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MODINEX

Cera-Façade

Structural Performance Assessment Report

Revision 2 | 9th March 2026

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	Name	Date	Signature
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TABLE OF CONTENTS

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1 COMPLIANCE STATEMENT

This report details the assessment methodologies and results of assessments into the structural performance of the Modinex Cera-Facade system. This assessment has been undertaken with the purpose of evaluating the cladding product for use on buildings in wind zones N4, N5, N6, C2, C3 and C4 (to AS4055).

The assessments found that it is most likely that the critical components of the system are the fixings (clips, nails and screws) rather than the plank itself; therefore, the capacity of the supports/fixings drive the requirement for number of, type of, and spacing of support points. Table 1 below outlines the results of these assessments.

Limitations and assumptions adopted for this assessment of this report are provided in Section 2.3.

The results of this report rely directly on the information, results and limitations set out in the documents listed in Section 2.4.

Table 1: CERA-FACADE - Fixing configurations for wind classes N4, N5, N6, C2, C3 and C4

Wind Class	Timber Frame or Steel Frame	
	Panel Zone (>1.2m from external building corner)	Corner Zone (<1.2m from external building corner)
N4 / C2	1 Panel Clip @ 600mm + 1 Face Nail or Screw between clips	1 Panel Clip @ 600mm + **2** Face Nail or Screw between clips
N5 / C3	1 Panel Clip @ **450mm** + 1 Face Nail or Screw between clips	1 Panel Clip @ **450mm** + **2** Face Nail or Screw between clips
N6 / C4	1 Panel Clip @ **300mm** + 1 Face Nail or Screw between clips	1 Panel Clip @ **300mm** + **2** Face Nail or Screw between clips

*Refer to tables in Section 3 for max. panel spans.

2 INTRODUCTION

2.1 Product Description

The following product description is provided:

Cera-Façade

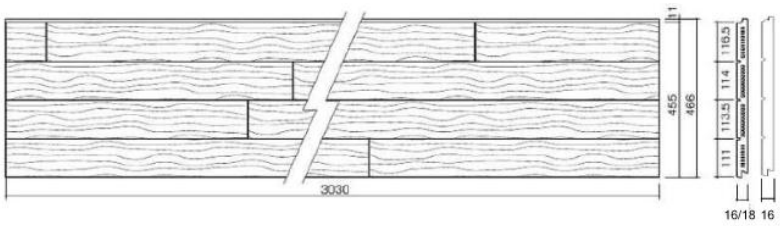
1. *The CERA-FAÇADE System is a cavity-based extruded fibre-reinforced cement panel wall claddings. CERA-FAÇADE panels are available in a range of surface profile patterns and prefinished colours. CERA-FAÇADE panels are rebated to form hidden laps and are fixed with clips to form a drained and ventilated cavity.*
2. *The system incorporates a primary and secondary means of weather resistance (first and second line of defence) against water penetration by separating the cladding from the external wall framing with a nominal 15 mm drained and ventilated cavity.*
3. *CERA-FAÇADE panels are manufactured in Japan to the Japanese Industrial Standard JIS A 5422 (fibre reinforced cement sidings) and are classified as a Type A, Grade 1 (fibre cement) sheet in accordance with ASTM C1186. Suitable for use in applications where non-combustible materials are specified by the Deemed to Satisfy Provisions of the 2019 BCA Vol1, Clause C1.9(e).*

2.2 Elements of Façade System

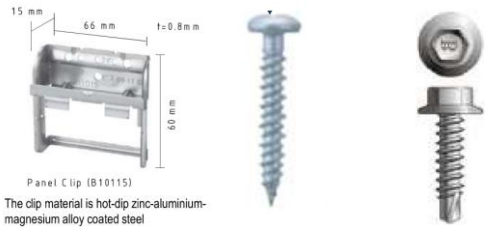
Cera-Facade Panels

The elements of the façade system which form part of the load path are as follows:

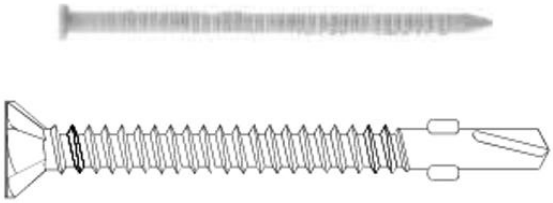
- Fibre cement board planks; three types:
    - 16mm hollow (455mm wide)
    - 18mm hollow (455mm wide)
    - 16mm solid (455mm wide)



- Proprietary support clips and self-drilling screws for timber or metal



- Nails or self-drilling countersunk screws for additional / intermediate fixing in middle of planks



2.3 Limitations and Critical Assumptions

This report relates only to the structural performance of the Modinex Cera-Façade panel system under self-weight and out-of-plane loads (i.e. wind) in vertical installation only (i.e. as external wall cladding).

