

## PRODUCT DATA SHEET: PPC™ — 1121 EC

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### PRODUCT DESCRIPTION

PPC™ 1121 EC, also referred to as Tuf Stuf™, is an iso-phthallic polyester-based polymer overlay and patching system designed for the rapid repair and rehabilitation of PCC bridge decks and pavements. PPC™ 1121 EC achieves over 4000 psi in compressive strength within 24 hours as well as over 850 psi in tensile strength. Adhesion testing, in accordance with ACI 503, results in failure to PCC concrete substrate.

PPC™ 1121 EC offers some important improvements

- PPC™ 1121 EC has very high strength mechanical properties
- PPC™ 1121 EC has a low compressive modulus of elasticity with correspondingly less strain to the bond line resulting in superior adhesion
- PPC™ 1121 EC, when mixed and applied properly, withstands traffic loads within 1.5-3 hours at temperatures down to 40 F.
- PPC™ 1121 EC can be placed at thicknesses from 3/8" to 12" in a single lift
- PPC™ 1121 EC seals PCC surfaces and is a barrier to chlorides and other environmental contaminants
- PPC™ 1121 EC technology has been in continuous use for over 25 years in Western, USA

For today's congested bridges and highways, PPC™ 1121 EC is the right material for high density polymer concrete overlays. This product is extremely useful for protective overlays, patching, and pairing Portland Cement Concrete, Latex Modified Concrete, or Silica Fume Modified Concrete.

**SPECIAL FEATURES**

- Low viscosity for easy mixing
- Rapid curing and strength development
- Superior adhesion to PCC, LMC, Silica Fume concrete even under damp conditions
- Excellent compressive and tensile properties
- Low compressive modulus resulting in a tough paving material

PHYSICAL PROPERTIES– PPC™ Binder Resin	
Weight per gallon(resin binder only)	9.0-9.4 lbs./gal.
Viscosity	<200cps
Flash Point(Setaflash)	90 F
Adhesion(Saturated Surface Dry Bond Test)	>500 psi
Tensile Strength (ASTM D-638, 1/4" specimen)	2500psi
Tensile Elongation (ASTM D-638, 1/4" specimen)	35%, min
Meets CARB(California Air Resources Board Regulations for Emissions)	Rule 1162
Styrene content	45-55%

PHYSICAL PROPERTIES– PPC™-1121 EC	
Tensile Strength(ASTM C-307)	850 psi typical
Cured Density(ASTM C905)	135lbs/cu ft(avg)
Compressive Strength(ASTM C-39)	5K psi

Aggregates for the 1121 system have a minimum Moh hardness of 6.5. The aggregates have a low absorption and are kiln dried. The important characteristic of 1121 aggregate system is its workability and ease of compaction.

**APPLICATION**

**Surface Preparation:** Shot-blasting is the preferred method of preparation for bridge deck overlays. The goal of surface preparation is to remove all deleterious dirt, asphalt and curing compounds from the deck surface as well as expose aggregate. Sandblasting, roto-milling, chipping, or other preparation processes may be used as alternative preparation methods to provide proper surface preparation for a long-lasting polymer overlay and/or patching system. Unsound concrete areas should be located by using a chain-drag or hammer. The unsound areas must be removed until a sound concrete base is established.

**Patching:** After the bridge deck area to be overlaid is cleaned and prepared properly, follow the next steps to remove unsound concrete:

1. Saw cut(dry blade) a minimum 3/4" depth shoulder around the edge of the prepared spall area
2. Chip out and remove delaminated surfaces
3. Blow off(sweep away) dust from saw cutting and chipping operations
4. Prime the spall with KBP 204, high molecular weight methacrylate primer
5. Mix PPC™ 1121 EC according to the mix design outlined below
6. Fill the prepared area to rough grade; screed to final grade
7. Texture finished surface with 10 x 30 sandblast sand and/or tine
8. Overlay operations are similar except screeds are set to achieve specified depth and grade profile

**PPC™ 1121 EC System**

**Primer:** Mix ½ gallon KBP 204 with 1 fluid ounce of 6% Cobalt Drier(Dark Blue Material). Stir for 10 seconds. Add 1 fluid ounce of Cumene Hydro Peroxide and stir for another 30 seconds (Note: use a mechanical agitator to stir the components like a battery powered Makita type drill motor mixer). Using a paint brush or similar applicator, wet-out the entire surface of the area to be repaired. KBP 204 is very fluid and will wet the surface quickly. The excess will rapidly build-up at the lowest points in the prepared area. Minimize excess primer in the deep valleys of areas to be overlaid or patched. Some build-up is unavoidable. Note: This mix ratios listed above represents a starting point for anticipated temperatures of 70 F during daytime installation conditions. Modifications may be required for working under different temperature conditions or during night time application. For very warm day time temperatures, night time application should be considered. Reducing CHP levels to 1 fl oz per gallon during elevated temperatures should be evaluated. During cold night time application, both Promoter and CHP levels may be increased. Adding Kwik Bond's Z Cure accelerator may be required.

