

CRYSTALLINE WATERPROOFING ADDITIVE

Section 03050

Standards of Australia Version

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

Furnishing of all labour, materials, services and equipment necessary for the supply and installation of crystalline waterproofing additive to concrete structures as indicated on the drawings and as specified herein. The crystalline waterproofing material shall be added to concrete during the mixing cycle, and shall be used in above or below-grade walls and slabs, including liquid retaining structures where enhanced chemical resistance is required.

B. Related Sections:

1. Section 03100 - Concrete Work
2. Section 03200 - Concrete Reinforcement
3. Section 07900 - Joint Sealers

1.02 REFERENCES

A. Applicable Standards: The following standards are referenced herein.

1. Australian Standards (AS)
2. Standards Australia (SAA)
3. Concrete Institute of Australia (CIA)
4. Australian Standards / New Zealand Standards (AS/NZS)
5. American Society for Testing and Materials (ASTM)
6. American Concrete Institute (ACI)
7. Army Corps of Engineers (CRD)
8. NSF International (NSF)

1.03 SYSTEM DESCRIPTION

A. *Crystalline Waterproofing Additive*: Concrete waterproofing system shall be of the crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete. The system shall cause the concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete from deterioration due to harsh environmental conditions.

1.04 SYSTEM PERFORMANCE REQUIREMENTS

A. *Testing Requirements*: Crystalline waterproofing system shall be tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance requirements as specified herein.

B. *Independent Laboratory*: Testing shall be performed by an independent laboratory meeting the requirements of Australian Standards (AS) and certified by the Australian National Association of Testing Authorities (NATA), or ASTM E 329-90 and certified by the United States Bureau of Standards. Testing laboratory shall obtain all concrete samples and waterproofing product samples.

C. *Crystalline Formation*: Crystallizing capability of waterproofing system shall be evidenced by independent SEM (Scanning Electron Microscope) photographs showing crystalline formations within the concrete matrix.

D. *Permeability*: Independent testing shall be performed according to U.S. Army Corps of Engineers CRD-C48-73 "Permeability of Concrete". Treated concrete samples shall be pressure tested to 1.05 MPa (106 m head of water). The treated samples shall exhibit no measurable leakage.

E. *Chemical Resistance*: Independent testing shall be performed to determine "Sulphuric Acid Resistance of Concrete Specimens". Treated concrete samples (dosage rates of 3%, 5% and 7%) shall be tested against untreated control samples. Equivalent dosage rates for the Xypex Admix "No Fines" grade are: 1.9%, 3.2% and 4.5%. All samples shall be immersed in sulphuric acid and weighed daily until a control sample reaches a weight loss of 50% or over. On final weighing the percentage weight loss of the treated samples shall test significantly lower than the control samples.

F. *Compressive Strength*: Independent testing shall be performed according to AS 1012.9 "Determination of the Compressive Strength of Concrete Specimens" or ASTM C39 "Compressive Strength of Cylindrical Concrete Specimens". Concrete samples containing the crystalline waterproofing additive shall be tested against untreated control sample (Do not use admixtures in test specimens). At 28 days, the Xypex treated sample shall exhibit an increase in compressive strength over the control sample.

G. Potable Water Approval: Independent testing shall be performed according to AS/NZS 4020:1999 "Products for use in contact with Drinking Water" evidenced by AS/NZS certification, or NSF Standard 61, and approval for use of waterproofing material on structures holding potable water shall be evidenced by NSF certification.

1.05 SUBMITTALS

A. General: Submit listed submittals in accordance with conditions of the Contract and with Division 1 Submittal Procedures Section.

B. Product Data: Submit product data, including manufacturer's specifications, installation instructions, and general recommendations for waterproofing applications. Also include manufacturer's certification or other data substantiating that products comply with requirements of Contract Documents.

C. Test Reports: Submit, for acceptance, complete test reports from approved independent testing laboratories certifying that waterproofing system conforms to performance characteristics and testing requirements specified herein.

