



BRANZ Appraised

Appraisal No. 1250 [2024]

BASE-TECT® SYSTEM

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BRANZ Appraisals

Technical Assessments of products for building and construction.



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Product

- 1.1 The Base-Tect® System, designed and installed by Markham Distributing Ltd, is a permeability-reducing system for concrete in basement installations. The system is comprised of colloidal silica concrete admixtures, a spray-applied treatment, and butyl polymer-based gaskets.

Scope

- 2.1 The Base-Tect® System is a permeability-reducing system used to assist with the waterproofing of concrete for buildings of importance level 1-5 as defined by AS/NZS 1170.
- 2.2 Buildings with concrete using the Base-Tect® System must be the subject of specific design.
- 2.3 Concrete used in the Base-Tect® System must be supplied by a ready-mixed concrete supplier that is certified to the requirements of NZS 3104.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, the Base-Tect® System, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 [a] not less than 50 years. The Base-Tect® System meets this requirement. See Paragraphs 13.1 and 13.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2 and E2.3.3. The Base-Tect® System contributes to meeting these requirements. See Paragraphs 15.1 and 15.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Base-Tect® System meets this requirement.

Technical Specification

- 4.1 The AQURON 300 and CONQOR B50 admixtures used in the Base-Tect® System are chemical admixtures used to reduce the water permeability of concrete and to aid the production of watertight concrete. These admixtures will contribute to enhanced durability and improved protection against reinforcement corrosion by providing a physical pore-blocking action that protects resulting concrete against water ingress via hydrostatic pressure. The use of the Base-Tect® System will therefore contribute to producing a concrete with the following properties relative to a control concrete:
- reduced porosity
 - increased water resistance
 - reduced permeability
 - increased corrosion resistance.
- 4.2 The addition of AQURON 300 or CONQOR B50 admixtures has no detrimental effect on the properties of concrete.
- 4.3 System components and accessories supplied by Markham Distributing Ltd for the Base-Tect® System are:

Concrete Admixtures

- AQURON 300 concrete admixture is a colloidal silica hydrogel admixture for concrete; or,
- CONQOR B50 concrete admixture is a colloidal silica hydrogel admixture for concrete.

Spray-Applied Hydrogel Treatment

- AQURON 2000 is a spray-applied colloidal silica hydrogel treatment for sub-surface densifying, moisture control, molecular binding, and waterproofing. AQURON 2000 spray treatment must be used in conjunction with the chosen concrete admixture.

Waterstops

- CONQOR 47B Delayed Expansion Waterstops are butyl hydrophilic polymer-based gaskets with a built-in delay system that activates approximately 5-10 days after constant exposure to water.
- CONQOR 87B Waterstops are butyl hydrophilic polymer-based gaskets which undergo controlled expansion when exposed to water.

Handling and Storage

- 5.1 Handling and storage of all materials supplied as part of the Base-Tect® System is under the control of by Markham Distributing Ltd.
- 5.2 All materials are to be kept clean, dry, and undamaged, and must be used within the maximum storage period as specified by Markham Distributing Ltd.

Technical Literature

- 6.1 This Appraisal must be read in conjunction with:
- Base-Tect® Basement Waterproofing System - 10/2023.1.
- 6.2 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 The Base-Tect® System must be the subject of specific design when intended to provide resistance to water penetration and/or resistance to water vapour. The building structure design must also incorporate waterstops and other appropriate means to waterproof joints, penetrations and formwork ties. The critical aspects of the Base-Tect™ System design are:
- minimum cement content; and,
 - water/cement ratio; and,
 - minimum concrete thickness; and,
 - methods of crack control; and,
 - curing; and,
 - correct installation and confinement of the waterstops.
- 7.2 Design and installation of the Base-Tect® System must be carried out in association with Markham Distributing Ltd.
- 7.3 Care should be taken with regard to ground water containing high concentrations of calcium ('hard water') or other electrolytes, particularly trivalent cations, as these may negatively impact the efficacy of the waterstop components of the system. Where doubt exists, groundwater the system will be exposed to should be analysed and direction sought from Markham Distributing Ltd.
- 7.4 CONQOR Waterstops may not be suitable for use in environments where repeated wet/dry cycling of the product is a possibility. Where concern exists, Markham Distributing Ltd should be consulted.

