BRANZ Appraised
Appraisal No. 1211 [2022]

AXON™ PANEL CLADDING

Appraisal No. 1211 (2022)
Amended 03 April 2024

BRANZ Appraisals
Technical Assessments of products for building and construction.

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Product

1.1 Axon™ Panel Cladding is a cavity-based or direct-fixed, fibre cement sheet wall cladding. It is designed to be used as an external wall cladding for residential and light commercial type buildings where domestic construction techniques are used.

Scope

2.1 Axon™ Panel Cladding has been appraised as a direct-fixed, external wall cladding for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with a risk score of 0-6, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Wind Zones up to, and including, Very High.

2.2 Axon™ Panel Cladding, when installed over timber cavity battens, has also been appraised as an external wall cladding for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

2.3 Axon™ Panel Cladding, when installed over Hardie™ CLD™ Structural Cavity Battens, has also been appraised for weathertightness and structural wind loading when used as an external wall cladding for buildings between 0 and 25 m high within the following scope:

- buildings with a building height not exceeding 25 m; and,
- constructed with timber framing complying with the NZBC; and,
- situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 1.5 kPa where studs are at maximum 600 mm centres; and,
- situated in specific design wind pressures up to a maximum design differential ULS of 3.2 kPa where studs are at maximum 400 mm centres; and,
- with inter-storey deflections designed for and up to height/180 of horizontal in-plane movement during seismic serviceable limit state (SLS) events (based on a 3 m inter-storey height); and,
- constructed with timber framing subject to specific engineering design; and,
- when fixed over James Hardie RAB™ Board rigid air barrier for buildings over 10 m in height.

2.4 Axon™ Panel Cladding must only be installed vertically on vertical, flat surfaces.

2.5 Axon™ Panel Cladding has been appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *(Note: The Appraisal of Axon™ Panel Cladding relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone.)*

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Axon™ Panel Cladding, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. Axon™ Panel Cladding meets the requirements for loads arising from self-weight, wind, impact and creep [i.e. B1.3.3 (a), (h), (j) and (q)]. See Paragraphs 9.1-9.4.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.2. Axon™ Panel Cladding meets these requirements. See Paragraphs 10.1-10.4.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. Axon™ Panel Cladding meets this requirement. See Paragraphs 14.1-14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Axon™ Panel Cladding meets this requirement.

Technical Specification

4.1 System components and accessories for Axon™ Panel Cladding, which are supplied by James Hardie New Zealand Limited are:

Axon™ Panels

- **Axon™ Panels** are fibre cement panels manufactured from a water-resistant cellulose cement formulation. They are manufactured to conform to the requirements of AS/NZS 2908.2, in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.7.2. The panels are formed, cut to length and then cured by high-pressure autoclaving. They are branded 'Axon™ Panel' at regular intervals on the back face. Axon™ Panels are sealed and primed on the face and the back is clear sealed.

Axon™ Panel Grooved

- **Axon™ Panel 133 mm Grooved** is a 9 mm thick shiplap-jointed panel with grooves on the front face nominal 10 mm wide by 2.25 mm deep, spaced at 133 mm centres. It is available 1,200 mm wide and 2,450, 2,750, 3,000 or 3,600 mm long.
- **Axon™ Panel 133 mm Grooved Grained** is a 9 mm thick shiplap-jointed panel with grooves on the front face nominal 10 mm wide by 2.25 mm deep, spaced at 133 mm centres. Between the grooves is a wood-grain texture. It is available 1,200 mm wide and 3,000 mm long.
- **Axon™ Panel 400 mm Grooved** is a 9 mm thick shiplap-jointed panel with grooves on the front face nominal 10 mm wide by 2.25 mm deep, spaced at 400 mm centres. It is available 1,200 mm wide and 2,450, 2,750 or 3,000 mm long.

