

REVISED: MARCH, 2010

HIGH PERFORMANCE CRACK BRIDGING IMMERSION LINING

The *Elasti-Liner® I.2* is a high performance, crack-bridging full time immersion lining system for concrete tanks, sumps and trenches. *Elasti-Liner® I.2* with substrates of concrete steel and aluminum. *Elasti-Liner® I.2* was first introduced in 1999 is a truly monolithic lining with exceptional performance in full time chemical immersion with crack-bridging capability and abrasion resistance. Covered by U.S. Patent Number 5,814,693, *Elasti-Liner® I.2*, has a basecoat and an abrasion resistant topcoat, that is derived from the *Elasti-Liner® I* polymer used in the very successful crack bridging containment lining.

Elasti-Liner® I.2 is an elastomeric lining system that provides superior service to that of traditional rubber linings with unequalled permeation, chemical, and abrasion resistance and costs far less on an installed cost basis with installation by both roller or plural component spray equipment. Installed *Elasti-Liner® I.2* is a truly monolithic lining application with no joints or seams, and is applied, with primer onto prepared concrete, steel, stainless steel or aluminum surfaces.

Elasti-Liner® I.2 is made from the same but modified polymer system used in the original containment lining, with *I.2* used to designate the full time immersion tank lining system. The *Elasti-Liner® I.2* system product has been engineered with a greater density of polymer and higher degree of cross linking to resist molecular permeation in full time immersion conditions and now has excellent abrasion resistance, in every coat. Special, separate AR topcoats are no longer required for *Elasti-Liner® I.2*.

Elasti-Liner® I.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 first used, 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, the *Elasti-Liner® I.2* lining system is applied in multiple coats by roller to the recommended system thickness from 60 to 80 mils (dft), depending on chemicals, concentration, temperatures expected and other conditions such as abrasion, expected in actual operations.

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

- Unequalled chemical resistance to organic & inorganic acids, caustics, some solvents (*Consult KCC for recommendations on your specific process requirements.*)
- Unprecedented crack bridging on concrete substrates in full time immersion with **one year warranty** on *Elasti-Liner® I.2*
- Excellent abrasion resistance.
- Resistant to high temperature immersion in aqueous materials up to 180°F.
- Monolithic, no joints, seams or dissimilar layers of materials. Installed over expansion and isolation joints to provide a truly monolithic, seamless 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 continues to be the answer.

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

CHEMICAL RESISTANCE¹

Elasti-Liner® I.2 is suitable for full time immersion conditions in tank linings, sumps, trenches and concrete tanks up to 180°F in aqueous environments. As examples, *Elasti-Liner*® I.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. Mixtures of chemicals may not yield the same results stated herein. Consult KCC.

ACIDS	ALKALINES	SOLVENTS, CHEMICALS
1-50% Acrylic	All Plating & Anodizing Solutions	All Alcohols
1-50% Acetic	All Pulp Liquors	Animal & Mineral Oils
1-30% Chromic	1-10% Ammonium Fluoride	Ethylene Glycol
1-37% Hydrochloric	1-20% Ammonium Hydroxide	Fuel Oils
1-20% Hydrofluoric	1-15% Calc. Hypochlorite	Lubricating Oils
1-40% Nitric	1-45% Potassium Hydroxide	Mineral Oils
1-85% Phosphoric	1-50% Sodium Hydroxide	Sour Crude Oils
1-75% Sulfuric	1-15% Sodium Hypochlorite	

MAXIMUM SERVICE TEMPERATURE ¹*Elasti-Liner*® I.2 aqueous chemicals immersion: 180°F; intermittent immersion: 200°F. In solvents, ambient temperature, low concentrations 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:	50% ± 2.0% by weight
.....	44% ± 1.5% by volume
EPA Solids Content	71% ± 1.0% by weight
Volatile Organic Content:	1.297 lbs. per gallon
Flash Point: (Pensky-Martens Closed Cup).....	Resin Part A > 65°F
	Hardener Part B > 55°F
Viscosity: @ 75°F (mixed).....	3000 – 4000 cps
Weight/Gallon:.....	9.1 ± 0.2 lbs./gal. (mixed)
Thinner:.....	Only if and as directed by KCC, Do Not Use MEK.
Coverage: (theoretical sq. ft. per gallon).....	32 sq.ft./gl. @ 50 wet mils → 20 mils dry
	Vertical Rolling Aid is used on vertical surfaces
System Thickness (minimum DFT recommended):.....	40 - 80 mils (dft) varies with service conditions Color:
.....	Light Grey