This report does not include the assessment for the following:

- performance of the façade system under imposed loads / impact loads
- for application as a roof or soffit cladding or for instances where the slope of the wall exceeds 15 degrees from the vertical.
- overall weatherproofing, durability or thermal performance of the façade system, as these performance requirements vary based on application.

Refer to Modinex for further information.

The use of this product in cyclonic regions is subject to the limitations set out by the Azuma test reports for performance under cyclic loading (in accordance with AS4040.3).

This report is provided for technical guidance only.

Cera-Façade Panels

1. Nails must be 'flat head nails' compliant with AS2334-1980 (Steel nails – metric series) and hand driven into timber.

   Diameter: 3.15mm min.

   Length: 75mm min.

2. Screws must be compliant with AS3566.1-2002 (Self drilling screws for the building and construction industries Part 1: General requirements and mechanical properties).

	Fixing to timber		Fixing to steel	
	Clip screws	Intermediate screws	Clip screws	Intermediate screws
Head type:	Pan, wafer, or hex	Countersunk	Pan, wafer, or hex	Countersunk
Diameter:	4.17mm (#8 gauge)	4.17mm (#8 gauge)	4.17mm (#8 gauge)	4.17mm (#8 gauge)
Head diameter:	7mm	7mm	7mm	7mm
Length:	20mm min.	55mm min.	20mm min.	40mm min.

3. The clip product is assumed to be minimum grade G2 steel (i.e. tensile strength >300MPa), and the assessments presented herein relate strictly to the existing design of the clip – any changes to this proprietary product may affect the performance of the system as a whole.

General

4. All screws and nails must be installed in the centre of studs.
5. Timber used for framing of walls must be of timber species groups J1 to J6 (unseasoned) or JD1 to JD5 (seasoned) in accordance with AS1720.1-2010 Table H2.3 and H2.4. This excludes the use of unidentified imported softwood species.
6. Steel used for the framing of walls must be minimum 0.9mm thick, minimum grade G2 steel (i.e. tensile strength >300MPa).
7. The system must be installed with an internal airseal barrier (e.g. sarking or RAB board) which is designed and installed to resist the full internal pressure.

Note: limited testing of these products to resist substantial pressures is available, but it is suggested that sarking (flexible membrane type materials) should not be used in cyclonic wind regions due to the high internal pressures which can result in high wind events – in which case, RAB board products will likely be required.

8. Established limitations on the tolerances of installation set out in the Cera-Façade design and installation manuals, are to be observed and adhered to.
9. The results of this report and the subsequent recommendations apply only to residential housing construction. Further assessments beyond residential housing construction are to be undertaken as a separate independent engineering assessment.

2.4 Reference Documentation

The following documentation is relied upon to determine the overall performance of the system:

- KMEW Cera-Façade for Timber Frame Design/Installation Manual for Australia; dated 1 September 2022
- KMEW Cera-Façade for Steel frame Design/Installation manual for Australia; dated 21 September 2022
- BRANZ Test Report DC12569-001 Testing of 16mm Hollow Core Fibre Cement Board; dated 17 June 2021

The following standards are applicable to the design of the system:

- AS4055-2012 Wind loads for housing
- AS2908.2-2000 Cellulose-cement products Part 2: Flat sheets
- AS1720.1-2010 Timber structures Part 1: Design methods
- AS2334-1980 Steel nails – metric series
- AS3566 Self-drilling screws for the building and construction industries (all parts)
- AS4600-2018 Cold-formed steel structures

2.5 Wind Categories

The three wind categories which are assessed are N4, N5 and N6 in accordance with AS4055. Wind pressures adopted for these categories are as listed below in Table 2.

As noted above in Section 2.3: the system is reliant on an internal air barrier which is designed and installed to resist the full internal wind pressure components, so the external cladding resists only the external component of the wind pressure.

