



**BRANZ Appraised**

Appraisal No.594 [2008]

**BRANZ Appraisals**

Technical Assessments of products  
for building and construction

**BRANZ  
APPRAISAL  
No. 594 (2008)**

**XPRESSCLAD  
VENTILATED  
CAVITY SYSTEM -  
RESIDENTIAL**

**PBS Investments Ltd**  
P O Box 302 202  
North Harbour  
Auckland  
Tel: 09 477 0960  
Fax: 09 477 0961



**BRANZ Limited**  
Private Bag 50 908  
Porirua City  
New Zealand  
Tel: +64 4 237 1170  
Fax: +64 4 237 1171  
[www.branz.co.nz](http://www.branz.co.nz)

**BRANZ Pty Ltd**  
P O Box 830  
Brookvale  
NSW 2100  
Australia  
Tel: +61 2 9938 6011  
Fax: +61 2 9938 6911  
[www.branz.com.au](http://www.branz.com.au)



## Product

1.1 The XpressClad Ventilated Cavity System is a cavity-based, express-jointed wall cladding system. It is designed to be used as an external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.

1.2 The XpressClad Ventilated Cavity System consists of Eterpan fibre cement sheet fixed over extruded aluminium runners to form a cavity. The fibre cement sheet is finished with a 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 framing with a nominal 20 mm cavity.



## Scope

2.1 The XpressClad Ventilated Cavity System has been appraised as an external wall cladding system for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution 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 Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Building Wind Zones up to, and including 'Very High'.

2.2 The XpressClad Ventilated Cavity System has also been appraised for weathertightness and structural wind loading when used for buildings subject to specific design engineering up to an ultimate limit state (ULS) wind pressure of 2500 Pa.

2.3 The XpressClad Ventilated Cavity System must only be installed on vertical surfaces (except for tops of sills and balustrades, which must have a minimum slope as defined by NZBC Clause E2/AS1 or NZBC Clause F4/AS1 and be waterproofed in accordance with the Technical Literature).

2.4 The XpressClad Ventilated Cavity System is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *(The Appraisal of the XpressClad Ventilated Cavity System relies on the joinery meeting the requirements of NZS 4211 for the relevant Building Wind Zone, or be specifically designed for use in specifically designed buildings.)*

## Building Regulations

### New Zealand Building Code (NZBC)

**3.1** In the opinion of BRANZ, the XpressClad Ventilated 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 XpressClad Ventilated 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 11.1 – 11.3.

**Clause B2 DURABILITY:** Performance B2.3.1 (b), not less than 15 years and B2.3.2. The XpressClad Ventilated Cavity System meets this requirement. See Paragraph 12.1.

**Clause C3 SPREAD OF FIRE:** Performance C3.3.5. The XpressClad Ventilated Cavity System meets this requirement. See Paragraphs 14.1 and 14.2.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. The XpressClad Ventilated Cavity System meets this requirement. See Paragraphs 16.1 – 16.5.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. The XpressClad Ventilated Cavity System meets this requirement and will not present a health hazard to people.

**3.2** This Appraisal appraises an **Alternative Solution** in terms of New Zealand Building Code Compliance.

## Technical Specification

**4.1** System components and accessories for the XpressClad Ventilated Cavity System supplied by PBS Distributors Ltd are:

### Eterpan Sheet

- Eterpan sheet is supplied for the system is either 9.0 mm thick for the cladding, or minimum 4.5 mm thick for the rigid air barrier, 1200 mm wide and either 2400 mm, 2700 mm or 3000 mm long, and is manufactured from a cellulose cement formulation. The boards are formed, cut to length and then cured by high-pressure autoclaving. They are produced in flat, smooth surfaced sheet material form.

