



CSI Master Format Specifications

Kryton International Inc.

SECTION 03152

Cementitious Crystalline Waterstop – Krystol Waterstop System

ATTENTION SPECIFIER This section details the use of the Krystol Waterstop System, consisting of Krystol Waterstop Grout and Krystol Waterstop Treatment, manufactured by Kryton International Inc., which is located at:

1645 Kent Avenue East
Vancouver BC V5P 2S8
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Kryton products waterproof concrete by a chemical process that develops insoluble hydration crystals called "Krystol" in the capillary pores of concrete. This section outlines the use of Krystol as a waterstop for non-moving construction joints. The Krystol Waterstop System replaces conventional PVC and Bentonite Waterstops, and consists of two components: Krystol Waterstop Grout which provides crystalline and physical waterproofing along a portion of the joint, and Krystol Waterstop Treatment which is applied as a slurry and provides crystalline waterproofing along the full width of the joint. For new concrete, Krystol is available as an admixture, Krystol Internal Membrane (KIM) as described in Section 03305 and Application Instruction 102. A brush-on surface treatment for existing concrete called Krystol T1/T2 is described in Section 07162 and Application Instruction 401 and 402. A dry-shake product for concrete flatwork called Krystol Broadcast is described in Section 07162 and Application Instruction 101.

Two installation methods are available for the Krystol Waterstop System: Internal installation for wall-to-slab joints where the system is completely encased by concrete, and external installation for wall-to-wall, slab-to-slab, or slab-to-wall joints where the concrete is cast with a keyway built into the formwork leaving an open space which is later packed with the Waterstop materials. The components of the internal system are colour coded to allow for easy visual inspection prior to being covered with concrete.

For optimal results, the Krystol Waterstop System should be used in conjunction with concrete waterproofed using KIM waterproofing admixture.

Part 1 General

1.1 SECTION INCLUDES

- A. Crystalline waterproofing joint system – Provide Krystol Waterstop System consisting of Krystol Waterstop Grout and Krystol Waterstop Treatment, for all non-moving construction joints to provide waterproofing by growth and penetration of hydrophilic crystals into the concrete.
- B. Provide all written materials and site services necessary to complete the installation as herein specified.

1.2 RELATED SECTIONS

ATTENTION SPECIFIER Edit to add or remove sections as required for the project.

- A. Section 03300 – Cast-in-Place Concrete
- B. Section 07162 – Crystalline Waterproofing

1.3 REFERENCES

ATTENTION SPECIFIER Delete references not required by the text of the edited specification.

- A. COE CRD-C 48 – Standard Test Method for Water Permeability of Concrete; 1992.
- B. 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 and installation 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.



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- 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. Training: Contractor shall advise manufacturer's representative 2 weeks prior to placement of jointing materials to ensure manufacturer's representative can be available on site for application training.
- F. Shop Drawings: Show construction joint types, layout and location.
- G. 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. Provide Krystol Waterstop System consisting of Krystol Waterstop Grout and Krystol Waterstop Treatment manufactured by Kryton International Inc., 1645 East Kent Avenue, Vancouver BC, V5P 2S8. Tel: (604) 324-8280.
- B. Installer/Applicator shall be an experienced installer approved by the manufacturer or by a non-approved installer under direct supervision of 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 WARRANTY

- A. Provide manufacturer's standard warranty document authorized by manufacturer's representative for 25 year material warranty from date of substantial completion for projects utilizing the Krystol Waterstop System in conjunction with concrete treated with KIM waterproofing admixture.

Part 2 Products

2.1 Waterproof Joint System for Non-Moving Joints:

- A. System Components: The Krystol Waterstop System shall consist of the waterproofing grout Krystol Waterstop Grout and waterproofing slurry Krystol Waterstop Treatment manufactured by 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. Krystol Waterstop Grout Internal (K-322i) shall be used for the internal installation method (Application Instruction 201). Krystol Waterstop Grout External (K-322x) shall be used for the external installation method (Application Instruction 202).
- C. Internal jointing (completely encased in concrete) shall be colour coded to allow for visual inspection of application procedures prior to covering with concrete. Colour coding shall be as follows: Krystol Waterstop Grout = Red, Krystol Waterstop Treatment = Yellow. Colour coding is not required for External joint installation.
- D. Waterproofing materials shall consist of cement, quartz silica and active ingredients that promote the growth of insoluble, hydrophilic hydration crystals within the concrete.
- E. Waterproofing materials shall not contain chlorides.
- F. 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.
- G. Krystol Waterstop Grout shall be non-shrink, non-toxic, fast setting, contain hydrophilic crystal producing chemicals, and when mixed with water and installed according to the manufacturer's written procedures withstand water pressure of 1250 vertical feet of head pressure when tested in accordance with USACE C48-92.
- H. Krystol Waterstop Treatment shall consist of a cementitious powder and hydrophilic crystal producing chemicals that when mixed with water and installed according to the manufacturer's written procedures shall promote crystal growth and penetration to a minimum depth of four inches in both directions from the coated surface.
- I. Adjacent concrete (slabs and walls) shall be waterproofed with KIM (Krystol Internal Membrane) as per section 03305 and Application Instructions 102-108 where applicable.



