



## BRANZ Appraised

Appraisal No. 799 [2019]

## BGC DURAGROOVE™ AND DURASCAPE™ FACADE SYSTEMS [CAVITY]

Appraisal No. 799 [2019]



### BRANZ Appraisals

Technical Assessments of products  
for building and construction.



Appraisal Holder:

**BGC Fibre Cement  
Australia Pty Ltd**

Marketed by:

**BGC Fibre Cement (NZ)**

PO Box 76695

Manukau City

Auckland

Free Phone: 0800 424 234

Tel: 09 273 1457

Fax: 09 273 1461

Email: [nz@bgc.com.au](mailto:nz@bgc.com.au)

Web: [www.bgcinnovatedesign.co.nz](http://www.bgcinnovatedesign.co.nz)



**BRANZ**

**BRANZ**

1222 Moonshine Rd,

RD1, Porirua 5381

Private Bag 50 908

Porirua 5240,

New Zealand

Tel: 04 237 1170



## Product

- 1.1 The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] are cavity-based, shiplap-jointed wall cladding systems. They are designed to be used as external wall cladding systems for residential and light commercial type buildings where domestic construction techniques are used.
- 1.2 The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] consist of Duragroove™ and Durascape™ fibre cement sheets fixed with mechanical fasteners and adhesive sealant over timber battens to form a cavity. The fibre cement sheet is finished with a paint system.
- 1.3 The systems incorporate 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 BGC Duragroove™ and Durascape™ Facade Systems [Cavity] have been appraised as external wall cladding systems 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 Wind Zones up to, and including Extra High.
- 2.2 BGC Duragroove™ and Durascape™ Facade Systems [Cavity] have also been appraised for weathertightness and structural wind loading when used as external wall cladding systems 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 complying with the NZBC; and,
  - situated in specific design wind pressures up to a maximum design differential ultimate limit state [ULS] of 2.5 kPa.
- 2.3 BGC Duragroove™ and Durascape™ Facade Systems [Cavity] 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 BGC Duragroove™ and Durascape™ Facade Systems [Cavity] are appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *[The Appraisal of the BGC Duragroove™ and Durascape™ Facade Systems [Cavity] relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone, or design wind pressures.]*



## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, BGC Duragroove™ and Durascape™ Facade Systems [Cavity], 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. BGC Duragroove™ and Durascape™ Facade Systems [Cavity] meet 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 – 9.4.

**Clause B2 DURABILITY:** Performance B2.3.1 (b) 15 years, B2.3.1 (c) 5 years and B2.3.2. BGC Duragroove™ and Durascape™ Facade Systems [Cavity] meet this requirement. See Paragraph 10.1 – 10.4.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] meet this requirement. See Paragraphs 14.1 – 14.5.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] 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 Components and accessories for the BGC Duragroove™ and Durascape™ Facade Systems [Cavity] supplied by BGC Fibre Cement [NZ] are:

### Duragroove™ and Durascape™

- Duragroove™ and Durascape™ are 9 mm thick fibre cement sheets, manufactured from BGC standard fibre cement formulation. They are produced in sheet material form with 'Duragroove' or 'Durascape' printed on the back face. The sheets are formed, cut to length, and then cured by high pressure autoclaving. The sheets are coated on the front face and four edges with a sealer.
- Duragroove™ and Durascape™ sheets are available in sizes of 1200 mm wide and 2450, 2750 and 3000 mm long. Duragroove™ sheets have vertical grooves 4.5 mm wide and 2mm deep at either 100 mm centres [Duragroove™ Smooth Narrow] and 150 mm centres [Duragroove™ Smooth Wide]. Duragroove™ Woodgrain has a textured surface with grooves at 150 mm centres. Durascape™ is a flat sheet. Both Duragroove™ and Durascape™ have shiplap joints which are chamfered to provide a vertical groove. The sheets are manufactured to conform to the requirements of AS/NZS 2908.2.

### Accessories

- **BGC Aluminium Internal Corner** – extruded aluminium profile, 61 mm by 61 mm wide and 2450, 2750 and 3000 mm long. The internal corner is available in chromate treated finish.
- **BGC Aluminium External Corner** – extruded aluminium profile, 61 mm by 61 mm wide and 2450, 2750 and 3000 mm long. The external corner is available in chromate treated finish.
- **BGC Horizontal Flashing** – extruded aluminium 'h' profile, 70 mm high, 14 mm wide and 3000 mm long. The horizontal flashing is available in chromate treated finish.
- **BGC Edge Sealer** – acrylic sealer supplied in 400 g can to seal cut edges of Duragroove™ or Durascape™ sheets prior to installation.

4.2 System components and accessories for the BGC Duragroove™ and Durascape™ Facade Systems [Cavity], which are supplied by the building contractor are:

- **Structural cavity battens** – nominal 50 mm wide by 25 mm thick [minimum finished size of 45 mm wide by 18 mm thick] SG8 framing grade pinus radiata timber cavity battens, treated to Hazard Class H3.1.
- **Structural cavity batten fixings** – 65 x 2.8 mm Paslode RounDrive®, ring-shank galvanised nails.



