

CeramycGuard™ Technology Benefits

CeramycGuard nano-ceramic technology heals and seals concrete, improving its physical structure and chemical stability, while reversing the damage done by decades of corrosion. Zirconia's CeramycGuard can restore and preserve the concrete, preventing the need for demolition and reconstruction at dramatically higher costs.

1. Zirconia's concrete coating technology came out of a Rutgers University study, which began in the late 1990's as to why Roman concrete has lasted for thousands of years. This is the basis of our unique and high-performance *inorganic* (alumina-silicate polymer) concrete coating technology.
2. CeramycGuard (CG) is an inorganic coating for concrete which utilizes nano-Alumina and Zirconia Silicates. A chemical reaction takes place which turns the top layer of the concrete into a continuous layer of ceramic (similar to granite).
3. This ceramic polymer “heals” and “seals” the concrete surface at the nano-, micro-, and macro-scale levels (CG average particle size from <1 nm to 10 um). The CeramycGuard fills in voids, cracks, capillaries, and surface erosion, restoring old concrete surfaces to a like-new condition.
4. CG preserves concrete from multiple forms of corrosion, including: carbonation, salts, biological, freeze-thaw cycles, weathering and abrasive water flow.
5. This ceramic barrier layer stops salt intrusion, and is immune to chemical attack by salts.
6. The increased density and hardness of the ceramic composite surface will resist weathering and wear over extended periods of time much better than the concrete alone.
7. CeramycGuard is unaffected by ultra-violet light, heat and cold. Also, it is not affected by wet/dry or freeze/thaw cycles and will not flake, chalk, peel, or delaminate in any manner.
8. The CeramycGuard eliminates the porosity in concrete that provides habitat for microbial life (fungi, liken, algae, etc.), while also inhibiting larger plant organisms. The oxidative and photocatalytic surface (antimicrobial) inhibits organic surface growth, especially in the presences of sunlight.
9. Once the chemical reaction of CeramycGuard takes place at the surface of hydrating concrete, standard concrete gains performance and longevity similar to high-performance geopolymers (i.e., Roman Cements, or alumina-silicate mortars), at only a very small fraction of the cost of these products. Basically, the longevity traits of Roman Cements, are transferred to the much shorter-lived hydrated Portland Concrete.
10. Geopolymers are made with salts, so they are unaffected by salts. Geopolymers are strengthened and densified by salts, humidity, and sunlight (UV), becoming denser over time when outdoors.
11. CeramycGuard forms a permanent, dense ceramic composite with the surface of concrete, which is many times more chemically stable than the concrete surface. The alumina-zirconia-silicate polymer is an analogue of granite, basically it forms a "skin of granite". This inorganic coating technology bonds back into itself, making it possible to renovate any surface easily in the future.
12. During application, the CeramycGuard will naturally "fill up" the void spaces, based on the surfaces' need for corrosion repair. It will not need to be thicker than 7-10* mils at the surface, but will penetrate deep into cracks, pores and damaged areas as needed.
13. CeramycGuard is an inorganic glue, and will rebond concrete together, and protect reinforcing steel from corrosion. It works great for restoring spalls or otherwise cracked or damaged concrete.

14. CeramycGuard is chemically bonded into the concrete, versus traditional plastic film coatings like epoxies which rely on a plastic layer "adhering" to the concrete temporarily. CG will never peel, flake or debond.
15. CeramycGuard provides a durable non-slip surface for greater worker and public safety, even when wet.
16. CeramycGuard is resistant to fire (fireproof/inert, insulator, zero flame, zero smoke surface). Also, CG is about 30% reflective in the infrared (IR), increasing its resistance to fire and concrete protection.
17. A very forgiving, easy to use technology. After just a short training, Ceramic Guard is easy to apply and quite user friendly. For outdoor assets, the majority of the surface preparation is just high-pressure water removal of loose surface materials, carbonated concrete, efflorescence, and organic life.

CeramycGuard Nanotechnology: Porosity vs. Surface Coverage

CeramycGuard is a nano-ceramic water-based slurry (it is basically liquid granite). The micro- and nano-scale ceramic elements chemically react with the chemistry of concrete, not just at the surface, but also within all the pores, capillaries, cracks, and spalled areas. It will basically recreate a stable physiology within the concrete mass at the surface, thus stabilizing the concrete asset.

CeramycGuard Estimated Coverage Based on Severity of Concrete Corrosion*

State of Concrete	Coverage Rate (SQFT/Gal)	Wet Film Thickness (Surface)	Effective Wet Film Thickness (Total)
New/Undamaged	225	7 mils	7 mils
	200	7 mils	8 mils
Weathered	175	7 mils	9 mils
	150	7 mils	11 mils
Degraded/Porous	125	7 mils	13 mils
	100	7 mils	16 mils

** Coverage amounts per gallon listed above are an estimate based on the condition of the concrete. The lower the coverage rate per gallon, the more the concrete needs deeper surface restoration.*

One gallon of CeramycGuard coats the same area regardless of whether the coated area is at the surface or subsurface. Accordingly, what you see at the surface in terms of square footage coated will vary based on the level of corrosion-induced porosity of the concrete. This is something new in terms of the behavior dynamics of coatings. This is a nano-ceramic chemistry that very much wants to chemically bond to calcium, silica, and other elements in the cement paste, sand, and aggregate, to form a granite like composite at the surface. So, CeramycGuard is basically an inorganic glue bonding all these elements together. The more corroded the concrete, the more need for CeramycGuard to infill the corrosion-induced porosity, which lessens the surface visible square footage, but fully restores the concrete.

Please contact us with any questions:

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