



BRANZ Appraised

Appraisal No.436 [2011]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
No. 436 (2011)**

This Appraisal replaces BRANZ
Appraisal No. 436 (2005) dated
11 July 2005.

Amended 15 July 2011.

**BUTYNOL® AND ECO
BUTYNOL® ROOFING
MEMBRANES**

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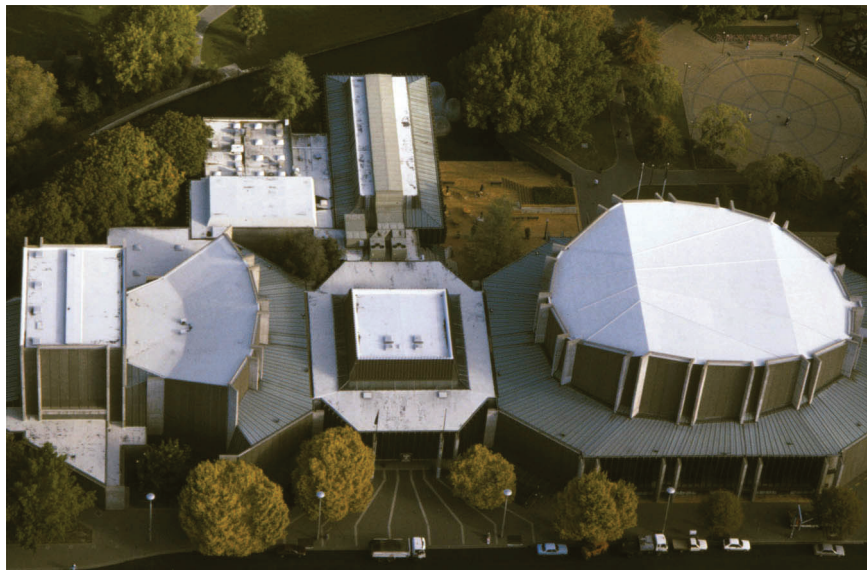
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Product

1.1 Butynol® and ECO Butynol® Roofing Membranes are synthetic rubber waterproofing membranes designed to be used on roofs and decks.

1.2 The products are supplied as single-ply, flexible synthetic rubber sheet in roll form, with the ECO Butynol® having polypropylene filaments welded to the underside for better wetting by water based adhesives. The products are installed as single layer systems.



1mm Butynol laid in 1972. The main auditorium roof is still in service after 39 years. Some of the other low slope roofs are due to be upgraded with new Butynol during current building refurbishment.

Scope

2.1 Butynol® and ECO Butynol® Roofing 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 nominally flat or pitched roofs constructed to drain water to gutters and drain outlets complying with NZBC; and,
- with substrates of plywood sheet; and,
- with decks that have a maximum size of 40m².

2.2 Butynol® and ECO Butynol® Roofing Membranes have also been appraised for use as waterproofing membranes for external reinforced concrete and plywood roofs, 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; and,
- with timber supporting structures designed and constructed in accordance with the NZBC; and,
- subjected to maximum wind pressures (refer Paragraph 8.1); and,
- with nominally flat, curved or pitched roofs constructed to drain water to gutters and drain outlets complying with NZBC.

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

- constructed to suitable falls (Refer Paragraph 13.1 – 13.9); and,
- with no steps within the deck level, no integral roof gardens and no down pipe discharging directly onto the deck.

2.4 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 The membranes must be installed by Ardex New Zealand Limited approved applicators.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Butynol® and ECO Butynol® Roofing Membranes, 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. Butynol® and ECO Butynol® Roofing Membranes meet this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Roofs, Decks and balconies incorporating Butynol® and ECO Butynol® Roofing Membranes meets these requirements. See Paragraphs 13.1 – 13.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Butynol® and ECO Butynol® Roofing Membranes meet this requirement and will not present a health hazard to people.

3.2 This Appraisal appraises an **Acceptable Solution** in terms of New Zealand Building Code compliance and the product complies with NZBC Acceptable Solution E2/AS1 Paragraph 8.5. This product is also appraised as an Alternative Solution as outlined in Paragraph 2.2.

Technical Specification

4.1 Materials supplied by Ardex New Zealand Limited are as follows:

Butynol® Membranes

- All membranes are single-ply, flexible synthetic rubber membranes. They are supplied in rolls nominally 1.4 metres wide by 17.86 metres long. Each roll is packed in polythene wrapper trademarked 'Butynol®' with thickness identified. Gauges available are 1.0, 1.5 and 2.25mm in black and 1.5mm in six colours.