Axon™ Panel Textured

- **Axon™ Panel Smooth** (formerly known as EasyLap™ Panel) is a 9 mm thick shiplap-jointed panel, available 1,200 mm wide and 2,450 or 3,000 mm long.
- **Axon™ Panel Brushed Concrete** is a 8.5 mm thick shiplap-jointed panel with an embedded textured surface. It is available 1,200 mm wide and 2,440, 2,750, 3,000 or 3,600 mm long.

Accessories

- **Hardie™ CLD™ Structural Cavity Batten** - 19 mm thick fibre cement cavity batten installed over RAB™ Board or a flexible underlay. It is 19 mm thick x 70 mm wide x 3,000 mm long.
- **Hardie™ Aluminium Radius External Box Corner** - a box corner mould to form the external joints, etch-primed and available in 2,750, 3,000 or 4,000 mm lengths.
- **Hardie™ Aluminium Invert External Box Corner** - a box corner mould to form the invert external joints, etch-primed and available in 2,750 or 4,000 mm lengths.
- **Hardie™ 9 mm Panel Aluminium Horizontal 'h' Mould** - a horizontal flashing to flash the horizontal joints, etch-primed and available in 3,000 mm lengths.

- **Hardie™ 9 mm Aluminium Angle T Socket** - a horizontal T flashing to flash the horizontal joints, etch-primed and available in 3,000 mm lengths.
- **Hardie™ Angle T Horizontal Jointer** - a jointer to cover the butt joint of T mould, etch-primed and available in 100 mm lengths.
- **Hardie™ Angle T External Corner Jointer** - a T mould external corner, etch-primed.
- **Aluminium 'h' Mould Jointer** - a jointer to cover the butt joint of 'h' mould. Available in 100 mm lengths.
- **Hardie™ 9 mm Panel Aluminium 'h' External Corner Jointer** - a 'h' mould external corner.
- **Hardie™ CLD™ Batten Corner Flashing Aluminium** - used at internal corner sealant joints at floor joist level.
- **Hardie™ Axent™ Trim** - for box corners and facings, 19 mm thick, 3,000 mm long and available 45, 70 or 89 mm wide.
- **uPVC Vent Strip** - available in 3,000 mm lengths.
- **uPVC Corner Under Flashing** – a 50 x 50 mm corner mould used for internal and external joints.
- **Inseal® 3259 tape** - black, compressible, medium density, polyvinyl chloride (PVC) closed cell foam. The tape is 1.5 mm thick and is supplied in rolls 48 and 80 mm wide, and 50 m long.

4.2 Accessories supplied by the building contractor are:

- **Cavity battens** - nominal 50 mm wide by 25 mm thick (minimum finished size of 45 mm wide by 18 mm thick) timber cavity battens, treated to Hazard Class H3.1.
- **C-25 brad nail** – Grade 304 stainless steel brad nails used to fix Axon™ Panels to Hardie™ CLD™ Structural Cavity Battens.
- **ND 50 brad nail** – 50 mm stainless steel brad nail used to fix Axon™ Panels direct fixed to timber framing.
- **65 x 2.87 mm RounDrive ring shank nails** - hot-dip galvanised or stainless steel nails used for fixing Hardie™ CLD™ Structural Cavity Battens to timber framing.
- **Hardie™ Flex 60 x 3.15 mm nails** - for fixing panels through timber cavity battens. Hot-dip galvanised or 316 stainless steel.
- **Hardie™ Flex 75 x 3.15 mm nails** - for fixing panels through timber cavity battens. Hot-dip galvanised or 316 stainless steel.
- **Adhesive sealant** – Bostik® Seal N' Flex™-1 or Sika Sikaflex® 11FC.
- **Flexible wall underlay** – building paper complying with NZBC Acceptable Solution E2/AS1, Table 23, or breather-type membranes covered by a valid BRANZ Appraisal or CodeMark for use as wall underlays.
- **Flexible wall underlay support** – polypropylene strap, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible wall underlay in place and preventing bulging of the bulk insulation into the drainage cavity. *(Note: Mesh and wire galvanising must comply with AS/NZS 4534.)*
- **Rigid wall underlay** – HomeRAB™ Pre-Cladding/RAB™ Board, plywood or fibre cement panel complying with NZBC Acceptable Solution E2/AS1, Table 23, or rigid sheathing covered by a valid BRANZ Appraisal or CodeMark for use as rigid air barrier systems.
- **Horizontal drained joint flashing.**
- **Joinery head flashings** - folded from aluminium or galvanised steel to suit the window or door trim opening. Refer to NZS 3604, Section 4 and NZBC Acceptable Solution E2/AS1, Table 20 for durability requirements.
- **Window and door trim cavity air seal** - air seals and PEF rod complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal for use around window, door and other wall penetration openings.
- **Flexible sill and jamb flashing tape** - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.

