



ARDEX Butynol®

**BRANZ Appraised,
E2/AS1 Acceptable Solution**

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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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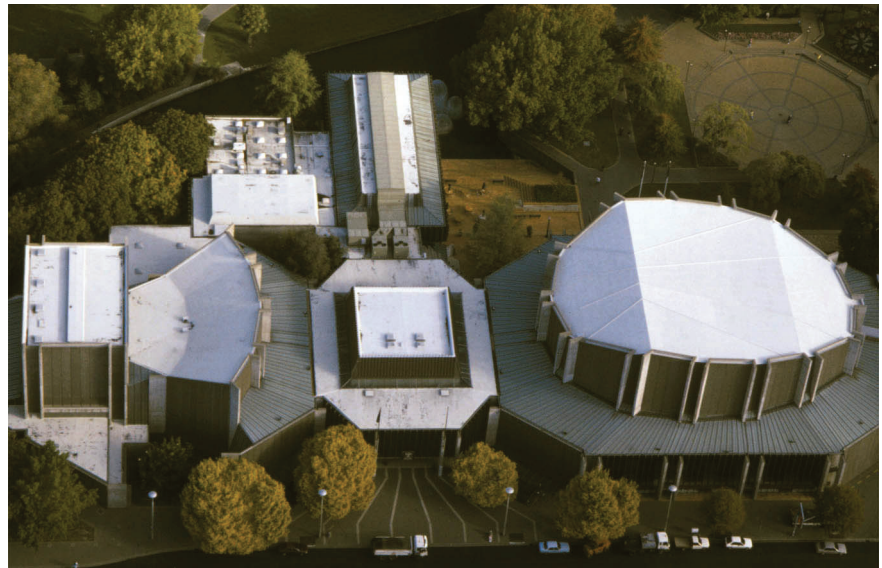


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Product

- 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

ARDEX Butynol®

BRANZ Appraised, E2/AS1 Acceptable Solution



BUTYNOL® SYSTEM SPECIFICATION

A synthetic rubber with properties which resist ageing from heat, sunlight and ozone. It has excellent gas impermeability and toughness and remains flexible at low temperatures.

Butynol® is manufactured by combining the petroleum gases isobutylene and isoprene at the extremely low temperature of -100°C . (Rubber Technology–Morton)

Butynol® is marketed by Ardex as a warranted roofing, decking and tanking product and fixed by their trained and experienced approved Applicators.

BUTYNOL® MATERIAL SPECIFICATIONS

Our requirements for long term warranty necessitate that Butynol® meets these typical technical requirements:

Specific Gravity to ASTM D297	1.20±0.05
Hardness IRHD to ASTM D1415	65±5
Tensile Strength to ASTM D412	8.3 MPa min
Modulus at 300% elongation to ASTM D412	4.15 MPa min
Elongation at break to ASTM D412	300% min
Heat Ageing (7 days at 115°C)	
Tensile Retention to ASTM D412	70% min
Elongation Retention to ASTM D412	70% min
Tear Strength to ASTM D624	26kN/m
Ozone Resistance to ASTM D1149 (7 days at 40°C in 50pphm ozone)	No visible cracks
Water Absorption to ASTM D471	
1.65% (by mass) 0.72% (by volume)	
Water Permeability to ASTM E96-92	
Vapour Flow Resistance (MNs/g)	12414
Vapour Flow Rate ($\text{g}/\text{m}^2\text{d}$)	0.013

Note: Interesting comparable figures for water permeability are –
Polythene 156, Asphalt 1830, P.V.C. 4900.

K Values on 1mm Butynol sheeting

K Value (Thermal Conductivity) 7.4×10^3
Cal/cm/sec/deg C.

Conductivity Data on 1mm Butynol sheeting

Resistance/ m^2 $\Omega/\text{m}^2 = 0.6816$ on 9.3 volts.

SEAM TAPE PERFORMANCE

Tests on the seam tape bonding method, by an

independent testing laboratory, have shown average values equivalent to 90% of unwelded material. It is considered impossible for the test methods used to be duplicated in normal service ie. 400% elongation.

BUTYNOL® PROTECTION

Butynol® protects against water, moisture vapour, gases, sun, ozone, frost, acids, chemicals and bacteria.

BUTYNOL® RESISTANCE

Butynol® resists tearing, flex cracking, bubbling and abrasion. It is extremely strong, has a long life and is versatile.

STAINING OF LIGHT COLOURED BUTYNOL®

To avoid staining care must be taken during design stage to ensure that water running off unpainted treated timber and some metals (eg copper) do not run over light coloured Butynol®.

BUTYNOL® GAUGES

Standard 1.0mm and 1.2mm–For roofs, gutters and decks with protection.

1.2mm–For roofs.

1.5mm–For roofs, gutters and walk out decks.

2.25mm Heavy Duty

Factory welded panels in all gauges can be custom made.

BUTYNOL® IS PACKAGED

In rolls of nominal 1.4m width and 17.86m long. Each roll is packed in polythene wrapper trademarked Butynol® with thickness identified. Coverage 25m^2 except 2.25mm gauge which is 12m^2

Gauges available are:

1.0mm black. Weight: nominal 30kg

1.5mm black. Weight: nominal 45kg

2.25mm black. Weight: nominal 32kg

1.2mm dove grey. Weight: nominal 32kg

1.5mm all colours. Weight: nominal 47kg

ADHESIVES AND SOLVENTS

Specially formulated for all Butynol® applications. Available in solvent and water based. Supplied in 20L steel/plastic pails (approx. 20kg). 4 and 1 litre cans.

BUTYNOL® SEALANT

Available in tubes for caulking guns.

ARDEX Butynol®

BRANZ Appraised, E2/AS1 Acceptable Solution

SEAM PRIMER

Seam Primer is specially formulated for use with Seam Tape. Applied with scrubber pads. Available in 4 and 1 litre cans.

SEAM TAPE

Recommended for all Butynol® laps.

Supplied by Ardex in 50mm x 30.5m rolls (6 to a carton).

DETAIL TAPE (uncured)

A malleable exterior tape for flashing exterior corners etc. 150mm x 30.5m rolls.

FLASHING TAPE

A malleable tape for moulding in gussets, pipe flashings and awkward situations. Supplied in 100mm x 5m rolls. Flashing tape must not be left exposed. A cover strip of Butynol® or detail tape must be applied over flashing tape to finish.

PLYWOOD TREATMENT

To be in accordance with Acceptable Solution E2/AS1 plywood substrate must be treated to H3.2 with Waterborne CCA treatment and kiln dried after treatment. All plywood joints should be taped with Ardex Release tape.

Plywood must not be LOSP treated.

DURABILITY

Butynol® when fixed according to Ardex instruction will meet the NZBC requirements of B2.3.1(b) 15 years. Refer BRANZ Appraisal Certificate No 436 (2011).

EXTERNAL MOISTURE

New Zealand Building Code Acceptable Solution E2/AS1 requirements recommend membrane clad roofs have a minimum pitch of 2° (1:30).

BUILDING TO NZBC ACCEPTABLE SOLUTION E2/AS1

NZBC Acceptable Solution E2/AS1 limits the size of decks to 40m² as covered by the scope of Appraisal No. 436 (2011). Butynol® Roofing Membrane is suitable for use on decks larger than 40m². These decks are the subject of specific design and are outside the scope of E2/AS1.

CLEANING WEATHERED BUTYNOL®

Use sugar soap to remove oxidation and restore surface. Wind blown dirt is more noticeable on low slope roofs, particularly on black Butynol®.

DAMP AND WEATHERPROOFING

The Building Code of Australia Deemed-to-Satisfy Provisions F1.9 and F1.10 are met by Butynol as an acceptable damp-proof course.

Butynol® when used as described in ABSAC Technical Opinion 188 August 1994 complies with the Building Code of Australia Deemed-to-Satisfy Provision F1.7(b) and Acceptable Construction Manual Part 3.8.1.0, or AS 3740 for "Water Proofing of Wet Areas in Buildings".

PAINTING OVER BUTYNOL®

Use Ardex WPM 908. Wash with Sugar Soap. Beware of using non Ardex primers as this may effect your Butynol® Warranty.

FIRE RATING

The Butynol® roofing system must be considered combustible but may be used on buildings for all purpose groups, subject to the requirements of NZBC Acceptable Solution C/AS1 Part 7, Paragraph 7.11.1.

When used for roofs in Purpose Groups SC and SD a non-combustible substrate or timber 18mm thick is acceptable. Refer 7.11.1.

Building Code of Australia allows use in all building types under Specification C1.10, Clause 7(e), except in bush fire prone areas.

PRODUCT WARRANTY

When laid by an approved Applicator in accordance with Ardex's specifications, a material warranty for up to 20 years (covering the Membrane, adhesive and tape) is available.

