



**SPECIFY WITH  
CONFIDENCE**

**BRANZ Appraisals**

**Technical Assessments of  
products for building and  
construction**

**BRANZ  
APPRAISAL  
CERTIFICATE  
No. 507 (2006)**

**VOLCLAY®  
WATERPROOFING  
SYSTEM**

**Allco Agencies Ltd**  
5 Airborne Road  
Albany  
Auckland

Tel: 09 448 1185  
Fax: 09 448 1186



BRANZ Limited  
Private Bag 50 908  
Porirua City  
New Zealand  
Tel: +64 4 237 1170  
Fax: +64 4 237 1171  
www.branz.co.nz

BRANZ Pty Ltd  
P O Box 830  
Brookvale  
NSW 2100  
Australia  
Tel: +61 2 9938 6011  
Fax: +61 2 9938 6911  
www.branz.com.au



## Product

1.1 The Volclay® Waterproofing System consists of products that are based on or use sodium bentonite as the principle waterproofing component. 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. The system is also used to waterproof plaza decks where they act as a roof to spaces below.

1.2 The system is based on two membranes, Voltex® and Swelltite®, with other accessory products completing the system.



## Scope

2.1 The Volclay® Waterproofing 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 following the principles of NZBC Acceptable Solution E2/AS1; and,
- a waterproof membrane to plaza deck roof structures.

2.2 The Volclay® Waterproofing System must:

- be used adequately confined and protected against damage during construction and in service; and,
- not be used where ground water conductivity exceeds 2,500µS/cm (Refer Paragraph 12.1).

2.3 All installations incorporating the Volclay® Waterproofing System must be the subject of specific design. Building designers are responsible for the incorporation of the system following the guidance details provided by Allco Agencies Ltd. The designer must provide design and installation detailing within the contract documents.

2.4 The Volclay® Waterproofing System must be installed by Allco Agencies Ltd Approved and Trained Applicators.

# Building Regulations

## New Zealand Building Code (NZBC)

**3.1 In the opinion of BRANZ, the Volclay® Waterproofing System if designed, used, installed and maintained in accordance with the statements and conditions of this Certificate, will meet the following provisions of the NZBC:**

**Clause B2 DURABILITY:** Performance B2.3.1 (a) not less than 50 years. The Volclay® Waterproofing System meets this requirement. See Paragraph 14.1.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.3. The Volclay® Waterproofing System meets this requirement. See Paragraphs 16.1 – 16.3.

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

**3.2** This Certificate appraises the Volclay® Waterproofing System as an **Alternative Solution** in terms of New Zealand Building Code compliance.

## Technical Specification

**4.1** Components and accessories for the Volclay® Waterproofing System supplied by Allco Agencies Ltd are:

### **Voltex® Membrane**

- Is a sheet membrane manufactured from two geotextile membranes which are needle punched together and contain 5.3 kg/m<sup>2</sup> of granular Sodium Bentonite. The membrane bonds to poured concrete to form an integral seal in the form of a tenacious bond to prevent water migration. The Voltex® membrane is supplied in 1.2 m wide x 4.5 m long and 1.5 m wide x 40 m long rolls.

### **Swelltite® Membrane**

- Is a sheet membrane made up of a blend of Sodium Bentonite and Butyl Rubber integrally bonded between geomembrane and a clear poly-siliconised release liner. It is used primarily for waterproofing foundation walls and plaza roof decks. The Swelltite® membrane is supplied in a 1 m wide x 11.6 m long roll.

### **Waterstop RX®**

- Is a flexible strip waterstop manufactured from 75% Sodium Bentonite and 25% Butyl Rubber. It is primarily designed to stop water infiltration through both vertical and horizontal concrete construction joints, junctions between new and existing construction, irregular surfaces and around wall penetrations such as plumbing and electrical conduits. It is supplied in 10.2 m and 6.1 m long rolls.

### **WB-Adhesive™**

- Is a non-flammable, latex, water based adhesive used to temporarily secure Waterstop RX® to concrete, metal, wood and PVC surfaces in vertical and horizontal applications. It is packed in 1US Gallon cans.

### **Bentoseal®**

- Is a trowel grade sodium bentonite compound used as detailing mastic around penetrations and corner transitions. It is supplied in US 3 Gallon pails.

### **Aquadrain®**

- Is a prefabricated drainage composite consisting of a heavy filter fabric adhered to a high strength plastic drainage core. It is supplied in 1.2 m wide x 15.6 m long rolls.

