



BRANZ Appraised

Appraisal No. 641 [2021]

NULINE PLUS™ WEATHERBOARD CAVITY SYSTEM

Appraisal No. 641 [2021]

This Appraisal replaces BRANZ
Appraisal No. 641 [2015]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 The NuLine Plus™ Weatherboard Cavity System is an external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.
- 1.2 The system consists of horizontally fixed NuLine Plus™ fibre cement weatherboards installed over non-structural or structural timber battens to form the cavity, flashings and accessories and is finished with a latex paint system.
- 1.3 The system incorporates a primary and secondary means of weather resistance [first and second line of defence] against water penetration by separating the cladding from the external wall frame with a nominal 20 mm drained cavity.

Scope

- 2.1 The NuLine Plus™ Weatherboard Cavity System has been appraised as an external horizontally fixed wall cladding system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable System E2/AS1, Paragraph 1.1; and,
 - constructed with timber framing complying with the NZBC; and,
 - with a risk score of 0-20, calculated in accordance with NZBC Acceptable System E2/AS1, Table 2; and,
 - situated in NZS 3604 Wind Zones up to, and including, Extra High.
- 2.2 The NuLine Plus™ Weatherboard Cavity System has also been appraised for weathertightness and structural wind loading when used as an external horizontally fixed wall cladding system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regard 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 The NuLine Plus™ Weatherboard Cavity System is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *[Note: The Appraisal of the NuLine Plus™ Weatherboard Cavity System relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.]*

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the NuLine Plus™ Weatherboard Cavity System, 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. The NuLine Plus™ Weatherboard Cavity System meets the requirements for loads arising from self-weight, earthquake, wind and impact [i.e. B1.3.3 (a), (f), (h), and (j)]. 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. The NuLine Plus™ Weatherboard Cavity System meets these requirements. See Paragraphs 10.1 and 10.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The NuLine Plus™ Weatherboard Cavity System meets this requirement. See Paragraphs 14.1-14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The NuLine Plus™ Weatherboard Cavity System meets this requirement.

Technical Specification

4.1 System components and accessories supplied by BGC [Australia] Pty Ltd are as follows:

NuLine Plus™ weatherboards

- NuLine Plus™ weatherboards are bevelback weatherboards with a tongue and groove at each end for jointing. The weatherboards are produced with a smooth face, sealed and pre-primed with an acrylic primer on the front face and both edges. The bottom edge of the weatherboard has a square [3 mm chamfer] profile. The weatherboards are 14 mm thick and are available 150, 175 and 205 mm wide. All boards are supplied 4,200 mm long.
- NuLine Plus™ Weatherboards are manufactured from a cellulose fibre cement formulation. The boards are formed, cut to length and then cured by high-pressure autoclaving. After autoclaving, the selected profile is cut on the front corner at the bottom of the weatherboards and the ends are tongue and grooved for jointing.

Accessories

- **NuLine Plus™ box corner trim** - NuLine Plus™ Weatherboards cut to suit and formed into box corners.
 - **External and internal corner mouldings** - aluminium external box corner and 90° internal corner 'W' mould. The mouldings are available in 3,000 mm lengths.
 - **Corner soakers** - 90° soakers available in aluminium, copper and stainless steel.
 - **BGC edge sealer** - acrylic sealer supplied in a 400 g can.
- 4.2 Accessories used with the NuLine Plus™ Weatherboard Cavity System, which are supplied by the building contractor are as follows:
- **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** - plywood or fibre cement sheet complying with NZBC Acceptable Solution E2/AS1, Table 23, or rigid wall underlay covered by a valid BRANZ Appraisal for use as rigid air barrier systems.
 - **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.

- **Cavity vent strip** - PVC, aluminium or stainless steel, punched with 3-5 mm holes or slots complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3.
- **Structural cavity battens** - nominal 50 mm wide by 25 mm thick [minimum finished size of 45 mm wide by 18 mm thick] S68 framing grade pinus radiata treated to Hazard Class H3.1.
- **Non-structural cavity battens** - nominal 50 mm wide by 25 mm thick [minimum finished size of 45 mm wide by 18 mm thick] timber treated to Hazard Class H3.1.
- **Structural cavity batten fixings** - 65 x 2.87 mm Paslode RounDrive® ringshank galvanised nails or 60 x 2.8 mm hot-dip galvanised jolthead nails.
- **Non-structural cavity batten fixings** - 40 x 2.8 mm hot-dip galvanised flathead nails.
- **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.
- **Aluminium joinery head flashings** - as supplied by the joinery manufacturer or contractor.
- **Flashings** - including internal corner flashing, balustrade and parapet cap flashings and inter-storey joint flashing. Refer to NZS 3604, Section 4 and NZBC Acceptable Solution E2/AS1, Table 20 for durability requirements.
- **Timber box corners** - constructed from timber treated to Hazard Class H3.1, pre-primed before installation.
- **Scribers** - timber treated to Hazard Class H3.1, pre-primed before installation.