D. Manufacturer's Certification: Provide certificate signed by manufacturer or manufacturer's representative certifying that the materials to be installed comply in all respects with the requirements of this specification.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturers quality system to be in compliance with ISO 9001 Standards and to have no less than 10 years experience in manufacturing the crystalline waterproofing additive for the required work. Manufacturer must be capable of providing field service representation during construction phase. Manufacturers that cannot provide the performance test data specified herein will not be considered for the project.

B. Applicator: Installer of crystalline waterproofing additive shall be approved by the manufacturer or manufacturer's representative in writing.

C. Pre-Installation Conference: Prior to installation of waterproofing, conduct meeting with Architect/Engineer, owner's representative, applicator (concrete supplier), concrete placer and waterproofing manufacturer's representative to verify and review the following:

1. Project requirements for waterproofing as set out in Contract Document.
2. Manufacturer's product data including application instructions.

D. Technical Consultation: The waterproofing manufacturer's representative shall provide technical consultation on waterproofing application.

1.07 DELIVERY, STORAGE AND HANDLING

A. *Ordering*: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. *Delivery*: Deliver packaged waterproofing materials to project site in original undamaged containers, with manufacturer's labels and seals intact.

C. *Storage*: Store waterproofing materials in dry, enclosed location, at temperature and humidity conditions recommended by manufacturer.

1.08 WARRANTY

A. *Project Warranty*: Refer to conditions of the Contract for project warranty provisions.

B. *Manufacturer's Warranty*: Manufacturer shall provide standard product warranty executed by authorized company official.

PART 2 - PRODUCTS

2.01 MATERIALS

A. *Acceptable Manufacturer*: Concrete Waterproofing Manufacturing Pty. Ltd.
T/A XYPEX AUSTRALIA ABN 96-093-161-963

45 Union Road
(P.O. Box 255)
Lavington NSW, 2641 Australia

Telephone: +61 2 6040 2444, Facsimile: +61 2 6040 2411

Email: xypenq@xypex.com.au Website: www.xypex.com.au

B. *Proprietary Products*: Xypex crystalline waterproofing additives as follows:

1. Xypex Admix C-1000NF

2. Xypex Admix C-5000

Note: Supplemental specifications are available for Xypex Admix C-1000 (fines grade) and Xypex Admix C-2000 (fines grade).

C. *Substitutions*: No substitutions permitted.

D. *Source Quality*: Obtain proprietary crystalline waterproofing products from a single manufacturer.

2.02 DOSAGE

A. *General*: Xypex Admix must be added to concrete mix at time of batching.

B. *Dosage Rate*: Under normal conditions, the crystalline waterproofing powder shall be added to the concrete mix at a rate of 0.8% - 1% by weight of cementitious material. For enhanced chemical protection or meeting specific project requirements, consult with manufacturer or its authorized representative to determine appropriate dosage rates.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. *Compliance*: Comply with manufacturer's product data regarding installation, including technical bulletins, product catalogue, installation instructions and product packaging labels.

3.02 PROJECT CONDITIONS

A. *Reinforcement*: All concrete elements in which crystalline waterproofing is to be used, shall be designed and constructed strictly in accordance with the current version of AS 3600, Concrete Structures Code. In those jurisdictions not covered by Australian Standards, the equivalent requirements of AS 3600 are to be used. (Note: Crystalline waterproofing products should not be considered flexible.)

B. *Setting Time and Strength*: Some extension of set may occur when using Xypex Admix. The amount of extension will depend upon the concrete mix design, the dosage rate of the Admix, temperature of concrete and climatic conditions. Concrete containing Xypex Admix may develop higher ultimate strengths than plain concrete. Conduct trial mixes under project conditions to determine setting time and strength of the concrete. Consult with manufacturer or manufacturer's representative regarding concrete mix design, project conditions and proper dosage rate.

C. *Placement*: Practices for all aspects of placement shall conform with the current version of AS3600 and Guide to Concrete Construction SAA HB64. When using crystalline waterproofing, finishing of concrete must include either power trowelling of the surface or vigorous hand steel trowelling. Subsequent to this finishing any desired finish can be applied.