- **Joint Sealant** – Bostik Seal'n'Flex FC.
- **Sealant** – Bostik MS Safe Seal for weather sealing.
- **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 a wall underlay.
- **Flexible wall underlay support** – polypropylene strap at 300 mm centres fixed horizontally and drawn taut for securing the wall underlay in place and preventing bulging of the bulk insulation into the drainage cavity where cavity battens are installed at greater than 450 mm centres. *[Note: additional vertical battens may also be installed to provide support.]*
- **Rigid wall underlays** – minimum 7 mm thick H3 treated plywood or 6 mm thick fibre cement complying with NZBC Acceptable Solution E2/AS1 Table 23, or rigid air barrier systems covered by a valid BRANZ Appraisal, such as BGC Durabarrier, which is covered by BRANZ Appraisal No. 721 [2011].
- **Flexible sill and jamb flashing tape** – 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.
- **Joinery sill and head flashings** – folded from aluminium or galvanised steel to suit the window or door trim opening. Refer to NZS 3604, Section 4 and NZBC Acceptable Solution E2/AS1, Table 20 for durability requirements.
- **Window and door trim cavity air seal** – air seals and PEF rod complying with NZBC Acceptable Solution E2/AS1 Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal for use around window, door and other wall penetration openings.

#### Sheet Fixing

- **Duragroove™ and Durascape™ sheet nail fixings** – 25 x 1.6 mm stainless steel brad-nails, or 30 x 2.8 mm hot-dip galvanised or stainless steel ring shank fibre cement nails. *[Note: Hot-dip galvanising must comply with AS/NZS 4680 and stainless steel must be Grade 304 or 316.]*
- **Duragroove™ and Durascape™ sheet screw fixings** – 25 x 10g galvanised steel or stainless steel countersunk wood screws. *[Note: Galvanised screws must be mechanically zinc plated in accordance with AS 3566.2 Corrosion Class 4 minimum, and stainless steel must be minimum Grade 304.]*
- **Adhesive Sealant** – Bostik Seal'n'Flex FC, for fixing Duragroove™ and Durascape™ sheets to the cavity battens.

#### Paint System Specification

- 4.3 Paint systems are not supplied by BGC Fibre Cement [NZ] and have not been assessed by BRANZ and are therefore outside the scope of this Appraisal.
- 4.4 All exposed faces and edges of Duragroove™ and Durascape™ sheets must be finished with at least two coats of an exterior grade latex acrylic 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 BGC Fibre Cement Australia Pty Ltd or the building contractor, whether on site or off site, is under the control of the building contractor. Duragroove™ and Durascape™ 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 and surfaces. The sheets must always be carried on edge.
- 5.2 BGC aluminium profiles, 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 BGC Duragroove™ and Durascape™ Facade Systems [Cavity]. 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

### Framing

#### Timber Treatment

- 7.1 Timber wall framing behind the BGC Duragroove™ and Durascape™ Facade Systems [Cavity] 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. Dwangs must be fitted flush between the studs at maximum 800 mm centres.
- 7.3 Timber framing must have a maximum moisture content of 20% at the time of the BGC Duragroove™ and Durascape™ Facade Systems [Cavity] application. *[Note: If the BGC Duragroove™ and Durascape™ Facade Systems [Cavity] are fixed to framing with a moisture content of greater than 20% problems may occur at a later date due to excessive timber shrinkage.]*

#### Cavity Battens

- 7.4 The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] incorporate vertical cavity battens which form the nominal 20 mm cavity behind the Duragroove™ or Durascape™ sheet. Cavity battens 45 mm wide are required to support all vertical Duragroove™ and Durascape™ sheet edges and at intermediate studs.

#### Duragroove™ and Durascape™ Sheet Set Out

- 7.5 All Duragroove™ and Durascape™ sheet edges must be supported with vertical edges fixed to the vertical timber battens. Horizontal sheet edges must be supported by the BGC Horizontal Flashing as described in the Technical Literature. At the base of the wall, the sheets must hang 50 mm minimum below the supporting framing.
- 7.6 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

- 8.1 Flexible wall underlays that comply with Table 23 of NZBC Acceptable Solution E2/AS1 may be used with the BGC Duragroove™ and Durascape™ Facade Systems [Cavity] in NZS 3604 Wind Zones up to and including Very High. For installations in NZS 3604 Wind Zone Extra High and for wind pressures up to 2.5 kPa [ULS], the system must incorporate a rigid wall underlay. When the BGC Duragroove™ and Durascape™ Facade Systems [Cavity] are used for specifically designed buildings up to 2.5 kPa [ULS] wind pressure, only the weathertightness aspects of the cladding and Duragroove™ and Durascape™ 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.
- 8.2 Punchings in the cavity vent strip must provide a minimum 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].