ECO Butynol® Membrane

- All membranes are single-ply, flexible synthetic rubber membranes with polypropylene filaments welded to the underside. They are supplied in rolls nominally 1.4 metres wide by 17.86 metres long. Gauges available are 1.0, 1.5 and 2.25mm in black, 1.2 mm in Dove Grey and 1.5mm in six colours.

Adhesive WPM 09A

- A contact brushing, spray grade and rolling solvent free adhesive for fixing to the ECO Butynol to substrates. Supplied in 20L plastic containers.

Adhesive WPM 09C Catalyst

- Used with the WPM 09A to assist adhesion in adverse conditions. Supplied in 1, 4 and 20 litre containers.

Adhesive WA98

- A specially formulated solvent-based adhesive for all Butynol® applications. Supplied in 1, 4 and 20 litre containers.

Seam Primer

- A water resistant primer adhesive, used with seam tape for general lap bonding.

Seam Tape

- Uncured cold gum tape used for general lap bonding and laps likely to be subject to periodic ponding. Supplied in 50mm x 30.5 metre rolls.

Flashing Tape

- A malleable tape for moulding gussets, pipe flashings and awkward situations. Supplied in widths of 50-100mm x 5 metres long.

Butynol Sealant

- A specially designed and formulated sealant for sealing Butynol® flashings into chases. Supplied in 375mm tubes.

Handling and Storage

5.1 Handling and storage of all materials whether on or off site is under the control of the Ardex New Zealand Limited approved applicators. Dry storage must be provided for all products and the rolls of membrane must be stored in an upright position.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Butynol® and ECO Butynol® Roofing Membranes. 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 Butynol® and ECO Butynol® Roofing Membranes are for use on roofs, decks and balconies where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas.

7.2 The 1.0mm thickness product is designed for use on roofs and gutters, and will accommodate light traffic; the 1.5mm is for walk out decks and high maintenance areas; and the 2.25mm is a heavy duty product that is custom made on request. The 1.2mm is available in ECO Butynol® only is for use on roofs.

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 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 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.

Building to NZBC Acceptable Solution E2/AS1

7.5 NZBC Acceptable Solution E2/AS1 limits the size of decks to 40 m² as covered by the scope of this Appraisal. Butynol® and ECO Butynol® Roofing Membranes are suitable for use on decks larger than 40 m². These decks are the subject of specific design and are outside the scope of this Appraisal.

Structures

8.1 Butynol® and ECO Butynol® Roofing Membranes fully bonded are suitable for use in areas subject to maximum wind pressure of 3 kPa Ultimate Limit State subject to the limitations of the substrates.

Substrates

Plywood

9.1 Plywood must be treated to H3 (CCA treated). LOSP treated plywood must not be used. Plywood must comply with NZBC Acceptable Solution E2/AS1 Paragraph 8.5.3 and 8.5.5. Where specific design is used (i.e. outside the scope of E2/AS1), the plywood thickness and fixing size may increase and centres may decrease to meet specific wind loadings.

Concrete

9.2 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

10.1 Butynol® and ECO Butynol® Roofing Membranes when subjected to normal conditions of environment and with proper maintenance can expect to have a serviceable life of at least 20 years.

Maintenance

11.1 No maintenance of the membrane is normally required provided significant substrate movement does not occur.

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

11.3 Drainage outlets must be maintained to operate effectively.

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 Roofs, 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 matches details in NZBC Acceptable Solution E2/AS1.

13.2 When installed in accordance with this Appraisal and the Technical Literature, Butynol® and ECO Butynol® Roofing 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 roof, roof deck or balcony.

13.3 The minimum fall to roofs is 1 in 40, decks and balconies 1 in 60 and gutters 1 in 100 with no seams in the gutter closer than 1 m to an outlet in accordance with NZBC Acceptable Solution E2/AS1 Paragraph 8.5.1. All falls must slope to an outlet. Inadequate falls will allow moisture to collect and may increase the risk of deterioration of the membranes. *(Note: Where possible a minimum fall of 1 in 60 in gutters is preferred.)*

13.4 Roof, deck and balcony falls must be built into the substrate and not created with mortar screeds applied over the membranes.

13.5 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.

13.6 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.

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

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

13.9 Butynol® and ECO Butynol® Roofing 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.

Water Supplies

14.1 Water is not contaminated by Butynol® and ECO Butynol® Roofing Membranes. The first 25 mm of rainfall from a newly installed Butynol® and ECO Butynol® Roofing Membranes roof must be discarded before drinking water collection starts. This is to remove residues which may have developed in the processes involved in the production of a Butynol® and ECO Butynol® Roofing Membranes.

