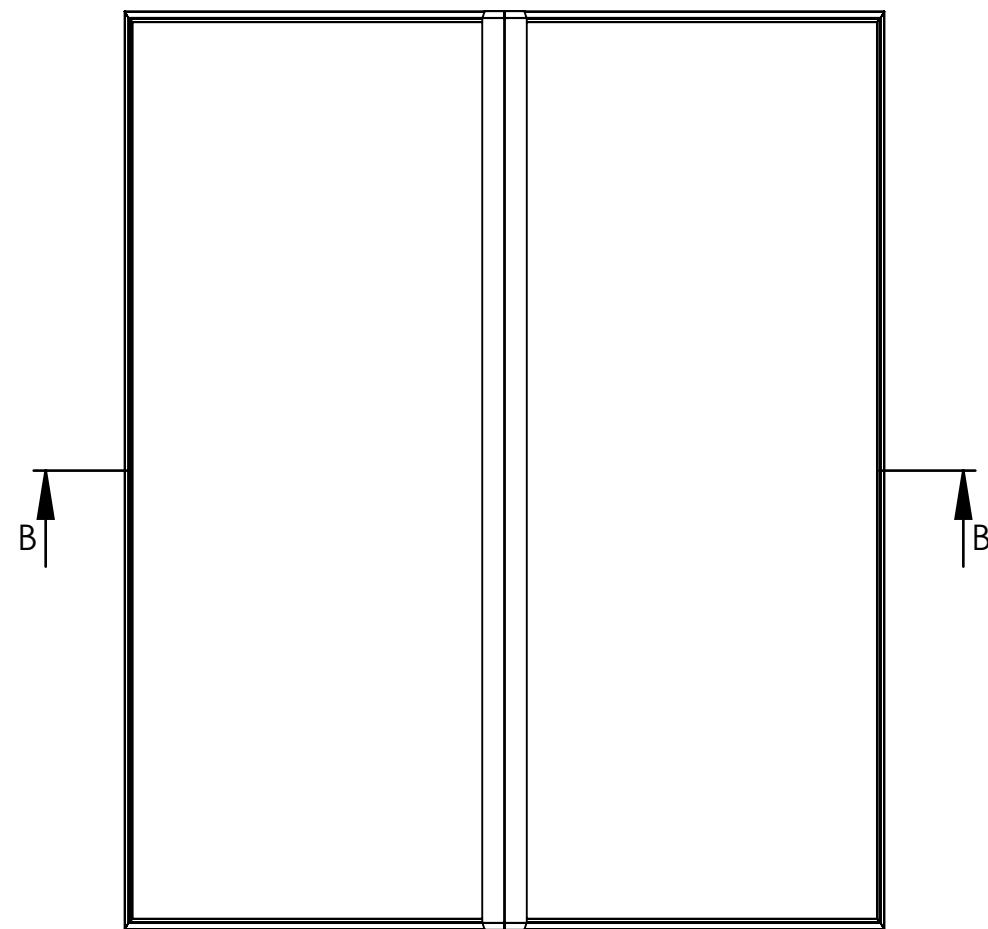
ADLUX Industries Ltd

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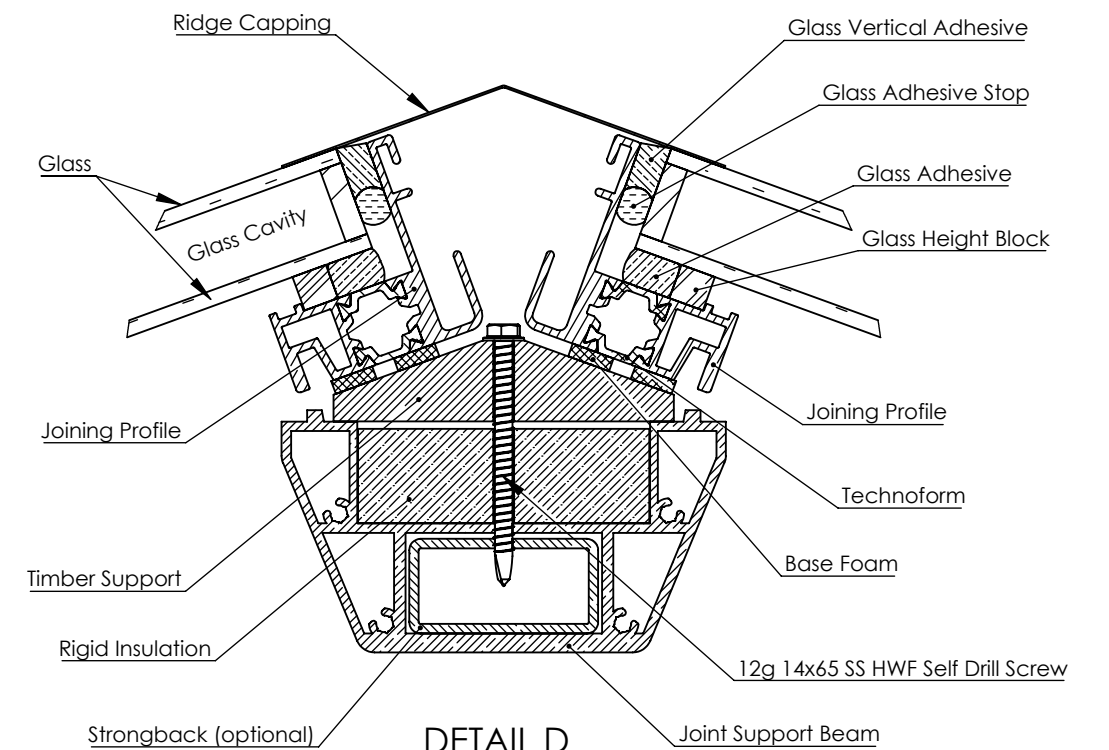
P.O. Box 13866, Auckland New Zealand

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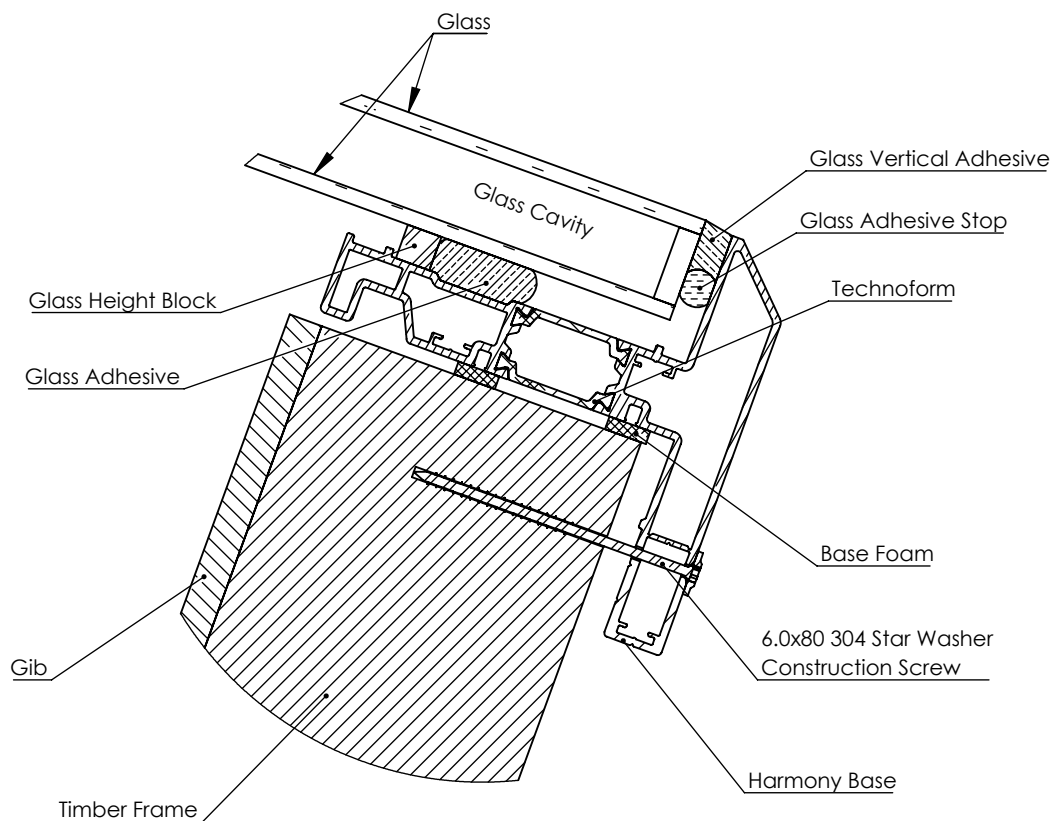
Email: sales@adlux.co.nz