WORKMANSHIP

A warranty for workmanship shall be provided directly by the approved Applicator. The period and terms of the workmanship warranty shall be determined by the conditions of contract or the approved Applicator.

ADHESIVES AND SOLVENTS FOR USE WITH BUTYNOL®

- WA98 - The Standard contact brushing, spray grade and rolling adhesive for fixing to the substrate and for laps not subject to periodic ponding.
(Pitch 5° and above)
- WA98S - Solvent for clean up of WA98 adhesive.
- WPM 09A - Solvent free spray/brush adhesive.
(for use with Eco Butynol®)
- WPM 09C - Solvent free catalyst used in conjunction with WPM 09A
(for use with Eco Butynol®)
- Seam Primer - A water resistant primer, used with seam tape for general lap bonding.

Note: Temperature and Humidity

The evaporation of any solvent adhesive system causes a drop in temperature at the interface. At times of high humidity this can result in a micro molecular water layer at the interface which will result in a failure to bond, falsely attributed to Adhesive failure. Fixing should not proceed under these circumstances.

NOTES

1. In cases of extreme absorbency, a priming coat of 50/50 WA98 adhesive and solvent may assist water shedding and absorption. However, a follow up of full strength adhesive for full bonding should not be proceeded with under four hours, thus allowing full evaporation of solvents absorbed into the substrate. Primers must be time dried not touch dried.
2. As new substrate materials continually appear on the market, consult Ardex for approval of their use with Butynol®.
3. Seam tape and seam primer must be used for all Butynol® joints.
4. Do not use in temperatures less than 6°C.

ARDEX Butynol®

BRANZ Appraised, E2/AS1 Acceptable Solution

SUBSTRATE SPECIFICATION (Plywood)

To conform with Acceptable Solution E2/AS1 plywood shall be:

A minimum of 17mm complying with AS/NZS 2269, at least CD Structural Grade plywood with the sanded C face upwards, and H3.2 with Waterborne CCA treatment and kiln dried after treatment.

Substrates must be dry when Butynol® is applied. The plywood and the timber substructure shall have a maximum moisture content of 20% when Butynol is adhered.

Plywood panels shall be laid with staggered joints (brick bond), the edge of sheets shall be supported with dwangs or framing, unless a structurally tested tongue-in-groove edge provides equivalent support. The maximum recommended span in E2/AS1 is 400mm. However specific design may allow 17.5mm plywood or greater to be laid on 400mm purlins with nogs or dwangs at 600mm or even 1200mm centres. Plywood shall be laid with the face grain at right angles to the supports. A 20mm triangular fillet shall be used at the base of any 90° upstand. External edges shall be chamfered with a minimum radius of 5mm.

Plywood shall be fixed with 10 gauge x 50mm stainless steel countersunk head screws with 3mm gaps between all sheets, at 150mm centres on edges, and 200mm in the body of the sheets.

All joints in the plywood and junctions of plywood with other materials shall have 25mm Ardex Release tape applied before application of Butynol®.

PLYWOOD QUALITY

Plywood to be installed in accordance with the plywood manufacturer's recommendation to provide a suitable surface for membrane.

Problems with plywood quality may effect long term membrane performance.

Please check with your plywood supplier.

We have duplicated the position of one supplier below.

- Face checks in plywood do not affect the structural integrity of the panel as they are confined to the surface veneer and are strictly aesthetic in nature.
- As face checking occurs naturally Carter Holt Harvey Woodproducts does not consider them to be a manufacturing or product fault.

Source: *Specifications and Installation Guide Carter Holt Harvey.*

Laying on plywood with face checking as above should be avoided and surface corrected if possible.

NOTE: The use of LOSP (Light Organic Solvent Preservative) treated plywood must NOT be used under Butynol® in any circumstances or conditions.

SUBSTRATE SPECIFICATION (Concrete)

New concrete

Must be cured for a minimum of 28 days and all curing compounds removed prior to application.

A reduction in cure time can be achieved by utilising the Ardex HydrEpoxy System (consult Ardex Technical Department for details).

Old concrete

Must be clean from any contaminants prior to application.

For further substrate types please consult Ardex Technical Department.

ROOF VENTILATION

The most important precaution to observe with low slope roofs is that no construction moisture is enclosed. Low slope or flat roof structures are generally slow drying because of their impermeable cladding. All timbers should be below 20% moisture before being enclosed.

No amount of ventilation will cope with moisture problems created by drying timbers.

If there is a reason to believe that there is moisture trapped in the roof structure Ardex can provide our standard one way substrate ventilators or our lo rise one way ventilators to provide a better visual appearance.

Soffit ventilation is the most effective way to provide effective roof cavity ventilation. Careful placement of the soffit ventilation to avoid gutters etc, will provide a natural airflow as well as cooling to a low slope membrane clad roof.

Closed-in construction spaces under Butynol® roofs and decks shall have adequate ventilation to prevent the accumulation of moisture under Butynol®. There should be a minimum gap of 20mm between the underside of the substrate and any insulation.

SUBSTRATE VENTILATION

Substrate ventilation should be used to release moisture trapped under the Butynol® on concrete surfaces. Substrate ventilators are used in conjunction with vent tapes. Tapes should be laid in a grid pattern spaced at 600mm venting to the roof perimeter. On plywood substrates ventilators are used at the junction of the ply. Ventilators are not required in most applications for cavity ventilation - seek advice from an Ardex Representative. One way substrate ventilators prevent moisture vapour build up and if required can be installed every 90 square metres. Not designed to ventilate roof cavities. (Refer Diagram page 20).

TYPICAL ARCHITECTURAL BUTYNOL® RUBBER ROOFING SPECIFICATION

1. Preliminary

Refer to the Preliminary and General Clauses of this specification and to the General Conditions of Contract which are equally binding on all trades. This section of the specification shall be read in conjunction with all other sections.

2. Scope

This section of the contract consists in general of the provision and laying of all the Butynol® rubber, for the roofs, decks, gutters and flashings on the buildings. Refer to Clause 12 hereafter for Extent of Work.

3. Workmanship

The whole of the work shall be carried out by skilled tradesmen using adequate and proper equipment and methods in accordance with best trade practice, and following the specifications methods and recommendations as laid down by the manufacturers.

4. Sub-contractors

The work included in this section of the contract shall be carried out by a firm of roofing experts conversant with and specialising in the supply and fixing of this material and shall be a firm approved by Ardex.

5. Warranty

When laid by an approved Applicator in accordance with Ardex's specifications, a written material warranty of up to 20 years is available. It is the responsibility of the approved Applicator to confirm proper installation and to request Ardex to issue a material warranty on behalf of the customer following completion of installation.

6. Materials

6.1 Butynol® Rubber

(a) Shall be 1.0mm thick standard Black Butynol® rubber to all roof surfaces, gutters and fascias and walk out decks where membrane is to be overlaid with tiles or timber.

(b) Shall be 1.5mm thick Butynol® to all walk out decks.

6.2 Adhesives

Shall be as recommended by Ardex specially formulated for Butynol® rubber and suitable for the particular application and the relevant temperature and conditions applicable.

Generally Ardex WA98 adhesive (or WPM 09A) is used for substrate bonding.

Ardex seam primer shall be used in conjunction with Ardex seam tapes for all laps.

When conditions are experienced that are outside the temperature and/or moisture ranges recommended by the manufacturers for the above standard adhesives work will cease.

6.3 Seam Tapes

Shall be 50mm wide seam tape provided by Ardex.

6.4 Substrate Joint Tape

All Plywood joints shall be taped with a 25mm wide pressure sensitive Ardex Release tape.

7. Roof Deckings

Shall be 1.5mm Butynol® or 1mm with a protective covering for all deck surfaces.

All decks to which Butynol® is to be fixed shall be clean, smooth, dry and free from dirt, grit or sharp objects.

Deck substrates may be primed with 50/50 WA98 adhesive/solvent.

The Butynol® roofer shall co-operate with the other trades laying the decking to ensure that the final surface is in first class condition for the laying of the Butynol® rubber roofing.

The Butynol® roofer shall check the deck before laying any Butynol® to ensure that the surface is completely sound, screw fixed to specifications: screw heads flush, sheets spaced to provide for thermal movement or shock.

NZBC Acceptable Solution E2/AS1 limits the size of decks to 40m² as covered by the scope of Appraisal No. 436 (2011). Butynol® Roofing Membrane is suitable for use on decks larger than 40m². These decks are the subject of specific design.

Full Ardex specifications also available on Masterspec.

ARDEX Butynol®

BRANZ Appraised, E2/AS1 Acceptable Solution

8. Laying of Butynol® Roofing

It is the responsibility of the Applicator to ensure that the substrate surface to be covered by the Butynol® is in fit and proper condition, suitable for the laying of the material.

