CHEM CONCRETE PTY LTD

Manufacturer & Supplier of Hybrid Concrete Waterproofing Admixtures

Operating in Australia, New Zealand, USA, Canada & UK with Distributors in Major Countries.

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Headquarter: 16 Caird Place, Seven Hills, NSW 2147, Australia.

PRODUCT TECHNICAL DATA

R2: 10/02/2025

Hybrid ChemConcrete^{-WP} Admixture

Hybrid Integral Waterproofing Admixture for Concrete Protection

• Introduction

ChemConcrete^{-WP} Admixture is the new generation of integral concrete waterproofing admixtures (called 'hybrid' admixture), which is proven to be more reliable, environmentally friendly, and cost-effective compared to traditional products. This admixture (Patent No. 2023902368) is used to improve the strength and durability of concrete and produce a permanently waterproof concrete for water and liquid retaining structures. This product is classified as non-toxic, environmentally-friendly, and non-hazardous material. Hybrid ChemConcrete^{-WP} Admix significantly improves the durability of concrete structures exposed to seawater, chloride, acid, sulphate, rainwater, salt, alkali-silica reaction (ASR), freezing-thawing, efflorescence, static and hydrostatic water pressures, etc. Current waterproofing admixtures on the market normally use only one waterproofing mechanism or agent (i.e., hydrophobic, crystalline, pore blocking agents). But in ChemConcrete^{-WP} Admix, different waterproofing agents such as pore blocking, self-healing, densifying, and nano-sized chemicals are used to provide a more effective and reliable waterproofing/durability-enhancing admixture with a comprehensive waterproofing mechanism. ChemConcrete^{-WP} Admix severely disrupts the capillary system in concrete through the simultaneous use of different technologies. Concrete treated with this admixture meets the requirements of water absorption and permeability specified in German, UK, and USA standards and guidelines for waterproof concrete. Comprehensive independent testing and research by several companies and universities have confirmed the exceptional performance of this product in terms of improving the strength, durability, and waterproofing performance of conventional concrete. This product complies with the requirements of ASTM C494 and AS1478, as tested by well-known AASHTO and NATA accredited laboratories.

• Properties

Appearance	White/Grey gel
Unit weight	1.40 gr/cm^3
Chloride ion content	< 0.001%
Solid content	34 ± 2 %
pH	5 - 8

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• Applications

Hybrid ChemConcrete^{-WP} Admix is used to extend the service life and eliminate the ingress of water in concrete basements, bridge decks, wharves, tunnels, foundations, concrete waterways, swimming pools, parking lots, concrete piles, shotcretes, concrete pavements/pavers, water and OSD tanks, dams, sewer pipes, podium decks, reclaimed land, service environments, trafficable and/or landscaped concrete, concrete pipelines, roofs, balconies, concrete road barriers, concrete kerbs, tunnels, shotcretes, concrete blocks/bricks, and areas where hazardous chemicals (e.g., salt, organic acids, sulphates, and chlorides) may be present.

It is also used in any concrete in maritime environments that needs a long-term and maintenance-free service life such as jetties and wharves, boat ramps, and other similar structures. It can be used in any situation that is damp or wet and where the transfer of moisture, the intake or absorption of water, and the presence of salts, acids, or other corrosive chemicals is unpleasant. This product permanently waterproofs concrete under both static and hydrostatic water pressure.

• Product Performance

Water Absorption, Permeability, Strength, Workability, Shrinkage, and Creep

ChemConcrete^{-WP} Admix at a dosage of 10 – 20 litres per cubic metre of concrete (2 – 4 gallons per cubic yard) drastically reduces the water absorption rate and permeability of concrete compared to untreated concrete under both static and hydrostatic water pressure (Table 1).

Compared with untreated concrete with similar amount of cement and constant workability (slump), ChemConcrete^{-WP} improves the compressive, flexural, and tensile strengths of concrete by over 40% (Table 1) depending on the dosage used. This admixture significantly improves the early-age strength of concrete (by around 30 to 70%). The modulus of elasticity of concrete treated by ChemConcrete^{-WP} is around 30% higher than that of the equivalent untreated concrete.

ChemConcrete^{-WP} Admix significantly improves the shrinkage, creep properties, abrasion resistance, and visual appearance, and reduces surface defects such as early-age cracks in concrete as proved by independent testing and research.

ChemConcrete^{-WP} Admix maintains excellent cohesion within the concrete matrix, and eliminates excessive bleeding or segregation. This product improves the workability/slump and finish-ability of concrete as well. This product does not have significant impact on the setting time of concrete.

Table 1. Effect of ChemConcrete^{-WP} Waterproofing Admix on concrete properties (laboratory tests results).

