

**DeStefano &
Chamberlain**

Incorporated

Structural and
Architectural
Engineering

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Beach Memorial Pool
Liner Replacement Project

Hedgehog Road - Trumbull, CT

VICINITY MAP

Project #	15-892	S1
Date	8-3-2015	
Drawn by	KHC	
Checked by	Checker	Scale 1" = 1500'



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Liner Replacement Project

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EXISTING CONDITIONS

Project #	15-892	S2
Date	8-3-2015	
Drawn by	KHC	
Checked by	Checker	Scale 1/32" = 1'-0"



Existing northeast corner, zero entry



Existing northwest corner, zero entry



Lower existing floor surface as required for replacement termination bar to sit flush with gutter lip

Existing flush gutter

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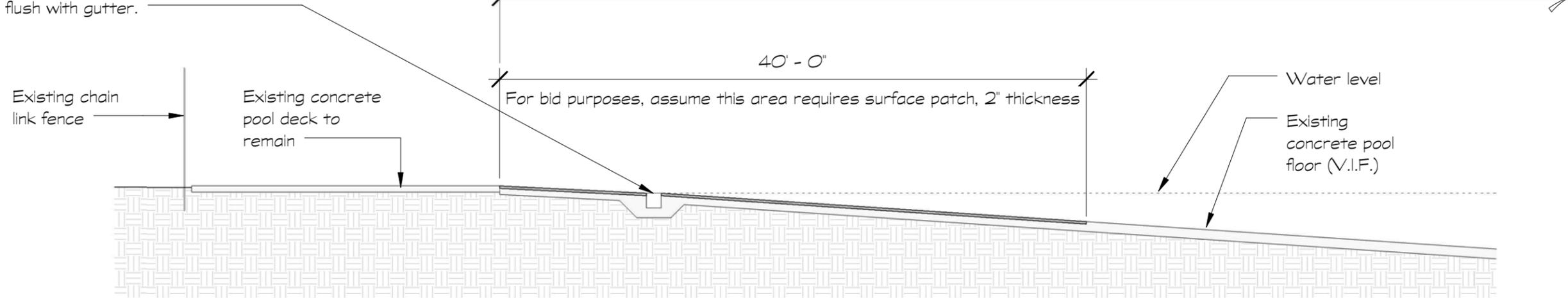
Hedgehog Road - Trumbull, CT

EXISTING CONDITIONS

Project #	15-892	S3
Date	8-3-2015	
Drawn by	KHC	
Checked by	Checker	Scale 11/2" = 1'-0"

Existing flush gutter at zero water depth to remain. Cut and patch adjacent downslope concrete surface so that liner termination bar will lay flush with gutter.

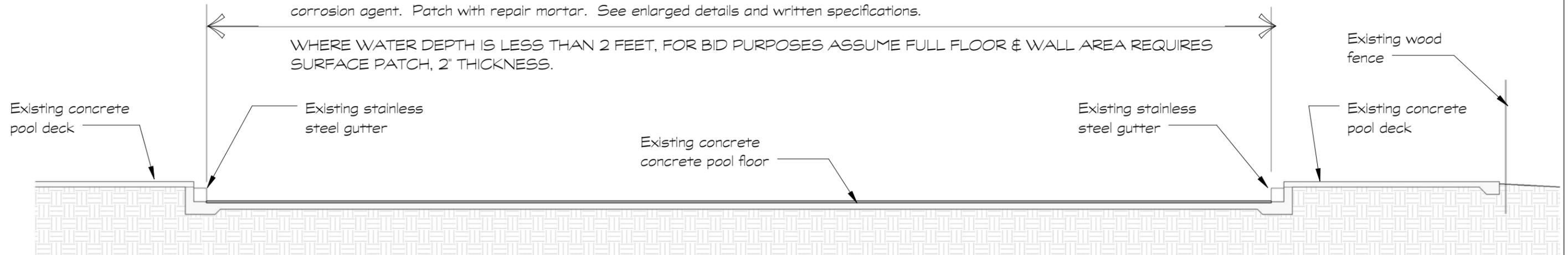
ENTIRE POOL: Visually examine existing concrete to identify and mark all cracks. Epoxy inject all cracks. Chain drag test entire pool shell to locate spalled concrete, notify Engineer to witness testing. Remove all failed concrete down to sound base, vacuum and power-wash. Wire brush all exposed reinforcing steel to remove rust. Sawcut edge of repair areas to produce neat joint. Apply epoxy-modified bonding & anti-corrosion agent. Patch with repair mortar. See enlarged details and written specifications.



LONGITUDINAL SECTION
1/8" = 1'-0"

ENTIRE POOL: Visually examine existing concrete to identify and mark all cracks. Epoxy inject all cracks. Chain drag test entire pool shell to locate spalled concrete, notify Engineer to witness testing. Remove all failed concrete down to sound base, vacuum and power-wash. Wire brush all exposed reinforcing steel to remove rust. Sawcut edge of repair areas to produce neat joint. Apply epoxy-modified bonding & anti-corrosion agent. Patch with repair mortar. See enlarged details and written specifications.

WHERE WATER DEPTH IS LESS THAN 2 FEET, FOR BID PURPOSES ASSUME FULL FLOOR & WALL AREA REQUIRES SURFACE PATCH, 2" THICKNESS.



