



SPECIFICATION IN NBS FROMAT

E10/418

Krytol Internal Membrane™ (KIM®)

DESCRIPTION

Krytol Internal Membrane (KIM) is a hydrophilic crystalline admixture used to create permanently waterproof concrete. Optional Krytonite waterstops and adhesive can be added to serve a wide range of applications.

Kryton Krytol Internal Membrane™ (KIM®):

- A hydrophilic crystalline admixture internationally known for making exceptionally durable and watertight concrete.
- Contains advanced Krytol® technology, which drives a catalytic reaction using cement and water to grow a protective crystalline network throughout the concrete's pores, capillaries, cracks, and micro-cracks.
- Long-term reactivity provides adaptive self-sealing and self-healing properties that counteract deterioration and allow concrete to maintain its integrity.
- Non-toxic and meets all requirements of ACI 212.3R as a Permeability Reducing Admixture for Hydrostatic Conditions (PRAH).

Kryton Krytol Internal Membrane™ (KIM®) recommended uses:

- Water and wastewater structures;
- Transportation infrastructure;
- Dams, spillways and power stations;
- Marine structures;
- Tunnels;
- Pipes, manholes and pump stations;
- Parking structures;
- Foundations, basements;
- Elevator/ lift pits;
- Pre-cast and shotcrete;
- Secondary containment;
- Pools and fountains.



Krytonite Swelling Waterstop:

Use to permanently waterproof horizontal or vertical construction joints, pipe penetrations, between precast elements and other concrete joints. Standard version for all typical waterstop applications including where salt and other water contaminations are anticipated, or rain-protected version in wet environments where premature swelling is a risk.

Smart Bond Adhesive

For use with Krytonite Swelling Waterstop to waterproof seal construction joints, around penetrations, between precast elements and other places where concrete joints occur.

Performance Requirements

- Permeability: Reduced vs. untreated concrete when tested to modified BS EN 12390-8 (Taywood Valenta). Control 4.29×10^{-14} m/s, treated 1.28×10^{-14} m/s.
- Compressive Strength: Equal or higher compressive strength when tested to BS EN 12390-3.
- Flexural Strength: Equal or higher compressive strength when tested to BS EN 12390-5.
- Slump: No change in slump class compared to untreated mix when tested to BS EN 1Air Content: Max 2% above untreated mix when tested to BS EN 12350-7.
- Drying Shrinkage, Reduced vs. untreated concrete when tested to BS 1881-5. Control value 0.040%, treated concrete 0.030%.
- Wetting Expansion, Reduced vs. untreated concrete when tested to BS 1881-5. Control value 0.030%, treated concrete 0.020%.
- Resistance to freeze-thaw expansion, reduced vs. intreated concrete when tested to BS 5075-2. Control value 0.742, treated concrete 0.099.
- Water soluble chloride ion content; max 0.1% by weight.
- Bond to steel (BBA internal method T1/19) - Pass
- VOC content – 0 g/L

Quality Control Documents

- BBA Certificate 05/4217
- Factory Production Control Certificate 14/F086

Permeability

- When tested to BS EN 12390-8 or DIN 1048-5 at $<0.5 \text{ MPa}><<72.5 \text{ psi}>>$ for 72 hours, the permeability of treated concrete will be reduced by 70% over untreated concrete.
- When using the Taywood / Valenta method of testing to modified BS EN 12390-8 at $<1 \text{ MPa}><<150 \text{ psi}>>$ for 96 hours and then measuring and calculating the coefficient of permeability, the permeability of treated concrete will be reduced by a minimum of 70% over untreated concrete.

- When tested to USACE CRD C48, no passage of water through treated samples when exposed to a vertical water head equal to 200 psi (460 foot head pressure) for 14 days.
- When tested to USACE CRD C48, treated samples exposed to a vertical water head equal to 200 psi (460 foot head pressure) for 14 days will show a reduced coefficient of permeability of 97%.
- Compressive Strength: Treated concrete must have compressive strength equal or higher than plain concrete when tested to ASTM C39/C39M at 28 days.
- Drying Shrinkage: Minimum 20% reduced drying shrinkage for treated concrete when tested to ASTM C157.
- Self-Sealing: Autogenous crack sealing of treated concrete for cracks with width of <0.5mm><<0.02 inches>> or greater; verified by independent testing.
- Chemical Resistance: The waterproofing admixture shall improve sulphuric acid resistance of cement-based materials by blocking capillary pores to reduce acid penetration.
- Corrosion of Reinforcing Steel:
 - Field Performance - The waterproofing admixture must provide enhanced corrosion resistance to embedded steel such that low half-cell readings and no noticeable signs of corrosion are evident after 10 years exposure directly in the corrosive marine tidal zone whereas untreated panels show evidence of corrosion.
 - Testing following ASTM G109 and ASTM C876, and assessed using half-cell measurements, macro cell corrosion rate, and linear polarization resistance (LPR) after exposure to severe corrosive conditions, must demonstrate that the waterproofing admixture significantly delays the onset of corrosive conditions and reduces corrosion rates.
- Evidence of Crystallization:
 - Manufacturer must present independent evidence of waterproofing crystals using both optical imaging and scanning electronic microscope (SEM) to verify waterproofing crystals are needle-shaped.
 - The manufacturer must present independent evidence using Energy Dispersive X-Ray Spectroscopy (EDS) that waterproofing crystals are distinct from ettringite crystals.
- Bonding of coatings and finishes – Manufacturer must present tensile pull-off testing showing that the waterproofing admixture does not reduce the bond strength of subsequent coatings or finishes, with examples of using four different coatings (acrylic coating, rubber coating, epoxy coating, and tile thin-set).

