



BRANZ Appraised
Appraisal No. 475 [2019]

**FLEXI-SEAL®
EXTERIOR
WATERPROOFING
SYSTEMS**

Appraisal No. 475 [2019]

This Appraisal replaces BRANZ
Appraisal No. 475 [2010]

Amended 02 June 2023



BRANZ Appraisals

Technical Assessments of
products for building and
construction.

Product

- 1.1 Flexi-Seal® Exterior Waterproofing Systems are liquid-applied waterproofing membrane systems for use under ceramic or stone tile finishes on exterior decks and balconies.

Scope

- 2.1 Flexi-Seal® Exterior Waterproofing Systems have been appraised for use as deck and balcony waterproofing membranes for buildings within the following scope:
- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; or,
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regard to building height and floor plan area when subject to specific engineering design; and,
 - with substrates of plywood, fibre cement compressed sheet or suspended concrete slab; and,
 - with minimum falls for decks and balconies of 1:40; and,
 - with deck and balcony size limited to 40 m²; and,
 - situated in NZS 3604 Wind Zones up to, and including, Extra High.
- 2.2 Decks and balconies must be designed and constructed in accordance with the following limitations:
- with the membrane continually protected from exposure to ultraviolet (UV) light and from physical damage by ceramic or stone tile finishes; and,
 - with no steps within the deck level and no downpipes discharging directly onto the deck.
- 2.3 Movement and control joints in the substrate must be carried through the membrane and tile finish. The design and construction of the substrate and movement and control joints is specific to each building, and is therefore the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.
- 2.4 The ceramic or stone tile finishes are outside the scope of this Appraisal.
- 2.5 The membranes must be installed by trained installers, approved by DGL Bondlast Ltd.



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Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Flexi-Seal® Exterior Waterproofing Systems, 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 B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.2. Flexi-Seal® Exterior Waterproofing Systems meet these requirements. See Paragraph 9.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Decks and balconies incorporating Flexi-Seal® Exterior Waterproofing Systems meet these requirements. See Paragraphs 12.1–12.9.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Flexi-Seal® Exterior Waterproofing Systems meet this requirement.

Technical Specification

4.1 Materials supplied by DGL Bondlast Ltd are as follows:

- **Flexi-Seal® 2-Part** is a two-part, flexible, acrylic, cementitious liquid waterproofing membrane. Once mixed it is coloured grey and supplied in kits of 10 L liquid (in a 20 L bucket) and a 15 kg bag of powder. [Note: Flexi-Seal® 2-Part is a Class II as per AS/NZS 4858.]
- **Flexi-Seal® PUD** is a single-part, water-based polyurethane modified, flexible waterproofing membrane. It is coloured blue and supplied in 4 and 15 L pails.
- **Orgo'Clean®** is an organic cleaning concentrate for the removal of moss, mould and lichen if present on existing substrates.
- **Universal Primer** is a green liquid concentrated primer for concrete and wet area plasterboard substrates.
- **RL20 Grey** is a two-part epoxy primer used to spot prime galvanised nails and screw heads, as well as PVC and steel waste traps, and to prime plywood and particle board substrates prior to the application of the Flexi-Seal® 2-Part.
- **Flexi-Seal® Reinforcing Bandage** is a polyester, woven bandage used in conjunction with Flexi-Seal® primers or Flexi-Seal® 2-Part as a bond breaking mechanism to reinforce wall/wall and wall/floor junctions as well as cracks in concrete floors.
- **Butylseal Tape** is a butyl rubber tape used to detail wall/wall joints and all exterior joints. It is available in a roll of 80 or 150 mm wide and 15 m long.
- **Silcoflex 590 Neutral Cure Silicone** is a siliconised compound used as a bond breaker medium at wall/wall and wall/floor junctions.
- **Aftek FlexPro50FC or NPT U-Seal 500** are polyurethane compounds designed to fill control joints such as in concrete floors.

Handling and Storage

5.1 All materials must be stored inside, away from direct sunlight, heat and flame, in a dry space, at temperatures between 10°C and 32°C. Materials must not be removed from their containers until ready to use. The products in the original unopened packaging have a shelf life of 12 months from the date of manufacture. Once opened, the materials must be used within 3 months.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Flexi-Seal® Exterior Waterproofing Systems. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained within the scope of this Appraisal and the Technical Literature must be followed.



Design Information

General

- 7.1 Flexi-Seal® Exterior Waterproofing Systems are for use on decks and balconies where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas.
- 7.2 The membranes must be protected from exposure to UV light and from physical damage by ceramic or stone tile finishes within seven days.
- 7.3 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membrane. Refer to the BRANZ Good Practice Guide: Membrane Roofing.
- 7.4 Movement and control joints may be required depending on the shape and size of the deck, and the finish specified. Design guidelines for control joints for tiles can be found in the BRANZ Good Practice Guide: Tiling.
- 7.5 Timber framing must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases, framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and that all sheet edges are fully supported.
- 7.6 Timber framing supporting the substrates must be constructed such that deflections do not exceed 1/360th of the span. Where NZS 3604 is used, the allowable joist spans given in Table 7.1 must be reduced by 20%.