TRANSVERSE SECTION
1/8" = 1'-0"

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Hedgehog Road - Trumbull, CT

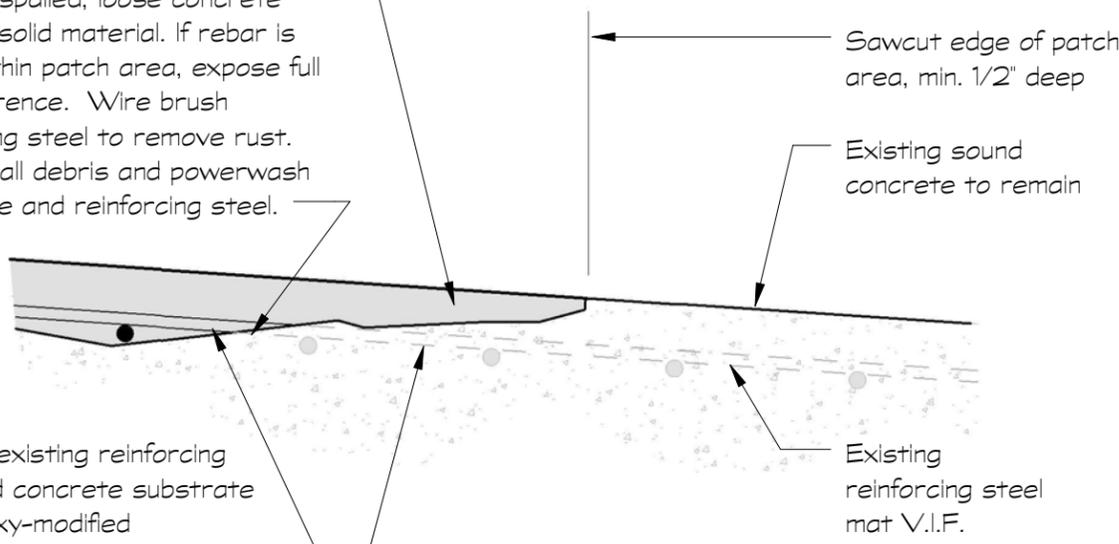
POOL SECTIONS

Project #	15-892	S5
Date	8-3-2015	
Drawn by	KHC	
Checked by	Checker	
		Scale 1/8" = 1'-0"

Patch with repair mortar. See written specification for products.

Remove spalled, loose concrete down to solid material. If rebar is found within patch area, expose full circumference. Wire brush reinforcing steel to remove rust. Vacuum all debris and powerwash substrate and reinforcing steel.

Coat all existing reinforcing steel and concrete joint with epoxy-modified cementitious bonding & anti-corrosion agent. See written specification for products.



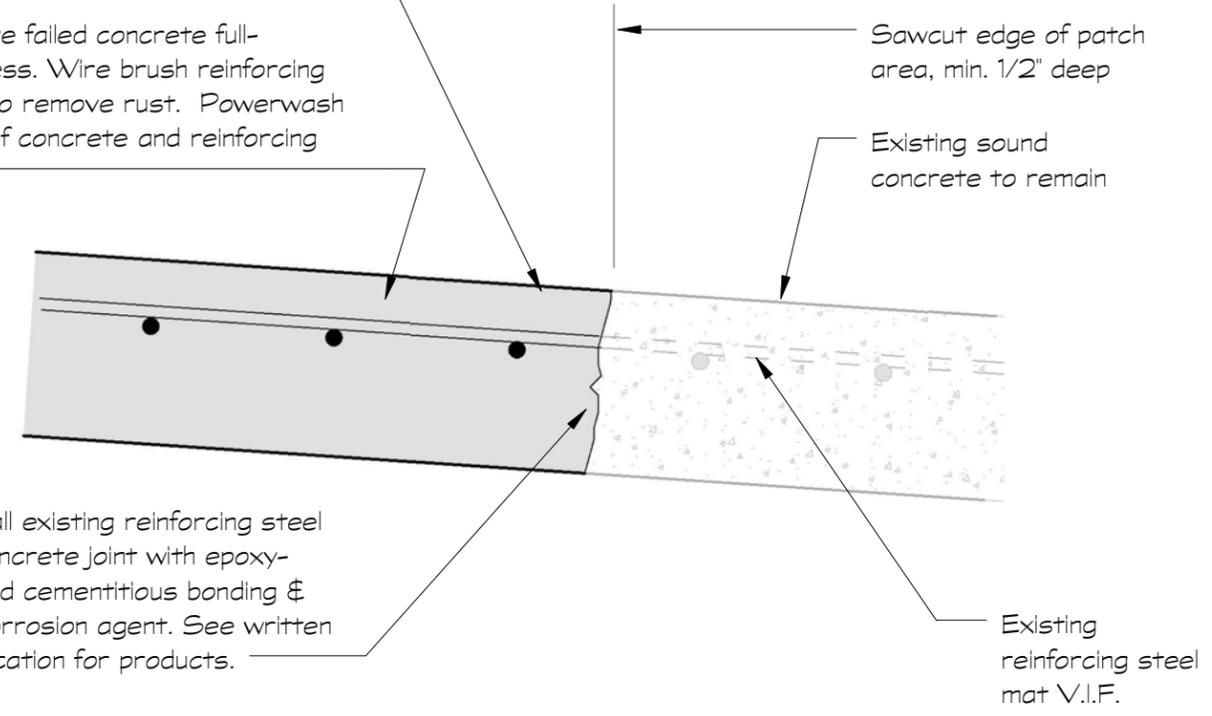
SURFACE PATCH DETAIL

1 1/2" = 1'-0"

4,000 psl concrete

Remove failed concrete full-thickness. Wire brush reinforcing steel to remove rust. Powerwash edge of concrete and reinforcing steel.

Coat all existing reinforcing steel and concrete joint with epoxy-modified cementitious bonding & anti-corrosion agent. See written specification for products.



FULL-THICKNESS PATCH DETAIL

1 1/2" = 1'-0"

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Liner Replacement Project
Hedgehog Road - Trumbull, CT

PATCH DETAILS

Project #	15-892	SG
Date	8-3-2015	
Drawn by	KHC	
Checked by	Checker	
		Scale 1 1/2" = 1'-0"

SECTION 039300 - CONCRETE REHABILITATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Removal of deteriorated concrete and subsequent patching and rebuilding, including all prep work, cleanup, and waste disposal.
 - 2. Reinforcing bar replacement.
 - 3. Epoxy crack injection.

1.3 UNIT PRICES

- A. General
 - 1. Unit prices include labor, materials, tools, equipment, overhead, profit, and incidentals for performing the work indicated.
 - 2. Furnish with the bid add and deduct unit prices for each of the items listed in the Schedule of Unit Prices.
 - 3. Add price and deduct price must be the same amount.
 - 4. Measurement of quantities will be performed by the Contractor and subject to verification by the Owner and Engineer. Provide supporting documentation for review.
- B. Schedule of Unit Prices
 - 1. Concrete Removal and Patching or Rebuilding: Work will be paid for by the cubic foot computed on the basis of rectangular solid shapes approximating the actual shape of concrete removed and replaced with average depths, widths, and lengths, measured to the nearest inch.
 - 2. Reinforcing Bar Replacement: Work will be paid for by the pound of replacement steel.
 - 3. Epoxy Crack Injection: Work will be paid for by the linear foot of crack injected.

