



BRANZ Appraised

Appraisal No.667 [2009]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
No. 667 (2009)**

REDGARD® EXTERNAL WATERPROOFING AND CRACK PREVENTION MEMBRANE

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Product

1.1 RedGard® Waterproofing and Crack Prevention Membrane is a one part liquid-applied waterproofing membrane for use under ceramic or stone tile finishes on external decks and balconies.



Scope

2.1 RedGard® Waterproofing and Crack Prevention Membrane has been appraised for use as a waterproofing membrane 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 a substrate of fibre cement compressed sheet; and,
- with decks that have a maximum size of 40m².

2.2 RedGard® Waterproofing and Crack Prevention Membrane has also been appraised for use as a waterproofing membrane 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 Building structural 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 are specific to each building, and therefore the responsibility of the building designer and building contractor and are 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 Global Tile Ltd approved and trained applicators.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, RedGard® Waterproofing and Crack Prevention Membrane, 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. RedGard® Waterproofing and Crack Prevention Membrane will meet this requirement. See Paragraph 9.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Decks and balconies incorporating RedGard® Waterproofing and Crack Prevention Membrane will meet these requirements. See Paragraphs 12.1 – 12.9.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. RedGard® Waterproofing and Crack Prevention Membrane will 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 New Zealand Building Code compliance.

Technical Specification

4.1 Materials supplied by Global Tile Ltd are as follows:

RedGard® Waterproofing and Crack Prevention Membrane

- A ready to use, styrene-butadiene rubber co-polymer based, elastomeric, waterproofing and crack prevention membrane for exterior and interior applications. It is supplied as a pink liquid in 3.78 or 13.2 litre containers.

Custom Waterproofing and Anti Fracture Mesh

- A high strength, polymer coated, alkali resistant fibreglass mesh tape for reinforcing any changes of plane, corners, around drains and over minor substrate cracks. It is supplied as a 150 mm wide x 45.72 m long roll.

Handling and Storage

5.1 All materials must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and out of freezing conditions. The materials in the original unopened packaging have a shelf life of 12 months from 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 RedGard® Waterproofing and Crack Prevention Membrane. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 RedGard® Waterproofing and Crack Prevention Membrane is 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 membrane 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 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 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. 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%. 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 RedGard® Waterproofing and Crack Prevention Membrane must not be used to bridge or cover over existing expansion, control, construction, cold or saw cut joints.

Substrates

Fibre Cement Compressed Sheet

8.1 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. Installation must be in accordance with instructions of the manufacturer.

Concrete

8.2 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 RedGard® Waterproofing and Crack Prevention Membrane, when subjected to normal conditions of environment and use, is expected to have a serviceable life of at least 15 years and be compatible with ceramic or stone tiling finishes with a design service life of 15-25 years.

Maintenance

10.1 No maintenance of the membrane will be required provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiling to ensure it is sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiling and any grout or 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 may affect polymer based membranes must not be used.

Outbreak of Fire

11.1 The membrane must be protected from heat sources such as flues and chimneys in accordance with the requirements of NZBC 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 Third Edition June 2004.

12.2 When installed in accordance with this Appraisal and the Technical Literature, RedGard® Waterproofing and Crack Prevention Membrane will prevent the penetration of water and will therefore meet code compliance with NZBC Clause E2.3.2. The membrane is impervious to water and will give a weathertight deck or balcony.

12.3 RedGard® Waterproofing and Crack Prevention Membrane is 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, balconies 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.

12.5 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 membrane 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.

14.2 The relative humidity of the concrete must be 75% or less before membrane application. Concrete substrates can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 424.

14.3 The moisture content of a timber substructure must be a maximum of 20% and fibre cement must be dry with no ponding water at time of membrane application. This will generally require the fibre cement sheets to be covered until just before the membrane is laid, to prevent rain wetting.

Membrane Installation

15.1 Installation must not be undertaken where the substrate surface temperature is below 4°C or above 35°C.

15.2 RedGard® Waterproofing and Crack Prevention Membrane must be thoroughly stirred before application.

15.3 The membrane must be applied in a minimum of two coats at the rates set out in the Technical Literature. Subsequent coats must be applied in an opposite direction to the previous coat. The total finished system thickness of the RedGard® Waterproofing and Crack Prevention Membrane must be a minimum of 1.2 mm.

15.4 Application can be made by roller (rough textured), a notched steel trowel or airless sprayer.

15.5 Any changes of plane or cracks where movement may occur must be reinforced with the Custom and Waterproofing Anti Fracture Mesh imbedded in the membrane before a full coat of the membrane is applied. In all other situations, reinforcement provisions as set out in this Appraisal and the Technical Literature apply.

15.6 Clean up may be undertaken with water.

15.7 It is strongly recommended that the membrane is protected with temporary covers until it is protected by the ceramic or stone tile finish.

Tiling

16.1 The membrane must be fully cured before tiling, this would generally be indicated by the colour change from pink to red. The cured membrane 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 the adhesive manufacturer or Global Tile 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.

Installation Information

Installation Skill Level Requirement

13.1 Installation of the membrane must be completed by Global Tile 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 Global Tile 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.

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.

Basis of Appraisal

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

Tests

19.1 The following testing of RedGard® Waterproofing and Crack Prevention Membrane has been undertaken by various organisations:

- Testing to Acceptance Criteria AC115 Acceptance Criteria for Waterproofing Membranes for Flooring and Shower Liners.
- Testing for seam strength, breaking strength, dimensional stability, resistance to water, resistance to fungi and static head.
- Testing for tensile strength, elongation, water vapour permeance, water swelling, wet adhesion to concrete and tear resistance.

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 RedGard® Waterproofing and Crack Prevention Membrane by BRANZ technical experts.

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

20.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

21.1 The manufacture of the membrane has not been examined by BRANZ, but details regarding the quality and composition of the materials were obtained by BRANZ and found to be satisfactory.

21.2 The quality management system of the membrane's manufacturer has been assessed by BRANZ and found to be satisfactory.

21.3 The quality of supply of the membrane system materials to the market is the responsibility of Global Tile Ltd.

21.4 Quality on site is the responsibility of the Global Tile Ltd approved and trained applicators.

21.5 Designers are responsible for the substrate design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of the substrate manufacturer, Global Tile Ltd and this Appraisal.

21.6 Building owners are responsible for the maintenance of the tiling systems in accordance with the instructions of Global Tile Ltd.

Sources of Information

- AS 2908.2: 2000 Cellulose-cement products – Flat sheet.
- AS 3958.1: 1991 Guide to the installation of ceramic tiles.
- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 2269:1994 Plywood - Structural.
- AS/NZS 4858 - 2004 Wet area membranes.
- NZS 3101: 1995 The design of concrete structures.
- NZS 3604: 1999 Timber framed buildings.
- 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 August 2008 Amendment.
- Good Practice Guide Tiling, BRANZ, March 2004.
- Good Practice Guide Membrane Roofing, BRANZ, October 2003.



BRANZ

In the opinion of BRANZ, the RedGard® External Waterproofing and Crack Prevention Membrane 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 Global Tile 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. Global Tile 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 Global Tile 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 Global Tile Ltd or any third party.

For BRANZ

P Burghout
Chief Executive

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