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HIGH PERFORMANCE CRACK BRIDGING TANK LINING

The *Elasti-Liner*® family of products, first introduced in 1994, represent unique (*U.S. Patent Number 5,814,693*) technology and an entirely new class of advanced, high performance, secondary containment linings. *Elasti-Liner*®, which has become widely known as “The Ultimate Containment Lining”® is a completely new generation of polymers which combine unequalled chemical resistance with unsurpassed crack-bridging and unmatched resistance to weathering and UV exposure in a uniform (top to bottom) polymer system. *Elasti-Liner*® allows for truly monolithic lining application (no joints; applied directly over existing joints) and is fire retardant. The proven success and reliability of the first *Elasti-Liner*® products continues to provide facility owners with the most advanced technology available and has become the new standard for containment linings. As a result of the relentless innovation on-going at KCC, the original product, now called *Elasti-Liner*® II, has been further improved to handle the highest concentrations of both organic and inorganic acids, all alkalines and many solvents in full time immersion conditions as a tank lining.

Elasti-Liner® II.2 is made from the same polymer system as the original containment lining, with II.2 used to designate the full time immersion tank lining system for concrete, steel or aluminum substrates. The II.2 system product has been created to provide a far more dense, cross-linked film, resisting molecular permeation to a level significantly above either containment lining versions of *Elasti-Liner*®.

Elasti-Liner® II.2 is applied by roll and brush at a maximum rate of 20 mils (wft) per coat on vertical surfaces and 50 mils (wft) on horizontal surfaces. On any surface, E 3 primer is used that may be followed by epoxy scratch coat to resurface concrete or steel filling pits or voids. After primer and / or scratch coat application and cure, it is recommended that a thin film, 20 mils (wft) of *Elasti-Liner*® I containment lining system be used to enhance bond in the system to scratch coat or to E 3 primer, followed by 30 to 50 mils (dft) depending on chemicals, concentration and temperatures expected in actual operations.

Specifying either *Elasti-Liner*® II.2 provides the end user with very significant performance advantages:

- Unequalled chemical resistance to organic & inorganic acids, caustics, many solvents (*Consult KCC for your specific requirements.*)
- Unprecedented crack bridging on concrete substrates in full time immersion with **one year warranty** on *Elasti-Liner*® II.2
- Excellent abrasion resistance. Slip resistant (SR) additive may be used on lined surfaces which will support foot traffic.
- Resistant to high temperature immersion in aqueous materials up to 170°F.
- Monolithic, no joints, seams or dissimilar layers of materials. Installed over expansion and isolation joints to provide a truly monolithic, seamless lining system. corrosion resistant tank lining.
- Recommended for old and new concrete. Not recommended in full time immersion over other failed linings.
- Unaffected by weathering and UV light. *Elasti-Liner*® will not lose crack bridging properties and chemical resistance capability, maintains excellent elongation in low temperature environments.
- Highly competitive installed "first cost" compared to far less capable materials.

Review the chemical resistance charts and physical properties for each product on the following pages. Consult with KCC for the optimum choice to meet your performance requirements. KCC *Elasti-Liner*® technology is the answer.

***Elasti-Liner*® II.2 is now “the ultimate tank lining”®**
Elasti-Liner® and “the ultimate tank lining”® are copyrighted trademarks of KCC Corrosion Control Co., Ltd.

CHEMICAL RESISTANCE ¹

Elasti-Liner® II.2 is suitable for full time immersion conditions in tank linings, sumps, trenches and concrete tanks up to 170°F in aqueous environments. As examples, *Elasti-Liner*® II.2 is recommended for the following chemical environments. Consult KCC for specific recommendations to meet your chemical concentrations and temperatures. Immersion testing may be required.

