

Kryton International Inc.

SECTION 07162

Integral Crystalline Waterproofing of Concrete – Crack Repair and Surface Treatment

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Waterproofing of existing concrete by surface treatment with hydrophilic crystalline material – Furnish labor, materials, equipment and services as necessary for the supply and application Krystol T1/T2 cementitious waterproofing system to concrete structures as indicated on drawings and specified herein.
- B. Provide all written materials and site services necessary to complete the installation as herein specified.

1.2 RELATED SECTIONS

- A. Section 03300 - Cast-in-Place Concrete. Concrete surfaces.
- B. Section 03152 – Concrete Joint Control
- C. Section 03050: Basic Concrete Materials and Methods

1.3 REFERENCES

- A. ASTM E 329 - Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction; 1998a.
- B. DIN 1048 Part-5: Testing of Hardened Concrete (Water Penetration).
- C. ASTM 1543-02: Standard Test Method for Determining the Penetration of Chloride Ion into Concrete by Ponding
- D. NSF 61 - Drinking Water System Components - Health Effects; 2000a.

1.4 SUBMITTALS

- A. Certificates of Conformance or Compliance: before delivery of the materials a copy of the manufacturer's certificates, attesting that materials meet the requirements specified, shall be submitted to and approved by the contracting officer.
- B. Product Literature: Manufacturer's descriptive product literature shall be submitted and shall consist of detailed specifications, available performance test data, surface preparation instructions and application instructions.
- C. Certified Laboratory Test Reports – Before delivery of materials, copies of the reports of all tests specified herein or in reference publications shall be submitted to and approved by the contracting officer.

- D. Test reports shall be accompanied by certificates from the manufacturer certifying that the previously tested material is of the same type, quality and make as that proposed for this project.
- E. References: Product must have a history of over 10 years of successful use and must be accompanied by a list of job sites of a similar nature.

1.5 QUALITY ASSURANCE

- A. Supply waterproofing and related materials manufactured by Kryton International Inc., 1645 East Kent Avenue, Vancouver BC, V5P 2S8. Tel: (604) 324-8280 or other licensed manufacturing facility.
- B. Installer/Applicator shall be an experienced installer approved by the manufacturer or by a non-approved installer under direct supervision a manufacturer's representative or an independent materials engineering company.
- C. Prior to installation, hold a meeting of all relevant parties required for successful installation of waterproofing products to verify installation methods and warranty requirements. Relevant parties may include the waterproofing installer, installers of adjacent work or work penetrating waterproofing, manufacturer's representative and project engineer/architect.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged packages bearing the manufacturer's name, brand designation and batch number.
- B. Store materials in a dry storage area to avoid contact with moisture.

1.7 PROJECT CONDITIONS

- A. Install waterproofing products under environmental conditions (temperature, humidity and ventilation) within limits recommended in manufacturer's literature. If project conditions are outside these limits, delay application or take measures to rectify conditions such as temperature controls and windbreaks as required.

1.8 WARRANTY

- A. Provide manufacturer's standard warranty document authorized by manufacturer's representative for 10 year material warranty from date of substantial completion.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: Kryton International Inc. located at: 1645 Kent Avenue East,

Vancouver BC V5P 2S8; Toll Free Tel: 800-267-8280; Tel: 604-324-8280; Fax: 604-324-8899; Email: info@kryton.com; Web: www.kryton.com

- B. Obtain all crystalline waterproofing products from a single source.
- C. Substitutions: Not permitted.

