



BRANZ Appraised
Appraisal No. 897 [2015]

LINEA® OBLIQUE WEATHERBOARD [VERTICAL] CAVITY CLADDING

Appraisal No. 897 [2015]
Amended 15 December 2015



BRANZ Appraisals

Technical Assessments of products
for building and construction.



James Hardie New Zealand
PO Box 12 070
Penrose
Auckland

Tel: 0800 808 868

Fax: 0800 808 988

Web: www.jameshardie.co.nz



BRANZ

1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz



Product

- 1.1 Linea® Oblique Weatherboard [Vertical] Cavity Cladding is a cavity-based fibre cement weatherboard wall cladding. It is designed to be used as an external cladding system for residential and light commercial type buildings where domestic construction techniques are used.
- 1.2 Linea® Oblique Weatherboard [Vertical] Cavity Cladding consists of Linea® Oblique Weatherboard, which is a rusticated profile fibre cement weatherboard, fixed vertically over ventilated timber battens to form the cavity. The cladding is finished with a latex paint system.
- 1.3 The cladding incorporates a primary and secondary means of weather resistance [first and second line of defence] against water penetration by separating the cladding from the external wall framing with a nominal 20 mm cavity. The cavity allows for any occasional ingress of water that may get past the external skin to drain to the exterior of the building, and any remaining moisture to dry by evaporation.

Scope

- 2.1 Linea® Oblique Weatherboard [Vertical] Cavity Cladding has 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.
- 2.2 Linea® Oblique Weatherboard [Vertical] Cavity Cladding has also been appraised for weathertightness and structural wind loading when used as an external vertically fixed wall cladding for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
 - constructed with timber framing subject to specific engineering design; and,
 - situated in specific design wind pressures up to a maximum design differential ultimate limit state [ULS] of 2.5 kPa.
- 2.3 Linea® Oblique Weatherboard must only be installed vertically on vertical surfaces.
- 2.4 Linea® Oblique Weatherboard [Vertical] Cavity Cladding is appraised for use with aluminium window and door joinery that is installed with vertical jambs and vertical heads and sills. *[Note: The Appraisal of Linea® Oblique Weatherboard [Vertical] Cavity Cladding relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.]*

[Note: Linea® Oblique Weatherboard [Vertical] Cavity Cladding can be used to provide fire resistance rated construction, but this aspect has not been assessed by this Appraisal and is outside its scope.]

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Linea® Oblique Weatherboard (Vertical) Cavity 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. Linea® Oblique Weatherboard (Vertical) Cavity 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 - 9.3.

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years, B2.3.1 (c) 5 years and B2.3.2. Linea® Oblique Weatherboard (Vertical) Cavity Cladding meets these requirements. See Paragraphs 10.1 - 10.4.

Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE: Performance C3.7 (a). Linea® Oblique Weatherboard (Vertical) Cavity Cladding meets this requirement. See Paragraph 12.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. Linea® Oblique Weatherboard (Vertical) Cavity Cladding meets this requirement. See Paragraphs 14.1 - 14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Linea® Oblique Weatherboard (Vertical) Cavity Cladding meets this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 Linea® Oblique Weatherboards are rusticated profile weatherboards. The weatherboards are pre-primed with an acrylic primer on the front face and edges. Linea® Oblique Weatherboards are 16 mm thick and are available 200 and 300 mm wide. The boards are supplied 2700 and 4200 mm long.

4.2 Linea® Oblique Weatherboards are manufactured from a reduced density cellulose fibre cement formulation. The boards are formed, cut to length and then cured by high-pressure autoclaving. After autoclaving, a rusticated profile is machined on the top edge of the front face, and a rebated lap is machined on the bottom of the back face of the weatherboard. The front edge at the bottom of the board and the board ends are finished square. Linea® Oblique Weatherboards are manufactured to meet the requirements of AS/NZS 2908.2.