Tape all joints in substrate sheets with 25mm wide pressure sensitive tape approved by Ardex.

All Butynol® sheeting shall be laid out on the roof to "relax" the sheeting before fixing. A period of at least 20 minutes is usually required. Do not finally position sheeting with a tension exceeding 2%.

Apply adhesive to the substrate and the underside of the Butynol® rubber sheeting by brush, spray or an approved type roller at a spreading rate of generally not less than 2.5 square metres per litre. Leave to tack dry before bonding the two surfaces together.

Lay sheeting by drawing back halfway either longitudinally or transversely. Thoroughly roll or work over the surface of the sheet to exclude all air and to obtain a full bond.

All Butynol® shall be "lap bonded" as detailed below.

Bonding Laps with Ardex Seam Tape and Seam Primer

1. The top lap is positioned and the bottom sheet marked to indicate the edge of the top sheet.
2. The top sheet is folded back.
3. The Ardex Seam Primer is then applied to the Butynol® in the area marked on the bottom sheet and 50mm in from the edge on the top sheet. The Ardex Seam Primer is applied to the mating surfaces using a synthetic scrubbing pad. Scrubbing pads should be replaced as they become dirty. Allow the primer to become 'dry to the touch'.
4. Position and unroll the 50mm Ardex Seam Tape along the seam. The edge of the release paper should be aligned to the mark on the bottom membrane sheet.
5. Roll the length of the seam with the release paper still in place.
6. Remove the release paper from the Ardex Seam Tape by pulling at a 45° angle away from the seam. Keep the release paper low to the roof surface as it is removed.
7. Fold into place the primed edge of the top sheet.
8. Roll the completed seam.

9. Tiling Over Butynol®

To direct fix tiles to Butynol, ABA Optima two part adhesive should be used. Ensure the Butynol® surface is clean and dry before applying the adhesive. All laps must have seam tape.

Tiles may also be adhered to a removeable layer of Ardex DS60 to comply with (E2 7.3.1.1) with the ability to lift the top surface off when necessary.

(Refer Optima page 41)

10. Protection of Laid Butynol® Sheeting

The Butynol® roofing contractor shall ensure that his fixers only work on the Butynol® roofing with soft sole shoes.

The Butynol® roofer shall co-ordinate with the main contractor who shall ensure that any other trades who work over the completed roof wear soft sole shoes.

Upon completion of each area the roofer shall get the main contractor to inspect the area and the main contractor will sign off that the area was free from any defects or damage. It is then the responsibility of the main contractor to ensure the Butynol® roofing is in no way damaged by other trades.

11. Completion

On completion carefully and thoroughly clean off and remove all scraps and other rubbish from finished surfaces and leave in tidy order.

12. Extent of Work

Observe the foregoing specification and supply and lay Butynol® rubber sheeting to all roofs, decks, gutters and flashings as shown and detailed in the Ardex specification.

Failure to comply with the above specifications will result in all warranties being null and void.

LAYING SPECIFICATION

The Sub contractor for the work called for in this trade will be a Company or Person approved by Ardex.

The approved Applicator (hereafter called the Applicator) shall examine all drawings and provide for the flashing, caulking and sealing of all vents, stacks and pipes penetrating the roofing membrane. Also all flashings at walls, parapets, verges, gutters etc., unless otherwise instructed in the specifications.

The surface to which Butynol® is to be fixed shall be clean, smooth, dry and free from sawdust, grit or sharp objects. Membrane laying shall not start until defects have been corrected.

To avoid staining care should be taken to avoid water runoff from copper downpipes or guttering on to light coloured Butynol®.

When CCA plywood is used in conjunction with a light coloured membrane it is advisable to prime any plywood that will not be covered the same day.

It is the responsibility of the Applicator to ensure that the surface to be covered by the Butynol® is in fit and proper condition, suitable in all respects for the laying of the material.

On completion the Applicator will provide the owner with a Workmanship Warranty and obtain from Ardex a Materials Warranty.

Failure to comply with the above specifications will result in all warranties being null and void.

LAYING THE BUTYNOL®

Before applying the Butynol®, it shall be unrolled for twenty minutes to relieve stresses induced by manufacture and storage. The Butynol® sheet shall be set out in the exact position in which it will be finally required and while it is held in place, it shall be folded back lengthwise to expose half the underside. To the now exposed underside and the area of roof also left exposed, apply an even coat of WA98 Adhesive or WPM 09A (solvent free). When the adhesive has become touch dry, work the sheet back into its original position avoiding wrinkles and the inclusion of air bubbles.

Repeat the process with the other half of the sheet and when completed, roll the whole sheet with hand press rollers or the like.

When applying the next sheet, it shall be lapped over the first sheet by 50mm. All turn ups and downs shall be neatly formed and cut to a straight line if required.

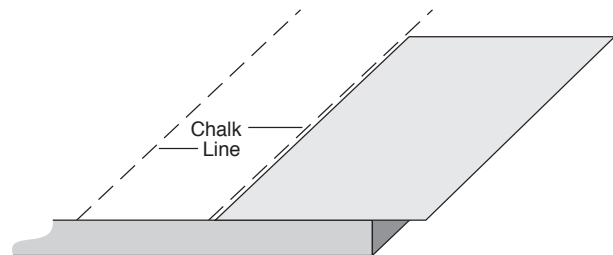
Butynol shall not be laid under tension.

When the whole area has been covered or as work progresses, the applicator has to seal the laps.

BUTYNOL® LAYING METHOD

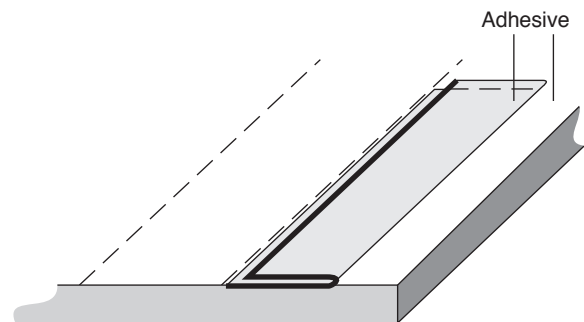
STEP 1

Accurately place sheet. Mark spacing with chalk line.



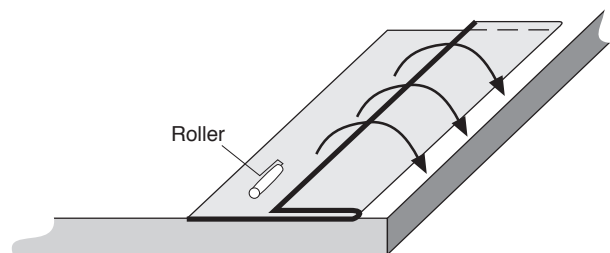
STEP 2

Fold back half sheet. Apply adhesive to both faces.



STEP 3

After flash off, fold membrane into place. Roll thoroughly.



STEP 4

Treat 2nd half of Butynol® similarly.

ARDEX Butynol®

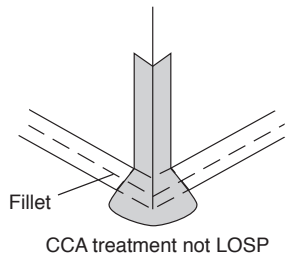
BRANZ Appraised, E2/AS1 Acceptable Solution

EXTERNAL CORNERS

To comply with Acceptable Solution E2/AS1 Figure 57.

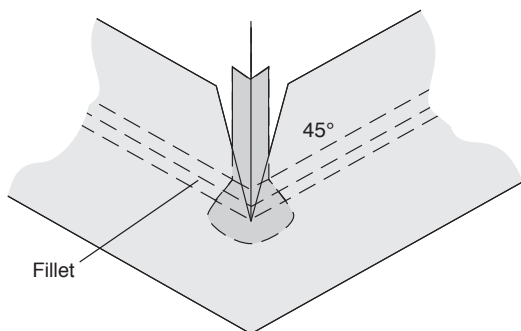
STEP 1

Bond 100mm flashing to corner as shown.



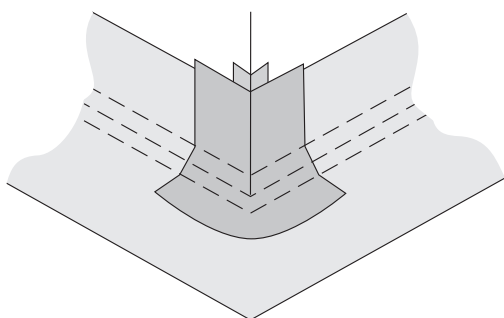
STEP 2

Bond Butynol® to deck and up wall 150mm minimum. Cut sheet from corner at 45° as shown.



STEP 3

Cover corner point with layer of detail tape.

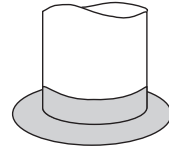


NOTE: Fillets must be used on all internal corners.

