

PoreBlocker™

Colloidal Aluminate-Silicate Restoration & Purging Agent

The New Standard in Concrete Preservation Concrete infrastructure is an appreciable asset, yet it is often left to decay until expensive structural repairs are required. Zirconia PoreBlocker™ changes this paradigm. By incorporating this treatment into routine maintenance schedules, asset owners can effectively pause the aging process. Restoring the pH and sealing the porosity of mid-life concrete can double its remaining service life, turning a potential capital replacement cost into a manageable maintenance line item.

PRODUCT DESCRIPTION

Zirconia PoreBlocker™ is a deep-penetrating concrete restoration agent designed to densify, heal, and purge contaminants from aging concrete. Utilizing a proprietary matrix of 5-10nm colloidal particles doped with Aluminate (AlO₄⁻) and Silicate (SiO₄), it penetrates deep into the slab to reverse micro-cracking and carbonation.

Unlike topical sealers, PoreBlocker™ functions through Ionic Attraction. It chemically reacts with free Calcium Hydroxide in the pores and micro-cracks, converting soluble paste into insoluble C-S-H and C-A-S-H. This process creates a "Structural Cement Binder" that knits micro-cracks, blocks moisture vapor, and prepares the substrate for high-performance coatings.

TECHNICAL SPECIFICATIONS

PROPERTY	VALUE
Chemistry	Aluminate-Modified Colloidal Silica (AlO ₄ ⁻ / SiO ₄)
Particle Size	5 – 10 nanometers (Average)
Reactive Monomers	~1021 per gallon (Hyper-Saturation)
Appearance	Clear to Opalescent Liquid
Odor	None / Negligible
Solubility	100% Water Soluble
VOC Content	0 g/L (Zero VOC)
Flash Point	None (Non-Flammable)
Reaction Product	C-S-H (Calcium Silicate Hydrate) & C-A-S-H (Calcium Aluminate Silicate Hydrate)
pH Stabilization	Restores pore water pH to >11.5

APPLICATION CONDITIONS

Temperature: 35°F minimum, 90°F maximum

ORDERING INFORMATION

Packaging: 1 gallon and 5 gallon kits

Weight: 8.5 ± 0.2 lb/gallon

SAFETY PRECAUTIONS

Refer to the SDS sheets before use.

Product Characteristics

Color: Cloudy White VOC: <0.000 g/L; 0.000 lb/gal

Recommended Spread Rate per Coat

	Minimum	Maximum
Coverage sqft/gal	TBD	175

NOTE: Only a single coat is needed to achieve properties.

Curing Schedule

To Topcoat:

Minimum: 24 hours

Maximum: N/A

Foot Traffic: 3 hours

Heavy Traffic: 24 hours

Pot Life: Indefinite

Shelf Life: 5 Years, Store indoors between
35°F - 100°F

Flash Point: None (water based)

Clean Up: Water

COVERAGE RATES

Coverage will vary depending on the porosity and surface profile of the substrate.

- **Typical Coverage: 175 sq. ft. per gallon** (18.6 m² per gallon.) over aged concrete.
- **Surface Profile Note:** Surfaces that are degraded, corroded or those with higher **Concrete Surface Profiles, CSP 1–10 per International Concrete Repair Institute (ICRI) standards**, will exhibit higher porosity and surface area, requiring additional material to achieve saturation.

CRITICAL DEFINITIONS & GUIDELINES

Success with colloidal chemistry relies on managing moisture and evaporation. Contractors must adhere to the following definitions.

A. Saturated Surface Dry (SSD)

Definition: The condition where the concrete pores are 100% saturated with water, but the surface is damp with **no standing puddles**.

- **Requirement:** PoreBlocker[™] is hydrophilic (water-loving). If the concrete is dry/white, the product will dry on the surface and fail to penetrate. If the concrete has standing water, the product will dilute.
- **Guideline:** Pre-wet the slab until saturated. Allow standing water to drain or evaporate until the surface has a matte, damp appearance. (A squeegee or push broom can be used to move water and accelerate surface water removal.)

