



BRANZ Appraised

Appraisal No.728 [2011]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
No. 728 (2011)**

Amended 24 May 2013

**ARDEX WPM 615 TPO
ROOFING MEMBRANE**

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Product

1.1 Ardex WPM 615 TPO Roofing Membrane is a single ply, adhesive fixed, polyester weft reinforced, thermoplastic polyolefin (TPO) waterproofing sheet membrane for building roofs.



The roof of the Scenic Circle Aurum Hotel, Queenstown.

Scope

2.1 Ardex WPM 615 TPO Roofing Membrane has been appraised as a roof waterproofing membrane 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 roof supporting structures of timber framing with substrates of plywood; and,
- with substrates of suspended concrete slabs; and,
- situated in NZS 3604 Wind Zones, up to, and including 'Extra High'.

2.2 Ardex WPM 615 TPO Roofing Membrane has also been appraised for use as a roof waterproofing membrane on specifically designed buildings within the following scope:

- with building structures designed and constructed to comply with the NZBC; and,
- with roof supporting structures of timber framing with substrates of plywood; and,
- with substrates of suspended concrete slab; and,
- subjected to maximum wind pressures (Refer Paragraph 8.1); 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 Appraisal.

2.3 Roofs waterproofed with Ardex WPM 615 TPO Roofing Membrane must be designed and constructed in accordance with the following limitations:

- nominally flat, curved or pitched roofs constructed to drain water to gutters and drainage outlets complying with the NZBC; and,
- constructed to suitable falls (Refer Paragraph 14.3); and,
- with no integral roof gardens.

2.4 The design and construction of the substrate and movement and control joints is specific to each building, and therefore is the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.

2.5 The membrane must be installed by Ardex New Zealand Limited approved applicators.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Ardex WPM 615 TPO Roofing Membrane, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years. Ardex WPM 615 TPO Roofing Membrane meets this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1, E2.3.2 and E2.3.6. Roofs incorporating Ardex WPM 615 TPO Roofing Membrane meets these requirements. See Paragraphs 14.1 – 14.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Ardex WPM 615 TPO Roofing Membrane meets this requirement and will not present a health hazard to people.

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

Technical Specification

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

Ardex WPM 615 TPO Roofing Membrane

- Is a fully adhered roofing system based on a thermoplastic polyolefin (TPO) sheet, with non-halogenated flame retardants laminated around a polyester weft reinforcement. It is supplied in grey or white in rolls 1.5 mm thick, 2.0 m wide and 30.5 m long.

Ardex WPM 623 – TPO Flashing

- Is a non reinforced TPO membrane designed to be used in situation where a pre-moulded accessory is not available. It is supplied as a 0.61 m x 15.25 m roll in colours of white and grey.

Ardex TPO Inside/Outside Corners

- Are made from a flexible non reinforced TPO and are specifically designed for flashing inside or outside corners. They are supplied as a 76 mm x 76 mm x 82 mm corner with a 12.7 mm radius on all edges of the raised corner, in colours of white or grey.

Ardex TPO Universal and Large Pipe Flashing

- Are TPO membrane flashings, designed for flashing of round penetrations. The universal is used for flashing round penetrations with an outside diameter of 25.4 mm to 152.4 mm; the large is used for flashing round penetrations with an outside diameter of 101.6 mm to 203.2 mm. They are supplied in colours of white and grey.

Ardex TPO QuickSeam Flashing

- Is a non reinforced TPO membrane laminated to a white cured seaming tape for flashing metal roof edging profiles and other details as indicated by Ardex New Zealand Limited. It is supplied as a 0.14 m x 30.5 m roll, in white.

Ardex WPM 642 – Water Based Bonding Adhesive

- Is a water based contact adhesive for bonding Ardex WPM 615 TPO membrane to wood, metal and other acceptable substrates. It is supplied as a grey colour in 18.9l pails.

Ardex WPM 651 – TPO Cut Edge Sealant

- Is a polymer based sealant designed to seal cut edges of Ardex WPM 615 TPO membrane where the scrim reinforcement is exposed. It is supplied as white or grey in cartons of 4 bottles.

Ardex WPM 657 – TPO General Purpose Sealant

- Is a high quality sealant with excellent adhesion to a variety of surfaces, used as a termination bar caulk and cut edge/seam sealant. It is supplied in cartridges, coloured white.

Ardex WPM 659 – TPO Pourable Sealant

- Is a two component polyurethane sealer designed to seal around small pipe penetration, clusters of pipes, I beams etc in a penetration pocket detail. It is supplied in 3.78l packs and is coloured black.

Ardex All Purpose Fasteners

- Are specifically designed for mechanical attachment of the Ardex TPO membrane to steel, plywood and timber decks. They are supplied as 32 mm long screws, coloured red.

Ardex HD Seam Plate

- Are specifically designed to be used for the attachment of Ardex TPO membranes to approved substrates using Ardex All Purpose Fasteners. They are supplied as 60.3 mm diameter plates.

