



BRANZ Appraised
Appraisal No. 1150 [2021]

SIKA WATERTIGHT CONCRETE [SIKA WT-200P]

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BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 Sika WT-200P is a combined water-resisting and crystalline waterproofing admixture which incorporates a high-range water-reducer (HRWR) and/or superplasticiser used to reduce the permeability of concrete.

Scope

- 2.1 Sika WT-200P is a permeability-reducing admixture used to assist with the waterproofing of concrete for structures of importance level 1-5 as defined by AS/NZS 1170.
- 2.2 Buildings containing Sika Watertight Concrete [Sika WT-200P] must be the subject of specific design.
- 2.3 Sika Watertight Concrete [Sika WT-200P] 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, Sika Watertight Concrete [Sika WT-200P], 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. Sika Watertight Concrete [Sika WT-200P] will meet this requirement. See Paragraphs 13.1 and 13.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2 and E2.3.3. Sika Watertight Concrete [Sika WT-200P] will meet these requirements. See Paragraphs 15.1 and 15.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Sika Watertight Concrete [Sika WT-200P] meets this requirement.



Technical Specification

General

4.1 The Sika WT-200P admixture is a chemical admixture used to reduce the water permeability of concrete and aid the production of watertight concrete. Sika WT-200P admixture produces concrete with enhanced durability and improved protection against reinforcement corrosion by providing a physical pore-blocking action that protects concrete against water ingress via hydrostatic pressure. The use of Sika WT-200P admixture will therefore produce a concrete with the following properties relative to a control concrete:

- reduced porosity
- increased water resistance
- reduced permeability
- increased corrosion resistance.

The addition of Sika WT-200P admixture has no detrimental effect on the properties of concrete.

4.2 The Sika WT-200P admixture is a chemical admixture, consisting of cement, amino alcohols and fillers, and is manufactured by a blending process. It is supplied in 1.75 kg water-soluble bags, which are packed in sixes into 25 L containers. Each 25 L container bears the name of the manufacturer and the product, the batch number, and health and safety information.

Handling and Storage

5.1 The Sika WT-200P admixture must be stored at a temperature between 5°C and 35°C, in a dry environment and protected from direct sunlight, moisture, frost and contamination. The Sika WT-200P admixture, if stored in unopened and undamaged original sealed containers, has a maximum shelf life of 12 months from the date of production.

Technical Literature

6.1 Refer to the Appraisal listing on the BRANZ website for details of the current Technical Literature for Sika Watertight Concrete [Sika WT-200P]. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained within the scope of this Appraisal and the Technical Literature must be followed.

Design Information

Use

7.1 Sika Watertight Concrete [Sika WT-200P] 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 Sika Watertight Concrete [Sika WT-200P] design are:

- minimum cement content
- water/cement ratio
- minimum concrete thickness
- methods of crack control; and,
- curing.

Design must be carried out in association with Sika [NZ] Ltd.

Water Penetration

8.1 Sika Watertight Concrete [Sika WT-200P] has greater resistance to water penetration than the equivalent plain concrete. Subject to proper design, Sika Watertight Concrete [Sika WT-200P] provides watertight concrete for slab-on-grade, basements, pools, tanks, tunnels, culverts, car park decks and the like.



Water Vapour Permeability

- 9.1 Sika Watertight Concrete [Sika WT-200P] has a lower permeability to water vapour than the equivalent plain concrete. Subject to proper design Sika Watertight Concrete [Sika WT-200P] can provide water vapour resistant concrete for slabs and walls in damp-proofing situations.

Additional

- 10.1 Sika WT-200P admixture may be used in concrete that does not meet the specific design criteria of this Appraisal. Sika Watertight Concrete [Sika WT-200P] may be used as an additional protection should the damp-proof membrane (DPM) fail.