### Accessories

- VentClad vented battens - 50 mm wide x 20 mm thick or 70 mm wide x 20 mm thick timber, with 20 mm wide x 5 mm deep machined grooves at 100 mm centres on both faces, treated to Hazard Class H3.1.
- Extrusions manufactured from 6000 series aluminium:
  - XHR - Horizontal runner with pre-punched drain and fixing holes, 3600 mm lengths.
  - XVR - Vertical runner with pre-punched fixing holes, 3000 mm lengths.
  - XZR - Horizontal closer with pre-punched drain and fixing holes, 3600 mm lengths.
  - XIR - Vertical stiffener with pre-punched fixing holes, 3000 mm lengths.
  - XPF - Vertical pocket filler, 3000 mm lengths.
  - 25 x 25 x 1.0 mm aluminium angle, 3000 mm lengths.
- Flashings manufactured from 5000 series aluminium sheet:
  - Stop end, includes 8 gauge grade 304 stainless steel self tapping screw.
  - Exhibited XHR soaker.
- Vented mesh closer manufactured from aluminium micro mesh with a black polyester finish.

- Fasteners:
  - 19 mm, 10 gauge, grade 304 stainless steel self drilling and tapping countersunk phillips sheet screw.
  - 19 mm, 10 gauge, grade 304 stainless steel Tek screw with neoprene washer.
  - 25 mm, 10 gauge, grade 304 stainless steel self drilling and tapping countersunk phillips sheet screw and cup washers.
  - 60 mm, 10 gauge, grade 304 stainless steel self drilling and tapping countersunk phillips sheet screw.
  - 38 mm, 10 gauge, grade 304 stainless steel truncated head square drive screw.
- High impact plastic shims.
- Epoxy filler for filling/covering screw holes.
- 4.2** Accessories used with the XpressClad system that are supplied by PBS Distributors Ltd or the building contractor are:
  - PEF rod and sealant for air seal around openings.
  - Building wrap complying with NZBC E2/AS1 Table 23 or holding a valid BRANZ Appraisal.
  - Paint system.
  - Building wrap support – polypropylene strap, 75 mm galvanised mesh, galvanised wire, or additional vertical runners for securing the building wrap in place and preventing bulging of the bulk insulation into the drainage cavity. (Note: mesh and wire galvanising must comply with AS/NZS 4534.)
  - 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 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.

### Paint System Specification

**4.3** The Eterpan fibre cement sheet must be finished with a paint system that will protect it from moisture. A latex exterior paint system complying with any of parts 7, 8, 9 or 10 of AS 3730 are suitable.

### Handling and Storage

**5.1** Handling and storage of all materials supplied by PBS Distributors Ltd or the building contractor, whether on site or off site, is under the control of the building contractor. Eterpan sheets 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 by providing waterproof covers to the stack. Care must be taken to avoid damage to edges, ends and surfaces. The sheets must always be carried on edge.

**5.2** Aluminium extrusions, cavity battens and other 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 XpressClad Ventilated Cavity System. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained within the Technical Literature and within the scope of this Appraisal must be followed.

## Design Information

### Cavity Battens

7.1 The XpressClad Ventilated Cavity System incorporates vertical and horizontal aluminium runners which form the 20 mm cavity behind the fibre-cement sheet cladding. The VentClad Cavity Batten may be used as an alternative to the vertical aluminium runner, see the Technical Literature for details. The horizontal aluminium runners are full-width as an alternative to the wooden battens normally specified for ventilated cavity systems. This system has been specifically tested to ensure compliance with the ventilation, drainage and drying requirements of NZBC Clause E2.

### Framing

#### Timber Treatment

8.1 Timber wall framing behind the XpressClad Ventilated Cavity System must be treated as required by NZS 3602.

#### Timber Framing

8.2 Studs must be provided at maximum 600 mm centres. Nogs, where required, must be fitted flush between the studs.

8.3 Timber framing must comply with NZS 3604 or be to a specific design using NZS 3603 and NZS 4203 or AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604.

8.5 Timber wall framing must have a maximum moisture content of 24% at the time of the cladding application.

#### Eterpan Sheet Set Out

8.6 All vertical Eterpan sheet edges must be supported and fixed to the aluminium cavity runners. Horizontal sheet edges must be supported by horizontal XpressClad runners as described in the Technical Literature. At the base of the wall, the sheets must hang 50 mm below the supporting framing.

