

SECTION 03 01 03 - REHABILITATION OF CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bonding agents.
2. Patching mortar.
3. Preplaced concrete materials.
4. Joint filler.
5. Epoxy crack-injection materials.
6. Corrosion-inhibiting materials.
7. Polymer-overlay materials.
8. Polymer-sealer materials.
9. Composite reinforcement materials.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1. Review methods and procedures related to concrete work, including, but not limited to, the following:
 - a. Verify concrete-maintenance specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Concrete restoration specialist.
 - c. Materials, material application, sequencing, tolerances, and required clearances.
 - d. Shoring and bracing.
 - e. Quality-control program.
 - f. Coordination with building occupants.

1.3 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.
 - a. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, project application types consisting of horizontal, vertical or overhead locations and application instructions.

B. Shop Drawings:

1. Shoring and Bracing: Provide Drawings or documentation to ensure that structure and temporary supports withstand the anticipated loads during construction and the effect of demolition on the capacity of the structure. Submit design calculations, sealed by an engineer licensed in state of Project, for shoring and bracing where required by the extent of structural repairs or removal of deteriorated concrete and subsequent replacement.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For concrete-maintenance specialist and manufacturers.
- B. Product Test Reports: For each composite structural reinforcement, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Field quality-control reports.
- D. Quality-Control Program: Submit before work begins.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Each composite-structural-reinforcement manufacturer must employ factory-authorized service representatives who are available for consultation and Project-site inspection and on-site assistance.
- B. Concrete-Maintenance Specialist Qualifications: Engage an experienced concrete-maintenance firm that employs installers and supervisors who are trained and approved by manufacturer to apply composite structural reinforcement when performing the Work of this Section. Firm must have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing or patching new concrete is insufficient experience for concrete-maintenance work.
 1. Field Supervision: Concrete-maintenance specialist firm must maintain experienced full-time supervisors on Project site during times that concrete-maintenance work is in progress.
- C. Quality-Control Program: Prepare a written plan for concrete maintenance to systematically demonstrate the ability of personnel to properly perform maintenance work, including each phase or process, protection of surrounding materials during operations, and control of debris and runoff during the Work. Describe in detail materials, methods, equipment, and sequence of operations to be used for each phase of the Work.
- D. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1.6 FIELD 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 eight hours.
 - 2. Use only Class A or B epoxies when substrate temperatures are below or are expected to go below 60 deg F within eight hours.
 - 3. Use only Class C epoxies when substrate temperatures are above and are expected to stay above 60 deg F for eight hours.
- B. Cold-Weather Requirements for Cementitious Materials:
 - 1. Do not apply unless concrete surface and air temperatures are above 40 deg F and will remain so for at least 48 hours after completion of Work.
 - 2. Comply with the following procedures:
 - a. When air temperature is below 40 deg F, heat patching-material ingredients and existing concrete to produce temperatures between 40 and 90 deg F.
 - b. 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 or provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
 - c. 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.
- D. Environmental Limitations for High-Molecular-Weight Methacrylate Sealers: Do not apply when concrete surface temperature is below 55 deg F or above 75 deg F >. Apply only to substrates that have been dry for at least 72 hours.

PART 2 - PRODUCTS

2.1 BONDING AGENTS

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Manufactured 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.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ARDEX Americas
 - b. Dayton Superior Corporation
 - c. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - d. MAPEI Corporation
 - e. Sika Corporation
 - f. SpecChem, LLC
 - g. Sto Corp.
- B. Epoxy Bonding Agent: ASTM C881/C881M Type V bonding system, free of VOCs.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Abatron, Inc
 - b. ChemCo Systems, Inc.
 - c. Dayton Superior Corporation
 - d. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - e. Kaufman Products, Inc
 - f. MAPEI Corporation
 - g. Master Builders Solutions
 - h. Sika Corporation
 - i. Sto Corp.
 - j. US SPEC, Division of US MIX Company
 - k. Xypex Chemical Corporation
- C. Latex Bonding Agent, Redispersible: Type I, ASTM C1059/C1059M for use at nonstructural and interior locations unless otherwise indicated.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dayton Superior Corporation
 - b. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - c. Kaufman Products, Inc
 - d. US SPEC, Division of US MIX Company
 - e. W. R. Meadows, Inc
- D. Mortar Scrub Coat: Mix consisting of 1 part portland cement and 1 part fine aggregate complying with ASTM C144, except 100 percent passing a No. 16 sieve.

2.2 PATCHING MORTAR

A. Patching Mortar Requirements:

1. Only use patching mortars that are recommended by manufacturer for each applicable horizontal, vertical, or overhead use orientation.
2. Color and Aggregate Texture: Provide patching mortar and aggregates of colors and sizes necessary to produce patching mortar that matches existing, adjacent, and exposed concrete. Blend several aggregates if necessary to achieve suitable matches.
3. Coarse Aggregate for Patching Mortar: ASTM C33/C33M, Size No. 8, Class 5S washed aggregate. Add to patching-mortar mix only as permitted by patching-mortar manufacturer.

B. Job-Mixed Patching Mortar: 1 part portland cement and 2-1/2 parts fine aggregate complying with ASTM C144, except 100 percent passing a No. 16 sieve.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CGM, Incorporated
 - b. ChemMasters, Inc
 - c. Dayton Superior Corporation
 - d. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - e. Kaufman Products, Inc
 - f. KOSTER American Corporation
 - g. MAPEI Corporation
 - h. Master Builders Solutions
 - i. Sika Corporation
 - j. Simpson Strong-Tie Co., Inc.
 - k. Sto Corp.
 - l. Tnemec Company, Inc.
 - m. US SPEC, Division of US MIX Company
 - n. W. R. Meadows, Inc

C. Cementitious Patching Mortar: Packaged, dry mix for repair of concrete.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CGM, Incorporated
 - b. ChemMasters, Inc
 - c. Dayton Superior Corporation
 - d. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - e. Kaufman Products, Inc
 - f. KOSTER American Corporation
 - g. MAPEI Corporation
 - h. Master Builders Solutions
 - i. Schonox HPS North America, Inc.