Ardex Pressure Seal

- Is designed for termination of Ardex TPO membrane against smooth walls in all roofing situation. They are supplied as 3.1 m x 35 mm x 2.2 mm thick bars.

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 lying down on pallets.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Ardex WPM 615 TPO Roofing Membrane. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 Ardex WPM 615 TPO Roofing Membrane is for use on roofs where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas.

7.2 Ardex WPM 615 TPO Roofing Membrane can be adversely affected by contact with bituminous materials or polystyrene insulation. Ardex New Zealand Limited should be contacted for advice in either of these situations.

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 AS/NZS 1170. In all cases framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and that all sheet edges are fully supported.

7.5 Where regular foot traffic is envisaged i.e. maintenance of lift equipment, a walkway over the membrane should be used to ensure the membrane is protected. Ardex WPM 615 TPO Roofing Membrane is designed for limited, irregular pedestrian access only.

Structure

8.1 Ardex WPM 615 TPO Roofing Membrane fully bonded is suitable for use in areas subject to maximum wind pressure of 3 kPa Ultimate Limit State subject to the limitations of the substrate.

Substrates

Plywood

9.1 Plywood must be treated to H3 (CCA treated). LOSP treated plywood must not be used. 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.

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 Ardex WPM 615 TPO Roofing Membrane when subjected to normal conditions of environment and with proper maintenance can expect to have a serviceable life of at least 15 years.

Maintenance

11.1 Maintenance requirements of the membrane are provided by the membrane supplier.

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 membrane must be protected from heat sources such as flues and chimneys in accordance with the requirements of NZBC Acceptable Solution C/AS1 Part 9 for the protection of combustible materials.

Spread of Fire

13.1 The membrane may be used on roofs of buildings intended for all Purpose Groups, including SC and SD, subject to the requirements of NZBC Acceptable Solution C/AS1 Part 7, Paragraph 7.11.1.

13.2 The membrane may be used on fire-rated roof construction, providing the roof construction complies with the requirements of NZBC Acceptable Solution C/AS1 Part 7.

External Moisture

14.1 Roofs 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.

14.2 When installed in accordance with this Appraisal and the Technical Literature, Ardex WPM 615 TPO Roofing Membrane will prevent the penetration of water and will therefore meet code compliance with NZBC Clause E2.3.2. The membrane is impervious to water and will give a weathertight roof.

14.3 The minimum fall for roofs is 1 in 30 and for gutters is 1 in 100. All falls must slope to an outlet. Inadequate falls will allow moisture to collect and increase the risk of deterioration of the membrane. *Note: Where possible, BRANZ recommends falls in gutter to be 1 in 60.*

14.4 Roof falls must be built into the plywood substrate.

14.5 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 roof does not drain to an external gutter or spouting.

14.6 Penetrations and upstands of the membrane must be raised above the level of any possible flooding caused by blockage of roof drainage.

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

14.8 Ardex WPM 615 TPO Roofing Membrane is impermeable; therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with NZBC Clause E2.3.6.

Installation Information

Installation Skill Level Requirement

15.1 Installation of the membrane 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 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.

Membrane Installation

17.1 The installation of this membrane system is very complex and limited to trained applicators only. The Ardex New Zealand Limited Applicators Manual should be referred in all instances for the correct procedures.

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 Technical Literature instructions.

Health and Safety

19.1 Safe use and handling procedures for the membrane system is provided in the Technical Literature.

The product must be used in conjunction with the relevant Materials Safety Data Sheet.

Sources of Information

- AS/NZS 2269: 2008 Plywood – structural.
- BRANZ Good Practice Guide – Membrane Roofing, October 2003.
- AS/NZS 1170: 2002 Structural Design action – general principles.
- NZS 3101: 2006 The design of concrete structures.
- NZS 3604: 2011 Timber-framed buildings.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (Amendment 5, 1 August 2011).
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition (Amendment 12, 10 October 2011).
- The Building Regulations 1992.

Basis of Appraisal

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

Tests

20.1 Testing has been carried out on the membrane by various organisations for tensile strength, elongation, joint peel and shear strength, cold bending after UV aging, static load resistance, water pressure resistance, water vapour permeability, shear / joint strength, adhesion to plywood, peel adhesion, resistance to aging, resistance to impact, resistance to frost, resistance to freeze/thaw, elongation, seam strength, breaking strength, low temperature brittleness point, water absorption and resistance to UV.

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

Other Investigations

21.1 A durability opinion has been given on Ardex WPM 615 TPO Roofing Membrane 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 Ardex WPM 615 TPO Roofing Membrane has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.

22.2 The quality of supply of the product to the market is the responsibility of Ardex New Zealand Limited.

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

22.4 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.



BRANZ

In the opinion of BRANZ, [Ardex WPM 615 TPO Roofing Membrane](#) is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to [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

A handwritten signature in black ink, which appears to read "Peter Burghout".

P Burghout
Chief Executive

Date of issue: 18 May 2011

Amendment No. 1, dated 31 January 2012.

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

Amendment No. 2, dated 24 May 2013.

This Appraisal has been amended to update the gutter fall requirements.