



BRANZ Appraised
Appraisal No. 619 [2015]

SARNAFIL® G ROOF AND DECK MEMBRANE SYSTEM

Appraisal No. 619 [2015]

This Appraisal replaces BRANZ
Appraisal No. 619 [2008].



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



BUILDING TRUST

Sika [NZ] Ltd

PO Box 19 192
Avondale
Auckland 1746
Tel: 0800 SIKA NZ
Fax: 0800 SIKA FAX
Web: www.sika.co.nz



BRANZ

BRANZ

1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz



Product

- 1.1 Sarnafil® G Roof and Deck Membrane System is a glass fibre reinforced PVC membrane for waterproofing roofs and decks.

Scope

- 2.1 Sarnafil® G Roof and Deck Membrane System has been appraised as a roof and deck waterproofing membrane 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 or suspended concrete slab; and,
 - with minimum falls for roofs of 1:30 and decks of 1:40; and,
 - with deck size limited to 40 m²; and,
 - situated in NZS 3604 Wind Zones, up to, and including Extra High.
- 2.2 Sarnafil® G Roof and Deck Membrane System has also been appraised as a roof and deck waterproofing membrane on buildings within the following scope:
 - subject to specific structural and weathertightness design; and,
 - with substrates of plywood 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 the Sarnafil® G Roof and Deck Membrane System must be designed and constructed in accordance with the following limitations:
 - decks and nominally flat or pitched roofs 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; and,
 - with the deck membranes 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 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 Sika [NZ] Ltd Approved Applicators.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Sarnafil® G Roof and Deck Membrane System, 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. Sarnafil® G Roof and Deck Membrane System meets this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1, E2.3.2 and E2.3.6. Roofs incorporating Sarnafil® G Roof and Deck Membrane System meets these requirements. See Paragraphs 13.1 - 13.8.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Sarnafil® G Roof and Deck Membrane System 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 Sika [NZ] Ltd are as follows:

- **Sarnafil® G Roof and Deck Membrane System** is a fully adhered or loose-laid and ballasted membrane roof and deck system for use on buildings. It is a glass fibre reinforced, multilayer, synthetic roof and deck waterproofing sheet based on PVC with two variants and a range of components:
 - **Sarnafil® G 410 membrane** has a lacquer coating on the upper face to provide an easy clean surface and is used for the exposed, fully adhered system. It is supplied as a grey membrane, 2.0 mm thick and in rolls 15 m long and 2 m wide.
 - **Sarnafil® G 476 membrane** has no lacquer coating and is used for the protected, ballasted system. It is supplied as an orange membrane, 2.0 mm thick and in rolls 15 m long and 2 m wide.
- **Sarnacol 2170 Adhesive** is a nitrile rubber-based contact adhesive for adhering membrane to membrane and membrane to concrete, plywood, plaster or steel. It is supplied as a red liquid in 20 kg pails.
- **Sarnacol 808 Adhesive** is a solvent based contact adhesive used to fully adhere the membrane to the substrate. It is supplied as a yellow brown liquid in 18 kg pails.
- **Fasteners [Fastener SB Series]** - Carbon steel based fasteners used together with washers to secure exposed membrane to substrate. They are available in a range of lengths depending on application.
- **Washers [Coated Steel Based]** - Used with fasteners to secure the membrane to substrate and spread the load evenly.
- **Termination Bar [S-Termination Bar]** - Coated steel based bar used to terminate the membrane onto upstands. It is available as a 2 mm thick and 2 m long bar either 20 or 35 mm wide.
- **U Bar [S-U Bar]** - Coated steel based bar used at the perimeter of roof or detail joints for reinforcing the fixing of the membrane. It is supplied as a 1 mm thick, 25 mm wide and 2 m long bar.
- **Sikaflex 11FC Sealant** is a one component polyurethane sealant used to seal termination bars to upstands or joints. It is supplied in 300 ml cartridges and 600 ml sausages.
- **Prefabricated Parts [S-Cable Penetration and S-Corner PVC]** - Prefabricated parts either made from or including PVC membrane to enable welding to membrane system.
- **Sarnametal** is a metal sheet with membrane laminated on one side, it is used for capping, flashing or termination at details when required.
- **Accessories** - A range of drain and leaf guards, rainwater outlets, felts, walkway compatible with the Sarnafil® System are available on request.