Accessories

4.3 Accessories used with Linea® Oblique Weatherboard (Vertical) Cavity Cladding which are supplied by James Hardie New Zealand are:

- **James Hardie horizontal cavity battens** – 45 x 20 mm thick Radiata pine batten treated to Hazard Class H3.1. The top edge is bevelled with an 18° slope. The back face is grooved with 50 mm wide x 6 mm deep rebates at 150 mm centres, and the front face is grooved with 5 mm wide x 5 mm deep rebates at 150 mm centres. The grooves are offset on each face.
- **Oblique Trimline joint flashing** – extruded aluminium in 3000 mm lengths.
- **Trimline jointers** – aluminium horizontal, internal corner and external corner jointers to cover joints in the Trimline joint flashing.
- **External and internal corner mouldings** – 90° anodised aluminium external box corner available in 2700 and 4000 mm lengths, and 90° internal corner 'W' mould, available in 2700 mm lengths.
- **Cavity vent strip** – uPVC, available in 3000 mm lengths.

4.4 Accessories used with Linea® Oblique Weatherboard (Vertical) Cavity Cladding which are supplied by the building contractor are:

- **Flexible wall underlay** – building paper complying with NZBC Acceptable Solution E2/AS1 Table 23, or breather-type membranes covered by a valid BRANZ Appraisal 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** – James Hardie Rigid Air Barriers covered by BRANZ Appraisal No. 611 [2011].
- **Flexible sill, head 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.
- **Cavity batten fixings** – 40 x 2.8 mm flat head hot-dip galvanised nails.
- **Linea® Oblique Weatherboard fixings [with flexible wall underlays]** – 65 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nails.
- **Linea® Oblique Weatherboard fixings [with rigid wall underlays up to 10 mm thick]** – 75 x 3.06 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nails.
[Note: Stainless steel fixings must be Grade 316 and hot-dip galvanising must comply with AS/NZS 4680].
- **Joinery head flashings** – extruded or 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 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 suitable for use around window, door and other wall penetration openings.
- **Flexible sealant** – sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.

Paint System Specification

- 4.5 Paint systems are not supplied by James Hardie New Zealand and have not been assessed, therefore they are outside the scope of this Appraisal.
- 4.6 All exposed faces, including top edges at sills and all bottom edges of Linea® Oblique Weatherboard and accessories must be finished with a latex exterior paint system complying with any of Parts 7, 8, 9, or 10 of AS 3730.

Handling and Storage

- 5.1 Handling and storage of all materials supplied by James Hardie New Zealand or the building contractor, whether on site or off site, is under the control of the building contractor. Linea® Oblique Weatherboards must be stacked flat, off the ground and supported on a level platform. They must be kept dry at all times either by storing under cover or providing waterproof covers to the stack. Care must be taken to avoid damage to edges, ends and surfaces. Weatherboards must always 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 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Linea® Oblique Weatherboard [Vertical] Cavity Cladding. The Technical Literature must be read in conjunction with this Appraisal. 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 Linea® Oblique Weatherboard [Vertical] Cavity 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 a building within the scope limitations of NZS 3604. Buildings or parts of a building 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. Studs must be at maximum 600 mm centres. Nogs/dwangs must be in a continuous line and be fitted flush between the studs at maximum 600 mm centres.
- 7.3 Timber framing must have a maximum moisture content of 24% at the time of the cladding application. [Note: If weatherboards are fixed to framing with a moisture content of greater than 24% problems may occur at a later date due to excessive timber shrinkage.]
- 7.4 Timber wall framing must have a maximum moisture content of 18% before the weatherboards are painted.

