BRANZ Appraised
Appraisal No. 463 [2017]

ARDEX SHELTERBIT MEMBRANES

Appraisal No. 463 (2017)

This Appraisal replaces BRANZ Appraisal No. 463 (2011)

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 ARDEX Shelterbit Membranes are waterproofing membranes for nominally flat and pitched roofs and decks. They are installed as multi-layer systems with a mineral chip finished product or as a single layer system onto a concrete substrate under heavy protection such as paving slabs or a topping screed.

Scope

2.1 ARDEX Shelterbit Membranes have been appraised as roof and deck waterproofing membranes on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; or,
- the scope of limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area when subject to specific structural design; and,
- with substrates of plywood, Strandsarking (roofs only) or suspended concrete slab; and,
- with minimum falls for plywood roofs of 1:30, concrete roofs of 1:60 and decks of 1:40; and,
- with deck size limited to 40 m^2; and,
- situated in NZS 3604 Wind Zones, up to, and including Extra High.

2.2 ARDEX Shelterbit Membranes have also been appraised as roof and deck waterproofing membranes on buildings within the following scope:

- subject to specific structural and weathertightness design; and,
- with substrates of plywood, Strandsarking (roofs only) or suspended concrete slab; and,
- situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 6 kPa; and,
- with the weathertightness design of junctions for each specific structure being the responsibility of the building designer.

2.3 Roofs and decks waterproofed with ARDEX Shelterbit Membranes must be designed and constructed in accordance with the following limitations:

- nominally flat or pitched roofs and decks constructed to drain water to gutters and drainage outlets complying with the NZBC; and,
- with no steps within the deck level, no integral roof gardens and no downpipe direct discharge to the deck;
- with the deck membrane continually protected from physical damage by a pedestal protection system.

2.4 The design and construction of the substrate and movement and control joints is specific to each building, and is therefore is 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 trained installers, approved by ARDEX New Zealand Ltd.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, ARDEX Shelterbit 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 and B2.3.2. ARDEX Shelterbit Membranes meet these requirements. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. ARDEX Shelterbit Membranes meet these requirements. See Paragraphs 14.1 – 14.9.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. ARDEX Shelterbit Membranes meet this requirement and will not present a health hazard to people.

Technical Specification

4.1 Materials supplied by ARDEX New Zealand Ltd are as follows:

- **Shelterbit Membranes General** - These are general torch-on membranes used either as single layer protected systems or as base and intermediate layers in built-up systems. They are supplied in thicknesses of 2.5, 3.5 or 4.0 mm and have a sand finish top surface and a thermofusible film backing. The 4.0 mm thick membrane must be used for single layer protected systems.
- **Shelterbit WPM 444 Membrane** - A 4.1 mm thick reinforced APP modified bitumen torch-on membrane with either a sanded or talc surface and an embossed bottom surface protected by a heat sensitive polythene film.
- **Shelterbit Duo Mineral Membrane WPM 189** - A 4.0 mm thick (excluding the slate finish) SBS/APP plastomeric type modified bitumen torch-on membrane with a mineral top surface and an embossed bottom surface protected by a heat sensitive polythene film. It is designed to be used as the cap layer and is available in various colours.
- **ARDEX WPM 150 Shelterstick** - A 2.0 mm thick self-adhesive bituminous membrane with a thermo fusion film backing. It is designed to be used as a base layer on heat sensitive substrates.
- **ARDEX WPM 114** - A 4.0 mm APP vented base sheet. It can be counted as a waterproof layer in a multi layer system.
- **Shelterbit Primer WPM 240** - A solvent-based, bitumen modified, black liquid primer available in 5 and 20 litre cans.
- **Shelter Primer WPM 247** - A water-based bitumen modified black liquid primer available in 5 and 20 litre containers..

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 Trained Installers. 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 ARDEX Shelterbit 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 ARDEX Shelterbit Membranes are for use on roofs and decks where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas. The products can be used on new or existing buildings. ARDEX New Zealand Limited must be consulted as to the suitability of any existing substrates prior to using ARDEX Shelterbit Membranes.

7.2 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membranes. Refer to BRANZ publication Good Practice Guide - Membrane Roofing.

7.3 The Shelterbit General Membrane is designed for use on roofs and decks as the first layer of a double layer system and all areas requiring detailing such as upstands, protrusions, rainwater heads and outlets. The Shelterbit Mineral and Duo Mineral Membrane are used as the top layer of double layer systems.

7.4 Decks must always be protected from physical damage by a pedestal protection system.

Structure

8.1 ARDEX Shelterbit Membranes fully bonded double layer systems are suitable for use in areas subject to maximum wind pressures of 6kPa Ultimate Limit State.

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. Timber framing must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of 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 all sheet edges are fully supported.

Strandsarking

9.2 Strandsarking must be installed in accordance with the manufacturer's instructions and BRANZ Appraisal No. 946 (2016).

Concrete

9.3 Concrete substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101.

Existing Construction

9.4 A thorough inspection of the substrate must be made to ensure it is in fit condition and does not contain any materials that will adversely affect the performance of the membrane.

9.5 Repairs must be undertaken, where applicable, to ensure the substrate is sound, the joints are sealed, and the flashings are sound. Plywood substrates must be checked for screw fixings, and if necessary refixed as for new plywood.

Durability

Serviceable Life

10.1 ARDEX Shelterbit Membranes are expected to have a serviceable life of at least 15 years, provided they are designed, used, installed and maintained in accordance with this Appraisal and the Technical Literature.

Chemical Resistance

10.2 Industrial air pollutants and windborne salt deposits should not significantly affect the durability of the membranes. However, the long term properties of the material may be affected by contact with petroleum-based products such as oils, greases and solvents.