2.2 MATERIALS

- A. Concrete Waterproofing System:
 - 1. System Components - Crack repair and surface treatment: – The system shall consist of the cementitious waterproofing slurry KRYSTOL T1, the cementitious waterproofing slurry KRYSTOL T2, the rapid setting hydraulic grout KRYSTOL PLUG and the waterproof capping and finishing material KRYSTOL BARI-COTE.
 - 2. Slurry waterproofing materials shall consist of powder containing Portland cement, quartz silica and active ingredients that when mixed with water will promote by chemical process the growth and penetration of insoluble hydration crystals to a minimum depth of four inches from the treated surface.
 - 3. Grouting materials shall be non-shrink, non-toxic, fast setting and contain crystal promoting chemicals of the same type as the waterproofing slurries.
 - 4. The waterproofing materials shall not contain chlorides.
 - 5. The waterproofing materials shall not provide waterproofing by way of hydrophobic ingredients such as oils, stearates, silanes, silicate salts or other hydrophobic treatment. Manufacturer must certify in writing the absence of these materials.
- B. Waterproofing Treatment: Provide installed products that comply with the following, when tested using regular concrete samples made without admixtures, with two 0.05 inch (1 mm) thick coats of waterproofing:
 - 1. Penetration: At least 100mm (4 inches) penetration of crystal material, evidenced by independent microscopic analysis.
 - 2. Integral Waterproofing – Continued waterproofing performance after removal of surface treatment – verified by independent testing.
 - 3. Permeability: Reference concrete becomes waterproof with crystalline surface treatment when tested using DIN 1048 Part-5 for direct water penetration at 51m (167 feet) of head pressure.
 - 4. Resistance to Chloride Ion Penetration – Chloride content at 15mm (2/3 inches) depth below threshold for corrosion in new construction according to guidelines from ACI Committee Report 222R-85 after ponding in a chloride solution for 90 days.
 - 5. Sulfate Resistance – Treated concrete shows increased resistance to sulfate attack compared to untreated concrete after repeated exposure to a 10% sodium sulfate solution.
 - 6. Self Sealing – Surface treatment penetrates and seals leaking cracks.
 - 7. Potable Water Contact Approval: NSF certification for use on structures holding potable water, based on testing in accordance with NSF 61.

- C. Waterproofing: Krystol T1/T2 - Crystalline Waterproofing System:
 - 1. First Coat: Slurry of Krystol T1; proprietary compound of Portland cement, quartz silica and active ingredients, mixed with water and applied according to the manufacture's written procedures.
 - 2. Coverage for Krystol T1: 0.8 kg/sq m (1.5 lb/sq yd).
 - 3. Second Coat: Krystol T2; proprietary compound of Portland cement, quartz silica and active ingredients, mixed with water and applied according to the manufacture's written procedures.
 - 4. Coverage for Krystol T2: 0.8 kg/sq m (1.5 lb/sq yd).

- D. Plug Compound: Rapid setting (1-2 minutes) hydraulic grout for repair of actively leaking cracks; KRYSTOL PLUG.

- E. Dry Pack Waterproofing Compound: Dry pack consistency mixture of KRYSTOL T1; proprietary compound of Portland cement, quartz silica and active ingredients; mixed with water and applied according to the manufacturer's written procedures.

- F. Patching and Repair Compound: Fast-setting, non-shrink, high bond strength hydraulic grout with crystal growth properties; KRYSTOL BARI-COTE.

PART 3 EXECUTION

3.1 General

- A. Safety precautions shall conform to the manufacturer's MSDS and all local regulations.
- B. Do not install waterproofing until satisfactory surface preparation has been achieved.
- C. Concrete surfaces must be clean and free of laitance, oil, dirt, paint or other foreign material.
- D. Structural defects such as cracks, faulty construction joints and honeycombing should be routed out to sound concrete and repaired.
- E. Concrete surfaces must have an open pore structure for penetration of Krystol. Roughen surface by sandblasting or other mechanical method; acid etching not permitted.
- F. Surface must be thoroughly soaked with clean water to a surface saturated dry condition (SSD). Do not leave standing water.
- G. Strictly follow manufacturer's published procedures for mixing, application and curing of waterproofing products.

3.2 Cracks and Joints:

- A. All crack and joints shall be repaired following Technical Bulletin #101.

- B. Mechanically chase out cracks to 1" (25mm) wide and 1.5" (38mm) deep. Careful attention must be taken to ensure the chase is square or "U" shaped and not "V" shaped.
- C. Repair the full length of all leaking cracks, even if only a portion of the crack is visually leaking.
- D. Fill first 1/3 of chase with grouting mortar, KRYSTOL PLUG. This step may be omitted only if the crack is not actively leaking.
- E. Fill second 1/3 of chase with dry pack of KRYSTOL T1.
- F. Fill final 1/3 of chase with waterproof cap, KRYSTOL BARI-COTE (2/3 if Krystol Plug was not required).

3.3 Rock Pockets, Honeycombing, and Other Defective Concrete:

- A. Repair as per Technical Bulliten #180.
- B. Rout out defective areas to sound concrete.
- C. Remove loose material and saturate with water.
- D. If defect is actively leaking, install rapid setting grout, KRYSTOL PLUG to a max depth of 1/3 of the defect.
- E. Fill defect with waterproof capping material, KRYSTOL BARI-COTE.

3.4 Concrete Base Slabs and Walls

- A. To properly prepared surface, apply slurry coating of KRYSTOL T1 by brush using circular scrubbing motion as to achieve maximum adhesion and penetration. Spreading rate is 0.8 Kg/m² (1.5 lb/yd²).
- B. When KRYSTOL T1 has set, apply KRYSTOL T2 by brush using a circular scrubbing motion as to achieve maximum adhesion and penetration. Spreading rate is 0.8 Kg/m² (1.5 lb/yd²).

