KCC Coatings

AEP 18AR TECHNICAL BULLETIN

Revised: August, 2005

100% SOLIDS AMINE ADDUCT CURED FLEXIBILIZED EPOXY ABRASION and EROSION RESISTANT COATING/LINING SYSTEM

TECHNI-PLUS AEP 18AR is a 100% reactive solids, high performance, amine adduct cured epoxy coating/lining designed for use as an erosion and abrasion resistant immersion lining, and interior or exterior coating system on steel or other metallic surfaces. AEP 18AR is extremely resilient with internal flexibilization allowing excellent resistance to tank hoop stresses, flexing steel surfaces and surfaces exposed to wet solids impact and erosion.

TECHNI-PLUS AEP 18AR is easily applied by spray, roller and brush, has a long pot life and a convenient 4 to 1 mix ratio by volume. The film permeability of the system is extremely low, in the range of ten times lower than conventional high build epoxy coatings. High bond strength to steel combined with exceptional abrasion resistance makes the TECHNI-PLUS AEP 18AR system an ideal choice as a protective lining for water boxes, condenser head boxes, water sluices, troughs and inlet pipe interiors, as well as an external coating for traveling water screens, trash racks and similar equipment exposed to high levels of erosion and abrasion from natural water sources containing suspended solids at high velocity. AEP 18AR may be used as a lining in limestone slurry tanks and in other similar service conditions. AEP 18AR may be used as a tank truck lining for chemical service conditions as recommended by KCC.

CHEMICAL RESISTANCE [1]

TECHNI-PLUS AEP 18 AR system typically surpasses the chemical resistance properties of conventional epoxy coatings. It is recommended for immersion service up to 110°F in many corrosive environments. Contact KCC Corrosion Control with complete operating service conditions for specific product recommendations.

ACIDS	ALKALINES	SOLVENTS, CHEMICALS
Dilute organic, e.g.,	Dilute & conc. caustic solutions, e.g.,	Brine solutions, e.g.,
Oleic	Ammonium hydroxide	Calcium chloride
Acetic	Calcium hydroxide	Potassium chloride
Acrylic	Hydrogen peroxide	Sodium chloride
Dilute to moderate inorganic, e.g.,	Potassium hydroxide	Sea water
Chromic	Sodium hydroxide	
Hydrochloric		Fuel oils
Phosphoric	Calcium phosphate	Lubricating oils
Sulfuric	Limestone slurry	Sour crude oil

MAXIMUM SERVICE TEMPERATURE [1] 350°F dry, 110°F for Immersion.

RESISTANCE TO WEATHERING

TECHNI-PLUS AE 18 AR is specially formulated to resist degradation by ultraviolet rays. In time, the coating may lose some gloss and the surface may chalk slightly, but these events do not adversely affect the overall performance of the coating.

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

TYPICAL PROPERTIES

Solids Content:		100% Reactive
Volatile Organic Content:		Zero
Volume Mix Ratio:		4 parts Resin to 1 part Hardener
Flash Point: (Pensky-Marten Closed Cup)		AEP 18 AR Resin.....> 300°F
		AEP 18 Hardener .....> 225°F
Viscosity:		9,500 cps @ 77°F (mixed)
Thinner:		**DO NOT THIN!**
Weight per Gallon:		10.9 lbs. + 0.2 (mixed)
Coverage for Steel:	(Theoretical)	107 sq. ft. per gallon at 15 wet mils
		160 sq. ft. per gallon at 10 wet mils
	(Practical)	90 sq. ft. per gallon at 15 wet mils
		135 sq. ft. per gallon at 10 wet mils
Color:		Medium Gray, Tile Red and Off White are standard;
		limited special colors are available with minimum quantity order.

PHYSICAL PROPERTIES OF CURED SYSTEM

Tensile Strength (ASTM D-638):	3,690 psi
Bond Strength to Steel (ASTM D-4541):	>1,800 psi
Tensile Elongation (ASTM D-638):	1 %
Impact Resistance (ASTM D-256, Method A):	>0.60 ft-lb./in
Shore "D" Hardness (ASTM D-2240):	70 to 80+
Taber Abrasion Resistance (ASTM D-4060):	30 mg loss/1000 cycles
	Tested for 1000 cycles with 2000 grams and CS-17 wheel (Taber Test).