FLASHING - EXISTING PIPE

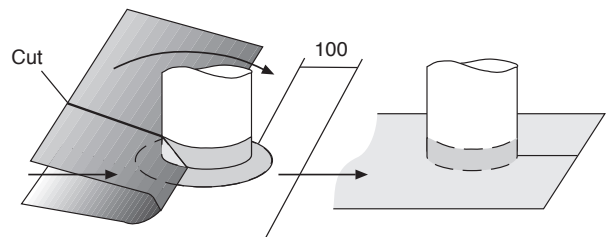
STEP 1

Under flash pipe with 100mm Butynol® flashing tape.



STEP 2

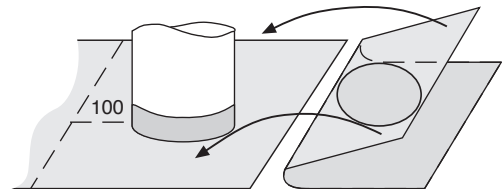
Bond Butynol® to 100mm past pipe. N.B. When flashing black Butynol® use Butynol® or detail tape.



STEP 3

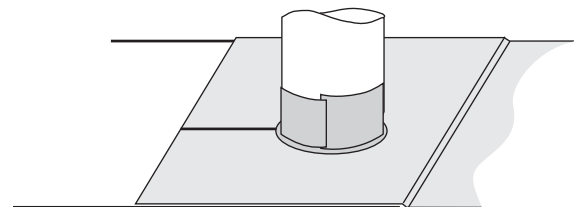
Bond continuation of Butynol® to overlap base sheet and beyond pipe 100mm.

Cut a smooth round hole 20mm smaller than diameter of penetration.



STEP 4

Apply collar of detail tape or Butynol® cover strip. DO NOT STRETCH STRIP.

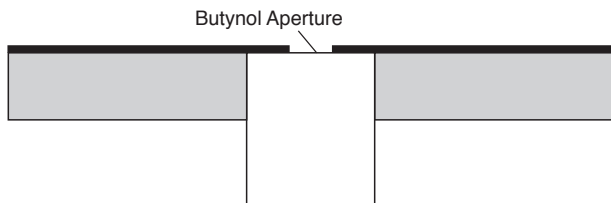


N.B. Flashing tape MUST NOT be left exposed. Cover strip must be Butynol®. When detail tape is used a cover strip of Butynol® is not required.

FLASHING - NEW PIPE

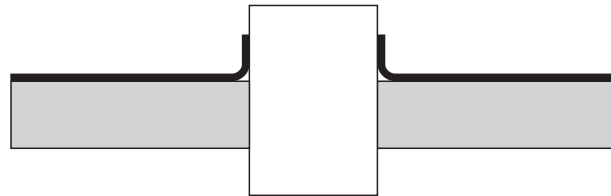
STEP 1

Cut smaller diameter hole than pipe.



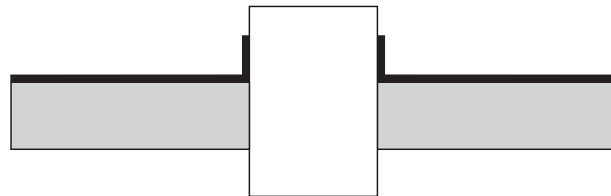
STEP 2

Pipe is raised through smaller diameter hole in Butynol®, forcing edge upwards to create upstand.



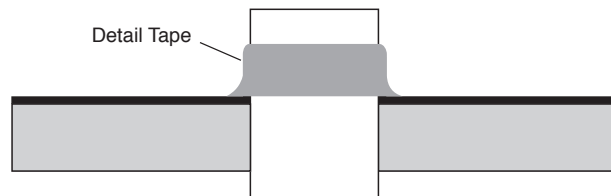
STEP 3

Pull pipe down to eliminate void.



STEP 4

After pulling pipe down approximately 1cm to sharpen corner, tape upstanding Butynol® to pipe using seam primer and detail tape.

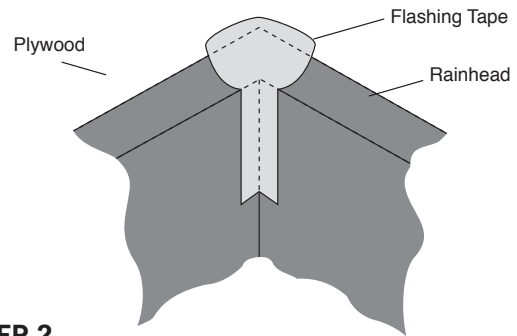


N.B. If flashing tape is used it MUST NOT be left exposed. A cover strip of Butynol® must be applied over the flashing tape to finish.

INTERNAL CORNERS FOR RAINHEADS and areas where a pig's ear cannot be used.

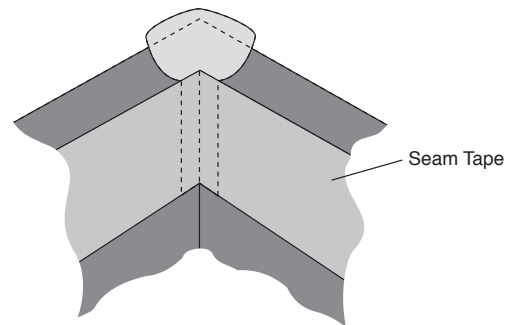
STEP 1

Apply Flashing Tape over Rainhead and Plywood.



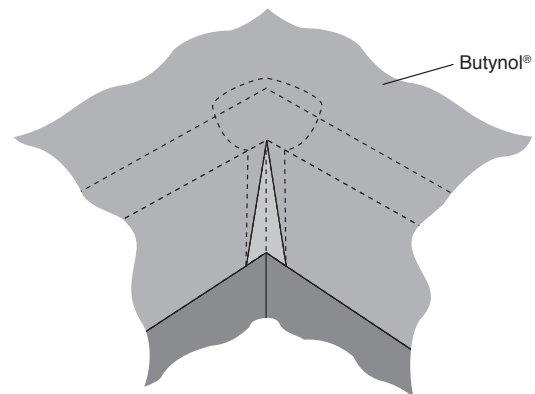
STEP 2

Run Seam Tape along all four vertical sides of Rainhead.



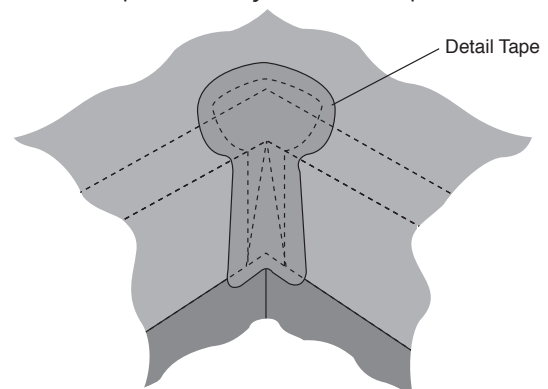
STEP 3

Cut Butynol® sheet to fit into corners.



STEP 4

Cover corner point with layer of detail tape.

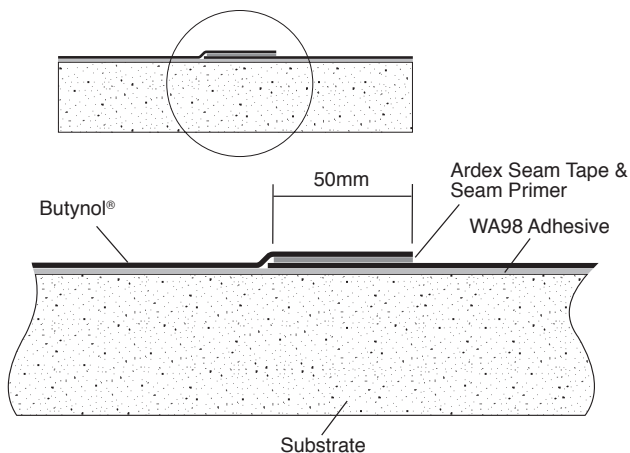


ARDEX Butynol®

BRANZ Appraised, E2/AS1 Acceptable Solution

BONDING THE LAPS

Seam tape and seam primer must be used for all Butynol® joints.