3.5 Curing

- A. Moist cure waterproof treatment with fog mist sprayer or wet burlap for 48 hours.
- B. Protect treatment from rain, excessive evaporation and freezing conditions for 24 hours.
- C. Treated surfaces should not be permanently exposed to liquids for 7 days.

3.6 Construction Joints.

A. Construction joints are to be waterproofed using the Krystol Waterstop System consisting of Krystol Waterstop Grout and Krystol Waterstop Treatment as described in Section 03152 and Kryton Technical Bulletins #103 and #104.

B. Wall-to-Slab Joints - Internal Installation Method:

1. The Krystol Waterstop System shall be mixed and installed in all non-moving construction joints according to Kryton Technical Bulletins #103.
2. Apply Krystol Waterstop Grout in center of joint area in a triangular strip. If reinforcing bar is present, install as close to the center and possible.
3. Place plastic grout with 50mm (2") margin trowel, then use Kryton Triangle Trowel or similar tool to form a continuous strip of peaked material.
4. The triangular strip of Grout shall have straight angles sides and measure 50mm at the base by at least 1.25" in height (50x30mm). Usage is 15m installed material per 25 Kg pail (49 feet per pail).
5. Apply slurry of Krystol Waterstop Treatment after Grout has reached sufficient strength not be damaged by application of Treatment. Apply Treatment with a stiff bristled brush employing a circular, scrubbing motion to achieve maximum contact and penetration.
6. Spreading rate of slurry of Krystol Waterstop Treatment is 1 Kg/m² (1.8 lb/yd²). Krystol Waterstop Treatment shall be applied to the entire width of the joint and cover the previously installed Krystol Waterstop Grout.
7. Forms may be closed immediately after inspection. Protect the completed Krystol Waterstop System from rain, freezing or rapid evaporation for a minimum of 12 hours or until covered by concrete.

C. Wall-to-Wall and Slab-to-Slab and Slab-to-Wall Joints – External Method:

1. Waterstop Treatment:
 - a. The Krystol Waterstop System shall be mixed and installed in all non-moving construction joints according to Kryton Technical Bulletins #104.
 - b. Apply Krystol Waterstop Treatment to the entire contact area where the two pours will meet. Apply Treatment with a stiff bristled brush employing a circular, scrubbing motion to achieve maximum contact and penetration.
 - c. Spreading rate for slurry of Krystol Waterstop Treatment is 1 Kg/m² or 3 lineal meters per 1 Kg for a 30cm wide slurry (1.8 lb/yd² or 9 lineal feet per 1.8 lbs for a 1 foot wide slurry).
 - d. Protect application from rain, freezing conditions and rapid evaporation.
2. Krystol Waterstop Grout

- a. Form a keyway to intersect the joints. A suitable keyway may be made from a dressed 2 by 2 by trimming one edge so it tapers to 1.25" (40x40mm tapered to 30mm). Do not use release agents on the keyway form.
- b. Keyway may be pressed into horizontal surfaces at the joint or attached to vertical formwork prior to pouring concrete.
- c. Remove wall keyway form material from hardened concrete.
- d. Keyway must be clean and free of release agents, debris and laitance. Soak Keyway to Surface Saturated Dry Condition (SSD). Do not leave standing water.
- e. Pack keyway with Krystol Waterstop Grout as per manufacturer's written procedures. Usage 7.5m installed material per 25Kg 1-pail (25 feet per pail).
- f. Protect the application from rain, freezing conditions and rapid evaporation for 48 hours.

3.7 FIELD QUALITY CONTROL

- A. Manufacturer's Site Services: Provide manufacturer's site services consisting of product recommendations and site visits to verify surface preparation and installation procedures when required by manufacturer.
- B. Where applicable, water test structures capable of holding water for 24 hours after conclusion of curing period. Repair identified leaks and repeat water testing until structure is watertight.

3.8 CLEANING AND PROTECTION

- A. Protect waterproofing treatment from damage during construction.
- B. Do not backfill against waterproofed surfaces for a minimum of 24 hours after installation. Inspect waterproofing treatment for bond and cohesive strength prior to backfilling. When backfilling occurs less than 7 days after installation, use moist backfill material.
- C. Concrete must be cured a minimum of 28 days before applying paint or other coatings. Surface preparation and application should follow guidelines supplied by the paint/coating's manufacturer.

END OF SECTION