

Revised: September, 2008

1/8 INCH WOVEN CLOTH REINFORCED EPOXY LINING/FLOORING SYSTEM

TECHNI-PLUS EP 125CR is a corrosion resistant lining or floor topping with excellent chemical and wear resistance based on advanced epoxy technology, amine cured and filled with blended silica aggregate. TECHNI-PLUS EP 125CR is a 1/8 inch system reinforced with 10 oz. woven glass cloth saturated with epoxy resin. Graphite filled "G" version (EP 125CR/G) is available where conductive flooring is required and meets NFPA 99 standards. The "G" version is also used for fluoride and some caustic exposures. Abrasion resistant "AR" version (EP 125CR/AR) is also available for highly abrasive environments.

TECHNI-PLUS EP 125CR functions as a monolithic flooring designed to withstand a broad range of chemicals including splash and spillage of acids, alkalis and solvents. TECHNI-PLUS EP 125CR functions as a lining designed to withstand a broad range of chemicals in immersion at elevated temperatures. The short cure time of EP 125CR results in minimum downtime and the reinforcement layer offers resistance to thermal cycling.

EP 125 CR / SF is a silicone free version used when lining electro coat tanks. This system uses E 3.2 SF primer, also silicone free.

CHEMICAL RESISTANCE¹

The TECHNI-PLUS EP 125CR will handle immersion service for a broad range of chemicals. Examples of chemical resistance for immersion service are listed. 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 |
|--------------------|--|---------------------|
| 1-25% Acetic | 1-30% Hydrogen Peroxide | Isopropyl Alcohol |
| 1-30% Hydrochloric | Sodium Peroxide Bleach | Methyl Alcohol |
| 1-25% Nitric | 1-45% Potassium Hydroxide ² | Mineral Spirits |
| Plating Solutions | Pulp Liquors | Perchloroethylene |
| 1-50% Sulfuric | 1-50% Sodium Hydroxide ² | Vegetable Oils |

MAXIMUM SERVICE TEMPERATURE¹ 220°F for Splash/Spillage, 180°F for Immersion.

TYPICAL PROPERTIES

| | |
|---|--|
| Solids Content:..... | 100% |
| Volatile Organic Content: | Zero |
| Liquid Mix Ratio by Volume:..... | 4 parts resin to 1 part hardener. |
| Mortar Mix Ratio by Weight: | 2.6 parts powder to 1 part mixed resin / hardener. |
| Flash Point: (Pensky-Martens Closed Cup)..... | Resin.....> 200°F Hardener.....> 200°F |
| Viscosity: | 300-500 cps @ 75°F (mixed liquids); mortar consistency with Lining Powder #4. |
| Thinner:..... | DO NOT THIN! |
| Weight per Gallon:..... | 13.0 lbs. Resin, Hardener, Powder Mix. |
| Color: | Gray is standard. Graphite "G" version is Black. Minimum quantity order applies to limited special colors. |

¹ FOR SPECIFIC RECOMMENDATIONS CONTACT KCC CORROSION CONTROL CO., LTD.

² GRAPHITE "G" VERSION IS RECOMMENDED FOR THESE EXPOSURES.

PHYSICAL PROPERTIES OF CURED SYSTEM

| | |
|--|--|
| Compressive Strength (ASTM C579A-82): | 12,000 psi |
| Flexural Properties (ASTM C580-85): | |
| Strength:..... | 3,400 psi |
| Modulus of Elasticity:..... | 1.6 x 10 ⁶ psi |
| Tensile Strength (ASTM C307-83): | 2,750 psi |
| Tensile Bond Strength: | Sandblasted Steel - exceeds 2500 psi. Concrete - exceeds 500 psi tensile. |
| Taber Abrasion (ASTM D 4060):..... | 16 mg. loss/1000 cycles with 1000 gms. CS - 17 Wheel |
| Water Absorption (ASTM C413-83):..... | + 0.03 % |
| Moisture Permeability (ASTM E96-85): | 0.0019 perm-inch. |
| Electrical Properties – Resistivity (ASTM F 150):..... | 5x10 ⁴ to 1x10 ⁶ ohms (EP 125 CR/G conductive version only.) |

ESTIMATING AND ORDERING

**Priming with TECHNI-PLUS E 3
COVERAGE**

| | |
|---------------------------|----------------------------|
| <u>Concrete</u> | <u>Steel</u> |
| 175 sq. ft. / 1 gal. unit | 300 sq. ft. / 1 gal. unit |
| 875 sq. ft. / 5 gal. unit | 1500 sq. ft. / 5 gal. unit |

**EP 125CR & CR/SF Basecoat/Saturant/Topcoat
Resin and Hardener Unit**

90 sq. ft./ 5 gal. unit @ 0.125 inches thick

Lining Powder #4 for Basecoat and Topcoat

35 sq. ft./ 35 lb. bag @ 0.125 inches thick

Lining Powder G - For Graphite (G) Version only.

