Dryshake CSI Format

Section 07160

PART 1 – GENERAL

1.01 SUMMARY

A. ***Section Includes:*** Furnishing of all labor, materials, services and equipment necessary for the supply and installation of cementitious crystalline waterproofing (dry shake) to horizontal concrete surfaces as indicated on drawings and as specified herein.

B. ***Related Sections:***

1. Section 03100 - Concrete Work
2. Section 03300 - Cast-In-Place Concrete
3. Section 03360 - Concrete Finishing

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)

1.03 SYSTEM DESCRIPTION

A. ***Cementitious Crystalline Waterproofing (Dry Shake):*** Blend of portland cement, active proprietary chemicals and aggregate that has been graded and crushed to particle sizes suitable for concrete floors. When applied as a dry shake to freshly poured concrete slabs, the active chemicals cause a catalytic reaction which generates a non-soluble crystalline formation 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. For areas where increased abrasion resistance is required, the dry shake waterproofing shall contain a proprietary aggregate hardener.

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 Penetration:*** Crystallizing capability of waterproofing material shall be evidenced by independent SEM (Scanning Electron Microscope) photographs documenting penetration of crystal-forming waterproofing material to a depth of 2 inches (50 mm).

D. ***Permeability:*** Independent testing shall be performed according to U.S. Army Corps of Engineers CRD C48-73 “Permeability of Concrete”.

1. Concrete samples (treated and untreated) to have design strength of 2000 psi (13.8 MPa) and thickness of 2 inches (50 mm). No admixtures permitted.
2. Samples to be pressure tested to 175 psi (405 foot head of water) or 1.2 MPa (123.4 m head of water).
3. Treated samples, after crystalline growth has occurred, shall exhibit no measurable leakage.

E. ***Chemical Resistance:*** Independent testing shall be performed according to ASTM C267-82 (1990) and ASTM C39-86 "Chemical Resistance of Mortars".

1. Concrete samples (treated and untreated) to have design strength of 4000 psi (27.6 MPa). No admixtures permitted.

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

3. Treated specimens shall exhibit no detrimental effects after exposure, and shall have a minimum of 14% increase in compressive strength versus untreated control specimens.

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 certificates signed by manufacturer or manufacturer's representative certifying that the materials to be installed comply in all respects with the requirements of this specification, and that the applicator is qualified and approved to install the materials in accordance with manufacturer's product data.

1.06 QUALITY ASSURANCE

A. ***Manufacturer Qualifications:*** Manufacturer should be ISO 9001 registered, and shall have no less than 10 years experience in manufacturing the cementitious crystalline waterproofing materials (dry shake) for the required work. Manufacturers that cannot provide the performance test data specified herein will not be considered for the project.

B. ***Applicator:*** Waterproofing applicator shall be experienced in the installation of dry shake cementitious materials as demonstrated by previous successful installations, and shall be approved by the manufacturer in writing.

C. ***Pre-Installation Conference:*** Prior to installation of waterproofing, conduct meeting with waterproofing applicator, concrete placer, concrete finisher, Architect/Engineer, owner's representative, 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.
3. Procedures for substrate preparation, waterproofing installation and concrete finishing.

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.

1.08 WARRANTY

A. ***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.

B. ***Applicator's Warranty:*** Applicator shall warrant the waterproofing installation against defects caused by faulty workmanship or materials for a period of [specify term] years from Date of Substantial Completion. The warranty will cover the surfaces treated and will bind the applicator to repair, at his expense, any and all leaks through the treated surfaces which are not due to structural weaknesses or other causes beyond applicator's control such as fire, earthquake, tornado and hurricane. The warranty shall read as follows:

1. Warranty: The applicator warrants that, upon completion of the work, surfaces treated with cementitious crystalline waterproofing will be and will remain free from water leakage resulting from defective workmanship or materials for a period of [specify term] years from Date of Substantial Completion. In the event that water leakage occurs within the warranty period from such causes, the applicator shall, at its sole expense, repair, replace or otherwise correct such

defective workmanship or materials. Applicator shall not be liable for consequential damages and applicator's liability shall be limited to repair, replacement or correcting of defective workmanship or materials. Applicator shall have no responsibility with respect to water leakage or other defects caused by structural failure or movement of the structure, or any other causes beyond Applicator's control.