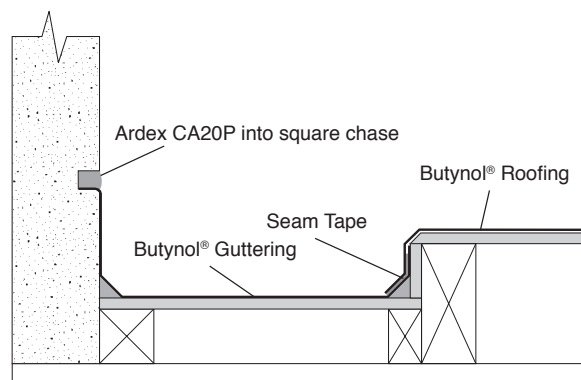


1. The top lap is positioned and the bottom sheet marked to indicate the edge of the top sheet.
2. The top sheet is folded back.
3. The Ardex Seam Primer is then applied to the Butynol® in the area marked on the bottom sheet and 50mm in from the edge on the top sheet. The Ardex Seam Primer is applied to the mating surfaces using a synthetic scrubbing pad. Scrubbing pads should be replaced as they become dirty. Allow the primer to become 'touch dry'.
4. Position and unroll the 50mm Ardex Seam Tape along the seam. The edge of the seam tape should be aligned to the mark on the bottom membrane sheet. The see-through backing film makes this very simple.
5. Roll the length of the seam with backing film still in place.
6. Remove the backing film from the Ardex Seam Tape by pulling at a 45° angle away from the seam. Keep the backing film low to the roof surface as it is removed.
7. Fold into place the primed edge of the top sheet.
8. Roll the completed seam.

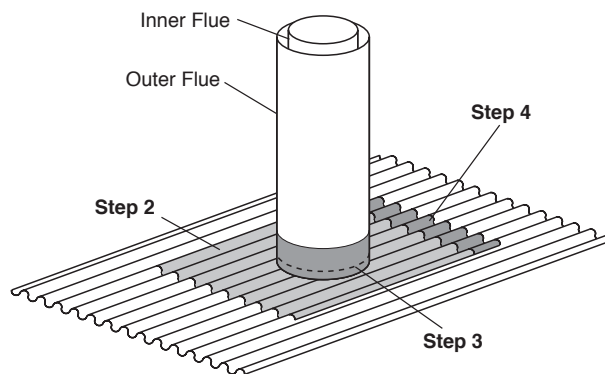
FORMING LAPS FOR GUTTERS

Laps are most important in gutter work and should be formed using Ardex seam tape and seam primer.

All internal boxed gutters can be easily formed to any shape or size using Butynol® over any specified substrate.



FLUE FLASHING



Step 1

Measure Butynol® to suit size of pipe. Cut a smooth round hole at least 20mm smaller than diameter at flue penetration.

Step 2

Fix Butynol® Flashing onto roofing with WA 98 adhesive ensuring membrane is relaxed into roofing profile.

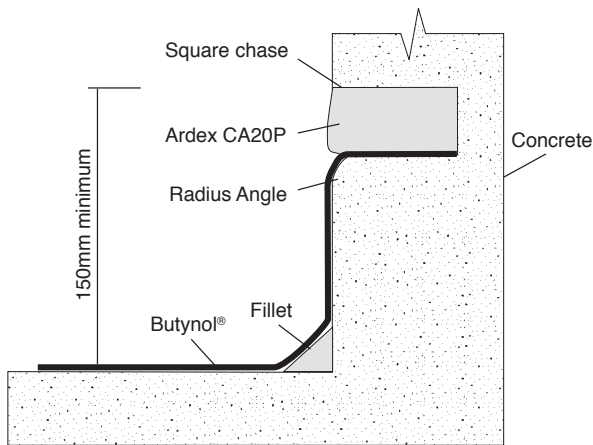
Step 3

Apply collar of Detail Tape sealed with Seam Primer onto 20mm Butynol® upstand.

Step 4

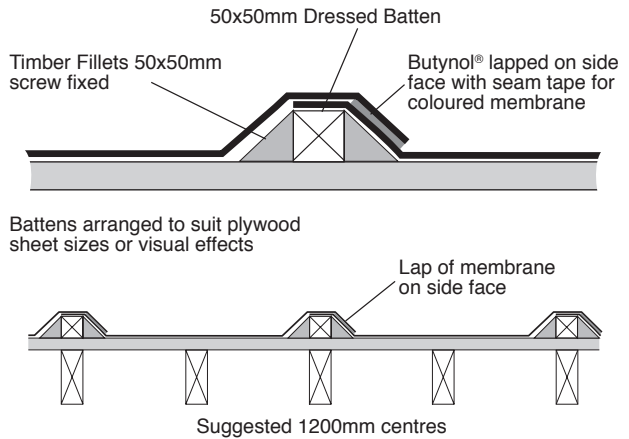
Apply flashing strip of Detail Tape sealed with Seam Primer onto Butynol® top edge and roofing ensuring feather edge is on the upside.

FLASHING INTO CONCRETE WALLS



Butynol® is glued into square chase and finished with Butynol® Sealant.

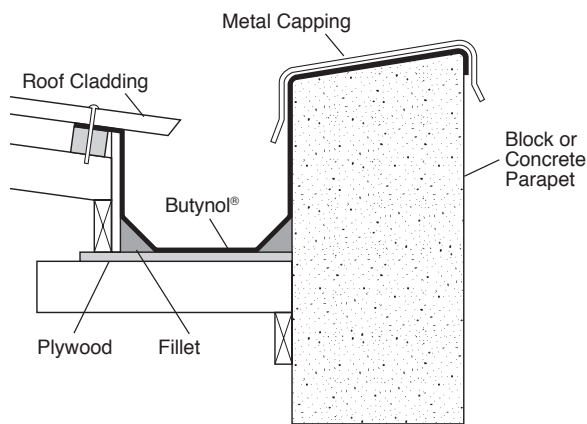
RECOMMENDED BATTEN PROFILE DETAIL



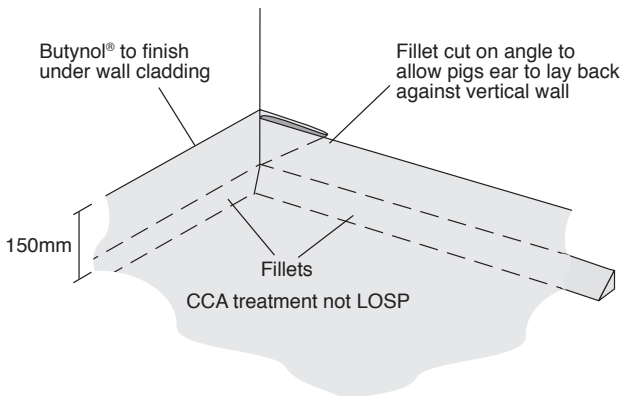
Example of a 1400mm sheet of Ardex Butynol® dressed over battens at 1200mm centres

Note: Treatment for battens must be H3.2 (CCA) only. Not LOSP treated.

BOXED GUTTER AND PARAPET DOWNTURN



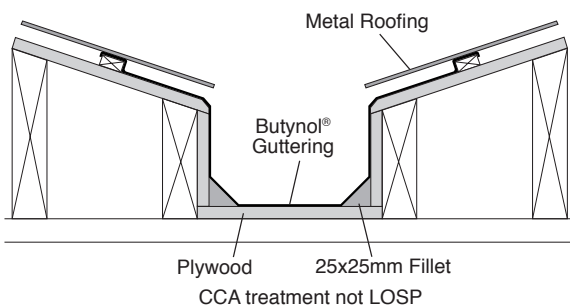
INTERNAL CORNERS



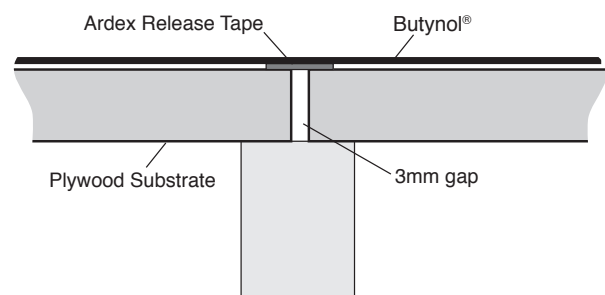
Without cutting Butynol® simply fold a 'pig's ear' corner as shown. The angle fold should be behind the main sheet.

NOTE: Fillets must be used on all internal corners.

INTERNAL GUTTER



TAPING SUBSTRATE SHEETS



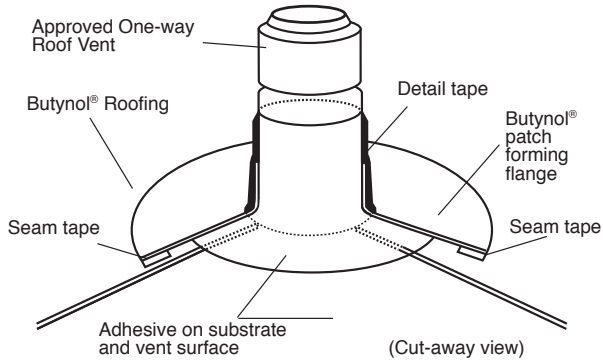
All joints between substrate sheets of Ply should be taped to prevent stressing of the Butynol® in case of marked timber movement.