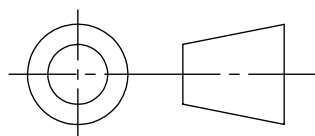
SECTION B-B



DETAIL D
SCALE 1 : 2



DETAIL E
SCALE 1 : 2



REVISION No

MATERIAL

Drawing Title

Harmony Array - over ridge - with Joint Support Beam

A3

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES

DATE

29/05/2025

DRAWN BY

M Herman

SCALE 1:20

SHEET 3

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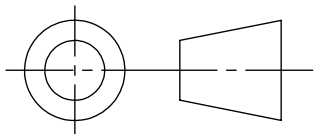
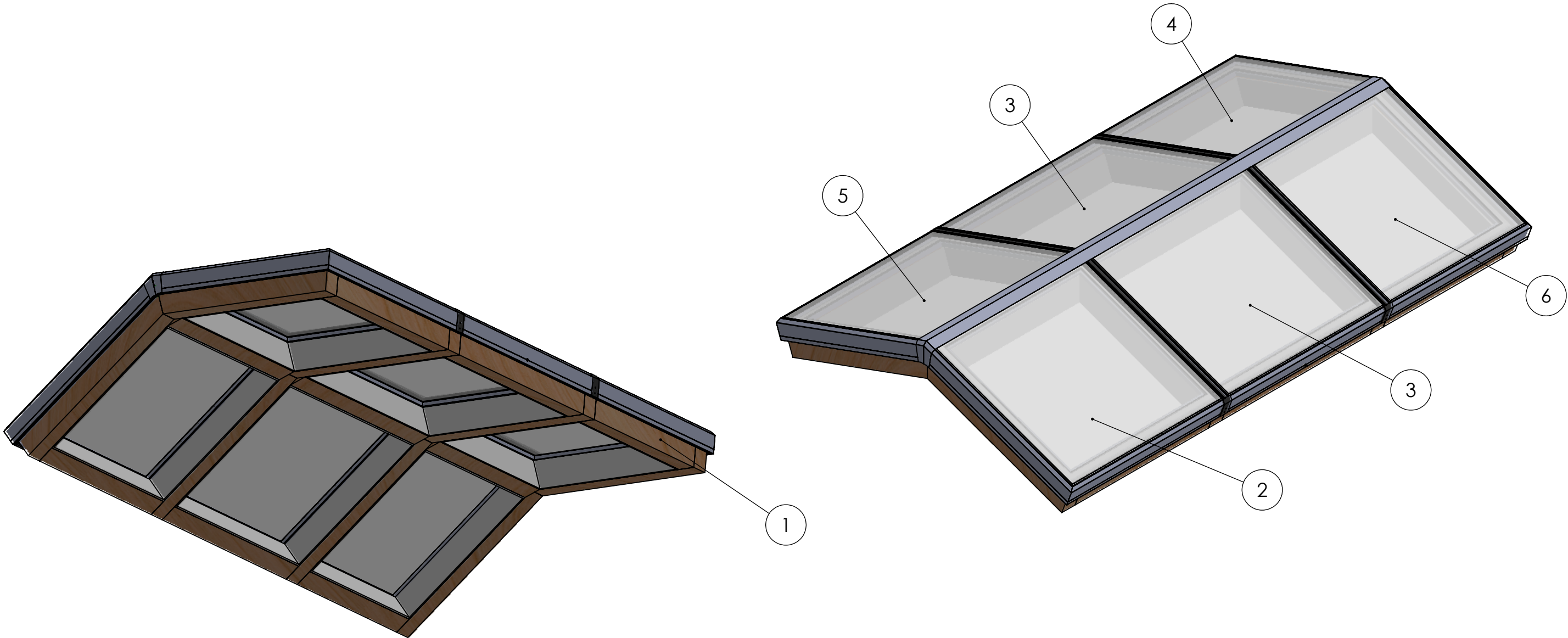
30 Sistema Way, Mangere, Auckland

P.O. Box 13866, Auckland New Zealand

Ph: (09) 636 6866

Email: sales@adlux.co.nz

ITEM NO.	PART NUMBER	QTY.
1	Harmony Array Ridge Upstand - Unsupported (By Others)	1
2	Harmony Array - Ridge - Corner	1
3	Harmony Array - Intermediate unit - Ridge	2
4	Harmony Array - Ridge - Corner - 3	1
5	Harmony Array - Ridge - Corner - 4	1
6	Harmony Array - Ridge - Corner - 2	1
7	Harmony Array Ridge Main Capping	1