POT LIFE/RECOAT TIME

Temp.	Pot Life	Recoat Time	
		Minimum	Maximum
@ 50°F	130 min.	8 hrs.	14 days [3]
@ 75°F	45 min.	4 hrs.	14 days [3]
@ 90°F	25 min.	2.5 hrs.	14 days [3]

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

PACKAGING

TECHNI-PLUS AEP 18AR is packaged in pre-measured units as follows:

1 Gal. Unit	5 Gal. Unit	30 Gal. Unit
Resin 9.5 lbs.	Resin 47.5 lbs.	Resin 285.0 lbs.
Hardener 1.65 lbs.	Hardener 8.25 lbs.	Hardener 49.5 lbs.

BID SPECIFICATION

Steel may be primed (optional) with a nominal 3 wet mils TECHNI-PLUS E 3 Primer. TECHNI-PLUS AEP 18AR shall be applied at 10 to 15 wet mils per coat by spray or roller. Two coats minimum are to be applied, excluding primer. The materials shall be applied to substrate prepared in accordance with the manufacturer's specifications.

STORAGE AND SHELF LIFE

TECHNI-PLUS AEP 18AR 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	18
@ 75°F	12
@ 80°-90°F	6

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 structure is to be protected from the corrosive action of the contents or the contents are to be protected from contamination from the structure surface, the coating must be continuous. The structure 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.

[3] *IF PROTECTED FROM DIRECT SUNLIGHT.*

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 splatter 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 length. Nozzles smaller in diameter or with long pipe nipple lengths should be made of any alloy or utilize a fiberglass plastic nozzle insert. Threaded fittings must be avoided or made of alloy suitable to resist the corrosive contents.

Depending on service conditions, all surfaces to be coated require either a white metal blast (SSPC-SP-5; NACE 1) or near white metal (SSPC-SP-10; NACE 2) with an abrasive blast media that removes visible mill scale, existing coating and rust. Performance is directly related to the anchor patter profile and cleanliness of the steel. For immersion service conditions, highly corrosive environments and thermal shock, steel substrates should be cleaned to white metal, must be dry and have a minimum anchor profile of 3 mils. For less severe conditions, non-immersion service, splash, spillage and no thermal shock, a near white metal blast and 2 mil anchor profile is generally acceptable.

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 MATERIAL APPLICATION IF SUBSTRATE TEMPERATURE IS WITHIN 5°F OF DEW POINT OR IF RELATIVE HUMIDITY IS GREATER THAN 95%.

Both components contain fillers which may settle during shipment and storage and should therefore be stirred thoroughly prior to mixing together. After stirring each, add Hardener to Resin portion and mix for 2 to 3 minutes. ***DO NOT THIN!***

If plural component spray equipment is used, both components must be thoroughly stirred prior to use. Agitated tanks may be required depending on volume and residence time. Hardener is not added to resin, but mixed in spray equipment at nozzle. Mix ratio must be controlled precisely. Proper ratio is important to ultimate cure and film properties.

TECHNI-PLUS AEP 18AR is applied at a nominal 10 to 15 mil thickness in each coat. A minimum of two cxoats is generally required for most service conditions.

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 & Equipment.

TECHNI-PLUS AEP 18AR may be applied by brush, roller and spray. When spraying with conventional equipment, the pots and lines should be flushed with KCC's 622 Clean Up Solvent after every 3 to 4 batches when temperatures exceed 80°F. Abrasion resistant fillers contained in AEP 18AR will accelerate wear on spray nozzles.

- **Pot Life / Working Time** (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.

- **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

Maximum recoat time for TECHNI-PLUS AEP 18 AR exposed to direct sunlight (ultraviolet light) is 5 days. This time period can be extended to 14 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 or sanding to remove all shiny surfaces of the product and then, after wiping all dust from the surface, the product is ready for topcoat application.

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 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 Cure
If substrate maintained:	@ 50°F……72 hrs.
	@ 75°F……24 hrs.
	@ 90°F……12 hrs.

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.

Reference Documents: *Steel Structure 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

TECHNI-PLUS AEP 18AR Resin is combustible, containing epoxy resins and diluents. TECHNI-PLUS AEP 18AR Hardener contains ***AMINES*** *(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 reworn. 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 areas. When using these types of materials any sources of ignition should be eliminated in the immediate work area.

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.***

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.**