NBRSARCHITECTURE50

24th June 2019

Metro Building Consultancy Pty Ltd
Suite 211, 25 Berry Street
North Sydney NSW 2060

Attention: Sean Moore

Dear Sean,

RE: Armidale Secondary College Redevelopment – 17352 – Façade Compliance

This letter is to confirm that the proposed Fibre Cement cladding to the Façade of the Armidale Secondary College is to be Exotec paneled prefinished fibre cement which has been tested for water tightness to confirm its compliance to Performance Requirement FP1.4 of the Building Code of Australia (BCA2016) Amendment 1. The confirmation of this is represented by the Codemark Certificate CM40221 which is attached.
The installation of the cadding is to be undertaken in line with the manufactures recommendations and the limitations of the Codemark certificate, as specified within the 0434 Cladding section of the specification, which is attached, with highlighted sections relating to the cladding requirements..

Yours Faithfully
NBRSARCHITECTURE

TREVOR EVELEIGH
Studio Principle - Advisory

P:\17\17352\05_DOC\02_REPORTS\BCA\CC-90%\17352 - Facade Design Compliance Letter June 2019.docx

Certificate of Conformity

Certification Body:

CertMark International
ABN: 80 111 217 568
JAS-ANZ Accreditation No. Z4450210AK
PO Box 7144, Sippy Downs
Qld 4556
+61 (07) 5445 2199
www.CertMark.org

Certificate Holder:

James Hardie Australia Pty Ltd
ABN: 12 084 635 558
10 Colquhoun St, Rosehill
NSW 2142
www.jameshardie.com.au

Certificate number: CM40221

THIS TO CERTIFY THAT

Exotec™ Facade Panel and Fixing System

Type and/or use of product:

External Façade Panel and Fixing System.

Description of product:

The James Hardie Exotec™ facade panel system is an express joint façade system comprising of compressed fibre cement (CFC) panels and the proprietary James Hardie top hat system. Panels are supplied as paintable or pre-finished.

COMPLIES WITH THE FOLLOWING BCA PROVISIONS AND STATE OR TERRITORY VARIATION(S) **BCA 2016 Amdt. 1**

	Volume One		Volume Two	
Performance Requirement(s):	FP1.4	Roof and external walls must prevent the penetration of water	P2.2.2	Weatherproofing
Deemed-to-Satisfy Provision(s):	B1.2	Determination of individual actions	3.5.3.3(a)	Wall cladding boards – Fibre-cement
	B1.4	Determination of structural resistance of materials and forms of construction	3.5.3.4(a)	Sheet wall cladding
	C1.9(a)(i), (d)&(e)(iv)	Non-combustible building elements	3.5.3.5	Eaves and soffit linings
	G5.2	Construction in bushfire prone areas (BAL Low-40)	Part 3.7.4	Bushfire areas (BAL Low-40)
	J1.5	Walls (9mm - R-Value 0.015 - Contributes to the overall performance of the building envelope)	3.11.2	Resistance to actions
			3.11.3	Determination of individual actions
			3.11.6	Determination of structural resistance of materials and forms of construction
			3.12.1.4	Building fabric thermal insulation (9mm - R-Value 0.015 - Contributes to the overall performance of the building envelope)
State or territory variation(s):	NSW & SA G5.2, SA G5.3, QLD J1.5		QLD, NSW, SA & Tas 3.7.4	

John Thorpe - CMI

Don Grehan – Unrestricted Building Certifier

Date of issue: 13/04/2018

Date of expiry: 13/04/2021

Certificate of Conformity

SUBJECT TO THE FOLLOWING LIMITATIONS AND CONDITIONS AND THE PRODUCT TECHNICAL DATA IN APPENDIX A AND EVALUATION STATEMENTS IN APPENDIX B

Limitations and conditions:

1. A qualified Structural Engineer must design the substructure and the connection between the substructure and the top hats.
2. It is the responsibility of the Project Engineer to determine the appropriate wind pressure for the project and specify the fixing of the top hats to the structure. The Engineer must limit deflection of the supporting structure to span/250 for Serviceability Wind Load in accordance with AS 1170.2:2011 'Structural design actions Wind actions'.
3. The Exotec™ Façade Panel, as certified, will contribute to the overall thermal performance of the building; however, the performance values are for guidance only and must be verified by a suitably qualified person(s). It is the responsibility of the building designer to ensure the minimum thermal requirements for the building envelope is achieved.
4. A suitable weather barrier must be installed behind Exotec™ Façade Panel and Fixing System in accordance with the relevant requirements of the BCA and AS/NZS 4200.2:2017 'Pliable building membranes and underlays Installation. Where a combustible weather barrier is proposed, it must be assessed independent of this certificate. Refer A6 – Other relevant technical data.
5. This Certificate is issued based on the evidence of compliance as detailed herein. Any deviation from the specifications contained in this Certificate is outside of this document's scope and the installation of the certified product/system will not be covered by this CodeMark certification. This may result in the product being classified as a non-conforming building product/system.

Building classification/s:

1,2,3,4,5,6,7,8,9 & 10

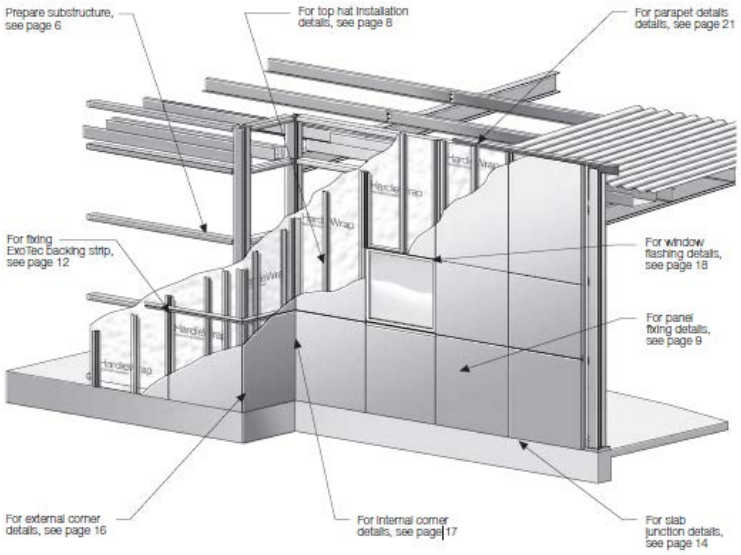
Scope of certification: The CodeMark Scheme is a building product certification scheme. The rules of the Scheme are available at the ABCB website www.abcb.gov.au. This Certificate of Conformity is to confirm that the relevant requirements of the Building Code of Australia (BCA) as claimed against have been met. The responsibility for the product performance and its fitness for the intended use remain with the certificate holder. The certification is not transferrable to a manufacturer not listed on Appendix A of this certificate.