1.4 QUANTITY ALLOWANCES

- A. The Contract Sum: Base the Contract Sum on the following bid quantities:
 - 1. Concrete Removal and Patching or Rebuilding: Shaded area shown on the Pool Plan and Sections, plus an additional 500 cubic feet.
 - 2. Reinforcing Bar Replacement: 500 pounds.
 - 3. Epoxy Crack Injection: 500 lineal feet.

1.5 SUBMITTALS

- A. Product Data: Basis of design is Sika Corporation products. If alternate material manufacturers are proposed, submit product data. Include material descriptions, chemical composition, physical properties, test data, and mixing and application instructions.
 - 1. Include Material Safety Data Sheets, if applicable.
- B. Qualification Data: For installers to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
 - 1. For products required to be installed by workers approved by product manufacturers, include letters of acceptance by product manufacturers certifying that installers are approved to apply their products.
- C. Rehabilitation program for each phase of the rehabilitation process, including protection of surrounding materials and Project site during operations. Describe in detail the materials, methods, equipment, and sequence of operations to be used for each phase of the Work.
 - 1. If alternative materials and methods to those indicated are proposed for any phase of rehabilitation work, submit substitution request and provide a written description of proposed materials and methods, including evidence of successful use on other comparable projects, and a testing program to demonstrate their effectiveness for this Project.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Retain installers that employ workers trained and approved by manufacturer to apply corrosion-inhibiting treatments, concrete patching and rebuilding materials, and epoxy crack injection materials.
- B. Manufacturer Qualifications: Manufacturers shall have factory-trained representatives who are available for consultation and Project site inspection at no additional cost.
- C. Source Limitations: Obtain all materials through one source from a single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original and unopened containers, labeled with type and name of products and manufacturers.
- B. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.
- C. Store cementitious materials off the ground, under cover, and in a dry location.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations for Epoxies: Do not apply when air and substrate temperatures are outside limits permitted by manufacturer. During hot weather, cool epoxy components before mixing, store mixed products in shade, and cool unused mixed products to retard setting. Do not apply to wet substrates unless approved by manufacturer.
1. Use only Class A epoxies when substrate temperatures are below or are expected to go below 40 deg F within 8 hours.
 2. Use only Class A or B epoxies when substrate temperatures are below or are expected to go below 60 deg F within 8 hours.
 3. Use only Class C epoxies when substrate temperatures are above 60 deg F.
- B. Cold-Weather Requirements for Cementitious Materials: Comply with the following procedures:
1. When air temperature is below 40 deg F, heat patching material ingredients and existing concrete to produce temperatures between 40 and 90 deg F.
 2. When mean daily air temperature is between 25 and 40 deg F, cover completed Work with weather-resistant insulating blankets for 48 hours after repair.
 3. When mean daily air temperature is below 25 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
- C. Hot-Weather Requirements for Cementitious Materials: Protect repair work when temperature and humidity conditions produce excessive evaporation of water from patching materials. Provide artificial shade and wind breaks, and use cooled materials as required. Do not apply to substrates with temperatures of 90 deg F and above.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products:
1. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent:
 - a. Sika Corporation; Armathec 110 EpoCem.
 2. Polymer-Modified, Cementitious Patching Mortar:
 - a. Sika Corporation; SikaTop 122 Plus.
 3. Epoxy Crack Injection Adhesive:
 - a. Sika Corporation; Sikadur 35 Hi-Mod LV.

2.2 BONDING AGENTS

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Product that consists of water-insensitive epoxy adhesive, portland cement, and water-based solution of corrosion-inhibiting chemicals that forms a protective film on steel reinforcement.

2.3 PATCHING MORTAR

- A. Patching Mortar: Unless otherwise indicated, use one of the following:
 - 1. Polymer-Modified, Cementitious Patching Mortar: Packaged, dry mix complying with ASTM C 928, that contains a non-redispersible latex additive.
- B. Coarse Aggregate for Adding to Patching Mortar: Washed aggregate complying with ASTM C 33, Size No. 8, Class 5S. Add only as permitted by patching mortar manufacturer.

2.4 CONCRETE

- A. Concrete Materials and Admixtures: Comply with Division 3 Section "Cast-in-Place Concrete."
- B. Steel Reinforcement and Reinforcement Accessories: Comply with Division 3 Section "Cast-in-Place Concrete."
- C. Form-Facing Materials: Comply with Division 3 Section "Cast-in-Place Concrete."

2.5 MISCELLANEOUS MATERIALS

- A. Epoxy Crack Injection Adhesive: ASTM C 881, Type IV, Grade 1, Class C.
- B. Epoxy Capping Adhesive: Product manufactured for use with crack injection adhesive by same manufacturer.

2.6 MIXES

- A. Mix products in clean containers according to manufacturer's written instructions.
 - 1. Add clean silica sand and coarse aggregates to products only as recommended by manufacturer.
 - 2. Do not add water, thinners, or additives unless recommended by manufacturer.
 - 3. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.
 - 4. Do not mix more materials than can be used within recommended open time. Discard materials that have begun to set.
- B. Dry-Pack Mortar: Mix with just enough liquid to form a damp cohesive mixture that can be squeezed by hand into a ball but is not plastic.
- C. Ready-mix or site-mix normal-weight concrete.
 - 1. Minimum Compressive Strength: 4000 psi at 28 days.
 - 2. Maximum W/C Ratio: 0.45.
 - 3. Slump Limit: 4 inches, plus or minus 1 inch.
 - 4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

5. Materials:
 - a. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
 - 1) Portland Cement: ASTM C 150/C 150M, Type I/II, gray.
 - 2) Normal-Weight Aggregates: ASTM C 33, $\frac{3}{4}$ " maximum aggregate size, free of materials with deleterious reactivity to alkali in cement.
 - 3) Air-Entraining Admixture: ASTM C 260
 - 4) Submit other admixtures for approval.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Following complete removal of the existing vinyl liner, conduct site meeting with Owner and Engineer to review condition of existing pool shell, confirm bid assumptions, identify areas in need of repair, and make any adjustments to the proposed work.
- B. In presence of the Engineer, Contractor shall locate areas of delamination using hammer or chain drag sounding and mark boundaries. Mark areas for removal by simplifying and squaring off boundaries of delaminated areas.
- C. In presence of the Engineer, locate at least three reinforcing bars using a pachometer, and drill test holes to determine depth of cover. Calibrate pachometer, using depth of cover measurements, and verify depth of cover in removal areas using pachometer.