Handling and Storage

- 5.1 Handling and storage of all materials whether on or off site is under the control of the Sika [NZ] Ltd 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 Sarnafil® G Roof and Deck Membrane System. 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 Sarnafil® G Roof and Deck Membrane System is for use on roofs and decks where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas.
- 7.2 Sarnafil® G Roof and Deck Membrane System can be adversely affected by contact with bituminous or polystyrene insulation. Sika [NZ] Ltd 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.
- 7.5 Ballasted systems [concrete roofs only] must be mechanically fixed at the upstands and edges. The membrane should be covered by a protection layer prior to the application of at least 50 mm washed, rounded gravel. In some areas bonding of the ballast up to 1 m from the edge may be required. For full installation details on ballasted systems refer to the Technical Literature.
- 7.6 On roofs where regular foot traffic is envisaged, i.e. maintenance of lift equipment, special protection precautions must be taken. The Sarnafil® G Roof and Deck Membrane System is designed for limited, irregular pedestrian access only.
- 7.7 Decks using Sarnafil® G Roof and Deck Membrane System must be protected by either tiles or timber decking resting on Sika [NZ] Ltd approved pedestal supports.

Structure

- 8.1 Sarnafil® G Roof and Deck Membrane System fully bonded is suitable for use in areas subject to maximum wind pressure of 6 kPa design differential ULS subject to the limitations of the substrate. Ballasted systems must be the subject of specific engineering design and the precise ballast requirements must be calculated using AS/NZS 1170.

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. Roof design must take account of the additional dead load of the ballast roof. Dead loads on ballasted roofs can dramatically increase if drains become partially or completely clogged, therefore gravel guards must be used on all rainwater outlets.

Durability

Serviceable Life

- 10.1 Sarnafil® G Roof and Deck Membrane System 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 is provided by the Sika [NZ] Ltd.
- 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. Gravel guards must be inspected annually with the ballasted systems to ensure no blockages.

Prevention of Fire Occurring

- 12.1 Separation or protection must be provided to Sarnafil® G Roof and Deck Membrane System 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, Sarnafil® G Roof and Deck Membrane System 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 or deck.
- 13.3 Roof and deck falls must be built into the substrate and not created with mortar screeds applied over the membrane.
- 13.4 The minimum fall to roofs is 1 in 30 and for decks is 1 in 40. Lower falls will allow moisture to collect, increasing the risk of ponding and membrane deterioration. All falls should slope to an outlet. *[Sika [NZ] Ltd permit the Sarnafil Roof and Deck Membrane to be used on roofs and decks with falls less than the minimum specified above. This has not been assessed and is outside the scope of this Appraisal.]*
- 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 Sarnafil® G Roof and Deck Membrane System is 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.
- 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 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 roof or deck 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.

Installation Information

Installation Skill Level Requirement

- 14.1 Installation of the membrane must be completed by Sika [NZ] Ltd Approved Applicators.
- 14.2 Installation of substrates must be completed by tradespersons with an understanding of roof construction, in accordance with instructions given within the Sika [NZ] Ltd Technical Literature and this Appraisal.

Preparation of Substrates

- 15.1 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.
- 15.2 Concrete substrates can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 515. The relative humidity of the concrete must be 75% or less before membrane application.
- 15.3 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

- 16.1 The installation of this membrane system is very complex and limited to approved applicators only. The Sika [NZ] Ltd Technical Literature should be referred to in all instances for the correct procedures.

Inspections

- 17.1 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

- 18.1 Safe use and handling procedures for the membrane system is provided in the Technical Data Sheets. The product must be used in conjunction with the relevant Materials Safety Data Sheet.

Basis of Appraisal

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

Tests

- 19.1 Testing has been carried out on the membrane for tensile strength, elongation, shrinkage, flexibility at low temperature, puncture resistance, water tightness, joint strength under shear, heat aging resistance, chemical resistance and artificial weathering followed by tensile strength, elongation and low temperature flexibility retention. Results and test methods have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 20.1 A durability opinion has been given of the Sarnafil® G Roof and Deck Membrane System by BRANZ technical experts.
- 20.2 Site visits have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.
- 20.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.



Quality

- 21.1 The manufacture of the Sarnafil® G Roof and Deck Membrane System 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. BRANZ has taken note of product certification covering quality aspects associated with these products.
- 21.2 The quality of supply of the product to the market is the responsibility of Sika [NZ] Ltd.
- 21.3 Quality on site is the responsibility of the Sika [NZ] Ltd Approved Applicators.
- 21.4 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, Sika [NZ] Ltd and this Appraisal.

Sources of Information

- AS/NZS 1170: 2002 Structural design action - General principles
- AS/NZS 2269: 2012 Plywood - Structural.
- BRANZ Good Practice Guide - Membrane Roofing, reprint October 2003.
- NZS 3101: 2006 The design of concrete structures.
- 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 6, 14 February 2014].
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.



In the opinion of BRANZ, **Sarnafil® G Roof and Deck Membrane System** 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 **Sika [NZ] Ltd**, 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. **Sika [NZ] Ltd:**
 - 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 **Sika [NZ] Ltd**.
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 **Sika [NZ] Ltd** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

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16 October 2015