Weatherboard fixings - structural cavity battens

- **NuLine Plus™ weatherboard fixings [concealed nail]** - 50 x 2.87 mm Paslode hot-dip galvanised, ringshank, D-head gun nail or 50 x 2.8 mm hot-dip galvanised or stainless steel ringshank flathead nails.
- **NuLine Plus™ weatherboard fixings [face nail]** - 60 x 3.15 mm hot-dip galvanised or stainless steel ringshank jolthead nails.

Weatherboard fixings - non-structural cavity battens

- **NuLine Plus™ weatherboard fixings [concealed nail]** - 65 x 2.87 mm Paslode hot-dip galvanised, ringshank, D-head gun nail or 60 x 2.8 mm hot-dip galvanised or stainless steel ringshank flathead nails.
- **NuLine Plus™ weatherboard fixings [face nail]** - 75 x 3.15 mm hot-dip galvanised or stainless steel ringshank jolthead nails.

Boxed corner and scribe fixings

- **Boxed corner and scribe fixings** - 60 x 2.8 mm or 75 x 3.15 mm hot-dip galvanised or stainless steel ringshank jolthead nails.

[Note: Hot-dip galvanising must comply with AS/NZS 4680 and stainless steel fixings must be Grade 316.]

Paint System Specification

- 4.3 Paint systems are not supplied by BGC (Australia) Pty Ltd and 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 all bottom edges of NuLine Plus™ weatherboards and accessories must be finished with at least two coats of an exterior grade latex acrylic paint 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 BGC [Australia] Pty Ltd or the building contractor, whether on-site or off-site, is under the control of the building contractor. NuLine Plus™ Weatherboards must be stacked flat, clear of the ground by a minimum of 150 mm and supported on timber bearers at maximum 300 mm centres. They must be kept dry at all times either by storing within an enclosed building or when stored externally an additional secondary cover to the plastic wrapping is required. Care must be taken to avoid damage to edges, ends and the primed 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 the NuLine Plus™ Weatherboard Cavity System. 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 the NuLine Plus™ Weatherboard Cavity System 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 must be at maximum 600 mm centres. Dwargs must be fitted flush between the studs at maximum 800 mm centres.
- 7.3 Additional framing may be required at soffits, internal and external corners, and window and door openings for the support and fixing of the NuLine Plus™ Weatherboard Cavity System.
- 7.4 Timber wall framing and cavity battens 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.]*
- 7.5 Timber wall framing and cavity battens must have a maximum moisture content of 18% before the weatherboards are painted.

General

- 8.1 When the NuLine Plus™ Weatherboard Cavity System is used for specifically designed buildings up to 2.5 kPa design differential ULS wind pressure, only the weathertightness aspects of the cladding and maximum framing centres 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 must provide a minimum ventilation opening area of 1,000 mm² per lineal metre of wall in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3 b].
- 8.3 The ground clearance to finished floor levels as set out in NZS 3604 must be adhered to at all times. At ground level, paved surfaces such as footpaths must be kept clear of the bottom edge of the cladding system by a minimum of 100 mm, and unpaved surfaces by 175 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Table 18.



- 8.4 At deck or roof/wall junctions, the bottom edge of the NuLine Plus™ Weatherboard Cavity System must be kept above the top surface of any adjacent roof flashing by a minimum of 35 mm in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.
- 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 a rigid wall underlay 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 fixing lengths for structural cavity battens and weatherboards 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 cavity and the flashing to the opening.
- 8.7 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.

Inter-storey Junctions

- 8.8 Inter-storey junctions must be constructed in accordance with the Technical Literature. Inter-storey 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).