REVISION No

MATERIAL

Drawing Title
Harmony Array - over ridge - on structural supports

A3

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES

DATE

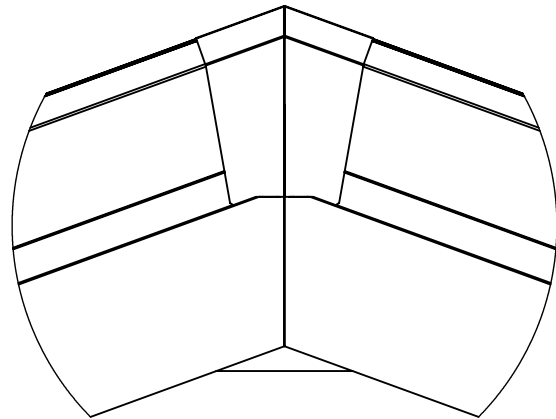
26/05/2025

DRAWN BY

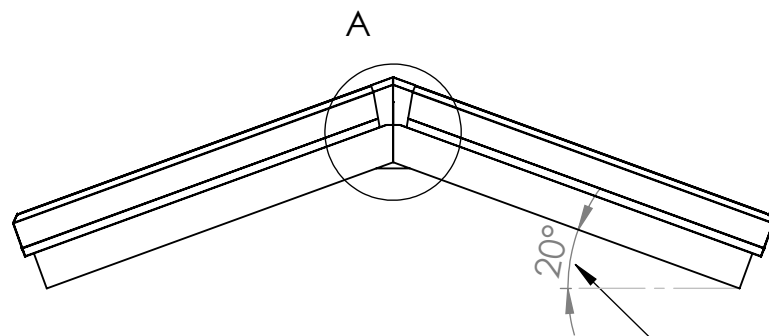
M Herman

SCALE 1:20

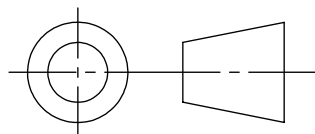
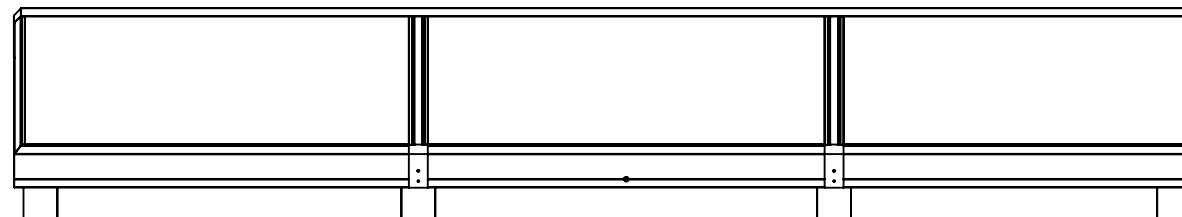
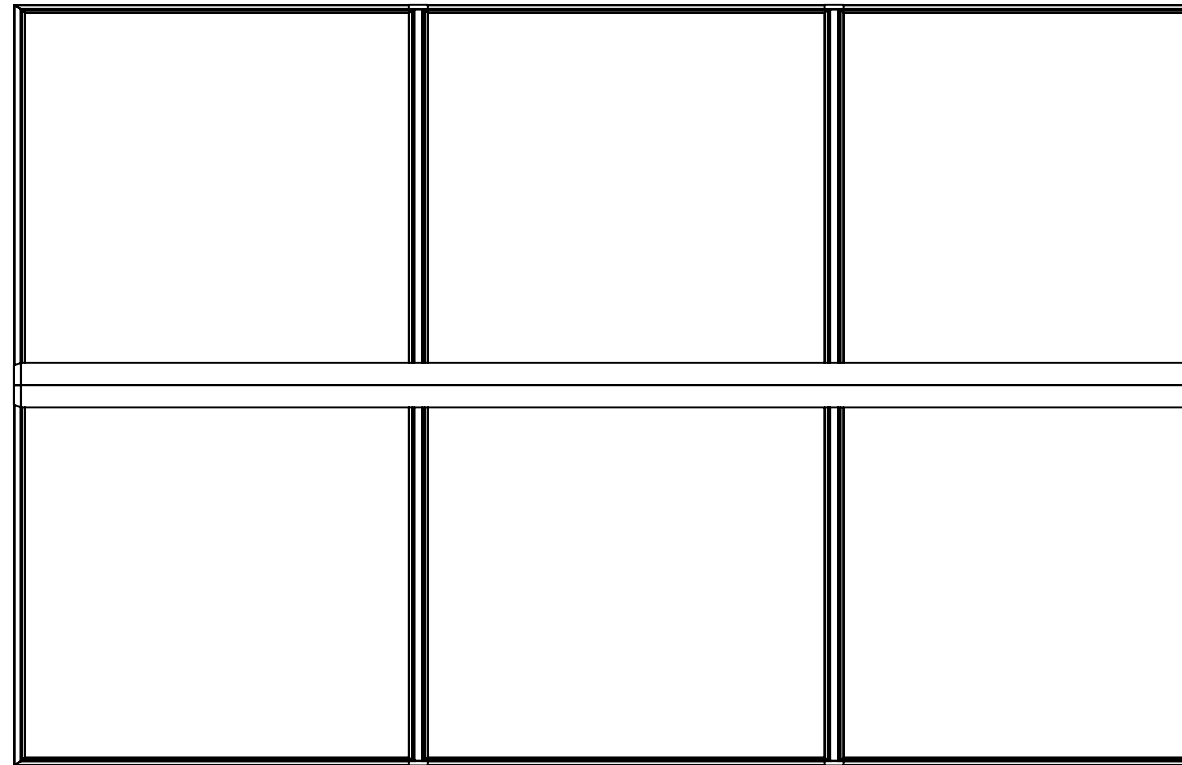
SHEET 1



DETAIL A
SCALE 1 : 5



Note: Pitch range 2° - 65°



REVISION No

MATERIAL

Drawing Title

Harmony Array - over ridge - on structural supports

A3

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES

DATE

26/05/2025

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M Herman

SCALE 1:20

SHEET 2

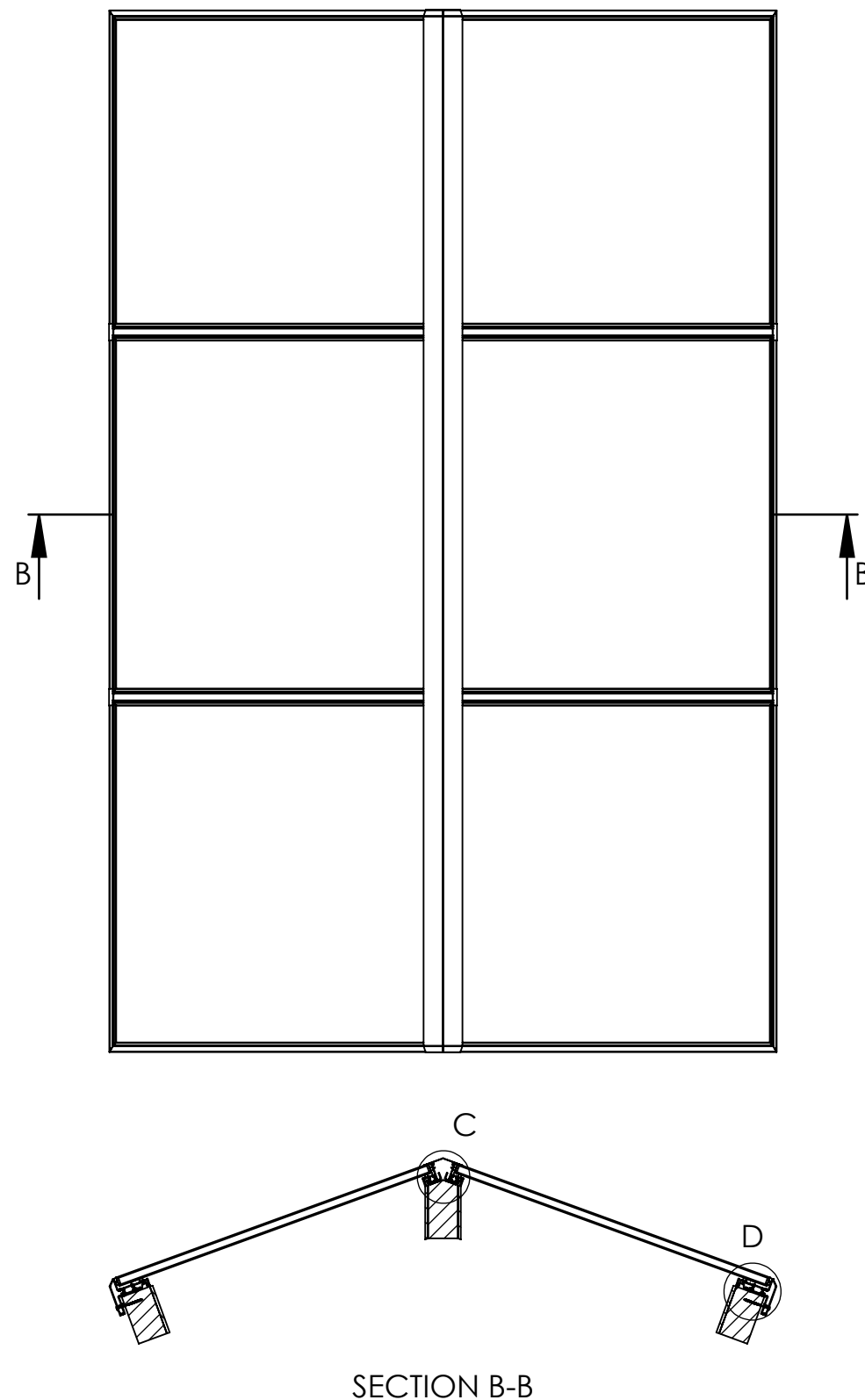
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Ph: (09) 636 6866