8.7 Additional framing may be required at soffits, internal and external corners and window and door openings for the support and fixing of sheet edges.

### General

9.1 Flexible building wraps that comply with Table 23 of NZBC Clause E2/AS1 may be used with the XpressClad Ventilated Cavity System for ULS design wind pressures up to 1550 Pa. For ULS design wind pressures greater than this, up to 2500 Pa, the system must incorporate a fibre cement rigid air barrier. See Paragraph 11.3. When XpressClad Ventilated Cavity System is used for specifically designed buildings up to 2500 Pa ULS wind pressure, only the weathertightness aspects of the cladding and fibre cement sheet fixing 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.

9.2 Punchings in the horizontal runners provide a ventilation opening area of at least 1000 mm<sup>2</sup> per lineal metre of wall in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3(b).

9.3 At ground level the bottom edge of Eterpan fibre cement sheets 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.

9.4 At balcony, deck or low pitched roof/wall junctions, the bottom edge of the XpressClad Ventilated Cavity System

must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35 mm in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.6.

9.5 All buildings must have barriers to airflow in the form of interior linings with all joints stopped, or alternatively, unlined gables and walls must incorporate a rigid air barrier as described in Paragraph 11.3.

9.6 Where penetrations through the XpressClad Ventilated Cavity System are wider than the cavity batten spacing, allowance must be made for airflow between adjacent cavities. A minimum 10 mm gap must be left between the bottom of the vertical cavity batten and the flashing to the opening.

9.7 Where the XpressClad Ventilated Cavity System abuts other cladding systems, the designer must detail the junction to meet their own requirements and the performance requirements of the NZBC. These details are outside the scope of this Appraisal.

### Drained Joints

10.1 Inter-storey drained joints must be provided for walls over 2 storeys in height in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4(b), or as required by the Technical Literature for buildings outside the scope of NZBC Clause E2/AS1.

### Structure

#### Mass

11.1 The mass of the XpressClad Ventilated Cavity System is dependent on whether a building wrap or rigid air barrier is used. The following list gives the different weights of the different thickness Eterpan fibre cement sheets:

- 9.0 mm sheet, 12.1 kg/m<sup>2</sup>.
- 7.5 mm sheet, 10.1 kg/m<sup>2</sup>.
- 6.0 mm sheet, 8.1 kg/m<sup>2</sup>.
- 4.5 mm sheet, 6.1 kg/m<sup>2</sup>.

#### Impact Resistance

11.2 The XpressClad Ventilated Cavity System has good resistance to hard body impacts 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

11.3 The XpressClad Ventilated Cavity System is suitable for use in all Building Wind Zones of NZS 3604 up to, and including, Very High. For Specific Design situations the ULS wind pressure for the system is 2500 Pa. For wind pressures over 1550 Pa a rigid air barrier, being at least 4.5 mm thick Eterpan fibre cement sheet, must be used.

### Durability

#### Serviceable Life

12.1 XpressClad Ventilated Cavity System installations are expected to have a serviceable life of at least 50 years provided that the paint coating to the fibre cement sheet is maintained in accordance with this Appraisal to ensure the Eterpan fibre cement sheets remain dry in service. For the XpressClad Ventilated Cavity System to meet the durability requirements of the NZBC, it must be finished within three months of installation of the Eterpan Sheets.

## Maintenance

13.1 Regular maintenance is essential for XpressClad Ventilated Cavity System installations to continue to meet the NZBC durability performance provision and to maximise their serviceable life.

13.2 Annual inspections must be made to ensure that all aspects of the cladding system, including the flashings and any sealed joints remain in a weatherproof condition. Any cracks, damaged areas or areas showing signs of deterioration that would allow water ingress, must be repaired immediately. Sealant, paint coatings, flashings or the fibre cement sheets must be repaired in accordance with the relevant manufacturer's instructions.

13.3 Regular cleaning (at least annually) of the paint coating is recommended to remove grime, dirt and organic growth, to maximise the life and appearance of the coating.

