

dsRevised: November, 2006

### 100% REACTIVE SOLIDS POLYESTER COATING / LININGS SYSTEMS

TECHNI-PLUS PB 40.1 is a 30 to 40 dry mil modified bisphenol polyester resin based, flake-filled system coating / lining system. PB 40.1 has outstanding chemical resistance in Chlor-Akali service at temperatures ranging to 210°F (98.9°C). PB 40.1 is designed for use as an immersion lining, exterior coating or chemical containment membrane on metal or concrete. Graphite filled version, TECHNI-PLUS PB 40.1G, is available. Consult KCC for uses in service such as fluoride exposures.

The PB40.1 applied in two 20 - 25 wet mil coats. The PB 40.1 can be sprayed with conventional equipment or rolled.

TECHNI-PLUS PB 40.1 has very high bond strength to steel and concrete. The permeability is extremely low. Abrasion resistance is excellent. The combination of all these factors allows PB 40.1 to be used on floors with light equipment and foot traffic and chemical spills. This product is also ideally suited for use in oil production storage areas, offshore structures, chemical and waste treatment processes and for protecting buried pipeline that

is cathodically protected, when used with KCC P4.0 nanocomposite primer.

TECHNI-PLUS PB 40.1 has excellent resistance to organic acids, dilute inorganic acids, aliphatic and aromatic solvents and has very good resistance in chloro alkali environments.

In immersion service and most other environments, TECHNI-PLUS PB 40.1 is used with P 3.3 primer or P 4.0 nanocomposite primer for superior resistance to molecular vapor permeation. PB 40.1 now uses the VE 62 flake system, which in independent testing has proven to be dramatically superior to competitors 100 - 150 mil trowel applied linings in blocking molecular permeation.

PB 40.1 is setting new standards in superior chemical resistance in full time immersion while providing higher immersion temperatures, with the best permeation resistance of any medium thickness flake filled coating / lining system.

#### CHEMICAL RESISTANCE<sup>1</sup>

Excellent resistance to a wide variety of industrial chemicals (examples listed) at ambient and elevated temperatures in immersion. In flooring applications, the system will generally withstand higher concentrations. Contact KCC Corrosion Control with complete operating service conditions for specific product recommendations.

ACIDS	ALKALINES	SOLVENTS, CHEMICALS
1-75% Acetic	1-29% Ammonium Hydroxide	1-30% Benzene Sulfonic Acid
1-25% Acrylic Acid	Black Liquor (pulp)	Butyl or Benzyl Alcohol
All concentrations Brine Salt	All Sodium Bisulfite	Ethyl Alcohol, Methyl Alcohol
All concentrations Chlorine Water	1-50% Potassium Hydroxide	Isopropyl Alcohol
1-48% Hydrobromic	1-15% Sodium Cyanide	Kerosene, Jet Fuel
1-37% Hydrochloric	1-50% Sodium Hydroxide	All concentrations Lithium Chloride
1-20% Hydrofluoric <sup>2</sup>	1-20% Sodium Hypochlorite	Naphtha
1-35% Hydrofluosilic <sup>2</sup>	All concentrations Sodium Lauryl Sulfate	Salt Brine (Sodium Chloride)
1-75% Sulfuric	All concentrations Sodium Sulfite	Toluene Sulfonic Oils

**MAXIMUM SERVICE TEMPERATURE**<sup>1</sup> 350°F Dry, 250°F for Splash/Spillage, 210°F for Immersion. Always consult KCC for maximum temperatures in your intended environment.

<sup>1</sup> FOR SPECIFIC RECOMMENDATIONS CONTACT KCC CORROSION CONTROL CO., LTD.

<sup>2</sup> PC 40.1 G IS RECOMMENDED FOR HYDROFLUORIC ACID and STRONG CAUSTICS.

<sup>3</sup> IF PROTECTED FROM DIRECT SUNLIGHT

**PHYSICAL PROPERTIES**

Solids Content:.....	100% Reactive
Volatile Organic Content:.....	0.45 lbs per gallon
Flash Point: (Pensky-Martens Closed Cup).....	PB 40/PC 40/ PB 40 F Resin.....> 100°F
	Hardener 2 C (MEKP) .....> 135°F
Viscosity:.....	3500-3900 cps @ 73°F
Thinner:.....	<b>DO NOT THIN!</b>
Weight per Gallon:.....	9.1 lbs. Mixed
Coverage for Steel: .....	(Theoretical)... 70 sq. ft. per gallon at 22.5 wet mils average.
	(Practical)..... 60 sq. ft. per gallon per coat when applied at 20 to 25 wet mils yielding 15 to 20 dry mils. Normally applied in two coats to yield 30 to 40 dry mils.
Coverage for Concrete:.....	Same as steel; if concrete is dense and primer is used. Porous or unprimed concrete may reduce coverage to 40 to 50 sq. ft. per gallon per coat at 20 to 25 wet mils.
Color: .....	Medium Gray; Beige (Off-White) standard. PB 40.1 G is Black.

