



BRANZ Appraised

Appraisal No.469 [2005]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
CERTIFICATE
No. 469 (2005)**

**DUROSET® AND
DUROQIK® EXTERNAL
WATERPROOFING
MEMBRANES**

Waterproofing Systems Ltd

P O Box 1113

Palmerston North

Tel: 06 357 9148

Fax: 06 357 9410

www.waterproofing.co.nz

Email: info@waterproofing.co.nz



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

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



Product

1.1 DuroSET® and DuroQIK® External Waterproofing Membranes are liquid -applied waterproofing membranes for use under ceramic or stone tile finishes on external decks and balconies.



Scope

2.1 DuroSET® and DuroQIK® External Waterproofing Membranes have been appraised as waterproofing membranes on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with respect to building height and maximum floor plan areas; and,
- with building structures designed and constructed to meet the requirements of the NZBC; and,
- with deck and balcony supporting structures of timber framing with substrates of plywood; and,
- with substrates of suspended concrete slabs; and,
- situated in all Building Wind Zones of NZS 3604, up to and including 'Very High'.

2.2 DuroSET® and DuroQIK® External Waterproofing Membranes have also been appraised for use as a waterproofing membranes on specifically designed buildings within the following scope:

- with building structures designed and constructed to comply with the NZBC; and,
- with deck and balcony supporting structures of timber framing with substrates of plywood and fibre cement compressed sheet; and,
- with substrates of suspended concrete slab; and,
- subjected to maximum wind pressures (Refer Paragraph 7.7); and,
- with the weathertightness design of all junctions being the subject of specific design by the designer.

Note: The design of these junctions has not been appraised by BRANZ and is outside the scope of this Certificate.

2.3 Decks and balconies waterproofed with DuroSET® and DuroQIK® External Waterproofing Membranes must be designed and constructed in accordance with the following limitations:

- constructed to suitable falls (Refer Paragraphs 13.3 - 13.6); 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 pipes 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 Certificate.

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

2.6 The membranes must be installed by trained applicators, approved by Waterproofing Systems Ltd.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, DuroSET® and DuroQIK® External Waterproofing Membranes, if designed, used, installed and maintained in accordance with the statements and conditions of this Certificate, will meet or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years. DuroSET® and DuroQIK® External Waterproofing Membranes meet this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Decks and balconies incorporating DuroSET® and DuroQIK® External Waterproofing Membranes meet these requirements. See Paragraphs 13.1 – 13.9.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. DuroSET® and DuroQIK® External Waterproofing Membranes meet this requirement and will not present a health hazard to people.

3.2 This Certificate appraises an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 Materials supplied by Waterproofing Systems Ltd are as follows:

DuroSET®

- DuroSET® is a styrene-butadiene copolymer-based, one-part, ready-to-use, liquid-applied membrane supplied as a beige thixotropic paste in 20 litre pails.

DuroQIK®

- DuroQIK® is a quick drying, latex based, two-part, flexible, cementitious-based, liquid-applied membrane. It is supplied as DuroQIK® liquid in 15 litre pails and DuroMIX® powder in 18.75 kg bags. When dry, the membrane is light grey in colour.

duroPRIME™

- duroPRIME™ is a multi-purpose, two-in-one primer and waterproof bonding agent. It is used to prime substrates prior to the application of the membranes. It is supplied as a white coloured liquid in 20 litre pails.

Reinforcing Fabric

- The reinforcing fabric is a 100% non-woven polypropylene used as reinforcement flashing fabric in DuroSET® and DuroQIK® membranes. The fabric has a weight of 40 g/m² and is available in rolls 100 m long x 100 mm and 200 mm wide.

Elastofabric Tapes and Corners

- Elastomeric bond-breaker tapes are used at movement and expansion joints, and elastomeric formed corner sections for use at internal and external corner wall/floor junctions as

set out in the Technical Literature. The tapes are available in rolls 10 m long x 120 mm wide. The corner sections are approximately 150 mm long and are available for internal corner/floor junctions (90°) and external corner/floor junctions (270°).

