TECHNICAL DATA SHEET

Surface Applied Concrete Waterproofing

Krystol® T1

DESCRIPTION

Krystol T1 is a surface applied waterproofing treatment based on advanced Krystol® crystalline technology that transforms concrete into a permanent waterproof barrier. Krystol® migrates into the concrete and drives a catalytic reaction using cement and water to grow a protective crystalline network through the concrete's pores, cracks, and micro-cracks. Any moisture introduced over the lifespan of the concrete will initiate new crystallization, ensuring permanent protection.

BENEFITS

- Contains advanced Krystol® crystalline waterproofing technology.
- Permanent integral protection.
- Provides low permeability - Effective to 140 m (460) feet of head pressure.
- Reliably self-seals hairline cracks up to 0.5 mm (0.02 inches) and effectively self-heals micro-cracks.
- Proven protection against:
  - Water penetration
  - Salts/chlorides and corrosion
  - Sulfate attack
  - Aggressive chemicals and H_2S sewer environments.
  - Freezing-thawing cycles
  - Alkali-silica reaction (ASR)
- Non-corrosive – does not contain chlorides
- Use on new or existing concrete
- Not harmed by UV rays.
- Allows concrete to breathe
- Can be applied from either the positive (wet) or negative (dry) side of the concrete
- Non-toxic – zero VOC – Contributes to LEED credits – Concrete remains recyclable
- Certified to NSF/ANSI/CAN No. 61 – safe for contact with potable water

WHERE TO USE

- Basements and foundations
- Marine structures
- Elevator pits and equipment pits
- Parking structures
- Pools and water features
- Water reservoirs and tanks
- Tunnels, pipes, manholes and vaults
- Bridge decks and support structures
- Retaining walls
- Maintaining and protecting infrastructure

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Packaging and yield	25kg (55 lb.) pail – Covers up to 20 m^2 (225 square feet) 5 kg (11 lb.) pail – Covers up to 4 m^2 (45 square feet)
Color	Available in Grey or White (see Limitations section below)
VOC content	0 g/L
Shelf-Life	At least 3 years for unopened pails when stored in a dry enclosed area
Mix Ratio	3.5 parts powder to 1 part water by volume (based on loose powder) Each 25 kg (55 lb.) pail takes approx. 6.5 Liters or 1.7 gallons of water
Working time (20°C / 68°F, 50% RH)	30 minutes
Hardening time (20°C / 68°F, 50% RH)	5 hours
Hydrostatic head resistance	140 m (460 feet) tested to USACE CRD-C48
Typical rate of crystal penetration	2-10 mm (0.08-0.40 inches) per week
Self-sealing of cracks	≤ 0.5 mm (0.08 inches)
Pull-off Strength (ASTM C1583)	3.1 MPa (450 psi)

TEST RESULTS

Water Permeability	DIN 1048: Part 5 (0.5 MPa/72.5 psi hydrostatic pressure for 72 hours): • Krystol T1 treated samples had an 85.6% reduction in permeability over the same untreated (control) concrete; 5.3 mm (0.21 in) vs. 36.7 mm (1.45 in). - *Kuwait University, 2004* • Krystol T1 treated samples had 25 mm (0.98 in) of water penetration while the equivalent untreated concrete showed 100 mm (3.94 in), or a 75% reduction in permeability. *Metro Testing.* USACE CRD-C48 (1.38 MPa / 200 psi for 14 days) • Krystol T1 treated samples were split in half and water penetration depths measured. Controls had an average penetration depth of 50mm while Krystol T1 treated samples averaged 5mm, demonstrating a 90% reduction in water permeability. *Kryton Research Center* IS: 2645-2003 (0.2 MPa, 29 psi for 8 hours) • Water percolation test – Plain Mortar 195 ml, Krystol T1 Treated Zero (Nil). *Shriram Institute for Industrial Research*
Crack Sealing	• Krystol T1 sealed leaking cracks in concrete block 7 days after application. *Seoul National University of Technology.* • Testing of several crystalline coatings found that Krystol T1 was the only product to fully seal and resist 0.45 MPa of water pressure (65 psi), the maximum of the apparatus. *Port Authority of New York and New Jersey*