13.4 Recoating of the paint system will be necessary throughout the life of the cladding system. The interval between recoats depends on the colour, orientation, coating formulation and the quality of the application, and will be at approximately 5-10 yearly intervals in accordance with the paint manufacturer's instructions.

13.5 Minimum ground clearances as set out in this Appraisal and the Technical Literature 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 the XpressClad Ventilated Cavity System.)

## Spread of Fire

14.1 The XpressClad Ventilated Cavity System, when finished with a coating system less than 1 mm thick, is considered to meet the Type A requirements of Table 7.5 of NZBC Clause C/AS1 when used as an exterior cladding.

14.2 A fire rated XpressClad System is available that will provide a fire resistance rating of 30/30/30. This system incorporates a 6 mm Eterpan fibre cement sheet rigid air barrier, which is in turn attached to 90 mm x 45 mm timber framing. The inside face of the wall system is lined with 10 mm GIB Fyrelite®. The wall cavity includes Pink® Batts® R2.2. The maximum loading allowed on the fire rated wall is 15 kN/m. For more information consult the Technical Literature.

## Outbreak of Fire

15.1 The XpressClad Ventilated Cavity System must be separated from chimneys and flues in accordance with the requirements of NZBC Acceptable Solution C/AS1 Part 9 for the protection of combustible materials.

## External Moisture

16.1 The XpressClad Ventilated Cavity System, when installed and maintained in accordance with this Appraisal and the Technical Literature on buildings with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2, prevents the penetration of moisture that could cause undue dampness or damage to building elements.

16.2 The cavity must be sealed off from the roof and sub-floor spaces to meet compliance with NZBC Clause E2.3.5.

16.3 The XpressClad Ventilated Cavity System allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet compliance with NZBC Clause E2.3.6.

16.4 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.

16.5 The use of the XpressClad Ventilated Cavity System where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirement for joints, penetrations and junctions to remain weather resistant.

## Internal Moisture

17.1 NZBC Acceptable Solution E3/AS1 Paragraph 1.1.1(a) requires a minimum wall R-value of 1.5 for framed cavity wall construction, and therefore, the wall frame cavity must be insulated. This requirement does not apply to Communal Non-residential, Commercial, Industrial, Outbuildings or Ancillary buildings.

## Water Vapour

17.2 The XpressClad Ventilated Cavity System is not a barrier to the passage of water vapour, and when installed in accordance with this Appraisal will not create or increase the risk of moisture damage resulting from condensation.

# Installation Information

## Installation Skill Level Requirements

18.1 Installation of Eterpan sheets and accessories supplied by PBS Distributors Ltd and the building contractor must be completed by tradespersons with an understanding of cavity construction and fibre cement sheet installation, in accordance with instructions given within the XpressClad Ventilated Cavity System Technical Literature and this Appraisal.

## System Installation

### Building Wrap, Rigid Air Barrier and Flexible Sill and Jamb Tape

19.1 The selected building wrap and flexible sill and jamb tape systems must be installed by the building contractor in accordance with the wrap and tape manufacturers' instructions prior to the installation of the cavity runners. Particular attention must be paid to the installation of the building wrap and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed timber wall framing in the opening is protected. Where required by higher wind pressures, the building wrap must be replaced with a rigid air barrier consisting of minimum 4.5 mm thick Eterpan fibre cement sheet.

### Cavity Runners

19.2 XpressClad ventilated cavity runners must be installed vertically over the building wrap to the wall studs at maximum 600 mm centres, and horizontally as required by the Technical Literature. The runners are fixed in place with 10 gauge, 38 mm stainless steel screws at 250 mm centres.

### Aluminium Joinery Installation

19.3 Aluminium joinery and associated head flashings must be installed by the building contractor in accordance with the Technical Literature. A nominal 10 mm 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.

### Eterpan Fibre Cement Sheet Installation

19.4 Eterpan fibre cement sheets may be cut using either hand or power tools. 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.