EF Polyurethane Sealant

- EF Polyurethane Sealant is an elastomeric, single component, moisture curing polyurethane, multi-purpose construction sealant used for forming the bond breaker joints at junctions under the membrane. The sealant can be used in conjunction with backing rods where required. It is available in 600 ml sausages for use in a caulking gun.

DuroFIX®

- DuroFIX® is a polymer-modified, flexible, quick-drying tile adhesive used to adhere tiles to the membranes. It is available in 20 kg bags and must be mixed with clean water.

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 reference to the current Technical Literature for the DuroSET® and DuroQIK® External Waterproofing Membranes. The Technical Literature must be read in conjunction with this Certificate. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Certificate must be followed.

Design Information

General

7.1 DuroSET® and DuroQIK® 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 DuroQIK® product is designed to be used where a quicker curing time is required, such as in cool or humid conditions.

7.3 The membranes must be protected from exposure to UV light and from physical damage by ceramic or stone tile finishes.

7.4 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membrane. Refer to the BRANZ publication “Good Practice Guide – Membrane Roofing”.

7.5 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.

7.6 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 NZS 4203. 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.

7.7 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 shall be reduced by 20%.

7.8 DuroSET® and DuroQIK® External Waterproofing Membranes are suitable for use in areas subject to maximum wind pressures of 10 kPa Ultimate Limit State.

Substrates

Plywood

8.1 Plywood must be treated to H3 (CCA treated). LOSP treated plywood must not be used. Plywood must comply with NZBC Acceptable Solution E2/AS1 Third Edition July 2005 Paragraph 8.5.3 and 8.5.5.

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

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

10.1 DuroSET® and DuroQIK® External Waterproofing Membranes, 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 tiling finishes with a design service life of 15-25 years.

Maintenance

11.1 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 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.

11.2 In the event of damage to the membranes, the tiling must be removed and the membrane repaired by removing the damaged portion and applying a patch as for new work.

11.3 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

12.1 The membranes 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

13.1 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 by the Technical Literature which gives details aligned with NZBC Acceptable Solution E2/AS1 Third Edition July 2005.

13.2 When installed in accordance with this Certificate and the Technical Literature, DuroSET® and DuroQIK® External 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.

13.3 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.

13.4 DuroSET® and DuroQIK® 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.

13.5 Deck and balcony falls must be built into the substrate and not created with mortar screeds applied over the membrane.

13.6 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.

13.7 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.

13.8 Penetrations and upstands of the membranes must be raised above the level of any possible flooding caused by blockage of deck and balcony drainage.

13.9 The design of details not covered by the Technical Literature is subject to specific weathertightness design and is outside the scope of this Certificate.

Installation Information

Installation Skill Level Requirement

14.1 Installation of the membranes must be completed by trained applicators, approved by Waterproofing Systems Ltd, who have experience in the application of waterproofing membranes and understand waterproofing principles.

14.2 Installation of substrates must be completed by tradespersons with an understanding of deck and balcony construction, in accordance with instructions given within the Waterproofing Systems Ltd Technical Literature and this Certificate.

Preparation of Substrates

15.1 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.

15.2 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. 424.

15.3 The moisture content of the timber substructure and plywood must be a maximum of 20% and fibre cement and plywood sheets 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.

15.4 Substrates must be primed with DuroPRIME™ and allowed to dry fully before the membrane is installed.

Membrane Installation

16.1 Installation must not be undertaken where the substrate surface temperature is below 5°C or above 35°C.

16.2 DuroQIK® liquid and DuroMIX® powder must be mixed and left to stand for 5 minutes before re-mixing, then applying. DuroSET® must be thoroughly stirred before application.

16.3 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 membrane must be a minimum of 1.2 mm.

16.4 Application can be made by roller (medium/long nap), brush (long bristle), or a non-edge serated flat steel trowel.

16.5 In all situations, reinforcement provisions as set out in this Certificate and the Technical Literature apply.

16.6 It is strongly recommended that the membrane is protected with temporary covers until it is fully cured in case of mechanical damage or rain wetting.

