



DIVISION 3 - CONCRETE
Section 03550 - Concrete Toppings
Section 03720 - Concrete Resurfacing
Section 03730 - Concrete Rehabilitation

Part 1 – General

1.01 Summary

- A. This specification describes the patching or overlay of interior and/or exterior horizontal surfaces with a polymer-modified, portland cement mortar/concrete.

1.02 Quality Assurance

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.03 Delivery, Storage, and Handling

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.04 Job Conditions

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F (5°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified material.

1.05 Submittals

- A. Submit two copies of manufacturer's literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDS).

1.06 Warranty

- A. Provide a written warranty from the manufacturer against defects of materials for a period of one (1) year, beginning with date of substantial completion of the project.

Part 2 - Products

2.01 Manufacturer

- A. **SikaTop 111 Plus**, as manufactured by Sika Corporation, is considered to conform to the requirements of this specification.

2.02 Materials

- A. Polymer-modified Portland cement mortar:
1. Component A shall be a liquid polymer emulsion of an acrylic copolymer base and additives.
 - a. pH: 4.5-6.5
 - b. Film Forming Temperature: 73°F max.
 - c. Tear Strength: 950-psi min.
 - d. Elongation at Break: 500% min.
 - e. Particle Size: less than 0.1 micron
 2. Component A shall contain an organic, penetrating corrosion inhibitor which has been independently proven to reduce corrosion in concrete via ASTM G3 (half-cell potential tests). The corrosion inhibitor shall not be calcium nitrite, and shall have a minimum of 5 years of independent field testing to document performance on actual construction projects.
 3. Component B shall be a blend of selected portland cements, specially graded aggregates, admixtures for controlling setting time, water reducers for workability, and an organic accelerator.
 4. The materials shall be non-combustible, both before and after cure.
 5. The materials shall be supplied in a factory-proportioned unit.
 6. The polymer-modified, portland cement mortar must be placeable from 1/2-in. to 1-in. in depth per lift for horizontal applications.
- B. To prepare a polymer-modified portland cement concrete: aggregate shall conform to ASTM C-33. The factory-proportioned unit shall be extended with 42-lb. max. of a 3/8 in. (No.8 distribution per ASTM C-33, Table II) clean, well-graded, saturated surface dry aggregate, having low absorption and high density. Aggregate must be approved for use by the engineer.

2.03 Performance Criteria

- A. Typical Properties of the mixed polymer-modified, portland cement mortar:
1. Working Time: Approximately 30 minutes
 2. Finishing Time: 50-120 minutes
 3. Color: concrete gray
- B. Typical Properties of the cured polymer-modified, portland cement mortar:
1. Compressive Strength (ASTM C-109 Modified)
 - a. 1 day: 2500 psi min. (17.2 MPa)
 - b. 7 day: 5500 psi min. (37.9 MPa)
 - c. 28 day: 7000 psi min. (48.3 MPa)
 2. Flexural Strength (ASTM C-293) @ 28 days: 1500 psi (10.3 MPa)
 3. Splitting Tensile Strength (ASTM C-496) @ 28 days 700 psi (4.8 MPa)
 4. Bond Strength (ASTM C-882 Modified) @ 28 days: 2500 psi (17.2 MPa)
 5. The portland cement mortar shall not produce a vapor barrier.
 6. Density(wet mix): 136 lbs. / cu. ft. (2.18 kg/l)
 7. Permeability (AASHTO T-277 @ 28 days Approximately 500 Coulombs)

Note: Tests above were performed with the material and curing conditions @71°F - 75°F and 45-55% relative humidity.

Part 3 – Execution

3.01 Surface Preparation

- A. Areas to be repaired must be clean, sound, and free of contaminants. All loose and deteriorated concrete shall be removed by mechanical means. Mechanically prepare the concrete substrate to obtain a surface profile of +/- 1/16" (CSP 5 or greater as per ICRI Guidelines) with a new exposed aggregate surface. Area to be patched shall not be less than 1/2" in depth.
- B. Where reinforcing steel with active corrosion is encountered, sandblast the steel to a white metal finish to remove all contaminants and rust. Where corrosion has occurred due to the presence of chlorides, the steel shall be high pressure washed after mechanical cleaning. Prime steel with 2 coats of Sika Armatex 110 EpoCem as directed by manufacturer. (See Spec Component SC-201-0699)