3.2 PREPARATION

- A. Protect people, motor vehicles, equipment, surrounding construction, Project site, plants, and surrounding buildings from injury resulting from concrete rehabilitation work.
 1. Protect adjacent equipment and surfaces by covering them with heavy polyethylene film and waterproof masking tape or a liquid strippable masking agent. If practical, remove items, store, and reinstall after potentially damaging operations are complete.
 2. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
 3. Dispose of runoff from wet operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
- B. Concrete Removal: Saw-cut perimeter of areas indicated for removal to a depth of at least 1/2 inch. Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcing. Remove loose and deteriorated concrete by breaking up and dislodging from reinforcing.
 1. Remove concrete between cuts to a depth of at least 1/2 inch.
 2. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar to provide at least a 3/4-inch clearance.
 3. Test areas where concrete has been removed by tapping with hammer, and remove additional concrete until unsound concrete is completely removed.

4. Provide fractured aggregate surfaces with a profile of at least 1/8 inch that are approximately perpendicular or parallel to original concrete surfaces. At columns and walls, make top and bottom surfaces level.
 5. Thoroughly clean removal areas of loose concrete, dust, and debris.
- C. Reinforcing Bar Preparation: Remove loose and flaking rust from reinforcing bars by wire brushing until only tightly bonded light rust remains.
1. Where section loss of reinforcing bar is more than 25 percent, or 20 percent in 2 or more adjacent bars, cut bars and remove and replace as directed by Engineer. Remove additional concrete as necessary to provide at least a 3/4-inch clearance at existing and replacement bars. Splice replacement bars to existing bars according to ACI 318, by lapping, welding, or using mechanical couplings.
- D. Surface Preparation for Corrosion-Inhibiting Treatment: Clean concrete by low-pressure water cleaning to remove dirt, oils, films, and other materials detrimental to treatment application. Allow surface to dry before applying corrosion-inhibiting treatment.

3.3 APPLICATION

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Apply to reinforcing bars and concrete by stiff brush or hopper spray according to manufacturer's written instructions. Apply to reinforcing bars in two coats, allowing first coat to dry two to three hours before applying second coat. Allow to dry before placing patching mortar or concrete.
- B. Patching Mortar: Unless otherwise recommended by manufacturer, apply as follows:
1. Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.
 2. For vertical patching, place material in lifts of not more than 1 inch nor less than 1/4 inch. Do not feather edge.
 3. After each lift is placed, consolidate material and screed surface.
 4. Where multiple lifts are used, score surface of lifts to provide a rough surface for application of subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.
 5. Allow surfaces of lifts that are to remain exposed to become firm and then finish to a smooth surface with a wood or sponge float.
 6. Wet-cure cementitious patching materials, including polymer-modified, cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.
- C. Dry-Pack Mortar: Use for deep cavities. Place as follows:
1. Provide forms where necessary to confine patch to required shape.
 2. Wet substrate and forms thoroughly and then remove standing water.
 3. Place dry-pack mortar into cavity by hand, and compact into place with a hardwood drive stick and mallet or hammer. Do not place more material at a time than can be properly compacted. Continue placing and compacting until patch is approximately level with surrounding surface.

4. After cavity is filled and patch is compacted, trowel surface to match profile and finish of surrounding concrete. A thin coat of patching mortar may be troweled into the surface of patch to help obtain required finish.
5. Wet-cure patch for not less than seven days by water-fog spray or water-saturated absorptive cover.

D. Concrete: Use for full-thickness concrete replacement. Place as follows:

1. Apply epoxy-modified, cementitious bonding and anticorrosion agent to reinforcing and concrete substrate.
2. Use vibrators to consolidate concrete as it is placed.
3. At unformed surfaces, screed concrete to produce a surface that when finished with patching mortar will match required profile and surrounding concrete.
4. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.
5. Fill placement cavities with dry-pack mortar and repair voids with patching mortar. Finish to match surrounding concrete.

E. Epoxy Crack Injection: Comply with manufacturer's written instructions and the following:

1. Clean areas to receive capping adhesive of oil, dirt, and other substances that would interfere with bond, and clean cracks with oil-free compressed air or low-pressure water to remove loose particles.
2. Place injection ports as recommended by epoxy manufacturer, spacing no farther apart than thickness of member being injected. Seal injection ports in place with capping adhesive.
3. Seal cracks at exposed surfaces with a ribbon of capping adhesive at least 1/4 inch thick by 1 inch wider than crack.
4. Inject cracks wider than 0.003 inch to a depth of 8 inches or to a width of less than 0.003 inch, whichever is less.
5. Inject epoxy adhesive, beginning at widest part of crack and working toward narrower parts. Inject adhesive into ports to refusal, capping adjacent ports when they extrude epoxy. Cap injected ports and inject through adjacent ports until crack is filled.
6. After epoxy adhesive has set, remove injection ports and grind surfaces smooth.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to sample materials and perform tests on concrete and patching mortar.