14.2 Note that all water collected off roof surfaces made from any material is considered to be non-potable due to possible contamination from other sources. Water collection in this way can only be considered potable if it has been passed through a suitable sterilization system. Sterilization systems have not been assessed and are outside the scope of this Appraisal.

Installation Information

Installation Skill Level Requirement

15.1 Installation of the membranes must be completed by approved applicators, approved by Ardex New Zealand Limited.

15.2 Installation of substrates must be completed by tradespersons with an understanding of roof, deck and balcony construction, in accordance with instructions given within the Ardex New Zealand Limited Technical Literature and this Appraisal.

Preparation of Substrates

16.1 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.

16.2 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.

16.3 The moisture content of a timber substructure must be a maximum of 20% and plywood sheet must be dry at time of membrane application. This will generally require plywood sheets to be covered until just before the membrane is laid, to prevent rain wetting.

16.4 In cases of extreme absorbency a priming coat of 50/50 solution of WA98 and adhesive solvent may be required, consult with the Ardex New Zealand Limited if in doubt.

Membrane Installation

17.1 The membranes must be installed in accordance with the Technical Literature.

17.2 Plywood joints must be taped with 25mm wide PVC pressure sensitive tape.

17.3 The membranes must be unrolled without tension onto the prepared substrate and allowed to 'relax' for at least 20 minutes prior to installation.

17.4 Adhesive must be applied to both the membrane and the substrate, one half at a time. When the adhesive is tack dry, the sheet is rolled onto the substrate. The process is then repeated for the other half of the sheet. Joints in substrates with a pitch of 5° or less, all coloured membranes and ECO Butynol® irrespective of pitch, all guttering and areas subjected to periodic ponding require lap bonding using Ardex seam tape. Joints in substrates with a pitch above 5° can be sealed using WA98 adhesive; this applies to the black Butynol® only.

Inspections

18.1 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.

Health and Safety

19.1 Safe use and handling procedures for the membrane system is 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

20.1 Tests have been carried out on the membranes by Materials and Quality Consultancy Ltd. This testing covered specific gravity, shore hardness, tensile strength, modulus of elongation, elongation at break, tensile and elongation retention after heat aging, tear strength, ozone resistance and water absorption as detailed in NZBC Acceptable Solution E2/AS1 Paragraph 8.5.4(b). Results and test methods have been reviewed by BRANZ and found to be satisfactory.

20.2 Water vapour permeability tests have been undertaken by BRANZ in accordance with ASTM E96.

20.3 The adhesives, primers and seam tapes used with Butynol® and ECO Butynol® Roofing Membranes meet the performance requirements of NZBC Acceptable Solution E2/AS1 Paragraph 8.5.4(c).

Results and test methods have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

21.1 An assessment was made of the durability of the Butynol® Roofing Membrane by BRANZ technical experts using NZBC B2/VM1 History of Use.

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 Butynol® and ECO Butynol® Roofing 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. The membranes manufacturer is the subject of AS/NZS ISO 9001: 2008 Certificate by Telarc Limited.

22.2 The quality of manufacture of the products is the responsibility of Ardex New Zealand Limited.

22.3 The quality of supply of the products to the market is the responsibility of Ardex New Zealand Limited.

22.4 Quality on site is the responsibility of the Ardex New Zealand Limited approved applicators.

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, Ardex New Zealand Limited and this Appraisal.

Sources of Information

- AS/NZS 2269: 2008 Plywood – Structural.
- ASTM E 96-02 Water vapour transmission of materials in sheet form, American Society of Testing Materials, Philadelphia, 1992.
- NZS 3101: 1995 The design of concrete structures.
- NZS 3604: 1999 Timber framed buildings.
- 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.
- New Zealand Building Code Handbook and Approved Documents, Building Industry Authority, 1992.
- The Building Regulations 1992, up to, and including October 2004 Amendment.
- Membrane Roofing Good Practice Guide, BRANZ, November 1999.



The new Christchurch Airport Terminal has been covered with 1.5mm Dove Grey Butynol.



BRANZ

In the opinion of BRANZ, **Butynol®** and **ECO Butynol® Roofing Membranes** 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 **Ardex New Zealand Limited**, 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. **Ardex New Zealand Limited:**
 - 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 **Ardex New Zealand Limited**.
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 **Ardex New Zealand Limited** or any third party.

For BRANZ

P Burghout
Chief Executive

Amendment No. 1, dated 15 July 2011.

This Appraisal has been amended to align the minimum fall requirements as specified in Acceptable Solution E2/AS1.

Date of issue: 23 May 2011