APPENDIX A – PRODUCT TECHNICAL DATA

A1 Type and intended use of product

As per page 1.

A2 Description of product



Source: *Certificate Holder*

Product	Description	Quantity / Size (Nominal)		
		Thickness (mm)	Width (mm)	Lengths (mm)
Exotec™ facade panel	Dense compressed panel. Square edge. Factory sealed on all six sides. The Nominal density of the 9mm board is 1550kg/m^3 The Paintable panel has a distinctive white face, which accepts a wide range of paint finishes. The panel must be installed with the white side facing the exterior of the structure. The Pre-Finished Panel is pre-sealed by James Hardie to create a natural “raw” fibre-cement aesthetic with an optional pre-finish using factory applied coating via a third-party supplier.	9	900 200	1800, 2100, 2400, 2700 and 3000
		12	1200	2400 and 3000

Exotec™ Top Hat	A rolled metal section, for use with Exotec™ façade panel and fixing system, designed to span vertically across the building structure to support façade panels and isolate different movement of the panels from those of the structure.	1.15 gauge	124 wide x 35 deep	6000 and 7200
James Hardie Intermediate Top Hat	A metal top hat installed vertically for use with Exotec™ and ComTex façade panel and fixing system, for intermediate sheet support.	1.15 gauge	50 wide x 35 deep	6000 and 7200
Exotec™ Gasket Snap Strip	For use with the Exotec™ façade panel fixing system, this gasket snap strip is specially designed to clip into the Exotec™ Top Hat at vertical façade panel joins to cover fixings to the structure and to provide an initial weather seal and drainage using a neoprene gasket.	-	-	3620
James Hardie Backing Strip	A weather seal at horizontal panel joints for use with Exotec™ façade panel and fixing system.	-	-	1190, 2390 and 2990
James Hardie Façade Washers	Façade washers used for exposed fastener fixing with Exotec™ façade panel and fixing system.	-	-	-
James Hardie Base Coat	A water-resistant base coat compound used to finish over countersunk fasteners with epoxy.	-	-	-
James Hardie Joint Sealant	A general purpose, paintable, exterior grade polyurethane joint sealant.	-	-	-
HardieEdge™ Trim	An architectural slab edge solution fabricated from high-quality powder coated aluminium.	-	-	3950

A3 Product Specification

Strength and Moisture Related			
Physical Property	**Saturated Condition**	**Equilibrium Condition 23ºC – 50% RH**	**Standard**
Average Bending Strength Category Type	> 7.0MPa 3 A	-	AS/NZS 2908.2
Density in kg/m^3 (Oven Dry)	1490	-	AS/NZS 2908.2
Watertightness	-	Passes	AS/NZS 2908.2
Water Absorption	24.7%		ASTM C1186
EQ Moisture Content	-	3.2%	ASTM C1186
Dimensional Conformance	-	Passes	AS/NZS 2908.2

Weatherproofing

Testing of James Hardie Exotec™ Façade Panel in accordance with AS/NZS 4284:2008.

The AS/NZS 4284:2008 test arrangement consisted of a single storey test sample comprising the Exotec™ façade panel system using 9mm sheet. The sample was approximately 3500mm high and 4400mm wide. The system was built on a 140 x 45mm SG8 timber stud frame at 400mm centres with nogs at 800mm centres. A window of 765 x 1200mm, and a 600 x 400mm return detail was included, clad in 6mm James Hardie RAB board, with 'Top Hat metal rails fixed vertically down the system between nog lines – not on the studs. A horizontal expansion joint was included at 2700mm above the footer, including an Aluminium 'T' socket.

Test	Result
Static Water Penetration Test	No water leaks
Cyclic Water Penetration Test	No water leaks

Seismic test at serviceability limit displacement

Seismic deflection parameters (SLS)

Distance (d ± x mm)	Cycles (n)	Period (T, seconds)	Pause at mid-point and ends (sec)
18 ± 1 mm	10	10mm/sec	10
20 ± 2 mm	10	10mm/sec	10

Note: The seismic deflection testing at ±20mm was undertaken straight after the SLS seismic deflection of ±18mm and resulted in a fine crack occurring at the head of the window. The cyclic water penetration test was performed following the seismic test with the results as follows.

Cyclic water test

Phase	Air Pressure (Pa)	Duration	Result
	0	5 Mins	No water leaks
1	525-1050	5 Mins	No water leaks
2	700-1040	5 Mins	No water leaks
3	1050-2100	5 Mins	Dampness on back of RAB board around crack in RAB board. No water leakage.

Structural test at ultimate limit state air pressure

Air Pressure (Pa)	Result
+5000	Ok
-5000	Ok

Ultimate limit state seismic test

ULS seismic deflections

Distance (± x mm)	Cycles (n)	Period (T, seconds)	Pause at ends (sec)
30mm	10	Approx. 10 sec, with 3-4 sec between end points	10

Durability

Description	Result	Standard
Heat-Rain Durability	Passes	AS/NZS 2908.2
Warm Water Resistance	Passes	AS/NZS 2908.2
Freeze-Thaw Resistance	Passes	AS/NZS 2908.2
Soak-Dry	Passes	AS/NZS 2908.2

Thermal Properties

When tested in accordance with ASTM C518, the 9mm panel achieves an R-Value of 0.015. It is the responsibility of the building designer to ensure the minimum R-Value for the building envelope is achieved.