General

- 8.1 When the Linea® Oblique Weatherboard [Vertical] Cavity Cladding is used for specifically designed buildings up to 2.5 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.
- 8.2 Punchings in the cavity vent strip and rebates in the cavity batten provide a minimum ventilation opening area of 1000 mm² per lineal metre of wall. [Note: James Hardie horizontal cavity battens do not provide vermin proofing to the bottom of the cavity and an additional cavity vent strip must be used.]
- 8.3 At ground level the bottom edge of Linea® Oblique Weatherboards 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 Linea® Oblique Weatherboards 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 All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for wind zones up to and including Very High, and rigid underlays for buildings in the Extra High wind zone and specifically designed buildings up to 2.5 kPa design differential ULS wind pressure. Unlined gables and walls must incorporate 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 underlays are used, the weatherboard fixing lengths must be increased by a minimum of the thickness of the underlay.
- 8.6 Where cladding penetrations 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.
- 8.7 Where Linea® Oblique Weatherboard [Vertical] Cavity Cladding 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.

Interstorey Junctions

- 8.8 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 metres in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4[b].

Structure

Mass

- 9.1 The mass of the 200 mm wide Linea® Oblique Weatherboard when installed on the wall is 20.6 kg/m² at equilibrium moisture content [EMC] and the mass of the 300 mm wide board is 19.7 kg/m² at EMC. Linea® Oblique Weatherboard [Vertical] Cavity Cladding is therefore considered a light wall cladding in terms of NZS 3604.

Impact Resistance

- 9.2 Linea® Oblique Weatherboard [Vertical] Cavity Cladding will resist impacts likely to be encountered in normal residential use. The likelihood of impact damage to the cladding when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers provided for vulnerable areas.

Wind Zones

- 9.3 Linea® Oblique Weatherboard [Vertical] Cavity Cladding 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.

Durability

- 10.1 Linea® Oblique Weatherboard [Vertical] Cavity Cladding meets the performance requirements of NZBC Clause B2.3.1 [b], 15 years for the Linea® Oblique Weatherboards, flashings and cavity system, and the performance requirements of NZBC Clause B2.3.1 [c], 5 years for the exterior paint system.

Serviceable Life

- 10.2 Linea® Oblique Weatherboard [Vertical] Cavity Cladding installations are expected to have a serviceable life of at least 50 years provided the paint coating system is maintained in accordance with this Appraisal to ensure the Linea® Oblique Weatherboards and fixings remain dry in service. Linea® Oblique Weatherboards must be painted within 3 months of fixing.
- 10.3 Coastal locations can be very corrosive to fasteners, especially locations within distances of up to 500 m from the sea including harbours, or 100 metres 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. To achieve a 50 year serviceable life in Zone D, Linea® Oblique Weatherboards must be fixed with stainless steel fasteners. Fasteners outside Zone D may be hot-dip galvanised steel.
- 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 Linea® Oblique Weatherboards 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 Linea® Oblique Weatherboard [Vertical] Cavity Cladding installations to continue to meet the NZBC durability performance provision and to maximise their serviceable life.
- 11.2 Annual inspections must be made to ensure that all aspects of the cladding system, including the paint coating system, flashings and any sealed joints remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water 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 paint coating surface is recommended to remove grime, dirt and organic growth and to maximise the life and appearance of the coating. Paint systems must be recoated at approximately 7-15 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 will adversely affect the long term durability of Linea® Oblique Weatherboard [Vertical] Cavity Cladding.]*

Control of External Fire Spread

- 12.1 Linea® Oblique Weatherboard has a peak heat release rate of less than 100 kw/m² and a total heat released of less than 25 MJ/m² in accordance with NZBC Acceptable Solution C/AS1 Table 5.1. The system is suitable for use on buildings with a SH Risk Group classification, at any distance to the relevant boundary. Linea® Oblique Weatherboard is also suitable for use where a non-combustible material is specified. When Linea® Oblique Weatherboard is finished with a paint coating of not more than 1.0 mm in thickness, the exterior surface finishes requirements of NZBC Acceptable Solutions C/AS2 - C/AS6 Paragraph 5.8.1 do not apply in accordance with NZBC Acceptable Solutions C/AS2 - C/AS6 Paragraph 5.8.2 a).