**Mix Design:** To a 9 cubic foot mortar mixer, charge 36-38 lbs of PPC™ Binder Resin 32-043-15(approximately 4 gallons). Begin agitation. Add 8- 10 fl.oz. of DDM 9 initiator (MEKP) , depending on temperature and conditions to achieve a minimum set time of 20-40 minutes. While agitating, add 100 lbs. of KBEC 39 Coarse Aggregate. Continue Agitation. Add 200 lbs.(4 bags) of KBEC 11 Fine Sand. Mix for an additional one to two minutes and dump into a transfer device. Follow the finishing steps described below. Approximate yield from the 338.75 lb mix is 2.53 (134 lbs per cubic foot) cubic feet. Read the notes section regarding primer mix design and application. Mix design modifications are required for changes in temperature or night time application. Higher or lower catalyst additions may be required as well as substitution of faster catalysts for night time conditions. Temperature and application timing have a definite effect upon set time of the polyester polymer concrete and the ultimate return to service.

For high volume applications, a positive displacement, plural component pump with appropriate monitoring equipment may be added to a volumetric mixer to obtain outputs of upward of 8-10 cubic yards every 30 minutes.

**Finishing:** Deliver mixed material to work area. For repair of PCC spalls, fill areas to rough grade with the PPC™ 1121 EC mix. Strike-off to final grade. Lightly tamp to drive out residual air and trowel smooth. Use a steel trowel for finishing. Use a small amount of Acetone solvent (MEK lacquer thinner, orange cleaner may be used) periodically to clean tools from the sticky resin. Typical work time is 30 minutes. UV light accelerates the set time. PPC™ 1121 EC is best placed at temperature range of 40-90 F.

For Bridge deck overlay applications, use of tandem mortar mixers and a vibratory strike off screed are typically used for small projects. Wood or pipe screeds are set to achieve the proper thickness and profile. Mixed polymer concrete is transferred to the vibratory screed using wheel barrows, "Georgia" buggies, or bob cat loaders. The polymer concrete is raked manually in front of the screed using concrete rakes to keep an even depth of material in front of the screed. The screed is winched along at a uniform speed to produce a smooth, well-compacted final surface. The final surface should be longitudinally tined and/or alternatively, receive a broadcast sand finish to remove any excess resin glaze from the surface. Applying broadcast sand to excess followed by a transverse broom drag and provided an excellent surface finish with high skid resistance values.

For large bridge deck or highway applications, slip form pavers have been used very successfully to pave at speeds of 5-8 feet per minute, 12 feet wide, and 1.25" thick. The minimum recommended thickness for the polyester polymer concrete application is ¾". However, the 1121 EC mix can be paved from 1/4" (without the coarse aggregate) to as thick as 12", if necessary, successfully.

### Standard Packaging

- PPC™ Binder Resin-4 5 lb pail., 496 lb steel drum, 40,000 lb bulk trailer
- KBEC 11-Fine Sand-50 lb bags, 3000 lb super sacks
- KBEC 39-Coarse Agg-50 lb bags, 3000 lb super sacks
- DDM 9 Catalyst(MEKP)- 1 gallon bottles
- KBP 204 primer- 4 gallon pails, 50 gallon drums
- 6% Cobalt Promoter- available in pre-packaged bottles, 1- gallon cans, and 4 gallon pails
- Cumene Hydro Peroxide-available in 1 gallon jugs, or 4 gallon cases
- Z Cure- available in pre-packaged bottles, 1 gal cans, 5 gal pail

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### SAFETY

PPC™ 1121 EC paving system consists of polymer materials that have been used safely for over 20 years. However, there are certain safety issues that need to be readily understood. PPC™ Binder Resin is FLAMMABLE! NO SMOKING is allowed! Fire extinguishers must be available as well as plans for emergency situations. Emergency situations are unlikely, but preparation is always SMART!

The KBP 204 primer is a three component system. The 6% Cobalt Drier and the Cumene Hydro Peroxide, used to catalyze the KBP 204 monomer, are INCOMPATIBLE materials. They must NEVER be mixed together by themselves! A FLASH FIRE WILL OCCUR! To safely mix the KBP 204 primer, follow the mixing instructions EXACTLY. Follow the mixing instructions outlined in this product data sheet and safety will be maintained.

Wear protective clothing, eye protection, and chemical resistant gloves. Organic vapor respirators are not normally required. For individuals highly sensitive to chemical vapors, organic vapor respirators are suggested.

For emergency situations, always have available clean water for accidental contact in the eyes, fire extinguishers, and emergency center addresses, phone numbers.

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### STORAGE

Aggregate, PPC™ Binder Resin, and KBP 204, high molecular weight methacrylate should be stored in a cool, dry location and in their original containers. The shelf life for these materials stored at temperatures 80 F and below is typically 12 months or more. PPC™ Binder Resin and KBP 204 contain reactive polymers. At elevated temperature storage shelf life is significantly reduced. Store all bagged aggregates in a clean, dry location away from moisture. Absolutely, prevent aggregates from becoming wet.

The technical data furnished is true and accurate to the best of our knowledge. However, no guarantee of accuracy is given or implied. We suggest that customers evaluate these recommendations and suggestions in conjunction with their specific application. Kwik Bond Polymers, LLC warrants its products to be free from manufacturing defects conforming to its most recent material specifications. In the event of defective materials, Kwik Bond Polymers, LLC's liability will be limited to the replacement of material or the material value only at the sole discretion of Kwik Bond Polymers, LLC. Kwik Bond Polymers, LLC assumes no responsibility for coverage, suitability of application, performance or injuries resulting from use. 2-1-2009