Water Penetration

- 8.1 Concrete incorporating the Base-Tect® System has greater resistance to water penetration than the equivalent plain concrete. Subject to proper design, the Base-Tect® System can contribute to watertight concrete for basements.

Water Vapour Permeability

- 9.1 Concrete incorporating the Base-Tect® System has a lower permeability to water vapour than the equivalent plain concrete. Subject to proper design, the Base-Tect® System can contribute to water vapour resistant concrete for slabs and walls in damp-proofing situations.

Additional

- 10.1 The Base-Tect® System may be used in concrete that does not meet the specific design criteria of this Appraisal, but this use is not covered by the Appraisal. The Base-Tect® System may be used as an additional protection should the damp-proof membrane [DPM] fail.

Concrete

- 11.1 The Base-Tect® System must be supplied as ready-mixed concrete in accordance with NZS 3104, NZS 3109, the instructions of Markham Distributing Ltd, and this Appraisal. AQURON 300 admixture is added to concrete at a rate of 650 ml/100 kg of cement, and CONQOR B50 admixture is added to concrete mixes at a rate of 585 ml/100 kg of cement.
- 11.2 Concrete containing AQURON 300 or CONQOR B50 admixtures have a minimum binder content of 350 kg/m² and a water/binder ratio of 0.48-0.54. Further details of suitable mixes can be obtained from Markham Distributing Ltd.
- 11.3 Where the control of water vapour is required, it will be necessary to provide a mix with sufficiently low vapour permeability in combination with adequate section thickness.
- 11.4 Concrete mix design must be in accordance with this Appraisal and the Technical Literature. Once mixed, further materials must not be added to the fresh concrete.

Structure

- 12.1 Concrete buildings must be designed in accordance with NZS 3101, NZS 3106, or other suitable design standards.
- 12.2 The reinforcement of structures incorporating the Base-Tect® System for critical applications must be detailed to limit the maximum crack width in the concrete to 0.3-0.4 mm.
- 12.3 The mechanical properties of concrete incorporating the Base-Tect® System will not be adversely affected by its inclusion.

Durability

- 13.1 The Base-Tect® System will not adversely affect concrete in which it is incorporated, and concrete containing the Base-Tect® System will have its expected durable life.
- 13.2 Concrete using the Base-Tect® System, if properly mixed, placed and cured, will have improved properties that are likely to extend the life of the concrete. Incorporation of the Base-Tect® System in concrete will reduce its permeability relative to an equivalent concrete at the same water/cement ratio. Possible benefits include:
 - greater freeze/thaw resistance
 - increased reinforcement protection for the same depth of reinforcement cover due to enhanced concrete durability
 - increased carbonation resistance.

Maintenance

- 14.1 No maintenance is required to the Base-Tect® System provided that significant building movement or cracking does not occur. Regular checks must be made for cracks or damage, and Markham Distributing Ltd consulted regarding waterproofing-related repairs.

External Moisture

- 15.1 Concrete containing the Base-Tect® System admixtures will contribute to producing watertight concrete for structures and water vapour resistance for concrete slabs and walls when designed and used in accordance with the instructions of Markham Distributing Ltd and this Appraisal.
- 15.2 The building structure design must incorporate details for waterstops and waterproofing of joints, junctions, penetrations and the like. These details have not been assessed and are outside the scope of this Appraisal.

Installation Information

- 16.1 The Base-Tect® System must be installed by Markham Distributing Ltd.
- 16.2 Concrete to be used as part of the Base-Tect® System must be batched by ready-mixed concrete plants that are certified to the requirements of NZS 3104.
- 16.3 Admixtures used as part of the Base-Tect® System must be added to the mix water at the correct ratio, prior to batching the concrete constituents. Admixtures must be added in accordance with the instructions in the Technical Literature. The resulting concrete should be mixed to industry standard minimums of 80 revolutions to ensure the admixture is uniformly distributed.
- 16.4 AQURON 2000 must be used as part of the Base-Tect® System and is spray-applied using multiple passes to achieve a coverage of approximately 4.5 m² per litre. Application of the hydrogel must be carried out by applicators approved by Markham Distributing Ltd, in accordance with the Technical Literature.
- 16.5 CONQOR 47B and 87B Waterstops must be installed on smooth, clean surfaces on the positive water ingress side of any reinforcing. Installation must be carried out by Markham Distributing Ltd, in accordance with the Technical Literature.

