ZIRCONIA™
Ending Concrete Corrosion

ActiveCure™
Product **Sheet**

ActiveCure™

Colloidal Aluminate-Silicate Curing & Densifying Agent

Advanced concrete curing technology designed to solve the most critical problem in fresh concrete: Early-Age Moisture Loss

OVERVIEW

ActiveCure™ penetrates the wet slab to initiate an Internal Curing process, then chemically locks the mix water into the cement paste, maximizing hydration efficiency during the critical first 24 hours. The result is a dramatic increase in **Early Tensile Strength,** significantly decreasing the internal stresses that cause plastic shrinkage cracking, crazing, and slab curling.

The Kinetic Advantage: A 50x Faster Reaction Speed is critical when fighting evaporation. Standard cement hydration is slow. The catalytic nature of **ActiveCure™ accelerates this process when it matters most.**

- **Atomic-Scale Penetration:** Upon contact with the wet slab, ActiveCure™ releases **billions of reactive seed molecules (AlO4 and SiO4)** per square millimeter, which catalyzes immediate C-S-H and C-A-S-H polymerization.
- **Flash Reaction:** These atomic-scale seed molecules react instantly with free Calcium, driving the formation of strong cement paste (C-A-S-H, Calcium Aluminosilicate Hydrate) at **50x the rate** of standard hydration.
- **Result:** This reaction flash-sets (seals) the surface pores, locking in moisture before wind or heat can dry it out. Crucially, it achieves this by forming **C-A-S-H**, the strongest and most durable form of cement paste.

Root Cause Solution – The ITZ Solution: Concrete failure begins at the microscopic level, specifically in the **Interfacial Transition Zone (ITZ)** around aggregates. ActiveCure™ floods this porous zone with hyper-reactive C-A-S-H precursors. Because of the 50x reaction speed, it densifies the ITZ instantly, preventing the formation of the micro-cracks that eventually evolve into structural fractures. This also eliminates future accelerated carbonation and chloride attack.

The "Aluminate" Immune System: ActiveCure™ installs a chemical defense system into the concrete. The reactive Aluminates act as "magnets" for chloride ions, trapping them inside the matrix. This stops road salts and sea spray at the surface, preventing them from reaching the steel reinforcement.

Core Applications

- **Large Slabs:** Eliminates curling and shrinkage cracks in warehouses and data centers.
- **Pavements & Roads:** Can replace water curing, preventing surface crazing in wind/heat.
- **Industrial Floors:** Delivers a hard, dust-proof surface immediately.
- **Shotcrete/Vertical:** Retains moisture in difficult-to-cure vertical applications.

Application Protocol – Early Walk-On: For optimal performance on concrete decks, ActiveCure™ is applied at the **"Early Walk-On"** stage.

Post-Set Application: ActiveCure™ may also be applied to hardened or young concrete (after initial set) to further densify the surface (eliminating porosity), though early plastic application is preferred for optimized curing benefits.

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ActiveCure™ Features & Benefits

FEATURE	FUNCTION	BENEFIT
Early Tensile Strength	**Rapid Strength Gain:** Maximizes cement early-curing efficiency in the first 24 hours.	Prevents slab curling and allows the concrete to resist internal tension without cracking.
Internal Curing Water Lock	**Rapid Hydration Protection:** Chemically holds mix water in the slab.	Eliminates Plastic Shrinkage Cracking and "Crazing" by ensuring the surface hydrates fully.
50x Reaction Rate	**Catalyzed Flash Polymerization:** Drives C-S-H & C-A-S-H formation instantly.	Outruns the evaporation rate, sealing the surface matrix before dehydration damage can occur.
Atomic-Scale Penetration	**Reactive Seeding:** Delivers billions of reactive C-S-H & C-A-S-H seed sites per mm^2.	Floods the smallest capillary pores (<1nm) to ensure 100% densification of the paste (eliminating porosity).
Salt Defense	**Aluminate Doping:** Traps chlorides (Friedel's Salt).	Creates an integrated immune system that stops salt corrosion before it reaches the rebar.
Freeze-Thaw Resistance	**Pore Blocking:** Lowers water absorption below critical saturation by sealing porosity.	Physically blocks water ingress, ensuring the matrix stays too dry to freeze and spall.
Carbonation Defense	**pH Stabilization:** Consumes Free Lime (the target of Carbonation), by converting it to C-A-S-H.	Prevents dusting and pH drop, maintaining the alkaline environment required to protect rebar*.
C-A-S-H Conversion	**Paste Rebuilding:** Converts weak Calcium Hydroxide into C-A-S-H.	Turns the "soft" byproduct of curing into hard structural paste, increasing density and abrasion resistance.
Interfacial Transition Zone (ITZ) Reinforcement	**Aggregate Bonding:** Densifies the zone around aggregate stones, eliminating this problematic failure	Strengthens the "grip" between the paste and the rock, preventing surface spalling and dusting.

** C-A-S-H maintains a stable pore solution pH of 11.5–12.5, keeping the steel passivated without the risk of leaching or carbonation inherent to standard C-S-H. C-A-S-H is the most chemically stable, durable form of cement binder. This creates a 'Buffer Vault' that maintains rebar passivation decades longer than standard CSH paste can.*

Better curing means better concrete.
Evaporation doesn't wait for concrete to cure. Neither does ActiveCure™. With billions of particles driving silicate polymerization at 50x the accelerated rate, we seal the surface matrix instantly beating the evaporation clock and eliminating water loss, the root cause of shrinkage cracking and curling. What you get is optimally hydrated, denser concrete without microcracks and other weaknesses.

Saves time and money.
ActiveCure™ significantly reduces construction downtime by bypassing the industry-standard 28-day cure requirement. Zirconia CeramycGuard™ can be applied just 7 days after placement, acting as a secondary curing membrane that locks in critical moisture for maximum hydration while protecting the young surface from early contamination. For other coating systems, the stable, densified surface created by ActiveCure™ allows for topcoat application at Day 21, shaving a full week off the critical path schedule.

Bottom line: This technology upgrades both the hydration process and surface chemistry. It seals pores, strengthens the binder, and actively preserves the concrete from future corrosion.

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