Fire

Description	Result	Standard
Non-Combustibility	Non-Combustible	Suitable where non-combustible materials are required in accordance with C1.9(e)(iv) of the BCA
Sample Classification Average Specific Extinction Area	Group 1 55.1m2/Kg	AS/NZS 3837
Fire Propagation Index	0	BS 476.6
Spread of Flame Index	Class 1	BS 476.7

Bushfire

Provided any joints are no greater than 3mm or appropriately sealed, compliance with AS 3959-2009 as well as the National Construction Code of Australia Volumes 1 and 2 2016 and 2016 Amendment 1 for BAL-Low to BAL-40.

A4 Manufacturer and manufacturing plant(s)

James Hardie
1-35 Cobalt Street,
Carole Park QLD 4300
Australia.

A5 Installation requirements

The ExoTec™ Façade Panel and Fixing system must be installed in accordance with the relevant James Hardie technical literature. Where ExoTec™ Façade Panel is to be painted on-site or finished with a factory applied coating, the panels must be specified and installed in accordance with the ExoTec™ Façade Panel and Fixing System Installation Guide (April 2018) and ExoTec™ Façade Panel and Fixing System Technical Specification (April 2018). Where the ExoTec™ RAW Façade Panel is to be used, refer to the ExoTec™ RAW Façade Panel and Fixing System (April 2018).

The Exotec™ façade panel can be installed upright horizontally or vertically. The panel layout will determine the location of the Exotec™ and James Hardie Intermediate top hats. The vertical expressed joints may be aligned or offset in a brick pattern layout.

1. The Exotec™ façade panels must be fixed to:
   a) Exotec™ top hat for vertical sheet joints.
   b) James Hardie Intermediate top hat for supporting the panels between vertical sheet joints.
2. Exotec™ façade panels are installed with a 10mm nominal expressed joint between adjacent panels, vertically and horizontally. Vertical joints up to 20mm width can be formed, with additional care required at installation to ensure the panel edges cover the Exotec™ gasket snap strip on both sides of the joint. A minimum vertical expressed joint of 6mm is allowed with care. Horizontal joints are a nominal 10mm.
3. Exotec™ façade panels may be fixed to Exotec™ top hats and James Hardie Intermediate top hats by either:
   a) Countersunk fasteners: Flush finished over screw heads with a suitable epoxy, and then with James Hardie base coat.
   b) Exposed head screws: Using pan, wafer or hex head screws. Used where pre-finished panels are installed. Exposed head fasteners may be colour coated to match panel finish. Note: This option is for site painted panels. Where ExoTec™ panels are pre-finished with a factory applied finish, or for ExoTec™ RAW panels are used, refer to Option B. Fasteners must have the appropriate level of durability required for the intended project. This is of particular importance in coastal areas, subject to salt spray and other corrosive environments. Fasteners must be fully compatible with all other materials that the fasteners will come in contact with, to ensure the durability and integrity of assembly. For exposed head fasteners, James Hardie Façade Washers are recommended to be inserted between the panel and the fastener.

6. A suitable weather barrier must be installed behind Exotec™ Façade Panel and Fixing system in accordance with the relevant requirements of the BCA and the AS/NZS 4200.2:2017 'Pliable building membranes and underlays – Installation. James Hardie recommends HardieWrap™ Weather Barrier – refer to the building designer, certifier, or other relevant expert, for suitability.

Design Considerations

Slab and Footings	The slab and footings on which the building is situated must be designed and certified by a qualified Structural Engineer according to all relevant codes, regulations and standards.
Ground Clearances	Install James Hardie external cladding with a minimum 150mm clearance to the earth on the exterior of the building or in accordance with local building codes if greater than 150mm is required. Also, maintain a minimum 50mm clearance between James Hardie external cladding and roofs, decks, paths, steps and driveways. Adjacent finished grade must slope away from the building in accordance with local building codes, typically a minimum slope of 50mm minimum over the first metre. Do not install external cladding in areas where it may remain in contact with standing water or debris.
Coastal Areas	In coastal areas located within 1km of the shoreline or large expanses of salt water (e.g. Port Phillip Bay, Sydney Harbour east of the Spit and Harbour Bridges, Swan River wet of the Narrows Bridge), one of the following is required: • All horizontal and vertical expressed joints must be filled with a suitable sealant. • Where both the horizontal and vertical expressed joints are not filled, the joints and panels must be washed down twice a year. • On unprotected walls, rain will perform this washdown, but where walls are protected by soffits above, the washdown twice per year is a maintenance requirement.