- **Flexible sealant** - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal or CodeMark for use as a weather sealing sealant for exterior use.

Finishing System Specification

4.3 Paint systems, where elected to be applied by James Hardie New Zealand Limited, are selected in consultation with the designer and building contractor. Finishing systems applied by James Hardie New Zealand Limited have not been assessed by BRANZ, and are therefore outside the scope of this Appraisal.

4.4 All exposed faces, including top edges at sills and bottom edges of Axon™ Panels, trims and accessories must be finished with an acrylic exterior paint system complying with any of Parts 7, 8, 9 or 10 of AS 3730. Finishing must be carried out within 90 days of installation to protect the Axon™ Panels and give the desired finish colour to the exterior walls.

4.5 All cut edges of Axon™ Panels are to be sealed on-site with an acrylic sealer suitable for use with the selected proprietary acrylic paint system as listed in the Technical Literature for the Axon™ Panel Cladding.

Handling and Storage

5.1 Handling and storage of all materials supplied by James Hardie New Zealand Limited or the building contractor, whether on-site or off-site, is under the control of the building contractor. Axon™ Panels are packed on pallets and must be kept dry during transport. The panels must be horizontally stacked on a flat surface and must always be sufficiently supported so that they do not sag. They must be kept dry at all times, either by storing under cover or providing water covers to the stack, so they are stored in a dry ventilated space. Axon™ Panels must always be lifted from a stack by two people and then be carried on edge.

5.2 Accessories must be stored so they are kept clean, dry and undamaged. All accessories must be used within the maximum storage period recommended by the manufacturer.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Axon™ Panel Direct Fixed Technical Specification, dated March 2024.
- Axon™ Panel Timber Cavity Batten Technical Specification, dated March 2024.
- Axon™ Panel Fixed to Hardie™ CLD™ Structural Cavity Batten Technical Specification, dated March 2024.

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Framing

Timber Treatment

7.1 Timber wall framing behind Axon™ Panel Cladding must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

7.2 Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases, studs shall be at a maximum of 600 mm centres. Nogs/dwangs must be fitted flush between the studs and spaced to suit the site framing requirements.

7.3 The moisture content of the timber framing must not exceed 24% at the time of the cladding installation. *(Note: If Axon™ Panel Cladding is fixed to framing with a moisture content of greater than 24%, problems may occur at a later date due to excessive timber shrinkage.)*

General

8.1 Axon™ Panels are available in a variety of sheet lengths to readily accommodate installations up to 3 m in height without requiring a horizontal junction between sheets.

8.2 When Axon™ Panel Cladding is used for specifically designed buildings up to 3.2 kPa ULS wind pressure, only the weathertightness and structural aspects of the cladding are within the scope of this Appraisal. All other aspects of the building need to be specifically designed and are outside the scope of this Appraisal.

8.3 At ground level, the bottom edge of Axon™ Panel Cladding must be kept clear of paved surfaces, such as footpaths, by a minimum of 100 mm and unpaved surfaces by 175 mm, in accordance with NZBC Acceptable Solution E2/AS1, Table 18. The ground clearances to finished floor levels as set out in NZS 3604 must be adhered to.

8.4 At balcony, deck or low pitch roof/wall junctions, the bottom edge of Axon™ Panel Cladding must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 50 mm.

8.5 Punchings in the cavity vent strip provide a minimum ventilation opening area of 1,000 mm^2 per lineal metre of wall.