- 16.6 Concrete containing the additives used in the Base-Tect® System will be a special concrete as defined by NZS 3104, and as such, any testing requirements and compliance tolerances must be defined by the purchaser or designer in collaboration with Markham Distributing Ltd. Methods of sampling must be in accordance with NZS 3109. As the Base-Tect® System will be used for watertight or low vapour permeability concrete, special care must be taken during placing, compaction, finishing and curing, and these actions must be in accordance with NZS 3109.
- 16.7 Common defects found in typical concrete cannot be tolerated. Poor consolidation, unplanned cold joints, random cracking, penetrations, contaminations, etc. will all result in a leaking structure if not accounted for in the design and installation.
- 16.8 Markham Distributing Ltd must be consulted before concrete is placed regarding the inclusion of cold joints, penetrations and control joints, for methods of dealing with these. These methods have not been assessed and are outside the scope of this Appraisal.
- 16.9 Compaction of concrete is best achieved by internal vibration. Where this is not practical, external vibration or vibrating screeds should be used. Compaction is important as improperly compacted concrete is much more likely to leak.
- 16.10 Freshly placed concrete must be protected from extreme temperatures or drying conditions.

Inspections

- 17.1 The contract documents must be referred to during the installation and inspection of the Base-Tect® System by building consent authorities or territorial authorities. Critical areas of inspection are:
- AQURON 300 or CONQOR B50 admixture is added at the specified dosage.
 - Concrete incorporating the Base-Tect® System is batched, placed, consolidated, protected and cured according to accepted concrete practices, instructions from Markham Distributing Ltd and the relevant sections of NZS 3109.
 - Construction joints are prepared and waterproofed according to the guidance of Markham Distributing Ltd.
 - Control joints are suitably spaced to prevent random cracking, and are waterproofed as per the guidance of Markham Distributing Ltd.
- 17.2 The Base-Tect® System Quality Assurance check sheets and supporting documentation must be completed and returned to Markham Distributing Ltd or the Project Manager as appropriate and as required by contract.

Health and Safety

- 18.1 When handling the components of the Base-Tect® System, the normal health and safety procedures associated with cementitious materials should be observed.

Basis of Appraisal

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

Tests

- 19.1 The test results carried out as part of previous certifications of the components of the Base-Tect® System were reviewed as part of the assessment. They were results of comparison tests with control concrete and included the following:
- slump
 - plastic density
 - air content
 - setting times
 - water permeability
 - drying shrinkage
 - wetting expansion
 - freeze/thaw expansion
 - compressive strength
 - flexural strength
 - modulus of elasticity
 - water vapour permeability.

Other Investigations

- 20.1 An assessment of the durability of the Base-Tect® System was made by BRANZ technical experts.
20.2 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 21.1 Manufacture of the components of the Base-Tect® System has not been examined by BRANZ, but details of quality, composition, and testing were obtained and found to be satisfactory.
21.2 The quality of supply to the market is the responsibility of Markham Distributing Ltd.
21.3 Installation on-site is the responsibility of Markham Distributing Ltd.

Sources of Information

- AC10 Acceptance criteria for quality documentation. ICC Evaluation Service, February 2009.
- AS/NZS 1170 Structural design actions.
- NZS 3101:2006 Concrete structures standard.
- NZS 3104:2003 Specification for concrete production.
- NZS 3106:1986 Code of practice for concrete structures for the storage of liquids.
- NZS 3109:1997 Concrete construction.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



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16 April 2024

BASE-TECT® SYSTEM



In the opinion of BRANZ, the **Base-Tect® 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 **Markham Distributing 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. **Markham Distributing 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 **Markham Distributing 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 **Markham Distributing Ltd** or any third party.

For BRANZ

Claire Falck
Chief Executive
Date of Issue:
16 April 2024