Moisture Management	The Exotec™ Facade Panel and Fixing System acts as a weather shield. To achieve a particular level of weathertightness, the designer must determine the appropriate moisture management detailing for the project. The designer should consider the following matters when making that determination: • It is the responsibility of the builders and designers to identify moisture related risks associated with any particular building design. • It is the responsibility of the builder to ensure appropriate moisture management is provided during framed wall construction through effective use of flashings, sealants and vapour permeable membranes such as HardieWrap™ weather barrier, building wraps, vapour retarders and damp-proof course. Before installing panels, all wall openings, penetrations, intersections, connections, window sills, heads and jambs must incorporate appropriate flashing and waterproofing. Materials, components and the installation practices that are used to manage moisture in framed wall construction must, at a minimum, comply with the requirements of relevant standards, building codes and the manufacturer's specifications. Sealant at sheet joints must be installed where detailed in this literature. For wind pressures up to 4.0kPa, please refer to the Exotec™ Façade Panel and Fixing System – Technical Specification (April 2018) for installation requirements. For high walls it may be necessary to provide flashing to drain the facade at one or more intermediate levels. The installation of smoke, vermin and other barriers must not restrict moisture from reaching flashings.
Top Hat Framing	Exotec™ facade panels must be fixed to Exotec™ top hat and James Hardie Intermediate top hat sections which are installed vertically over steel, masonry or timber structures. Exotec™ top hat and James Hardie Intermediate top hat sections must not be installed horizontally. Ensure a planar fixing surface for Exotec™ facade panels. The structure can either be straightened or packed out between the substructure and top hats. Packing out of top hats must be limited to 20mm maximum. It is the responsibility of the project engineer to determine the appropriate wind pressures for the project and specify the fixing of the top hats to the structure. The engineer must limit the deflection of the supporting structure to span/250 for Serviceability Wind Load. The nominal spacing between top hats is 605mm for a 1200mm wide panel and 455mm for a 900mm wide panel, i.e. top hats are required at panel edges and at intermediate spacings within the panels. The Exotec™ top hats at panel edges have the legs facing out from the structure and at intermediate locations the James Hardie Intermediate top hat is used, with the legs fixed to the structure. The maximum spans and nominal spacings of Exotec™ top hats and James Hardie Intermediate top hats for wall and soffit applications are provided below. For wall applications, the maximum cantilever distance of the top hats is one quarter of the single span.

Walls – Maximum Exotec™ Top Hat and James Hardie Intermediate Top Hat Spans (mm) For Ultimate Design Wind Pressures (9mm and 12mm Panels).

Span Type	Nominal Top Hat Spacing (mm)	Design Wind Pressure (kPa)									
		1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0
Single Span	450	1680	1470	1330	1240	1160	1110	1060	980	890	800
	600	1530	1330	1210	1120	1060	1010	N/A	N/A	N/A	N/A
2 Span	450	2250	1970	1790	1660	1500	1380	1250	1080	950	830
	600	2050	1790	1620	1400	1250	1140	N/A	N/A	N/A	N/A
3 Span	450	2080	1810	1650	1530	1440	1350	1250	1080	950	830
Continuous	600	1890	1650	1500	1390	1250	1140	N/A	N/A	N/A	N/A

Soffits – Maximum Exotec™ Top Hat and James Hardie Intermediate Top Hat Spans (mm) For Ultimate Design Wind Pressures (9mm and 12mm Panels).

Span Type	Nominal Top Hat Spacing (mm)	Design Wind Pressure (kPa)									
		1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0
Single Span	450	1560	1390	1270	1190	1120	1070	1030	960	900	860
	600	1420	1260	1160	1080	1020	N/A	N/A	N/A	N/A	N/A

2 Span	450	2090	1860	1710	1600	1440	1310	1210	1050	930	840
	600	1900	1690	1520	1340	1200	N/A	N/A	N/A	N/A	N/A
3 Span	450	1930	1720	1580	1470	1390	1310	1210	1050	930	840
Continuous	600	1750	1560	1430	1340	1200	N/A	N/A	N/A	N/A	N/A

Fastener Spacings - Walls and Soffit

Fasteners Spacing (9mm and 12mm Thick Panels) For Wall and Soffit Application

Design Wind Pressure (ultimate) (kPa)	Nominal Top Hat Spacing (mm)	Max. Fasteners Spacing	Max. Fasteners Spacing at Intermediate Top Hats (mm)
1.0	600	600	600
1.5	600	600	600
2.0	600	400	400
2.5	600	400	400
3.0	*600	400	300
3.0	450	400	400
3.5	450	350	350
4.0	450	300	300
4.5	450	300	300
5.0	450	300	250
5.5	450	300	250
6.0	450	300	200
6.5	400	250	200
7.0	400	250	200

Notes:

1. For high walls it may be necessary to provide flashing to drain the façade at one or more intermediate levels. The installation of the barrier must not restrict moisture from reaching flashings and draining out.
2. The Engineer must limit the deflection of the supporting structure to span/250 for Serviceability Wind Load. Except Where * is shown it is span/180

A6 Other relevant technical data

Weather Barrier

HardieWrap™ Weather Barrier is recommended to be installed behind Exotec™ Façade Panels and Fixing System in accordance with AS/NZS 4200.2:2017 'Pliable building membranes and underlays – Installation' and HardieWrap™ Technical Data Sheet; however, for Type A or B Construction, must be assessed by a suitably qualified Fire Safety Engineer to ensure the barrier will not affect the compliance of the wall system.

If using an alternate product in lieu of HardieWrap™ Weather Barrier; in addition to the above, the designer must ensure that the product is fit for purpose and it has the following properties in accordance with AS/NZS 4200.1:2017 'Pliable building membranes and underlays Materials':

a. Vapour barrier - low or medium;
b. Water barrier – high.

Refer to the building designer for the suitability of HardieWrap™ Weather Barrier or other specified membrane or contact James Hardie for more information.

Bushfire

BAL-FZ construction requires the ExoTec™ Façade Panel and Fixing System to be installed in conjunction with a suitable fire rated wall system with minimum 30 minute FRL – refer to the James Hardie Bush Fire Prone Areas Technical Supplement for more information, and James Hardie™ Fire and Acoustically Rated Walls Application Guide.

Fire Rated Wall Systems

Both one and two-way fire rated wall systems are available with the ExoTec™ Facade Panel and Fixing System. This will depend on the wall configuration and internal materials used. For more information refer to the ExoTec™ Facade Panel and Fixing System FRL External Walls section of the James Hardie™ Fire and Acoustically Rated Walls Application Guide.

APPENDIX B – EVALUATION STATEMENTS

B1 Evaluation methods

1. Structural Provision – A2.2(a)(v) and 1.2.2(a)(iii). Reports from Qualified Professional Engineer.
2. Characteristic Type Testing – A2.2(a)(iv) and 1.2.2(a)(i). Reports from accredited test laboratories.
3. Bushfire Assessment – A2.2(a)(v) and 1.2.2(a)(iii). Reports from a Qualified Professional Engineer.
4. Fire Assessment – A2.2(a)(iv) and 1.2.2(a)(i). Reports from accredited test laboratories.
5. Thermal Properties – A2.2(a)(v) and 1.2.2(a)(iii). Reports from an appropriately qualified person.