END OF SECTION 039300

SikaTop® 122 PLUS

Two-component, polymer-modified, cementitious, trowel-grade mortar plus Sika FerroGard® 901 penetrating corrosion inhibitor

Description	SikaTop® 122 PLUS is a two-component, polymer-modified, portland cement based, fast-setting, trowel-grade mortar. It is a high performance repair mortar for horizontal and vertical surfaces and offers the additional benefit of Sika FerroGard® 901, a penetrating corrosion inhibitor.
Where to Use	<ul style="list-style-type: none"> ■ On grade, above and below grade on concrete and mortar. ■ On horizontal surfaces. ■ As a structural repair material for parking structures, industrial plants, walkways, bridges, tunnels, dams, ramps, floods, etc. ■ To level concrete surfaces. ■ As an overlay system for topping/resurfacing concrete.
Advantages	<ul style="list-style-type: none"> ■ Extremely low shrinkage proven by four industry standard test methods. ■ High compressive and flexural strengths. ■ High abrasion resistance. ■ Increased freeze/thaw durability and resistance to deicing salts. ■ Compatible with coefficient of thermal expansion of concrete - Passes ASTM C-884. ■ Increased density - improved carbon dioxide resistance (carbonation) without adversely affecting water vapor transmission (not a vapor barrier). ■ Sika FerroGard® 901, a penetrating corrosion inhibitor - reduces corrosion even in the adjacent concrete. ■ USDA certifiable for the food industry. ■ ANSI/NSF Standard 61 potable water complaint.
Coverage	0.51 cu. ft./ unit mortar; 0.75 cu. ft./unit concrete; (mixed mortar + 42 lbs. 3/8 pea gravel)
Packaging	Component 'A' - 1-gal. plastic jug; 4/carton. Component 'B' - 61.5-lb. multi-wall bag.

Typical Data (Material and curing conditions @ 73°F (23°C) and 50% R.H.)
RESULTS MAY DIFFER BASED UPON STATISTICAL VARIATIONS DEPENDING UPON MIXING METHODS AND EQUIPMENT, TEMPERATURE, APPLICATION METHODS, TEST METHODS, ACTUAL SITE CONDITIONS AND CURING CONDITIONS.

Shelf Life	One year in original, unopened packaging.		
Storage Conditions	Store dry at 40°-95°F. Condition material to 65°-75°F before using. Protect Component 'A' from freezing. If frozen, discard.		
Color	Concrete gray when mixed.		
Mixing Ratio	Plant-proportioned kit, mix entire unit.		
Application Time	Approximately 30 minutes.		
Finishing Time	50-120 minutes		
Note:	All times start after adding Component 'B' to Component 'A' and are highly affected by temperature, relative humidity, substrate temperature, wind, sun and other job site conditions.		
Density (wet mix)	ASTM C 138		136 lbs./ft ³ (2.18 kg./l)
Flexural Strength	ASTM C 293	28 days	1,500 psi
Split Tensile	ASTM C 496	28 days	500 psi
Bond Strength	ASTM C 882 (modified)	28 days	2,000 psi
Compressive Strength	ASTM C 109		
		1 day	2,500 psi
		7 days	5,300 psi
		28 days	7,000 psi
Shrinkage	ASTM C 157		
	(mod. ICRI 320.3R)		
Specimen Size 1"x1"x11-1/4"		28 days	<0.05%
Specimen Size 3"x3"x11-1/4"		28 days	<0.021%
Ring Test (days)	ASTM C 1581		>70 days
Ring Test - Average Max Strain	ASTM C 1581		-9 µstrain
Ring Test - Average Stress Strain	ASTM C 1581		0.49 psi/day
Ring Test - Potential for Cracking	ASTM C 1581		Low
Baenzinger Block		90 days	No cracking
Freeze/Thaw Durability (300 cycles)	ASTM C 666		98%
Cl Permeability	ASTM C 1202		<500 Coulombs.
Direct Bond Strength	ASTM C 1583		
		7 days	400 psi
		28 days	>300 psi
Modulus of Elasticity	ASTM C 531		3.00x10 ⁶ psi
Initial Set Time (min)	ASTM C 266		40-70

Construction



PRIOR TO EACH USE OF ANY SIKA PRODUCT, THE USER MUST ALWAYS READ AND FOLLOW THE WARNINGS AND INSTRUCTIONS ON THE PRODUCT'S MOST CURRENT PRODUCT DATA SHEET, PRODUCT LABEL AND SAFETY DATA SHEET WHICH ARE AVAILABLE ONLINE AT [HTTP://USA.SIKA.COM/](http://usa.sika.com/) OR BY CALLING SIKA'S TECHNICAL SERVICE DEPARTMENT AT 800.933.7452 NOTHING CONTAINED IN ANY SIKA MATERIALS RELIEVES THE USER OF THE OBLIGATION TO READ AND FOLLOW THE WARNINGS AND INSTRUCTIONS FOR EACH SIKA PRODUCT AS SET FORTH IN THE CURRENT PRODUCT DATA SHEET, PRODUCT LABEL AND SAFETY DATA SHEET PRIOR TO PRODUCT USE.

