Xypex Chemical Corporation
13731 Mayfield Place
Richmond, BC Canada V6V 2G9
Phone: (800) 961-4477
Phone: (604) 273-5265
Fax: (604) 270-0451
E-mail: info@xypex.com
www.xypex.com

This MANU-SPEC® utilizes the Construction Specifications Institute (CSI) *Project Resource Manual* (PRM), including *MasterFormat*™, *SectionFormat*™ and *PageFormat*™. A MANU-SPEC is a manufacturer-specific, product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by [ ]; delete optional text in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

This MANU-SPEC specifies Xypex Concrete Waterproofing by Crystallization as manufactured by Xypex Chemical Corporation. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles, including 07 10 00 Dampproofing and Waterproofing; 03 31 00 Structural Concrete; 03 40 00 Precast Concrete.

SECTION 07 16 13
POLYMER MODIFIED CEMENT WATERPROOFING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Crystalline waterproofing of concrete substrates, above-grade or below-grade, on either dry or wet side of substrates.

1. Applications of crystalline waterproofing of concrete include:

a. Surface Application: Xypex powder applied as slurry coat.

Specifier Note: Coordinate paragraph below with Division 03 Concrete. Typically, concrete admixtures and dry shake materials are specified in Division 03 Concrete Sections. Delete or retain paragraph below per specifier's practice.

b. Dry Shake Application: Xypex powder applied as dry shake.

c. Admixture: Xypex admixture included in concrete mix design.

Specifier Note: Revise paragraph below to suit project requirements. Add section number per CSI *MasterFormat* and specifier's practice.

B. Related Sections: Section(s) related to this section include:

1. Division 03 Concrete Sections.

Specifier Note: References Article usually is not used when specifying manufacturer's proprietary products and recommended installation. Add References Article when specifying products and installation by industry standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating date of standard(s) referenced. Conditions of the Contract or Division 01 References Section may establish the edition date of standard(s). This article does not require compliance with standard(s), but is merely a listing of references used.

1.02 REFERENCES

A. ASTM International:

1. ASTM C267 Standard Test Methods for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacings and Polymer Concretes.

2. ASTM C672 Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.

B. US Army Corps of Engineers (USACE):

1. CRD-C-48-73 Permeability of Concrete.

C. USA Standards:

1. USA Standard No. N69 Protective Coatings for the Nuclear Industry.

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 01 Submittal Procedures Section.

1.03 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and with Division 01 Submittal Procedures Section.

B. Product Data: Submit product data, including manufacturer's SPEC-DATA® product sheet, for specified products.

C. Quality Assurance Submittals: Submit the following:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical requirements.

3. Manufacturer's Instructions: Manufacturer's installation instructions.

4. Manufacturer's Field Reports: Manufacturer's field reports.

D. Closeout Submittals: Submit the following:

1. Warranty: Warranty documents specified herein.

Specifier Note: Article below should include prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate article below with Division 01 Quality Assurance Section.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Installer should be experienced (as determined by contractor) to perform work of this section, should have specialized in the installation of work similar to that required for this project, and should be acceptable to product manufacturer.

B. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 01 Project Management and Coordination, Project Meetings Section.

Specifier Note: Article below should include special and unique requirements. Coordinate article below with Division 01 Product Requirements Sections.

1.05 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 01 Product Requirements Sections.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1. Temperature Conditions: Dry store Xypex products at a minimum temperature of 45 degrees F (7 degrees C).

1.06 PROJECT CONDITIONS

A. Environmental Requirements/Conditions: Substrate and ambient air temperature shall be within range acceptable to the manufacturer.

Specifier Note: Coordinate article below with Conditions of the Contract and with Division 01 Closeout Submittals (Warranty) Section.

1.07 WARRANTY

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

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.

Specifier Note: Coordinate paragraph below with manufacturer's warranty requirements.

1. Warranty Period: [Specify term.] years commencing on Date of Substantial Completion.
2. Warranty Acceptance: Owner is sole authority who will determine acceptability of manufacturer's warranty documents.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards and descriptions as applicable. Use of such phrases as "or equal" and "or approved equal" may cause ambiguity in the specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 CRYSTALLINE WATERPROOFING

A. Acceptable Manufacturer: Xypex Chemical Corporation.

Specifier Note: Paragraph below is an addition to CSI *SectionFormat* and a supplement to MANU-SPEC. Retain or delete paragraph below per project requirements and specifier's practice.

1. Contact: 13731 Mayfield Place, Richmond, BC Canada V6V 2G9; Telephone: (800) 961-4477, (604) 273-5265; Fax: (604) 270-0451; E-mail: info@xypex.com; website: www.xypex.com.
2. Proprietary Products: Xypex crystalline waterproofing materials:
   a. Xypex Concentrate: Manufacturer's proprietary compound of Portland cement, silica sand and various active chemicals.