D. *Weather Conditions*: For mixing, transporting and placing concrete under conditions of high temperature or low temperature, follow concrete practices as referred to in Guide to Concrete Construction SAA HB64, Chapter 10, Hot and Cold Weather Concreting or ACI 305R-77 (Hot Weather Concreting) and ACI 306R-78 (Cold Weather Concreting). For flatwork being placed in either hot, dry or windy

conditions use of monomolecular film (evaporation retardant) is recommended to control loss of bleed water.

3.03 APPLICATION

A. *General:* Xypex Admix shall be added to the concrete mix at time of batching. Thorough blending of the Xypex Admix throughout the concrete mix is essential for correct performance of the product and, therefore, care should be taken to ensure that a homogeneous mixture is obtained.

B. *Concrete Batching & Mixing:* Xypex Admix must be added to the concrete at the time of batching. The sequence of procedures for addition will vary according to the type of batch plant operation and equipment:

1. READY MIX PLANT - DRY BATCH OPERATION - Prior to concrete being batched, add Xypex Admix in powder form to the drum of the ready-mix truck. After batching, mix the materials for 2 -3 minutes to ensure the Admix is distributed evenly throughout the batch. A minimum of 10 minutes must elapse before discharge of the concrete. A further 1 minute of mixing at high speed immediately prior to discharge is recommended.

2. READY MIX PLANT - CENTRAL MIX OPERATION - Mix Xypex Admix with water to form a very thin slurry (e.g. 7.0 kg of powder mixed with 13.0 litres of water). Pour the required amount of material into the drum of the ready-mix truck. The aggregate, cement and water should be batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready-mix truck). Pour the concrete into the truck and mix for at least 5 minutes to ensure even distribution of the Xypex Admix throughout the concrete.

3. PRECAST BATCH PLANT - Add Xypex Admix to the rock and sand, then mix thoroughly for 2 - 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

3.04 CURING

A. *General:* Concrete containing Xypex Admix shall be moist cured in accordance with CIA Recommended Practice Note Z9 or ACI Reference 308, " Standard Practice for Curing Concrete".

B. *Curing Compounds:* Curing compounds may be used in the event that project requirements or conditions prevent moist curing. Curing compounds shall comply with AS3799 within Australia. In those jurisdictions not governed by Australian Standards, the minimum requirement shall be the curing efficiency called for in ASTM C-309.

3.05 PROTECTION

A. *Protection:* Protect installed product and finished surfaces from damage during construction.

3.06 FIELD QUALITY CONTROL

A. *Examination for Defects*: Do not conceal Xypex treated concrete before it has been observed by Architect / Engineer, waterproofing manufacturer's representative and other designated entities. Concrete shall be examined for structural defects such as honeycombing, rock pockets, tie holes, faulty construction joints, cold joints and cracks. Such defects to be repaired in accordance with manufacturer's repair procedures.

B. *Flood Testing for Suspended Slabs*:

1. Perform flood test on completed waterproofing installation before placement of other construction.
2. Plug or dam drains and fill area with water to a depth of 50 mm or to within 12.5 mm of top of waterproofing treatment.
3. Let water stand for 24 hours.
4. If leaks are discovered, make repairs and repeat test until no leaks are observed.

3.07 INTERACTION WITH OTHER MATERIALS

A. *Backfilling*: Normal backfilling procedures may be used after concrete has been cured for at least seven days. If backfill takes place within seven days after concrete placement, then backfill material shall be moist so as not to draw moisture from the concrete. In no event shall backfilling take place before concrete has gained sufficient strength to withstand the applied load.

B. *Grout, Cement Parge Coat, Plaster or Stucco*: Because concrete containing Xypex Admix forms a relatively smooth surface and the resulting crystalline formation fills the concrete pores thereby reducing suction characteristics of the concrete, it may be necessary to use a suitable bonding agent for proper bonding of cementitious systems.

C. *Responsibility to Ensure Compatibility*: The manufacturer makes no representations or warranties regarding compatibility of Xypex treated concrete with coatings, plasters, stuccos, tiles or other surface-applied materials. It shall be the responsibility of the installer of the surface-applied material that is to be applied over the Xypex treated concrete, to take whatever measures are necessary, including testing, to ensure acceptance by or adhesion to the waterproofing treatment.

END OF SECTION 03050