**PHYSICAL PROPERTIES OF CURED SYSTEM**

Tensile Bond Strength: .....	Sandblasted Steel – 2,500 psi
	Concrete - exceeds 500 psi tensile
Taber Abrasion (ASTM D 4060).....	22 mg. loss / 1000 cycles with 1000 gms. CS - 17 Wheel
Moisture Permeability (ASTM E96-85):.....	0.000357 perm-inch depending on KCC’s VE 62 Flake System
Barcol Hardness:.....	35+

**POT LIFE AND RECOAT TIME**

Temp.	Pot Life PB 40.1	Recoat Time		
		Minimum PB 40.1	Maximum All	
@ 50°F	100 min.	12 hrs.	6 hrs.	7 days <sup>5</sup>
@ 75°F	60 min.	4 hrs.	2 hrs.	7 days <sup>5</sup>
@ 90°F	0 min.	3 hrs.	1 hr.	7 days <sup>5</sup>

Pot Life test is performed on 200 gm. sample; working time in larger quantities will be shorter!

**PACKAGING**

TECHNI-PLUS PB 40.1 is packaged in pre-measured units as follows:

1 Gal. Unit	5 Gal. Unit	30 Gal. Unit
Resin 9.1 lbs.	Resin 45.5 lbs.	Resin 273 lbs.
Hard. 2 C 2.0 fl. oz.	Hard. 2 C 10.0 fl. oz.	Hard. 2 C 60.0 fl. oz.

PB 40.1 G, substitute hardener as follows:

1 Gal. Unit	5 Gal. Unit	30 Gal. Unit
Hard. 2 C 3.2 fl. oz.	Hard. 2 C 16.0 fl. oz.	Hard. 2 C 96.0 fl. oz.

**BID SPECIFICATION**

Concrete or steel shall be primed with a nominal 3 wet mils of KCC Corrosion Control's TECHNI-PLUS P 3 or P 4.0 Primer. This primer shall be topcoated with a nominal 30 to 40 mil thickness of KCC Corrosion Control's TECHNI-PLUS PB 40.1 shall be applied in two 20 - 25 wet mil coats. The materials shall be applied to substrate prepared in accordance with the manufacturer's specifications.

**STORAGE AND SHELF LIFE**

TECHNI-PLUS PB 40.1 components should be stored in cool dry area and out of direct sunlight. The hardener is a **PEROXIDE (KCC Yellow Label)** and **SHOULD NOT BE STORED NEAR AMINES (KCC Red Label)**.

**TYPICAL SHELF LIFE**

Temperature	Months
@ 50°F - 10°C	7
@ 75°F - 23.9°C	6
@ 90°F - 32.3°C	4

<sup>1</sup> IF PROTECTED FROM DIRECT SUNLIGHT.

## **INSTALLATION PROCEDURES**

The installation procedures in this bulletin will be as specific as possible. If any questions arise after reading this bulletin, please contact KCC Corrosion Control for more specific information.

- **Equipment Design, Fabrication and Surface Preparation**

Whether the vessel is to be protected from the corrosive action of the contents or the contents are to be protected from contamination from the vessel surface, the coating must be continuous. The vessel design must consider the need to eliminate sharp corners, projections, crevices and acute angles and provide access to all surfaces. The design must also minimize movement when in operation.

### ***Steel***

External stiffeners and bracing should be used when acceptable. Internal bracing, dividers, nozzle projections, etc. must have continuous welding (no skip welding) with weld rippling, undercutting and weld spatter ground smooth. Edges must be ground to a 1/8" radius. To facilitate the coating application, nozzles should have large diameter (4" minimum) and short pipe nipple length. Nozzles smaller in diameter or with long pipe nipple lengths should be made of an alloy or utilize a Fiberglass Plastic nozzle insert. Threaded fittings must be avoided or made of alloy suitable to resist the corrosive contents.

All surfaces to be coated require a "White Metal" blast to SSPC-SP-5 or NACE 1, with an abrasive blast media that removes all visible mill scale, existing coating and rust. Performance is directly related to the anchor pattern profile conditions, highly corrosive environments and thermal shock, the steel substrate should be clean, dry and have a minimum anchor profile of 3 mils. For less severe conditions, non-immersion service, splash, spillage and no thermal shock, a 2 mil anchor profile with a "Near White Metal" blast to SSPC-SP-10 or NACE 2, may be acceptable, consult KCC Corrosion Control.