Specifier Note: Below product is used as second coat over Xypex Concentrate. Xypex Modified produces a harder finish and is less expensive than Xypex Concentrate. Xypex Modified may be used as an alternate for spray tar emulsion as a single coat when only dampproofing is required.

   b. Xypex Modified: Manufacturer's proprietary compound of Portland cement, silica sand and various active chemicals.

Specifier Note: Below product used for dry shake application on horizontal concrete prior to finishing. Coordinate with Division 03 Concrete Sections.

   c. Xypex Concentrate DS1 and DS2: Manufacturer's proprietary compound of Portland cement, silica sand and various active chemicals, formulated as a powder compound for dry shake application.

Specifier Note: Coordinate admixture products below with Division 03 Concrete Sections.

   d. Xypex Admix C-2000: Manufacturer's proprietary compound of Portland cement, silica sand and various active chemicals, formulated as an admixture for concrete batching.
   e. Xypex Admix C-1000: Manufacturer's proprietary compound of Portland cement, silica sand and various active chemicals, formulated as an admixture for concrete batching during cooler ambient temperatures.

Specifier Note: Product below is a single component, fast setting, nonshrink, high bond strength hydraulic cement compound for concrete repairs. For waterproofing, the product should be used in conjunction with Xypex Concentrate. Product may be used with Xypex Xycrylic Admix to increase bond strength to existing concrete.

   f. Xypex Patch'n Plug.
   g. Xypex Xycrylic Admix.

Specifier Note: Product below is a light blue liquid that is diluted with water to form a curing agent specifically designed for Xypex Crystalline Products. Use of Gamma-Cure may eliminate need for water curing Xypex coating. Consult Xypex for specific recommendations.

h. Xypex Gamma-Cure.

3. Product(s) Testing:
   a. Permeability: USACE CRD-C-48-73 Permeability of Concrete.
   b. Chemical Resistance: ASTM C267.
   c. Freeze/Thaw and Deicing Chemical Resistance: ASTM C672.
   d. Radiation Resistance: Protective Coating for the Nuclear Industry per USA Standard No. N69.

Specifier Note: Edit paragraph below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Division 01 Product Requirements (Product Substitution Procedures) Section.

B. Substitutions: No substitutions permitted.

Specifier Note: Coordinate article below for related materials specified in other section(s) with product requirements of this section.

2.02 RELATED MATERIALS

A. Concrete: Refer to Division 03 Concrete for concrete materials and concrete mix design.

2.03 MIXES

A. Mixing: Mix proprietary materials in accordance with manufacturer's instructions, including product data and product technical bulletins.
   1. Slurry Coat Mix: Mix Xypex powder with clean water in the following proportions by volume:
      a. Brush Application:
         1) Coverage: 1.5 lb/yd^2 (0.8 kg/m^2): Mix 5 parts powder to 2 parts water.
         2) Coverage: 2.0 lb/yd^2 (1.09 kg/m^2): Mix 3 parts powder to 1 part water.
      b. Spray Application:
         1) Coverage: 1.5 lb/yd^2 (0.8 kg/m^2): Mix 5 parts powder to 3 parts water. Adjust mix as recommended by manufacturer with spray equipment type used.
   2. Dry-Pac Mix: Mix 6 parts Xypex Concentrate powder with 1 part clean water by volume.

2.04 SOURCE QUALITY

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

PART 3 EXECUTION

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.03 PREPARATION

A. Surface Preparation: Concrete surfaces to be Xypex treated shall be clean and free of laitance, dirt film, paint, coatings or other foreign matter harmful to the performance of proprietary products. Surface shall have an open capillary system to provide tooth and suction for Xypex treatment. Where concrete surfaces are too smooth for Xypex treatment, as determined by treatment manufacturer, acid etch, sandblast or waterblast as recommended by treatment manufacturer.

1. Defects: Rout out defects, such as cracks, faulty construction joints, honeycombing and other defects to sound concrete, and repair in accordance with Xypex repair procedures manual.
2. Horizontal Surfaces: Prepare horizontal surfaces with a rough wood float or broom finish to receive Xypex treatment.