ARDEX Butynol®

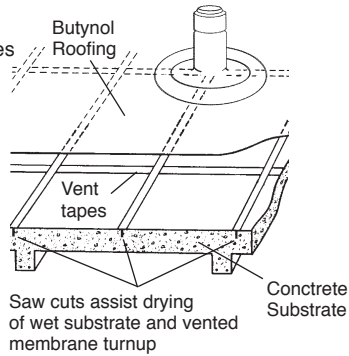
BRANZ Appraised, E2/AS1 Acceptable Solution

ONE WAY SUBSTRATE VENTILATOR

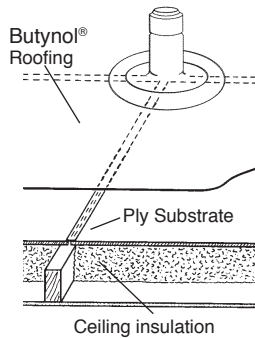
PVC or Aluminium



Vent installed over intersection of vent tapes on concrete substrate



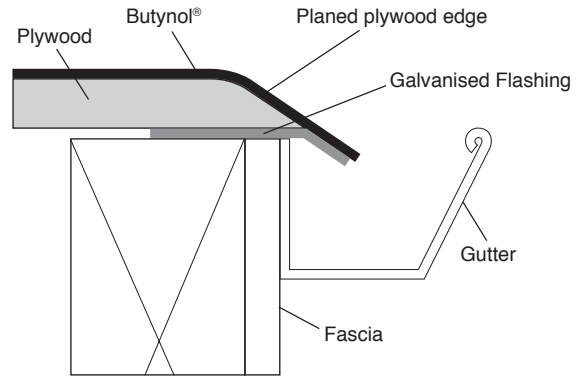
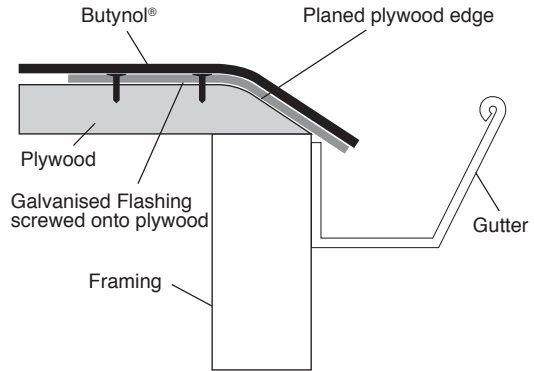
Vent installed over intersection of 3mm gap between Ply substrate sheets.



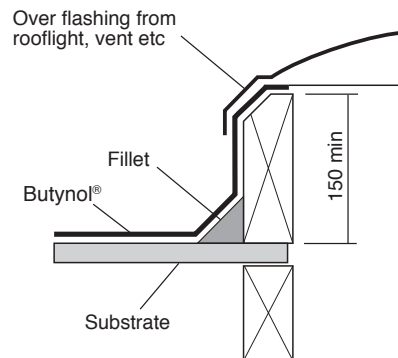
LO RISE ROOF VENT



TWO METHODS FOR FINISHING OVER A GUTTER

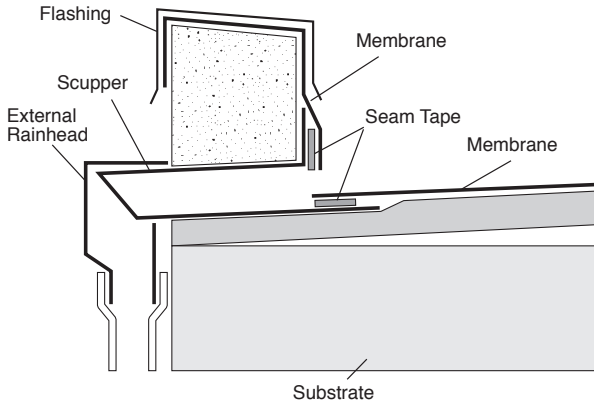


ROOFING PENETRATION IN MEMBRANE

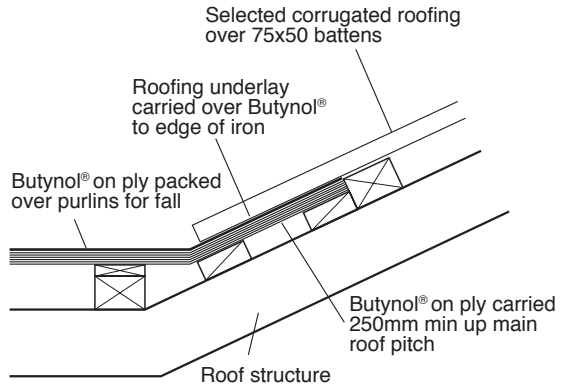


NOTE: 1 For maximum penetration size of 1200x1200mm
2 External corners to be formed as shown

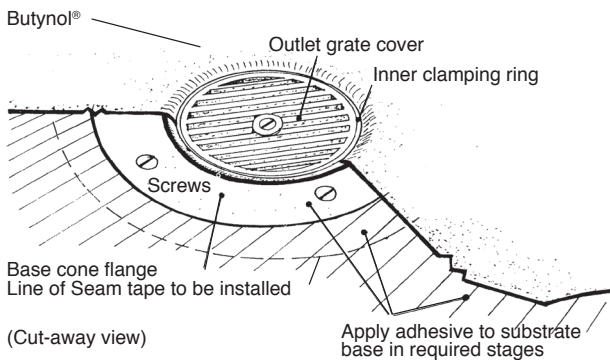
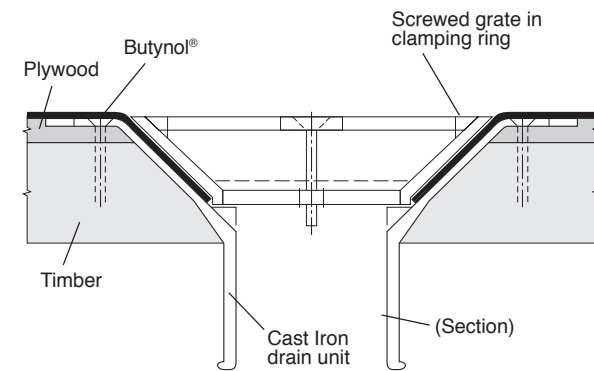
SCUPPER OUTLET



BUTYNOL®/CORRUGATE PITCH CHANGE JUNCTION

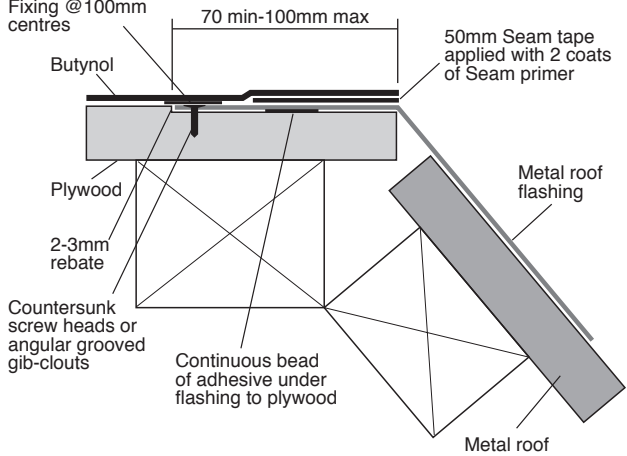


INTERNAL ROOF DRAIN (NZBC E2/AS1 Approved)



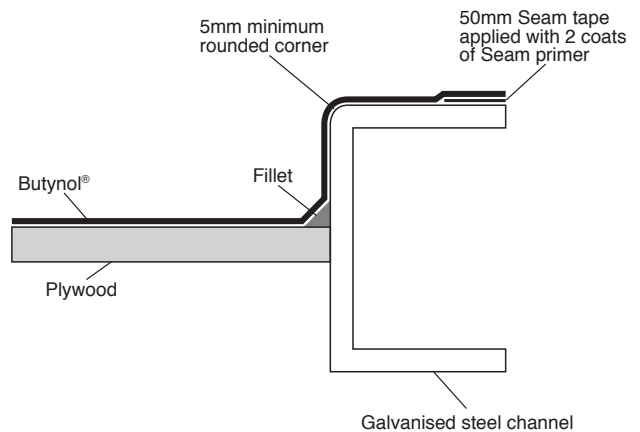
BUTYNOL® LAPPING OVER METAL FLASHING

25mm polyethylene release tape over metal edge and screw/clout heads. Fixing @ 100mm centres



Where Seam tape is to be used **no** silicone sealant should be used when installing flashing. If silicone is present remove completely with solvent.