B2 Reports

1. Cardno; Engineering Report S11713-LO-44A; Certification of James Hardie ExoTec™ Façade Panel and Fixing System - compliance to AS/NZS 1170.2-2002 Clause 2.5.5 & AS 4040.3-1992; Dated 18/08/2009.
2. David Beneke Consulting Pty Ltd; Report No.: 2011-45-LO-05; Certification of James Hardie ExoTec™ Façade Systems in High Wind Applications; Dated 19/04/2011.
3. James Hardie Australia Pty Ltd; NATA Accreditation No. 14220; Compliance Certificate ExoTec™ Façade Panel - Characteristic Type Tests required by AS/NZS 2908.2:2000; Dated July 2010.
4. CSIRO; NATA Accreditation No. 165; Certificate No.: 1126; Certificate of Assessment in accordance with AS/NZS 3837 Group Number 1 and Average specific extinction area: 55.1m^2/kg; Dated 28/08/2008.
5. Acronem Consulting Australia Pty Ltd; Thermal break requirements for Exotec™ on Metal Frames Single Stud; Dated 28/11/2017.
6. Facade Testing NZ Limited; IANZ Accreditation No. 1259; Report No. FT-R1005a; Testing in accordance with AS/NZS 4284:2008; Dated 08-09/05/2017.
7. BRANZ, Project Number: EC0712; Thermal Conductivity Measurement of Six Samples of Fibre Cement Board Products; Dated 17/10/2003.
8. Ignis Solutions Pty Ltd; Evaluation No. IGNS-6690-01 Issue 01 Revision 00[2018]; Compliance with AS 3959-2009 BAL Low-40; Dated 31/03/2018.

The Certificate holder has chosen not to make the above evidence of compliance publicly available, due to the documents being considered commercial in confidence.

0434 CLADDING – FLAT SHEETS AND PANELS

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide lightweight external wall cladding and associated work, as documented.

Ambient climatic conditions
Design rainfall intensity (mm/h) to AS/NZS 3500.3: 219.

Location exposure severity
Wind pressure: Refer to the Structural drawings.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:

- *0171 General requirements*
- *0342 Light steel framing*
- *0471 Thermal insulation and pliable membranes.*

Requirement: The design and installation of the compressed fibre cement cladding system, CFC shall be in accordance with:

- *Installation Guide, ExoTec™ Façade Panel And Fixing System, Commercial*, May 2019.
- *Technical Specification ExoTec™ Façade Panel And Fixing System, Commercial*, May 2019.
- *CodeMark Certifcate of Conformity no.CM40221* for ExoTec™ Façade Panel And Fixing System.

1.3 INTERPRETATION

Abbreviations
General: For the purposes of this worksection the following abbreviations apply:

- CCA: Copper chrome arsenate.
- CFC: Compressed fibre cement.
- EIFS: External insulated finishing system.
- FC: Fibre cement.
- LOSP: Light organic solvent preservative.

1.4 TOLERANCES

Permitted deviations
Requirement: To the manufacturer's recommendations.

1.5 SUBMISSIONS

Fire performance
Combustibility: Submit evidence of conformance to PRODUCTS, **FIRE PERFORMANCE**, **Combustibility**.

Fire hazard properties: Submit evidence of conformance to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Fire-resistance level: Submit evidence of conformance to PRODUCTS, **FIRE PERFORMANCE**, **Fire-resistance of building elements**.

Operation and maintenance manuals
General: Submit manufacturer’s published use, care and maintenance requirements.

Products and materials
Type tests: As appropriate for the project, submit evidence of conformance to the following:

- Plastic cladding: Cladding and fastenings to AS 1562.3 Section 5 for resistance to wind forces and resistance to impact.

Prototypes
Requirement: Erect a prototype of the following:
- Compressed fibre cement cladding system, CFC
- Vertical louvre blades LVB(X)
- Perforated aluminium screens PM01

General: Erect a prototype of each panel type, including at least one example of each component in the system to verify selections submitted as samples, to demonstrate aesthetic effects, to set quality standards for materials and execution and to verify performance, including wind loading.

Inclusions:
- Typical components, attachments to building structure and methods of installation.
- Window opening with cladding panel, trim and returns.
- Sealant filled joint.

Samples
Finish: Submit samples of the cladding material showing the range of variation available.

Shop drawings
Requirement: Submit shop drawings of the following:
- Compressed fibre cement cladding system, CFC
- Vertical louvre blades LVB(X)
- Perforated aluminium screens PM01

General: Submit shop drawings to a scale that best describes the detail, showing the following:
- Dimensioned elevations of all elements.
- Details of construction, connections and all support systems.
- Dimensions of all typical elements and of any special sizes and shapes.
- Provision for the exclusion and/or drainage of moisture.
- Jointing details and method of fixing between individual elements and between this installation and adjacent work, including adjustment.
- Sealant types and full size sections of all sealant-filled joints and backing rods.
- Provision for thermal movement.
- Provision for movement under seismic and wind loads.
- Sequence of installation.
- Co-ordination requirements with other work.
- Schedule of materials, finishes, componentry, hardware and fittings.

Subcontractors
General: Submit names and contact details of proposed suppliers and installers.

Warranties
Cladding materials: Submit the manufacturer's published product warranties.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Workshop assemblies before delivery to the site.
- Framing, sarking, vapour barrier and insulation before covering up or concealing.
- Completion of a prototype.

2 PRODUCTS

2.1 GENERAL

Storage and handling
Requirement: Store and handle materials to the manufacturer’s recommendations and the following:
- Protect materials including edges and surfaces from damage.
- Keep dry and unexposed to weather.