8.6 All external walls of buildings must have barriers to airflow in the form of flexible wall underlays and interior linings with all joints stopped for Wind Zones up to, and including, Very High, and rigid wall underlays for buildings in the Extra High Wind Zone and specifically designed buildings up to 2.5 kPa design differential ULS wind pressure.

8.7 All external walls of buildings must have barriers to airflow in the form of 9 mm thick RAB™ Board when used on buildings between 10-25 m high, or situated in specific design wind pressures over a maximum differential ULS of 1.5 kPa.

8.8 Unlined gables and walls must incorporate either RAB™ Board, a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid wall underlays are used, the panel fixing lengths must be increased by a minimum of the thickness of the underlay.

8.9 Where cladding penetrations through the Axon™ Panel Cladding are wider than the cavity batten spacing, allowance must be made for airflow between adjacent cavities by leaving a minimum gap of 10 mm between the bottom of the vertical cavity batten and the flashing to the opening.

8.10 Where the system abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. Details not included within the Technical Literature have not been assessed and are outside the scope of this Appraisal. Such details should be discussed with James Hardie New Zealand Limited technical team for guidance.

Inter-storey Junctions

8.11 Inter-storey drained joints must be constructed in accordance with the Technical Literature. Inter-storey drained joints must be provided to limit continuous cavities to the lesser of 2-storeys or 7 m in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4 b). For buildings more than 10 m high, a drained horizontal joint must be provided at each floor to accommodate the inter-storey deflections.

Structure

Mass

9.1 The mass of Axon™ Panel Cladding, when installed on the wall, is 12.1 kg/m^2 at equilibrium moisture content (EMC). The cladding is therefore considered a light wall cladding in terms of NZS 3604.

Impact Resistance

9.2 Axon™ Panel Cladding will resist impacts likely to be encountered in normal residential use. The likelihood of impact damage to the cladding used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers should be provided for vulnerable areas.

Wind Zones

9.3 Axon™ Panel Cladding, when installed as a direct-fixed cladding, is suitable for use in all Wind Zones of NZS 3604 up to, and including, Very High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1.

9.4 Axon™ Panel Cladding, when installed over timber cavity battens, is suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, or up to 2.5 kPa ULS wind pressure where buildings are specifically designed.

9.5 Axon™ Panel Cladding, when installed over Hardie™ CLD™ Structural Cavity Battens, is suitable for use in buildings up to 25 m high, situated in specific design wind pressures up to maximum design differential ULS of 3.2 kPa, where studs are at maximum 400 mm centres.

Durability

10.1 Axon™ Panel Cladding meets the performance requirements of NZBC Clause B2.3.1 (b) 15 years for the Axon™ Panels and flashings, when installed in accordance with the manufacturer's instructions and when painted within 90 days of installation.

Serviceable Life

10.2 Axon™ Panel Cladding installations are expected to have a serviceable life of at least 50 years provided that they are maintained in accordance with this Appraisal and the Technical Literature.

10.3 Coastal locations can be very corrosive to fasteners, especially locations within 500 m from the sea, including harbours, or 100 m from tidal estuaries and sheltered inlets, and otherwise as shown in NZS 3604, Figure 4.2. These coastal locations are defined in NZS 3604 as Zone D. It is recommended that Axon™ Panel Cladding be fixed with stainless steel fasteners in these situations.

10.4 Microclimatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals or fertilisers can convert mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of Axon™ Panel Cladding in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604, Paragraph 4.2.4, and is outside the scope of this Appraisal.

Maintenance

11.1 Regular maintenance is essential for Axon™ Panel Cladding to continue to meet the NZBC durability performance provision and to maximise the serviceable life.

11.2 Annual inspections must be made to ensure that all aspects of the cladding, including applied finishing systems, flashings and any sealed joints remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow moisture ingress must be repaired immediately. Sealant and paint coatings must be repaired in accordance with the sealant or paint coating manufacturer's instructions.