BUTYNOL® FLUSH FINISH TO METAL EDGE

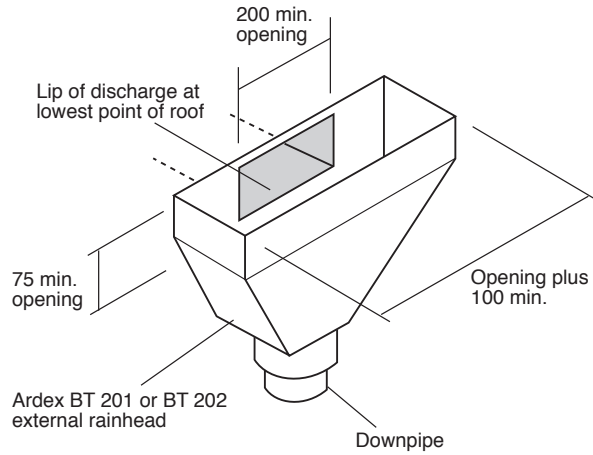


ARDEX Butynol®

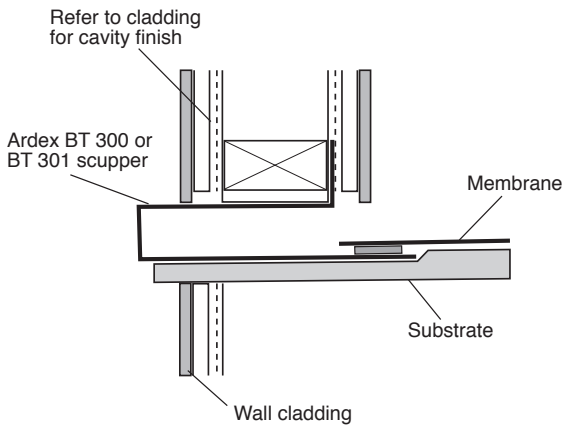
BRANZ Appraised, E2/AS1 Acceptable Solution

RAINWATER HEAD AND SCUPPER OPENING IN MEMBRANE USING ARDEX BT 300 OR BT 301 SCUPPER

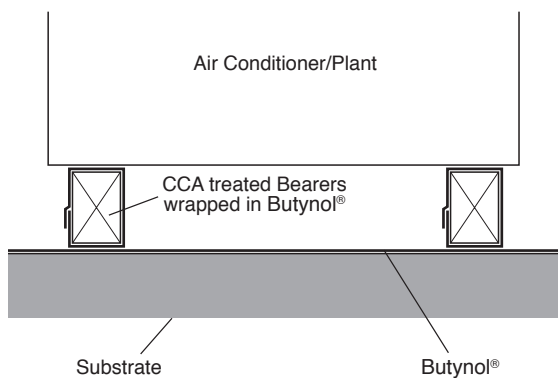
Deck outlet



Overflow

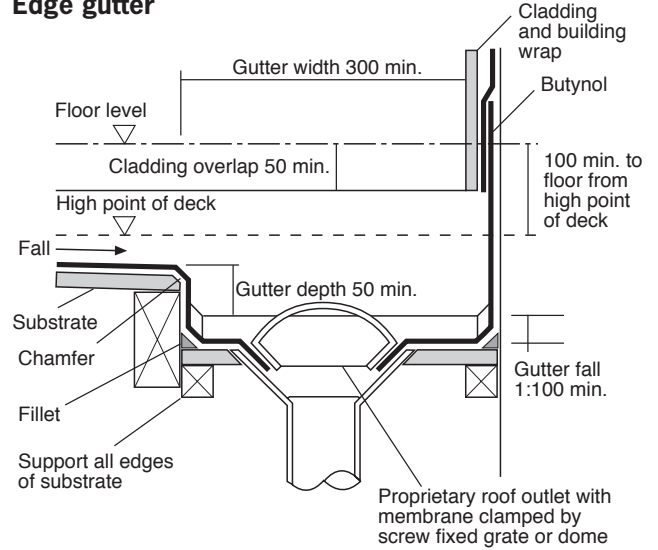


Air Conditioning/Plant Fixing Detail

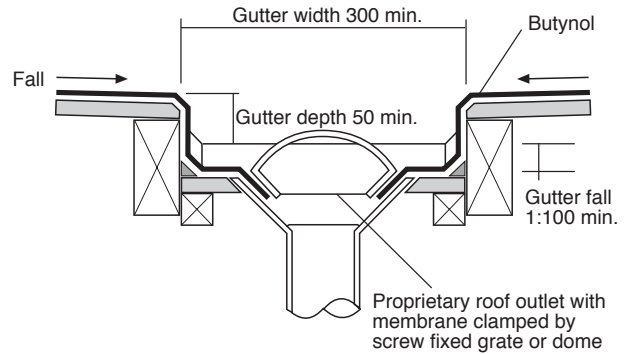


GUTTERS AND OUTLETS IN MEMBRANE

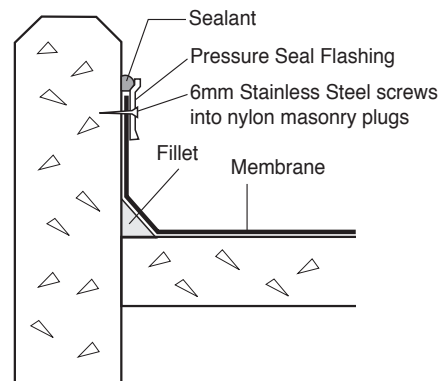
Edge gutter



Central gutter

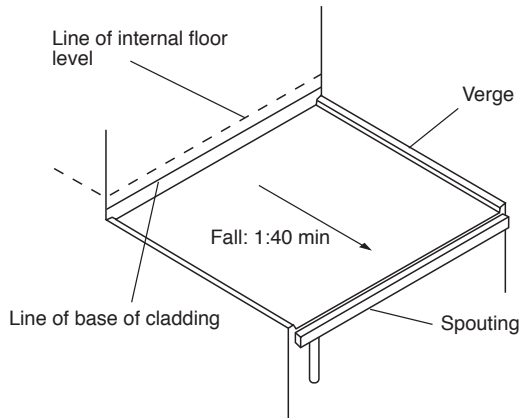


Aluminium Pressure Bar Seal

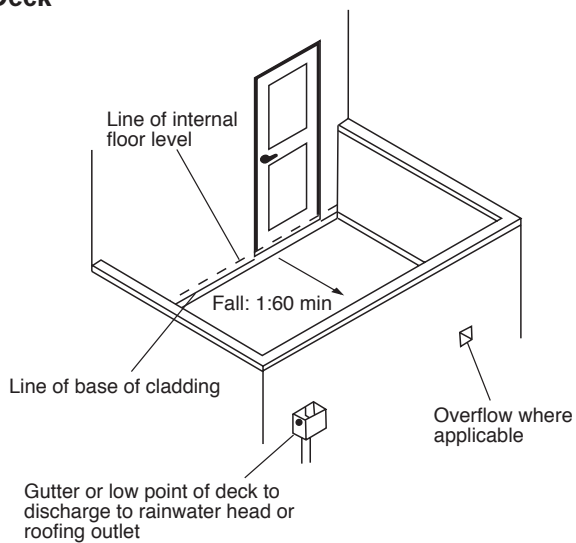


FALLS IN BUTYNOL® ROOFS AND DECKS

Roof

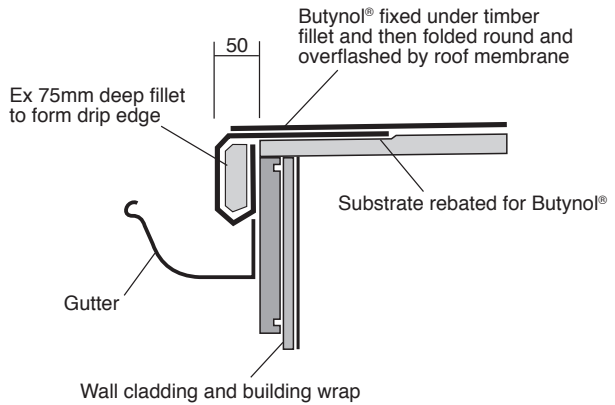


Deck

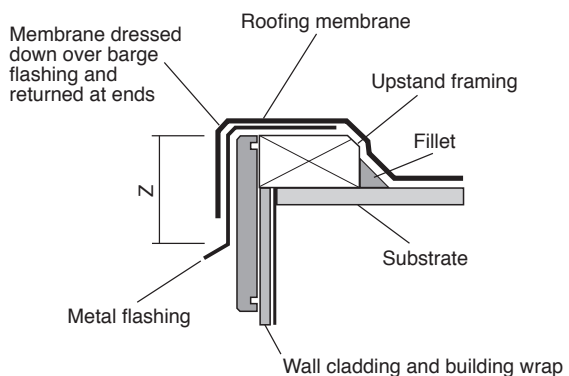
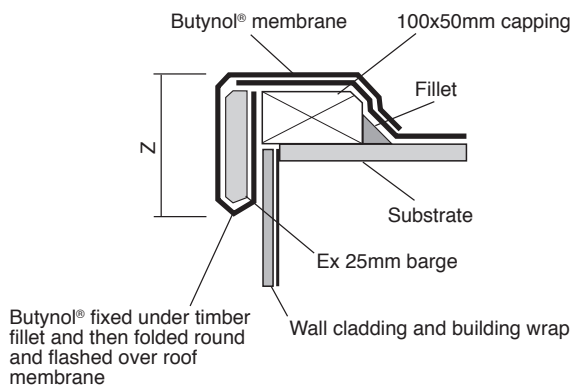


