



ADMIX C-5000

CEMENTITIOUS CRYSTALLINE

Durability Enhancing & Waterproofing Admixture

Description

XYPEX ADMIX C-5000 is a unique chemical treatment that has been specially formulated to enhance the durability of re-inforced concrete exposed to aggressive conditions as well as delivering superior waterproofing performance to concrete. Xypex Admix C-5000 is added to the concrete mix at the time of batching.

Features and Benefits

Xypex Admix C-5000 is a powdered additive consisting of Portland cement and various active proprietary chemicals. These active chemicals react with the moisture in fresh concrete and the by-products of cement hydration to cause a catalytic reaction which generates a non-soluble crystalline formation throughout the pores, capillary tracts, and micro-cracks within the concrete. Crystalline formation prevents penetration of deleterious substances and water into ordinary or blended Portland cement concrete, significantly. Experimental investigations conducted in Australia, Canada, and Japan have demonstrated that Xypex Admix C-Series enhance the durability of the concrete exposed to aggressive environmental conditions such as, but not limited to, marine environment, sulphate attack, and acid attack whilst maintaining excellent hydrostatic pressure resistance.

NOTE: The Xypex Admix C-Series has been specially formulated to meet varying project and temperature conditions (see Setting Time and Strength). Consult with a Xypex Representative to determine the most appropriate Xypex Admix and to obtain technical support literature for your project.

Compliance

Xypex Admix C-5000 complies with the requirements of AS 1478.1, as a type SN Special Purpose Admixture, AS4020 Standard for products for use with drinking water.

Recommended For:

- Marine Structures
- Water and Wastewater Treatment Plants and Sewage Systems
- Secondary Containment Structures
- Chemical Processing Facilities
- Reservoirs, Dams and Irrigation Structures
- Power Generating Stations
- Foundations / Basements / Parking Structures
- Bridges
- Tunnels, Subway Systems and Underground Vaults
- Pre-Stressed and Pre-Cast Components
- Shotcrete Installations
- Swimming Pools and Aquatic Facilities

Advantages

- Improves fresh and hardened concrete properties
- Reduces water permeability coefficient of the concrete significantly
- Ease of application
- Becomes an integral part of the concrete
- Highly resistant to sulphate, acid, and chloride attack
- Addresses a wide range of environmental issues
- Highly resistant to chemical attack within a pH range of 3 to 11 in constant contact
- Can self-heal static hairline cracks up to 0.4 mm
- Allows concrete to breathe
- Non-toxic / no VOCs
- Cost efficient
- Permanent
- Added to the concrete at time of batching and is therefore not subject to climatic restraints
- Increases flexibility in construction scheduling

Packaging

Xypex Admix C-5000 is available in 15 kg buckets. Each bucket contains 6 x 2.5 kg soluble bags. For large projects, customised packaging is available.

Storage

Xypex products must be stored dry at a minimum temperature of 7°C. Shelf life is one year when stored under proper conditions.

Dosage Rates

Xypex Admix C-5000: 0.45% - 0.65% by weight of cementitious content. Consult with Xypex Australia's Technical Department or your local Xypex Representative for assistance in determining the appropriate dosage rate and for further information regarding enhanced chemical resistance, optimum concrete performance, or meeting the specific requirements and conditions of your project.

Test Data

COMPRESSIVE STRENGTH

AS 1012.9, "Compressive Strength of Cylindrical Concrete Specimens", Australia Centre of Construction and Innovation, University of New South Wales, Sydney, Australia

Type-GB blend cements containing Xypex Admix C-5000 dosed at a rate of 0.5% by weight of cementitious material recorded significant increase in early-age and 28-day compressive strength by up to 20% compared to samples without Xypex Admix (control).

DRYING SHRINKAGE

AS 1012.13, "Determination of Drying Shrinkage of Concrete", Australia Centre of Construction and Innovation, University of New South Wales, Sydney, Australia

Concrete samples incorporating Xypex Admix C-5000 indicated significant lower drying shrinkage by up to 25% compared to the control mixes using Type-GB cement.

PERMEABILITY

ACCI Water Permeability Test, "Water Permeability of Concrete", Australia Centre of Construction and Innovation, University of New South Wales, Sydney, Australia

Concrete samples containing Xypex Admix C-5000 were tested for water permeability against control samples. All the samples were subjected to a pressure of 10 bars (100 meters water-head) for 2 weeks. Water permeability coefficients were calculated and the Xypex Admix modified concrete showed significant reduction in water permeability by up to 81%.

CHEMICAL RESISTANCE

AS2350.14, "Length Change in Sulphate Solution", Australia Centre of Construction and Innovation, University of New South Wales, Sydney, Australia

Potential expansion of concrete in sulphate environments was assessed in accordance with AS2350.14 by immersing samples in a sulphate solution over 16 weeks. Concrete samples containing Xypex Admix C-5000 were tested against untreated control samples for sulphate resistance. The test data showed the use of Xypex Admix demonstrated significant improvements in sulphate resistance (low expansion) by up to 26%.

NT BUILD 443, ACCI Modified Test, "Chloride Diffusion by NordTest with 3% NaCl solution", Australia Centre of Construction and Innovation, University of New South Wales, Sydney, Australia

Xypex Admix modified concretes were immersed in a 3.0% sodium chloride solution for at least 35 days. The chloride diffusion coefficients were calculated according to Fick's Second Law based on the chloride content profile in the concrete samples after immersion. Significant reductions in the chloride diffusion coefficients were found with all the Xypex Admix modified concretes by up to 50% compared to control concretes. The concretes modified with Xypex Admix C-5000 demonstrated the highest level of protection against chloride ingress in the testing.