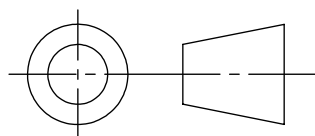
Email: sales@adlux.co.nz



SECTION B-B

DETAIL C
SCALE 1 : 2

DETAIL D
SCALE 1 : 2



REVISION No

MATERIAL

Drawing Title

Harmony Array - over ridge - on structural supports

A3

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES

DATE

26/05/2025

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SCALE 1:20

SHEET 3

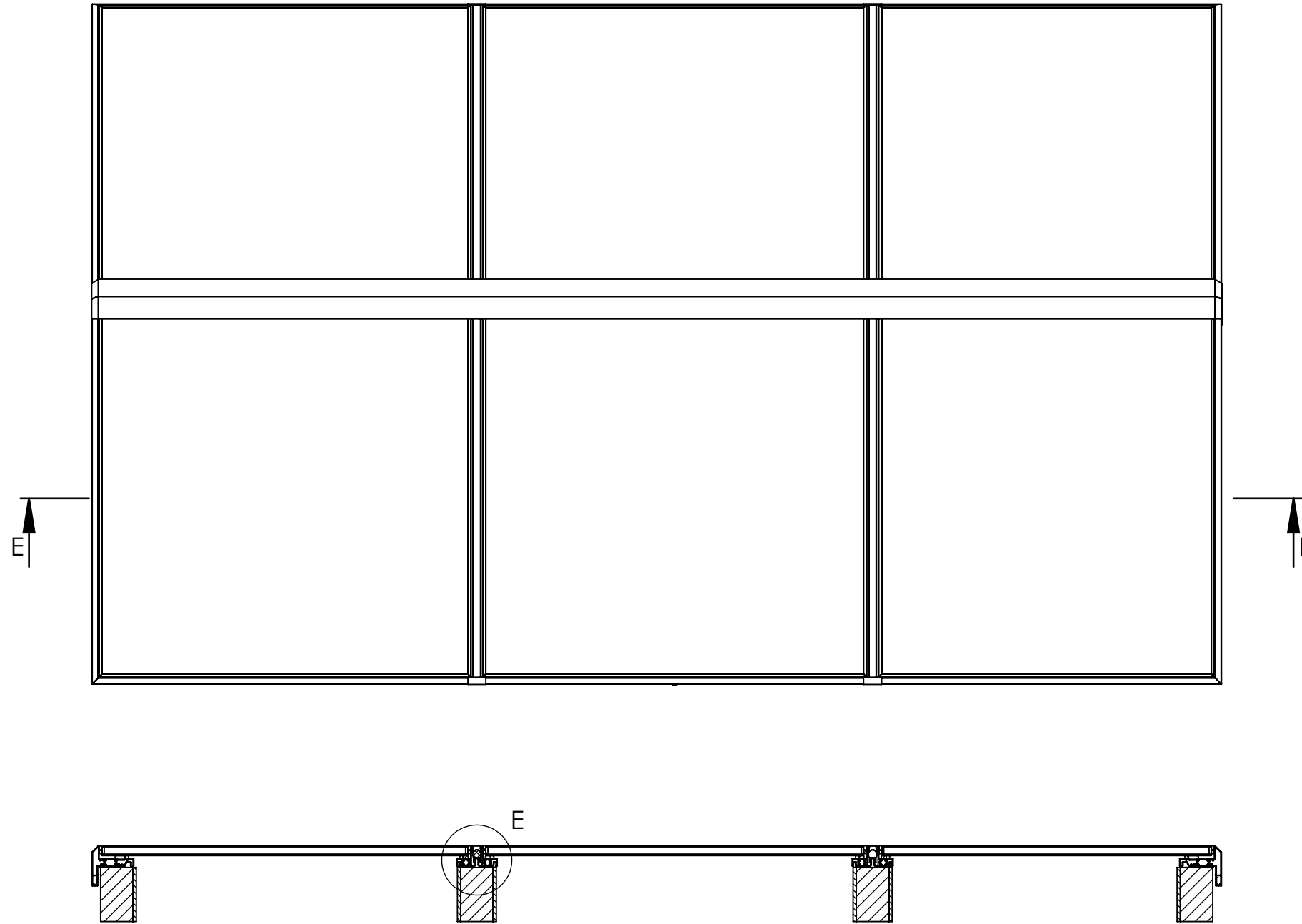
ADLUX Industries Ltd

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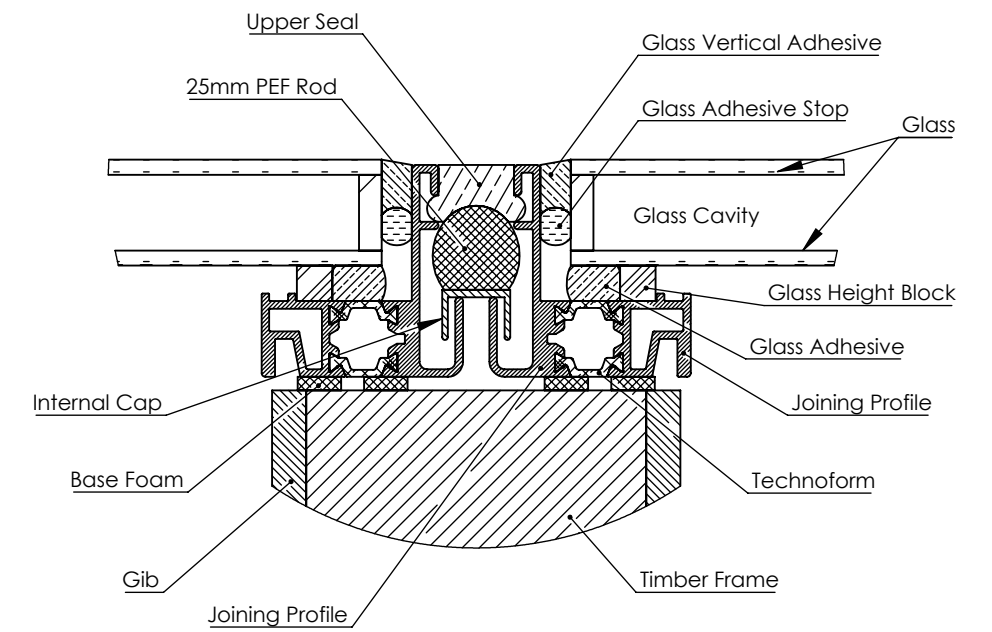
P.O. Box 13866, Auckland New Zealand