- Do not drag metal sheets or panels across each other or over other materials.
- AAC panels: Stack on edge, support off the ground and level to avoid sagging and damage to ends, edges and surfaces.
- Composite panels: Store unpacked panels by size in racks and protect from scratching, warping or bending.
- Sheeting: Stack flat and off the ground on at least 3 evenly placed bearers.

Components

Fasteners and ties: Type, size, corrosion resistance class and spacing to the cladding manufacturer's recommendations.

Flashings: To AS/NZS 2904.

2.2 FIRE PERFORMANCE

Combustibility

Cladding: Tested to AS 1530.1.

Requirement: All components of the cladding system for external walls, including the covering, framing, sarking and insulation, must be non-combustible in accordance with clause C1.9 of the Building Code of Australia.

Fire hazard properties

Bonded laminated materials: Tested to AS/NZS 1530.3. Fire hazard indices, as follows:

- Spread of Flame Index: 0.
- Smoke-Developed Index: ≤ 3.

Fire-resistance of building elements

Fire-resistance level: To AS 1530.4.

2.3 COMPOSITE PANELS

General

Requirement: Proprietary panels comprising prefinished skins continuously laminated over a thermoplastic or mineral core.

Panel joints and control joints: Integral.

Flexible sealant: Non-staining to the manufacturer’s recommendations.

2.4 COMPRESSED FIBRE CEMENT (CFC) SHEETS

General

Requirement: Proprietary compressed fibre cement sheets.

Standard: To AS/NZS 2908.2 and the following:

- Type A Category 5.

Quality: Smooth and even with factory sealed edges, free of imperfections such as chips.

Edge profile: Square.

Sealant and bond breaking tape: To the manufacturer’s recommendations.

2.5 FIBRE CEMENT (FC) SHEETS

General

Requirement: Proprietary single faced fibre cement sheets.

Standard: To AS/NZS 2908.2 and the following:

- Type A Category 3.

Sealant and bond breaking tape: To the manufacturer’s recommendations.

2.6 EXTERNAL SCREENS

General

Requirement: Provide weatherproof infill panel materials mounted in a metal perimeter frame or subframe as follows:

- To withstand imposed actions and wind actions for the location without failure or permanent distortion, and without panel flutter.
- To shed water without pooling.

Expansion joints
Requirement: Provide for expansion and contraction in continuous sections at spacings not exceeding the manufacturer's recommendations, or 6 m, whichever is the lesser.

Fixing: Provide a fixing system appropriate to the panel material that will retain the panel without distortion or dislocation.

Framing materials
Requirement: Provide frames fabricated from solid or hollow metal sections. Fix to fastener brackets or arms mounted on the face of the building, and brace as necessary.

3 EXECUTION

3.1 PREPARATION

Substrates or framing
Preparation: Before fixing cladding, check the alignment of substrates or framing and adjust if required.

3.2 INSTALLATION

General
Fixing method: As documented or to one of the following fixing methods to the manufacturer's recommendations:

- Steel framing: Screw.
- Timber framing: Nail or screw.

Horizontal cladding surface:

- Minimum slope: 1:15.
- Staining: Slope away from visible vertical façade areas to prevent staining.

Defective components: Do not install component parts which are defective, including warped, bowed, dented, abraded or broken members.

Damaged parts: Remove and replace damaged members during installation.

Accessories and trim
Requirement: Provide accessories and trim necessary to complete the installation, or as documented.

Metal separation
Requirement: Prevent direct contact between incompatible metals, and between green hardwood or chemically treated timber and aluminium or coated steel, by either of the following methods:

- Apply an anti-corrosion, low moisture transmission coating to contact surfaces.
- Insert a separation layer.

Incompatible metal fixings: Do not use.

Proprietary systems or products
Product fixing: Fix proprietary systems to the manufacturer's recommendations.

3.3 COMPOSITE PANEL CLADDING

General
Fabrication: Factory fabricate panels and elements wherever possible.

Installation: Install composite panels as follows:

- Plumb, level, straight and true within acceptable building tolerances.
- Fixed or anchored to the building structure in conformance with the wind action loading recommendations.
- Isolated from any building loads, including loads caused by structural deflection or shortening.
- Allow for thermal movement.

Protection: Protect surfaces and finishes, including the retention of protective coatings during installation.

Joints
Requirement: Rigidly secure joints other than movement and open joints. Reinforce as required and fix with hairline abutments or as documented.

Control joints:

- Location: To coincide with structural movement joints, as documented.

3.4 CFC SHEET CLADDING

Preparation

Requirement: Cut sheets to suit the layout as documented, allowing a joint gap of 10 mm between panels.

Joints

Joints: Expressed vertical and horizontal joints with proprietary, roll-formed steel and rubber backing strips behind

Arrangement: Set out in even panels with joints coinciding with framing or as documented.

Fixing

General: Screw fix to proprietary framing supports at centres to the manufacturer's recommendations.

3.5 FC SHEET CLADDING

Preparation

Requirement: Cut sheets to suit the layout as documented.

Joints

Control joints:

- Locate between the panel and fixing system and the supporting structure, as documented.
- Sheet edges: Square cut.
- Sealant: Do not apply finish coating over joint sealants.

Arrangement: Set out in even panels with joints coinciding with framing or as documented.

Fixing

General: Corrosion resistant nails or screws to the manufacturer's recommendations.

Eaves and soffit lining: Fix at 150 mm centres to soffit bearers at a maximum of 450 mm centres.

3.6 FABRICATION OF EXTERNAL SCREENS

Aluminium fabrication and construction

Standard: To AS/NZS 1664.1 or AS/NZS 1664.2.

Fasteners

Requirement: Provide fasteners of sufficient strength and quality to perform their required function.

Joints

Requirement: Make accurately fitted tight joints so that neither fasteners nor fixing devices create pressure indentations that are visible on exposed faces. Where heads of fasteners are unavoidably visible, finish them to match the adjacent finished surface.

Protection

Corrosion protection: Provide protection against corrosion which may be caused in metals by products or processes normally employed on a building site or by normal atmospheric or other ambient conditions and by-products including rainwater, potable and non-potable water, airborne salt and airborne pollution.