3.02 Mixing and Application

- A. Mechanically mix in appropriate sized mortar mixer or with a Sika jiffy paddle and low speed (400-600 rpm) drill. Pour approximately 4/5 gal Component A into the mixing container. Add Component B while continuing to mix. Mix to a uniform consistency for a maximum of three minutes. Add remaining Component A to mix if a more loose consistency is desired. Should smaller quantities be needed, be sure the components are measured in the correct ratio and that the Component B is uniformly blended before mixing the components together. Mix only that amount of material that can be placed in 30 minutes. Do not retemper material.
- B. Mixing of the polymer-modified portland cement concrete: Pour all (1-gal) of Component A into the mixing container. Add Component B while continuing to mix. Add correct amount of the pre-approved coarse aggregate, and continue mixing to a uniform consistency. Mixing time should be 3 minutes maximum.
- C. Placement Procedure: At the time of application, the substrate should be saturated surface dry with no standing water. Mortar and/or concrete must be scrubbed into substrate filling all pores and voids. While the scrub coat is still wet, force material against edge of repair, working toward center. If repair area is too large to fill while scrub coat is still wet use Sika Armatex 110 EpoCem in lieu of scrub coat (See Spec Component SC-200). After filling, consolidate, then screed. Allow mortar or concrete to set to desired stiffness, then finish with trowel, manual or power, for smooth surface. Broom or burlap drag for rough surface. Areas where the depth of the repair is less than 1-inch shall be repaired with polymer-modified portland cement mortar. In areas where the depth of the repair is greater than 1 inch, the repair shall be made with polymer-modified portland cement concrete.
- D. 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. Moist curing should commence immediately after finishing and continue for 48 hours. Protect newly applied material from rain, sun, and wind until compressive strength is 70% of the 28-day compressive strength. To prevent from freezing cover with insulating material. Setting time is dependent on temperature and humidity.

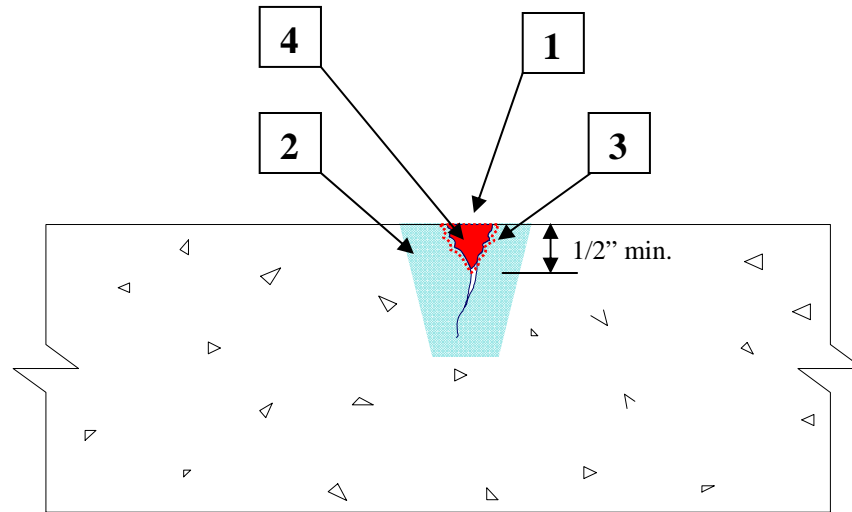
*Pretesting of curing compound is recommended.
- E. Adhere to all procedures, limitations and cautions for the polymer-modified portland cement mortar in the manufacturers current printed technical data sheet and literature.