Property	Control concrete	ChemConcrete^{-WP}	Reference
Water absorption	8.61 %	1.87 %	ASTM C 642
Water Penetration	13 mm	2 mm	DIN 1048
Initial surface absorption test (ISAT) (ml·m^{-2}·s^{-1})			BS 1881: 2008
10 min	0.55	0.01	
30 min	0.30	0.005	
Compressive strength	43 MPa	60 MPa	ASTM C39
Flexural strength	5.70 MPa	7.70 MPa	ASTM C78
Slump	130 mm	130 mm	ASTM C143

* For particular concrete mixes and site conditions, it is suggested to evaluate the specific effect of ChemConcrete^{-WP} Admix on the properties of concrete through site trials prior to the application.

Durability

Ingress of water and waterborne contaminants is the main reason responsible for almost all the major physical and chemical degradations of concrete structures and pavements. In general, there is a relatively direct relationship between the durability of concrete and its water absorption rate and permeability. The reduced water absorption and permeability of concrete containing ChemConcrete^{-WP} Admix drastically slows down the diffusion of aggressive chemicals into concrete and significantly improves protection against reinforcement corrosion and alkali-silica reaction (ASR). Moreover, ChemConcrete^{-WP} significantly improves the durability and service life of concrete exposed to seawater, chloride, acid, sulphate, rainwater, salt, freezing-thawing, and efflorescence. The chloride ion content of the product is below 0.001%. Test results show that this product complies with the corrosion behaviour requirements given in BS EN 934-1-2008, Clause 5.1, by testing to BS EN 480-14-2006. This product is effective under both static and hydrostatic water pressure. Cracks in concrete are a common phenomenon due to its relatively low tensile strength. However, the self-healing ability of concrete treated by ChemConcrete^{-WP} Admix assists in repairing its micro-cracks autogenously. Besides, after 300 freeze-thaw cycles, the concrete samples treated with ChemConcrete^{-WP} Admix (containing an air-entraining admixture) indicated 102% relative durability. A relative durability factor of 108% was achieved when no air-entraining admixtures were used in the concrete containing ChemConcrete^{-WP} Admix. Its low alkali content significantly reduces the ASR and improves the freeze-thaw resistance of concrete. Tests results show that this admixture significantly mitigates the ASR of waste glass-based concrete as well. This product complies with the requirements of ASTM C494 and AS1478, as tested by well-known AASHTO and NATA accredited laboratories.

- ## Mix and Dosage

ChemConcrete^{-WP} Admix is often used at a dosage of 10 – 20 litres per cubic metre of concrete (2 – 4 gallons per cubic yard). This admixture is in liquid form and must be used as water replacement in the mix. Consult with a Technical Staff of Chem Concrete in Sydney office, Australia, to determine the appropriate dosage. Before using this admixture in concrete, it is suggested to dilute the admixture by adding 1 part admixture in 1 part water. It is recommended to add this admixture to concrete in batching plant; however, it may also be added to the concrete trucks on site and mixed well until thoroughly dispersed. ChemConcrete^{-WP} Admix contains several proprietary chemicals, such as hydrophobic, self-healing, densifying, and pore-blocking/nano chemicals that improve/increase the workability (slump) of concrete and reduce water demand; therefore, account for the added water in the mix design and slump.

- ## Packaging and Storage

ChemConcrete^{-WP} Admixture in liquid form has a shelf life of 12 months. It should be stored at a temperature between 8 to 25 ^{o}C. This admixture is supplied in 15 L pails, 200 L drums, and 1000 L IBC tanks.

- ## Environmental Friendliness

The main ingredients used in the manufacture of ChemConcrete^{-WP} Admixture are classified as non-toxic, environmentally-friendly, and non-hazardous chemicals with “no or low risk to human and environment” based on Australian Industrial Chemicals Introduction Scheme (AICIS). The manufacturing process of this product is also environmentally-friendly with almost zero percent greenhouse gas emissions into the environment. For further information and advice regarding transportation, handling, storage and disposal of chemical products, user should refer to the actual Safety Data Sheets containing physical, environmental, toxicological and other safety related data. User must read the current actual Safety Data Sheets before using any product.

- ## Legal Disclaimer

The information, and, in particular, the recommendations related to the application and end-use of ChemConcrete^{-WP} Admixture, are given in good faith based on CHEM CONCRETE team's current knowledge and experience on the product when properly stored, handled, and used in normal conditions in conventional concrete in accordance with recommendations provided by CHEM CONCRETE team. In practice, the user of the product must investigate the product's suitability for the intended application and purpose, and CHEM CONCRETE reserves the right to change or enhance the properties of its products and update the related technical information. All orders are accepted subject to our current terms of sale and delivery.

*Under some specific conditions, CHEM CONCRETE may provide performance-based warranties, sometimes up to the design life of the projects, when Hybrid ChemConcrete^{-WP} Admixture is used. Please consult this with a technical team member of CHEM CONCRETE in Sydney office, Australia.