Krystol® Waterstop System

Waterproofing Unintended Cold Joints (Shotcrete)

DESCRIPTION

The Krystol Waterstop System is used to permanently waterproof concrete construction joints. It is installed in place of other less reliable joint systems and allows for flexible scheduling and easy inspection. The Krystol Waterstop System uses Krystol crystalline technology which reacts with water and un-hydrated cement particles to grow insoluble needle-shaped crystals that fill capillaries, micro cracks and pores of concrete to reduce permeability and stop water.

The following application instructions are used to waterproof unintended cold joints that may occur in Shotcrete applications using Krystol Waterstop Treatment. These joints sometimes develop when multiple layers of shotcrete are placed during a single shift, particularly along life lines when using a “bench gunning” technique. They are more common in hot weather or when using highly accelerated mixes, and must be addressed immediately or they will be vulnerable to water penetration.

Drawings and Specifications:

For section drawings, CAD details and specification language related to this product, visit www.kryton.com/technical-info/ or contact your authorized Kryton representative.

LIMITATIONS

Krystol Waterstop System is effective for rigid structures only and may not reliably seal joints that experience variable loading or repeated movement. Consult a Kryton representative for project specific recommendations. Use typical cold weather practices if applying in cold climatic conditions. Installation during heavy rain must be avoided.

NOTES

Use this procedure as a last resort. Whenever possible, the shotcrete set time and shooting schedule should be designed to prevent unintended cold joints. If possible, build shotcrete elements to their full height in one layer.

SAFETY PRECAUTIONS

Read and follow the Safety Data Sheets (SDS) for these products (available at www.Kryton.com). For professional use only. These products become highly caustic when mixed with water or perspiration. Avoid contact with skin or eyes. Avoid breathing dust. Wear long sleeves, safety goggles and impervious gloves.

STEP 1: MONITOR SHOTCRETE FOR EARLY HARDENING BETWEEN LIFTS

1. Inspect the shotcrete between lifts to see if it has set hard before shooting the next layer. The shotcrete can be inspected by a simple penetration test with a suitable object such as a penetrometer, metal thermometer or even a pen.
2. If the test probe can penetrate the shotcrete and displace a portion of the cement paste and large aggregate, then the next layer can be placed provided that the existing shotcrete is firm enough to support the next layer.
3. If the shotcrete has hardened and the test probe cannot penetrate the shotcrete, then Krystol Waterstop Treatment must be applied as described below before shooting the next layer.

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STEP 2: SURFACE PREPARATION

1. Shotcrete surfaces to receive Krystol Waterstop Treatment must be sound, clean and free of dirt, oil, and other elements which may interfere with bonding. Rebound, overspray or dust should be removed by an air/water blast.
2. Surfaces to receive the Krystol Waterstop System must be brought to a saturated, surface-dry (SSD) condition. This means that the pores of the concrete are completely saturated with water but no free water remains at the surface. For fully hardened shotcrete, thoroughly pre-soak the surface with water; then remove excess water with a sponge just before applying Krystol Waterstop Treatment.

STEP 3: INSTALL KRYSTOL WATERSTOP TREATMENT

1. Bring concrete to a saturated surface-dry (SSD) condition. This means that the pores of the concrete are completely saturated with water but no free water remains at the surface. Thoroughly pre-soak the surface with water; then remove excess water with a sponge just before applying Krystol Waterstop Treatment.
2. Mix Krystol Waterstop Treatment to a thick but free flowing paste (approximately 3 parts powder to 1 part clean water by volume). The paste will seem thick at first, but will become thinner with mixing. Mix only as much material as can be placed in 30 minutes. **NOTE:** Material left standing will quickly stiffen, but mixing will restore plasticity. Do not add water to the material once it has started to set. Over-watering will result in shrinkage cracking.
3. Coat the entire surface area of the joint with Krystol Waterstop Treatment using a concrete brush at a spread rate of 1 kg/m2 (0.2 lb. /sq. ft.), which will be at least 1 mm (40 mil). Employ a circular, scrubbing motion to achieve maximum penetration and adhesion. Do not allow Krystol Waterstop Treatment to build up on nearby reinforcement.
4. Protect the Krystol Waterstop Treatment application from damage by rain, rapid drying or freezing for 24 hours or until concrete /shotcrete is placed over it. Typical hardening time of Krystol Waterstop Treatment is 2.5 hours at 20°C.
   NOTE: For shotcrete placed the same day, the subsequent layer of shotcrete must be placed while the Krystol Waterstop Treatment is still plastic (within 60 minutes under most conditions).

   IMPORTANT: Krystol products must be protected from rapid drying and kept damp to develop their full properties. Cover the Krystol Waterstop Treatment with plastic sheeting or damp burlap to contain moisture. After the treatment has hardened, mist the surface with water to maintain moisture levels for 24 hours. Do not use curing compounds.

COVERAGE

Material	Coverage
Krystol Waterstop Treatment	Approximately 80 m per 25 kg pail @ 30 cm wide (225 ft. per 55 lb. pail @ 12 in. wide)

TOOLS & MATERIALS

- Clean water supply
- Mixing bucket, drill and mortar paddle
- Natural bristle concrete brush
- Water spray and towel/sponge
- High pressure water blaster

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