



**BRANZ Appraised**  
Appraisal No.463 [2005]

BRANZ Appraisals

Technical Assessments of products  
for building and construction

**BRANZ  
APPRAISAL  
CERTIFICATE  
No. 463 (2005)**

**SHELTERBIT ROOFING  
MEMBRANES**

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## Product

1.1 Shelterbit Roofing Membranes are waterproofing membranes for flat, pitched and curved roofs. They are installed as a multi-layer system with a mineral chip finished product as the top layer, or as a single layer system under heavy protection such as paving slabs or a topping screed.

1.2 The products are supplied as torch-on and adhesive fixed, reinforced, polymer-modified bitumen sheets in roll form.



*Shelterbit Phoenix Star Mineral - Shopping Centre in Ascoli, South Italy (14,000m<sup>2</sup>).*

## Scope

2.1 Shelterbit Roofing Membranes have been appraised as roof waterproofing membranes and for use as upstands, gutters, rainwater heads and drain outlets for buildings within the following scope:

- with nominally flat (minimum falls of 1:40), curved or pitched roofs constructed to drain water to gutters and drainage outlets complying with the NZBC; and,
- with clean, sound, substrates of concrete or plywood complying with the NZBC; and,
- with the substrate supporting structure designed and constructed in accordance with the NZBC.

2.2 The membranes must be installed by Ardex NZ Ltd trained installers in accordance with the Ardex NZ Ltd Technical Literature referenced in Paragraph 6.1.

## Building Regulations

### New Zealand Building Code (NZBC)

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

**Clause B2 DURABILITY:** Performance B2.3.1 (b) 15 years. Shelterbit Roofing Membranes meet this requirement. See Paragraphs 11.1 and 11.2.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.1 and E2.3.2. Shelterbit Roofing Membranes meet these requirements. See Paragraphs 15.1 – 15.5.

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

3.2 This Certificate appraises an Alternative Solution in terms of New Zealand Building Code compliance. The membranes are an alternative to the membranes specified in NZBC Acceptable Solution E2/AS1 Third Edition June 2004, and an Alternative Solution subject to specific design for other buildings not covered within E2/AS1.

## Technical Specification

4.1 All membranes are combined reinforced (polyester and fibreglass) atactic polypropylene (APP) modified bitumen membranes meeting the requirements of BS 747: 1994 when used as part of a built-up specification. They are supplied in various thicknesses in rolls 1 metre wide by 10 metres long, except 2.5 mm thickness where rolls are 15 metres long.

4.2 Materials supplied by Ardex NZ 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 Mineral

- A 4.0 mm thick (excluding the slate finish) torch-on membrane with a slate finish top surface and a thermofusible thermoplastic film backing. It is designed to be used as the cap layer and is available in grey, green, white, black or red.

### Shelterbit Fibre-backed Base Sheet

- A 2.7 mm thick membrane with a polythene top surface and a polyester fleece backing for adhesive fixing. It is designed to be used as a base sheet when adhesive fixed over plywood substrates.

### Shelterbit Vented Base Sheet

- A 0.8 mm thick APP sheet with a torchable film on the upper and lower surface. The sheet contains 119, 40 mm holes per square metre. It is designed to be used as the base sheet in a multi-layer system on a concrete substrate. It must not be counted as a waterproofing layer in a multi-layer system.

### Shelterbit Primer

- A solvent-based, bitumen modified, black liquid primer available in 5 and 20 litre cans.

### Shelter Adhesive

- A solvent-based contact adhesive in 4 and 20 litre cans.

## Handling and Storage

5.1 Handling and storage of all materials whether on or off site is under the control of the Ardex NZ Ltd 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 Shelterbit Roofing Membranes. The Technical Literature must be read in conjunction with this Certificate. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Certificate must be followed.

## Design Information

### General

7.1 Shelterbit Roofing Membranes are designed for use as a multi-layer system on concrete or plywood substrates, or as a single layer system on concrete substrates with a protective topping such as paving slabs or concrete.

7.2 The base layer on plywood substrates must be Shelterbit Fibre-backed Base Sheet adhesive fixed, and the base layer on concrete may be any of the non-mineral Shelterbit membranes torch bonded (refer 4.2). The top layer of multi-layer systems is always Shelterbit Mineral.

7.3 The membranes may also be used for upstands, gutters, rainwater heads, drain outlets and the like associated with roof cladding systems.

