SECTION 07 16 16

CRYSTALLINE WATERPROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for furnishing and installing crystalline waterproofing at inside surfaces of elevator pit walls and floors.

B. Related Sections:

1. Cast-in-place concrete is specified in Section 03 30 00.

2. Modified bituminous sheet membrane waterproofing is specified in Section 07 13 52.

3. Elastomeric liquid waterproofing is specified in Section 07 14 16.

4. Bentonite waterproofing is specified in Section 07 17 00.

1.02 SYSTEM DESCRIPTION

A. Blend of portland cement, fine treated silica sand and active proprietary chemicals. When mixed with water and applied as a cementitious coating, the active chemicals cause a catalytic reaction which generates a non-soluble crystalline of dendritic fibers within the pores and capillary tracts of concrete. This process causes concrete to become permanently sealed against the penetration of liquids from any direction.

1.03 SYSTEM PERFORMANCE REQUIREMENTS

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

B. Independent Laboratory: Testing shall be performed by an independent laboratory requirements of ASTM E329 and certified by the US Bureau of Standards.

C. Crystalline Penetration: Crystallizing capability of waterproofing material shall be evidenced by independent SEM photographs documentating penetration of crystal-forming waterproofing material to a depth of 2-inches.

D. Permeability: Independent testing shall be performed according to U.S. Army Corp. of Engineers CRD C48-73 " Permeability of Concrete" .

1. Concrete samples (treated and untreated) shall have a strength of 2,000-psi and thickness of 2-inches. No admixtures permitted.

2. Coatings shall have maximum thickness of 0.05-inches per coat with up to two coats permitted.

3. Samples shall be pressure tested to 175-psi (405 foot head of water).

4. Treated samples, after crystalline growth has occurred, shall exhibit no measureable leakage.

E. Chemical Resistance: Independent testing shall be performed according to ASTM C267 and ASTM C39.

1. Concrete samples (treated and untreated) shall have design strength of 4,000-psi. No admixtures permitted.

2. Coatings shall have maximum thickness of 0.05-inches per coat with up to two coats permitted.

3. Untreated and treated specimens shall be immersed for a minimum of 84-days in following chemical solutions: hydrochloric acid (3.5pH), brake fluid, transformer oil, ethylene glycol, toluene, caustic soda.

4. Treated specimens shall exhibit no detrimental effects after exposure and shall have minimum of 14-percent increase in compressive strength versus untreated control specimens.

1.04 SUBMITTALS

A. Product Data: Furnish product data including manufacturer' s specifications, installation instructions, and general recommendations. Include manufacturer' s certification or other data substantiating that products comply with specified requirements.

B. Test Reports: Complete tests results from an approved independent testing laboratory certifying that waterproofing system conforms to specified performance characteristics.

C. Manufacturer' s Field Report: Copy of report from manufacturer' s representative confirming that the surfaces to which waterproofing material is to be applied are acceptable.

D. Warranty.

1.05 QUALITY ASSURANCE

A. Manufacturer: Minimum 10-years experience in manufacturing crystalline waterproofing.

B. Applicator: Familiar with the application of crystalline waterproofing with at least three successful applications in the last three-years and approved by waterproofing manufacturer.

C. Pre-Installation Conference: Prior to installation, conduct meeting with waterproofing applicator, installers of work adjacent to or which penetrates waterproofing, County' s Representative, and waterproofing manufacturer' s representative. Verify and review the following:

1. Project requirements for waterproofing.

2. Manufacturer' s product data including application instructions.

3. Substrate conditions, and procedures for substrate preparation and waterproofing installation.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver waterproofing products in the manufacturer's unopened original containers with product designations, batch numbers and date of manufacture visible on each container.

B. Handle and store materials in accordance with the manufacturer's published directions; protect materials from damage, moisture and temperatures below 40-deg. F.

C. Do not exceed manufacturer's recommended shelf life.

1.07 JOB CONDITIONS

A. Do not proceed with waterproofing work until surface is satisfactory to receive crystalline waterproofing.

B. Provide ventilation, heaters, humidifiers and water sprays as required to reach and maintain the surface and air temperatures and humidity within the limits specified for the installation of the waterproofing materials.

C. Provide surface preparation and installation equipment as recommended by the manufacturer and as required.

1.08 WARRANTY

A. Warrant crystalline waterproofing against leaking, and failure to stay in place for 3-years from the date of Substantial Completion.

B. Warranty includes replacement and repair of other work damaged by water leakage in crystalline waterproofing.

C. This warranty shall be in addition to and not a limitation of other rights the County may have against the Developer Design/Builder under the Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Approved Manufacturers: Xypex Chemical Corporation " Xypex" or approved equal.

B. Waterproofing: One-component, penetrating material.

C. Provide accessory materials as recommended by waterproofing manufacturer for each specific condition.

2.02 MIXES

A. Mix waterproofing material by volume with clean water, free from deleterious materials. Mix waterproofing material in quantities that can be applied within 20- to 30-minutes from time of mixing. As mixture stiffens, stir frequently but do not add additional water. Do not mix bonding agents or admixtures with crystalline waterproofing materials.