Durability: Provide materials resistant to exposure to weather and UV radiation so that their colour, surface finish, flexibility and water resistance are maintained.

Temporary measures: Do not use adhesive tape, film or paper, or applied coatings liable to bond to the substrate, when exposed to sunlight or weather, as temporary measures to protect screen components during the course of the works. If temporary measures are used, remove all traces, particularly from contact mating surfaces before joining up.

3.7 WELDING OF EXTERNAL SCREENS

General

Quality: Provide finished welds descaled and free of surface and internal cracks, slag inclusion and porosity. Provide continuous welding unless permanently concealed.

Restrictions: Do not weld as follows:

- On site.

- On finished surfaces.
- Next to a finished surface or glass, unless the adjacent surface is protected from damage.

3.8 EMBEDDED FIXINGS FOR EXTERNAL SCREENS

General

Fixing: Fix screens to the building structure by one of the following methods:

- Fasteners cast into the concrete of the building structure. Do not displace reinforcement, when locating embedded items.
- Chemical fixings, expanding bolt sockets.
- Bolting or welding to brackets or structural framing.

Submission: If other methods of fixing (e.g. preformed pockets or explosive tools) are proposed, submit details.

Standard for embedment

For concrete: To AS 3600.

For masonry: To AS 3700.

Fixing brackets

Requirement: Provide fasteners and other methods of attachment of the screens to the structure with the following characteristics:

- Three-way adjustment to accommodate fabrication and construction tolerances.
- Provision for building movements while fixing the screens in their correct positions.
- Adequacy for structural design actions.

3.9 COMPLETION

Reinstatement

Extent: Repair or replace damage to the cladding. If the work cannot be repaired satisfactorily, replace the whole area affected.

Touch up: If it is necessary to touch up minor damage to pre-painted metal cladding, do not overspray onto undamaged surfaces.

Cleaning

Requirement: Remove excess debris, metal swarf, solder, sealants and unused materials.

Exposed metal surfaces: Clean surfaces of substances that interfere with uniform weathering or oxidisation.

Protection: Remove protective coatings using methods required by the manufacturer after completion.

Composite panels: Clean surfaces with soft, clean cloths and clean water to the manufacturer's recommendations.

Warranties

Requirement: Cover materials and workmanship in the form of interlocking warranties from the supplier and installer.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

4 SELECTIONS

4.1 COMPRESSED FIBRE CEMENT CLADDING, CFC

Location

General: To external walls. Refer to the drawings.

System description

General: A proprietary cladding system comprising:

- Pre-finished compressed fibre cement panels, installed so as to be weather tight under the applicable ambient climatic conditions
- A sub-structure of top hat sections to which the panels are fixed
- Sarking
- Matching trim to form parapets, reveals, cappings and the like

- Accessories and fixings as necessary to complete the installation.

Cladding panels

Material: A fibre cement composite material consisting of cement cellulose and mineral materials, reinforced by a visible matrix.

Thickness: 12mm.

Density: 1550 kg/m^3 .

Maximum panel size: 1200 x 2400mm.

Panel layout: Refer to the drawings.

Finish: Factory pre-finished coloured coating.

Colours: The panels are required to be finished in approximately 12 different colours. Refer to the drawings and the *Exterior Finishes Schedule.*

Backing wall structure

General: Concrete, concrete blockwork or 150 x 1.15mm steel studwork.

Framing

Requirement: Provide a proprietary framing system consisting of vertical galvanised steel top hat sections, 35mm deep, fixed to the structure of the building.

Provide all framing required to fix the panel system in position and to ensure that the panels are securely anchored to the building structure. Provide any framing required to reinforce the rear of the panel as recommended by the panel manufacturer.

Top hats: 124 x 35 x 0.75mm.

Intermediate top hats: 50 x 35 x 0.75mm.

Thermal break

Requirement: Install behind the top hat sections and over the sarking.

Framed wall thermal break strips:

- Application: To steel framing with lightweight external cladding.
- R-Value: ≥ 0.2.
- Proprietary item: HardieBreak thermal strip.

Fixings

Type: Visible wafer-head screws and washers which are colour-matched to the panels.

Size and spacing: To the panel manufacturer’s recommendations.

Requirement: Panels must be pre-drilled for fixings.

Sarking

Refer to *0471 Thermal insulation and pliable membranes*.

Flashings

Requirement: Provide flashings at penetrations, window and door openings, base of walls and the like to ensure that any moisture that penetrates the cladding system will drain to the outside of the building.

Installation

Requirement: Install the cladding system, including panels and framing strictly in accordance with the manufacturer’s recommended details. The installation is to be carried out by installers approved by the panel manufacturer.

Joints: Expressed vertical and horizontal joints with proprietary, roll-formed steel and backing strips behind

Joint width: 10mm.

Backing strip for vertical joints: Continuous steel strip which fits into the vertical top hat section.

Backing strip for horizontal joints: Continuous steel strip bonded to the back of the lower panel.

- Provide a continuous sealant fillet to the lower panel, along the expressed horizontal joint.

Base detail: Provide a proprietary flashing behind the top hats. Provide a proprietary base trim and open joint that allows moisture to escape.

Window heads: Provide a proprietary flashing behind the top hat sections and an open joint that allows moisture to escape.

Window sills: Provide a proprietary flashing and sealant over a backing rod.

Downpipes: Do not fix downpipe brackets to panels. Ensure there is galvanised steel sub-framing behind downpipes for the fixing of downpipe brackets.

Completion

Warranty: Provide a warranty for materials (including both panel and panel finish) and installation for 10 years.

Maintenance manual: Submit a maintenance manual containing a technical specification of the cladding system and setting out the manufacturer's recommendations for maintenance.

Cleaning: When the installation is complete remove extraneous matter and marks. Protect as necessary and have the finished work undamaged on completion.

Proprietary Item

CFC cladding system: ExoTec Façade Panel And Fixing System, Commercial by James Hardie.