How to Use

Substrates	Concrete, mortar, and masonry products.									
Surface Preparation	<p>Remove all deteriorated concrete, dirt, oil, grease and all bond inhibiting materials from surface. Be sure repair area is not less than 1/8 inch in depth. Preparation work should be done by high pressure water blast, scabblor, or other appropriate mechanical means to obtain an exposed aggregate surface with a minimum surface profile of $\pm 1/16$ inch (CSP-5); $\pm 1/8$ inch (CSP-6). Saturate surface with clean water. Substrate should be saturated surface dry (SSD) with no standing water during application.</p> <p>Reinforcing Steel: Steel reinforcement should be thoroughly prepared by mechanical cleaning to remove all traces of rust. Where corrosion has occurred due to the presence of chlorides, the steel should be high-pressure washed with clean water after mechanical cleaning. For priming of reinforcing steel use Sika® Armatec® 110 EpoCem (Consult Product Data Sheet).</p> <p>Priming Concrete Substrate: Prime the prepared substrate with a brush or sprayed applied coat of Sika® Armatec® 110 EpoCem (consult Product Data Sheet). Alternately, a scrub coat of SikaTop® 122 PLUS can be applied prior to placement of the mortar. The repair mortar has to be applied into the wet scrub coat before it dries.</p>									
Mixing	<p>Pour approximately 7/8 of Component 'A' into the mixing container. Add Component 'B' (powder) while mixing continuously. Mix mechanically with a low-speed drill (400- 600 rpm) and mixing paddle or mortar mixer. Add remaining Component 'A' (liquid) to mix if a more loose consistency is desired. Mix to a uniform consistency, maximum 3 minutes. Thorough mixing and proper proportioning of the two components is necessary.</p> <p>For SikaTop® 122 PLUS concrete: Pour all of Component 'A' into mixing container. Add all of Component 'B' while mixing, then introduce 3/8 inch coarse aggregate at desired quantity. Mix to uniform consistency, maximum 3 minutes. Addition rate is 42 lbs. per bag (approx. 3.0 to 3.5 gal. by loose volume). The aggregate must be non-reactive (reference ASTM C 1260, C 227 and C 289), clean, well-graded, saturated surface dry, have low absorption and high density, and comply with ASTM C 33 size number 8 per Table 2. Note: Variations in the quality of the aggregate will affect the physical properties of SikaTop® 122 PLUS. The yield is increased to 0.75 cu. ft./unit with the addition of the aggregate (42 lbs.). Do not use limestone aggregate.</p>									
Application	SikaTop® 122 PLUS must be scrubbed into the substrate, filling all pores and voids. Force material against edge of repair, working toward center. After filling repair, consolidate, then screed. Allow mortar or concrete to set to desired stiffness, then finish with wood or sponge float for a smooth surface, or broom or burlap-drag for a rough finish.									
Tooling & Finishing	As per ACI recommendations for portland cement concrete, curing is required. Moist cure with wet burlap and polyethylene, a fine mist of water or a water based* compatible curing compound (ASTM C 309 compliant). Curing compounds adversely affect the adhesion of following layers of mortar, leveling mortar or protective coatings. Moist curing should commence immediately after finishing. Protect newly applied material from direct sunlight, wind, rain and frost. *Pretesting of curing compound is recommended.									
Limitations	<table border="1"> <thead> <tr> <th>Application thickness:</th> <th>Min.</th> <th>Max. in one lift</th> </tr> </thead> <tbody> <tr> <td>Neat</td> <td>1/8 inch (3 mm)</td> <td>1 inch (25 mm)</td> </tr> <tr> <td>Extended</td> <td>1 inch (25 mm)</td> <td>4 inches (100 mm)</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ■ Minimum ambient and surface temperatures 45°F (7°C) and rising at time of application. ■ Addition of coarse aggregates may result in variations of the physical properties of the mortar. ■ Do not use solvent-based curing compound. ■ Size, shape and depth of repair must be carefully considered and consistent with practices recommended by ACI or ICRI. For additional information, contact Technical Service. ■ For additional information on substrate preparation, refer to ICRI Guideline No.310.2R Coatings, Polymer Overlays, and Concrete Repair. ■ If aggressive means of substrate preparation is employed, substrate strength should be tested in accordance with ACI 503 Appendix A prior to the repair application. ■ As with all cement based materials, avoid contact with aluminum to prevent adverse chemical reaction and possible product failure. Insulate potential areas of contact by coating aluminum bars, rails, posts etc. with an appropriate epoxy such as Sikadur® 32, Hi-Mod. 	Application thickness:	Min.	Max. in one lift	Neat	1/8 inch (3 mm)	1 inch (25 mm)	Extended	1 inch (25 mm)	4 inches (100 mm)
Application thickness:	Min.	Max. in one lift								
Neat	1/8 inch (3 mm)	1 inch (25 mm)								
Extended	1 inch (25 mm)	4 inches (100 mm)								

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Product Data Sheet
Edition 7.23.2014
Sikadur® 35, Hi-Mod LV

Sikadur® 35, Hi-Mod LV

High-modulus, low-viscosity, high-strength epoxy grouting/sealing/binder adhesive

Description	Sikadur® 35, Hi-Mod LV is a 2-component, 100% solids, moisture-tolerant, low-viscosity, high-strength, multi-purpose, epoxy resin adhesive. It conforms to the current ASTM C-881, Types I, II, and IV, Grade-1, Class C* and AASHTO M-235 specifications. * Except for gel time
Where to Use	<ul style="list-style-type: none"> ■ Pressure-injection of cracks in structural concrete, masonry, wood, etc. ■ Gravity-feed of cracks in horizontal concrete and masonry. ■ Epoxy resin binder for epoxy mortar patching and overlay of interior, horizontal surfaces. ■ Seal interior slabs and exterior above-grade slabs from water, chlorides, and mild chemical attack; also improves wearability.
Advantages	<ul style="list-style-type: none"> ■ Super low viscosity. ■ Convenient easy mix ratio A:B = 2:1 by volume. ■ Unique, high-strength, structural adhesive for “can’t dry” surfaces. ■ Deep penetrating and tenacious bonding of cracks in structural concrete. ■ High-early-strength developing adhesive. ■ Excellent chemical resistance for flooring systems.
Coverage	1 gal. yields 231 cu. in. of adhesive and grout. 1 gal. of adhesive, when mixed with 5 gal. by loose volume of oven-dried aggregate, yields approximately 808.5 cu. in. of epoxy mortar.
Packaging	3 gal. units; 1 gal. units; 12 fl.-oz. units, 12/case.

Typical Data (Material and curing conditions @ 73°F (23°C) and 50% R.H.)

RESULTS MAY DIFFER BASED UPON STATISTICAL VARIATIONS DEPENDING UPON MIX DESIGNS, MIXING METHODS AND EQUIPMENT, TEMPERATURE, APPLICATIONS METHODS, TEST METHODS, ACTUAL SITE CONDITIONS AND CURING CONDITIONS

