

Revised: August, 2005

90% SOLIDS AMINE ADDUCT CURED EPOXY COATING/LINING SYSTEM

TECHNI-PLUS AEP 12 is a 12 to 16 dry mil surface tolerant epoxy polyamine adduct cured, flake-filled, polymer system. TECHNI-PLUS AEP 12 may be applied direct to rust, poorly prepared substrates and over other older coatings if the surface is free from loose scale and flaking coating material (SSPC-SP-7). Contact KCC Corrosion Control for specific recommendations when contemplating use over old coatings. TECHNI-PLUS AEP 12 is designed for use as a light duty immersion lining, exterior coating or chemical containment membrane on metal or concrete. Proprietary curing technology allows application of TECHNI-PLUS AEP 12 at temperatures below freezing with LTC additive.

TECHNI-PLUS AEP 12 is applied in two 6 to 8 dry mil coats. This system can be sprayed with conventional or airless equipment, brushed or rolled. In order to achieve film build desired, spraying is highly recommended.

TECHNI-PLUS AEP 12 has exceptional bond strength to steel and concrete. The film permeability is extremely low, on the order of ten times lower than conventional high build epoxies. The product may also be applied in many cases without the use of a primer. The abrasion resistance of TECHNI-PLUS AEP 12 is excellent. This

combination of product features allows TECHNI-PLUS AEP 12 to be used on floors with light equipment, foot traffic and chemical spills. TECHNI-PLUS AEP 12 is also ideally suited for use in oil, crude and refined product storage tanks, offshore structures, chemical and waste treatment processes.

TECHNI-PLUS AEP 12 exhibits excellent splash, spill and fume resistance to dilute inorganic acids, aliphatic and aromatic solvents, alkaline and salt water environments. In immersion service, TECHNI-PLUS AEP 12 is used in combination with TECHNI-PLUS E 3 Primer and performs as a corrosion resistant lining up to 120°F in many corrosive environments. In dry or atmospheric corrosive situations, TECHNI-PLUS AEP 12 resists continuous heat of 350°F.

RESISTANCE TO WEATHERING

TECHNI-PLUS AEP 12 is specially formulated to resist color fade and chalking when used outdoors in ultraviolet light. However, over time, the color may lose some luster and color, depending on the color selected, and some chalking and yellowing can also occur. These events will not have an adverse effect on the overall performance of the coating system.

TYPICAL PROPERTIES

Solids Content:	90% Reactive by volume.
Volatile Organic Content:	1.2 lbs per gallon.
Volume Mix Ratio:	4 parts Resin to 1 part Hardener.
Flash Point: (Pensky-Martens Closed Cup)	Resin.....> 90°F Hardener.....> 200°F
Viscosity:	1000-1300 cps @ 75°F (mixed).
Thinner:	DO NOT THIN!
Weight per Gallon:	12.1 lbs. Mixed.
Coverage for Steel:	(Theoretical)... 200 sq. ft. per gallon per coat average when applied at 8 wet mils. (Practical) 160 sq. ft. per gallon per coat average when applied at 7 - 9 wet mils yielding 6 to 8 dry mils. Normally applied in two coats to yield 12 to 16 dry mils.
Coverage for Concrete:	Same as above if concrete is dense and primer is used. Porous or unprimed concrete may reduce coverage to 130 to 150 sq. ft. per gallon per coat average at 7.5 to 10 wet mils.
Color:	Medium Gray, Off White, Black. Safety colors and special colors are available, minimum order quantities apply.

PHYSICAL PROPERTIES OF CURED SYSTEM

Tensile Bond Strength (ASTM D1002):.....	Sandblasted Steel – 2,500 psi, (ASTM C882): Concrete - exceeds 500 psi (tensile).
Tensile Strength (ASTM D638):	8370 psi
Tensile Modulus (ASTM D638):.....	376,000 psi
Taber Abrasion (ASTM C501-80):.....	75 mg. loss / 1000 cycles with 1000 grams CS - 17 Wheel.
Shore "D" Hardness (ASTM D2240):	78-82
Moisture Permeability (ASTM E96-85):	0.0019 perm-inch.

CHEMICAL RESISTANCE ¹

Examples of excellent resistance to a wide variety of industrial chemicals at ambient or slightly elevated temperatures in IMMERSION, are listed in the first table below. Contact KCC Corrosion Control with complete operating service conditions for specific product recommendations.

ACIDS	ALKALINES	SOLVENTS, CHEMICALS
Boric	10-50% Potassium Hydroxide	Ethylene Glycol
Citric	Pulp Liquors	Gasoline, Sour Crude
Dilute Mineral	Salt Brine	Jet Fuel
Ferric Chloride	1-15% Sodium Cyanide	Mercury & Salts
Pelargonic	10-50% Sodium Hydroxide	Naphtha, aliphatic
Urea Solutions	Sodium Peroxide (Bleach)	n-Butanol
Wet Sulfur Di & Trioxide	Sodium Sulfite	p-Xylene

Examples of resistance to a wide variety of industrial chemicals in splash, spill, and fume conditions are listed in the table below. Contact KCC Corrosion Control with complete operating service conditions for specific product recommendations.