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- J. Obtain all crystalline waterproofing products from a single source.
- K. Substitutions: Not permitted.

Part 3 Execution

3.1 Examination and Surface Preparation

- A. Safety precautions shall conform to the manufacturer's MSDS and all local regulations.
- B. Do not begin installation until substrates have been properly prepared.
- C. Concrete surfaces must be clean and free of laitance, oil, dirt, paint or other foreign material.
- D. Concrete surfaces to receive Waterstop material must be clean and free of contaminants or debris. Remove from oils, curing agents or sealers from surfaces to be treated.
- E. Structural defects such as loose rock pockets and honeycombing should be routed out to sound concrete and repaired with Krystol Waterstop Grout as per Kryton Application Instruction 302
- F. Surface must be thoroughly soaked with clean water to a surface saturated dry condition (SSD). Re-wet surface prior to installing Krystol Waterstop Treatment to the hardened Krystol Waterstop Grout.
- G. Strictly follow manufacturer's published procedures for mixing, application and curing of waterproofing products.

3.2 INSTALLATION

ATTENTION SPECIFIER The use of "Internal" or "External" installation will depend on the design of the joint as described below. Note that Waterstop Grout Internal (K-322i) and Waterstop Grout External (K-322x) are separate products and are not interchangeable. For detailed installation procedures, consult Application Instruction 201 and 202.

3.2.1 Internal Installation for Wall-to-Slab Joints:

- A. The Krystol Waterstop System shall be mixed and installed in all non-moving construction joints according to Kryton Application Instruction 201.
- B. Apply Krystol Waterstop Grout (K322i) in center of joint area in a triangular strip. If reinforcing bar is present, install as close to the center and possible.
- C. Place plastic grout with 2" margin trowel, then use Kryton Triangle Trowel or similar tool to form a continuous strip of peaked material.
- D. The triangular strip of Grout shall have straight angles sides and measure 2 inches at the base by at least 1.25" in height (50 x 30 mm). Usage is 15m installed material per 25 kg (1-pail).
- E. 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.
- F. Spreading rate of slurry of Krystol Waterstop Treatment is 1 kg/m². Krystol Waterstop Treatment shall be applied to the entire width of the joint and cover the previously installed Krystol Waterstop Grout.
- G. 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.

3.2.2 External Installation for Wall-to-Wall, Slab-to-Slab and Slab-to-Wall Joints.

A. Krystol Waterstop Treatment:

1. The Krystol Waterstop System shall be mixed and installed in all non-moving construction joints according to Kryton Application Instruction 202.
2. 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.
3. Spreading rate for slurry of Krystol Waterstop Treatment is 1 kg/m² (3 lineal meters per 1 kg for a 30 cm wide slurry).
4. Protect application from rain, freezing conditions and rapid evaporation.

B. Krystol Waterstop Grout

1. 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" (40 x 40 mm tapered to 30 mm). Do not use release agents on the keyway form.
2. Keyway may be pressed into horizontal surfaces at the joint or attached to vertical formwork prior to pouring concrete.
3. Remove wall keyway form material from hardened concrete.
4. Keyway must be clean and of free of release agents, debris and laitance. Soak Keyway to Surface Saturated Dry (SSD)



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- condition. Do not leave standing water.
5. Pack keyway with Krystol Waterstop Grout (K-322x) as per manufacturer's written procedures. Usage 7.5 m installed material per 25 kg (1-pail).
 6. Protect the application from rain, freezing conditions and rapid evaporation for 48 hours.

3.3 FIELD QUALITY CONTROL

- A. Do not cover the Krystol Waterstop System with concrete until it has been observed by manufacturer's field representative or Architect/Engineer.
- B. Inspection in two stages:
 1. Following the installation of Krystol Waterstop Grout, an inspector shall visually inspect the application to verify the presence of the "red" triangular strip in the correct location and proper dimensions.
 2. Following the installation of Krystol Waterstop Treatment, an inspector shall visually inspect the application to verify the presence of the "gold" slurry coat covering the entire contact area of the joint including the previously installed triangle of Grout
- C. If a two stage inspection is not possible, a single inspection shall verify the presence of the "gold" slurry of Krystol Waterstop Treatment which shall cover the entire contact area of the joint. At or near the center of the joint shall be a raised triangle with the proper dimensions for Krystol Waterstop Grout. A small section of the "gold" treatment may be removed from the triangle to verify the presence of "red" Grout underneath.

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 of not required.

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.

END OF SECTION