## **Waterstoppage**

- Is granular Volclay® Bentonite used to detail areas that may require additional Volclay® protection. It is supplied in 25 kg bags.

## **Volclay® Seamtape**

- Is a tacky butyl rubber tape used to seal Swelltite® overlap seams and membrane edges from inclement weather and construction debris. It is supplied in 12.5 m long rolls.

## **Volclay® M-2000 Liquid Flashing**

- Is trowel grade bitumen modified polyurethane waterproofing mastic used to detail around penetrations, drains and at corner transitions. It is supplied in 7 litre tins.

## Handling and Storage

**5.1** Handling and storage of all materials whether on or off site is under the control of the Approved and Trained Applicator. Dry storage must be provided for all products and the membranes must be protected from UV radiation.

## Technical Literature

**6.1** The Technical Literature which provides guidance for designers is available from Allco Agencies Ltd.

## Design Information

### General

**7.1** Every installation of the Volclay® Waterproofing 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 Allco Agencies Ltd.

### Substrate Design

**8.1** Substrate design must be in accordance with the NZBC to relevant standards, such as, NZS 4203 for design loadings, NZS 3101 for insitu or precast concrete and NZS 4210, 4229 and 4230 for concrete masonry.

**8.2** Soil substrates must be prepared in accordance with the requirements of Allco Agencies Ltd. In general a minimum requirement is well-levelled soils without voids and debris, compacted to a minimum of 85% Modified Proctor density for uniform support.

**8.3** The substrate 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 Allco Agencies Ltd.

**8.5** The Volclay® Waterproofing System may be used as an alternative DPM material to the materials listed in NZBC Acceptable Solution E2/AS1, Section 12.

### Control Joints

**9.1** Where control or construction joints are formed in the substrate, Allco Agencies Ltd must be consulted regarding the use of the membranes over these joints.

## Backfilling and Drainage

10.1 Voltex® and Swelltite® membranes must be confined and protected against damage. It is recommended that Aquadrain® is placed between the membrane and the granular fill.

10.2 Backfilling should be undertaken as soon as possible after placing the Volclay® Waterproofing System. Swelltite® 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, backfilling, drainage and the backfill capping must be completed in accordance with NZBC Acceptable Solution E2/AS1, Paragraphs 12.3 and 12.3.1 and Figure 133.

10.4 When being used as tanking membrane 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 Allco Agencies 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.

## Plaza Roof Deck

11.1 The Swelltite® membrane using Volclay® seamtapes to seal Swelltite® over the lap joints is laid directly over reinforced concrete plaza roof deck slabs. Aquadrain® drainage composite is then laid fabric side up over the Swelltite® membrane. The Swelltite® system is then covered and protected by a minimum of 75 mm thick concrete wearing slab or clay, concrete or stone pavers at least 50 mm thick laid on a bed of sand or cementitious grout. For system details contact Allco Agencies Ltd.

## Chemical Resistance

12.1 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 ground water contamination (salinity), Allco Agencies Ltd offer conductivity tests on soil water, and from these tests make a recommendation on the appropriate system specification. One solution to contaminated area treatment is outlined in Paragraph 18.6. The membrane is not affected by organic contaminants.

## Resistance to Loading

13.1 Providing Voltex® membranes are adequately confined, properly hydrated, 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

14.1 The Volclay® Waterproofing 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 Certificate and is continually confined and protected from UV radiation and physical damage.

## Maintenance

15.1 Annual inspections must be made of the membrane top

edge seal and protection, the backfill capping, subsoil drainage system and plaza deck finishing ensuring all are functioning as originally designed.

15.2 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

16.1 The Volclay® Waterproofing System, when installed in accordance with this Certificate, will provide an effective barrier to liquid water and water vapour penetrating to the interior face of basement retaining walls, floors and plaza roof decks.

16.2 The membranes have a vapour flow resistance of not less than 90 MN s/g as required by NZBC Acceptable Solution E2/AS1, Paragraph 12.2.1 (a).

16.3 The system forms sealed joints and seals at penetrations.

16.4 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 Certificate.

## Installation Information

### Installation Skill Level Requirement

17.1 Installation of the membranes must be completed by Allco Agencies Ltd Approved and Trained applicators that have a minimum 3 years waterproofing application experience.