11.3 Regular cleaning (at least annually) of the finish is required to remove grime, dirt and organic growth and to maximise the life and appearance of the coating. Grime may be removed by brushing with a soft brush, warm water and detergent. Paint systems must be re-coated at approximately 7-10 yearly intervals in accordance with the paint manufacturer's instructions.

11.4 Minimum ground clearances as set out in this Appraisal must be maintained at all times during the life of the cladding. *(Note: Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature may adversely affect the long-term durability of Axon™ Panel Cladding).*

Prevention of Fire Occurring

12.1 Separation or protection must be provided to Axon™ Panel Cladding from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Acceptable Solution C/AS1 and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Control of External Fire Spread

Vertical Fire Spread - Buildings 10 m in height or less

13.1 When the system is used in buildings 10 m or less in height, NZBC Functional Requirement C3.2 identifies that external vertical fire spread to upper floors only needs be considered for buildings with a building height greater than 10 m.

Vertical Fire Spread - Buildings greater than 10 m in height

13.2 Axon™ Panel Cladding can form part of an external wall cladding system designed to meet Vertical Fire Spread requirements. The following information is provided to support the specific engineering design.

13.3 Axon™ Panel Cladding, as part of the James Hardie External Cladding System, has been tested to NFPA 285 and has passed the test criteria. The components listed in Table 1 form a part of the James Hardie External Cladding System and have been tested and achieved the listed classifications.

Table 1: Components of the Axon™ Panel Cladding system

Component	Test Method	Result
Axon™ Cladding Panels	AS/NZS 3837:1998 Component of NFPA 285 test	Pass: Type A Pass
James Hardie Rigid Air Barrier (RAB™ Board)	AS/NZS 3837:1998 Component of NFPA 285 test	Pass: Type A Pass
Hardie™ CLD™ Structural Cavity Battens	Component of NFPA 285 test	Pass
Joinery and joint flashings and mouldings	Aluminium as defined in C/AS2 definitions	Non-combustible
Inseal Foam Tape	Component of NFPA 285 test	Pass
Fixings	Steel as defined in C/AS2 definitions	Non-combustible

Horizontal Fire Spread

13.4 Axon™ Panels have a peak heat release rate of less than 100 kw/m^2 and a total heat released of less than 25 MJ/m^2. Refer to NZBC Acceptable Solutions C/AS1 and C/AS2 and NZBC Verification Method C/VM2 for fire resistance rating (FRR) and control of external fire spread requirements for external walls.

External Moisture

14.1 Axon™ Panel Cladding, when installed in accordance with this Appraisal and the Technical Literature, will prevent the penetration of moisture that could cause undue dampness or damage to building elements.

14.2 The cavity must be sealed off from the roof and subfloor space to meet code compliance with NZBC Clause E2.3.5.

14.3 Axon™ Panel Cladding allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet code compliance with NZBC Clause E2.3.6.

14.4 The details given in the Technical Literature for weather sealing are based on the weathertightness design principles outlined in NZBC Acceptable Solution E2/AS1. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature and the relevant provisions of NZBC Acceptable Solution E2/AS1. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.

14.5 Where a designed cavity drainage path is used in conjunction with Axon™ Panel Cladding, it does not reduce the requirements for junctions, penetrations, etc. to remain weather-resistant.

Internal Moisture

15.1 Buildings must be constructed with an adequate combination of thermal resistance and ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

Water Vapour

15.2 Axon™ Panel Cladding is not a barrier to the passage of water vapour, and when installed in accordance with the Technical Literature and this Appraisal, will not create or increase the risk of moisture damage resulting from condensation.

Installation Information

Installation Skill Level Requirement

16.1 All design and building work must be carried out in accordance with the Axon™ Panel Cladding Technical Literature and this Appraisal, by competent and experienced tradespersons conversant with Axon™ Panel Cladding. Where the work involves Restricted Building Work (RBW), this must be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant License Class.