ACIDS	ALKALINES	SOLVENTS, CHEMICALS
1-80% Acrylic	All Plating Solutions	All Alcohols
1-Glacial Acetic	All Pulp Liquors	Animal & Mineral Oils
1-50% Chromic	1-10% Ammonium Fluoride	Fuels & Fuel Oils
1-37% Hydrochloric	1%-Sat. Ammonium Hydroxide	1-30% Hydrogen Peroxide
1-49% Hydrofluoric	1-15% Calc. Hypochlorite	Lubricating Oils
1-70% Nitric	1-45% Potassium Hydroxide	Methyl Cellosolve
1-85% Phosphoric	1-50% Sodium Hydroxide	Sour Crude Oils
1-98% Sulfuric	1-17% Sodium Hypochlorite	Triethanolamine

MAXIMUM SERVICE TEMPERATURE ¹ *Elasti-Liner*® II.2 aqueous chemicals immersion: 170°F; intermittent immersion: 250°F. In solvents, ambient temperature splash & spill only.

RESISTANCE TO COLOR FADE:

All *Elasti-Liner*® products are specially formulated to resist color fade and will not chalk when used outdoors in ultraviolet light. However, over time, the color may lose some color and some of its luster in full immersion. These events will not adversely affect the overall performance of the coating system in chemical containment applications.

TYPICAL PROPERTIES:

Solids Content:	41% ± 2.0% by weight
.....	34% ± 1.5% by volume
EPA Solids Content	71% ± 1.0% by weight
Volatile Organic Content:	2.23 lbs. per gallon
Flash Point: (Pensky-Martens Closed Cup).....	Resin Part A > 65°F
.....	Hardener Part B > 53°F
.....	Standard Accelerator Part C > 120°F
.....	LTC Accelerator Part C > 120°F
Viscosity: @ 75°F (mixed).....	2500 – 3300 cps
Weight/Gallon:.....	8.4 ± 0.2 lbs./gal. (mixed)
Thinner:.....	Only if and as directed by KCC, Do Not Use MEK.
Coverage: (theoretical sq. ft. per gallon).....	32sq.ft./gl.@50 wet mils→19m dry
System Thickness (minimum DFT recommended):.....	40 to 60 mils (dft)
Color:	Charcoal

PHYSICAL PROPERTIES - FULLY CURED SYSTEM ²

Tensile Strength at break (ASTM D-412):	1300 lbs force/in ²
Tensile Strength at 50% Elongation (ASTM D-412).....	380 lbs force/in ²
Elongation at break: (ASTM D-412):	150% average
Bond Strength to Concrete (ASTM D-1002):.....	> tensile strength of concrete; breaks 5000 psi concrete
Shore "A" Hardness (ASTM D-2240):	65 to 75
Tear Strength (ASTM D-624):.....	110 lbs force/in ²
Impact Strength	undamaged at highest test force possible

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

PACKAGING:

1 Gal. Unit	5 Gal. Unit	30 Gal. Unit
Part A 7.2 lbs.	Part A 36.0 lbs.	Part A 216.0 lbs.
Part B 0.16 lbs.	Part B 0.81 lbs.	Part B 4.86 lbs.
Std. C 0.51 lb.	Std. C 2.5 lbs.	Std. C 15.0 lbs.
LTC C 0.36lb.	LTC C 1.8 lbs.	LTC C 10.8 lbs.

RECOAT and POT LIFE LIMITATIONS:**POT LIFE and RECOAT TIME**

with Part C Standard Accelerator

Temp.	Pot Life	Minimum Time to Recoat	Maximum Time to Recoat*
@ 70°F	2 hrs.	8 hrs.	36 hrs.
@ 80°F	1½ hrs.	6 hrs.	30 hrs.
@ 90°F	1 hrs.	4 hrs.	24 hrs.

POT LIFE and RECOAT TIME

with Part C Low Temp. Cure Accelerator

Temp.	Pot Life	Minimum Time to Recoat	Maximum Time to Recoat*
@ 50°F	2 hrs.	8 hrs.	30 hrs.
@ 60°F	2 hrs.	6 hrs.	18 hrs.
@ 70°F	1½ hrs.	4 hrs.	12 hrs.

*Recoat time is affected by wet film thickness. Times given above relate to 50 wet mils. Thinner films require faster recoating. (See below).

RECOAT AND TOPCOAT LIMITATIONS

Elasti-Liner® has a limited recoat time. It is recommended that successive topcoats be applied within 24 hours. Recoat times using LTC version are shorter. Recoat time is dependent on wet film thickness applied. Values given in tables above relate to 40 wet mils (II) and 40 wet mils (I). Thinner films will cure faster and require faster recoating. ***Elasti-Liner*® may be recoated as soon as material is cured well enough to resist damage by walking on or handling the surface.**¹

STORAGE AND SHELF LIFE

All *Elasti-Liner*® components should be stored in their sealed containers in a cool dry area and out of direct sunlight in temperatures ranging from 60°F to 80°F.