17.2 Substrates must be completed by tradespersons skilled in the relevant construction method chosen and in accordance with instructions given within the Allco Agencies Ltd Technical Literature and this Certificate.

## System Installation

### Substrate Preparation

18.1 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

18.2 Voltex® is installed with the darker coloured face in direct contact with the substrate to be waterproofed. Swelltite® is installed with the sodium bentonite compound in direct contact with the substrate to be waterproofed. In the case of Swelltite®, sodium bentonite is exposed by removing the clear siliconized release sheet and side laps overlapped by a minimum of 50 mm and ends of sheets a minimum of 300 mm. Internal corners must be reinforced with an 18 mm thick bead of Bentoseal.

18.3 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 an 18 mm cant of Bentoseal or a paste made up insitu by mixing Bentonite granules with water.

18.4 Termination bars and any exposed laps must be temporarily sealed until the finished ground level is determined. The membrane should not finish above the finished ground level and must be completed with a flashing or other technique as shown in the Technical Literature.

18.5 Aquadrain® must be installed before backfilling. Backfilling must commence immediately after the membrane

is installed to ensure the membrane is confined correctly. Compact backfill, approved by Allco Agencies Ltd, in 300-400 mm lifts compacted to 85% Modified Proctor density. With plaza roof decks the Aquadrain® is used under an approved wear layer system. Contact Allco Agencies Ltd for “Technical Reference 205” a full specification on backfilling requirements and approved wear layer systems.

18.6 In chemically contaminated areas the membrane can be pre-hydrated by deliberately soaking with clean, cold mains water and leaving to soak for 2-3 hours before backfilling or pouring the concrete.

### Inspections

18.7 The contract documents must be referred to during the inspection of substrate and membrane installations by building consent authorities and territorial authorities.

## Health and Safety

19.1 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

20.1 The following is a summary of the supplied testing information on Volclay® Waterproofing System:

- Hydraulic Conductivity Determination to ASTM D-5084.
- Low Temperature Flexibility to ASTM D 1970
- Tensile Strength to ASTM D 4632
- Puncture Resistance to ASTM D 4833.
- Concrete adhesion to ASTM D 903
- Hydrostatic pressure resistance to ASTM D 5385
- An investigation of the effectiveness of Voltex® as a Water Vapour Barrier by University of Hertfordshire.

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

20.2 The Volclay® Waterproofing System has held a valid BBA Agrément Certificate (UK) since 1986.

## Other Investigations

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

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

21.3 The Technical Literature has been examined by BRANZ and found to provide satisfactory guidance to designers for the use of the Volclay® Waterproofing System.

## 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.

22.2 The quality management system of the membrane manufacturer, Cetco Building Materials Group, USA has been assessed and accredited as meeting the requirements of BS EN ISO 9001: 2000 by BSI Management Systems, USA, Registration Number FM 67591.

22.3 The quality of materials supplied is the

responsibility of Allco Agencies Ltd.

22.4 Quality of installation on site is the responsibility of the installer.

22.5 Building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of Allco Agencies Ltd.

22.6 Designers are responsible for the building design and the design and installation details for the Volclay® Waterproofing System.

22.7 Building owners are responsible for the maintenance of the top edge of the membrane system and plaza deck finishes in accordance with the instructions of Allco Agencies Ltd.

## Sources of Information

- British Board of Agrément Certificate No. 86/1650, Volclay® Waterproofing System for Structures.
- 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.
- NZS 4210: 1989 Masonry construction: Materials and Workmanship.
- NZS 4229: 1999 Concrete masonry buildings not requiring specific engineering design.
- NZS 4230: 2004 Design of reinforced concrete masonry structures.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005.
- New Zealand Building Code Handbook and Approved Documents, Building Industry Authority, 1992.
- The Building Regulations 1992, up to, and including October 2004 Amendment.

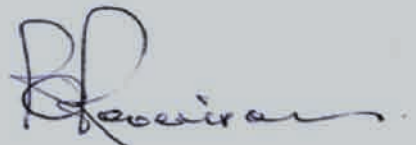
**In the opinion of BRANZ, the Volclay® Waterproofing System is fit for purpose and will comply with the Building Code to the extent specified in this Certificate provided it is used, designed, installed and maintained as set out in this Certificate.**

**The Appraisal Certificate is issued only to the Certificate Holder, Alco Agencies 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



**P Robertson  
Chief Executive**

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