Beach Memorial Pool
Liner Replacement Project
Hedgehog Road - Trumbull, CT
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Hedgehog Road - Trumbull, CT

EXISTING CONDITIONS

Project # 15-882
Date 8-3-2015
Drawn by KHC
Checked by Checker Scale 1/32" x 1'-0"
EXISTING CONDITIONS

Existing northwest corner, zero entry

Existing northeast corner, zero entry

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

Existing flush gutter
For bid purposes, assume entire pool shell in shaded area (walls and floor) requires 2" thick surface patch. Assume balance of pool requires additional 500 cubic feet of patch.

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. Replace any corroded reinforcing steel by lapping in new bars. Sawcut edge of repair areas to produce neat joint. Apply epoxy-modified bonding & anti-corrosion agent. Patch with repair mortar or concrete (see enlarged details and written specifications).

Existing stainless steel gutter, existing shade structure, existing snack bar, existing lifeguard chair, existing ladder, existing concrete pool deck.
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.
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.

*Existing sound concrete to remain*

Sawcut edge of patch area, min. 1/2" deep

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

4,000 psi concrete

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

Sawcut edge of patch area, min. 1/2' deep

Existing sound concrete to remain

Coat all existing reinforcing steel and concrete joint with epoxy-modified cementitious bonding & anti-corrosion agent. See written specification for products.
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.
   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; Armatec 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.
   2) Normal-Weight Aggregates: ASTM C 33, ¾” 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
- 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
- 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.)

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM</th>
<th>Days</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Flexural Strength</td>
<td>C 293</td>
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<td>Split Tensile</td>
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<td>500 psi</td>
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<td>Bond Strength</td>
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<td></td>
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<td>Ring Test (days)</td>
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<tr>
<td>Ring Test - Average Max Strain</td>
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<tr>
<td>Ring Test - Average Stress Strain</td>
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<td>0.49 psi/day</td>
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<td>Ring Test - Potential for Cracking</td>
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<td>Baenzinger Block</td>
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<td>90 days</td>
<td>No cracking</td>
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<td>98%</td>
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<td>CI Permeability</td>
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<td>&lt;500 Coulombs.</td>
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<td>Direct Bond Strength</td>
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<td>Modulus of Elasticity</td>
<td>C 531</td>
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<td>3.00x10⁶ psi</td>
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<tr>
<td>Initial Set Time (min)</td>
<td>C 266</td>
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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 or by calling Sika’s technical service department at 800.933.7452. Nothing contained in any Sika material 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.

Keep container tightly closed. Keep out of reach of children. Not for internal consumption. For industrial use only. For professional use only.

For further information and advice regarding transportation, handling, storage and disposal of chemical products, users should refer to the actual safety data sheet containing physical, ecological, toxicological and other safety related data. Read the current actual safety data sheet before using the product. In case of emergency, call CHEMTREC at 1-800-424-9300, International 703-527-3887.

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 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 instruction for each Sika product as set forth in the current Product Data Sheet, product label and Safety Data Sheet prior to product use.

Sika warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Product Data Sheet if used as directed within shelf life. User determines suitability of product for intended use and assumes all risks. Buyer’s sole remedy shall be limited to the purchase price or replacement of product exclusive of labor or cost of labor. No other warranties express or implied shall apply including any warranty of merchantability or fitness for a particular purpose. Sika shall not be liable for any incidental, special, or consequential damage. Sika shall not be responsible for the use of this product in a manner to infringe on any patent or any other intellectual property right held by others. Sale of Sika products are subject to Sika’s terms and conditions of sale available at http://usa.sika.com or by calling 800.933.7452.
**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**

- 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**

- Super low viscosity.
- 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.

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**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.