Prevention of Fire Occurring

- 13.1 Linea® Oblique Weatherboard is considered a non-combustible material and need not be separated from heat sources such as fire places, heating appliances, flues and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated from fireplaces, heating appliances, flues and chimneys in accordance with the requirements of Part 7 of NZBC Acceptable Solutions C/AS1 - C/AS6 and NZBC Verification Method C/VM1.

External Moisture

- 14.1 Linea® Oblique Weatherboard [Vertical] Cavity 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 sub-floor space to meet code compliance with Clause E2.3.5.
- 14.3 Linea® Oblique Weatherboard [Vertical] Cavity Cladding allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet code compliance with Clause E2.3.6.
- 14.4 The details given in the Technical Literature for weather sealing are based on the design principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. 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 The use of Linea® Oblique Weatherboard [Vertical] Cavity Cladding where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirement 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 Linea® Oblique Weatherboard [Vertical] Cavity 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 Requirements

- 16.1 Installation of Linea® Oblique Weatherboard and accessories supplied by James Hardie New Zealand and the building contractor must be carried out by, or under the supervision of a Licensed Building Practitioner with the relevant Licence Class, in accordance with instructions given within the Linea® Oblique Weatherboard [Vertical] Cavity Cladding Technical Literature and this Appraisal.

System Installation

Wall underlay and Flexible Sill and Jamb Tape Installation

- 17.1 The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturer's instructions prior to the installation of the cavity battens and the rest of the Linea® Oblique Weatherboard [Vertical] Cavity Cladding system. Flexible wall underlay must be installed vertically and be continuous around corners. Underlay must be lapped 75 mm minimum at vertical joints and 150 mm minimum over studs at vertical joints. James Hardie Rigid Air Barriers must be installed in accordance with the instructions of James Hardie New Zealand. 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.

James Hardie Horizontal Cavity Battens

- 17.2 James Hardie horizontal cavity battens must be installed over the wall underlay to the wall framing [nogs/dwangs] at maximum 600 mm centres. The battens must be installed with the top edge sloping away from the wall underlay towards the back of the weatherboards. The cavity battens must be fixed in place with 40 x 2.8 mm hot-dip galvanised flat-head nails at maximum 800 mm centres to temporarily fix the battens in place prior to installation of the cladding.
- 17.3 A wall underlay support must be installed over flexible wall underlay at maximum 300 mm horizontal centres.

Linea® Oblique Weatherboard Installation

- 17.4 Linea® Oblique Weatherboards 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.
- 17.5 Weatherboards must be dry prior to installation. Before the weatherboards 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.
- 17.6 Before the weatherboards are installed, the corner detail must be prepared to suit the selected option, e.g. external box corner. The necessary flashings, including window flashings, must be installed before commencing weatherboard fixing and the cavity vent strip must be installed continuously around the bottom of the cavity.
- 17.7 Linea® Oblique weatherboards must be installed starting at the corner of the wall being clad. The first weatherboard must be installed plumb to assist with the installation of subsequent weatherboards. The weatherboards must overhang the bottom plate by a minimum of 50 mm. The weatherboards should be installed with the lap facing away from the prevailing winds.

- 17.8 Linea® Oblique Weatherboard laps are pre-determined by the machined joint detail.
- 17.9 200 mm wide Linea® Oblique Weatherboards must be fixed to each framing member [nog/dwang] using one 65 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nail depending on the location - see Paragraph 10.3. The nails must be positioned 100 mm in from the over lapping edge of the weatherboard. The 65 x 2.87 mm D-head nails must be punched a maximum of 2 mm below the surface of the board. Nails must not be closer than 12 mm to the end of the board.
- 17.10 300 mm wide Linea® Oblique Weatherboards must be fixed to each framing member [nog/dwang] using one 65 x 2.87 mm D-head or RounDrive hot-dip galvanised or stainless steel ring shank nails depending on the location - see Paragraph 10.3. The nail must be positioned 150 mm in from the over lapping edge of the weatherboard. The 65 x 2.87 mm D-head nails must be punched a maximum of 2 mm below the surface of the board. Nails must not be closer than 12 mm to the end of the board.