PHYSICAL PROPERTIES - FULLY CURED SYSTEM²

Tensile Strength at break (ASTM D-412):	1,060 lbs force/in ²
Tensile Strength at 50% Elongation (ASTM D-412)..	480 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):	70-80
Taber Abrasion (ASTM D-4060).....	11 mg. loss /1,000 cycles, 1,000 gms, CS-17 Wheel
Tear Strength (ASTM D-624):.....	110 lbs force/in ²
Impact Strength	undamaged at highest test force
Moisture Permeability (ASTM E96-85).....	0.00131 perm-inch

PACKAGING	1 Gal Unit	5 Gal Unit	30 Gal Unit
Resin – Part A	8.3 lbs.	41.5 lbs.	240.0 lbs.
Hardener – Part B	.4 lbs.	2.0 lbs.	12.0 lbs.

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

RECOAT and POT LIFE LIMITATIONS:

Temp.	Pot Life	Minimum Time to Recoat*	Maximum Time to Recoat*
@ 70°F	30 min.	8 hrs.	36 hrs.
@ 80°F	20 min.	4 - 6 hrs.	30 hrs.
@ 90°F	15 min.	2 - 4 hrs.	24 hrs.

*Recoat time is affected by wet film thickness, method of application, surface & product temperature. Times given above relate to a maximum 30 wet mils. Thinner films require faster recoating. (See below). Do not mix a full 5 gallon unit unless several people are rolling the product at the same time, otherwise the product will set up in the mixing container quickly after hardener addition.

RECOAT AND TOPCOAT LIMITATIONS

Elasti-Liner® has a limited recoat time. It is recommended that successive topcoats be applied within 24 hours. Recoat time is dependent on wet film thickness applied. Values given in tables above relate to 60 wet mils. Thinner films will cure faster and require faster recoating. ***Elasti-Liner*® I.2 may be recoated as soon as material is cured well enough to resist damage by walking, or is tack free and firm on a vertical 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 and understand the mixing and installation procedures prior to use.** If any questions arise after reading this bulletin, please contact KCC Corrosion Control for more specific information before proceeding.

- 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".

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 THE PRODUCT COMPONENTS, MEASURE TEMPERATURE OF SURFACE TO BE COATED USING FUNCTIONAL DIAL SURFACE THERMOMETERS, ALSO MEASURE THE PRODUCT TEMPERATURE. 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! PRODUCT COMPONENTS MUST BE CONDITIONED FOR 24 HRS ABOVE 60°F PRIOR TO USE.

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

When coating concrete surfaces outdoors, blow holes caused by concrete expelling air 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 direct sunlight to minimize the heating of the substrate and elimination of cyclic temperature changes will also reduce expulsion of air. Double priming or use of KCC Fast Cure Epoxy Scratch Coat may be used to minimize air expulsion from concrete if applied during time when concrete is cooling.

Elasti-Liner® I.2 Topcoat is a mixture of two components, Resin (Part A) and Hardener (Part B), which must be thoroughly and properly mixed in the prescribed order. The following are the important steps to properly mix **Elasti-Liner® I.2** components:

1. Using a mechanical (Jiffy type) mixer, thoroughly stir **Elasti-Liner® I.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® I.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. After all Part B 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.
4. **It is critical that the entire quantity of both components Part A and Part B 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! Do not vary from mixing instructions provided herein unless specifically instructed by KCC in writing.**
5. **After Part A & B are completely mixed, Vertical Rolling Aid is mixed in for use on vertical surfaces. Vertical Rolling Aid (add 1 - 16 oz bottle to a 5 gallon unit of Elasti-Liner I.2), mixed in after resin & hardener are mixed, to obtain about 20 to 22 wet mils per coat on vertical surfaces (Temperature can affect mils total mils obtained in rolling).**