B. Repair of Surface Defects:

1. Form Tie Holes, Construction Joints, Cracks: Chip defective areas in a "U" shaped slot 3/4 inch - 1 inch (19.1 - 25.4 mm) wide and minimum 1 inch (25.4 mm) deep. Clean slot, wet, saturate with water and remove surface water. Apply slurry coat of Xypex Concentrate at rate of 1.5 lb/yd^2 (0.8 kg/m^2) to slot. Allow slurry to reach initial set. Fill cavity with Xypex Concentrate Dry-Pac. Compress tightly into cavity using pneumatic packer or hammer and blocks.
2. Rock Pockets, Honeycombing or Other Defective Concrete: Rout out defective areas to sound concrete. Remove loose material and saturate with water. Remove surface water and apply one slurry coat of Xypex Concentrate. After slurry has set, but while still "green," fill cavity to surface with Xypex Patch'n Plug.
3. Coves, Sealing Strips, Control Joints: Prepare concrete joint surfaces by application of 1 coat of Xypex Concentrate in a slurry form at 2.0 lb/yd^2 (1.09 kg/m^2). Apply Xypex Concentrate in Dry-Pac form or Xypex Modified in mortar consistency while slurry coat is still green, but after slurry coat has reached initial set.
    a. Coves: Trowel apply and pack Xypex Modified into a cove shape.
    b. Sealing Strips: Fill preformed grooves, 3/4 inch (19.1 mm) wide and minimum 1 inch (25.4 mm) deep, located at construction joints with Xypex Concentrate, in Dry-Pac form. Compact tightly using pneumatic packer or hammer and block.
    c. Expansion Control Joints: Treat expansion joints as a special condition as directed by design professional.

Specifier Note: Coordinate article below with manufacturer's recommended installation details and instructions. See Xypex Standard Construction Joint Details, Above- and Below-Grade Details, Deck Details, Elevator/Sump Pit Detail, Planter Detail, Swimming Pool Detail, Tunnel Detail, Clarifier Tank Detail, Digester Section Detail, Reservoir/Wet Well Detail, Underground Vault/Dry Well Detail, Manhole Detail, Ferro–Cement Boat/Floating Docks Details, Standard Metal Pipe Detail and other special details.

3.04 INSTALLATION

A. Wetting Concrete: Wet concrete surfaces and saturate with clean water to enhance the crystalline formation process within concrete. Remove excess surface water before application of Xypex treatment.

B. Construction Joints: Apply Xypex Concentrate in slurry form at rate of 2.0 lb/yd^2 (1.09 kg/m^2) to joint surfaces between concrete pours. Moisten joint surfaces prior to slurry application.

C. Surface Application: Apply Xypex treatment uniformly with semi-stiff bristle brush under conditions and application rate recommended by manufacturer. Consult with manufacturer for application when spray equipment is used.

1. 1-Coat Application: Apply Xypex Concentrate slurry coat at rate and locations indicated.
2. 2-Coat Application: Apply Xypex Modified slurry coat while first coat of Xypex Concentrate is still green, but after reaching initial set. Use light prewatering between coats when rapid drying conditions occur.

D. Sandwich (Topping) Application: Place topping material while waterproofing application is still green, but after reaching initial set. Use light prewatering between coats when rapid drying conditions occur. Cure waterproofing in accordance with manufacturer's instructions prior to topping application.

E. Dry Shake Application: Apply Xypex powder to fresh horizontal concrete surfaces. Incorporate Xypex powder into surface during concrete finishing process.

1. Application Rate: [Specify application rate.] ____ lb/yd^2 (___ kg/m^2).

F. Curing: Proper curing of Xypex treatment is essential in order to prevent premature evaporation of moisture from the concrete substrate and to aid in the hardening of the Xypex cementitious coating. Cure Xypex treatment using a misty fog spray of clean water after Xypex coating has hardened. Avoid coating damage with spray operation. Spray Xypex treated surface 3 times a day for 2 to 3 days. In hot climates, as determined by treatment manufacturer, spray Xypex treated surfaces at intervals recommended by treatment manufacturer. During curing period, protect treated surfaces from rainfall, frost and puddling of water.

Specifier Note: Retain paragraph below for reservoirs, tanks and other liquid structures.

1. Concrete Liquid Structures: Cure Xypex treated concrete surface of structures that hold liquids for 3 days and allow treatment to set for 12 days before filing with liquid.

G. Sequence with Other Work: Comply with crystalline waterproofing manufacturer's recommendations for sequencing construction operations after waterproofing applications. Sequence operations to avoid detrimental performance of waterproofing application.

H. Related Products Installation Requirements:

1. Concrete: Refer to Division 03 Concrete Sections.
2. Concrete Topping: Refer to Division 03 Concrete Topping Section.

Specifier Note: Coordinate article below with Division 01 Quality Assurance and Quality Control Sections.

3.05 FIELD QUALITY REQUIREMENTS

Specifier Note: Edit paragraph below. Establish number and duration of periodic site visits with Owner and manufacturer, and specify below. Consult with manufacturer for services required. Coordinate paragraph below with Division 01 Quality Assurance Section. Delete if manufacturer field services not required.

A. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

Specifier Note: Coordinate article below with Division 01 Execution Requirements (Protecting Installed Construction) Section.

3.06 PROTECTION

A. Protection: Protect installed product from damage during construction.

END OF SECTION