### ***Concrete***

All oil, grease, chemicals, polymeric materials and/or weak laitance should be removed by either mechanical or chemical methods. Mechanical methods such as sandblasting, blasttracking or scarifying are the preferred methods. Chemical methods such as acid etching and detergents should be utilized to remove laitance, oil and grease when mechanical methods cannot be utilized. The concrete should have sufficient tensile strength (250 psi), and be clean and dry. All pits and surface imperfections, sharp corners, undercut areas from forms, honeycombing and bug holes opened up as a result of surface preparation must be filled with a scratch coat compatible with the coating system. It is the physical forcing, by troweling of a scratch coat onto and into the concrete surface that makes it possible to obtain an impervious finished coating. For specific scratch coat material recommendations, contact KCC Corrosion Control.

Specific recommendations and testing procedures for surface tensile strength and moisture content are contained in KCC Corrosion Control's "Specification for Preparation of Concrete to Receive Polymeric Floors and Linings" (SC-01).

**Reference Documents:** *National Association of Corrosion Engineers* (NACE) Standard RP0178-89, "Fabrication Detail, Surface Finish Requirements, and Proper Design Considerations for Tanks and Vessels to be Lined for Immersion Service."

*Steel Structures Painting Council* (SSPC), Volume 1, Chapter 14.2, "The Lining of Steel Tanks."

- **Mixing and Application**

**DO NOT ATTEMPT COATING APPLICATION IF SUBSTRATE TEMP IS WITHIN 5°F OF DEW POINT OR IF RELATIVE HUMIDITY IS GREATER THAN 95% OR IF SUBSTRATE TEMPERATURES ARE BELOW 50°F OR EXPECTED TO GO BELOW 50°F DURING CURE.**

If coating concrete surfaces, concrete expels air during the day and intakes air during the night. The best time to apply primer and basecoat is late afternoon or early evening at which time concrete is least likely to expel air. Other precautions such as shading the work area from sunlight to minimize the heating of the substrate and elimination of cyclic temperature changes will also reduce expulsion of air.

• **Mixing and Application (continued)**

The resin component should be stirred thoroughly prior to use whether the application is by brush, roller, batch-mix conventional spray, or plural component spray. For brush, roller and batch-mix spray, add Hardener 2 C and mix thoroughly for approximately 2 minutes. For plural component spray, the hardener is not added to the resin in the container, but mixes with the resin internally at the spray gun (red tracer dye in hardener is recommended). Proper ratio of resin to hardener is important to ultimate cure and film properties. **DO NOT THIN!**

TECHNI-PLUS PB 40 and PC 40 can be applied by brush, roller, conventional and plural component spray. When spraying batch-mix with conventional equipment, the pot and material lines should be flushed with solvent after every 3 - 4 batches when temperatures exceed 80°F. TECHNI-PLUS PB 40.1

**APPLICATION METHODS**

Brush-Roller: Natural bristle brush. Short nap wool or mohair roller.

Spray: Refer to KCC Recommended Practice Bulletin: RP-01, Spray Application Methods and Equipment.

A check for suitability of spray equipment can be made by first stirring the resin component of the product for two minutes with a jiffy mixer (no hardener), then spraying the product without the hardener. This procedure eliminates the risk of the product curing while adjusting or testing the spray unit.

• **Pot Life** (See values on Page 2)

The pot life or working time of the material is mass sensitive, the larger the volume the shorter the pot life.

**CURE TIME**

The cure time is dependent on temperature of the substrate. The ambient air temperature may not be the temperature of the substrate, i.e. direct sunlight will heat substrate to higher temperature than ambient air. In winter, substrate may be colder than ambient air. The substrate temperature should be measured and dewpoint calculated prior to coating. Substrate temperatures below 50°F will retard curing.

Do not catalyze more material than can be used within the pot life. Above 90°F ambient temperature, best results are obtained when the catalyzed material is poured into smaller containers reducing the mass. When ambient temperature exceeds 80°F the pot life can be extended by cooling the materials. The materials should be stored between 65°F and 75°F for 24 hours prior to use for optimum handling properties. If plural component application equipment is used materials are not premixed and pot life is not a factor. Mixing chamber and spray tip must be kept clean and flushed with solvent.

• **Clean-Up**

All mixing equipment, spray equipment and brushes should be cleaned immediately after use. Solvents recommended for clean-up are KCC Corrosion Control's 622 Clean-up Solvent or methyl ethyl ketone. **DO NOT USE ACETONE!**

**RECOAT AND TOPCOAT LIMITATIONS**

The maximum recoat time when exposed to direct sunlight (ultraviolet light) is 3 days. This time period can be extended to 7 days by protecting the product from exposure to direct sunlight. The first coat should always be tested for suitability for topcoating by utilizing a styrene sensitivity test. This test is performed by wiping several small areas of the first coat with styrene, waiting until the styrene flashes off (just a minute or two) and then checking to insure that the first coat surface contacted by styrene is now "tacky" to the touch. If the surface does not become "tacky", the surface must then be roughened or abraded by light abrasive blasting to remove all shiny surfaces of the product, and then, after wiping all dust from the surface, the product is ready for topcoat application. After light roughening of the surface the surface must be topcoated within 3 hours.