Structure

Mass

- 9.1 The mass of the 150 mm wide NuLine Plus™ weatherboard when installed on the wall is 27.9 kg/m² at equilibrium moisture content (EMC). The mass of the 175 mm wide board is 26.5 kg/m² at EMC and the mass of the 205 mm wide board is 25.7 kg/m² at EMC. NuLine Plus™ weatherboard is therefore considered a light wall cladding in terms of NZS 3604.

Impact Resistance

- 9.2 The NuLine Plus™ Weatherboard Cavity System has good resistance to impact loads likely to be encountered in normal residential use. The likelihood of impact damage to the system when 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 considered for vulnerable areas.

Wind Zones

- 9.3 The NuLine Plus™ Weatherboard Cavity System 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 design differential ULS wind pressure where buildings are specifically designed.

Durability

- 10.1 The NuLine Plus™ Weatherboard Cavity System meets the performance requirements of NZBC Clause B2.3.1 [b] 15 years for the NuLine Plus™ weatherboards and flashings, and the performance requirements of NZBC Clause B2.3.1 [c] 5 years for the exterior paint system.

Serviceable Life

- 10.2 NuLine Plus™ Weatherboard Cavity System installations are expected to have a serviceable life of at least 30 years provided the system is maintained in accordance with this Appraisal, and the NuLine Plus™ weatherboards and fixings are continuously protected by a weathertight coating and remain dry in service. NuLine Plus™ 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 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. To achieve an extended serviceable life in Zone D, NuLine Plus™ weatherboards must be fixed with stainless steel or protected hot-dip galvanised 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 a mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of NuLine Plus™ weatherboards and structural cavity battens 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 to ensure the performance requirements of the NZBC are continually met and to ensure the maximum serviceability of the system.
- 11.2 Regular cleaning [at least annually] of the paint coating 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 recoated at approximately 7-10 yearly intervals in accordance with the paint manufacturer's instructions.
- 11.3 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 relevant manufacturer's instructions.
- 11.4 Minimum ground clearances as set out in this Appraisal and the Technical Literature must be maintained at all times during the life of the system. *[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 the NuLine Plus™ Weatherboard Cavity System.]*

Prevention of Fire Occurring

- 12.1 Separation or protection must be provided to the NuLine Plus™ Weatherboard Cavity System from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

Vertical Fire Spread

- 13.1 This Appraisal only covers 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. Control of external vertical fire spread is therefore outside the scope of this Appraisal.



Horizontal Fire Spread

- 13.2 The NuLine Plus™ Weatherboard has a peak heat release rate of less than 100 kW/m² and a total heat released of less than 25 MJ/m². Testing was carried out as per Paragraph 5.4 of NZBC Acceptable Solution C/AS1 and Paragraph 5.8.1 of NZBC Acceptable Solution C/AS2, achieving a Type A performance. The NuLine Plus™ Weatherboard Cavity System can therefore be used within 1 m of the relevant boundary.
- 13.3 Refer to NZBC Acceptable Solutions C/AS1 and C/AS2 and Verification Method C/VM2 for fire resistance rating and control of external fire spread requirements for external walls.

External Moisture

- 14.1 The NuLine Plus™ Weatherboard Cavity System, 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 NZBC Clause E2.3.5.
- 14.3 The NuLine Plus™ Weatherboard Cavity System 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 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 NuLine Plus™ Weatherboard Cavity System, where there is a designed cavity drainage path for moisture that penetrates the cladding, 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 The NuLine Plus™ Weatherboard Cavity System is not a barrier to the passage of water vapour, and when installed in accordance with this Appraisal, will not create a risk of moisture damage resulting from condensation.

Installation Information

Installation Skill Level Requirements

- 16.1 All design and building work must be carried out in accordance with the NuLine Plus™ Weatherboard Cavity System Technical Literature and this Appraisal by competent and experienced tradespersons conversant with the NuLine Plus™ Weatherboard Cavity System. 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 The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the wall underlay and tape manufacturer's instructions prior to the installation of the NuLine Plus™ Weatherboard Cavity System. 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. Generic rigid wall underlays must be installed in accordance with NZBC Acceptable Solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems shall be installed in accordance with the manufacturer's instructions. Generic rigid sheathing materials must be installed in accordance with NZBC Acceptable solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems shall be installed in accordance with the manufacturer's instructions. 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.