Special Application Instructions - Elasti-Liner® I.2

For best results outdoors, it is recommended that all coats of **Elasti-Liner® I.2** be applied in late afternoon or early evening when the substrate surface temperatures are cooling and concrete is no longer expelling air. **Elasti-Liner® I.2** should **not** be applied at surface temperatures

below 50°F or above 110°F. Avoid direct sunlight use shading. **In a closed area, application can be performed anytime as long as temperature restrictions are followed. Always follow OSHA Rules for application, especially in a confined space.**

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

Elasti-Liner® I.2 no longer uses a separate AR Topcoat. All versions of **Elasti-Liner® I.2** shipped from KCC after December 8, 2005 no longer use a separate AR Topcoat. The abrasion resistance is built in to the product and each application when cured now has the excellent abrasion resistance of 11 mg of loss as tested in Taber Abrasion ASTM D 4060, see Physical Properties on Page 2. This advanced formulation provides for abrasion resistance without special field mixing or a special final topcoat

Never apply **Elasti-Liner® I.2** directly to bare concrete, it is required that concrete be first primed with E 3.2 primer and any voids filled. It is also recommended that all coats of **ELASTI-LINER® I.2** be applied at 20 wet mils on vertical surfaces and up to 40 wet mils per coat on all horizontal surfaces. Additional coats will be necessary to achieve recommended minimum film thickness of 60 to 80 dry mils in immersion conditions. See thickness requirements for your project or contact KCC for instructions. **Elasti-Liner® I.2** may be applied directly to surfaces primed with TECHNI-PLUS E 3.2 Primer and/or sealed with TECHNI-PLUS Epoxy Scratch Coat.

The most consistent film is applied at 30 to 40 wet mils maximum per coat on horizontal surfaces confirmed by use of a wet film thickness gauge and 20 to 25 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 brush application is difficult to achieve, therefore brushes are only used on small areas. Substrate temperature and material temperature are very important for proper handling.

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: KCC does not recommend spray application of **Elasti-Liner I.2**.

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REPAIR PROCEDURE FOR *Elasti-Liner*® I.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 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*® I.2 and allow cure to tack free finish. . Apply additional coats *Elasti-Liner*® I.2 as soon as possible after previous coat is tack-free.. The maximum recoat time for *Elasti-Liner*® I.2 is stated at the top of Page 3. If the maximum recoat window is exceeded on any coat, use this repair procedure prior to application of additional coats.

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.

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

If substrate maintained:	@ 50°F	10 Days	@ 50°F
	@ 70°F	10 Days	@ 70°F
	@ 80°F	7 Days	@ 80°F
	@ 90°F	5 Days	@ 90°F

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.

• **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 or MEK (Methyl Ethyl Ketone) FOR CLEAN-UP!**

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® I.2 Topcoat Part A and Hardener Part B are flammable. All *Elasti-Liner*® sealed components must be stored in a cool, dry & area out of direct 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. IT IS RECOMMENDED THAT YOU USE USE CLASS I GROUP D EXPLOSION PROOF ELECTRIC MIXING EQUIPMENT or AIR DRIVEN NON-SPARKING MIXERS. NEVER MIX BY HAND STIRRING !

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.

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

Any 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. If you do not have MSD Sheets for the materials you are using, do not proceed. Contact KCC Corrosion Control and request MSD Sheets be sent immediately by fax or e-mail.

KCC Corrosion Control recommends that the personnel mixing and applying the materials read, understand and follow the information contained in the KCC MSD Sheets as well as this KCC Product Technical Bulletin, prior to

mixing or application of any KCC material. If 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 AT ONCE !***

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.

RETURN MATERIAL POLICY:

Elasti-Liner I.2 is a short shelf life product, made to order. KCC does not accept returns on this or any short shelf life product.

WARRANTY:

For product warranty see KCC Corrosion Control Co., Ltd. ***STANDARD TERMS AND CONDITIONS (U. S. 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 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.