Shelf Life	2 years in original, unopened containers.					
Product Storage	Store dry at 40°-95°F (4°-35°C).					
Product Conditioning	Condition material to 65°-75°F (18°-24°C) before using.					
Color	Clear, amber.					
Mixing Ratio	Component A : Component B=2:1 by volume.					
Viscosity (Mixed)	Approximately 375 cps.					
Pot Life	Approximately 25 minutes. (60 gram mass)					
Tack Free Time	40°F (4°C)	73°F (23°C)	90°F (32°C)			
(3-5 mils) Neat	14-16 hrs.	3-3.5 hrs.	1.5-2 hrs.			
Tensile Properties (ASTM D-638)	Neat			Mortar		
7 day	Tensile Strength	8,900 psi (61.4 MPa)	14 day	840 psi (5.8 MPa)		
	Elongation at Break	5.4%		0.3%		
14 day	Modulus of Elasticity	4.1 X 10 ⁵ psi (2,800 MPa)		7.6 X 10 ⁵ psi (5,200 MPa)		
Flexural Properties (ASTM D-790)						
14 day	Flexural Strength (Modulus of Rupture)	14,000 psi (96.6 MPa)	2,200 psi (15.2 MPa)			
	Tangent Modulus of Elasticity in Bending	3.7 x 10 ⁵ psi (2,600 MPa)	9.5 X 10 ⁵ psi (6,500 MPa)			
Shear Strength (ASTM D-732)						
14 day	Shear Strength	5,100 psi (35.2 MPa)	2,300 psi (15.9 MPa)			
Heat Deflection Temperature (ASTM D-648)						
7 day	[fiber stress loading = 264 psi (1.8 MPa)]	124°F (51°C)	129°F (54°C)			
Bond Strength (ASTM C-882): Hardened concrete to hardened concrete						
2 day (moist cure)	Bond Strength	4,000 psi (27.6 MPa)				
14 day (moist cure)	Bond Strength	2,900 psi (20.0 MPa)				
2 day (dry cure)	Bond Strength	2,800 psi (19.3 MPa)				
Water Absorption (ASTM D-570)	7 day	(24 hour immersion)0.27 %				
Compressive Properties (ASTM D-695)						
Compressive Strength, psi (MPa)	Neat			Mortar (1:5)		
	40°F (4°C)	73°F (23°C)	90°F (32°C)	40°F (4°C)	73°F (23°C)	90°F (32°C)
4 hour	-	-	-	-	-	800 (5.5)
8 hour	-	180 (1.2)	3,200 (22.1)	-	-	4,100 (28.3)



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16 hour	-	4,500 (31.1)	6,300 (43.5)	-	400 (2.8)	5,700 (39.3)
1 day	-	6,000 (41.4)	9,100 (62.8)	120 (0.8)	5,000 (34.5)	6,900 (47.6)
3 day	4,000 (27.6)	10,700 (73.8)	10,500 (72.5)	6,200 (42.8)	6,800 (46.9)	7,000 (48.3)
7 day	6,800 (46.9)	11,000 (75.9)	10,500 (72.5)	6,300 (43.5)	7,900 (54.5)	8,800 (60.7)
14 day	10,300 (71.1)	12,000 (82.8)	10,500 (72.5)	6,800 (46.9)	8,500 (58.7)	8,800 (60.7)
28 day	12,400 (85.6)	13,000 (89.7)	10,500 (72.5)	7,000 (48.3)	8,600 (59.3)	8,800 (60.7)
Compressive Modulus		Neat		Mortar		
	7 day		3.2 X 10⁵ psi (2,200 MPa)	28 day		8.1 X 10⁵ psi (5,600 MPa)

How to Use

Surface Preparation Surface must be clean and sound. It may be dry or damp, but free of standing water. Remove dust, laitance, grease, curing compounds, impregnations, waxes, foreign particles and disintegrated materials.

Concrete - Blast clean, shot blast or use other approved mechanical means to provide an open roughened texture.

Steel - Should be cleaned and prepared thoroughly by blast cleaning.

Mixing

Proportion 1 part Component 'B' to 2 parts Component 'A' by volume into a clean pail. Mix thoroughly for 3 minutes with Sika Paddle on low-speed (400- 600 rpm) drill until uniformly blended. Mix only that quantity that can be used within its pot life.

To prepare an epoxy mortar, slowly add 4-5 parts by loose volume of an oven-dried aggregate to 1 part of the mixed Sikadur® 35, Hi-Mod LV and mix until uniform in consistency.

Application

To gravity feed cracks - Blow vee-notched crack clean with oil-free compressed air. Pour neat Sikadur® 35, Hi-Mod LV into vee-notched crack. Continue placement until completely filled. Seal underside of slab prior to filling if cracks reflect through.

To pressure-inject cracks - Use automated injection equipment or manual method. Set appropriate injection ports based on system used. Seal ports and crack with Sikadur® 31, Hi-Mod Gel or Sikadur® 33. When the epoxy adhesive seal has cured, inject Sikadur® 35, Hi-Mod LV with steady pressure. Consult Technical Service for additional information.

To seal slabs - Spread neat Sikadur® 35, Hi-Mod LV over slab. Allow penetration. Remove excess to prevent surface film. Seal interior slabs and above-grade exterior slabs only.

For an epoxy mortar - Prime prepared surface with neat Sikadur® 35, Hi-Mod LV. Place prepared epoxy mortar before primer becomes tack-free. Place the epoxy mortar using trowels. Compact and level with vibrating screed or trowels. Finish with finishing trowel. Sikadur® 35, Hi-Mod LV mortar is for interior use only.

Limitations

- Minimum substrate and ambient temperature 40°F (4°C).
- Do not thin with solvents. Consult Technical Service at 800-933-7452.
- Use oven-dried aggregate only.
- Maximum epoxy mortar thickness is 1.5 in. (38 mm) per lift.
- Epoxy mortar is for interior use only.
- Do not seal exterior slabs on grade.
- Minimum age of concrete must be 21-28 days, depending on curing and drying conditions, for mortar and to seal slabs.
- Porous substrates must be tested for moisture-vapor transmission prior to application.
- Not for injection of cracks under hydrostatic pressure at the time of application.
- Do not inject cracks greater than 1/4 in. (6 mm) Consult Technical Service.
- Not an aesthetic product. Color may alter due to variations in lighting and/or UV exposure.

