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100% REACTIVE SOLIDS VINYL ESTER COATING/LINING SYSTEM

TECHNI-PLUS VE 40.2 is a 30 to 40 mil vinyl ester resin based, flake-filled, peroxide cured polymer system. It is designed for use as a tank lining, exterior coating or chemical containment membrane on metal or concrete.

TECHNI-PLUS VE 40.2 exhibits excellent resistance to acid and alkaline environments as well as most organic solvents. In immersion service TECHNI-PLUS VE 40.2 is used in combination with TECHNI-PLUS P 3 Primer and

performs as a corrosion resistant lining up to 140°F in severe corrosive environments. TECHNI-PLUS VE 40.2 provides superior performance in primary and secondary containment where excellent acid and caustic resistance is required. TECHNI-PLUS VE 40.2 finds wide spread use in waste treatment applications, and is also an excellent high build exterior coating for moderate to severe corrosive environments.

CHEMICAL RESISTANCE¹

In coating applications, TECHNI-PLUS VE 40.2 will generally withstand higher concentrations. Examples of chemical resistance for immersion services are listed. Contact KCC Corrosion Control with complete operating service conditions for specific product recommendations.

ACIDS	ALKALINES	SOLVENTS, CHEMICALS
1-75% Acetic	1-29% Ammonium Hydroxide	Amyl Alcohol
1-25% Acrylic	Black White &ite Pulp Liquor	Butyl Alcohol
1-23% Adipic	1-100% Calcium Hydroxide ²	Ethyl Alcohol
Saturated Benzoic	Copper Plating Cyanide	Butylene Glycol
Boric – all conc.	Diethanolamine	Carbon Tetrachloride
1-50% Chloroacetic	Dimethyl Phthalate	1-10% Chlorotoluene
1-10% Chromic	Gold Plating Cyanide	Cyclohexane
1-100% Citric	30% Hydrogen Peroxide	Cyclohexanone
1-50% Hydrobromic	Isopropyl Amine	Divinylbenzene
1-37% Hydrochloric	Sodium Bisulfate	Dionized Water
1-20% Hydrofluoric ^{1, 2}	Sodium Bisulfite (saturated)	Jet Fuel
Maleic	0-50% Sodium Chlorate	Kerosene
Nickel Plating	0-50% Sodium Chlorite	1-5% Methanol
1-20% Nitric	1-100% Sodium Sulfite	MBTE/ Fuel C
Oleic	1-50% Sodium Hydrosulfide	Naphtha, Aromatic
1-30% Perchloric	1-50% Potassium Hydroxide	ortho- & para-Xylene
1-50% Propionic	1-15% Sodium Cyanide	Perchloroethylene
1-100% Phosphoric	1-10% Sodium Hydroxide ²	Salt Brine
Stearic – all conc.	10-50% Sodium Hydroxide	Toluene
1-25% Sulfamic	1-18% Sodium Hypochlorite ³	1,1,1 Trichloroethane
1-75% Sulfuric	Sodium Metabisulfite – all conc.	Turpentine

MAXIMUM SERVICE TEMPERATURE¹ 350°F Dry, 180°F for Splash/Spillage, 140°F for Immersion. Solvents listed are for Secondary Containment @ ambient temperature up to 72 hours, unless fewer hours are stated above. Mixed solvents or repeated spills must be reviewed by KCC. Contact KCC for specific recommendations to meet your requirements.

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

² FOR LOW CONCENTRATIONS SPECIAL CLEAR COAT REQUIRED.

³ CLEAR COAT REQUIRED GREATER THAN 15%.

TYPICAL PROPERTIES

Solids Content:	100% Reactive
Volatile Organic Content:	0.45 lbs. per gallon
Volume Mix Ratio:	64 parts resin to 1 part hardener
Flash Point: (Pensky-Martens Closed Cup)	Resin.....> 102°F Hardener 2 C (MEKP)> 137°F
Viscosity:	2200-2600 cps @ 75°F
Thinner:	DO NOT THIN!
Weight per Gallon:	9.1 lbs. mixed
Coverage for Steel:	(Theoretical)... 70 sq. ft. per gallon per coat when applied 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. To be 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) are standard. Minimum quantities apply for special colors.

PHYSICAL PROPERTIES OF CURED SYSTEM

Tensile Bond Strength:	Sandblasted Steel – 1,200 psi
Tensile Strength (ASTM D 638):	Concrete - exceeds 500 psi
Taber Abrasion (ASTM D 4060):	25 mg. loss / 1000 cycles with 1000 gms. CS - 17 Wheel
Barcol Hardness:	40+
Moisture Permeability (ASTM E96-85):	0.0015 perm-inch.

POT LIFE /RECOAT TIME

Temp.	Pot Life	Recoat Time	
		Minimum	Maximum
@ 50°F	120 min.	12 hrs.	7 days ⁴
@ 75°F	90 min.	4 hrs.	7 days ⁴
@ 90°F	60 min.	3 hrs.	7 days ⁴

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

PACKAGING

1 Gal. Unit	5 Gal. Unit	30 Gal. Unit
Resin 9.8 lbs.	Resin 49.0 lbs.	Resin 294 lbs.
Hard. 2.0 fl. oz.	Hard. 10.0 fl. oz.	Hard. 60 fl. oz.

TECHNI-PLUS VE 40.2 is packaged in pre-measured units.

BID SPECIFICATION

Concrete or steel shall be primed with a nominal 3 wet mils of KCC Corrosion Control TECHNI-PLUS P 3 primer. This primer shall be topcoated with a nominal 30 to 40 mil thickness of KCC Corrosion Control's TECHNI-PLUS VE 40.2 applied in two coats at 20 to 25 wet mils. The materials shall be applied to substrate prepared in accordance with the manufacturer's specifications.

STORAGE AND SHELF LIFE

TECHNI-PLUS VE 40.2 components should be stored in a cool dry area and out of direct sunlight. TECHNI-PLUS VE 40.2 should be used immediately. Storage is not recommended. The hardener is a **PEROXIDE** (KCC Yellow Label) and **SHOULD NOT BE STORED NEAR AMINES** (KCC Red Label).

⁴ IF PROTECTED FROM DIRECT SUNLIGHT.

TYPICAL SHELF LIFE

Temperature	Months
@ 50°F	2
@ 75°F	1-2
@ 80°F-90°F	< 1

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 splatter ground smooth. Edges must be ground to a 1/8" radius. To facilitate the coating application, nozzles should have a 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 be of an alloy suitable to resist the corrosive contents.

All surfaces to be coated 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. For less severe conditions, non-immersion service, splash, spillage and no thermal shock, a 2 mil anchor profile may be acceptable, contact 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 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 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 (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 direct sunlight to minimize the heating of the substrate will also reduce expulsion of air. Use of KCC Polyester Scratch Coat is recommended after priming to reduce air voids.

The resin component should be stirred thoroughly prior to use whether the application will be 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 VE 40.2 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 KCC's 622 Clean Up Solvent after every 3 to 4 batches when temperatures exceed 80°F.

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. Do not catalyze more material than can be used within the pot life. Above 90°F ambient temperature, best results are

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.

	Time To Complete Cure
If substrate is maintained: @ 50°F.....	48 hrs.
@ 75°F.....	24 hrs.
@ 90°F.....	16 hrs.

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 4 hours. 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.

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 (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. 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:

SAFETY

TECHNI-PLUS VE 40.2 resin is flammable. It contains vinyl-ester resins and styrene. Hardener 2 C contains **PEROXIDES** (*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 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 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.**