7.4 Roofs may be nominally flat, pitched or curved, however, for flat roofs minimum 1:40 falls must be used to prevent ponding. At walls or parapets an upstand must be provided.

7.5 The membrane systems are designed for use on non-trafficable roofs with limited access, except where specifically designed paving slab or concrete topping systems are installed. Non-trafficable, limited access roofs are defined for the purposes of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, drain outlets and rainwater heads. Where traffic in excess of this is envisaged, special precautions, such as additional protection to the membrane must be taken, and is outside the scope of this Certificate.

7.6 Care should be taken to minimise the number of penetrations required through the membrane. Sufficient space must be allowed between penetrations and roof upstands to ensure access for detailing work.

7.7 Substrate design must incorporate fillets to internal corners and chamfers to external corners in accordance with the Technical Literature.

7.8 Plywood must comply with AS/NZS 2269 and be H3.2 treated. LOSP treated plywood must not be used under any circumstances.

### Buildings to NZBC Acceptable Solution E2/AS1 Plywood Substrates and Framing

8.1 Plywood must be supported by timber framing systems complying with NZS 3604, or where specific engineering design input is required to the building, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of NZS 4203. Framing must be provided so that the maximum span of either the primary or the secondary support shall be 400 mm and plywood shall be laid with the face grain at right angles to the supports.

8.2 Plywood must be a minimum of 17 mm thickness and at least CD Structural Grade with the sanded C face upwards.

8.3 Plywood must be fixed with 10 g x 50 mm stainless steel countersunk head screws at 150 mm centres on edges and 200 mm centres in the body of the sheet. A 3 mm gap must be left between all sheets where sheets are butted, except where tongue-in-groove joints are used.

### Roof Drainage

8.4 Roofs must be constructed so that falls and drainage comply with Paragraph 8.5.6 of NZBC Acceptable Solution E2/AS1 Third Edition June 2004. Internal gutters must be constructed with minimum 1:100 falls, with no seams in the gutters closer than 1 m to an outlet.

## Junctions and Penetrations

8.5 Junctions of the roof to walls must comply with Paragraph 8.5.8 of NZBC Acceptable Solution E2/AS1 Third Edition June 2004, and penetrations must comply with Paragraph 8.5.9.

## Specifically Designed Buildings

### Plywood Substrates

9.1 Plywood substrates must be supported by a framing system meeting the requirements of the NZBC and the plywood manufacturer's specifications. Plywood must be of a thickness and grade to meet specific structural design requirements. Plywood must be secured to the structure to resist wind uplift and all other forces acting on the roof, such as deflection from gravity and incidental live loads.

### Concrete Substrates

9.2 Concrete substrates must be to a specific engineering design meeting the requirements of the NZBC.

### Roof Drainage, Junctions and Penetrations

9.3 A specific weathertightness design must be undertaken for each roof for roof drainage, junctions and penetrations to meet the requirements of the NZBC.

## Structure

### General

10.1 The prerequisite for the application to all substrates is that the substrate is capable of carrying the loads, is to the correct fall and does not deform.

10.2 Structural movement of the substrate must be adequately allowed for, and movement joints provided. The configuration and location of the joints in the substrate should be carefully considered. Conventional construction and movement (including seismic) joint details may be used. The BRANZ Good Practice Guide for Membrane Roofing gives guidance in this area.

10.3 The membrane needs to be considered as part of the total roof design, and as such will need to be stopped at formed waterproof construction and movement joints where these are installed. In common with any roof membrane system, the ability of the product to resist structural movement will decrease with age. As a result, premature failure may occur at structural movement joints if these are not designed and installed correctly.

## Durability

### Serviceable Life

11.1 Shelterbit Roofing 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 Certificate and the Technical Literature.

### Chemical Resistance

11.2 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

12.1 The membrane roof system must be regularly (at least annually) checked for damage, and to remove rubbish or debris. Damage, such as small punctures and tears must be repaired as recommended by Ardex NZ Ltd.

12.2 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.

## Outbreak of Fire

13.1 Separation or protection must be provided to the membranes and plywood substrate from heat sources such as flues and chimneys.

13.2 NZBC Acceptable Solution C/AS1 Part 9 and Verification Method C/MM1 provide methods for separation and protection of combustible materials from heat sources.

## Spread of Fire

14.1 The membranes 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.

14.2 The membranes may be used for cladding fire-rated roof construction, providing the roof construction complies with the requirements of NZBC Acceptable Solution C/AS1 Part 7.