Ph: (09) 636 6866

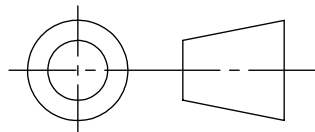
Email: sales@adlux.co.nz



SECTION E-E



DETAIL E
SCALE 1 : 2



REVISION No

MATERIAL

Drawing Title

Harmony Array - over ridge - on structural supports

A3

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES

DATE

26/05/2025

DRAWN BY

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SCALE 1:15

SHEET 4

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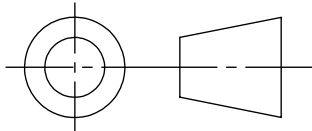
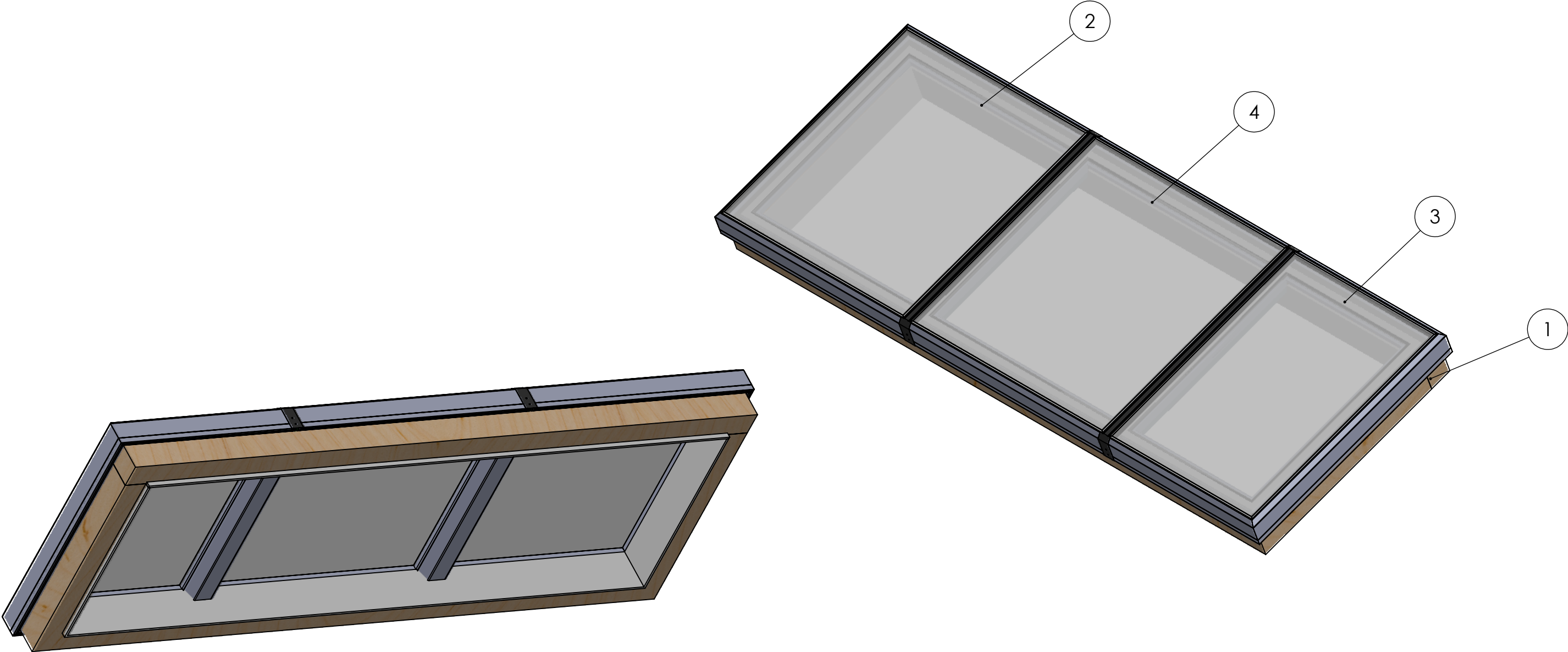
30 Sistema Way, Mangere, Auckland

P.O. Box 13866, Auckland New Zealand

Ph: (09) 636 6866

Email: sales@adlux.co.nz

ITEM NO.	PART NUMBER	QTY.
1	Roof Upstand (By Others)	1
2	Harmony Array - End Unit L	1
3	Harmony Array - End Unit R	1
4	Harmony Array - Intermediate unit	1
5	6.0 X 80 304 Star Washer Construction Screw	1



REVISION No

MATERIAL

Drawing Title

Harmony Array - Join Down Roof Fall

A3

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES

DATE

23/04/2025

DRAWN BY

M Herman

SCALE 1:15

SHEET 1

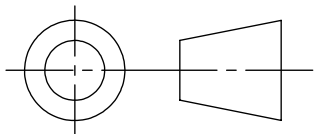
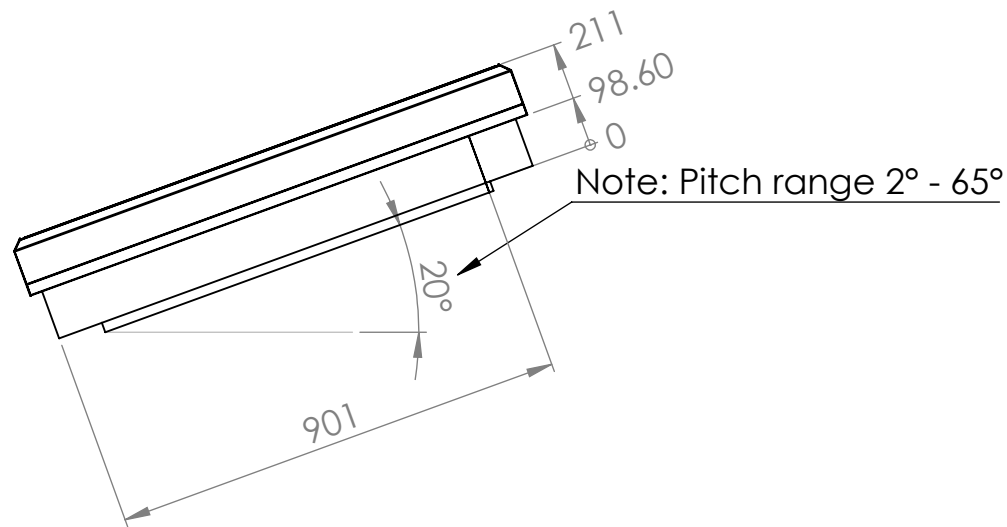
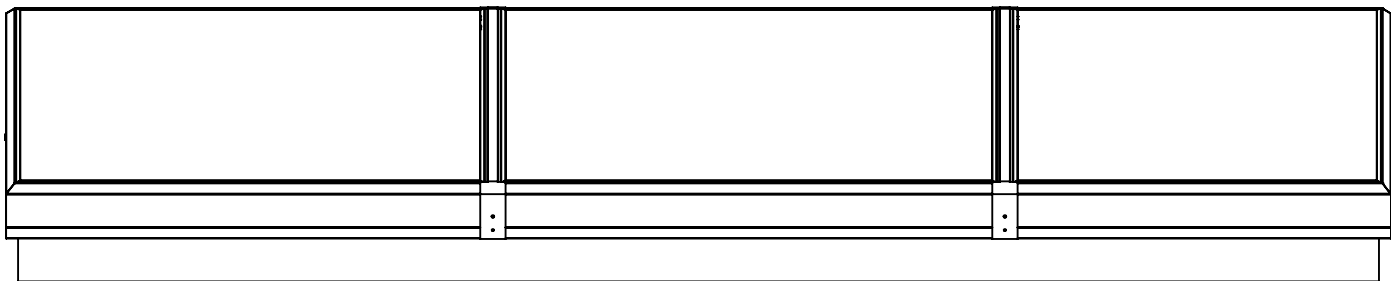
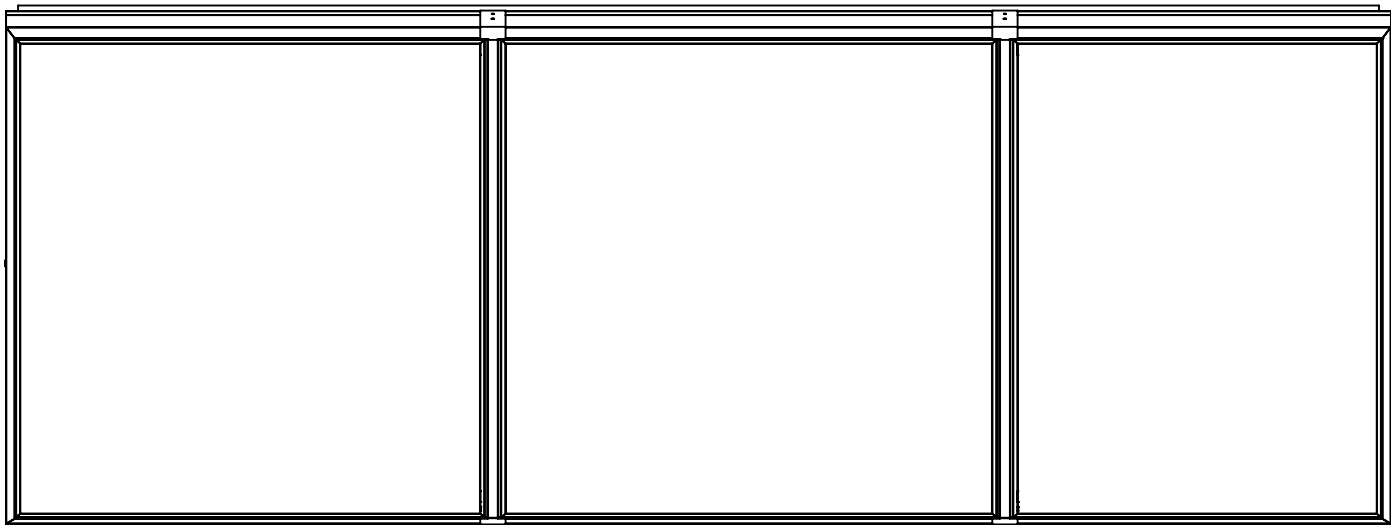
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P.O. Box 13866, Auckland New Zealand