ACIDS	ALKALINES	SOLVENTS, CHEMICALS
10% Acetic acid (F)	10% Ammonium Fluoride	10% Acetone
10% Acrylic acid (F)	Ammonium Nitrate	Alum (saturated solution)
10% Chromic acid	Ammonium Persulfate	Amyl Alcohol
Copper Plating acid	Gold Plating Cyanide	Carbon Tetrachloride
20% Hydrochloric acid	30% Hydrogen Peroxide	Ethyl Alcohol
37% Hydrochloric acid (F)	Potassium Chlorate	Formaldehyde
10% Hydrofluoric acid	45% Potassium Chlorate	Isopropyl Alcohol
Nickel Plating solution	50% Sodium Hydroxide	Methyl Alcohol
5% Nitric acid	Sodium Metasulfite (F)	Napthalene
20% Nitric acid (F)	Sodium Sulfide (saturated)	Perchloroethylene
Sodium Chromate	Sulfite Liquor	Phosphorous Oxychloride
10% Sulfuric acid		Phosphorous Trichloride
50% Sulfuric acid (F)		Potassium Fluoride
		Styrene
		Toluene

MAXIMUM SERVICE TEMPERATURE ¹ 350°F dry, 160°F for Splash/Spillage, 120°F for Immersion.

¹ FOR SPECIFIC RECOMMENDATIONS CONTACT KCC CORROSION CONTROL CO., LTD.
(F) FUME RESISTANCE ONLY.

POT LIFE/RECOAT TIME

Temp.	Pot Life	Recoat Time	
		Minimum	Maximum
@ 25°F (w/LTC)	20 hrs.	72 hrs.	30 days ²
@ 50°F	16 hrs.	24 hrs.	30 days ²
@ 75°F	8 hrs.	12 hrs.	30 days ²
@ 90°F	3 hrs.	6 hrs.	30 days ²

Pot life test on 200 gm. sample; working time in larger quantities will be shorter! (See installation procedure section.)

PACKAGING

1 Gal. Unit	5 Gal. Unit	30 Gal. Unit
Resin 10.40 lbs.	Resin 52.0 lbs.	Resin 312.0 lbs.
Hardener 1.66 lbs.	Hardener 8.3 lbs.	Hardener 49.8 lbs.

(LTC Hardener substituted when low temperature cure is required.)

BID SPECIFICATION

Concrete or steel shall be primed with a nominal 3 wet mils of KCC Corrosion Control's TECHNI-PLUS E 3 Primer. This primer shall be topcoated with a nominal 12 to 16 mils thickness of KCC Corrosion Control's TECHNI-PLUS AEP 12 applied in two 6 - 8 dry mil coats. The material shall be applied to substrate prepared in accordance with the manufacturer's specifications.

STORAGE AND SHELF LIFE

TECHNI-PLUS AEP 12 components should be stored in cool dry area and out of direct sunlight. The hardener is an *AMINE* and **SHOULD NOT BE STORED NEAR PEROXIDES.**

TYPICAL SHELF LIFE

Temperature	Months
@ 50°F	12
@ 75°F	12
@ 80°-90°F	8

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.

concrete surface that makes it possible to obtain an impervious finished coating. For specific scratch coat

• **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 and similar items must have continuous welds, (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 a larger 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 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 and cleanliness of the steel. For immersion service 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, is acceptable.

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 material recommendations, contact KCC Corrosion Control.

² IF PROTECTED FROM DIRECT SUNLIGHT.

Specific recommendations and testing procedures for surface tensile strength and moisture content are contained in KCC Corrosion Control Specification for Preparation of Concrete to Receive Polymeric Floors or 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 TEMPERATURE IS WITHIN 5°F OF DEW POINT OR IF RELATIVE HUMIDITY IS GREATER THAN 95%.

If coating concrete surfaces, concrete expels air during the day and intakes air during the night. The best time to apply primer and topcoat 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.

Both components should be stirred thoroughly prior to mixing Hardener into Resin. Add Hardener to Resin portion and mix approximately 2 minutes. **DO NOT THIN!** If plural component spray equipment is used, resin component must be thoroughly mixed. Hardener is not added to resin, but mixed in spray equipment at nozzle. Proper ratio is important to ultimate cure and film properties.

APPLICATION METHOD

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 dew point calculated prior to coating.

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.

TECHNI-PLUS AEP 12 may be applied by brush, roller or spray. When spraying with conventional equipment, the pots and lines should be flushed with solvent after every 3 - 4 batches when temperatures exceed 80°F.

• **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. Do not catalyze more material than can be used within the pot life. 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's 622 Clean-up Solvent or methyl ethyl ketone. **DO NOT USE ACETONE!**

RECOAT AND TOPCOAT LIMITATIONS

The maximum recoat time for all KCC Products exposed to direct sunlight (ultraviolet light) is 2 days. This time period can be extended to 7 days by protecting the product from exposure to direct sunlight. In the event that either of above recoat times are expired, 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, within 4-6 hours.

Time To Complete Cure

If substrate maintained:	@ 50°F.....	96 hrs.
	@ 75°F.....	48 hrs.
	@ 90°F.....	18 hrs.
with LTC additive:	@ 25°F.....	120 hrs.

² IF PROTECTED FROM DIRECT SUNLIGHT.

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. 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 (TECHNI-PLUS E 3 C) in place of the standard primer, TECHNI-PLUS E 3. 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."

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. Rev. 03/2006 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 any intellectual property owned by a KCC company or any KCC affiliate company.

NOTES:

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%.¹

TECHNI-PLUS AEP 12 Resin is flammable, containing epoxy resins and aromatic solvents. TECHNI-PLUS AEP 12 Hardener contains *AMINE (KCC Red Label)* and ***SHOULD NOT BE STORED NEAR PEROXIDES (KCC Yellow 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 reworked. The vapors given off during application and cure should not be allowed to build up. The ventilation should be sufficient to provide several air changes per minute 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.***