3.05 Cleaning

- A. The uncured polymer-modified portland cement mortar can be cleaned from tools with water. The cured polymer - modified portland cement mortar can only be removed mechanically.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

SC-026

SikaTop® 111 Plus Crack Repair

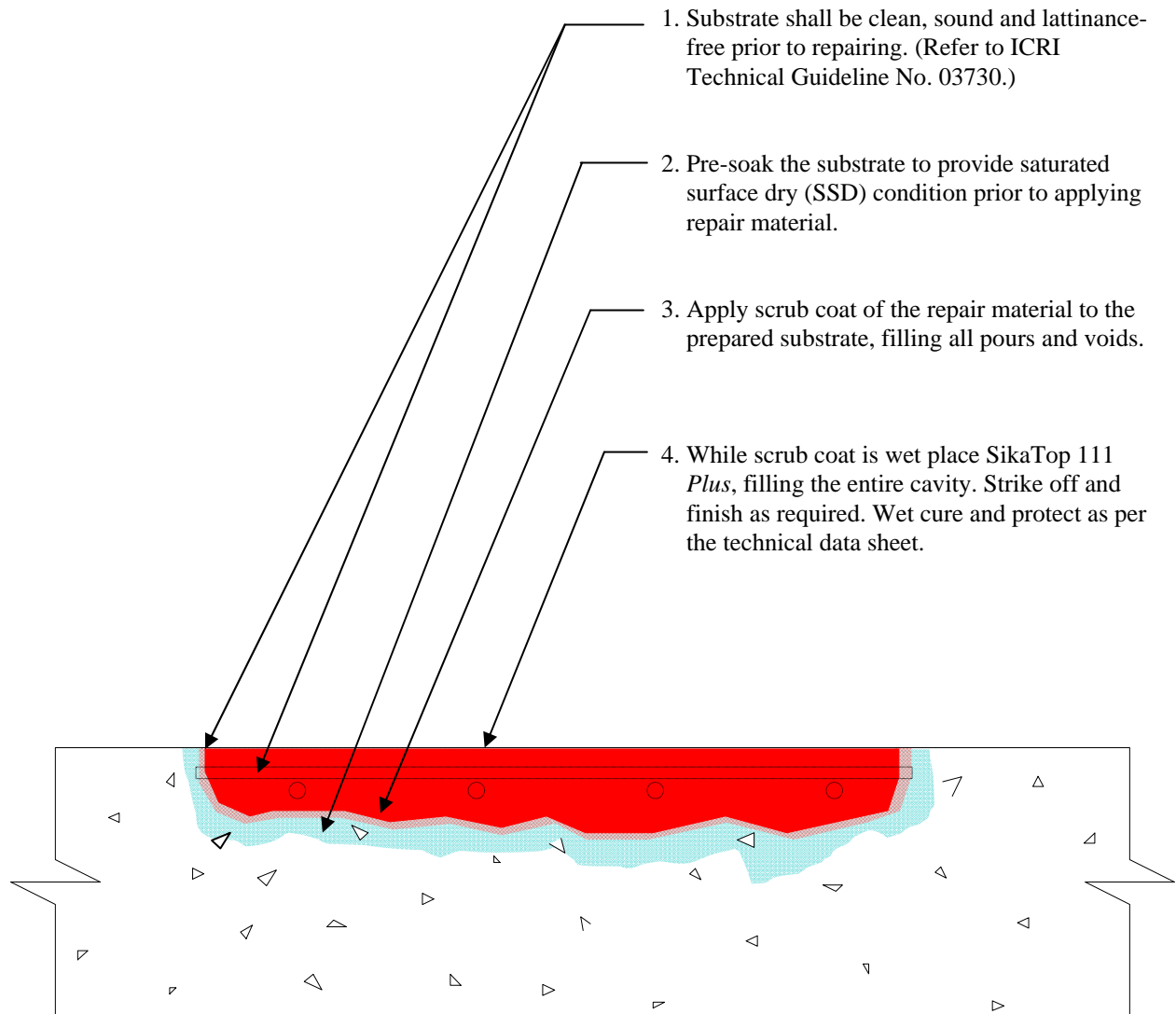


1. Substrate shall be clean, sound and lamination-free prior to repairing.
2. Pre-soak the substrate to provide saturated surface dry (SSD) condition prior to applying repair material.
3. Apply scrub coat of the repair material to the prepared substrate.
4. While scrub coat is wet place SikaTop 111 *Plus*, filling the entire cavity. Strike off and finish as required. Wet cure and protect as per the technical data sheet.

