



## PoreBlocker™

### Colloidal Aluminate-Silicate Restoration & Purging Agent

Deep-penetrating restoration agent designed to heal existing concrete at the microscopic level.



#### OVERVIEW

Aging concrete suffers from a silent killer: **Micro-Crack Proliferation**. Over decades, stress and thermal cycling turn weak molecular bonds into microscopic fissures. Left unchecked, these invisible micro-cracks coalesce into major structural fractures.

Zirconia's **PoreBlocker™** is a deep-penetrating restoration agent designed to **heal existing concrete** at the microscopic level. Utilizing a proprietary matrix of **5-10nm colloidal particles doped with Aluminate (AlO<sub>4</sub><sup>-</sup>)**, it penetrates deep into the slab to reverse aging.

Unlike topical sealers that merely bridge cracks with temporary plastic films, PoreBlocker™ flows into the fissure network. It utilizes **Ionic Attraction** to hunt down weak zones and chemically "knit" them back together, converting soluble Calcium Hydroxide into high-strength **Calcium Aluminate Silicate Hydrate (C-A-S-H)** – an ultra-stable **Structural Cement Binder** that restores integrity to the slab.

#### The Kinetic Advantage: Molecular Saturation

Old concrete is chemically dormant. To restart the reaction, you must overwhelm the matrix. **PoreBlocker™ delivers an astronomical flood of reactive chemistry.**

- **Hyper-Saturation:** A single gallon releases roughly 10<sup>21</sup> (sextillion) reactive monomers. This creates a "Catalytic Environment" that forces dormant cement to react instantly.
- **Dual-Action Flood:** We utilize both Silicate (SiO<sub>4</sub>) to densify the surface paste and Aluminate (AlO<sub>4</sub><sup>-</sup>) to hunt deep cracks.
- **The Result:** This overwhelming volume ensures that every available free Calcium ion is located, engaged, and converted into strong binder, regardless of the concrete's age.

#### The Mechanism: Ionic Drive & Structural Knitting

PoreBlocker™ uses a dual-action mechanism to arrest crack propagation:

- **Deep Ionic Drive:** The Aluminate monomers carry a specific ionic charge. They are magnetically pulled deep into micro-cracks and voids where positive Calcium ions accumulate.
- **Structural Knitting:** Once inside the crack, these monomers react instantly. They grow into interlocking C-A-S-H crystals that physically bridge the gap, "gluing" the micro-crack shut with dense Ceramic-Grade Binder.
- **Result:** The concrete is densified from the inside out, and the path for future cracking is blocked.

#### The "Purge" Effect: Chloride Decontamination

Old concrete is often saturated with chlorides and stagnant pore water. PoreBlocker™ forces them out.

- **The Displacement:** As the chemistry crystallizes inside the voids, it creates positive internal pressure.
- **The Purge:** Mobile contaminants (chlorides) are physically squeezed out of the matrix to the surface.
- **The Result:** A clean, chemically neutral substrate ready for coating.

**PoreBlocker™ Features & Benefits**

FEATURE	FUNCTION	BENEFIT
<b>Micro-Crack Healing</b>	<b>Structural Knitting:</b> Crystallizes C-A-S-H inside microscopic fissures.	Stops the "domino effect" of crack proliferation, preventing invisible defects from becoming major failures.
<b>Deep Ionic Drive</b>	<b>Smart Migration:</b> Charged AIO4- seeks Calcium deep in voids.	Bypasses the surface to rebuild the internal matrix, repairing hidden defects standard silicates cannot reach.
<b>Chloride Purging</b>	<b>Positive Displacement:</b> Densification squeezes salts to the surface.	Forces deep-seated chlorides out of the slab, allowing them to be washed away before coating.
<b>C-A-S-H Conversion</b>	<b>Paste Rebuilding:</b> Converts weak Calcium Hydroxide into ultra durable C-A-S-H.	"Heals" the aging matrix by turning weak, soluble lime into fresh, insoluble Structural Binder.
<b>Carbonation Reversal</b>	<b>pH Restoration:</b> Consumes Free Lime and re-alkalizes the pore water.	Restores the high-pH environment necessary to passivate rebar and stop corrosion.
<b>Aluminate Doping</b>	<b>Chloride Trap:</b> Creates an ionic trap for remaining salts, an inorganic immune system.	Locks any remaining internal chlorides into the matrix so they cannot migrate to the rebar.
<b>System Compatibility</b>	<b>Ideal Primer:</b> Creates a neutral, dense, salt-free surface.	Ensures maximum adhesion and lifespan for the CeramycGuard™ topcoat.

**The Ultimate Primer: Surface Treatment for Topcoats**

PoreBlocker™ is the best possible surface treatment for restoring concrete prior to the application of high-performance coatings like CeramycGuard™, BulletProof™, Fortress XD™, epoxies, or urethanes. It solves the three most common causes of coating failure:

- **Stops Vapor Drive:** By densifying the matrix, it blocks moisture vapor transmission that delaminates coatings from below.
- **Eliminates Contaminants:** The "Ionic Purge" forces out deep-seated salts and oils that cause bond failure.
- **Pays for Itself:** By creating a non-porous, high-density surface, PoreBlocker™ prevents the expensive topcoat from soaking into the slab. This significantly increases the coverage rate of CeramycGuard™, often generating enough material savings to offset the cost of the treatment itself.

**The Zirconia Restoration System (ZRS)**

For aging assets threatened by salt and corrosion, the pairing of PoreBlocker™ and CeramycGuard™ provides a complete, standalone restoration solution.

- **Step 1 (Internal):** PoreBlocker™ heals micro-cracks, densifies the paste, and purges internal contaminants.
- **Step 2 (External):** CeramycGuard™ fuses to this restored substrate, creating a permanent, breathable ceramic shield. This dual-layer approach eliminates the need for thick, failure-prone membranes. It transforms deteriorating concrete into a "Ceramic Fortress" that sheds water, blocks chlorides, and restores the asset for a fraction of the cost of replacement.

**Don't just coat over the problem – fix the substrate. PoreBlocker™ gives you a new, dense canvas that guarantees your topcoat performs.**