Ph: (09) 636 6866

Email: sales@adlux.co.nz



REVISION No

MATERIAL

Drawing Title

Harmony Array - Join Down Roof Fall

A3

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES

DATE

23/04/2025

DRAWN BY

M Herman

SCALE 1:15

SHEET 2

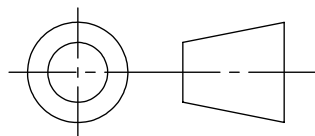
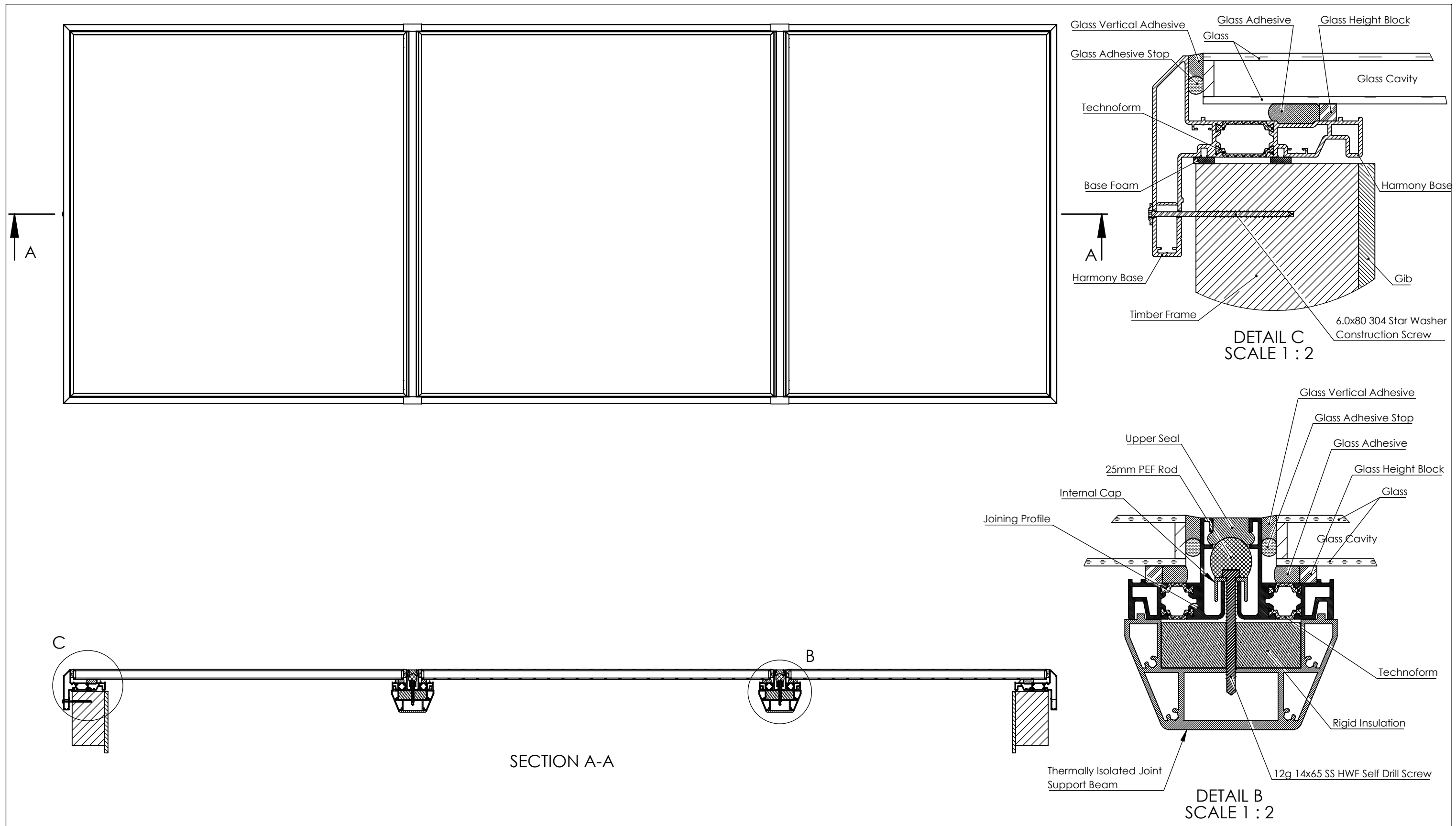
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Ph: (09) 636 6866

Email: sales@adlux.co.nz



REVISION No

MATERIAL

Drawing Title

Harmony Array - Join Down Roof Fall

A3

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN MILLIMETRES

DATE

23/04/2025

DRAWN BY

M Herman

SCALE 1:10

SHEET 3

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Email: sales@adlux.co.nz

Structural Glazing Sealant

SEALANT-90N

1/2

SEALANT-90N is a one-part, neutral-curing and non-corrosive silicone sealant. Once cured, this sealant becomes a high modulus and flexible silicone rubber suitable for structural and weatherseal applications. This sealant contributes to the superior design and high reliability of buildings.

1 Features

- One-part and neutral-cure RTV* silicone sealant
- Superior weatherability performance when exposed to a wide range of temperatures, moisture, ozone, and ultraviolet rays
- Excellent storage stability within a wide range of temperatures
- Excellent unprimed adhesion to most common building materials and easy-to-use in a wide range of temperatures
- $\pm 50\%$ Joint Movement Capability of the original joint width

* RTV stands for "room temperature vulcanizing" which means that this material can be cured at room temperature.