Substrates

Plywood

- 8.1 Plywood must be a minimum of 17 mm thick complying with AS/NZS 2269, CD Grade Structural with sanded C face upwards and treated to H3 [CCA treated]. LOSP treated plywood must not be used. The plywood must be supported with dwangs or framing with a maximum span of 400 mm in each direction, fixed with 10 g x 50 mm stainless steel countersunk head screws at 150 mm centres on the edges and 200 mm through the body of the sheets.

Fibre Cement Compressed Sheet

- 8.2 Fibre cement compressed sheet must be manufactured to comply with the requirements of AS/NZS 2908.2 and must be specified by the manufacturer as being suitable for use as an external decking substrate. The fibre cement sheet must be of a thickness to meet specific structural design requirements and must be secured to the structure to resist wind uplift and all other forces acting on the deck or balcony, such as deflection from gravity and live loads and installed as per the manufacturer's instructions.

Concrete

- 8.3 Concrete substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101.

Durability

Serviceable Life

- 9.1 Flexi-Seal® Exterior Waterproofing Systems, when subjected to normal conditions of environment and use, are expected to have a serviceable life of at least 15 years and be compatible with ceramic or stone tile finishes with a designed serviceable life of 15–25 years.

Maintenance

- 10.1 No maintenance of the membranes will be required provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiled areas to ensure they are sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiles, grout and sealant.
- 10.2 In the event of damage to the membrane, the tiling must be removed and the membrane repaired by removing the damaged portion and applying a patch as for new work.
- 10.3 Drainage outlets must be maintained to operate effectively and tile finishes must be kept clean. Cleaning materials that could affect polymer-based membranes must not be used.

Prevention of Fire Occurring

- 11.1 Separation or protection must be provided to the Flexi-Seal® Exterior Waterproofing Systems from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 12.1 Decks and balconies must be designed and constructed to shed precipitated moisture. They must also take account of snowfalls in snow prone areas. A means of meeting code compliance with NZBC Clause E2.3.1 is given in the Technical Literature which gives details aligned with NZBC Acceptable Solution E2/AS1.
- 12.2 When installed in accordance with this Appraisal and the Technical Literature, Flexi-Seal® Exterior Waterproofing Systems will prevent the penetration of water and will therefore meet code compliance with NZBC Clause E2.3.2. The membranes are impervious to water and will give a weathertight deck or balcony.
- 12.3 Flexi-Seal® Exterior Waterproofing Systems are impermeable, therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with NZBC Clause E2.3.6.
- 12.4 The minimum fall to decks and balconies is 1 in 40. The minimum fall to gutters is 1 in 60 and all falls must slope to an outlet. Inadequate falls will allow moisture to collect and increase the risk of deterioration of the membrane and tiling finish.
- 12.5 Deck and balcony falls must be built into the substrate and not created with mortar screeds applied over the membrane.
- 12.6 Allowance for deflection and settlement of the substrate must be made in the design of the deck or balcony to ensure falls are maintained and no ponding of water can occur.
- 12.7 Drainage flanges must be used for any outlet and must be fitted with a grate or cage to reduce potential sources of blockages. An overflow must be provided where the deck or balcony does not drain to an external gutter or spouting.
- 12.8 Penetrations and upstands of the membranes must be raised above the level of any possible flooding caused by blockage of deck and balcony drainage.
- 12.9 The design of details not covered by the Technical Literature is subject to specific weathertightness design and is outside the scope of this Appraisal.

Installation Information

Installation Skill Level Requirement

- 13.1 Installation of the membranes must be completed by trained installers, approved by DGL Bondlast Ltd that have experience in the application of waterproofing membranes and understand waterproofing principles.
- 13.2 Installation of substrates must be completed by, or under the supervision of, Licensed Building Practitioners with the relevant Licence Class, in accordance with the instructions given within the DGL Bondlast Ltd Technical Literature and this Appraisal.

Preparation of Substrates

- 14.1 Substrates must be dry, clean and stable before installation commences. Surfaces must be smooth and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents. All surface defects must be filled to achieve an even and uniform surface.
- 14.2 The relative humidity of concrete substrates must be 75% or less before membrane application. The concrete can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 585.
- 14.3 The moisture content of a timber substructure must be a maximum of 20% and fibre cement and plywood sheet must be dry at time of membrane application. This will generally require plywood and fibre cement sheets to be covered until just before the membrane is laid, to prevent rain wetting.
- 14.4 Fibre cement sheet substrates must be primed with Universal Primer diluted 1:1 with water and allowed to cure before the membrane is installed.
- 14.5 Flexi-Seal® Universal Primer must be used to prime all plastic waste traps and plywood substrates.