**Time To Complete Cure**

If substrate is maintained:	@ 50°F.....	96 hrs.
	@ 75°F.....	48 hrs.
	@ 90°F.....	24 hrs.

**CAUTION:** Styrene fumes are offensive to personnel and heavier than air, therefore, it is necessary to maintain sufficient ventilation in closed areas to meet OSHA regulations, and to continuously ventilate closed areas such as tanks, pits and trenches to keep the working environment safe, and prevent styrene fumes from being trapped and building up, which will prevent the proper cure of the product.

## INSPECTION OF FILM INTEGRITY

During installation of the coating, care should be taken to provide for the correct specified uniform thickness of material by carefully checking at regular, pre-specified intervals, with a wet film thickness gauge.

After allowing adequate cure time based on the actual substrate temperature, the surface should be inspected for runs, sags, foreign matter and under cured areas caused by insufficient hardener quantity, incomplete mixing or low temperature. Product that has been sprayed using plural component equipment with red tracer dye in the catalyst can be visually inspected by looking for variations in color. If under cured areas are found, they must be repaired.

Film thickness on steel structures should be checked with a magnetic dry film thickness gauge. Coatings to be subjected to immersion service should be tested for minute discontinuities (pin holes) using a high voltage DC holiday detector, set at no more than 100 volts per mil of the film thickness being tested.

Coatings on concrete surfaces may be checked for continuity by spark testing if so desired. If a coating is to be spark tested, a conductive primer must be used on the concrete in place of standard primer. Follow test procedure for completed coating outlined above.

**Reference Documents:** *Steel Structures Painting Council* (SSPC) Volume 1, Chapter 14.2, "The Lining of Steel Tanks", Section VIII, Inspection.

*National Association of Corrosion Engineers Standard* (NACE) RP0188-88, "Discontinuity (Holiday) Testing

## WARRANTY

For product warranty see KCC Corrosion Control Co., Ltd. **STANDARD TERMS AND CONDITIONS (U. S. 3/2006 KCC-Sale), stated terms including limitation of liability constitute the total warranty.**

The information contained herein is believed to be accurate and reliable but is not to be construed as implying any warranty or guarantee of performance. The suggestions or recommendations and data contained herein are based on laboratory tests and field data that are believed to be accurate and reliable. The suggestions or recommendations of data contained in this bulletin are made without guarantee or representations as to results. We suggest that the user evaluate these suggestions or recommendations in your facility or laboratory or in field testing prior to use. For specific Corrosion Control Co., Ltd. product Limited Warranty and Limitations of Liability see KCC Corrosion Control Co., Ltd. Terms and Conditions of Sale - U.S. 3/2006 KCC - Sale. No statement contained herein shall infer or be construed as granting the right or permission to use, in any manner whatsoever, any patent or other intellectual property owned by a KCC company or any KCC affiliate company.

of Protective Coatings" and Standard RP0288-88, "Inspection of Linings on Steel and Concrete."

## SAFETY

TECHNI-PLUS PB 40.1 resin is flammable, and contains polyester resins and styrene. Hardener 2 C contains **PEROXIDE (KCC Yellow Label)** and **SHOULD NOT BE STORED NEAR AMINES (KCC Red Label)**. All components should be stored in a cool dry place out of direct sunlight.

When working with any polymers, hardeners and dry aggregate fillers always wear appropriate safety glasses, breathing protection, clothing, and gloves. Any contaminated clothing should be washed prior to being rework. The vapors given off during application and cure should not be allowed to build up. The ventilation should be sufficient to turn over the air with special consideration for enclosed area. When using these types of materials any sources of ignition should be eliminated within a 50 ft. range.

**Material Safety Data Sheets** have been supplied with your shipment. KCC Corrosion Control recommends that the personnel applying the materials read and understand these prior to mixing any material. If the resin or hardener are splashed in the eyes flush with clean water for 15 minutes and **CONTACT A PHYSICIAN. IF INGESTED DO NOT INDUCE VOMITING AND CONTACT A PHYSICIAN.**

All empty containers; bags, cans, bottles and excess material must be properly disposed of in accordance with applicable Federal, State and Local Codes. **IN EMERGENCY SITUATIONS CONTACT CHEMTREC AT 800/424-9300.**