16.7 Clean up may be undertaken with water.

Tiling

17.1 The membranes must be fully cured 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.

17.2 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 Waterproofing Systems Ltd, if using other than DuroFIX® tile adhesive.

Inspections

18.1 The Technical Literature must be referred to during the inspection of membrane installations by Building Consent Authorities and Territorial Authorities.

18.2 Critical areas of inspection for waterproofing systems are:

- Construction of substrates, including crack control and installation of under flashings 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

19.1 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 Material Safety Data Sheet for each membrane.

Basis of Appraisal

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

Tests

20.1 The following testing of DuroSET® has been undertaken by the following organisations:

- Amdel Limited, Australia – water absorption; tensile strength and elongation; shore A hardness; water vapour transmission; accelerated weathering and low temperature flexibility.
- CSIRO, Australia – mass per unit area and gravimetric thickness; tensile strength and elongation at break; tensile strength and elongation at break after UV exposure, including immersion in water, bleach and detergent; loss on heating; moving joint test and cyclic strain.

20.2 The following testing of DuroQIK® has been undertaken by Amdel Limited, Australia – wet area durability testing in accordance with AS/NZS 4858 covering immersion in water, bleach, detergent, and heat ageing; UV ageing; water absorption; low temperature flexibility and water vapour transmission.

20.3 The following testing of Elastofabric has been undertaken by Amdel Limited, Australia – wet area durability testing in accordance with AS/NZS 4858 covering immersion in water, bleach, detergent, and heat ageing; cyclic movement; low temperature flexibility; water absorption and water vapour transmission.

20.4 Testing of DuroFIX® has been undertaken by Amdel Limited, Australia for tile adhesion shear strength to both membranes in accordance with ATM D2919-01 before and after heat ageing and water immersion.

20.5 The above test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

21.1 An assessment was made of the durability of the DuroSET® and DuroQIK® External Waterproofing Membranes by BRANZ technical experts.

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

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

Quality

22.1 The manufacture of the membranes has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.

22.2 The quality management system of the membranes' manufacturer has been assessed by BRANZ and found to be satisfactory.

22.3 The quality of supply of the membrane system materials to the market is the responsibility of Waterproofing Systems Ltd.

22.4 Quality on site is the responsibility of the trained applicators, approved by Waterproofing Systems Ltd.

22.5 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, Waterproofing Systems Ltd and this Certificate.

22.6 Building owners are responsible for the maintenance of the tiling systems in accordance with the instructions of Waterproofing Systems Ltd.

Sources of Information

- AS 2908.2: 2000 Cellulose-cement products – Flat sheet.
- AS 3958.1 – 1991 Guide to the installation of ceramic tiles.
- ASTM D2919 – 01 Standard test method for determining durability of adhesive joints stressed in shear by tension loading.
- AS/NZS 2269:1994 Plywood – Structural.
- NZS 3101: 1995 The design of concrete structures.
- NZS 3604: 1999 Timber framed buildings.
- BRANZ Good Practice Guide – Membrane Roofing, reprint October 2003.
- BRANZ Good Practice Guide – Tiling, reprint March 2004.
- 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 and Approved Documents, Building Industry Authority, 1992.
- The Building Regulations 1992, up to, and including October 2004 Amendment.



BRANZ

In the opinion of BRANZ, DuroSET® and DuroQIK® External Waterproofing Membranes are fit for purpose and will comply with the Building Code to the extent specified in this Certificate provided they are used, designed, installed and maintained as set out in this Certificate.

The Appraisal Certificate is issued only to the Certificate Holder, Waterproofing Systems Ltd, and is valid until further notice, subject to the Conditions of Certification.

Conditions of Certification

1. This Certificate:
 - 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. The Certificate Holder:
 - 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. The product and the manufacture are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ.
4. BRANZ makes no representation 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 the Certificate Holder.
5. Any reference in this Certificate to any other publication shall be read as a reference to the version of the publication specified in this Certificate.

For BRANZ

P Robertson
Chief Executive

Date of issue: 9 August 2005