Table 2: Wind pressure classes

Wind class	Pressure zone	ULS design wind speed ($V_{h.u}$)	External pressure		Internal pressure	
			Coefficient (K_L x C_{pe})	Pressure	Coefficient (C_{pi})	Pressure
N4 / C2	**Corner**	39 m/s	-1.30 / +0.70	-2.90 kPa / + 1.56 kPa	-0.30 / +0.20	-0.67 kPa / + 0.45 kPa
	General		-0.65 / +0.70	-1.45 kPa / + 1.56 kPa		
N5 / C3	**Corner**	47 m/s	-1.30 / +0.70	-4.27 kPa / + 2.30 kPa	-0.30 / +0.20	-0.99 kPa / + 0.66 kPa
	General		-0.65 / +0.70	-2.14 kPa / + 2.30 kPa		
N6 / C4	**Corner**	55 m/s	-1.30 / +0.70	-5.77 kPa / + 3.11 kPa	-0.30 / +0.20	-1.33 kPa / + 0.89 kPa
	General		-0.65 / +0.70	-2.88 kPa / + 3.11 kPa		

3 ASSESSMENT AND RESULTS

Two potential failure modes are considered which may limit the ability of the façade panels to perform its function as an external wall cladding:

1. Failure of the cladding product itself, through flexural failure under wind load
2. Failure of the fixings of the cladding, either the clips or the additional nails/screws

3.1 Cera-Facade

3.1.1. Tile Failure

The assessed bending strength / modulus of rupture (MOR) of the FC material in the wet condition is (as per AS2908.2 Table 1, Type A, category 3) is 7MPa.

The performance of the tile is assessed considering the maximum span between clips for each wind class (600mm).

Wind class	Pressure zone	Pressure	Max. panel span	Bending moment (kNm per m)	Approx. bending stress
N4 / C2	**Corner**	-2.90 kPa	600 mm	0.131 kNm / m	3.059 MPa
	General	-1.45 kPa	600 mm	0.065 kNm / m	1.529 MPa
N5 / C3	**Corner**	-4.27 kPa	450 mm	0.108 kNm / m	2.533 MPa
	General	-2.14 kPa	450 mm	0.054 kNm / m	1.270 MPa
N6 / C4	**Corner**	-5.77 kPa	300 mm	0.065 kNm / m	1.521 MPa
	General	-2.88 kPa	300 mm	0.032 kNm / m	0.759 MPa
				Max:	**3.059 MPa**

Therefore, in the worst-case, the product reserves a safety factor of: $SF = \frac{7\ MPa}{3.059\ MPa} = 2.29$

As this exceeds a reasonable safety factor of 2, it is not considered likely that failure would be observed in the panel itself – instead failure would be more likely to occur at the fixings.

3.1.2. Fastener Failure

The capacity of the fasteners are determined in accordance with the relevant standards and codes for fixing to timber and steel.

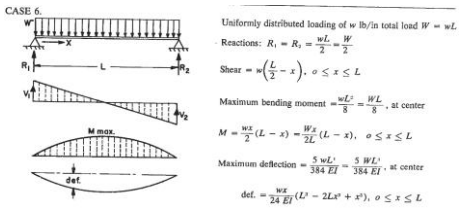
	Fixing to timber			Fixing to steel	
	Clip screws	Int. screws	Int. nails	Clip screws	Int. screws
Diameter:	4.17 mm	4.17 mm	3.15 mm	4.17 mm	4.17 mm
Length:	20 mm	55 mm	100 mm	20 mm	40.0 mm
Embedment / substrate thickness:	(20-0.8-2)mm = 17.2 mm	(55-15-18-2)mm = 20 mm	(100-15-18-2)mm = 65 mm	0.9 mm	0.9 mm
Substrate strength:	F_{tu} > 300 MPa (AS1720.1 Table 4.6(A), J6)	23 N/mm (AS1720.1 Table 4.6(A), J6)	6.6 N/mm (AS1720.1 Table 4.2(B), JD5)	F_{tu} > 300 MPa (Grade G2)	F_{tu} > 300 MPa (Grade G2)
Pullout:	0.34 kN	0.39 kN	0.36 kN	0.48 kN	0.48 kN
Head diameter:	7 mm	-	-	7 mm	-
Fixture thickness:	0.8 mm	16 mm with hollows	16 mm with hollows	0.8 mm	16 mm with hollows
Fixture strength:	F_{tu} > 300 MPa (Grade G2)	-	-	F_{tu} > 300 MPa (Grade G2)	-
Pullover:	1.26 kN	0.33 kN*	0.33 kN*	1.26 kN	0.33 kN*

