



KRYSTOL® CRACK REPAIR SYSTEM

Section 03 & 07 - Hydrophilic Crystalline Waterproofing for Concrete - Crack Repair and Surface Treatment

PART 1 GENERAL

1.1 SECTION INCLUDES

ATTENTION SPECIFIER Edit this section to specify the surface to be waterproofing and clearly indicate what side of the structure is to be waterproofed unless indicated on the drawings.

- 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

ATTENTION SPECIFIER Delete sections below not relevant to this project; add others if required.

- A. Section 03 30 00 – Cast-in-Place Concrete. Concrete surfaces.
- B. Section 03 15 00 – Concrete Joint Control.

1.3 REFERENCES

ATTENTION SPECIFIER Edit references to remove articles not required for the final specification.

- 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/ANSI Standard 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 ten years of successful use and must be accompanied by a list of jobsites 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 ten 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

ATTENTION SPECIFIER The Krystol coating is normally applied as a two coat system consisting of Krystol T1 and Krystol T2. Using two coats provides better coverage with fewer thin or missed spots, and the use of Krystol T2 provides a harder surface finish than Krystol T1. For some projects, it may be preferable to use two coats of Krystol T1, or to use a single coat of Krystol T1. Consult your Kryton representative for project specific recommendations.

- A. Concrete Waterproofing System:
 - 1. Crack repair and surface treatment: The system shall consist of the cementitious waterproofing coating Krystol T1, the cementitious waterproofing coating Krystol T2, the rapid setting hydraulic grout Krystol Plug and the waterproof capping and finishing material Krystol Bari-Cote.
 - 2. Waterproofing coating 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 10 cm (4 in.) 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 1 mm (0.05 in.) thick coats of waterproofing:
1. Penetration: At least 10 cm (4 in.) 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 51 m (167 ft.) of head pressure.
 4. Permeability: Waterproofing coating reduces water penetration by 75% compared to untreated concrete when testing according to DIN 1048 part 5.
 5. Resistance to Chloride Ion Penetration: Chloride content at 15 mm (0.67 in.) 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.
 6. Sulfate Resistance: Treated concrete shows increased resistance to sulfate attack compared to untreated concrete after repeated exposure to a 10% sodium sulfate solution.
 7. Self-Sealing: Surface treatment penetrates and seals leaking cracks, verified by independent testing.
 8. Potable Water Contact Approval: Certified by NSF to NSF/ANSI Standard 61 Drinking Water System Components - Health Effects for use in structures holding potable water.
- 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/m² (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/ m² (1.5 lb./sq. yd.).

ATTENTION SPECIFIER The following materials are used in conjunction with Krystol T1 & T2 slurry treatment to repair cracks and honeycombs.

- 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 SURFACE PREPARATION

- 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. Prepare the surface following the instruction in Application Instruction 2.11 — Waterproofing with Surface Application (Brush Method).



1. Mechanically roughen the surface by grinding, shot blasting, high pressure water blasting (minimum 3000 psi.) or similar. All laitance, oil, dirt, paint or other foreign material must be removed. Clean contaminated surfaces with a detergent or degreaser and rinse thoroughly.
2. All surfaces must be saturated-surface-dry (SSD) when installing the repair products or waterproofing coating. Soak concrete repeatedly to saturate the pores, or use high pressure water blasting. Remove all standing water so the surface remains only slightly damp. Re-saturate the concrete before installing each component, or if the concrete dries out during installation.

3.2 CRACKS AND JOINTS:

- A. Repair as per Application Instruction 5.11 — Waterproofing Cracks, Holes and Joints.
- B. Mechanically chase out cracks to 25 mm (1 in.) wide and 38 mm (1.5 in.) 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. Ensure all water is stopped. 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 Application Instruction 5.31 — Waterproofing Tie Holes and Defective Concrete.
- B. Rout out defective areas to sound concrete. Leave edges square, do not featheredge.
- 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 PIPE PENETRATIONS

- A. Repair as per Application Instruction 5.32 — Waterproofing Pipe Penetrations (Existing Construction).
- B. Rout out around pipe. 25 mm (1 in.) wide and 38 mm (1.5 in.) deep. Careful attention must be taken to ensure the chase is square or “U” shaped and not “V” shaped.
- C. If leaking – fill 1/3 of chase with grouting mortar, Krystol Plug. Ensure all water is stopped. This step may be omitted only if the crack is not actively leaking.
- D. Prepare the pipe surface:
 1. Steel pipes – clean and roughen pipe. Remove all dirt, oil, corrosion and scale. Sand or sandblast to achieve a coarse profile.
 2. PVC or ABS pipes – coat the pipe with a compatible joint cement, broadcast with silica sand, then remove excess sand after the joint cement has set.
- 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).

3.5 CONCRETE BASE SLABS AND WALLS

- A. The Krystol T1 & T2 System shall be mixed and installed according to Application Instruction 2.11 — Waterproofing with Surface Application (Brush Method) or Application Instruction 2.12 — Waterproofing with Surface Application (Spray Method)



- B. Surfaces must be saturated-surface-dry (SSD) when the Krystol coating is applied. Soak concrete repeatedly to saturate the pores, or use high pressure water blasting. Remove all standing water so the surface remains only slightly damp.
- C. Apply coating of Krystol T1 by brush or sprayer at a coverage rate of 0.8 kg/m² (1.5 lb./sq. yd.). Ensure full contact between the coating and the receiving surface. Brush with a strong, circular scrubbing motion for maximum penetration and adhesion. Brushing may still be needed for spray applications.
- D. Protect the freshly applied coating from sun, wind, rain and rapid evaporation.
- E. When Krystol T1 has set hard, wash and rinse surface to remove loose particles and bring the surface to an SSD condition. Apply Krystol T2 by brush or sprayer at a coverage rate of 0.8 kg/m² (1.5 lb./sq. yd.). Ensure full contact between the coating and the receiving surface. Brush with a strong, circular scrubbing motion for maximum penetration and adhesion. Brushing may still be needed for spray applications.
- F. Protect the freshly applied coating from sun, wind, rain and rapid evaporation.

3.6 CURING

- A. Cover the freshly applied coating with vapor resistant barriers such as tarps or plastic sheeting.
- B. Keep the application damp for at least 72 hours. Lightly mist the surface with water as needed to restore lost moisture.
- C. Treated surfaces should not be permanently exposed to liquids for seven days.

3.7 CONSTRUCTION JOINTS

ATTENTION SPECIFIER Construction joints for new, cast-in-place concrete should be waterproofed with the Krystol Waterstop System. Delete one of sections "B" or "C" below if not required for the project. For existing concrete structures, delete all of Section 3.7 and follow the instructions in section 3.2. For new construction, consider using KIM waterproofing admixture in place of Krystol T1 & T2 for reduced labor costs and longer warranty coverage.

- 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 Application Instruction 4.11 and 4.12 — Use of Krystol Waterstop System.

3.8 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.

ATTENTION SPECIFIER 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. Repair identified leaks and repeat water testing until structure is watertight.

3.9 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 seven 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