GREG KILLEN

CONSULTING ENGINEERS

MODINEX

Viroc

Structural Performance Assessment Report

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GREG KILLEN
CONSULTING ENGINEERS

Greg Killen Consulting Engineers
41 Dean Street
Toowong QLD 4066

ABN: 92 678 900 966

Tel: +61 7 3339 3133
Web: www.gregkillen.com

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	Name	Date	Signature
Prepared by:	Leroy Yeow	5.03.2026	
Reviewed by:	Mitchell McPherson	5.03.2026	
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TABLE OF CONTENTS

1 COMPLIANCE STATEMENT

This report details the assessment methodologies and results of assessments into the structural performance of the Modinex Viroc cladding 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 screw fixings 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: VIROC - 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	Edge Panel Fixing - 8g Screw @ **600mm** No intermediate Fixings	Edge Panel Fixing - 8g Screw @ **300mm** No intermediate Fixings
N5 / C3	Edge Panel Fixing - 8g Screw @ **600mm** No intermediate Fixings	Edge Panel Fixing - 8g Screw @ **300mm** No intermediate Fixings
N6 / C4	Edge Panel Fixing - 8g Screw @ **300mm** No intermediate Fixings	Edge Panel Fixing - 8g Screw @ **150mm** No intermediate Fixings

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

2 INTRODUCTION

2.1 Product Description

The following product description is provided:

Viroc

1. *Viroc is a cement-bonded particle board (CBPB) panel that combines the flexibility and workability of wood particles with the durability and strength of cement, giving a natural concrete aesthetic with robust performance. The Viroc cladding system incorporates a primary and secondary line of defence against water ingress by providing a drained and ventilated cavity between the panel and the external wall framing. The external face of the panel acts as the first barrier to direct weather exposure, while a compliant sarking or wall wrap behind the cladding forms the secondary weather-resistive barrier.*

2.2 Elements of Façade System

Viroc Panels

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

- Cement-bonded particle board (CBPB):
    - 16mm solid
    - Also available in 12mm and 19mm thickness
- Pan, wafer and countersunk head self-drilling screws for timber or metal

2.3 Limitations and Critical Assumptions

This report relates only to the structural performance of the Modinex Viroc 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.

Viroc Façade Panels

1. The façade panels are to be fixed to the following framing assumptions:
    - Timber frame – 45 x 90 stud (Douglas Fir, Hem-Fir, Spruce-pine Fir, Hoop Pine or Radiata Pine)
    - Steel Frame – 0.9mm, G2 grade steel.

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
Head type:	Pan, wafer, hex or countersunk	Pan, wafer, hex or countersunk
Head diameter:	16mm dia.	16mm dia.
Diameter:	5.5mm (#10 gauge)	5.5mm (#10 gauge))
Length:	55mm min.	16mm min.
Washer	Neoprene washer fitted to control clamping force	Neoprene washer fitted to control clamping force

General

3. All screws and nails must be installed in the centre of studs.
4. 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.
5. Steel used for the framing of walls must be minimum 0.9mm thick, minimum grade G2 steel (i.e. tensile strength >300MPa).
6. 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.
7. Established limitations on the tolerances of installation set out in the Viroc design and installation manuals, are to be observed and adhered to.
8. 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:

- MODINEX Viroc Installation Guide, dated August 2025
- MODINEX Viroc Fact Sheet, dated August 2025

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)

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

3.1. Panel Failure

A NATA Accredited test (test report AZT0540.25 & AZT0541.25) has also been undertaken to verify the bending strength / modulus of rupture (MOR) of the cement bonded particle board (CBPB) which was determined to be 7.8MPa.

The performance of the panel is assessed considering the maximum span between fixings for each wind class. The results are based on the performance of a typical 16mm thick Viroc panel.

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	600 mm	0.192 kNm / m	4.503 MPa
	General	-2.14 kPa	600 mm	0.096 kNm / m	2.257 MPa
N6 / C4	**Corner**	-5.77 kPa	600 mm	0.260 kNm / m	6.085 MPa
	General	-2.88 kPa	600 mm	0.130 kNm / m	3.037 MPa
				Max:	**6.085 MPa**

Therefore, in the worst-case, the product reserves a safety factor of: $SF = \frac{7.8\ MPa}{6.085\ MPa} = 1.28$

3.2. 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
	Edge screws	Edge screws
Diameter:	4.17 mm	4.17 mm
Length:	75 mm	40.0 mm
Embedment / substrate thickness: Substrate strength: Pullout:	(55-15-18-2)mm = 20 mm 23 N/mm (AS1720.1 Table 4.6(A), J6) 0.39 kN	0.9 mm 300 MPa (Grade G2) 0.48 kN
Head diameter: Fixture thickness: Fixture strength: Pullover:	16mm dia. head screws 16 mm - 0.40 kN*	16mm dia. head screws 16 mm - 0.40 kN*

*pullover capacity of edge screws through the Viroc panel is determined through NATA Accredited Testing (Test Report AZT0540.25 & AZT0541.25) with a test factor of satefy.

Therefore the capacity of the screw connection is taken as:

- Screw in timber: 0.40kN
- Screw in steel: 0.40kN

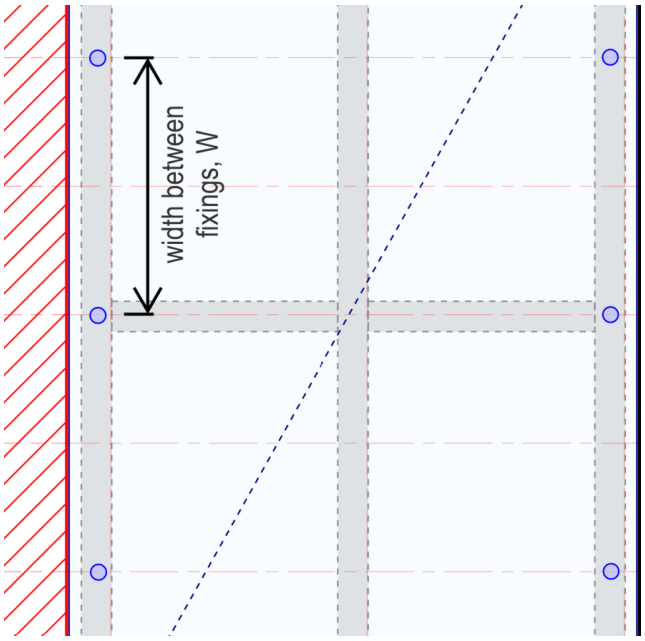

Figure: W denotes width between fixings

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

Wind class	Pressure zone	Pressure	Width between fixings	Load to end fixings
N4 / C2	**Corner**	-2.90 kPa	300 mm	0.261 kN
	General	-1.45 kPa	600 mm	0.261 kN
N5 / C3	**Corner**	-4.27 kPa	300 mm	0.384 kN
	General	-2.14 kPa	600 mm	0.385 kN
N6 / C4	**Corner**	-5.77 kPa	150 mm	0.260 kN
	General	-2.88 kPa	300 mm	0.259 kN
			Max.:	0.385 kN
			Capacity:	0.400 kN
			Result:	***PASS***