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Sika® Armatec® 110 EpoCem

Bonding Agent and Reinforcement Protection

Description	Sika® Armatec® 110 EpoCem is a 3-component, solvent-free, moisture-tolerant, epoxy-modified, cementitious product specifically formulated as a bonding agent and anti-corrosion coating.
Where to Use	<ul style="list-style-type: none">■ As an anti-corrosion coating for reinforcing steel in concrete restoration.■ As added protection to reinforcing steel in areas of thin concrete cover.■ As a bonding agent for repairs to concrete and steel.■ As a bonding agent for placing fresh, plastic concrete to existing hardened concrete.
Advantages	<ul style="list-style-type: none">■ Excellent adhesion to concrete and steel.■ Acts as an effective barrier against penetration of water and chlorides.■ Long open time - up to 16 hours.■ Not a vapor barrier.■ Can be used exterior on-grade.■ Contains corrosion inhibitors.■ Excellent bonding bridge for cement or epoxy based repair mortars.■ High strength, unaffected by moisture when cured.■ Spray, brush or roller application.■ Non-flammable, solvent free.
Coverage	Bonding agent: minimum (theoretical) on smooth, even substrate 80 ft. ² /gal. (=20 mils thickness). Coverage will vary depending on substrate profile and porosity. Reinforcement Protection: 40 ft. ² /gal. (=20 mils thickness) (2 coat application).
Packaging	3.5 gal. unit. (47.6 fl. oz. Comp. A + 122.1 fl. oz. Comp. B + 46.82 lb. Comp. C) Comp. A + B in carton, Comp. C in multi-wall bag. 1.65 gal. unit. (22.7 fl. oz. A + 57.6 fl. oz. B + 4 bags @ 5.5 lb.) Factory-proportioned units in a pail.

Typical Data (Material and curing conditions @ 73°F and 50% R.H.)

RESULTS MAY DIFFER BASED UPON STATISTICAL VARIATIONS DEPENDING UPON MIXING METHODS AND EQUIPMENT, TEMPERATURE, APPLICATION METHODS, TEST METHODS, ACTUAL SITE CONDITIONS AND CURING CONDITIONS.

Shelf Life	1 year in original, unopened packaging.
Storage	Store dry at 40°-95°F (4°-35°C). Condition material to 65°-75°F (18°-24°C) before using. If components A and B are frozen, discard. Protect Component C from humidity.
Color	Concrete gray
Density (Mixed)	125 lb./ft. ³ (2.0 kg.)
Pot Life	Approximately 90 minutes
Compressive Strength (ASTM C-109)	3 days 4500 psi (31.0 MPa) 7 days 6500 psi (44.8 MPa) 28 days 8500 psi (58.6 MPa)
Flexural Strength (ASTM C-348)	28 days 1250 psi (8.6 MPa)
Splitting Tensile Strength (ASTM C-496)	28 days 600 psi (4.1 MPa)
Important Data for Sika Armatec 110 as a Corrosion Protective Coating	
Water	Water Permeability at 10 bar (145 psi) 8.92 x 10 ⁻¹⁵ ft./sec. Control 7.32 x 10 ⁻¹⁰ ft./sec. Water vapor diffusion coefficient μ H ₂ O 110
Carbon Dioxide	Carbon dioxide diffusion coefficient μ CO ₂ 14000

TEST DATA: Time-to-Corrosion Study

- Sika® Armatec® 110 more than tripled the time to corrosion
- Reduced corrosion rate by over 40%

Construction



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Important Data for Sika® Armatec® 110 as a Bonding Agent

Bond Strength (ASTM C882)	14 days moist cure, plastic concrete to hardened concrete:	
Wet on Wet	2800 psi	(19.3 MPa)
24 hr. Open Time	2600 psi	(17.9 MPa)
Bond of Steel Reinforcement to Concrete (Pullout Test):		
Sika® Armatec® 110 Coated	625 psi	(4.3 MPa)
Epoxy Coated	508 psi	(3.5 MPa)
Plain Reinforcement	573 psi	(3.95 MPa)

How to Use

Surface Preparation **Cementitious substrates:** Should be cleaned and prepared to achieve a laitance and contaminant-free surface prepared in accordance with the requirements specified by the overlay or repair material by blast cleaning or equivalent mechanical means. Substrate must be saturated surface dry (SSD) with no standing water.
Steel: Should be cleaned and prepared thoroughly by blast cleaning.

Mixing Shake contents of both Component 'A' and Component 'B'. Empty entire contents of both Component 'A' and Component 'B' into a clean, dry mixing pail. Mix thoroughly for 30 seconds with a Sika paddle on a low speed (400-600 rpm) drill. Slowly add the entire contents of Component 'C' while continuing to mix for 3 minutes until blend is uniform and free of lumps. Mix only that quantity that can be applied within its pot life.

Application **As a bonding agent** - Apply by stiff-bristle brush or broom. Spray apply with Goldblatt Pattern Pistol or equal equipment. For best results, work the bonding slurry well into the substrate to ensure complete coverage of all surface irregularities. Apply the freshly mixed patching mortar or concrete wet on wet, or up to the maximum recommended open time, onto the bonding slurry.
 Maximum recommended open time between application of Armatec® 110 and patching mortar or concrete:
 80°-95°F (26°-35°C) 6 hours
 65°-79°F (18°-26°C) 12 hours
 50°-64°F (10°-17°C) 16 hours
 40°-49°F (4°-9°C) wet-on-wet

For corrosion protection only - Apply by stiff-bristle brush or spray at 80 ft.²/gal. (20 mils). Take special care to properly coat the underside of the totally exposed steel. Allow coating to dry 2-3 hours at 73°F, then apply a second coat at the same coverage. Allow to dry again before the repair mortar or concrete is applied. Pour or place repair within 7 days.

- Limitations**
- Substrate and ambient temperature: Minimum 40°F (5°C).
 - Maximum 95°F (35°C).
 - Minimum thickness: As a bonding agent 20 mils.
 - For reinforcement protection 40 mils.
 - (2 coats, 20 mils each).
 - Not recommended for use with expansive grouts.
 - Use of semi-dry mortars onto Sika® Armatec® 110 EpoCem must be applied "wet on wet".
 - When used in overhead applications with hand placed patching mortars, use "wet on wet" for maximum mortar built thickness.
 - Substrate profile as specified by the overlay or repair material is still required.
 - As with all cement based materials, avoid contact with aluminum to prevent adverse chemical reaction and possible product failure. Insulate potential areas of contact by coating aluminum bars, rails, posts etc. with an appropriate epoxy such as Sikadur® Hi-Mod 32.

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