Concrete

- 11.1 Sika Watertight Concrete [Sika WT-200P] must be supplied as ready-mixed concrete in accordance with NZS 3104, NZS 3109, the instructions of Sika [NZ] Ltd and this Appraisal. Sika WT-200P admixture is added to concrete mixes at a rate of 1% by weight of the cementitious binder.
- 11.2 Sika Watertight Concrete [Sika WT-200P] has a minimum binder content of 350 kg/m³ and a maximum water/binder ratio of 0.45. Depending on the specific mix design, the dosage of HRWR/superplasticiser has to be evaluated in order to achieve a S3/F4 consistence class [EN206-1]. Further details of suitable mixes can be obtained from Sika [NZ] 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 standard.
- 12.2 The reinforcement of structures incorporating Sika Watertight Concrete [Sika WT-200P] for critical applications must be detailed to limit the maximum crack width in the concrete to 0.3mm to 0.4mm.
- 12.3 The mechanical properties of concrete incorporating Sika WT-200P will not be adversely affected by its inclusion. Due to the set-retarding nature of Sika WT-200P, early age concrete strengths may be slightly lower than the equivalent plain concrete, but final strengths will be higher.

Durability

- 13.1 Sika WT-200P will not adversely affect concrete in which it is incorporated, and concrete containing Sika WT-200P will have its expected durable life.
- 13.2 Sika Watertight Concrete [Sika WT-200P], if properly mixed, placed and cured, will have improved properties that are likely to extend the life of the concrete. Incorporation of Sika WT-200P admixture 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
 - increased carbonation resistance.

Maintenance

- 14.1 No maintenance is required to Sika Watertight Concrete [Sika WT-200P] provided that significant building movement or cracking does not occur. Regular checks must be made for cracks or damage, and Sika [NZ] Ltd consulted regarding waterproofing related repairs.

External moisture

- 15.1 Concrete containing Sika WT-200P admixture provides watertight concrete for structures and can provide water vapour resistance for concrete slabs and walls when designed and used in accordance with the instructions of Sika [NZ] 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 Sika Watertight Concrete [Sika WT-200P] must be batched by ready-mixed concrete plants that are certified to the requirements of NZS 3104.
- 16.2 The Sika WT-200P admixture must be added to the mixer at the correct ratio, prior to batching the concrete constituents. The resulting concrete should be mixed for a minimum of five minutes, to ensure that the admixture is uniformly distributed prior to discharging. When using multiple admixtures in the same batch of concrete, they should be dispensed separately into the concrete to avoid intermixing and possible interference of the admixtures.
- 16.3 Sika Watertight Concrete [Sika WT-200P] 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 Sika [NZ] Ltd. Methods of sampling must be in accordance with NZS 3109. As Sika Watertight Concrete [Sika WT-200P] 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.
- 16.4 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.
- 16.5 Sika [NZ] 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.
- 16.6 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.
- 16.7 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 of Sika Watertight Concrete [Sika WT-200P] by building consent authorities or territorial authorities. Critical areas of inspection are:
 - Sika WT-200P admixture is added at the specified dosage.
 - Sika Watertight Concrete [Sika WT-200P] is batched, placed, consolidated, protected and cured according to accepted concrete practices, instructions from Sika [NZ] Ltd and the relevant sections of NZS 3109.
 - Construction joints are prepared and waterproofed according to the guidance of Sika [NZ] Ltd.
 - Control joints are suitably spaced to prevent random cracking, and are waterproofed as per the guidance of Sika [NZ] Ltd.
- 17.2 The Sika Watertight Concrete [Sika WT-200P] Quality Assurance check sheets and supporting documentation must be completed and returned to Sika [NZ] Ltd or the Project Manager as appropriate and as required by contract.

Health and Safety

- 18.1 When handling Sika Watertight Concrete [Sika WT-200P], the normal health and safety procedures associated with cementitious materials should be observed.



Basis of Appraisal

The following is a summary of technical investigations carried out:

Tests

- 19.1 The test results carried out as part of the BBA Certification of Sika Watertight Concrete [Sika WT-200P] 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 A durability opinion has been provided by BRANZ technical experts.

Quality

- 21.1 Manufacture of Sika WT-200P 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 Sika [NZ] Ltd.
- 21.3 Installation on-site is the responsibility of the installers.

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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24 May 2021

SIKA WATERTIGHT CONCRETE
[SIKA WT-200P]



In the opinion of BRANZ, **Sika Watertight Concrete [Sika WT-200P]** 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

Date of Issue:

24 May 2021