40 sq. ft. / 35 lb. bag @ 0.125 inches thick

Lining Powder AR - For AR Version Topcoat Only

(Add 9 lbs. to each 24 lbs. of Lining Powder #4
in Topcoat)

385 sq. ft./ 50 lb. bag mixed with Lining Powder #4

Cloth Reinforcement:

Order square feet needed plus 10%

PACKAGING

TECHNI-PLUS E 3 Primer

| 1 Gal. Unit | 5 Gal. Unit |
|-------------------|--------------------|
| Resin 6.3 lbs. | Resin 31.5 lbs. |
| Hardener 2.8 lbs. | Hardener 14.0 lbs. |

**EP 125 CR & CR / SF Basecoat, Saturant & Topcoat Resin
and Hardener**

| 1 Gal. Unit | 5 Gal. Unit |
|------------------|-------------------|
| Resin 7.1 lbs. | Resin 35.3 lbs. |
| Hardener 1.7 lbs | Hardener 8.2 lbs. |

PACKAGING (Continued)

Basecoat & Topcoat Powder

Lining Powder #4 - 35 lb. bags

For "AR" version: (used in Topcoat only)

Lining Powder AR - 50 lb. bag

For "G" version: (used in Basecoat & Topcoat)

Lining Powder G - 35 lb. bags

BID SPECIFICATION

Substrate shall be primed with a nominal 3 wet mils of KCC Corrosion Control's TECHNI-PLUS E 3 Primer. The substrate shall be protected with a nominal 1/8 inch thickness of KCC Corrosion Control's TECHNI-PLUS EP 125CR, consisting of a nominal 1/16 inch Basecoat reinforced with 10 oz. woven glass cloth saturated with TECHNI-PLUS EP 125CR Resin/Hardener and a nominal 1/16 inch Topcoat. The materials shall be applied to substrate prepared in accordance with the manufacturer's specifications.

STORAGE AND SHELF LIFE

The shelf life of the powder is indefinite provided it is stored in a cool dry place. The hardeners are *AMINES (KCC Red Label)* and **SHOULD NOT BE STORED NEAR PEROXIDES (KCC Yellow Label)**. The shelf life of the resins and hardeners are:

TYPICAL SHELF LIFE

| | E 3 | EP 125 |
|--------------------|---------------|---------------|
| Temperature | Months | Months |
| @ 50°F | 18 | 18 |
| @ 75°F | 12 | 18 |
| @ 80°-90°F | 6 | 12 |

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.

DO NOT ATTEMPT COATING APPLICATION IF SUBSTRATE TEMP IS WITHIN 5°F OF DEW POINT OR IF RELATIVE HUMIDITY IS GREATER THAN 95%.

- **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 lining 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 lining application, nozzles should have a large diameter (4" minimum) and short pipe nipple lengths. 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 be of an alloy suitable to resist the corrosive contents.

All surfaces to be lined require a white metal blast to SSPC-SP-5 or NACE 1 specification with a blast media that removes all visible mill scale and rust. Performance is directly related to the anchor pattern profile and cleanliness of the steel. For immersion service conditions, highly corrosive environments and thermal shock, the substrate should be clean, dry and have a minimum anchor profile of 3 mils.

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, blastracking or scarifying are the preferred methods. Chemical methods such as acid etching and detergents should be utilized to remove oil

and grease or 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 lining 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 materials 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 (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."

- **Priming the Substrate**

If lining 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.

TECHNI-PLUS E 3 Primer is to be used for TECHNI-PLUS EP 125CR system. The primer should be applied to the concrete at a thickness of 3 wet mils. The hardener should be added to the resin and mixed for approximately 2 minutes. The primer can be applied by brush, roller or spraying. Specific instructions are contained in the TECHNI-PLUS E 3 Primer bulletin.

TECHNI-PLUS EP 125CR Basecoat may be installed over very rough or porous concrete but should not exceed ¼" thickness on verticals, ½" on horizontals. A fill material would be recommended for any thicknesses in excess of those mentioned. Contact KCC Corrosion Control for recommendations if there is any question about the roughness or texture of the concrete.

• **Mixing of Basecoat/Topcoat Materials**

The units of TECHNI-PLUS EP 125CR should be mixed in a mortar mixer. First the Hardener should be added to the Resin in the pail and mixed approximately 3 - 5 minutes with a jiffy type mixer on a slow speed drill. For each 5 gallon pail of the combined mix of resin and hardener, 3½ bags of powder (120 lbs.) are added while the mixer is running. The mixing should continue until the powder is completely wet out and no dry spots remain. Smaller mixes can be made by using a one gallon unit of EP 125CR (Resin and Hardener) with 24 lbs. of Lining Powder #4. Bucket mixers are efficient for such small mixes. Quantity of Lining Powder #4 used in mix may vary according to site conditions.

For Graphite "G" version, four (4) bags of Lining Powder G are used with a 5 gallon unit of resin. For "AR version, topcoat mixture is modified by adding 9 lbs Lining Powder AR to each 24 lbs. of Lining Powder #4 used in the mix.

