

Phoscrete Concrete Repair



Company Background

Stellar Materials Incorporated



- Founded 1990 in Detroit, Michigan.
- Stellar's Liquid Phosphate Binder System is the patented process used in the technology of both Thermbond® Refractories and Phoscrete® Concretés.
- Headquarters in Boca Raton, Florida. Manufacturing operations in Whitmore Lake, Michigan. Subsidiaries in Mexico, Brazil, U.A.E. and The Netherlands. Installations worldwide.



Phoscrete Packaging



Properties of Phoscrete

Permanent Repairs

- Partial Depth Repairs
 - Because Phoscrete chemically bonds to existing poured concrete, partial depth repairs achieve faster results using less labor, material, and waste than full slab replacement.
- Zero Shrinkage Cracking
 - The Phoscrete Binder System responds to occurring strains by tensile deformation and does not crack; as demonstrated by the ASTM C1531 Ring Test.
- Resists Freeze/Thaw Cycling
 - Phoscrete repairs are highly resistant to freeze/thaw cycling and drastic weather changes as indicated by its very low porosity combined with its chemical bond.



Properties of Phoscrete

Withstands Harsh Environments

- Chemical Resistant
 - Phoscrete is resistant to alkaline materials, including heavy concentrations of salt water as demonstrated by it's excellent Chloride Ion Penetration test results.
- Heat Resistant
 - Phoscrete formulations are available that resist continuous operating temperatures above 2500°F.
- Inhibits Rusting
 - Phoscrete passivates rust. On contact, it converts iron oxides to metal phosphates, eliminating existing rust from reinforcing steel, and inhibiting further rusting.



Properties of Phoscrete

Easy to Mix and Place

- Accurate Mixing
 - Phoscrete a pre-measured, two component (bag and jug) system that insures accurate and consistent mixing from batch to batch.
- Fast Preparation and Placement
 - Simply remove all loose and deteriorated concrete and pour in Phoscrete. No surface treatment is necessary.
- Self Consolidating
 - Phoscrete reduces the labor required for leveling and finishing. Phoscrete forms a smooth and flush surface that blends with the existing concrete surface.



Properties of Phoscrete

Fix it Once and For Good

- All Season Use
 - Phoscrete cures once the exothermic reaction is complete. Formulations are available with specific setting and curing cycles for most climates and temperatures, **including winter climates.**
- Rapid Return to Service
 - Phoscrete is a rapid curing, high-early-strength material. Within one hour following placement, Phoscrete attains high compressive strengths, allowing the surface to be opened to heavy duty rubber tired traffic.
- Green Product
 - Using Phoscrete for permanent concrete repair is the ultimate sustainable solution. Save time, labor, material disposal and replacement costs, and extend the service life of aging structures.



The Phoscrete Bond

Phoscrete is a MALP CONCRETE

- **MALP:** Mono-Aluminum Liquid Phosphate
- Phoscrete Concretes chemically bond both to themselves and to existing substrates. During the **exothermic reaction** between the dry aggregate (technical grade magnesium-alumina) and the liquid activator (MALP), **ionic-bonding** occurs to form alkali earth metal-oxide phosphates. This high-strength chemically-bonded compound insures both coherence and adherence and is therefore extremely durable in high stress environments.



The Phoscrete Bond

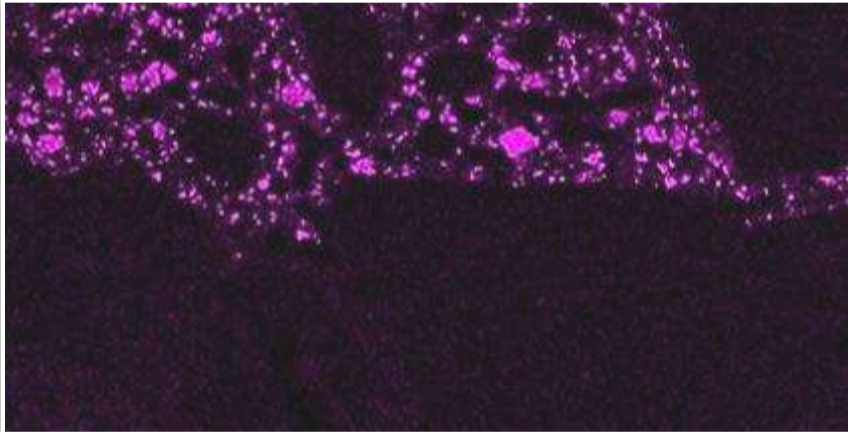
Both Cementitious and Polymeric Properties

- The Phoscrete Bond is rapid-setting with high-early strengths, but it is not brittle like other cementitious bonded materials.
- Due to the formation of chain and ring structures that are similar to polymers, after curing the Phoscrete Bond remains flexible.
- **NO SHRINKAGE CRACKING!**

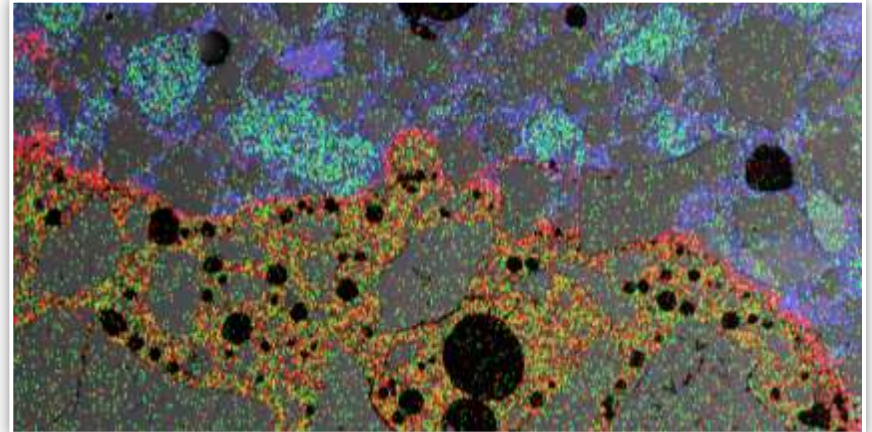


The Phoscrete Bond

Phoscrete Forms a Permanent Chemical Bond



- Calcium Distribution of Cement-Bonded Material.
- Scanning Electron Microscope (SEM) analysis demonstrates that the calcium aluminate cement (bright purple) does not penetrate the substrate surface (dark purple). Cement hydration occurs only at the interface forming only a mechanical bond.



- Element distribution of Phosphate-bonded monolithic material (Phoscrete Concrete)
- Phosphate component of Phoscrete (red) is roughly 100 microns infiltrated in the cement-bonded material and reacts with calcium (blue) from the cement to form calcium phosphate, creating a high strength chemical bond.

Phoscrete Formulations

Use it Year-Round

- Phoscrete 601 (for average temperatures 45°F - 70°F)
- Phoscrete 601-L (summer temperatures 70°F - 90°F)
- Phoscrete 601-E (extended working, above 90°F)
- Phoscrete 601-Q (faster setting, below 45°F)
- Phoscrete 601-P (patching for vertical/overhead)
- Phoscrete 601-AR (Abrasion Resistant)
- Phoscrete 601-G (gunnable mix)
- **Phoscrete 604-Seasons (New!)**
 - Designed for DOT use, one product works in ambient temperatures below zero to above 100°F using accelerator or retarder.



Fix It With Phoscrete!

We are available to answer any questions and discuss your application requirements.

Thank You!



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