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 Concentrate DS-1 (general applications)
2. Xypex Concentrate DS-2 (where enhanced abrasion resistance is required)

Note: Supplemental specifications are available for Xypex Concentrate and Modified (coatings) and Xypex Admix C-500, C-2000 (additives).

C. ***Substitutions:*** No substitutions permitted.

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

2.02 COVERAGE

A. ***Dry Shake Materials:*** Coverage rate for cementitious crystalline waterproofing shall be as follows:

Xypex Concentrate DS-1	1.75 lb per sq. yd. (0.95 kg/m^2)
Xypex Concentrate DS-2	6.75 - 7.5 lb sq. yd. (3.6 - 4.0 kg/m^2)

When using Xypex Concentrate DS-2 for enhanced impact and abrasion resistance, consult with manufacturer or its authorized representative to determine appropriate coverage rate.

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. ***Air Entrainment:*** For best results, air content of the concrete should not exceed 3%. If higher entrained air content is specified (e.g. for concrete that will be exposed to freeze-thaw cycle), consult with a manufacturer's technical representative for further application information.

B. ***Joint Sealants:*** Suitable flexible sealant shall be used for joints and chronic moving cracks.

C. ***Weather Conditions:*** In hot, dry, windy conditions, or where the use of a super-plasticizer will reduce amount of bleed water available for the dry shake material, consult with manufacturer's technical representative for additional or alternative application procedures.

3.03 APPLICATION

A. ***General:*** Apply cementitious crystalline waterproofing (dry shake) after placement, consolidation and leveling of fresh concrete.

B. ***Concentrate DS-1:*** Wait until fresh concrete can be walked on leaving an indentation of 1/4 - 3/8 in. (6.5 - 9.5 mm), then power float the surface (the concrete should be free of bleed water before power floating). Immediately after floating open the surface, apply the dry shake material evenly by hand or mechanical spreader. As soon as the dry shake material has absorbed moisture from the fresh base slab, power float the material into the surface (do not use a trowel). Thoroughly work the powder into the cement paste. When concrete has hardened sufficiently, power trowel concrete surface to the required finish.

C. ***Concentrate DS-2:*** Wait until fresh concrete can be walked on leaving an indentation of 1/4 - 3/8 in. (6.5 - 9.5 mm), then power float the surface (the concrete should be free of bleed water before power floating). Immediately after floating open the surface, apply one half of the required dry shake material evenly by hand or mechanical spreader. Then, after power floating the initial portion of the powder into the surface, apply the remaining dry shake material at right angles to the first application, and power float (do not use a trowel) the material into the surface. Thoroughly work the powder into the cement paste. When concrete has hardened sufficiently, power trowel concrete surface to the required finish.

D. ***Slab Edges:*** Where edges of concrete slab set up earlier than main body of concrete, apply dry shake material to edges and finish with hand tools prior to proceeding with the dry shake application to the main body of concrete slab.

3.04 CURING

A. ***General:*** Begin curing as soon as concrete has reached a final set but before the surface starts to dry. Conventional moist curing procedures such as water spray, wet burlap or plastic covers may be used 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.

C. ***Protection:*** During the curing period, protect treated surfaces from damage by wind, sun, rain and temperatures below 32°F (0°C).

3.05 INTERFACE WITH OTHER MATERIALS

A. ***Paint, Epoxy or Similar Coatings:*** Do not apply paint or other coatings until waterproofing treatment has cured and set for a minimum of 21 days. Before applying paint or coating, neutralize treated surface by dampening with water and then washing waterproofed surface with 15% muriatic acid, diluted in a ratio of one part acid to four parts water by volume. Flush acid off treated concrete surfaces.

B. ***Grout, Cement Parge Coat, Concrete Topping:*** Because the waterproof treatment 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 Chemical Corporation makes no representations or warranties regarding compatibility of Xypex treatment 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 waterproofing treatment, to take whatever measures are necessary, including testing, to ensure acceptance by or adhesion to the waterproofing treatment.

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:***

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 CLEANING AND PROTECTION

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

B. ***Protection:*** Take measures to protect installed product and finished surfaces from damage after application.

End of Section 07160