TYPICAL SHELF LIFE

Temperature	Months
@ 50°F	18
@ 75°F	12
@ 80°-90°F	6

INSTALLATION PROCEDURES

The installation procedures in this bulletin are as specific as possible. These procedures vary, depending on the version of *Elasti-Liner*® being applied. **Be certain to read the installation and mixing procedures which relate to the *Elasti-Liner*® product to be used.** If any questions arise after reading this bulletin, please contact KCC Corrosion Control for more specific information.

- Surface Preparation

The surface is to be protected from the corrosive action of the contents, therefore the coating must be a continuous film. The containment vessel design must consider the need to eliminate sharp corners, projections, crevices and acute angles and provide access to all surfaces. Proper design should also minimize movement when in operation.

- *Steel Containment Structures*

All steel surfaces to be coated require "White Metal" blast to SSPC-SP-5 or NACE 1, with an abrasive blast media that removes 100% of 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 with highly corrosive environments should be clean, dry and have a minimum anchor profile of 3 mils.

Use of special primers for steel may be required. Consult with KCC for specific recommendations on application of *Elasti-Liner*® to steel.

- *Concrete Containment Structures*

All oil, grease, chemicals, 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 may not be utilized. Only abrasive blasting is to be utilized to remove laitance, oil and grease. 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 repaired by "scratch coating". For specific surface repair material recommendations, contact KCC Corrosion Control.

Specific recommendations and testing procedures for surface tensile strength and moisture content are contained in KCC Corrosion Control Specification SC-01 "Preparation of Concrete for Thermoset Polymer Systems".

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

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**

BEFORE MIXING COMPONENTS, MEASURE TEMPERATURE OF SURFACE TO BE COATED USING FUNCTIONAL DIAL SURFACE THERMOMETERS. DO NOT ATTEMPT MATERIAL APPLICATION IF SURFACE TEMPERATURE IS BELOW 50°F, ABOVE 110°F, OR WITHIN 5°F OF DEW POINT. DO NOT USE AIR TEMPERATURE AS A DETERMINATION OF SURFACE TEMPERATURE!

When coating concrete surfaces, blow holes caused by air movement out of concrete may occur. Concrete generally expels air during the day and intakes air during the night. The best time to apply any coating to avoid blow holes in the coating film is late afternoon or early evening at which time concrete is cooling and temperature drop of surface has been confirmed by measurement. Other precautions such as shading work area from sunlight to minimize the heating of the substrate and elimination of cyclic temperature changes will also reduce expulsion of air. Use of KCC Fast Cure Epoxy Scratch Coat is used to minimize air expulsion from concrete if applied during time when concrete is cooling.

Elasti-Liner® II.2 Topcoat is a mixture of three components, which must be thoroughly and properly mixed in the prescribed order. The following are the three important steps to properly mix **Elasti-Liner® II.2** components:

1. Using a mechanical (Jiffy type) mixer, thoroughly stir **Elasti-Liner® II.2** Resin (Part A) for two minutes prior to adding any other component.
2. After stirring Part A for two minutes, continue to mix and slowly add **Elasti-Liner® II.2** Hardener (Part B), pouring the Part B into the vortex created by the mixer but away from the shaft. Mix for 2 to 3 minutes after Part B is added and frequently scrape the material at sides of the mixing bucket back into the mix using a clean flat-bladed tool.
3. Continuing to mix for a minimum of two minutes after addition of Part B is complete, slowly add **Elasti-**

Liner® II.2 Accelerator (Part C), pouring the Part C into the vortex created by the mixer but away from the shaft. After all Part C is added, continue to mix for an additional two minutes minimum and frequently scrape the material at sides of the mixing bucket back into the mix using a clean flat-bladed tool. **Use either Part C Standard Accelerator (surface temp. > 70°F) or Part C LTC Accelerator (surface temp. 50°-70°F).**