## External Moisture

15.1 Shelterbit Roofing Membranes, when installed in accordance with this Certificate and the Technical Literature, will provide a roof that will shed precipitated water and melted snow, and prevent the penetration of water that could cause undue dampness or damage to building elements.

15.2 The membrane systems must be installed and maintained in a weatherproof state at a minimum recommended fall of 1:40. All membrane joints must be as detailed in the Technical Literature.

15.3 At penetrations, the membrane must be raised to a level above that of any possible ponding that may be caused by blockage of roof drainage facilities.

15.4 Side laps must be a minimum of 100 mm and end laps must be a minimum of 150 mm. All laps joints must be torch sealed and staggered.

### Provisions for Snow

15.5 Specific weathertightness design for preventing the ingress of snow melt water is required in accordance with the requirements of NZBC Acceptable Solution E2/AS1 June 2004, Paragraph 1.3.

## Internal Moisture

16.1 The impermeability of the membranes requires that consideration must be given to the effective control of moisture in the roof structure, and closed-in construction spaces under the membrane must have adequate ventilation to prevent the accumulation of moisture. Venting and vapour barrier requirements will depend on the level of moisture that is present in the construction at the time of installation, the nature of the ceiling/roof construction, and the type of occupancy.

16.2 Roof construction that is dry and over areas of low moisture levels, such as found in offices, shops, and domestic buildings will generally require very little venting, and a painted ceiling will suffice as a vapour barrier. However, over areas of high moisture levels, such as found in laundries, commercial kitchens, internal swimming pools and spa rooms, the roof space will require venting, coupled with the proper use of vapour barriers. The BRANZ Good Practice Guide for Membrane Roofing provides details that should be followed in regard to vapour barrier installation and the venting of roof spaces.

16.3 The membranes must not be installed over wet construction. New concrete substrates must be allowed to cure

and dry before applying the membrane. The membrane must not be applied to screeds over substrates impermeable to water vapour until the screeds are completely dry.

16.4 There must be a minimum gap of 25 mm between the underside of the substrate and any insulation material.

## Water Supplies

17.1 Shelterbit Roofing Membranes have not been assessed for roofs used for the collection of water supplies in compliance with the provisions of NZBC G12.3.1.

## Installation Information

### Installation Skill Level Requirement

18.1 Installation of the membranes must be completed by Ardex NZ Ltd trained installers.

## System Installation

### Substrate Preparation

19.1 All surfaces must be checked to ensure they are dry, clean, smooth and free from sharp edges, loose or foreign materials, oil, grease or other deleterious material that may affect adhesion of the membranes or may damage the membrane.

19.2 Plywood must be fixed using stainless steel countersunk head screws only, and sheets must have 3 mm gaps between joints except where tongue-in-groove joints are used. For specifically designed buildings, fixings must be of a size and at centres to resist the design wind uplift pressures for the particular site, otherwise fixings are in accordance with NZBC Acceptable Solution E2/AS1 Third Edition June 2004. Plywood must be laid with the face grain at right angles to the main support framing, and with staggered joints (brick bond pattern).

19.3 Plywood and framing at the time of membrane application must have a maximum moisture content of 20%, or lower if specified by the plywood manufacturer.

19.4 The relative humidity of the concrete surface must be 75% or less before laying the membrane. Concrete slabs can be checked for dryness by using a hygrometer.

### Priming

19.5 Prior to application of the membrane all prepared concrete surfaces must be primed at a rate of 5-6 m<sup>2</sup> per litre, and allowed to dry.

### Membrane Installation

19.6 The membrane must be installed in accordance with the Technical Literature.

19.7 Bonding of torch-on sheets is achieved by melting the lower surface by torching and pressing the membrane down. Care must be taken not to overheat the membrane. A bead of molten material must exude from all laps to indicate a satisfactory seal. On all lower layer membranes this bead can be trowelled level using a rounded tipped trowel. On the mineral-capping layer the exuded bead must have extra mineral chip applied while still hot.

19.8 Adhesive fixing is carried out by applying the adhesive with a brush, roller or airless spray. The adhesive is applied to both the plywood substrate and the polyester fleece backing of the fibre backed base sheet. The membrane can be rolled after positioning if required.

### Inspections

19.9 The Technical Literature must be referred to by building consent authorities and territorial authorities during the inspection of membrane installations .

