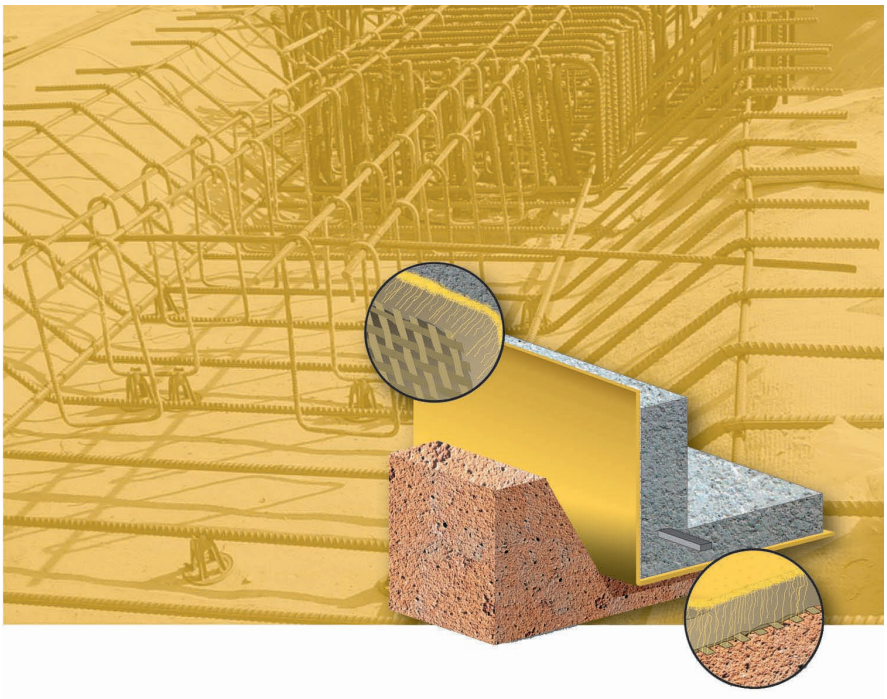
BRANZ Appraised
Appraisal No. 612 [2017]

SIKAPROOF® BENTONITE SYSTEM
BELOW GROUND WATERPROOFING

Appraisal No. 612 (2017)

This Appraisal replaces BRANZ Appraisal No. 612 (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
1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz

Product

1.1 The SikaProof® Bentonite System is based on natural sodium bentonite contained within a geosynthetic fabric with other accessory products completing the system. The system is used as a damp-proofing or waterproofing membrane below ground to protect basements and other underground structures against water penetration and water vapour transmission from the ground.

Scope

2.1 The SikaProof® Bentonite System has been appraised for use as:

- an external waterproof tanking membrane to in-situ concrete, precast concrete and concrete masonry basement constructions subject to hydrostatic pressures of up to 2 bar (20 metres); and,
- a damp-proof membrane (DPM) to slab-on-ground and basement constructions.

2.2 The SikaProof® Bentonite System must:

- be used adequately confined and protected against damage during construction and in service; and,
- not be used where ground water conductivity exceeds 2,500 $\mu S/cm^{-1}$ except on advice from Sika (NZ) Ltd (Refer Paragraph 11.1).

2.3 All installations incorporating the SikaProof® Bentonite System must be the subject of specific design. Building designers are responsible for the incorporation of the system following the guidance details provided by Sika (NZ) Ltd. The designer must provide design and installation detailing within the contract documents.

2.4 The SikaProof® Bentonite System must be installed by Sika (NZ) Ltd Approved and Trained Applicators.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, the SikaProof® Bentonite 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 (a) not less than 50 years. The SikaProof® Bentonite System meets this requirement. See Paragraph 13.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.3. The SikaProof® Bentonite System meets this requirement. See Paragraphs 15.1 – 15.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The SikaProof® Bentonite System meets this requirement and will not present a health hazard to people.