19.5 Sheets must be dry prior to installation. It is not necessary for sheet edges to be pre-painted with a seal coat prior to fixing, as required by NZBC Clause E2/AS1, Paragraph 9.7.3.

### **Eterpan Sheet Fixings**

19.6 Eterpan sheets must be fixed at 300 mm centres to the aluminium cavity runners with either of the 19 mm long fixings or the 25 mm fixing as described in Paragraph 4.1. The fixings must be positioned a minimum of 15 mm from all sheet edges, and a minimum of 150 mm vertically and 50 mm horizontally from sheet corners.

### **Finishing**

19.7 The Eterpan fibre cement sheet must be finished with a paint coating system that will protect it from moisture. A latex exterior paint system complying with any of parts 7, 8, 9 or 10 of AS 3730 are suitable.

19.8 The paint coating manufacturer's instructions must be followed at all times for application of the paint finish. The fibre cement sheet must be dry before commencing painting.

### **Inspection**

19.9 The Technical Literature must be referred to during the inspection of XpressClad Ventilated Cavity System installations.

## **Health and Safety**

20.1 Safe use and handling procedures for the components that make up the XpressClad Ventilated Cavity System are provided in the relevant manufacturer's Technical Literature.

20.2 Cutting of Eterpan sheets must be carried out in well ventilated areas, and a dust mask and eye protection must be worn. When power tools are used for cutting, grinding or forming holes, safety measures as set out in the Technical Literature must be undertaken because of the amount of dust generated.

## **Basis of Appraisal**

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

### **Tests**

21.1 The following testing has been completed by BRANZ:

- Testing was carried out to determine the face load pressure resistance of Eterpan sheet.
- Testing was carried out to determine the performance of Eterpan fibre cement sheet under hard body impact.

21.2 Testing has been carried out by Window Engineering Consultants to NZBC E2/VM1 requirements and AS/NZS 4284 requirements. The testing was observed by a BRANZ technical expert. The results have been reviewed by BRANZ and found to be satisfactory. 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 Acceptable Solution E2/AS1 for drained cavity claddings.

## **Other Investigations**

22.1 Structural, durability, fire and weathertightness opinions have been given by BRANZ technical experts.

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

22.3 The manufacturer's Technical Literature has been examined by BRANZ and found to be satisfactory.

## **Quality**

23.1 The manufacture of Eterpan fibre cement sheet by Eternit Guangzhou Co. Ltd has been assessed by BRANZ, including the methods for quality control. Details regarding the quality and composition of the materials used were obtained and found to be satisfactory.

23.2 The quality of materials, components and accessories supplied by PBS Distributors Ltd are the responsibility of PBS Distributors Ltd. The quality control system of PBS Distributors Ltd has been assessed by BRANZ and found to be satisfactory.

23.3 Quality of installation on site of components and accessories supplied by PBS Distributors Ltd and the building contractor is the responsibility of the installer.

23.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and joinery, building wraps, flashing tapes, airseals, joinery head flashings, cavity battens and Eterpan fibre cement sheets in accordance with the instructions of PBS Distributors Ltd.

23.5 Building owners are responsible for the maintenance of the XpressClad Ventilated Cavity System in accordance with the instructions of PBS Distributors Ltd.

## **Sources of Information**

- AS/NZS 1170 Structural design actions
- AS/NZS 2908.2: 2000 Cellulose-cement products - flat sheet.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3603: 1993 Timber structures standard.
- NZS 3604: 1999 Timber framed buildings.
- NZS 4203: 1992 General structural design and design loadings for buildings.
- NZS 4211: 1985 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.
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition May 2007.
- The Building Regulations 1992, up to, and including June 2007 Amendment.



**BRANZ**

In the opinion of BRANZ, **XpressClad Ventilated Cavity System - Residential** 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 **PBS Distributors 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. **PBS Distributors 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.
3. 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.
4. 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 **PBS Distributors Ltd**.
5. 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.
6. BRANZ provides no certification, guarantee, indemnity or warranty, to **PBS Distributors Ltd** or any third party.

For BRANZ

C Preston  
Chief Executive

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