4.2 RIBBED METAL CLADDING, MC1

Location

General: Refer to the drawings.

Description

Type: A proprietary system of preformed ribbed sheets with purpose-made accessories.

Material: Aluminium/zinc alloy coated steel with pre-painted finish.

Profile: Ribbed with 53mm deep ribs at approximately 340mm centres.

Thickness (base metal) (mm): 0.60.

Solar absorptance: 0.73.

Fixings:

- Type: Proprietary concealed fixing clips fixed to wall framing with self-tapping wafer head screws.
- Size and spacing: In accordance with the cladding manufacturer's recommendations

Installation: In accordance with the cladding manufacturer's recommendations.

Framed wall thermal break strips:

- Application: To steel framing with lightweight external cladding.
- R-Value: ≥ 0.2.

Proprietary item:

- Cladding: Maxline 340mm by Revolution Roofing
- Finish: Colorbond by Bluescope Lysaght.

Colour: Refer to the *Exterior Finishes Schedule*.

4.3 VERTICAL LOUVRE BLADES, LVB-01

Location

General: Refer to the drawings. The vertical louvre blades are typically located on the exterior of the buildings and fixed to steel brackets.

Description

Profile: Fabricated U shape blade.

- Width: Approximately 500mm
- Angle: Fixed at 45 degrees to the building facade

Material: 4mm thick perforated aluminium sheet.

Fixing: One side of blade to be screw fixed to the aluminium window mullions. To be designed by the manufacturer to AS 1170.2 to suit the ambient climatic conditions and location exposure severity.

Perforations:

- Hole size: 8mm diameter
- Hole spacing: At 12mm centres
- Pattern: 60 degree SG.

Finish: Powder coated.

Colour: Refer to the *Exterior Finishes Schedule.*

Proprietary item: Perforated aluminium sheet by the Locker Group.

4.4 VERTICAL LOUVRE BLADES, LVB-02

Location

General: Refer to the drawings. The vertical louvre blades are typically located on the exterior of the buildings and fixed to steel frames.

Description

Profile: Fabricated U shape blade.

- Width: Approximately 500mm
- Angle: Fixed at 45 degrees to the building facade

Material: As for vertical louvre blades LVB01.

Fixing: To be fixed steel frames. To be designed by the manufacturer to AS 1170.2 to suit the ambient climatic conditions and location exposure severity.

Perforations: As for vertical louvre blades LVB01.

Finish: As for vertical louvre blades LVB01.

Colour: Minimum 8 different colours. Refer to the *Exterior Finishes Schedule.*

Proprietary item: As for vertical louvre blades LVB01.

4.5 VERTICAL LOUVRE BLADES, LVB-03

Location

General: Refer to the drawings. The vertical louvre blades are typically located on the exterior of Zones 2 to 6 inclusive.

Description

Profile: Rectangular.

Material: Extruded aluminium box sections.

Fixing: Fixed to post between window mullions. To be designed by the manufacturer to AS 1170.2 to suit the ambient climatic conditions and location exposure severity.

Finish: Powder coated.

Colour: Minimum 7 different colours. Refer to the *Exterior Finishes Schedule.*

Proprietary item: Arcadia Zest 490 x 55mm rectangular blade.

4.6 PERFORATED ALUMINIUM SCREENS, PM01

Location

General: Refer to the drawings. The locations for perforated aluminium screens include, but are not limited to:

- The eastern end of the Administration building
- The entries to each of the Neighbourhood Resource Hubs
- The western entry to Block O
- The northern side of the Agriculture building. Refer to the drawings.

Description

Profile: Flat aluminium panels fixed to a steel frame.

Material: 4mm thick perforated aluminium sheet.

Image: Custom designed image designed for each location, created by punching different size holes in the sheet. Images to be provided by the Architect. Each screen is to have a different image.

Sheet finish: Powder coated.

Sheet colour: Refer to the *Exterior Finishes Schedule.*

Frame: Galvanised steel RHS. Refer to the drawings.

Proprietary item:

- Perforated aluminium sheet: Pic-Perf by the Locker Group.

4.7 SUNHOOD, SUN-01

Location

General: Around windows on upper floors in Zones 2 to 7 inclusive. Refer to the drawings.

Description
Type: Proprietary one, bracket-less sunhood with concealed fixings. The sunhood is to be on all 4 sides of each nominated window.

Projection from face of building: 450mm

Material: Folded 4mm thick aluminium plate.

Finish: Powder coated.

Leading edge: Folded to form a 25 x 25mm edge all round.

Rear of hood: Folded to form a 100mm wide plate all round for fixing.

Structure and fixings: To be designed by the manufacturer to AS 1170.2 to suit the ambient climatic conditions and location exposure severity. Refer to the Structural drawings.

Fixing: Concealed fixing to the building structure, behind the wall cladding. Fixings to be to the manufacturer's recommended size and spacing.

Requirement: Fall the hood at minimum 1 degree away from the building.

Proprietary item: Heka Hoods Bracket-less Awning System.

4.8 SUNHOOD, SUN-02

Location
General: Across the head of folding glazed overhead doors, FOD-02, including:

- 1 off to the Agriculture building.

Refer to *0454 Overhead Doors*.

Description
Type: Proprietary bracket-less sunhood with concealed fixings. The sunhood is to be across the head only of each folding door.

Projection from face of building: 450mm

Material: Folded 4mm thick aluminium plate.

Finish: Powder coated.

Leading edge: Folded to form a 25 x 25mm edge.

Rear of hood: Folded to form a 100mm wide plate for fixing.

Structure and fixings: To be designed by the manufacturer to AS 1170.2 to suit the ambient climatic conditions and location exposure severity. Refer to the Structural drawings.

Fixing: Concealed fixing to the building structure, behind the wall cladding. Fixings to be to the manufacturer's recommended size and spacing.

Requirement: Fall the hood at minimum 1 degree away from the building.

Proprietary item: Heka Hoods Bracket-less Awning System.