Cavity Battens

- 17.2 Cavity battens must be installed vertically over the building underlay to the wall studs at maximum 600 mm centres. Structural cavity battens must be fixed in place with 65 x 2.87 mm Paslode RounDrive®, ringshank hot-dip galvanised nails or 60 x 2.8 mm hot-dip galvanised jolthead nails, at maximum 300 mm centres alternately offset from the centre line by 12 mm. Where non-structural cavity battens are used, these are tacked into position with 40 x 2.8 mm hot-dip galvanised flathead nails. Where a rigid underlay is used, the length of the nail must be increased by a minimum of the thickness of the underlay.
- 17.3 Where studs are at greater than 450 mm centres and a flexible wall underlay is being used, a wall underlay support must be installed over the underlay at maximum 300 mm centres horizontally.

NuLine Plus™ Weatherboard Installation

- 17.4 NuLine Plus™ 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 and the back face of the bottom course must be sealed with BGC edge sealer or an acrylic sealer to reduce the absorbency of the fibre cement.
- 17.6 NuLine Plus™ weatherboards must be installed starting at the bottom of the wall. A cant strip [H3.1 treated timber or fibre cement] must be fixed behind the bottom course of weatherboards to ensure the weatherboards are set at the correct angle. The cant strip must be continuous around the perimeter of the building. The bottom course of weatherboards must overhang the bottom plate by a minimum of 50 mm.
- 17.7 Before the weatherboards are installed, the corner detail must be prepared to suit the selected option, e.g. external box corner, corner soaker. The necessary flashings must be installed before commencing weatherboard fixing.
- 17.8 The first course of weatherboards must be full length, i.e. 4,200 mm and commence from an external corner. Jointing of NuLine Plus™ weatherboards is made off the stud using the pre-cut tongue and groove joint. Off-stud joints may be located centrally between the studs, but must be no closer than 100 mm to the edge of a stud. A bead of sealant must be applied to the back side of the tongue before the corresponding board is inserted. Subsequent courses of weatherboards must be installed so that the vertical weatherboard joints are staggered by 600 mm minimum from joints in the previous course.
- 17.9 NuLine Plus™ weatherboards must have a minimum lap of 30 mm, and should be set out so as near to a full board as possible will finish under and over windows and doors and at the top of the wall. A storey rod can be used to accurately position weatherboard courses.

- 17.10 NuLine Plus™ weatherboards must be fixed to each stud using concealed fixings behind the lap of the boards and face nailing through the top board. Fixing length and type varies depending on whether structural or non-structural cavity battens are used. Refer to Table 1.
- 17.11 Concealed fixing nails must be fixed 20 mm from the top edge of the board and must be driven flush with the board surface.
- 17.12 Face nailing must be fixed 35 mm up from the bottom of the board and punched a maximum of 2 mm below the surface of the board. The weatherboards must be pre-drilled for face nailing.
- 17.13 Concealed nails must not be located closer than 50 mm to the end of the board. Face nails must not be located closer than 20 mm from the end of the board. Except for off-stud joints, NuLine Plus™ weatherboards must be fixed a maximum of 100 mm from the end of the board.

Window and Door Joinery Installation

- 17.14 Aluminium window and door joinery and associated head flashings must be installed by the building contractor in accordance with the Technical Literature. A 7.5-10 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.
- 17.15 After installing the window and door joinery, scribes must be installed in accordance with the Technical Literature to provide additional weatherproofing for the joinery/weatherboard junction.

Finishing

- 17.16 The paint coating manufacturer's instructions must be followed at all times for application of the paint finish. NuLine Plus™ weatherboards must be painted as soon as practicable (maximum 3 months) following fixing and must be clean and dry before commencing. Allow the recommended drying time between coats and follow the temperature limitations for application.

Table 1: Fixing Options - Cavity Cladding System

Batten type	Batten fixings**	Concealed board fixing (top)	Face nail fixing (bottom)
Structural cavity battens*	65 x 2.87 mm Paslode RounDrive ringshank galvanised nails or 60 x 2.8 mm hot-dip galvanised jolthead nails	50 x 2.87 mm Paslode hot-dip galvanised ringshank D-head gun nails or 50 x 2.8 mm hot-dip galvanised or stainless steel ringshank, flathead nails	60 x 3.15 mm hot-dip galvanised or stainless steel ringshank, jolthead nails
Non-structural cavity battens*	***40 x 2.8 mm hot-dip galvanised flathead nails	65 x 2.87 mm Paslode hot-dip galvanised ringshank D-head gun nails or 60 x 2.8 mm hot-dip galvanised or stainless steel ringshank, flathead nails	75 x 3.15 mm hot-dip galvanised or stainless steel ringshank, jolthead nails

* Suitable for differential wind pressures up to 2.5 kPa with studs at maximum 600 mm centres.