Membrane Installation

- 15.1 Installation must not be undertaken where the substrate surface temperature is below 10°C or above 35°C.
- 15.2 Flexi-Seal® liquid and Flexi-Seal® powder must be mixed and left to stand for 5 minutes before re-mixing, then applying.
- 15.3 Flexi-Seal® PUD must be thoroughly stirred before application.
- 15.4 The membranes must be applied in a minimum of two coats at the coverage rates set out in the Technical Literature. Subsequent coats must be applied in the opposite direction to the previous coat.
- 15.5 Membrane application can be made by roller [medium/long nap], brush [long bristle], or a rubber grouting blade.
- 15.6 Plywood, compressed sheet and concrete deck substrates must have the Butylseal Tape installed at wall/floor junctions or expansion joints. In all other situations, reinforcement provisions as set out in this Appraisal and the Technical Literature apply.
- 15.7 It is strongly recommended that the membranes are protected with temporary covers until it is fully cured in case of mechanical damage or rain wetting.
- 15.8 Clean up may be undertaken with water.

Tiling

- 16.1 The membranes must be cured for at least 24 hours in summer and 48 hours in winter before tiling. The cured membranes must be protected at all times to prevent mechanical damage, so may require temporary covers until the finishing is completed.
- 16.2 Tiling must be undertaken in accordance with AS 3958.1 and the BRANZ Good Practice Guide: Tiling. The compatibility of tile adhesive must be confirmed with DGL Bondlast Ltd.

Inspections

- 17.1 Critical areas of inspection for waterproofing systems are:
 - Construction of substrates, including crack control and installation of bond breakers and movement control joints.
 - Moisture content of the substrate prior to the application of the membrane.
 - Acceptance of the substrate by the membrane installer prior to application of the membrane.
 - Installation of the membrane to the manufacturer's instructions, particularly installation to the correct thickness and use of reinforcement.
 - Membrane curing and integrity prior to the installation of tiles, including protection from moisture, frost and mechanical damage during curing.

Health and Safety

18.1 Safe use and handling procedures for the membrane systems are provided in the Technical Literature. The products must be used in conjunction with the relevant Materials Safety Data Sheet for each membrane.

Basis of Appraisal

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

Tests

- 19.1 The following testing of Flexi-Seal® Exterior Waterproofing Systems have been undertaken by the following organisations:
- BRANZ - durability, water absorption, thermal stability, shear, adhesion, static water head resistance and water vapour transmission.
 - CSIRO, Australia - testing to the requirements of AS/NZS 4858.
- 19.2 The above test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 20.1 An assessment was made of the durability of the Flexi-Seal® Exterior Waterproofing Systems by BRANZ technical experts.
- 20.2 Site inspections were carried out by BRANZ to examine the practicability of installation.
- 20.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 21.1 The manufacture of the Flexi-Seal® Exterior Waterproofing Systems has been examined by BRANZ and found to be satisfactory.
- 21.2 The quality of manufacture of the Flexi-Seal® Exterior Waterproofing Systems is the responsibility of RLA Polymers Pty Ltd.
- 21.3 The quality of supply to the market is the responsibility of DGL Bondlast Ltd.
- 21.4 The quality of installation on-site is the responsibility of the DGL Bondlast Ltd approved and trained installers.

Sources of Information

- AS 3740:2021 Waterproofing of domestic wet areas.
- AS 3958.1:2007 Guide to the installation of ceramic tiles.
- AS/NZS 2269:2012 Plywood – structural.
- AS/NZS 2908.2:2000 Cellulose-cement products - Flat sheet.
- BRANZ Bulletin 585 - Measuring moisture in timber and concrete.
- BRANZ Good Practice Guide: Tiling, [Third Edition], April 2015.
- BRANZ Good Practice Guide: Membrane Roofing, [Second Edition], October 2015.
- NZS 3101:2006 Concrete structures.
- NZS 3109:1997 Concrete construction.
- NZS 3602:2003 Timber and wood-based products for used in buildings.
- NZS 3603:1994 Timber structures standard.
- NZS 3604:2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



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Amendments

Amendment No. 1, dated 03 September 2021.

This Appraisal has been amended to reflect building code updates relating to fire.

Amendment No. 2, dated 02 June 2023.

This Appraisal has been amended to update the Appraisal Holder.



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WATERPROOFING SYSTEMS



In the opinion of BRANZ, **Flexi-Seal® Exterior Waterproofing Systems** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **DGL Manufacturing 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. **DGL Manufacturing 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 **DGL Manufacturing 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 **DGL Manufacturing Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

13 September 2019