



BRANZ Appraised

Appraisal No.475 [2010]

BRANZ Appraisals

**Technical Assessments of products
for building and construction**

**BRANZ
APPRAISAL
No. 475 (2010)**

This Appraisal replaces Appraisal No.
475 (2005), issued 20 June 2005.

Amended 31 January 2012.

**FLEXI-SEAL EXTERIOR
WATERPROOFING
SYSTEMS**

Flexco (NZ) Ltd
P O Box 98 866
South Auckland Mail Centre
Manukau City

Tel: 09 268 6970

Fax: 09 269 6971



BRANZ

BRANZ Limited
Private Bag 50 908
Porirua City
New Zealand

Tel: +64 4 237 1170

Fax: +64 4 237 1171

www.branz.co.nz



Product

1.1 Flexi-Seal® Exterior Waterproofing Systems are of two types, one a two-part cementitious, acrylic modified, the other (Flexi-Seal® PUD) a single part water based polyurethane modified. Both are liquid applied, waterproof membrane systems designed for use on exterior pedestrian deck and balcony wet areas under ceramic and stone tiles.



Scope

2.1 Flexi-Seal® Exterior Waterproofing Membranes have been appraised for use as waterproofing membranes for buildings within the following scope:

- scope limitations of NZBC Acceptable Solution E2/AS1 Paragraph 1.1; and,
- with timber supporting structures designed and constructed in accordance with the NZBC; and,
- with substrates of plywood and fibre cement compressed sheet; and,
- with decks that have a maximum size of 40m².

2.2 Flexi-Seal® Exterior Waterproofing Membranes have also been appraised for use as waterproofing membranes for external reinforced concrete pedestrian decks and balconies for buildings within the following scope:

- up to 3 storeys with a maximum height from ground to eaves of 10m and with a floor plan area limited only by seismic and structural control joints; and,
- with the reinforced concrete structure designed and constructed in accordance with the NZBC.

2.3 This Appraisal is limited to decks and balconies within the following scope:

- constructed to suitable falls (Refer Paragraph 13.1 – 13.9); and,
- with the membranes continually protected from exposure to UV (ultra violet) light and from physical damage by ceramic or stone tile finishes; and,
- with decks and balconies designed and constructed such that deflections do not exceed 1/360th of the span; and,
- with no steps within the deck level, no integral roof gardens and no down pipe discharging directly onto the deck.

2.4 Movement and control joints in the substrate must be carried through to the tile finish. The design and construction of the substrate and movement and control joints is specific to each building, and therefore the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.

2.5 Ceramic or stone tile finishes are outside the scope of this Appraisal.

2.6 The membranes must be installed by Flexco (NZ) Ltd approved and trained applicators.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the 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. Flexi-Seal® Exterior Waterproofing Membranes meet this requirement. 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 13.1 – 13.9.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Flexi-Seal® Exterior Waterproofing Systems meet this requirement and will not present a health hazard to people.

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

Technical Specification

4.1 Materials supplied by Flexco (NZ) Ltd are as follows:

Flexi-Seal®

- Flexi-Seal® is a two-part, flexible, acrylic, cementitious liquid waterproofing membrane. Once mixed it is coloured grey and supplied in kits of 12 litre container and a 20 kg bag.

Flexi-Seal® PUD

- Flexi-Seal® PUD is a single part; water based polyurethane modified, flexible waterproofing membrane. It is coloured blue and supplied in 4 and 15 litre pails

Orgo'Clean®

- Orgo'Clean® is an organic cleaning concentrate for the removal of moss, mould and lichen if present on existing substrates.

Nail'n Screw Patch

- Nail'n Screw Patch is a fast setting cementitious compound used to fill nail and screw on plywood and particle board substrates, as well as repair chips and imperfections on concrete floors.

Primer Sealer

- Primer Sealer is a white liquid penetrative primer for concrete and wet area plasterboard substrates.

Mega Prime

- Mega Prime 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®.

Reinforcing Bandage

- Reinforcing Bandage is polyester, woven bandage used in conjunction with Flexi-Seal® Primers or Flexi-Seal® 2 Part Liquid Membrane as a bond breaking mechanism to reinforce wall/wall and wall/floor junctions as well as cracks in concrete floors.

Flexi-Seal® Deck Reinforcing Tape

- Flexi-Seal® Deck Reinforcing Tape is a bituminous tape to accommodate joint movement on plywood decks. The tape is a self-adhering, modified SBS rubberised asphalt tape with a white polyester upper face and is 1mm thick.

Butylseal Tape

- Butylseal Tape is a Butyl Rubber Tape used to detail wall/wall joints and all exterior joints and it is available in a roll of 80 or 150 mm wide and 15 m long.

Sikasil C

- Sikasil C is a siliconised compound used as a bond breaker medium at wall/wall and wall/floor junctions.

Sikaflex 11FC

- Sikaflex 11FC is a siliconised compound designed to fill controls joints such as in concrete floors.

Stencil

- A stencil is used as proof of waterproofing completion and that the system is ready to tile.