## Health and Safety

20.1 Safe use and handling procedures for the membrane systems is provided in the Technical Literature.

## Basis of Appraisal

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

### Tests

21.1 Testing of Phoenix Star and Phoenix Star Mineral (Shelterbit Membranes) has 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. Test methods and results have been reviewed by BRANZ and found to be satisfactory.

### Other Investigations

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

22.2 Installation of the membranes has been assessed by BRANZ for practicability of installation and found to be satisfactory.

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

### Quality

23.1 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.

23.2 The quality of materials supplied by Ardex NZ Ltd is the responsibility of Ardex NZ Ltd.

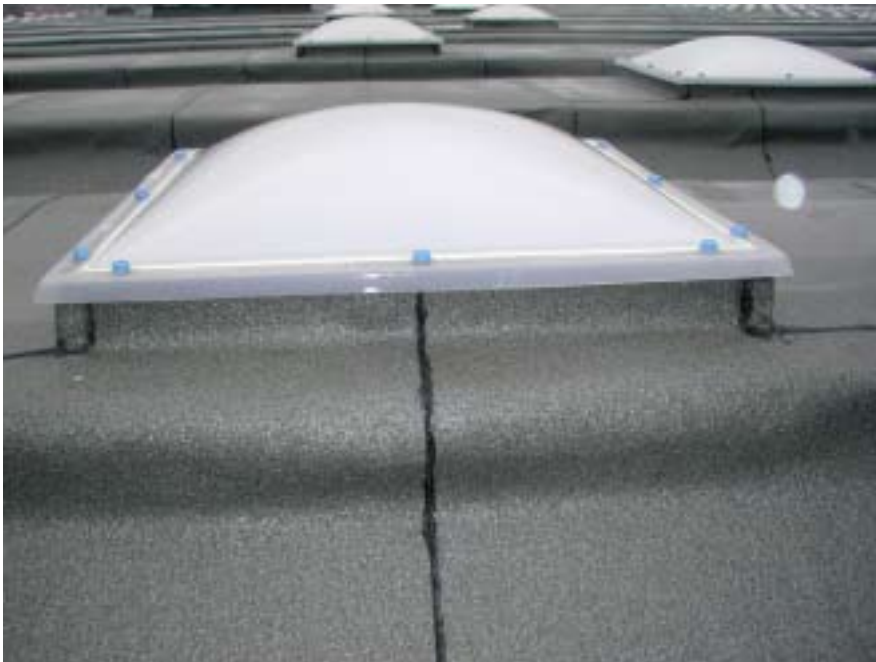
23.3 Quality on site is the responsibility of the Ardex NZ Ltd trained installers.

23.4 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 NZ Ltd and this Certificate.

23.5 Building owners are responsible for the maintenance of the membrane systems in accordance with the instructions of Ardex NZ Ltd and this Certificate.

## Sources of Information

- AS/NZS 2269: 1994 Plywood – structural.
- BRANZ Good Practice Guide – Membrane Roofing, reprint October 2003.
- British Board of Agrément Certificate No. 99/3586/C Phoenix Star and Phoenix Star Mineral Roof Waterproofing Membranes.
- NZS 3101: 1995 The design of concrete structures.
- NZS 3604: 1999 Timber framed buildings.
- NZS 4203: 1992 General structural design and design loadings for buildings.
- Approved Document for New Zealand Building Code External Moisture Clause E2, Building Industry Authority, Third Edition June 2004.
- New Zealand Building Code Handbook and Approved Documents, Building Industry Authority, 1992.
- The Building Regulations 1992, up to, and including April 2003 Amendment.



*Shelterbit Phoenix Star Mineral - Typical Skylight Detail*



*Shelterbit Phoenix Star Mineral - Shopping Centre in Cussignacco, North Italy (3,000m<sup>2</sup>).*



**BRANZ**

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

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

### Conditions of Certification

1. This Certificate:
  - a) relates only to the product as described herein;
  - b) must be read, considered and used in full together with the technical literature;
  - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
  - d) is copyright of BRANZ.
2. The Certificate Holder:
  - a) continues to have the product reviewed by BRANZ;
  - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
  - c) abides by the BRANZ Appraisals Services Terms and Conditions.
3. The product and the manufacture are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ.
4. BRANZ makes no representation as to:
  - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
  - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
  - c) any guarantee or warranty offered by the Certificate Holder.
5. Any reference in this Certificate to any other publication shall be read as a reference to the version of the publication specified in this Certificate.

For BRANZ



R I Burnett



M E Reed

Date of issue: 31 January 2005