System Installation

Wall Underlay and Flexible Sill and Jamb Tape Installation

17.1 Flexible underlay or rigid wall underlay and flexible sill and jamb tape systems must be installed by the building contractor, in accordance with the underlay and tape manufacturer's instructions and NZBC Acceptable Solution E2/AS1, prior to the installation of the cavity battens and the Axon™ Panel Cladding. Flexible wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Rigid wall underlays must be installed in accordance with the instructions of the manufacturer and the Technical Literature. Particular attention must be paid to the installation of the wall underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

17.2 In cavity installations where studs are at greater than 400 mm centres and a flexible wall underlay is used, a wall underlay support must be installed in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

RAB™ Board

17.3 RAB™ Board must be installed in accordance with the Technical Literature and BRANZ Appraisal No. 611 James Hardie Rigid Air Barriers.

Timber Cavity Battens

17.4 Cavity battens must be installed vertically over the flexible or rigid wall underlay to the wall studs. The battens must be temporarily fixed in place with 40 x 2.8 mm or longer nails at maximum 800 mm centres. Where a rigid wall underlay is used, the length of the cladding fixing must be increased by a minimum of the thickness of the underlay.

Hardie™ CLD™ Structural Cavity Battens

17.5 Hardie™ CLD™ Structural Cavity Battens must be fixed to the wall framing over the wall underlay to the studs at maximum 600 mm centres where the studs are at 600 mm centres or at 400 mm centres when studs are at 400 mm centres. Where a rigid wall underlay is used, the length of the fixing must be increased by a minimum of the thickness of the underlay. The battens are run continuously over the studs but must not run continuously over the floor joists. The smallest section of Hardie™ CLD™ Structural Cavity Batten must be at least 300 mm long.

Axon™ Panel Cladding Installation

17.6 Axon™ Panels may be cut on-site by power saw. Holes and cut-outs may be formed by drilling a number of holes around the perimeter of the opening required and tapping out the centre with a hammer, or by using a hole saw.

17.7 Axon™ Panels must be kept dry prior to installation. Before the panels are installed, cut ends exposed to the exterior such as at aluminium box corners or internal corners must be sealed with an acrylic sealer to reduce the absorbency of the fibre cement. Prior to installing cladding, ensure all pipes and penetrations have been sealed in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.

17.8 Cavity battens and cavity closers (when applicable) must be installed in accordance with the Technical Literature and NZBC Acceptable Solution E2/AS1.

17.9 Before the Axon™ Panels are installed, the sheet set out must be checked and the internal and external corners prepared to suit the selected design option, e.g. external box corners or corner soakers. The necessary flashings, including window flashings, must be installed before commencing with sheet fixing.

17.10 Axon™ Panel Cladding must be installed whilst ensuring alignment at the base of the cladding, ensuring the bottom edge of the Axon™ Panels overhang the bottom plate or bearer by a minimum of 50 mm.

17.11 Vertical sheet joints in Axon™ Panels must be made over solid support, either cavity battens in the case of a cavity installation, or over studs or vertical blocking within the wall frame in direct-fixed installations. Axon™ panel fixings must be installed as shown in the Technical Literature with regard to position from the sheet edge and installation angle. Vertical joints can be overlaid with a timber batten, in accordance with the details contained in the Technical Literature.

17.12 Axon™ Panels must be fixed in accordance with the Technical Literature and this Appraisal. Consideration shall be given to the type of installation (direct-fixed or cavity) and any requirements for corrosion resistance. In cases where a rigid wall underlay is used, cladding fixings shall be increased in length by at least the thickness of the rigid wall underlay to ensure the fixing performance is not compromised.

Aluminium Joinery Installation

17.13 Aluminium joinery and associated head and sill flashings and joinery support bars must be installed by the building contractor in accordance with the Technical Literature. A 7.5 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place.

17.14 After installing the window and door joinery, trim profiles such as planted sills and scribers may be installed in accordance with the Technical Literature to provide additional weatherproofing for the joinery/cladding junction.

Finishing

17.15 The finish coating manufacturer's instructions must be followed at all times for application of the paint finish. Axon™ Panel Cladding must be clean and dry before commencing painting.