<table>
<thead>
<tr>
<th>Property</th>
<th>Neat</th>
<th>Mortar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelf Life</td>
<td>2 years</td>
<td>2 years in original, unopened containers.</td>
</tr>
<tr>
<td>Product Storage</td>
<td>Store dry at 40°-95°F (4°-35°C).</td>
<td>Store dry at 40°-95°F (4°-35°C).</td>
</tr>
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<td>Product Conditioning</td>
<td>Condition material to 65°-75°F (18°-24°C) before using.</td>
<td>Condition material to 65°-75°F (18°-24°C) before using.</td>
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<td>Color</td>
<td>Clear, amber.</td>
<td>Clear, amber.</td>
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<tr>
<td>Viscosity (Mixed)</td>
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<td>Approximately 375 cps.</td>
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<td>Pot Life</td>
<td>Approximately 25 minutes. (60 gram mass)</td>
<td>Approximately 25 minutes. (60 gram mass)</td>
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<td>Tack Free Time (3-5 mils) Neat 40°F (4°C)</td>
<td>14-16 hrs.</td>
<td>14-16 hrs.</td>
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<td>14 day</td>
<td>3-5.5 hrs.</td>
<td>3-5.5 hrs.</td>
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<td>Tensile Properties (ASTM D-638) 7 day</td>
<td>Neat 8,900 psi (61.4 MPa)</td>
<td>Mortar 840 psi (5.8 MPa)</td>
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<tr>
<td>Elongation at Break</td>
<td>5.4%</td>
<td>0.3%</td>
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<tr>
<td>14 day</td>
<td>Modulus of Elasticity 4.1 X 10⁴ psi (2,800 MPa)</td>
<td>7.6 X 10⁴ psi (5,200 MPa)</td>
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<td>Flexural Properties (ASTM D-790) 14 day</td>
<td>Flexural Strength (Modulus of Rupture) 14,000 psi (96.6 MPa)</td>
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<td>Tangent Modulus of Elasticity in Bending</td>
<td>3.7 x 10⁶ psi (2,600 MPa)</td>
<td>9.5 X 10⁶ psi (6,500 MPa)</td>
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<td>Shear Strength (ASTM D-732) 14 day</td>
<td>Shear Strength 5,100 psi (35.2 MPa)</td>
<td>Shear Strength 5,100 psi (35.2 MPa)</td>
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<td>Heat Deflection Temperature (ASTM D-648) 7 day</td>
<td>124°F (51°C)</td>
<td>129°F (54°C)</td>
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<td>Bond Strength (ASTM C-882): Hardened concrete to hardened concrete</td>
<td>Bond Strength 4,000 psi (27.6 MPa)</td>
<td>Bond Strength 4,000 psi (27.6 MPa)</td>
</tr>
<tr>
<td>2 day (moist cure)</td>
<td>Bond Strength 2,900 psi (20.0 MPa)</td>
<td>Bond Strength 2,900 psi (20.0 MPa)</td>
</tr>
<tr>
<td>14 day (moist cure)</td>
<td>Bond Strength 2,800 psi (19.3 MPa)</td>
<td>Bond Strength 2,800 psi (19.3 MPa)</td>
</tr>
<tr>
<td>2 day (dry cure)</td>
<td>Bond Strength 2,800 psi (19.3 MPa)</td>
<td>Bond Strength 2,800 psi (19.3 MPa)</td>
</tr>
<tr>
<td>Water Absorption (ASTM D-570) 7 day</td>
<td>(24 hour immersion)0.27 %</td>
<td>(24 hour immersion)0.27 %</td>
</tr>
<tr>
<td>Compressive Properties (ASTM D-695)</td>
<td>Neat</td>
<td>Mortar (1:5)</td>
</tr>
<tr>
<td>Compressive Strength, psi (MPa) 40°F (4°C)</td>
<td>73°F (23°C)</td>
<td>Mortar 4,100 (28.3)</td>
</tr>
<tr>
<td>4 hour</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 hour</td>
<td>180 (1.2)</td>
<td>3,200 (22.1)</td>
</tr>
</tbody>
</table>

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/ 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.
TABLE 1:

<table>
<thead>
<tr>
<th></th>
<th>16 hour</th>
<th>1 day</th>
<th>3 day</th>
<th>7 day</th>
<th>14 day</th>
<th>28 day</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 day</td>
<td>3.2 X 10^6 psi (2,200 MPa)</td>
<td>8.1 X 10^6 psi (5,600 MPa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mortar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressive Modulus</td>
<td>4,500 (31.1)</td>
<td>6,300 (43.5)</td>
<td>10,500 (72.5)</td>
<td>10,700 (73.8)</td>
<td>10,500 (72.5)</td>
<td>10,500 (72.5)</td>
</tr>
</tbody>
</table>

**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 warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties of the current Sika Product Data Sheet if used as directed within shelf life. User determines suitability of product for intended use and assumes all risks. Buyer’s sole remedy shall be limited to the purchase price or cost of labor. NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL, CONSEQUENTIAL DAMAGES. SIKA SHALL NOT BE RESPONSIBLE FOR ANY INCIDENTAL DAMAGES. SIKA’S TERMS AND CONDITIONS OF SALE APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL, CONSEQUENTIAL DAMAGES. SIKA’S TERMS AND CONDITIONS OF SALE APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE RESPONSIBLE FOR ANY INCIDENTAL DAMAGES.**

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**Keep container tightly closed. Keep out of reach of children. Not for internal consumption. For industrial use only. For professional use only.**

For further information and advice regarding transportation, handling, storage and disposal of chemical products, users should refer to the actual Safety Data Sheets containing physical, ecological, toxicological and other safety related data. Read the current actual Safety Data Sheet before using the product. In case of emergency, call CHEMTREC at 1-800-424-9300, International 703-527-3887.
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
- 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
- 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
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.
- Water vapor diffusion coefficient μ H₂O 110

Carbon Dioxide
- Carbon dioxide diffusion coefficient μ CO₂ 14000

TEST DATA: Time-to-Corrosion Study
- Sika® Armatec® 110 more than tripled the time to corrosion
- Reduced corrosion rate by over 40%
Important Data for Sika® Armatec® 110 as a Bonding Agent

Bond Strength (ASTM C882)
- 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 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.