B. Brush Application Mix: Measure dry powder and place in mixing container. Measure water and mix into the dry powder with a paddle on a slow speed electric drill or other mixing device acceptable to the manufacturer. Mixing proportions as follows:

Coverage	Proportions (by volume)
1.5-lb./sq. yd.	5 power to 2 water
2.0-lb./sq. yd.	3 powder to 1 water

C. Spray Application Mix: Mixing shall be as specified for brush application except mixture shall be thinner.

D. Dry Pack Mix: Using a trowel, mix 1 part clean water with 6 parts concentrate powder for 10- to 15-seconds. Lumps may be present in the mixture. Mix only as much as can be applied in 15-minutes.

PART 3 - EXECUTION

3.01 GENERAL

A. Prepare surface, mix and install crystalline waterproofing and cure finished installation in accordance with manufacturer's recommendations.

3.02 SURFACE PREPARATION

A. Concrete Finish: Surfaces to receive waterproofing treatment shall have an open capillary system to provide tooth and suction, and shall be free from scale, excess form oil, laitance, curing compounds and foreign matter. Horizontal surfaces shall have a rough wood float or broom finish. Where a smooth trowel finish is required on horizontal surface, crystalline waterproofing material shall be applied by dry shake method at time of concrete finishing in accordance with waterproofing manufacturer' s instructions.

B. Surface Preparation: Smooth surfaces or surfaces covered with excess form oil or other contaminants shall be washed, lightly sandblasted, water blasted or acid etched with muriatic acid as required to provide a clean absorbent surface. Surfaces to be acid etched shall be saturated with water prior to application of acid.

C. Repair of Defects: Surface defects shall be repaired in accordance with manufacturer' s instructions as follows:

1. Form Tie Holes, Construction Joints, Cracks: Chip out defective areas in a " U" shaped slot 1-inch wide and a minimum of 1-inch deep. Clean slot of debris and dust. Soak area with water and remove excess surface water. Apply a slurry coat of concentrate at the rate of 1.5-lbs./sq. yd. to the slot. Allow slurry to reach an initial set, then fill cavity with Dry-Pac. Compress tightly into cavity using pneumatic packer or block and hammer.

2. Rock Pockets, Honeycombing or other Defective Concrete: Rout out defective areas to sound concrete. Remove loose materials and saturate with water. Remove excess surface water and apply a slurry coat of concentrate. Remove loose materials and saturate with water. Remove excess surface water and apply a slurry coat of concentrate to the area. After slurry has set, but while still " green" , fill cavity to surface level with non-shrink grout.

D. Wetting Concrete: Prior to application of waterproofing treatment, saturate concrete surfaces with clean water as required to ensure migration of crystalline chemicals into voids and capillary tracts of the concrete. Remove free surface water before application.

3.03 APPLICATION

A. Construction Joints: Apply concentrate in slurry form at a rate of 2.0-lbs./sq. yd. to joint surfaces between concrete pours. Moisten surfaces prior to slurry application. Where joint surfaces are not accessible prior to pouring new concrete, comply with manufacturer' s instructions.

3.04 CURING

A. General: Begin curing as soon as coating has hardened sufficiently so as not to be damaged by a fine spray. Cure with a mist fog spray of clean water 3 times a day for 2- to 3-days or cover treated surfaces with damp burlap for the prescribed period. In warm climates, more than 3 sprayings per day may be required to prevent excessive drying of coating.

B. Air Circulation: Do not lay plastic sheeting directly on the waterproofing coating as air contact is required for proper curing. If poor circulation exists in treated areas, provide fans or blown air to aid in curing.

C. Protection: During the curing period, protect treated surfaces from damage by wind, sun, rain and temperatures below 36-deg. F. If plastic sheeting is used for protection, it must be raised off of waterproofing coating to allow sufficient air circulation.

D. Curing Agent: If moist curing is not possible, use a chemical curing agent that is specifically designed for or compatible with the approved crystalline waterproofing treatment. Curing agent shall have a least 2-years of successful field use and shall be approved by waterproofing manufacturer.

3.05 INTERFACE WITH OTHER MATERIALS

A. Backfilling: Do not backfill for 36-hours after application. If backfill takes place within 7-days after application, backfill material shall be moist so as not to draw moisture from waterproofing coating.

3.06 FIELD QUALITY CONTROL

A. Do not conceal installed waterproofing system before it has been observed by County' s Representative and waterproofing manufacturer' s representative.

3.07 CLEANING AND PROTECTION

A. Cleaning: Clean spillage and soiling from adjacent surfaces using appropriate cleaning agents and procedures.

B. Protection: Take measures to protect completed waterproofing coating from damage after application. Do not permit traffic on unprotected coating.

END OF SECTION