Inspections

17.16 The Technical Literature must be referred to during the inspection of Axon™ Panel Cladding installations.

Health and Safety

18.1 Cutting of Axon™ Panels must be carried out in well ventilated areas, and a dust mask and eye protection must be worn.

18.2 When power tools are used for cutting or forming holes, health and safety measures as set out in the Technical Literature must be observed.

18.3 Safe use and handling procedures for Axon™ Panel Cladding are provided in the Technical Literature.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

19.1 Uniform wind face load tests to simulate wind pressures on Axon™ Panel Cladding were carried out by a James Hardie Australia Pty Ltd NATA accredited laboratory. The testing determined design wind suction pressures, and by comparing these pressures with the NZS 3604 and AS/NZS 1170 pressure coefficients, the fixing requirements were determined for timber-framed walls. The test methods and results have been reviewed by BRANZ and found to be satisfactory.

19.2 Axon™ Panel Cladding has been tested by a James Hardie Australia Pty Ltd NATA accredited laboratory in accordance with AS/NZS 2908.2 and ISO 8336. The testing covered: soak-dry, bending strength, warm water soaking, heat/rain, freeze/thaw and apparent density. The test methods and results have been reviewed by BRANZ and found to be satisfactory.

19.3 The James Hardie External Cladding System has been tested to NFPA 285 by Intertek and has passed the test criteria.

19.4 Axon™ Panel Cladding has been tested to AS/NZS 4284 by FacadeLab.

Investigations

20.1 Structural, weathertightness and durability opinions of Axon™ Panel Cladding have been provided by BRANZ technical experts.

20.2 Site inspections have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.

20.3 The Technical Literature for Axon™ Panel Cladding has been examined by BRANZ and found to be satisfactory.

Quality

21.1 The manufacture of Axon™ Panel Cladding has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality of materials used and finished product was obtained by BRANZ and found to be satisfactory.

21.2 The quality of components and accessories supplied by James Hardie New Zealand Limited is the responsibility of James Hardie New Zealand Limited.

21.3 Quality of installation on-site is the responsibility of the installer, in accordance with the Axon™ Panel Cladding Technical Literature.

21.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the building underlay, cavity battens, Axon™ Panels and accessories, in accordance with the instructions of James Hardie New Zealand Limited.

21.5 Sub-trades are responsible for the installation of penetrations, flashing etc. that are relevant to their trade, in accordance with the Axon™ Panel Cladding Technical Literature.

21.6 Building owners are responsible for the maintenance of Axon™ Panel Cladding in accordance with the instructions of James Hardie New Zealand Limited.

Sources of Information

- AS 3566.1-2002 Self-drilling screws for the building and construction industries - General requirements and mechanical properties.
- AS 3730 Guide to the properties of paints for buildings.
- AS/NZS 2904:1995 Damp-proof courses and flashings.
- AS/NZS 2908.2:2000 Cellulose-cement products - Flat sheet.
- AS/NZS 4284:2008 Testing of building facades.
- AS/NZS 4680:2006 Hot-dip galvanised (zinc) coatings on fabricated ferrous articles.
- BRANZ Appraisal No. 611 James Hardie Rigid Air Barriers.
- BRANZ EM7 Performance of mid-rise cladding systems.
- ISO 5660.1:2015 Heat release rate (cone calorimeter method).
- ISO 8336:2017 Fibre-cement flat sheets - Product specification and test methods.
- NZS 3602:2003 Timber and wood-based products for use in building.
- NZS 3604:2011 Timber-framed buildings.
- SNZ TS 4211:2022 Specification for the performance of windows.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 13 October 2022

This Appraisal has been amended to correct the serviceable life statement.

Amendment No. 2, dated 03 April 2024

This Appraisal has been amended to change the Appraisal name and to increase the scope for buildings up to 25 m in height.

BRANZ

In the opinion of BRANZ, Axon™ Panel Cladding is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to James Hardie New Zealand Limited, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. James Hardie New Zealand Limited:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by James Hardie New Zealand Limited.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to James Hardie New Zealand Limited or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
19 May 2022