** Where a rigid underlay is used, the length of the nail must be increased by a minimum of the thickness of the underlay.

*** There is no specific nail size specified in NZBC Acceptable Solution E2/AS1 for fixing non-structural cavity battens to the framing. This nail size is suggested to temporarily fix the batten in position until the cladding is fixed.

Inspection

- 17.17 The Technical Literature must be referred to during the inspection of NuLine Plus™ Weatherboard Cavity System installations.

Health and Safety

- 18.1 Cutting of NuLine Plus™ 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 because of the amount of dust generated.
- 18.3 Safe use and handling procedures for NuLine Plus™ 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 The NuLine Plus™ Weatherboard Cavity System was tested to NZBC Verification Method E2/VM1. BRANZ expert opinion on NZBC E2 code compliance for the NuLine Plus™ Weatherboard Cavity System was based on testing and evaluation of all details within the scope and as stated within this Appraisal. The testing assessed the performance of the foundation detail, window head, jamb and sill details, meter box head, jamb and sill details, vertical and horizontal weatherboard joints, internal and external corners. 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 solution will meet the performance levels of NZBC Acceptable Solution E2/AS1 for drained cavity claddings.
- 19.2 Wind face load testing was completed for the NuLine Plus™ Weatherboard Cavity System. BRANZ determined design wind suction pressures, and by comparing these pressures with the NZS 3604 design wind speeds and AS/NZS 1170 pressure coefficients, the fixing requirements were determined for timber-framed walls.
- 19.3 Cone calorimeter testing to determine the peak rate of heat release and total heat release of NuLine Plus™ weatherboard was completed by BRANZ. The testing was carried out in accordance with AS/NZS 3837.

Other Investigations

- 20.1 Structural and durability opinions have been provided by BRANZ technical experts.
- 20.2 Site inspections have been carried out to assess the practicability of installation and to examine completed installations.
- 20.3 The Technical Literature for the NuLine Plus™ Weatherboard Cavity System has been examined by BRANZ and found to be satisfactory.



Quality

- 21.1 The manufacture of NuLine Plus™ weatherboards has been examined by BRANZ, including methods adopted for quality control. 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 BGC [Australia] Pty Ltd is the responsibility of BGC [Australia] Pty Ltd.
- 21.3 The quality management system of the NuLine Plus™ weatherboard manufacturer, BGC [Australia] Pty Ltd, has been assessed and registered as meeting the requirements of ISO 9001 by SAI Global.
- 21.4 Quality of installation on site of components and accessories supplied by BGC [Australia] Pty Ltd and the building contractor is the responsibility of the installer.
- 21.5 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and joinery, wall underlays, flashing tapes, air seals and the NuLine Plus™ Weatherboard Cavity System in accordance with the instructions BGC [Australia] Pty Ltd.
- 21.6 Sub trades are responsible for the installation of penetrations, flashing etc that are relevant to their trade in accordance with the NuLine Plus™ Weatherboard Cavity System Technical Literature.
- 21.7 Building owners are responsible for the maintenance of the NuLine Plus™ Weatherboard Cavity System in accordance with the instructions of BGC [Australia] Pty Ltd.

Sources of Information

- AS 3730 Guide to the properties of paints for buildings.
- AS/NZS 1170: 2002 Structural design action - General principles.
- AS/NZS 3837: 1998 Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter.
- AS/NZS 4680:2006 Hot-dip galvanized [zinc] coatings on fabricated ferrous articles.
- NZS 3603: 1993 Timber structures standard.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 4211: 2008 Specification for performance of windows.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



BRANZ Appraised
Appraisal No. 641 [2021]

BRANZ Appraisal
Appraisal No. 641 [2021]
24 May 2021

NULINE PLUS™ WEATHERBOARD
CAVITY SYSTEM



BRANZ

In the opinion of BRANZ, **NuLine Plus™ Weatherboard Cavity System** 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 **BGC [Australia] Pty Ltd**, 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. **BGC [Australia] Pty Ltd**:
 - 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 **BGC [Australia] Pty Ltd**.
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 **BGC [Australia] Pty Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

24 May 2021