Package image

2 Applications

Structural glazing and weatherseal applications

4 Colors

Black, Gray

3 Specifications

- ASTM C1184*¹
- ASTM C920*² Type S, Grade NS, Class 50, Use NT, G, A
- KS F 4910*³ G-25HM

*¹ Standard Specification for Structural Silicone Sealants

*² Standard Specification for Elastomeric Joint Sealants

*³ Sealants for sealing and glazing in buildings

5 Packaging

300 mL cartridges (25 pcs/carton box)

600 mL sausages (20 pcs/carton box)

6 General properties

Product name		SEALANT-90N
Parameter		
Consistency		Paste
Slump	mm	0
Skin-Over Time at 23°C/50%RH		10
Density at 25°C		1.4
VOC Content*		30
After cured - After 7 days at 23°C/50%RH		Reference Test
Hardness Shore A	points	ASTM D2240
Tensile strength	MPa	ASTM D412
Elongation at break	%	
After cured - After 21 days at 23°C/50%RH		Reference Test
50% Tensile stress	MPa	ASTM C1135
Maximum tensile stress	MPa	
Joint movement capability	%	ASTM C719

* Based on SCAQMD, Reported Volatile Organic Compound (VOC) content was expressed as grams of volatile organic compounds per litre of submitted sample.

(Not specified values)

7 Instructions for use & Handling precautions

Please read the latest Shin-Etsu published Functional Sealants Technical Manual. The manual can be obtained from the Shin-Etsu website.

<http://www.shinetsusilicone-global.com/>

8 Important

1) Please insure that application procedures and quality control are in strict compliance with the latest Shin-Etsu published Functional Sealants Technical Manual. Before applying sealant, applicators are required to obtain the manual from the Shin-Etsu website.

<http://www.shinetsusilicone-global.com/>

- 2) All quality control test results must be logged and archived.
- 3) The Shin-Etsu Sales Department is available for specific advise.

9 Limitations

- 1) SEALANT-90N must not be used in any structural applications without pre-testing.
- 2) SEALANT-90N must not be used in food, medical or pharmaceutical applications.
- 3) The contents of this catalog are believed to be correct, but project conditions regarding actual application and use of Shin-Etsu sealant are beyond Shin-Etsu's control. Therefore it is the users responsibility to confirm the product meets the requirements of the application.
- 4) Shin-Etsu warrants only the sealant will confirm to Shin-Etsu's product specifications at the time of shipment, and makes no further warranties in respect of the sealant. Warranty remedy for such failure is limited to refund of purchase price or replacement of product. If applicators need extended warranty

for performance of sealants, please contact the Shin-Etsu Sales Department in advance of the project inception.

10 Storage conditions

Temperature: at or below 30°C

* Seal container tightly and store in a cool, dark place (out of direct sunlight) with good ventilation. Keep away from heat and flame.

11 Shelf life

12 months after production date under the above storage conditions in the original unopened container

12 Safety and hygiene

- 1) Uncured SEALANT-90N may cause skin irritation. When handling the products, take care to avoid contact with the skin and mucous membranes by wearing protective glasses and protective gloves. In case of skin contact, immediately wipe off with dry cloth and then flush thoroughly with running water. When using, be careful not to rub eyes with hands. In case of accidental eye contact, flush immediately with plenty of clean water for at least 15 minutes and then seek medical attention. Contact lens wearers must take special care. If the products get into the eye, the contact lens may become stuck to the eye.
- 2) Be sure to provide adequate ventilation when using the product. During curing, a small amount of Methanol gas is gradually generated. If you become uncomfortable with inhaling vapors, move to an area with fresh air immediately.
- 3) Keep out of reach of children.
- 4) Please read the Safety Data Sheets (SDS) before use. SDS can be obtained from our Sales Department.



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•Users are solely responsible for making preliminary tests to determine the suitability of products for their intended use. Statements concerning possible or suggested uses made herein may not be relied upon, or be construed, as a guaranty of no patent infringement.

•The silicone products described herein have been designed, manufactured and developed solely for general industrial use only; such silicone products are not designed for, intended for use as, or suitable for, medical, surgical or other particular purposes. Users have the sole responsibility and obligation to determine the suitability of the silicone products described herein for any application, to make preliminary tests, and to confirm the safety of such products for their use.

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Technical Data Sheet

DOWSIL™ 795 Structural Glazing Sealant

One-part, neutral-cure silicone sealant

Features & Benefits

- Meets ASTM C1184 for Structural Silicone Sealant
- Meets ASTM C719 Class 50 High movement capability $\pm 50\%$ in well designed weatherseal joint
- Excellent adhesion to a wide range of substrates including glass, anodized and coated aluminum profiles
- Non corrosive cure system
- Ease of use – all-temperature gunnability and easy tooling
- The cured product exhibits excellent weathering characteristics, and a high resistance to ultra-violet radiation, heat and humidity
- High ultimate tensile strength which makes it suitable for structural bonding applications
- Excellent mechanical properties

Composition

- One-part, neutral-cure, RTV silicone sealant

Applications

- DOWSIL™ 795 Structural Glazing Sealant is a one-component Silicone sealant designed for site or factory glazing and curtainwall production. It requires contact with air as it reacts with atmospheric moisture to cure to a tough but flexible silicone rubber. DOWSIL™ 795 Structural Glazing Sealant can be used where dual structural and weatherseal applications are desired. It has up to $\pm 50\%$ movement capability in a well-designed weatherseal joint.

Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

Test ¹	Property	Unit	Result
As supplied			
ASTM C 679	Tack-free time, 50% RH	hours	1.5 (max)
	Curing time at 25°C, 50% RH	days	7–14
	Full adhesion	days	14–21
ASTM C 639	Flow, sag or slump	mm	0
	Working time	minutes	20–30

1. ASTM – American Society for Testing and Materials.

Typical Properties (Cont.)

Test	Property	Unit	Result
	Specific gravity		1.44
	VOC content ²	g/l	32
As cured - 7 days at 25°C (77°F), 50% RH			
ASTM D 412	Tensile strength (ultimate)	MPa	2.3
	Elongation	%	670
ASTM C 661	Durometer hardness, Shore A	points	35
ASTM D 624	Tear strength, die B	kN/m	13
As cured – after 21 days at 25°C (77°F), 50% RH			
ASTM C 794	Peel strength	kg/cm	8.5
ASTM C 1135	Tensile strength, at 100% elongation	MPa	0.6
	Ultimate tensile strength, at break	MPa	1.2
	Ultimate elongation at break	%	400
ASTM C 719	Joint movement capability	%	±50
As cured – after 21 days at 25°C, 50% relative humidity followed by 5,000 hours in a quv weatherometer, ASTM G 154-06			
ASTM C 1135	Tensile strength, at 100% elongation	MPa	0.6
	Ultimate tensile strength, at break	MPa	1.1

2. Based on South Coast Air Quality Management District of California. Maximum VOC is listed both inclusive and exclusive of water and exempt compounds. For a VOC data sheet for a specific sealant color, please send your request to Dow.

Description

DOWSIL™ 795 Structural Glazing Sealant is a one-part, neutral-cure, architectural-grade sealant that easily extrudes over a wide temperature range. This cold-applied, non-sagging silicone material cures to a medium-modulus rubber upon exposure to atmospheric moisture. The cured sealant is durable and flexible enough to accommodate ±50% movement of original joint dimension when installed in a properly designed weatherseal joint. In a properly designed structurally glazed joint, the sealant is strong enough to support glass and other panel materials under high wind-load and seismic effects.

Approvals/ Specifications

DOWSIL™ 795 Structural Glazing Sealant meets the requirements of: ASTM Specification C 1184 for structural silicone sealants ASTM Specification C 920, Class 50.