It is critical that the entire quantity of all three components are used and mixed into the full unit. Proper ratio of components is important to ultimate cure and film properties. **Do not leave out any material! Do not add thinner! Use either Part C Standard Accelerator or Part C LTC Accelerator, but not both in any one mixture. Do not vary from mixing instructions provided herein unless specifically instructed by KCC.**

Special Application Instructions - Elasti-Liner® II.2

For best results, it is recommended that all coats of **Elasti-Liner® II.2** be applied in late afternoon or early evening when temperatures are cooling and concrete is no longer expelling air. **Elasti-Liner® II.2** should **not** be applied at surface temperatures below 50°F or above 110°F as measured by a functional surface thermometer. **Do not use air temperature as a determination of surface temperature! At temperatures above 70°F, Part C Standard Accelerator is used. At temperatures between 50°F and 70°F, Part C LTC (Low Temperature Cure) Accelerator is used. Shipments often contain both Part C Accelerators to accommodate changing temperature conditions. Use either Part C, but not both, in each mix.**

Roller or squeegee application is the required methods for installing **Elasti-Liner® II.2** Topcoat, although squeegee and spiked metal roller application is sometimes preferred on horizontal surfaces. Paint roller and brush application is generally only used for very small areas, areas inaccessible to spray equipment and small repairs. Notched squeegee application on horizontal surfaces is acceptable, provided maximum thickness of 40 wet mils per coat is not exceeded.

Elasti-Liner® II.2 Topcoat is applied at 40 wet mils maximum per coat on horizontal surfaces confirmed by use of a wet film thickness gauge and 20 wet mils per coat maximum on vertical surfaces as confirmed by use of a wet film thickness gauge. Consistent film thickness is achieved by using steel spiked rollers on horizontal surfaces. Consistent film thickness by paint roller or brush application is difficult to achieve, therefore paint rollers and brushes are only used on small areas and for repairs. For specific recommendations, see Repair Procedure section.

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Elasti-Liner® II.2 Topcoat may be applied to previously coated surfaces of *Elasti-Liner® II.2* (older than 20 days) after the surfaces have been cleaned and abrasively blasted to provide roughened finish equivalent to coarse grit sandpaper and *Elasti-Liner® Bonding Agent @ 10* wet mils (2 DFT) is applied first. *Prior to application of Elasti-Liner® II.2 to any existing lining or coating, test patches and pull tests are recommended to determine sufficiency of bond to existing coating or lining and bond of existing coating to concrete substrate.* See KCC Spec. SC-01 for complete concrete surface preparation recommendations. Never apply *Elasti-Liner® II.2* directly to bare concrete, it is required that concrete be first primed with E 3.2 primer and voids filled. It is also recommended that all coats of *ELASTI-LINER® II.2* be applied at 20 wet mils on vertical surfaces and 40 wet mils per coat on all horizontal surfaces.. Additional coats will be necessary to achieve recommended minimum film thickness of 40 to 60 dry mils minimum in immersion conditions. *Elasti-Liner® II.2* may be applied to surfaces primed with TECHNI-PLUS E 3.2 Primer and/or sealed with TECHNI-PLUS Epoxy Scratch Coat.

APPLICATION EQUIPMENT :

- Brush:** High quality natural bristle brush.
- Metal Spike Roller:** BB 1” diameter x 6” wide
- Fabric Roller:** Phenolic core short nap.
- Squeegee:** Flat blade or 1/8” notched to yield 40 wet mils maximum.

Spray Equipment: *ELASTI-LINER® II.2* contact KCC for instructions on spray application.

REPAIR PROCEDURE FOR *Elasti-Liner® II.2* TOPCOAT

Clean area to be repaired of all chemical residue. Wipe area with ketone solvent or degreaser. Abrade surface of material with 20 mesh sand paper. Be sure to abrade at

CURE TIME

The cure time is dependent on both air and substrate temperature. The ambient air temperature may not be the temperature of the substrate, i.e. direct sunlight will heat steel or concrete to higher temperature than ambient air. In winter, steel or concrete may be colder than ambient air. The substrate temperature should be measured and dew point calculated prior to application. Make sure that both air and substrate temperatures, as well as dew point, are measured prior to *Elasti-Liner®* installation.