Micron Mat

- Micron Mat is a continuous filament polypropylene yarn used on decks to ensure guaranteed micron thickness.

Handling and Storage

5.1 All of the materials must be stored indoors, 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 have a shelf life of one year.

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® External Waterproofing Membranes 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.

7.3 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membrane. Refer to BRANZ publication "Good Practice Guide to 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 Tiling Good Practice Guide.

7.5 Timber framing systems 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. Timber framing systems 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 shall be reduced by 20%.

Substrates

Plywood

8.1 Plywood must be a minimum of 17mm 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 400mm in each direction, fixed with 10g x 50mm stainless steel countersunk head screws at 150mm centres on the edges and 200mm 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 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

Service Life

9.1 Flexi-Seal® Exterior Waterproofing Systems when subjected to normal conditions of environment and use is expected to retain its integrity for a period of at least 15 years and be compatible with tiling finishes with a designed service 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 tiling finish remains intact. Regular checks must be made of 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 sealants.

10.2 In the event of damage to the waterproofing membrane the tiling must be removed. Repairs can then be carried out by a Flexco NZ Ltd approved and trained applicator.

10.3 Drains must be maintained to operate effectively and tiling finishes maintained clean. Cleaning materials that could affect polymer based membranes must not be used.

Outbreak of Fire

11.1 Flexi-Seal® Exterior Waterproofing Systems should be protected or separated from fireplaces, heating appliances, chimneys and flues in accordance with the requirements of Acceptable Solution C/AS1 Part 9 for the protection of combustible materials.

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 Membranes will prevent the penetration of water and will therefore meet code compliance with Clause E2.3.2. The membranes are impervious to water and will give a weathertight deck or balcony.

12.3 The minimum fall to decks and balconies must be 1 in 40 and gutters must be 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.

12.4 Flexi-Seal® Exterior Waterproofing Membranes are impermeable; therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with Clause E2.3.6.

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 Flexco (NZ) Ltd approved and trained applicators that have experience in the application of waterproofing membranes and understand waterproofing principles.

13.2 Installation of substrates must be completed by tradespersons with an understanding of deck and balcony construction, in accordance with instructions given within the Flexco (NZ) 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 Concrete substrates can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 424. The relative humidity of the concrete must be 75% or less before membrane application.

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 Flexi-Seal® Primer Sealer and allowed to cure before the membrane is installed.

14.5 Flexi-Seal® Mega Prime to prime all plastic waste traps and plywood substrates.

Basis of Appraisal

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

Tests

19.1 Testing has been carried out by BRANZ. This testing covered durability, water absorption, thermal stability, shear, adhesion, static water head resistance and water vapour transmission. The test results were reviewed by BRANZ experts and found to be satisfactory.

19.2 Testing has carried out by CSIRO to AS/NZS 4858, results of this testing has been reviewed by BRANZ technical experts and is found to be satisfactory.

Other Investigations

20.1 An assessment was made of the durability of the Flexi-Seal® Exterior Waterproofing System 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 Membranes has been examined by BRANZ and found to be satisfactory.

21.2 The quality of manufacture of the Flexi-Seal® Exterior Waterproofing Membranes is the responsibility of RLA Polymers (NZ) Ltd and RLA Polymers Pty Ltd.

21.3 The quality of supply to the market is the responsibility of Flexco (NZ) Ltd.

21.4 The quality of installation on site is the responsibility of the Flexco (NZ) Ltd approved and trained applicators.

Sources of Information

- AS/NZS 2269 - 2008 Plywood – structural.
- AS 2358 - 1990 Adhesive for fixing ceramic tiles.
- AS 3740 - 2004 Waterproofing of wet areas within residential buildings.
- AS 3958.1 - 1991 Guide to the installation of ceramic tiles.
- Good Tiling Practice, BRANZ, March 2004.
- NZS 3101:1995 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.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (Amendment 5, 1 August 2011).
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition (Amendment 12, 10 October 2011).
- The Building Regulations 1992.

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. Flexi-Seal® PUD must be thoroughly stirred before application

15.3 The membranes must be applied in a minimum of two coats at the rates set out in the Technical Literature.

For both membrane systems the second coat should be applied in the opposite direction to the first.

15.4 Application can be made by roller (medium/long nap), brush (long bristle), or a rubber grouting blade.

15.5 Plywood, compressed sheet and concrete deck substrates must have the Flexi-Seal® Reinforcing 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.

15.6 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.

15.7 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 Tiling Practice Guide. The compatibility of tile adhesive must be confirmed with Flexco (NZ) 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.



BRANZ

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 **Flexco (NZ) 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. **Flexco (NZ) 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 **Flexco (NZ) 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 **Flexco (NZ) Ltd** or any third party.

For BRANZ

P Burghout
Chief Executive

Date of issue: 6 August 2010

Amendment No. 1, dated 31 January 2012.

This Appraisal has been amended to update clause changes as required by the introduction of NZS 3604: 2011 and NZBC Acceptable Solution E2/AS1 Third Edition, Amendment 5.