- 8.3 At ground level, the bottom edge of the Duragroove™ and Durascape™ 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.
- 8.4 At balcony, deck or low pitched roof/wall junctions, the bottom edge of the BGC Duragroove™ and Durascape™ Facade Systems [Cavity] must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 50 mm in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.6.
- 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 wall 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 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 cavity batten fixing lengths must be increased by a minimum of the thickness of the underlay.
- 8.6 Where penetrations through the BGC Duragroove™ and Durascape™ Facade Systems [Cavity] 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.
- 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 in 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 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 BGC Duragroove™ and Durascape™ sheets when installed on the wall is 12.5 kg/m<sup>2</sup> at equilibrium moisture content [EMC]. The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] are therefore considered a light wall cladding in terms of NZS 3604.

#### **Impact Resistance**

- 9.2 The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] have good resistance to 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**

- 9.3 The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] are 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.

#### **Sheet Fixing**

- 9.4 The sheets must be mechanically fixed at the centres specified in Table 1 in conjunction with the adhesive sealant [see Paragraph 17.7].

**Table 1: Duragroove™ and Durascape™ sheet fixing centres**

Wind Exposure	Fixing Type and Vertical Centres		
	25 mm brad with adhesive*	30 x 2.8 mm fibre cement nail with adhesive*	10g x 25 mm screw with adhesive*
NZS 3604 Wind Zone Low, Medium, High, Very High, Extra High and wind pressures up to and including 2.5 kPa [ULS]	150 mm	200 mm	200 mm

\*Mechanical fixing must be used in conjunction with adhesive sealant. See Paragraph 17.7.

## Durability

### Serviceable Life

- 10.1 The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] meet the performance requirements of NZBC Clause B2.3.1 [b], 15 years for the BGC Duragroove™ and Durascape™ sheets, and the performance requirements of NZBC Clause B2.3.1 [c], 5 years for the exterior paint system.
- 10.2 BGC Duragroove™ and Durascape™ Facade Systems [Cavity] installations are expected to have a serviceable life of at least 30 years provided the paint coating to the Duragroove™ and Durascape™ sheets is maintained in accordance with this Appraisal, and the Duragroove™ and Durascape™ sheets and fixings are continuously protected by a weathertight coating and remain dry in service. Duragroove™ and Durascape™ sheets must be painted within three months of installation.
- 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 an extended serviceable life in Zone D, structural battens and Duragroove™ and Durascape™ sheets must be fixed with stainless steel or 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 mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of structural battens and Duragroove™ and Durascape™ sheets 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 recommended to remove grime, dirt and organic growth, to maximise the life and appearance of the coating. Grime may be removed by brushing with a soft brush, warm water and detergent.
- 11.3 Paint systems must be recoated at approximately 5-10 year intervals in accordance with the paint manufacturer's instructions.
- 11.4 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. The sheets must be checked to ensure the fixings and adhesive bond are sound. 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.





- 11.5 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 BGC Duragroove™ and Durascape™ Facade Systems [Cavity].]

### Prevention of Fire Occuring

- 12.1 When Duragroove™ and Durascape™ sheets are finished with a paint coating of not more than 1.0 mm in thickness, clearance separations from chimneys and flues are not required. However when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated from chimneys and flues in accordance with the requirements of Part 7 of NZBC Acceptable Solutions C/AS1-C/AS6 or NZBC Verification Method C/VM1.

### Control of External Fire Spread

- 13.1 The BGC Duragroove™ and Durascape™ Façade Systems [Direct Fixed] has a peak heat release rate of less than 100 kw/m<sup>2</sup> and a total heat released of less than 25 MJ/m<sup>2</sup>. Testing was carried out as per Paragraph 5.8.1 of NZBC Acceptable Solutions C/AS1-C/AS6 and limited to the exterior surface finishes.
- 13.2 Refer to NZBC Acceptable Solutions and Verification Methods C/AS1-C/AS7 and C/VM2 for Requirements for fire rating and exterior surface finish requirements of external walls.

### External Moisture

- 14.1 The BGC Duragroove™ and Durascape™ Facade Systems [Cavity], when installed and maintained 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 spaces to meet compliance with NZBC Clause E2.3.5.
- 14.3 The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] allow 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.
- 14.4 The details given in the Technical Literature for weather sealing are based on the principles 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 BGC Duragroove™ and Durascape™ Facade Systems [Cavity], where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirement for joints, 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, laundries and other spaces where moisture may be generated or may accumulate.

### Water Vapour

- 15.2 The BGC Duragroove™ and Durascape™ Facade Systems [Cavity] are 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.



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09 May 2019

BGC DURAGROOVE™ AND  
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[CAVITY]



In the opinion of BRANZ, **BGC Duragroove™ and Durascape™ Facade Systems [Cavity]** are 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 T/A BGC Fibre Cement**, 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 Fibre Cement 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 Fibre Cement 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 Fibre Cement Australia Pty Ltd** or any third party.

For BRANZ

**Chelydra Percy**

Chief Executive

Date of Issue:

09 May 2019