Technical Specification

4.1 Components and accessories for the SikaProof® Bentonite System supplied by Sika [NZ] Ltd are:

- **SikaProof® Bentonite** is made up of two geosynthetic membranes which are needle punched together and contain 4.3 kg of Sodium Bentonite per square metre, primarily used as waterproofing below grade horizontal and vertical surfaces, under slabs, footing and property line construction, soldier pile and lagging, metal sheet piling and concrete caisson retention. The SikaProof® Bentonite membrane is supplied in 1.1 m x 10 m and 2.2 m x 10 m rolls.
- **Sika PVC Waterbars** are flexible, PVC profiles used to seal construction and expansion joints against water ingress in concrete structures such as basements and underground car parks retaining walls. They are supplied in various widths, lengths and profiles.
- **SikaProof® Bentonite Paste** is a paste made up of hydrated Bentonite. It is used primarily for detailing around penetrations and for forming fillets. It is supplied in 20 litre pails.
- **SikaProof® Bentonite Powder** is Bentonite clay in dry form. It is used primarily for large voids and, when hydrated, as a detailing compound. It is supplied in 25 kg bags.
- **SikaSwell-P Profiles** are swellable joint sealing profiles which swell in contact with water; they are used for sealing construction joints and penetration in concrete structures. They are available in various widths, profiles and lengths.
- **SikaSwell® S-2** is a one component polyurethane sealant that swells in contact with water. It is used for sealing construction joints and penetrations in concrete structures and for fixing SikaSwell-P Profiles. It is coloured oxide red and available in 600 ml unifoil sausages.

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 and Trained Applicator. Dry storage must be provided for all products and the membrane must be protected from UV radiation.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the SikaProof® Bentonite 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 Every installation of the SikaProof® Bentonite System must be the subject of specific design. The designer is responsible for incorporating all design and installation details within the construction documentation based on the guidance documents provided by Sika [NZ] Ltd.

Substrate Design

8.1 Substrate design must be in accordance with the NZBC to relevant standards, such as, AS/NZS 1170 for design loadings, NZS 3101 for insitu or precast concrete and NZS 4210, 4229 and 4230 for concrete masonry. All concrete block masonry walls will use open ended, depressed web units; i.e. 1516, 2016 or 2516 and be solid filled.

8.2 Soil substrates must be prepared in accordance with the requirements of Sika [NZ] Ltd. In general a minimum requirement is well-levelled soils without voids and debris, compacted to a minimum of 90% Modified Proctor density, to ensure uniform support.

8.3 All substrates must be solid and have a surface finish that is smooth, clean and free from defects or irregularities which may damage the membrane.

8.4 The membrane must be confined to ensure a watertight seal is achieved and maintained. For specific installation details refer to the Technical Literature or Sika [NZ] Ltd.

Control Joints

9.1 Where control or construction joints are formed in the substrate, Sika [NZ] Ltd must be consulted regarding the use of the membranes over these joints.

Backfilling and Drainage

10.1 The SikaProof® Bentonite membrane must be confined and protected against damage.

10.2 Backfilling should be undertaken as soon as possible after placing the SikaProof® Bentonite System. SikaProof® must be backfilled the same day or whenever rain is imminent. Exposed laps must be protected from the weather and termination bars must be sealed with an approved sealant.

10.3 When being used as a DPM, the drainage will include a subsoil drainage system of at least a 100 mm diameter pipe with openings to collect water, a geotextile fabric or other filter material to prevent silting of the pipe, have access for cleaning the subsoil pipe and be a minimum of 200 mm below the floor level and sloped a minimum 1: 200 to an outlet.

10.4 For DPM or tanking application the backfill material must be free from builders debris and angular aggregate and must be compacted to 85% Modified Proctor. Further advice regarding backfilling is available from Sika [NZ] Ltd.

10.5 After backfilling in either situation, the installation is completed with a flashing in accordance with the details contained within the Technical Literature to protect the upper edge of the membrane.

Chemical Resistance

11.1 The gelling of Sodium Bentonite is adversely affected by the presence of electrolytes [particularly trivalent ions]. Calcium Bentonite may be formed in hard waters and has inferior gelling properties. Therefore if there are any concerns regarding contaminated ground water or salt water conditions exist, Sika [NZ] Ltd must be consulted prior to application.

Resistance to Loading

12.1 Providing the SikaProof® Bentonite membrane is adequately confined and not subject to point loading, an installation beneath a foundation slab will transmit dead and imposed loads safely without excessive deformation.

Durability

Serviceable Life

13.1 The SikaProof® Bentonite System when used as a tanking, waterproofing and DPM material is expected to have a serviceable life of at least 50 years provided it is installed and maintained in accordance with this Appraisal and is continually confined and protected from UV radiation and physical damage.