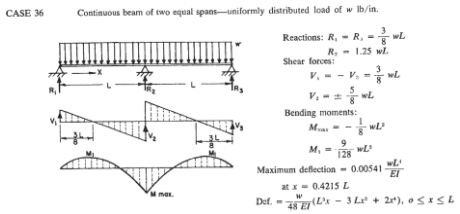
*pullover capacity of intermediate screws through the FC product is determined to be equivalent to existing specification

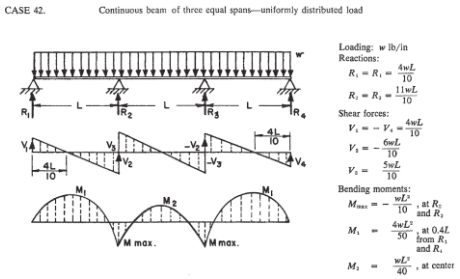
Therefore the capacity of the clips and their intermediate connections is taken as:

- Clip capacity: 0.34kN
- Intermediate fixing capacity: 0.33kN

Each of the fasteners are assessed considering the load attracted to it is representative of the load distributions set out below. Refer to figure below for width and panel span, L definitions.







<u>No intermediate screws/nails between clips</u>

Reaction load at clips:

$$\mathrm{R_{clip}} = wL = 100\% \times wL$$

<u>1 intermediate screw/nail between clips</u>

Reaction load at clips:

$$\mathrm{R_{clip}} = \frac{3wL}{8} = 37.5\% \times wL$$

Reaction load at nails/screws:

$$\mathrm{R_{int}} = \frac{5wL}{8} = 62.5\% \times wL$$

<u>2 intermediate screws/nails between clips</u>

Reaction load at clips:

$$\mathrm{R_{clip}} = \frac{8wL}{30} = 26.7\% \times wL$$

Reaction load at nails/screws:

$$\mathrm{R_{int}} = \frac{11wL}{30} = 36.7\% \times wL$$

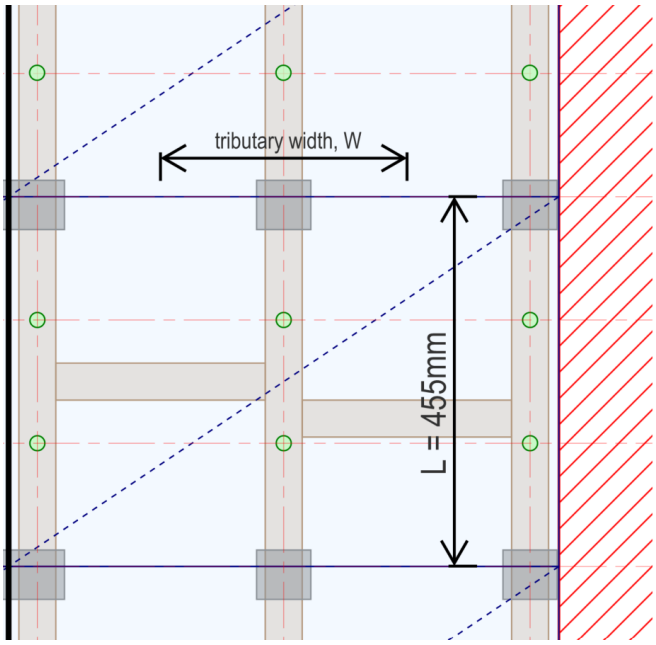


Figure: L denotes distance between clips & uniformly distributed load, w based on tributary width, W

Following the rules set out above, the load reaction on each support point can be determined:

Wind class	Pressure zone	Pressure	Width between fixings (W)	Number of intermediate fixings	Load to clips	Load to intermediate fixing
N4 / C2	**Corner**	-2.90 kPa	600 mm	2	0.211 kN	0.291 kN
	General	-1.45 kPa	600 mm	1	0.149 kN	0.248 kN
N5 / C3	**Corner**	-4.27 kPa	450 mm	2	0.233 kN	0.321 kN
	General	-2.14 kPa	450 mm	1	0.164 kN	0.273 kN
N6 / C4	**Corner**	-5.77 kPa	300 mm	2	0.210 kN	0.289 kN
	General	-2.88 kPa	300 mm	1	0.148 kN	0.246 kN
				Max.:	0.233 kN	0.321 kN
				Capacity:	0.340 kN	0.330 kN
				Result:	***PASS***	***PASS***