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SikaTop® 111 Plus Hand-applied Repair



Note:

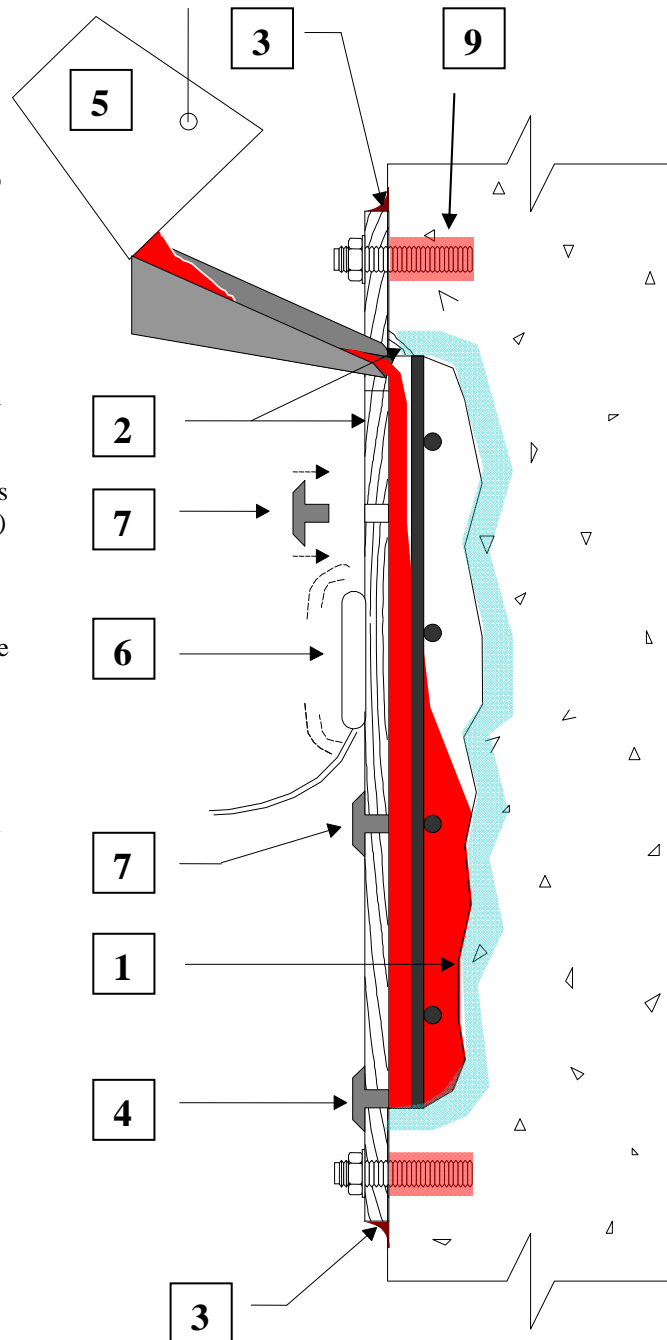
1. If repair area is too large to fill while scrub coat is still wet, use Sika Armatec 110 EpoCem in lieu of the scrub coat. (See Spec Component SC-200)
2. If reinforcing steel is located within the repair location refer to Spec Component SC-201
3. For applications greater than 1" in depth, add 3/8" coarse aggregate in accordance to the technical data sheet.

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SikaTop® 111 Plus Form & Pour Repair

1. Substrate shall be clean, sound and lamination-free prior to repairing. (Refer to ICRI Technical Guideline No. 03730.)
2. Fit form, provide vent holes and chip spot for pour box. Apply release agent to form, or use plastic lined plywood.
3. Anchor form and seal perimeter with bead of Sikaflex 1a, let cure.
4. Fill with water to check for water tightness and to provide saturated surface dry (SSD) substrate. Let drain to no free standing water.
5. Mix and place SikaTop 111 *Plus* as per the technical data sheet.
6. Vibrate form while pouring SikaTop 111 *Plus*.
7. Vent holes to be capped when steady flow is evident.
8. Strip form when appropriate.
9. Dry pack anchor holes with SikaGrout 212.