least 1 inch beyond entire area to be repaired. Dust off area well and rewipe with solvent. Allow solvent to dry for at least 10 minutes. Over entire previously prepared surface, apply by brush one coat (10 - 15 wet mils) of *Elasti-Liner® Bonding Agent*. Apply *Elasti-Liner® II.2* Topcoat as soon as possible after Bonding Agent is tack-free, in most cases within 20 minutes. The maximum recoat time to apply *Elasti-Liner® II.2* Topcoat over *Elasti-Liner® Bonding Agent* is 3 hours. If maximum recoat window is exceeded, repeat entire procedure. Additional coats of *Elasti-Liner® II.2* required to meet total thickness specifications must be applied within recoat limitations defined on page 3. dry volume, 1 lb. SR = 1.3 qts.). Part B is then mixed in as described above. An extra topcoat with SR Additive is applied at 30 wet mils. Thinning with 637 Thinner may be advised by KCC to improve handling by roller application. When thinned 12 oz. per gallon *Elasti-Liner®* with SR Additive will yield 12 mils DFT when applied at 30 mils wet. SR Additive is not broadcast into final topcoat! **Sand or abrasive grits are not to be used with *Elasti-Liner®* Topcoat.**

• **Pot Life or Working Time (see values on Page 3)**

The pot life or working time of the material is not mass sensitive, therefore a larger volume of material may be mixed, without the penalty of shorter pot life. However, no more material should be mixed than is capable of being applied by a crew in a two hour period. The materials should be stored between 60°F and 80°F for 24 hours prior to use for optimum handling properties.

• **Clean-Up**

Rollers, brushes and tools should be cleaned immediately after use. KCC recommends clean up of uncured material with 622 Clean Up solvent. *Elasti-Liner®* is very resistant to solvents when fully cured. Contact KCC for specific recommendations. **DO NOT USE ACETONE FOR CLEAN-UP!**

**Time To Complete Cure
(For Chemical Exposure)
*Elasti-Liner® II.2***

If substrate maintained:	@ 50°F (using Part C LTC Accelerator).....	10 Days	@ 50°F
	@ 70°F.....	10 Days	@ 70°F
	@ 80°F.....	7 Days	@ 80°F
	@ 90°F.....	5 Days	@ 90°F

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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 intermittent 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 coating on concrete is to be spark tested, a conductive primer (KCC TECHNI-PLUS E 3 C) is used as the primer coat. Follow test procedures for completed coating outlined above.

Reference Documents: *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

Elasti-Liner® II.2 Topcoat Part A and Hardener Part B are flammable and *Elasti-Liner® II.2* Part C Accelerators, both Standard and LTC, are combustible, containing both polymer resins and solvent based materials. *Elasti-Liner® Bonding Agent* Hardener Part B is flammable. All *Elasti-Liner®* sealed components must be stored cool, dry & out of sunlight.

IT IS VERY IMPORTANT THAT MATERIAL MIXING AND APPLICATION BE PERFORMED AWAY FROM ANY SPARKS, OPEN FLAME OR ANY SOURCE OF

IGNITION. SMOKING IS NOT ALLOWED WITHIN 50 FEET OF WORKSITE. USE ONLY CLASS I GROUP D EXPLOSION PROOF ELECTRIC MIXING EQUIPMENT. AIR DRIVEN NON-SPARKING MIXERS ARE PREFERRED.

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 re-worn.

The vapors given off during application and cure should not be allowed to build up.

The ventilation should be sufficient to provide as many air changes per minute as required to meet OSHA guidelines with special consideration for enclosed areas or trenches and sumps. When using these materials any sources of ignition should be eliminated within a 50 ft. range. NIOSH organic vapor cartridge respirators must be worn at all times during mixing and application.

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 resin, accelerator 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.***

SPECIAL CONTRACTOR NOTE: *Elasti-Liner®* is a patented product by KCC, and your company has signed confidentiality agreements with KCC to not disclose to any third party or to supply to any third party literature, samples of any components, adhesive, joint tape or any copies or originals of any documents involving KCC *Elasti-Liner®* Products.

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 other intellectual property owned by a KCC company or any KCC affiliate company.