

# TECHNICAL DATA SHEET

Concrete Waterproofing & Durability Enhancing Admixture



## Krystol Internal Membrane™ (KIM®)

### DESCRIPTION

Krystol Internal Membrane™ (KIM®) is a hydrophillic crystalline waterproofing admixture in dry powdered form, effective in creating waterproof concrete. KIM is the STANDARD used for qualifying Permeability Reducing Admixture - Hydrostatic Conditions as specified by 'ACI 212' (Highest Grade of Permeability Reducing Admixture). KIM is used in place of externally applied surface membranes to protect against moisture transmission, chemical attack and corrosion of reinforcing steel.

KIM admixture consists of portland cement, quartz, sand and propriety chemicals, but does not contain sterates and sodium-silicates. When combined with fresh concrete, Kryton's unique and proven Krystol technology reacts with un-hydrated cement particles to form millions of needle-like crystals. These crystals grow in a catalytic reaction, filling the naturally occurring pores and voids in concrete, and permanently blocking the pathways for water and waterborne contaminants. Later, if cracks form due to settling or shrinkage, incoming water triggers the crystallization process and additional crystals form, filling cracks and ensuring that the structure's waterproofing barrier is maintained and protected.

In addition to filling the pores and capillaries of the concrete matrix with crystals, KIM enhances the natural hydration process by intensifying and prolonging the hydration of the cementing materials. This reduces the size and number of capillary pores within the concrete matrix, making it dramatically less porous, and improving strength and durability characteristics.

### FEATURES & BENEFITS

- **KIM** is the **STANDARD** for Permeability Reducing Admixture - Hydrostatic Conditions (PRAH) as Specified by 'ACI212' - 2010
- **ONLY Crystalline Waterproofing Admixture** with **BIS Certification** for use in **India**
- Reduces Chemical Attack by deleterious materials
- **Significantly** prevents **Corrosion** of Steel in the RCC
- Replaces unreliable exterior membranes, liners and coatings
- Added directly to ready-mix truck or at batch plant, no mixing with water or additional step of premix with water required
- Self-seals hairline cracks up to 0.5 mm (0.02 inches) - **Best in Industry**
- Reactivates in the presence of moisture
- Waterproofs from any direction (i.e. positive or negative side) as it makes the total mass of the concrete watertight | Impervious to physical damage and deterioration
- **Significantly** reduces permeability, concrete shrinkage and cracking - **Best in Industry**
- Provides excellent resistance to waterborne chemicals such as sulfates, chlorides & acids
- Compatible with self-compacting concrete (SCC)
- Safe for contact with potable water
- Increases durability of concrete
- Increases reliability and quality control
- Shaves weeks off the construction schedule
- Reduces the cost of maintenance and repair
- Excellent performance

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### RECOMMENDED USES

Use KIM to provide permanent protection for all concrete that will be subject to water pressure, such as:

- Below grade parking structures, basements, elevator pits and foundations of high-rise towers
- Recreational facilities such as aquatic centers, aquariums, zoos, water parks and marinas
- Architectural water features such as fountains and waterfalls
- Water containment reservoirs, water treatment tanks, sewage tanks, manholes, traffic tunnels, below grade pipelines and subway tunnels, marine structures
- Bridges, dams and highway infrastructure
- Concrete homes including basements, foundations, swimming pools, decks, bathrooms, garages and exteriors
- Properly designed roof tops and plaza decks
- Shotcreting

### PROPERTIES

<u>Physical Properties</u>				
Appearance		Gray Powder		
Bulk density g/cm <sup>3</sup> (lb/ft <sup>3</sup> )		~ 1.35 (84)		
Specific gravity		~2.6		
Compressive Strength		No change or slight increase		
<u>Plastic Properties</u>		<u>Test Reference</u>	<u>Control Concrete</u>	<u>KIM Concrete (2% wt Cement)</u>
Water/Cement Ratio			0.49	0.47
Slump (mm) - 0 min	BS EN 12350-2		70	65
Slump (mm) - 30 min	BS EN 12350-2		40	45
Plastic Density (kg/m <sup>3</sup> )	BS EN 12350-6		2410	2420
<u>Hardened Properties</u>				
Coefficient of Water Permeability, Taywood/ Valenta		Reduced more than 90%*		
Drying Shrinkage, BS 1881-5		Reduced 25%		
Compressive Strength (28 Days), BS EN 12390-3		Increased 8%		
Flexural Strength (28 Days), BS EN 12390-5		Increased 7%		
Modulus of Elasticity, BS 1881-122		Increased 16%		

\*This is requirement of 'Coefficient of Water Permeability' reduction of 90% and more by specific clients/projects. KIM has been tested for same by third party NABL accredited labs and found to comply with the requirement.

### WORKABILITY

#### ASTM C143 – Standard Test Method for Slump of Hydraulic Cement Concrete

KIM enhances the workability and plastic properties of concrete in many ways. KIM provides plasticizing effects at low and high slump requirements and provides better flow and consolidation even at low slumps. KIM works very well with superplasticizers to achieve high slumps for long pumping distances and unique applications without segregation.

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### DOSAGE

0.8-2.0% by weight of Cement\* to a maximum of 8kg per cubic meter. Dosage should be matched to site requirements. Please consult a KRYTON representative to determine the appropriate dosage rate for specific projects or specific mix design. (\*Cement as per IS 456:2000). Trial tests are required to determine actual plastic properties.

### APPLICATION

KIM can be mixed directly into wet concrete in the dry powdered form it does not require pre-wetting or mixing into slurry prior to adding to Ready Mix Concrete. The dry application ensures that your w/c ratio in concrete is maintained and the durability and strength gain are as designed.

- **Central Mixer**

KIM can be added directly to the central mixer in the plant. A mixing time of 2-3 minutes should be sufficient depending on mix speed. The concrete then should be transferred to the site and poured in accordance with good concrete practices and ACI guidelines. Proper curing is essential to achieve the performance and benefits of KIM. Cure in accordance with ACI guidelines.

- **Transit Mixer**

KIM can be added directly in to the drum of a transit mixer after it reaches the site. A mixing time of 2-3 minutes should be sufficient depending on mix speed. The concrete then should be transferred to the site and poured in accordance with BIS or ACI requirements. Proper curing is essential to achieve the performance and benefits of KIM. Cure in accordance with ACI guidelines.

- **Pre-Cast Batch Plant**

Please refer to "Dosage" above.

### SAFETY

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.

### PACKAGING

KIM is available in 25 kg resealable pails and 20 kg bags.

### SHELF LIFE

When stored in a dry enclosed area, KIM has a shelf life of 5 years for unopened pails and 4 years for unopened bags.

### WARRANTY

Kryton Buildmat Co. Pvt. Ltd. warrants that its products are free from manufacturer's defects and, when applied in accordance with the current specifications and application instructions will perform as stated in its product literature. Because methods and conditions of use are beyond the control of Kryton, no guarantee, expressed or implied can be given as to the results of application. Liability of Kryton shall be limited to replacement of materials proved defective or, at its option, refund of the purchase price of the product.