EAVE AND VERGES IN BUTYNOL®

Eave



Verges



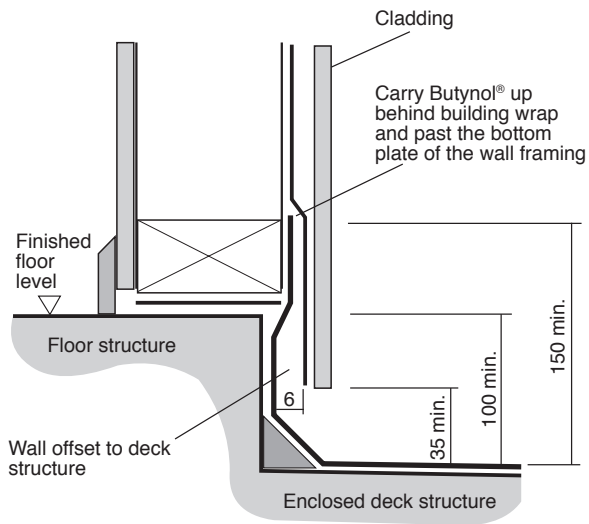
NOTE: Z = variable according to wind zone

ARDEX Butynol®

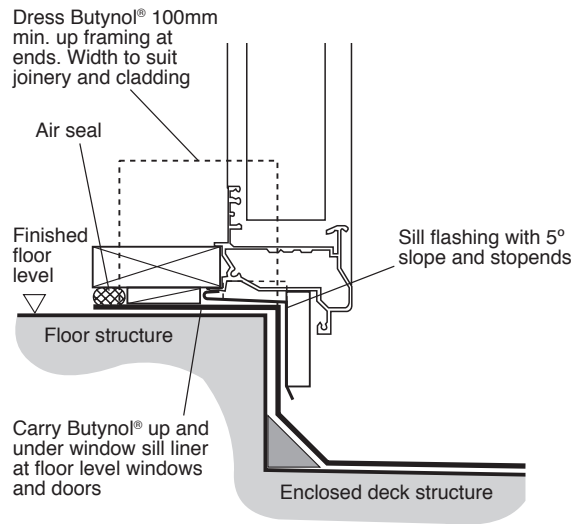
BRANZ Appraised, E2/AS1 Acceptable Solution

JUNCTIONS WITH WALLS FOR BUTYNOL®

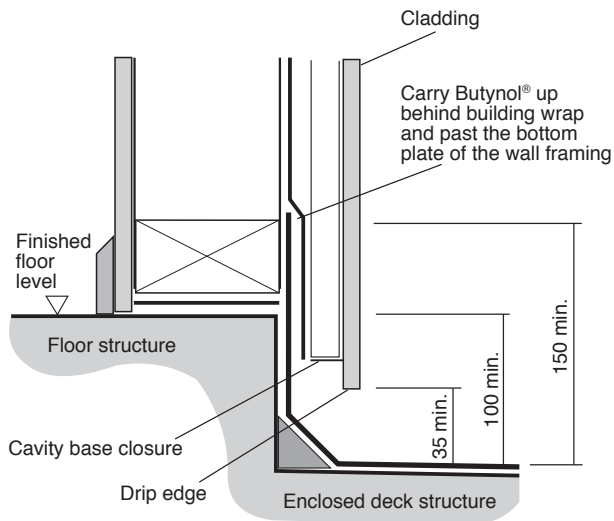
Direct fix threshold at wall



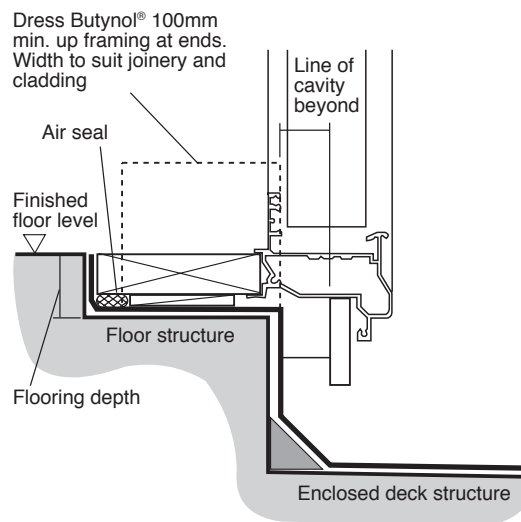
Direct fix threshold at opening



Cavity threshold at wall



Alternative threshold at opening



- NOTE: 1 Internal corners to be formed as shown on page 26
 2 Dimensions are shown to Butynol®. However, where there is an additional material applied over the Butynol® all dimensions shall apply to the highest level of the wearing surface

LOOSE LAID APPLICATION OF BUTYNOL® ROOFING

Materials used shall be as previously specified. When the surface is suitably prepared a large fully vulcanised Butynol sheet or sheets can be unrolled and spread over the prepared area and allowed to remain in this position for approximately one hour to relieve stresses induced by manufacture and storage. If necessary for ease of handling, these sheets can be supplied in varying sizes and vulcanised on site using an Ardex vulcanising machine or using seam tape with seam primer.

The Butynol® sheet shall be set out in the exact position in which it will be finally required and whilst it is held firmly in place it shall be folded back at least one metre from the roof's surrounding parapet or wall to allow the application of adhesive to that area of the exposed substrate.

WA98 adhesive may be applied to the substrate and the corresponding area of Butynol® sheeting which may then, when the adhesive is touch dry, be worked back into its required position avoiding wrinkles and the inclusion of air bubbles.

Upon completion of the detail work, parapets, drains and rainheads etc a layer of rounded gravel 30-40mm should be applied up to 50mm deep, over a layer of Geo Textile Fabric for protection of the Butynol® sheet.

Care must be taken at outlets to ensure the ballast cannot enter or cause a blockage that prevents rainwater from leaving the roof area. Maintenance paths should be created to air-conditioning or roof plant with concrete tiles.

Effects on the membrane in areas of high wind can be eliminated by stabilising the ballast with cement. Dry cement should be broadcast over the 30-40mm gravel with a broad mouth shovel and left to hydrate or lightly sprayed with water to set off.

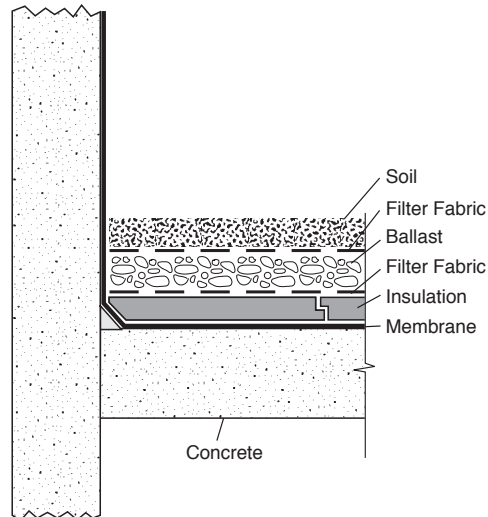
If possible a water test should be carried out prior to the application of ballast.

Note: Minimum pitch 2.0° to comply.

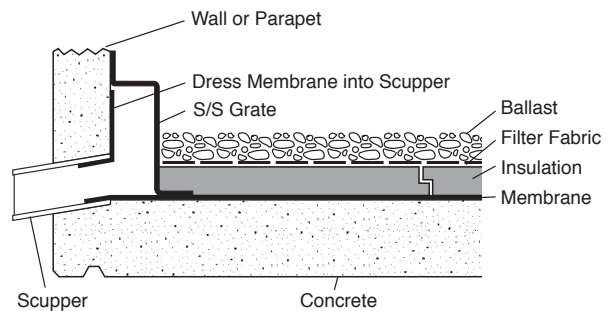
Refer NZBC Clause E@/AS1 External Moisture 8.5.1 (a).

Butynol® can be laid with zero pitch if compliance can be obtained. Lap may be welded in factory or on site if required.

TYPICAL BALLASTED/GARDEN ROOF DETAIL



SCUPPER ROOF OUTLET



SCUPPER ROOF OUTLET & GRAVEL RETAINER