• **Working Time**

The working time of the material is mass sensitive, the larger the volume the shorter the pot life. Do not catalyze more material than can be used within the pot life. At ambient temperature above 90°F, best results are obtained when the catalyzed material is poured into smaller containers reducing the mass. When ambient temperatures exceed 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.

Working Time of Mixed 1 Gal. Units (mortar)

- @ 50°F 90 min.
- @ 75°F 60 min.
- @ 90°F 45 min.

NOTE: Working time of mixed resin & hardener without Lining Powder is reduced by half.

• **Application**

The mixed basecoat should be troweled onto the cured E 3 Primer at a thickness of 1/16 inch. The basecoat should be applied in sections wide enough to be covered with the

cloth in one pass. Do not trowel more material than can be embedded with cloth and saturated prior to the basecoat hardening.

The 10 oz. woven glass cloth should be rolled into the wet basecoat and saturated with the mixed resin/hardener utilizing a short nap roller and a steel ribbed roller. The cloth should be saturated until no white or dry spots remain. The cloth should be overlapped a minimum of 1 inch at seams. When ending for the day, the cloth should be embedded and saturated in all the basecoat applied. Starting the next day, trowel a ½"-2" wide overlap section of basecoat over the cured saturated cloth and then begin troweling basecoat on the cured E 3 Primer or Scratch Coat. The cloth is rolled into the ½"-2" wide section and then applied as previously stated.

When the basecoat and saturated cloth layer is cured, the surface should be checked for air pockets or other imperfections. These imperfections should be cut out and repaired; the seams should be ground down with a sander or grinder. The topcoat units are the same as the basecoat units and should be mixed in the same manner. The topcoat is troweled at a nominal 1/16 inch thick. For AR topcoat, 9 lbs. of Lining Powder AR is added for each 24 lbs. of Lining Powder #4 in the topcoat mix. Topcoat may be smoothed while wet by brush applying small amounts of KCC Finishing Liquid "E". **DO NOT FLOOD SURFACE!**

• **Clean-Up**

All mixing equipment, rollers 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.

RECOAT AND TOPCOAT LIMITATIONS

It is important that the basecoat be fully cured prior to topcoat application and equally important that the basecoat is not exposed for a long period prior to topcoating. Minimum recoat time between basecoat and topcoat is 8 hours @ 75°F with maximum allowable time between basecoat and topcoat application is 4 days @ 75°F if not in direct sunlight. In direct sunlight, the maximum recoat time is 2 days.

CURE TIME OF COMPLETED SYSTEM

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 or concrete to higher temperature than ambient air. In winter, substrate or concrete may be colder than ambient air. The substrate temperature should be measured and dew point calculated prior to coating.

Time To Complete Cure

For minimum chemical service/foot traffic

| | | |
|-----------------------------|-------------|---------|
| If substrate is maintained: | @ 50°F..... | 24 hrs. |
| | @ 75°F..... | 16 hrs. |
| | @ 90°F..... | 8 hrs. |

For full chemical service/fork lift traffic

| | | |
|-----------------------------|-------------|---------|
| If substrate is maintained: | @ 50°F..... | 72 hrs. |
| | @ 75°F..... | 48 hrs. |
| | @ 90°F..... | 24 hrs. |

INSPECTION OF FILM INTEGRITY

During installation of the lining, care should be taken to provide for the correct specified uniform thickness of material by carefully checking at regular, pre-specified intervals, with guide bars or by using 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 temperatures. 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. Linings 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.

Linings on concrete surfaces may be checked for continuity by spark testing if so desired. If a lining 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 (NACE) Standard RP0188-88, "Discontinuity (Holiday) Testing of Protective Coatings" and Standard RP0288-88, "Inspection of Linings on Steel and Concrete."

SAFETY

CAUTION: Exposure of this product to concentrated nitric acid, above 70% concentration, is not recommended, as a nitration reaction may result, with potential hazard of fire or explosion. This does not mean the product is recommended for concentrations of nitric acid up to 70%. Consult KCC Corrosion Control for specific information.

TECHNI-PLUS E 3 and EP 125 CR resins contain epoxy resin. The hardeners are *AMINE (KCC Red Label)* and ***SHOULD NOT BE STORED NEAR PEROXIDES (KCC Yellow Labels)***. All components should be stored in a cool dry place out of direct sunlight. Finishing Liquid "E" is a flammable solvent.

When working with any polymer, hardeners and dry aggregate fillers always wear appropriate safety glasses, breathing protection, clothing, and gloves. Any contaminated clothing should be washed prior to being reworn. 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 areas. 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, as well as product labels, 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.***

WARRANTY

For product warranty see KCC Corrosion Control Co., Ltd. ***STANDARD TERMS AND CONDITIONS (U. S. 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 intellectual property owned by a KCC company or any KCC affiliate company.

NOTES: