

# GUIDE SPECIFICATION FOR ADI-CON CW PLUS: INTEGRAL CRYSTALLINE WATERPROOFING FOR CONCRETE AND MORTAR

## 07 16 00 – Cementitious and Reactive Waterproofing

Specifier Notes: This guide specification is written according to the Construction Specifications Institute (CSI) format. The section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project. Coordinate this section with other specification sections and drawings.

Specifier Notes: ADI-CON CW PLUS is an integral waterproofing admixture for Portland cement based concrete and mortars. Using ADI-CON CW PLUS as a concrete admixture produces a waterproof concrete which is also resistant against a high hydrostatic pressure; it also increases workability and results in a higher compressive strength. ADI-CON CW PLUS is suitable as a replacement of conventional waterproofing membranes for below grade concrete; its chemicals are active for the life of the concrete and provides a “self-healing” of static cracks, up to 0.02” (0.5 mm). ADI-CON CW PLUS is a dry, free flowing powder containing a blend of inorganic and organic chemicals, a small amount of sand and silica based materials. The reactive materials react with lime generated by the hydration reaction of cement and “plug” the capillary porosity, making concrete watertight under water head pressure.

ADI-CON CW PLUS admixture can be used above and below grade and is especially useful for reservoirs, sewage and water treatment plants, secondary containment units, tunnels and subway systems, underground vaults, foundations, parking structures, swimming pools, precise concrete components or any application that requires waterproof, durable concrete.

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Application of a hydrophilic, crystalline admixture that when added to the plastic mix will permanently waterproof hardened concrete by way of chemically promoting the growth of insoluble hydration crystals in the capillary pores.
- C. The general conditions, supplementary conditions and general requirements of this document apply to general contractors, sub-contractors, material suppliers and all other persons furnishing labor and materials under this section.

#### 1.02 WORK INCLUDED

- A. Provide all labor, material, and equipment necessary to apply cementitious coating in application over concrete surfaces as shown on the contract drawings and specified herein.

#### 1.03 RELATED SECTIONS

Specifier Notes: Edit the list of related sections as required for the project. List other sections dealing with work directly related to this section.

- A. Section 03 15 13 – Waterstops.
- B. Section 03 30 00 – Cast-In-Place Concrete.
- C. Section 03 35 00 – Concrete Finishing.
- D. Section 07 10 00 – Dampproofing and Waterproofing.

#### 1.04 REFERENCES

- A. ACI 211 - Guide for Submittal of Concrete Proportions.
- B. ACI 305R - Hot Weather Concreting (1999).
- C. ACI 306R - Cold Weather Concreting (1988).
- D. ACI 308 - Standard Practice for Curing Concrete (1992 - Reapproved 1997).
- E. ACI 506R – Guide to Shotcrete.
- F. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens (1999).
- G. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete (1998a).
- H. ASTM E 329 - Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction (1998a).
- I. ASTM C 666 - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing (1997).
- J. BS 5075-2: 1998 – Concrete Admixtures: Specification for Air Entraining Admixtures.
- K. EN 12390-2 Testing hardened concrete - Making and curing specimens for strength tests.
- L. EN 12390-8 Testing hardened concrete - Depth of penetration of water under pressure.

#### 1.05 QUALITY ASSURANCE

- A. The addition of the crystalline admixture to the pre-approved mix design shall be by a concrete ready-mix supplier approved by the manufacturer. Addition of the crystalline admixture by a non-approved supplier must be under direct supervision of a manufacturer's representative, or an independent materials engineering company.
- B. The concrete supplier must ensure that the admixture is being stored, added and mixed according to the manufacturer's written procedures.

Specifier Notes: ADI-CON CW PLUS has an EC Mark (European Community Certificate), as a Chemical Admixture for Concrete. The EC Certification is a very strenuous process that includes an exceptionally thorough audit of the production and R&D facilities. Gemite Products Inc. is one of the very few manufacturers that have achieved an EC Mark certification for its product line. Include "C" for projects requiring EC approvals.

- C. Waterproofing admixture shall hold a valid CE Certificate issued by an Approval Body appointed by the European Organization for Technical Approvals.
- D. Maintain a record of the batch numbers of all materials supplied for this project.

#### 1.06 PRE-CONSTRUCTION MEETING

- A. Convene [one] [\_\_\_\_], week [\_\_\_\_] prior to commencing work of this section, in accordance with Section 1.05 - Quality Assurance.
- B. Meeting to include all relevant parties required for successful installation of waterproofing products to verify installation methods and warranty requirements.
- C. Relevant parties may include the waterproofing installer, installers of adjacent work or work penetrating waterproofing, manufacturer's representative and project engineer/architect.

## 1.07 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

## 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean, dry area protected from direct sunlight, weather and other damage.
- C. Protect materials during handling and application to prevent damage or contamination.

## PART 2 PRODUCTS

### 2.01 MANUFACTURER

- A. W. R. MEADOWS, INC., PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 683-4500. Fax (847) 683-4544. Web Site [www.wrmeadows.com](http://www.wrmeadows.com).
- B. GEMITE PRODUCTS INC., 1787 Drew Road, Mississauga, Ontario, Canada L5S 1J5. (888) 443-6483. Fax (905) 672-6780. Web Site: [www.gemite.com](http://www.gemite.com).

### 2.02 MATERIALS

- A. Integral Waterproofing Admixture: ADI-CON CW PLUS manufactured by Gemite Products Inc., and distributed by W. R. Meadows is a proprietary mixture of Portland cement, quartz silica and active ingredients; when properly added to an approved mix design and delivered by an approved concrete producer, shall produce concrete that has the following characteristics:
  - 1. Crystal Growth: Evidenced by scanning electron microscope photographs comparing crystalline admixture treated concrete to untreated concrete.
  - 2. Permeability: Satisfies the hardened concrete hydraulic impermeability testing as per EN 12390-2.
  - 3. Chemical Resistance: Minimum 20% less weight loss compared to untreated specimen after exposure to 5% sulfuric acid for 70 days.
  - 4. Compressive Strength: At least 10 percent increase in strength compared to samples prepared without admixture, when tested in accordance with ASTM C 39/C 39M after 28 days.
  - 5. Drying Shrinkage: No Effect on Drying Shrinkage compared to untreated concrete when tested according to BS 1881-5.
  - 6. Waterproofing admixture shall not contain chlorides.
  - 7. Waterproofing admixture shall not provide waterproofing by way of hydrophobic materials such as oils, stearates, silanes, or other hydrophobic treatment. Manufacturer must certify in writing the absence of these materials.

### 2.03 ACCESSORY MATERIALS

- A. Hydraulic Cement for stopping active water leaks: MEADOW-PLUG manufactured by W.R. Meadows.

- B. Thin Patching Mortar for thin repairs, including bug holes: MEADOW-PATCH™ T1 manufactured by W.R. Meadows.
- C. General Purpose Structural Repair Mortar for repairs or coves: MEADOW-CRETE® GPS manufactured by W.R. Meadows.
- D. Flexible Cementitious Coating for existing crack repairs: CEM-KOTE FLEX ST manufactured by Gemite Products Inc., and distributed by W. R. Meadows.
- E. Reinforcing Fabric (Non-Woven) for crack treatment: REINFORCING FABRIC NW manufactured by Gemite Products Inc., and distributed by W.R. Meadows.
- F. Cementitious Rust Proofing Protection - Fibre-Prime - polymer modified cement slurry manufactured by Gemite Products Inc., and distributed by W.R. Meadows.
- G. Evaporation Retardant: EVAPRE Evaporation Retardant manufactured by W.R. Meadows.

## PART 3 EXECUTION

### 3.01 CONCRETE MIXING AND PLACING

Specifier Notes: ADI-CON CW PLUS admixture normally does not affect the setting time. Some retardation or acceleration may occur depending on many factors including the concrete mix design, batching procedures and temperature conditions. Trial batches are recommended. The concrete mixes must be checked for compatibility with air entraining admixture and correct entrained air content when applicable.

- A. Concrete shall be designed in accordance with ACI 211 - Guide for Submittal of Concrete Proportions.
- B. Crystalline admixture shall be strictly added as per the manufacturer's written instructions.
- C. Add crystalline admixture to the pre-approved mix design in the plastic state at a rate of 1-2% of the cementitious content (including fly ash) to a maximum of 13.5 lb per cubic yard (8 Kg per cubic meter) at the ready-mix plant or when pre-approved by the manufacturer added at the job site.
- D. Add crystalline admixture in addition to the total weight of the cementitious materials.
- E. Mix crystalline admixture treated concrete for a minimum of 10 minutes.
- F. Provide concrete with a maximum water-to-cementing materials ratio of 0.5, proportioned to meet all other structural and exposure criteria cited elsewhere in the documents.
- G. Ensure the Portland cement content shall not be less than 420 lbs per cubic yard (250 Kg per cubic meter).
- H. For shotcrete applications, ensure the maximum water-to-cementing materials ratio is 0.40. Shotcrete shall be applied according to ACI 506R - Guide to Shotcrete by an ACI approved nozzelman who is qualified in the shooting method employed and has passed jobsite prequalification testing.
- I. Trial mixes made under typical project conditions shall be used to determine that the setting time, slump, air content and compressive strength of the concrete are suitable for the project.
- J. Follow ACI guidelines when placing concrete in extreme temperature conditions; follow ACI 305R for hot weather concreting and ACI 306R for cold weather concreting.

- K. Use a compatible evaporation retardant for slabs during conditions prone to rapid evaporation, such as hot, dry, or windy conditions.
- L. Moist cure concrete in accordance with ACI 308; alternatively if moist curing is not possible, use a curing compound that complies with ASTM C309.

Specifier Notes: As mentioned in a previous Specifier Note, ADI-CON CW PLUS contains reactive materials that react with lime generated by the hydration reaction of cement and “plug” the capillary porosity, making concrete watertight under water head pressure. ADI-CON CW PLUS will not waterproof construction joints, expansion joints, larger dynamic cracks construction joints, poorly consolidated concrete, or penetrations through concrete.

### 3.02 CONSTRUCTION JOINTS

- A. Install the conventional water-stop system in all non-moving construction joints.
- B. All pipe penetrations shall be treated as per the manufacturer’s recommendations.
- C. Soak all tie-holes to a surface saturated dry (SSD) condition after completion of the pour.
- D. Coat any remaining steel ties with cementitious rustproofing material and pack the tie-holes with patching mortar.

### 3.03 CRACKS AND DEFECTS

Specifier Notes: This section includes a procedure for leaking cracks that do not self-seal in the time required by other construction, or are larger than 0.02” (0.5 mm).

- A. Mechanically chase out cracks to 1” (25 mm) wide and 1.5” (38 mm) deep. Careful attention must be taken to ensure the chase is square or “U” shaped and not “V” shaped.
- B. Apply hydraulic cement mortar to stop the active water leaks as per manufacturer’s instructions.
- C. Coat the hydraulic cement mortar and surrounding concrete with flexible cementitious coating once the active water leak has been stopped.

### 3.04 FIELD QUALITY CONTROL

- A. Provide manufacturer’s site services consisting of product recommendations and site visits to verify batching and installation procedures when required by manufacturer.

Specification Note: Not all applications will be possible or relevant to water test. Measure change in water level to determine if leaks exist if leaks cannot be directly observed. Delete this section if not required.

- B. Where applicable, water test structures capable of holding water for 24 hours after conclusion of curing period.
- C. Repair identified leaks and repeat water testing until structure is watertight.

### 3.05 CLEANING AND PROTECTION

- A. Protect waterproofed concrete from damage during construction.
- B. Use moist backfill material when backfilling occurs less than 7 days after installation.
- C. Cure concrete for a minimum of 28 days before applying paint or other coatings. Surface preparation and application should follow guidelines supplied by the paint or coating manufacturer.

3.06 SITE CLEANUP

- A. Remove all excess and waste materials from the jobsite in accordance with contract provisions.
- B. Ensure all surrounding areas where the material has been applied is free of debris.

END OF SECTION