Maintenance

11.1 The membrane roof and deck system, including any areas with a UV coating applied, must be regularly (at least annually) checked for damage, rubbish, debris or coating breakdown. Damage, such as small punctures and tears must be repaired and coatings reapplied as recommended by ARDEX New Zealand Ltd.

11.2 Special care must be taken when inspecting the membrane roof systems to ensure the continuing prevention of moisture ingress, and repairs must be undertaken where required.

11.3 Drainage outlets must be maintained to operate effectively.

Prevention of Fire Occurring

12.1 Separation or protection must be provided to ARDEX Shelterbit Membranes from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

13.1 Roofs and decks 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 aligns with details in NZBC Acceptable Solution E2/AS1.

13.2 When installed in accordance with this Appraisal and the Technical Literature, ARDEX Shelterbit Membranes will prevent the penetration of water and will therefore meet code compliance with NZBC Clause E2.3.2. The membranes are impervious to water and will give a weathertight roof or deck.

13.3 Roof and deck falls must be built into the substrate.

13.4 The minimum fall for roofs is 1 in 30. The minimum fall for plywood decks is 1 in 40, suspended concrete slab 1 in 60, and gutters 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 poosible a fall of 1 in 60 in the gutters is preferred.)*

13.5 Allowance for deflection and settlement of the substrate must be made in the design of the roof or deck to ensure falls are maintained and no ponding of water can occur.

13.6 ARDEX Shelterbit Membranes are 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.

13.7 Drainage flanges must be used for any outlet and must be fitted with a grate or cage to reduce potential sources of blockages. An overflow must be provided where the roof or deck does not drain to an external gutter or spouting.

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

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

Water Supplies

14.1 ARDEX Shelterbit Membranes have not been assessed for roofs used for the collection of potable water.

Installation Information

Installation Skill Level Requirement

15.1 Installation of the membranes must be completed by trained installers, approved by ARDEX New Zealand Ltd.

15.2 Installation of substrates must always be carried out in accordance with the ARDEX Shelterbit membranes Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant Licence Class.

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 The relative humidity of concrete substrates must be 75% or less before membrane application. The concrete can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 585.

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

16.4 All substrates must be primed with Shelterbit Primer and left to dry (1 hour) before the membrane is installed.

Membrane Installation

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

17.2 All roof or deck and wall junctions must have a 20 mm x 20 mm wooden fillet installed at the junction. Concrete substrate junctions must have a 20 mm x 20 mm cement mortar fillet installed. All external edges must be chamfered to a 5 mm radius to remove sharp edges.

17.3 The membrane must be unrolled without tension onto the prepared substrate and allowed to 'relax' for at least 30 minutes prior to installation.

17.4 The membrane is installed from the lowest point and each layer is installed across the roof fall allowing a 100 mm side overlap and a 200 mm end overlap. The cap sheet layer must be offset against the base sheet layer.

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 installation of the membrane.
- Installation of the membrane to the manufacturer's instructions.

Health and Safety

19.1 Safe use and handling procedures for ARDEX Shelterbit Membranes are provided in the Technical Literature. The products must be used in conjunction with the relevant Material Safety Data Sheets for each membrane.

Basis of Appraisal

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

Tests

20.1 Testing of Phoenix Star and Phoenix Star Mineral [Shelterbit Membranes] have been undertaken by ICITE, which formed the basis of the technical investigations and evaluation undertaken by the British Board of Agrément [BBA] for issue of the current BBA Certificate covering these products. This testing covered: tensile strength, elongation at break, tear strength, dimensional stability, low temperature flexibility, heat resistance, unrolling at low temperatures, sliding resistance, watertightness, static indentation, dynamic indentation, fatigue cycling, peel resistance, softening point, penetration, air pressure of joints, tensile strength of joints and peel strength of joints. Some testing covered heat aged, UV aged and water soaked samples as well as controls.

20.2 The Shelterbit Duo has been tested for tensile, elongation, tear resistance, adhesion of granules, dimensional stability, flow resistance and pliability at low temperature and is a CE marked product.

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

Other Investigations

21.1 A durability opinion has been provided by BRANZ technical experts.

21.2 Site inspections have been carried out by BRANZ to examine the practicability of installation and found to be satisfactory.

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

Quality

22.1 The manufacture of the membranes and primer 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. An examination of the manufacturing practice and quality control procedures employed in the manufacture of the membranes is subject to the ongoing validity of the current BBA Certificate.

22.2 The quality of the supply of products to the New Zealand market is the responsibility of ARDEX New Zealand Ltd.

22.3 Quality on site is the responsibility of trained installers, approved by ARDEX New Zealand Ltd.

22.4 Designers are responsible for the building design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of ARDEX New Zealand Ltd and this Appraisal.

22.5 Building owners are responsible for the maintenance of the membrane systems in accordance with the instructions of ARDEX New Zealand Ltd and this Appraisal.

Sources of Information

- AS/NZS 2269: 2012 Plywood – structural.
- AS/NZS 1170: 2002 Structural design actions.
- BBA Certificate No. 99/3586/C Phoenix Star and Phoenix Star Mineral Roof Waterproofing Membranes.
- BRANZ Appraisal No. 946 [2016] Strandsarking for Low Slope Membrane Roofs.
- BRANZ Good Practice Guide, Membrane Roofing, October 2015.
- NZS 3101: 2006 Concrete structures standard.
- NZS 3604: 2011 Timber framed buildings.
- Acceptable Solutions and Verification Methods for New Zealand Building Code, External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 [Amendment 7, 01 January 2017].
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

BRANZ

In the opinion of BRANZ, ARDEX Shelterbit 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

Chelydra Percy
Chief Executive

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17 January 2018