Maintenance

14.1 Annual inspections must be made of the membrane top edge termination and protection, the backfill capping and subsoil drainage system ensuring all are functioning as originally designed.

14.2 If required, the drainage system must be cleared to remove any sediment or silt build-up. The slope of the backfill capping must be maintained at all times.

External Moisture

15.1 The SikaProof® Bentonite System, when installed in accordance with this Appraisal, will provide an effective barrier to liquid water and water vapour penetrating to the interior face of basement retaining wall and floors.

15.2 The membrane has a vapour flow resistance of not less than 90 MN s/g.

15.3 The system forms sealed joints and seals at penetrations.

15.4 Building designers must ensure junctions with other membranes, such as at the floor/wall junction, form a waterproof joint. Junctions with other membranes have not been assessed and are outside the scope of this Appraisal.

Installation Information

Installation Skill Level Requirement

16.1 Installation of substrates must always be carried out in accordance with the SikaProof® Bentonite System Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.

16.2 Installation and finishing of components and accessories supplied by Sika [NZ] Ltd and its approved applicators must be completed by trained applicators, approved by Sika [NZ] Ltd.

System Installation

Substrate Preparation

17.1 All substrate surfaces must be checked to ensure they are clean, smooth and free from sharp edges, loose or foreign materials, oil, grease or other deleterious material that may damage the waterproofing membrane. Horizontal surfaces must be free from standing water.

Membrane Installation - In Situ

17.2 For poured in situ concrete the SikaProof® Bentonite is installed with the non woven [yellow] surface facing the pour.

17.3 Sealing around penetrations through the membrane, such as pile caps, service pipes and wall penetrations is performed by cutting a hole in the membrane, fitting it around the penetration and detailing with SikaProof® Bentonite Paste or a paste made up insitu by mixing SikaProof® Bentonite Powder with water.

17.4 The membrane should not finish above the finished ground level and must be completed with a termination bar as shown in the Technical Literature.

17.5 Backfilling must commence immediately after the membrane is installed to ensure the membrane is confined correctly.

Membrane Installation - Precast

17.6 For precast concrete, SikaProof® Bentonite can be installed in the precast panel bed at the precast factory by laying the membrane with the non woven [yellow] surface facing the concrete pour.

17.7 If SikaProof® Bentonite is installed on-site to precast concrete, it must be installed with the woven [white side] facing the concrete.

Inspections

17.8 The contract documents must be referred to during the inspection of substrate and membrane installations.

Health and Safety

18.1 Safe use and handling procedures for the membrane system are provided in the Technical Literature.

Basis of Appraisal

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

Tests

19.1 The following is a summary of the supplied testing information on SikaProof® Bentonite System:

- Hydraulic Conductivity Determination
- Low Temperature Flexibility
- Tensile Strength
- Puncture Resistance
- Concrete adhesion
- Hydrostatic pressure resistance
- Internal Shear

Test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

20.1 A durability opinion has been given by BRANZ technical experts.

20.2 Practicability of installation has been assessed by BRANZ and found to be satisfactory.

20.3 The Technical Literature has been examined by BRANZ and found to provide satisfactory guidance to designers for the use of the SikaProof® Bentonite System.

Quality

21.1 The manufacture of the 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.

21.2 The quality management system of the membrane manufacturer, Geofabrics Australasia Pty Ltd has been assessed and accredited as meeting the requirements of AS/NZS ISO 9001: 2015.

21.3 The quality of materials supplied is the responsibility of Sika (NZ) Ltd.

21.4 Quality of installation on site is the responsibility of the Approved Applicator.

21.5 Building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of Sika (NZ) Ltd.

21.6 Designers are responsible for the building design and the design and installation details for the SikaProof® Bentonite System.

21.7 Building owners are responsible for the maintenance of the top edge of the membrane system in accordance with the instructions of Sika (NZ) Ltd.

Sources of Information

- AS/NZS 1170 Structural design actions.
- NZS 3101: 2006 The design of concrete structures.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 4210: 2001 Masonry construction: Materials and Workmanship.
- NZS 4229: 2013 Concrete masonry buildings not requiring specific engineering design.
- NZS 4230: 2004 Design of reinforced concrete masonry structures.
- 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

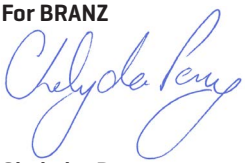
In the opinion of BRANZ, SikaProof® Bentonite System is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

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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