Aluminium Joinery Installation

- 17.11 Aluminium joinery and associated head and sill flashings must be installed by the building contractor in accordance with the Technical Literature. An 8 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.

Finishing

- 17.12 All punched fixings must be filled. The paint coating manufacturer's instructions must be followed at all times for application of the paint finish. Linea® Oblique Weatherboards and trim must be clean and dry before commencing painting.

Inspections

- 17.13 The Technical Literature must be referred to during the inspection of Linea® Oblique Weatherboard [Vertical] Cavity Cladding installations.

Health and Safety

- 18.1 Cutting of Linea® Oblique Weatherboard 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, grinding or forming holes, health and safety measures as set out in the Technical Literature must be observed to minimise the amount of dust generated.
- 18.3 Safe use and handling procedures for Linea® Oblique Weatherboard and the components that make up the cladding system are provided in the relevant manufacturer's Technical Literature.

Basis of Appraisal

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

Tests

- 19.1 BRANZ expert opinion on NZBC E2 code compliance for Linea® Oblique Weatherboard [Vertical] Cavity Cladding was based on testing and evaluation of all details within the scope and as stated within this Appraisal. Linea® Oblique Weatherboard [Vertical] Cavity Cladding was tested to NZBC Verification Method E2/VM1. The testing assessed the performance of the foundation detail, window head, jamb and sill details, meterbox head, jamb and sill details, balustrade to wall junction, parapet cap, internal and external corners and James Hardie horizontal cavity battens. In addition to the weathertightness test, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of NZBC Acceptable Solution E2/AS1 for drained cavity claddings.
- 19.2 Uniform wind face load tests to simulate wind pressures on Linea® Oblique Weatherboards were carried out by a James Hardie 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.

- 19.3 Cone Calorimeter testing to determine the peak rate of heat release and total heat release of Linea® Oblique Weatherboard was completed by BRANZ. The testing was carried out in accordance with AS/NZS 3837.
- 19.4 Linea® Oblique Weatherboards have been tested by a James Hardie 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.

Other Investigations

- 20.1 Weathertightness, structural, fire and durability opinions have been provided by BRANZ technical experts.
- 20.2 Site visits have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.
- 20.3 The manufacturer's Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 21.1 The manufacture of Linea® Oblique Weatherboard has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 21.2 The quality of materials, components and accessories supplied by James Hardie New Zealand is the responsibility of James Hardie New Zealand. The quality control system of James Hardie New Zealand has been assessed and registered as meeting the requirements of ISO 9001: 2008.
- 21.3 Quality on site is the responsibility of the installer.
- 21.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the wall underlay, cavity battens, Linea® Oblique Weatherboard and accessories in accordance with the instructions of James Hardie New Zealand.
- 21.5 Building owners are responsible for the maintenance of Linea® Oblique Weatherboard [Vertical] Cavity Cladding in accordance with the instructions of James Hardie New Zealand.

Sources of Information

- AS 3730 Guide to the properties of paints for buildings.
- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 2908.2: 2000 Cellulose-cement products - Flat sheet.
- AS/NZS 3837: 1998 Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter.
- AS/NZS 4534: 1998 Zinc and zinc/aluminium-alloy coatings on steel wire.
- AS/NZS 4680: 2006 Hot-dip galvanized [zinc] coatings on fabricated ferrous articles.
- ISO 8336: 2009 Fibre-cement flat sheets -- Product specification and test methods.
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 2011 Timber framed buildings.
- NZS 4211: 2008 Specification for performance of windows.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 [Amendment 6, 14 February 2014].
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 15 December 2015.

This Appraisal has been amended to remove rigid wall underlay complying with NZBC Acceptable Solution E2/AS1.



In the opinion of BRANZ, **Linea® Oblique Weatherboard [Vertical] Cavity 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**, 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:**
 - 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**.
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** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

Date of Issue:

20 November 2015