B. Evaporation Rate (American Concrete Institute, ACI 305R Guideline)

Definition: The speed at which moisture leaves the concrete surface due to wind, heat, and humidity.

- **Critical Threshold: 0.2 lbs./ft²/hour** (1.0 kg/m²/hour).
- **Guideline:** If the evaporation rate exceeds **0.1 lbs./ft²/hour**, rapid "flash drying" may occur, leaving a white silica dust on the surface instead of penetrating.
 - **Action:** In high evaporation conditions (Wind > 10mph or Temp > **85°F surface temperature**), you must keep the surface aggressively wet (SSD) prior to application, or apply during cooler hours (evening/early morning).
(**Pro-tip:** cold water can assist with dropping surface temperature, as well as achieving SSD.)

SURFACE PREPARATION

1. Contaminant Removal (The "Oil Barrier")

Colloidal chemistry **cannot** penetrate oil, grease, or silicone sealers.

- **Action:** Degrease chemically or grind mechanically. [Follow all coatings specifications for surface preparation, including surface level grinding (CSP 1-10) prior to colloidal application.]

- **Test:** Perform a "**Surface Wetting Test.**" Spray water on the surface. If it beads up, the surface is contaminated and PoreBlocker[™] will be rejected. If it absorbs evenly, the surface is ready.

2. The "After-Rain" Protocol (Pro Tip)

The most economical time to apply PoreBlocker[™] is after a significant rain event.

- **Benefit:** The rain naturally saturates the slab to optimal SSD conditions, allowing deep ionic drive without the labor of manual pre-wetting. The same is true for vertical concrete.
- **Restriction:** Ensure no rain is forecast for 24 hours after application.

APPLICATION INSTRUCTIONS

Step 1: Application

- Apply to **SSD** concrete using a low to medium pressure sprayer with a fan spray tip of 0.019 to 0.021 inches (vertical), 0.024 to 0.031 inches (horizontal). A 50% overlap on vertical work, or a 30%-50% spray overlap on horizontal work.
- **Technique:** Keep the product moving. Use a soft-bristle broom or squeegee to redistribute material and maintain uniform coverage.
- **Pro-tip:** In large-scale industrial flooring (like 50,000 sq. ft. warehouses), pros use an auto-scrubber in "**Double Scrub Mode**" (Squeegee UP, Vacuum OFF). The benefit is that the heavy brushes mechanically force the colloidal silica into the pores better than a broom can.
- **Pro-tip for aged, corroded substrates:** In some cases a "flood and spread" application may achieve the type of saturation necessary for extremely porous/corroded concrete. Concrete should uptake "all it can drink" before rejection, where excess material is moved with push broom or squeegee for even material distribution. Larger fan tips sprayer nozzles can also be used for flooding. (With this method the major goal is to restore a valuable concrete asset, not get a defined square footage during application. In other words, this technology gives the asset owner one last chance for restoration prior to demolition.)
- **Note:** As a low-density, water-based solution, this technology can be applied by robotics using drones, automated auto-scrubbers, etc.

Step 2: Monitoring Absorption

- **Keep it Wet:** Do not allow the material to dry on the surface during the first 20 minutes. Move material from low to high spots with a squeegee or push broom to ensure even saturation during the initial application phase.

- **Gelling:** As the product reacts, it may become slippery or gel-like. This indicates the reaction is occurring. (Generally, this happens subsurface, unless there are remaining dust or debris on surface that has not been properly cleaned. This can be removed after the 24-hour curing period.)

Step 3: Removal of Excess

- **Crucial:** Do not leave puddles to dry.
- Squeegee or broom excess material to adjacent porous areas or remove via wet-vac. Dried puddles will form silica deposits that will require removal. (This is generally not a problem in the field, with good application methods. In other words, this technology is easy, and forgiving for the applicator.)

Step 4: Restriction:

- Ensure the surface remains dry for 24 hours and/or no rain is forecast for 24 hours after application.