Note:

1. If reinforcing steel is located within the repair location refer to Spec Component SC-201
2. For applications greater than 1" in depth, add 3/8" coarse aggregate in accordance to the technical data sheet

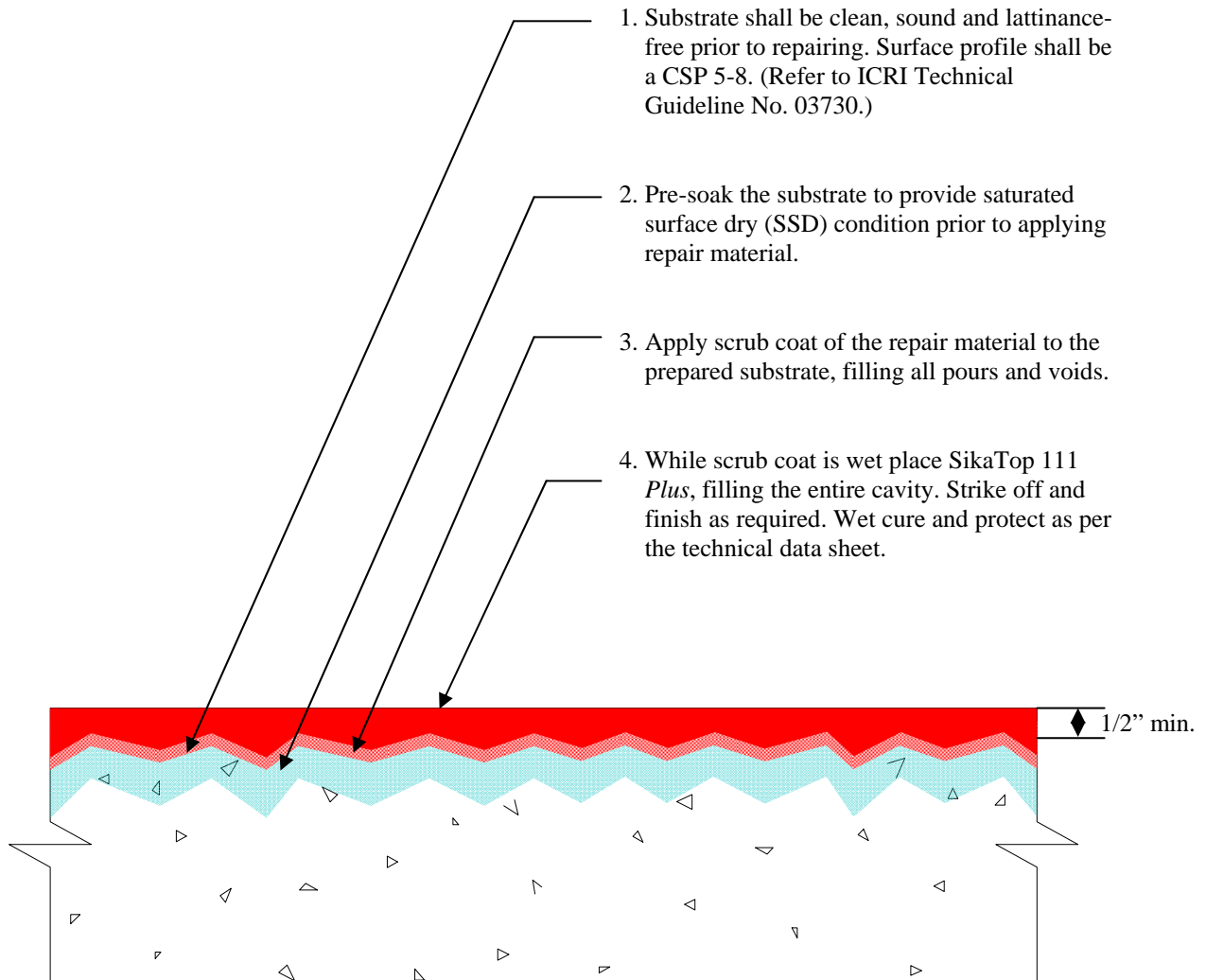
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SC-026

SikaTop® 111 Plus Overlay



Note:

1. If repair area is too large to fill while scrub coat is still wet, use Sika Armatec 110 EpoCem in lieu of the scrub coat. (See Spec Component SC-200)
2. If reinforcing steel is located within the repair location refer to Spec Component SC-201
3. For applications greater than 1" in depth, add 3/8" coarse aggregate in accordance to the technical data sheet.