POTABLE WATER EXPOSURE

AS/NZS 4020 "Products for Use in Contact with Drinking Water", Australian Water Quality Centre, Adelaide, South Australia

Exposure testing of potable water in contact with Xypex-treated samples indicated no harmful effects.

Directions for Use

Xypex Admix C-5000 is added to the concrete at the time of batching. It is important to obtain a homogeneous mix-

ture of Xypex Admix with the concrete. Do not add dry Admix powder directly to wet mixed concrete as this could cause clumping and thorough dispersion may not occur. The sequence of procedures for addition will vary according to the type of batch plant operation and equipment. Avoid direct contact with other additives during dosing process. The following methods have been used successfully in the past and it is recommended that the local Xypex Representative be consulted about the best method to use. Ensure all mix components are prepared and added in accordance with industry guides in particular supplementary cementitious materials. Due to the varied nature of supplementary and cementitious materials, Xypex recommends trial batching procedures prior to full batching processes.

1. ADDITION TO COARSE AGGREGATE BELT Add Xypex Admix powder directly to the coarse aggregate conveyor belt manually or through computer controlled mass batching system. Account for worker health and safety issues with moving belts and wind-blown dust issues. This is the most recommended dosing procedure.

2. TRUCK ADDITION (AT PLANT) Add Xypex Admix in bulk powder or soluble bag form to the drum of the ready-mix truck with a small amount of batch water immediately prior to driving the truck under the batch plant and adding the balance of the materials or the premixed concrete in accordance with standard concrete batching practices. Measures to ensure soluble bags are dispersed include adding the bags as far forward in the drum as possible, adding a small amount of batch water with the bags, and spinning the drum prior to adding remaining ingredients. Avoid delays in adding other components and utilize high speed mixing to ensure homogeneity of mix. Ensure consistent dosing procedures are conducted which align with trial mix procedures. Avoid direct contact with other additives during dosing process. Where there may be insufficient water for thorough dispersion of the bulk powder, a water slurry can be made with the Admix added to the truck mixer drum prior to batching. Refer to below procedures.

3. ADDITION TO CENTRAL MIXER Load the Admix in bulk powder form or in soluble bags along with the other components. Mix as per standard batching practices to ensure thorough dispersal of the Admix resulting in a homogeneous mixture. Ensure consistent dosing procedures are conducted which align with trial mix procedures. Avoid direct contact with other additives during dosing process. Account for worker safety issues when accessing the equipment.

NOTE

i. Although not normally recommended, on-site dosing of Xypex Admix may be conducted. The Admix shall be added in slurry form to the concrete mixture in the mixing truck. Mix the slurry with a ratio of 1kg of powder to 1.85kg of clean water in a suitable container with at least twice the volume of the mixture to avoid reaction effects and spillage. Add powder to the water slowly while mixing and ensure suitable number of containers for full dose and load size. Use appropriate mixing equipment to ensure any clumps of powder disperse and all the Admix is hydrated. All water added to the slurry mixture is to be allowed for in the concrete mix de-

sign including water needed to remove any residual paste. Add the slurry mixture to the concrete mixer ensuring thorough dispersion occurs. Ensure consistent dosing procedures are conducted which align with trial mix procedures. Avoid direct contact with other additives during the dosing process. Mix the dosed concrete for a minimum of 5 minutes on high speed to fully disperse the admixture.

Should personnel not be experienced in the dosing of Xypex Admix, Xypex recommends that trial mixing be conducted.

ii. Concrete containing the Xypex Admix does not preclude the requirement for design of crack control, construction joint detailing, proper placement, consolidation and curing of the concrete and measures for repairing defects such as honeycombing, tie holes, cracks beyond specified limits.

iii. Further guidelines are available that address the use of Xypex Admix for a specific situation, (e.g. dry mixes, use of ice in hot concrete, cold-weather concreting, etc.). Consult with a local Xypex Representative or Xypex Australia's Technical Department for further information.

Setting Time and Strength

The setting time of concrete is affected by the chemical and physical composition of ingredients, temperature of the concrete and climatic conditions. Extension of set time may occur when using Xypex Admix C-5000. The amount of extended set will depend upon the concrete mix design and the dosage rate of the Admix. Concrete containing Xypex Admix may develop higher ultimate strengths than plain concrete.

Trial mixes should be carried out under project conditions to determine setting time and strength of the concrete.

Limitations

When incorporating Xypex Admix, the temperature of the concrete mix should be above 4°C.

Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Department of Xypex Australia or your local Xypex Representative.

Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex buckets and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of your employees and customers. Contact Xypex Australia or your local Xypex Representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

Warranty

Concrete Waterproofing Manufacturing Pty Ltd (trading as Xypex Australia) (the "Manufacturer") warrants that the products manufactured by it shall be free from material defects and be of a consistent quality. Should any of the products be proven defective, the liability of the Manufacturer shall be limited to replacement of the product ex-factory. The Manufacturer gives no warranty as to fitness of the products for any particular purpose. The user shall: determine the suitability of the product for its intended use; comply with the directions for use and safe handling information available from Xypex; and assume all risks and liabilities in connection with the use of this product.

Sustainability

Both GreenTag LCARate and GreenRate are recognised third party certification schemes for Green Star® in Australia and NZ and can certify in a single certificate all Materials Calculators, VOCs, Formaldehyde Reduction, Best Practice PVC and Post Consumer Recycled Content credits. GreenTag is a unique Australian Competition and Consumer Commission (ACCC) approved National Certification Mark and is also registered as a Certification Mark in the EU and UK and is also the Preferred Certifier for the EarthCheck Eco-hospitality certification program.

