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# Krytol® Waterstop System (Shotcrete)

## Treatment of Unintended Cold Joints when Bench Gunning

Technical Bulletin #105 (Z)

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QUESTIONS: 1-800-267-8280 or [www.kryton.com](http://www.kryton.com)

TECHNICAL BULLETINS

### SCOPE

Technical Bulletin 105(Z) details the procedure to properly apply Krytol Waterstop Treatment to unintended shotcrete cold joints that sometimes develop when multiple layers of shotcrete are placed during a single shift. Unintended cold joints usually develop along lift breaks when using a "bench gunning" technique if the previous layer of shotcrete hardens before the next layer is placed, particularly for highly accelerated mixes. Unintended cold joints must be addressed during shooting operations as described below or they will be vulnerable to water penetration.

**Note** - this procedure is a modified version of Technical Bulletin 105(HV) used only for preplanned shotcrete construction joints.

### WHERE TO USE

When placing shotcrete using a bench gunning technique, the existing layer must be inspected to determine 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.

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 layer is firm enough to support the next layer.

### COVERAGE

Material	Coverage
Krytol Waterstop Treatment™	1 kg/m <sup>2</sup> = 3 lineal meters per 1.0 kg for a 30 cm joint = 10 lineal feet per 2.2 lbs for a 12" joint

If the shotcrete has hardened and the test probe cannot penetrate the shotcrete, then Krytol Waterstop Treatment must be applied as described below before shooting the next layer.

**Note** - Whenever possible, the shotcrete set time and shooting schedule should be designed to minimize the risk of unintended cold joints. If possible, build shotcrete elements to their full height in one layer.

### SAFETY PRECAUTIONS

For professional use only. These products contain Portland cement and will become caustic when mixed with water or perspiration. Avoid contact with skin and eyes. Wear protective clothing including goggles, impervious gloves and long sleeves. See the material safety data sheets for these products.

### TOOLS AND MATERIALS

- Krytol Waterstop Treatment™
- Mixing Bucket, drill and paddle
- Natural bristle concrete brush
- Watering can and towel
- High pressure water blaster
- Clean water supply

## STEP 1: PREPARE THE SURFACE

1. Shotcrete surfaces to receive Krystol Waterstop Treatment must be sound, clean and free of contaminants or debris. Rebound, overspray or dust should be removed by an air/water blast.

**VERY IMPORTANT:** Surfaces to receive Krystol Waterstop Treatment must be brought to a saturated surface-dry (SSD) condition. This means that the pores of the shotcrete are completely saturated with water but no free water remains at the surface. If necessary, dampen the surface with water and then remove excess water with a towel just before applying the Krystol Waterstop Treatment.

## STEP 2: APPLY KRYSTOL WATERSTOP TREATMENT

1. Mix Treatment to a thick slurry consistency (5 parts powder to 2 parts clean water by volume).
2. Apply Treatment to coat the intended joint area of the existing shotcrete using a concrete brush. Employ a circular, scrubbing motion so as to achieve maximum adhesion and penetration.
3. Apply Treatment at a spread rate of 1 kg/m<sup>2</sup> (5 square feet per pound). Be sure to cover the entire contact area of the joint.
4. Protect the application from damage by rain or rapid drying until the next layer of shotcrete is placed.
5. The subsequent layer of shotcrete must be placed while the Krystol Waterstop Treatment is still plastic (within 90 minutes under most conditions).

## REFERENCE:

Technical Data Sheet	Krystol Waterstop Grout
Technical Data Sheet	Krystol Waterstop Treatment
Technical Data Sheet	KIM (Krystol Internal Membrane)

Technical Bulletin 105(HV)	Shotcrete-to-Shotcrete Construction
Technical Bulletin 103	Krystol Waterstop System – Internal Method
Technical Bulletin 306	Instructions for Shotcrete Nozzleman and Crew
Technical Bulletin 307	Instructions for Shotcrete Inspector