Chloride Permeability	• After 90 days ponding in 10% Calcium Chloride Solution, acid soluble chloride ion content was determined at various depths. Krystol T1 treated concrete showed a reduction over the control of 62.9% at 5 mm (0.2 in), 83.8% at 10 mm (0.4 in) and 94.6% at 15 mm (0.5 in). *HBT Agra Ltd.* • ASTM C1202 (Rapid Chloride Permeability Test) – Control Concrete, 2564 Coulombs (moderate), Krystol T1 treated concrete < 100 Coulombs (negligible). *NBTC Group, Kuwait.*
Depth of (Krystol) Penetration	• Concrete was treated with 3mm of plaster, followed by Krystol T1. After curing, the Krystol T1 and plaster were removed and tested for permeability following DIN 1048-5 (0.5 MPa, 72.5 psi for 72 hours). The treated samples were 51% less permeable than the untreated concrete, even after the coating was removed. Krystol penetrated through the plaster layer and into the concrete itself. *MateriaLab, Hong Kong.* • "Crystal growth in capillary porosity was observed in fracture surfaces of the concrete cylinders used in these tests at locations up to 4 inches (100mm) away from the coated surface. This validates the claim of in-depth penetration achieved with the "Krystol." *HBT Agra Ltd.*
Water Absorption (BS 1881: Part 2)	• Untreated concrete had absorption of 1.8 ml/m^2.s. Krystol T1 treated concrete was NIL and was "too impermeable to be sensitive to a longer term test." *Sirim QAS International, Malaysia.*
Sulfate Resistance	• After 21 wet/dry cycles in a high sulfate solution, Krystol T1 treated concrete showed no strength loss whereas untreated concrete showed significant strength loss. *HBT Agra Ltd.*
Hydrocarbon Resistance	• Krystol T1 increased resistance to gasoline ~5 times, Diesel Fuel and Transformer Oil ~8 times. *Czech Technical University Klokner Institute.*
Bio-acid/H_2S Resistance	• Load deflection testing showed Krystol T1 treated samples where ~85% stronger than controls after exposure in a bio-acid (sewer) test chamber. *University of British Columbia.*
Alkali Silica Reaction	• Krystol T1 was shown to slow down and delay ASR and related damage in ASR affected concrete. - *University of Ottawa.*

Properties are typical obtained under laboratory conditions. Reasonable variation can be expected on-site due to specific project factors.

APPLICATION

General Procedure: Mix Krystol T1 to a thick but spreadable consistency (approximately 3.5 parts powder to 1 part clean water by volume). Apply evenly to properly prepared concrete that is in a saturated-surface-dry (SSD) condition using a sprayer, brush or broom at a rate of 1.2 – 1.6 kg/m^2 (2.2 – 3 lb/yd^2). For additional coats, apply the second coat when Krystol T1 has set hard (6 to 24 hours depending on conditions). Protect from frost, rain, traffic and rapid drying for 24 hours. Wet cure for at least 3 days. For full instruction, see:

- Application Instruction 2.11 — Waterproofing with Surface Treatment.
- As part of the Krystol Leak Repair System - Application Instruction 5.12 — Waterproofing Cracks, Holes and Joints.

Drawings, CAD details and specification language: See www.kryton.com/technical-info/ or contact your authorized Kryton representative.

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COVERAGE

One-coat Application	Standard Coverage:	1.2 kg/m^2 (covers approx. 20 m^2 or 225 sq feet) per pail).
	Enhanced Protection:	1.6 kg/m^2 (covers approx. 16 m^2 or 170 square feet per pail).
Multi-coat Application	Each coat may be applied as low as 0.8 kg/m^2 (covers approx. 32 m^2 or 340 square feet per pail).	

LIMITATIONS

Air and surface temperature at the time of application must be at least 4°C (40°F). The Krystol T1 Concrete Waterproofing is an effective waterproofing system for rigid concrete structures only and may not be reliable for structures with moving cracks or joints. Consult your Kryton representative for project specific recommendations. This product application is not intended as an aesthetic finish. As a result of varying substrate conditions, such as porosity and moisture availability, this application may exhibit uneven crystal growth, uneven texture and uneven color. If desired, an aesthetic finish may be applied over the application once it has been properly cured and prepared.

SAFETY

Read the Safety Data Sheet (SDS) for this product. For professional use only. This product becomes caustic when mixed with water or perspiration. Avoid contact with skin or eyes. Avoid breathing dust. Wear long sleeves, safety goggles and impervious gloves.

WARRANTY

Kryton International Inc. (Kryton) warrants that Kryton products are free from manufacturing defects and comply with the specifications given in their respective technical data sheet. Because conditions of use, such as site conditions, surface preparations, workmanship, concrete ingredients, weather, structural issues and other factors are beyond the control of Kryton, no warranty can be given as to the results of use. Purchaser agrees to seek the advice of qualified professionals and to determine for themselves the suitability of the products for their intended purpose and assumes all risks. Purchaser's sole remedy is limited to replacement of any product proven defective or at Kryton's option refund of the purchase price paid. THIS LIMITED WARRANTY CONTAINS THE ENTIRE OBLIGATION OF KRYTON. NO OTHER WARRANTIES, EXPRESS OR IMPLIED, SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. KRYTON SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. No representative of Kryton has the authority to make any representations or provision except as stated herein. Kryton reserves the right to change the properties of its products without notice.