Colors	DOWSIL™ 795 Structural Glazing Sealant is available in 4 colors: black, white, gray and bronze.
How to Use	When DOWSIL™ 795 Structural Glazing Sealant is used in structural applications the structural joint design MUST be reviewed by a technical service specialist. Complete design and installation guidelines are contained in the Asia Technical Manual, and must be followed for warranty applications when using this product.
Joint Design	Structural joints sealed with DOWSIL™ 795 Structural Glazing Sealant should have a minimum depth (or bite) of 6 mm. For large site-glazed joints the sealant or bite should be not more than 12 mm when the sealant can cure from one side only. When an open-cell moisture-permeable spacer tape is used, a structural bite up to 24 mm can cure to optimum strength. The exact structural bite should always be calculated. The thickness of the structural sealant joint or glueline should be 6 mm minimum. As it must accommodate thermal and dynamic movements the actual joint movements should be calculated. Ideally the bite to glueline ratio should be not more than about 3:1.
Accessory Selection	The appropriate selection of all accessories such as setting blocks and backing materials is important to avoid discoloration or adhesion-related problems due to incompatibility. Dow will also assess the suitability of proposed accessory materials as part of the standard testing services. Silicone-based setting blocks are generally recommended for best compatibility.
Preparatory Work	Thoroughly clean all substrates to be sealed, removing all contaminants such as grease, oil, dust, frost or water. All metal, glass, or other surfaces should be cleaned with the recommended solvent, using a lint free cloth.
Method of Application	Install backing material or joint filler, setting blocks, spacer shims and tapes. Mask areas adjacent to joints to ensure neat sealant lines. Apply DOWSIL™ 795 Structural Glazing Sealant in a continuous operation using positive pressure. (The sealant can be applied using many types of air-operated guns and most types of bulk dispensing equipment.) Before a skin forms (typically within 15 minutes), tool the sealant with light pressure to spread the sealant against the backing material and joint surfaces. Remove masking tape as soon as the bead is tooled.
Handling Precautions	PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.
Usable Life and Storage	When stored at or below 27°C (80°F), DOWSIL™ 795 Structural Glazing Sealant has a shelf life of 12 months from the date of manufacture. Refer to product packaging for "Use By Date." Questions about the use of DOWSIL™ 795 Structural Glazing Sealant can be answered by calling your local application sales engineer. Our laboratory personnel and technical service staff are also available for assistance.

Packaging Information

DOWSIL™ 795 Structural Glazing Sealant is supplied in 300 ml disposable plastic cartridges and 600 ml foil sausages.

Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

DOWSIL™ 795 Structural Glazing Sealant should not be used for structural applications without the prior written approval of the Construction Industry Technical Services Department. Each project should be specifically and separately approved by Dow.

Project specific approval involves the following prerequisites:

- Joint dimensioning and print reviews.
- Successful laboratory adhesion and compatibility testing to all building components.
- Observance of professional sealant application and workmanship standards.
- Users should always consult the Technical Services Department for adhesion recommendation.

Dow shall not be held liable for any possible claims arising from structural glazing use of DOWSIL™ 795 Structural Glazing Sealant for projects which have not been specifically approved by Dow.

For projects which have been approved, Dow will issue a structural adhesion warranty on a case by case basis at the user's request. It is the user's exclusive responsibility to ensure project compliance with local building regulations.

Health and Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, dow.com or consult your local Dow representative.

Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

dow.com

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Why silicones are better than polyurethane?

1. Silicones are UV light stable. Organic (urethane or polyurethane) products are not and break down in sunlight. This is because UV does not have enough energy to cleave the Si-O, silicone bond. However, C-C bonds used in organic materials are very unstable. UV weathering is the main cause of sealant degradation.
2. Silicones do not get hard when they cold, organics products do. This causes adhesive failures in organic products even when adhesion looks good after a pull test. Note that the most important time for a sealant to work in the winter (as building substrates shrink and joints therefore get wider), which is exactly when organics have hardened.
3. Silicones maintain flexibility over time, organic products lose flexibility with aging.
4. Silicones can be applied at -20°F (-29°C) without heating and will cure compared to organic sealants which need to be heated and will not cure unless they are above freezing.
5. DOWSIL silicones do not slump on hot days in the summer, polyurethanes tend to slump when hot.
6. Silicones skin over on average in 30 minutes versus 1-14 days for organic sealants, allowing the organic materials to pick-up more job site dirt. This dirt is embedded in the sealant permanently. Any dirt deposited on a silicone surface is easily cleaned away, even after years of build-up. Again, this is because silicone is basically a flexible Si-O (glass).
7. As organic sealants break down they crack, craze, split and chalk. Dirt can get embedded in the cracks easily. Silicone surfaces do not degrade.
8. Silicones last for 50+ years. This is because a silicone is basically glass. Just like you would not expect a pane of glass to melt after 20 or 30 years, neither will a silicone. Organic sealants begin to break down in 3-7 years. Where they are exposed to the most sunlight, like the south side of a building, they will break down faster. Urethanes can be thought of like paint in regard to weathering.
9. The DOWSIL CWS and 795 are low odor during cure and no odor after cure. As such they are approved for use inside healthy homes.
10. Many colors stocked and available in all products. 50 colors CWS in stock. We also offer custom colors with minimum quantities and 1-2 weeks lead times.
11. All our silicones (795, 792, 756, CWS, CCS) are independently tested and validated by SWRI (Sealant Weatherproofing and Restoration Institute). Please visit their web site at www.swrionline.org and note that all manufactures are part of SWRI but not all products are validated.
12. DOWSIL CWS is a single component sealant so no mixing is required on site versus a multi-component polyurethane. This gives much better quality control as you do not have to worry about the contractor properly mixing the sealant. Rarely do two-part products get mixed properly in the field.

13. DOWSIL silicones are non-staining on granite marble and limestone, specifically DOWSIL CCS, DOWSIL 790 and DOWSIL 756 SMS. Staining of sealants is an overblown issue as no sealants will stain brick or concrete or metals as these materials do not have the pour structure capillary action that pulls fluids out of sealants. On sensitive substrates DOWSIL employ proprietary cure systems that other manufacturer in the world.
14. All DOWSIL construction silicones are low VOC (less than 50g/L) and are LEED compliant.
15. Only silicones qualify for the LEED sustainability credit for building sealants.
16. The above information relates to DOWSIL silicones. Not all silicones are alike. Hybrid silicone/organic products exhibit the same degradation and failure rate as organics. "Siliconized" products are not silicones (they are leaning on the silicone quality reputation, but the free-fluid silicone used has little performance merit).
17. DOWSIL silicones are commonly used in re-caulking applications where urethanes were used previously.
18. Pull test for sealant performance and substrate preparation are important. However, silicones can often take 28 days at 68°F (20°C) and 80% RH to develop full adhesion. Just because a silicone is a cured solid DOES NOT mean that full adhesion set has occurred. Urethanes often have quick green strength (initial adhesion) but don't be confused into thinking they have better overall adhesion in a dynamic joint. This is because a urethane MUST have better adhesion due to their poor performance in cold weather and the high bondline stresses they create. This is the reason that silicones have lower adhesive failure rates.
19. Urethanes and polyurethanes have drastically altered formulas since 2009 when they because to change their chemicals to meet new VOC guidelines. Also, many chemicals used in sealant production have changed (due to stricter environmental regulations) or discontinued production (US recession and Japanese tsunami). Dow has virtually full vertical integration with many products. Common silicone sealant formulas, due to their inherently low VOC, have not changed in decades. It many seem odd to have a formula that has not changed in years, but in a low margin market where competitors have cheapened their sealants considerably, Dow products remain an unthinned option with a proven track record.