

# Additive CSI Format

## Section 03050

### 1.01 SUMMARY

- A. **Section Includes:** Furnishing of all labor, 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. American Society for Testing and Materials (ASTM)
  2. Army Corps of Engineers (CRD)
  3. American Concrete Institute (ACI)
  4. 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 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 150 psi (350 foot head of water) or 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 "Sulfuric Acid Resistance of Concrete Specimens". Treated concrete samples (dosage rates of 3%, 5% and 7%) shall be tested against untreated control samples. All samples shall be immersed in sulfuric 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 ASTM C39 "Compressive Strength of Cylindrical Concrete Specimens". Concrete samples containing the crystalline waterproofing additive shall be tested against untreated control sample. At 28 days, the treated samples shall exhibit a minimum of 10% increase in compressive strength over the control sample.
- G. **Potable Water Approval:** Independent testing shall be performed according to 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:** Manufacturer to be ISO 9001 registered, 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. Term of warranty shall be [specify term] years from Date of Substantial Completion.

## PART 2 – PRODUCTS

### 2.01 MATERIALS

- A. **Acceptable Manufacturer:**

Xypex Chemical Corporation  
13731 Mayfield Place, Richmond, B.C., Canada V6V 2G9  
Tel: 800 961.4477 or 604 273.5265 Fax: 604 270.0451  
E-mail: info@xypex.com Website: www.xypex.com

- B. **Proprietary Products:** Xypex crystalline waterproofing materials as follows:

1. Xypex Admix C-500
2. Xypex Admix C-1000
3. Xypex Admix C-2000

Note: Supplemental specifications are available for Xypex Admix C-500 NF (no fines grade), Xypex Admix C-1000 NF (no fines grade) and Xypex Admix C-2000 NF (no 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 the following rates:

|                    |  |
|--------------------|--|
| Xypex Admix C-500  | 2% – 3% by weight of portland cement content |
| Xypex Admix C-1000 | 2% – 3% by weight of portland cement content |
| Xypex Admix C-2000 | 2% by weight of portland cement content      |

For enhanced chemical protection or meeting specific project requirements, or where the concrete mix design contains higher than 20% fly ash content or includes a portland cement/slag cement blend, 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 reinforcement shall be rib deformed bar in accordance with applicable standards. Exposed concrete decks (joint free) shall contain sufficient reinforcement to minimize thermal movement and control cracking.
- B. **Setting Time and Strength:** Some retardation of set may occur when using Xypex Admix products. The amount of retardation will depend upon the concrete mix design, the particular Admix product used, dosage rate of the Admix, temperature of the concrete and climatic conditions. Concrete containing a Xypex Admix product 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. **Weather Conditions:** For mixing, transporting and placing concrete under conditions of high temperature or low temperature, follow concrete practices as referred to in 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:** Procedures for mixing will vary according to type of batch plant operation and equipment.

1. Ready Mix Plant - Dry Batching Operation: Add Xypex Admix powder to drum of ready-mix truck, then add 60% - 70% of required water along with 300 - 500 lb. (136 - 227 kg) of aggregate. Mix the materials for 2 - 3 minutes to ensure that the Admix is distributed evenly throughout the mix water. Add balance of materials to the ready-mix truck and mix in accordance with standard batch practices.

2. Ready Mix Plant - Central Mix Operation: Mix Xypex Admix with water to form a very thin slurry (e.g. 15 - 20 lb. or 6.75 - 9 kg of powder mixed with 3 gal. or 13.6 l of water). Pour the required amount of material in drum of 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 - Pan Type Mixer: 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 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 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 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 two inches (50 mm) or to within 0.5 inch (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:** Xypex Admix products are compatible with most admixtures used in the production of quality concrete. However, Xypex Chemical Corporation makes no representations or warranties regarding such compatibility of Xypex Admix products with other additives or admixtures, nor regarding compatibility of the Xypex treated concrete with coatings, plasters, stuccos, tiles or other surface-applied materials. It shall be the responsibility of the concrete contractor to take whatever measures are necessary, including testing, to ensure compatibility of the Xypex Admix with other additives or admixtures being used in the concrete mix, and 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 Xypex treated concrete.

**End of Section 03050**