Step 5: The "Purge Wash" (Decontamination)

- **Observation:** 24 hours or greater after application, a white haze or powder or other discoloring agents (historic contaminants) may appear. This is normal. It represents chlorides, free lime, and contaminants purged from the slab.
- **Procedure:** Pressure wash (minimum 3,000 psi) the entire surface to remove this purged residue. Or, spot grinding can be used on select areas if some historic localized contaminants are not removed by pressure washing (which is generally sufficient).

SYSTEM COMPATIBILITY & COATING READINESS

1. Coating Compatibility (Epoxy / Urethane / Polyaspartic) PoreBlocker[™] creates the ideal chemical profile for high-performance coatings.

- **pH Stabilization (11.5):** Stabilizes the surface pH to the exact alkalinity required by high performance coatings. This prevents "hot alkali" saponification (soap formation) that causes coating failure.
- **Bonding:** Creates a non-dusting, consolidated substrate that ensures permanent chemical bonding and more durable mechanical adhesion.

DISCLAIMER

The information and recommendations set forth in this Technical Data Sheet are based upon tests conducted by or on behalf of Zirconia Inc. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication.

Warranty

Zirconia warrants (i) its title to the product, (ii) that the quality of the product conforms to Zirconia's standards at the time of manufacture and (iii) that the product shall be delivered free of the rightful claim of any third person for infringement of any U.S. patent covering the product. THESE ARE THE ONLY WARRANTIES THAT ZIRCONIA MAKES AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, UNDER STATUTE OR ARISING OTHERWISE IN LAW, FROM A COURSE OF DEALING OR USAGE OF TRADE, INCLUDING WITHOUT LIMITATION, ANY OTHER WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR USE, ARE DISCLAIMED BY ZIRCONIA. Any claim under this warranty must be made by Buyer to Zirconia in writing within five (5) days of Buyer's discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life of the product, or one year from the date of the delivery of the product to the Buyer, whichever is earlier. Buyer's failure to notify Zirconia of such non-conformance as required herein shall bar Buyer from recovery under this warranty. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Zirconia. Zirconia is not responsible for any consequential damages.

2. Moisture Vapor Transmission (MVT)

- By densifying the matrix, PoreBlocker[™] significantly reduces moisture vapor drive, preventing the "blistering" and delamination common in resinous floor systems.

3. Biologically Impervious Defense

"Zirconia PoreBlocker[™] transforms porous, vulnerable concrete into a **Biologically Impervious** substrate. By permanently stabilizing the surface pH at 11.5, it creates a **Biostatic Environment** that actively inhibits the colonization of mold, algae, and acid-producing sewer bacteria (such as Thiobacillus). Unlike standard cement which quickly succumbs to biogenic acids, the Aluminate-enriched **C-A-S-H** binder provides inherent chemical resistance to acid attack. This combination of high alkalinity and physical densification effectively starves biological growth of its habitat, halting Microbiologically Induced Corrosion (MIC) and preventing the rapid degradation common in wastewater and marine infrastructure.

4. Recommended Systems

PoreBlocker[™] is the recommended substrate treatment for:

- **Zirconia CeramycGuard[™]** (The "Anti-corrosion Ceramic Fortress" System)
- **Industrial Epoxies & Urethanes**
- **Polished Concrete** (As a premium densifier/hardener)

8. LIMITATIONS

1. **Temperature:** Apply when ambient and surface temperatures are 40°F (4°C) to 90°F (32°C). Do not apply if freezing is expected within 24 hours.
2. **Glass & Aluminum:** Product may etch glass or untreated aluminum. Protect surrounding surfaces or rinse immediately, if splashed.
3. **Hydrophobic Surfaces:** Will not penetrate asphalt, latex, epoxy-sealed or otherwise contaminated surfaces.
4. **Appearance:** PoreBlocker[™] is a penetrant, not a coating. It will not hide stains or change the color of the concrete (unless purged salts appear, which are washed off).