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100% REACTIVE SOLIDS ISOPHTHALIC POLYESTER COATING/LININGS SYSTEM

TECHNI-PLUS PI 40 and PI 40 F are 30 to 40 dry mil isophthalic polyester resin based, flake-filled, peroxide cured polymer systems. They are designed for use as an immersion lining, exterior coating or chemical containment membrane on metal or concrete.

TECHNI-PLUS PI 40 and PI 40 F are applied in two 20 - 25 wet mil coats. The PI 40 system can be sprayed with conventional equipment or rolled. The PI 40 F is a fast cure version and is sprayed using a plural component system. TECHNI-PLUS PI 40 and PI 40 F have exceptional bond strength to steel and concrete. The permeability is extremely low, allowing the products to be applied in some cases without the use of a primer. The abrasion resistance of both products is excellent.

This combination of performance factors allow PI 40 and PI 40 F to be used on floors with light equipment and foot traffic and chemical spills. These products are also ideally suited for use in oil production storage and process vessels, offshore structures, chemical and waste treatment processes and for lining process vessels and sumps.

TECHNI-PLUS PI 40 and PI 40 F exhibit excellent resistance to organic acids, dilute inorganic acids, aliphatic and aromatic solvents. In immersion service TECHNI-PLUS PI 40 and PI 40 F are used in combination with TECHNI-PLUS P 3 Primer and perform as a corrosion resistant lining up to 140°F in corrosive environments. **NOT RECOMMENDED IN MANY ALKALINE ENVIRONMENTS.**

CHEMICAL RESISTANCE

Excellent resistance to a wide variety of industrial chemicals (examples listed) at ambient or slightly elevated temperatures in immersion. Contact KCC Corrosion Control with complete operating service conditions for specific product recommendations.

ACIDS	ALKALINES	SOLVENTS, CHEMICALS
1-50% Acetic	Sodium Chlorate	1-10% Acetone
1-25% Adipic	1-15% Sodium Cyanide	Ammonium Salts
1-saturated Boric		Butyl Alcohol
1-saturated Benzoic		Calcium Salts
1-20% Chloracetic		Diethanolamine
1-10% Chromic		Formaldehyde
Ferric Chloride		Isopropyl Alcohol
1-50% Hydrobromic		Jet Fuel
1-10% Hydrochloric		Kerosene
1-Concentrated Lactic		Mineral Spirits
Maleic		Naphtha
1-10% Nitric		Potassium Salts
Oleic		Salt Brine
1-85% Phosphoric		Sour Crude Oil
Stearic		Sodium Chloride
1-25% Sulfamic		Sodium Salts
1-50% Sulfuric		

MAXIMUM SERVICE TEMPERATURE ¹ 350°F Dry, 180°F Splash/Spillage, 140°F for Immersion.

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

² PI 40 F MUST BE SPRAYED PLURAL COMPONENT.

³ IF PROTECTED FROM DIRECT SUNLIGHT.

TYPICAL PROPERTIES

Solids Content:.....	100% Reactive
Volatile Organic Content:.....	0.46 lbs. per gallon
Flash Point: (Pensky-Martens Closed Cup).....	PI 40 / PI 40 F Resin> 75°F Hardener 2 C (MEKP)>137°F
Viscosity:.....	3500-3900 cps @ 75°F
Thinner:.....	DO NOT THIN!
Weight per Gallon:.....	9.1 lbs. Mixed
Coverage for Steel:	(Theoretical)... 70 sq. ft. per gallon at 22.5 wet mils avg. (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.
Concrete:.....	Same as above 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). Minimum quantities apply to special colors.

PHYSICAL PROPERTIES OF CURED SYSTEM

Tensile Bond Strength:	Sandblasted Steel – 2,500 psi Concrete - exceeds 500 psi tensile
Barcol Hardness:.....	30 - 40
Taber Abrasion (ASTM D4060):.....	75 mg. loss / 1500 cycles with 1000 gms. CS - 17 Wheel
Tensile Strength (ASTM D 638).....	3000 psi
Moisture Permeability (ASTM E96-85):.....	0.0015 perm-inch

POT LIFE AND RECOAT TIME

Temp.	Pot Life		Recoat Time		
	PI 40	PI 40 F ²	Minimum PI 40	Maximum PI 40 F	Maximum PI 40/PI 40 F
@ 50°F	100 min.	15 min.	12 hrs.	6 hrs.	7 days ³
@ 75°F	60 min.	10 min.	4 hrs.	2 hrs.	7 days ³
@ 90°F	40 min.	3 min.	3 hrs.	1 hr.	7 days ³

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

PACKAGING

TECHNI-PLUS PI 40 and PI 40 F are packaged in premeasured 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.

BID SPECIFICATION

Concrete or steel shall be primed with a nominal 3 wet mils of KCC Corrosion Control's 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 PI 40 or PI 40 F 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 PI 40 or PI 40 F 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	
	PI 40	PI 40 F
@ 50°F	12	6
@ 75°F	12	3
@ 80°-90°F	6	3

² PI 40 F MUST BE SPRAYED PLURAL COMPONENT.

³ 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 a large diameter and short length. Threaded fittings should not be used or be of an alloy resistant to the vessel 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, consult KCC.

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. Sharp corners should be rounded and all honeycombing and bug holes filled with a skim coat or 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 top coat 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.

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 PI 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 PI 40 F is a rapid cure version and may be applied only with plural component spray equipment.

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 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.

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 steel to higher temperature than ambient air. In winter, steel 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, and adversely effect the performance.

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.

• **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 must be topcoated within 3 hours.

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".

SAFETY

TECHNI-PLUS PI 40 and PI 40 F resins are flammable. They contain polyester resins and styrene. Hardener 2 C contains **PEROXIDES** (*KCC Yellow Label*) and **SHOULD NOT BE STORED NEAR AMINES** (*KCC Red*

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:

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.***