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## SHINSEGAE TUNNEL

Seoul, Korea  
Fall 2005



CONCRETE  
WATERPROOFING

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

### BACKGROUND

One of Korea's largest retail establishments, Shinsegae Co., Ltd. recently constructed its new flagship store in Seoul's upscale Myongdong commercial district. As part of the renovations, a 60-metre (196.8 ft) pedestrian tunnel was built to connect the Shinsegae retail store to the Hoehyun Subway Station, and a 20-metre (65.6 ft) passageway was created to link the store with a nearby underground shopping centre.



**A 60 metre (196.8ft) pedestrian tunnel was built to connect the Shinsegae retail store to the Hoehyun Subway Station.**

The original plans specified Ethylene Copolymer Bitumen (ECB) sheet membranes to waterproof the concrete tunnels. Once applied, ECB membranes expand and bridge the cracks that inevitably occur in concrete, thereby preventing moisture penetration. As with many sheet membranes, ECB is self-bonding and requires careful and precise installation.

However, given the design of the Shinsegae tunnels and the number of H-beams in the structures, it would take 15 workers more than 60 days to complete the ECB membrane installation. And, since ECB, like other membrane systems, deteriorates over time and is difficult to repair or replace, the project team began seeking out more efficient and cost-effective waterproofing methods.

### SOLUTION

The Shinsegae Tunnel project team tested Kryton International's Krystol™ Internal Membrane<sup>†</sup> (KIM™). KIM™ uses Kryton's proprietary crystalline technology to transform concrete into a watertight barrier.



**A total of 23,000 kg (50,705 lbs) of KIM™ was used.**



**KIM™ reduces repair and maintenance time and costs.**

PROJECT CASE STUDY

#### The Kryton Group of Companies.

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**The Shinsegae tunnels were completed in September 2005 and are now used by thousands of shoppers each day.**

When added to a concrete mix, Krystol™ reacts with water and unhydrated cement particles, causing millions of needle-like crystals to form, blocking the penetration of water and corrosive elements and resisting hydrostatic pressure. Over time, incoming water causes additional crystals to form, self-sealing small concrete cracks and reducing repair and maintenance time and costs.

A total of 23,000 kg (50,705 lbs) of KIM™ was used in the 3,100 m<sup>3</sup> (4,054 cubic yards) of concrete that made up the walls, floors and ceilings of the tunnels. For added protection, the team chose Kryton's Krystol™ Waterstop System, which provides a permanent, watertight seal at vulnerable construction joints.

More reliable than old-fashioned joint design systems, the Krystol™ Waterstop System offers two levels of waterproofing protection: an integral crystalline waterproofing barrier, plus a physical grout barrier with a compressive strength greater than most structural concretes. Unlike PVC or bentonite joint design systems, the Krystol™ Waterstop System is virtually impossible to damage during construction. It saves up to 50% of the cost of an installed PVC or bentonite waterstop system and it's guaranteed to last the lifetime of the structure.

By utilizing KIM™ and the Krystol™ Waterstop System instead of an Ethylene Copolymer Bitumen (ECB) membrane system, Shinsegae Co., Ltd. could potentially save more than \$60,000 US by cutting hundreds of hours of manpower, shortened their construction schedule by two months and just as importantly, prevented future repair work.

The Shinsegae tunnels were completed in September 2005 and are now used by thousands of shoppers each day. Shinsegae plans to build two additional concrete tunnels in spring 2006 and KIM™ has been specified as the waterproofing system for these structures.

## LOCATION

Seoul, Korea

## OWNER

Shinsegae Co., Ltd.

## ARCHITECT

Samoo Architects & Engineers

## ENGINEER

GEO Group Eng. Co. Ltd.

## GENERAL CONTRACTOR

Shinsegae Engineering & Construction

## KRYTON DISTRIBUTOR

Buil Keon Wha Co., Ltd.

### The Kryton Group of Companies.