Krytonite™ Swelling Waterstop:

- High performance elastomeric waterstop made from hydrophilic synthetic rubber.
- Available in standard or rain-protected versions.
- Delivers high performance waterproofing in a cost effective and easy to install solution.
- Uses swelling pressure to seal concrete construction joints and penetrations to stop water in the most extreme conditions.
- Extremely durable and will not deteriorate over time.
- Contains NO bentonite.
- Designed to replace moulded PVC waterstops and bentonite-based waterstops.
- Krytonite can also be used by itself as a single protection waterstop.

Smart Bond Adhesive:

- Specially designed to adhere Krytonite™ Swelling Waterstop to concrete construction joints and penetrations that require waterproofing.
- Has incredible bonding strength, even on damp concrete surfaces and can be used in all seasons.
- Adhesive
- Permanent elasticity
- Does not cause staining on natural stone
- High resistance to UV
- Suitable for dry and humid weather conditions
- Fast build-up of internal strength. The glue obtains most of its final strength already after a couple of hours
- High end strength
- Does not cause any corrosion in metal joints
- Paintable with most water and solvent based paints
- Solvent, isocyanate and phthalate free

Consult manufacturer's literature for application examples.

General Information

Colour	Grey
Finish	Other
Material	Other
Shape	Formless
Length	Bespoke
Width	Bespoke

Height	Bespoke
Warranty Description	25 Year
Uniclass	<u>Pr 20 31 03 36 Hardening and accelerating concrete admixtures</u> Primary
Caws	E10/418 Proprietary admixture

Specification data - Waterproofing concrete admixtures

Certification	<p>CE and UKCA Marked.</p> <p>British Board of Agrément (UK): Certificate 05/4217.</p> <p>British Board of Agrément (UK): Factory Production Control 0836-CRP-14/F086.</p> <p>KIWA GmbH (Germany): Factory Production Control 0770-CRP-21DE-02410_A.</p> <p>Dubai: Certificate of Product Conformity CL18020646.</p> <p>BRANZ (New Zealand) – Appraisal No 661.</p> <p>NSF – Certified to NSF/CAN/ANSI Standard 61.</p> <p>Singapore Green Label.</p> <p>Hong Kong – Gold Status.</p>
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Performance Requirements	<p>ASTM C494.</p> <p>EN 934-2.</p> <p>ACI 212-Chapter 15 – Permeability Reducing Admixture for Hydrostatic Conditions (PRAH).</p> <p>REACH and UK REACH Registered.</p>
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Admixture	<p>Kryton Krystol Internal Membrane™ (KIM®).</p> <p>Guidance for specification option:</p> <ul style="list-style-type: none"> • Appearance: Grey powder. • Specific gravity: ~2.8. • Bulk density: ~1.4 g/cm³ (88 lb/ft³). • Chloride ion content < 0.1% by weight. • VOCs: None. <p>Manufacturer guidance</p> <p>Consult manufacturer's literature for effects on hardened and plastic properties.</p>
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Waterstop

Krytonite™ Swelling Waterstop, standard,

Guidance for specification option:

- Colour: Yellow.
- Shape: Trapezoidal.
- Dimensions: 5 x 20 mm (0.2 x 0.8 inches).
- Material: Hydrophilic rubber.
- Hardness (Shore A) to ASTM D2240: 24 ±3.
- Tensile strength to ASTM D412 >3 MPa (435 psi).
- Elongation to ASTM D412: >400%.
- Density 1.2–1.25 g/cm³.

Krytonite™ Swelling Waterstop, rain protected.

Guidance for specification option:

- Colour: Blue.
- Shape: Trapezoidal.
- Dimensions: 5 x 20 mm (0.2 x 0.8 inches).
- Material: Hydrophilic rubber.
- Hardness (Shore A) to ASTM D2240: 35 ±3.
- Tensile strength to ASTM D412 >2 MPa (290 psi).
- Elongation to ASTM D412: >400%.
- Density 1.2–1.25 g/cm³.

Not required.

Adhesive

Smart Bond Adhesive.

Guidance for specification option:

For use with Krytonite Swelling Waterstop to waterproof seal construction joints, around penetrations, between precast elements and other places where concrete joints occur.

- Yield per cartridge: 8–10 linear metres (26–32 linear feet).
- Density at 23°C (73.4°F): 1.40 ±0.05 g/cm³.
- Shore A hardness to ASTM D 2240: 50 ±2 (after 21 days at 23°C (73.4°F) /

50% RH).

- Tensile strength to ASTM D 412: 3.0 MPa (approximate).
- VOCs (Volatile Organic Compounds): No volatile components present.

Not required.