- j. Sika Corporation
 - k. Simpson Strong-Tie Co., Inc.
 - l. Sto Corp.
 - m. Tnemec Company, Inc.
 - n. United Gilsonite Laboratories (UGL)
 - o. US SPEC, Division of US MIX Company
 - p. W. R. Meadows, Inc
 - q. Xypex Chemical Corporation
2. Compressive Strength: Not less than 4000 psi > at 28 days when tested in accordance with ASTM C109/C109M.
- D. Rapid-Strengthening, Cementitious Patching Mortar: ASTM C928/C928M packaged, dry mix for repair of concrete.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. ARDEX Americas
 - b. CGM, Incorporated
 - c. ChemMasters, Inc
 - d. Dayton Superior Corporation
 - e. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - f. Kaufman Products, Inc
 - g. MAPEI Corporation
 - h. Master Builders Solutions
 - i. Proflex USA
 - j. Schonox HPS North America, Inc.
 - k. Sika Corporation
 - l. Simpson Strong-Tie Co., Inc.
 - m. Sto Corp.
 - n. US SPEC, Division of US MIX Company
 - o. W. R. Meadows, Inc
2. Compressive Strength: Not less than 1000 psi within three hours when tested in accordance with ASTM C109/C109M.
- E. Polymer-Modified, Cementitious Patching Mortar: Packaged, dry mix for repair of concrete and that contains a latex additive as either a dry powder or a separate liquid that is added during mixing.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. AQUAFIN, Inc
 - b. ARDEX Americas
 - c. CGM, Incorporated
 - d. ChemMasters, Inc

- e. Cortec Corporation
 - f. Dayton Superior Corporation
 - g. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - h. Kaufman Products, Inc
 - i. MAPEI Corporation
 - j. Master Builders Solutions
 - k. Schonox HPS North America, Inc.
 - l. Sika Corporation
 - m. Simpson Strong-Tie Co., Inc.
 - n. Sto Corp.
 - o. United Gilsonite Laboratories (UGL)
 - p. US SPEC, Division of US MIX Company
 - q. Uzin Utz North America, Inc.
 - r. W. R. Meadows, Inc
2. Compressive Strength: Not less than 4000 psi at 28 days when tested in accordance with ASTM C109/C109M.
- F. Polymer-Modified, Silica-Fume-Enhanced, Cementitious Patching Mortar: Packaged, dry mix for repair of concrete and that contains silica fume complying with ASTM C1240 and a latex additive as either a dry powder or a separate liquid that is added during mixing.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. AQUAFIN, Inc
 - b. CGM, Incorporated
 - c. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - d. MAPEI Corporation
 - e. Master Builders Solutions
 - f. Sika Corporation
 - g. Simpson Strong-Tie Co., Inc.
 - h. Sto Corp.
 - i. W. R. Meadows, Inc
2. Compressive Strength: Not less than 4000 psi at 28 days when tested in accordance with ASTM C109/C109M.
- 2.3 Composite Structural Reinforcement Rod
- A. Basis-of-Design Product: Subject to compliance with requirements, provide a comparable product by:
1. MAPEI Corporation

2.4 PREPLACED CONCRETE MATERIALS

- A. Preplaced Aggregate: Washed aggregate, ASTM C33/C33M, Class 5S, with 95 to 100 percent passing a 1-1/2-inch sieve, 40 to 80 percent passing a 1-inch sieve, 20 to 45 percent passing a 3/4-inch sieve, zero to 10 percent passing a 1/2-inch sieve, and zero to 2 percent passing a 3/8-inch sieve.
- B. Fine Aggregate for Grout: Fine aggregate in accordance with ASTM C33/C33M, but with 100 percent passing a No. 8 sieve, 95 to 100 percent passing a No. 16 sieve, 55 to 80 percent passing a No. 30 sieve, 30 to 55 percent passing a No. 50 sieve, 10 to 30 percent passing a No. 100 sieve, zero to 10 percent passing a No. 200 sieve, and having a fineness modulus of 1.30 to 2.10.
- C. Grout Fluidifier for Grout: ASTM C937.
- D. Pozzolans for Grout: ASTM C618.

2.5 JOINT FILLER

- A. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A durometer hardness of at least 80 in accordance with ASTM D2240.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Abatron, Inc
 - b. ChemCo Systems, Inc.
 - c. Dayton Superior Corporation
 - d. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - e. Kaufman Products, Inc
 - f. MAPEI Corporation
 - g. Master Builders Solutions
 - h. Metzger/McGuire
 - i. Sika Corporation
- B. Color: Matching existing joint filler and as selected by Architect from full range of industry colors.

2.6 EPOXY CRACK-INJECTION MATERIALS

- A. Epoxy Crack-Injection Adhesive: ASTM C881/C881M, bonding system free of VOCs.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Abatron, Inc
 - b. ChemCo Systems, Inc.

- c. Dayton Superior Corporation
 - d. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - e. Fyfe Co. LLC
 - f. Kaufman Products, Inc
 - g. MAPEI Corporation
 - h. Master Builders Solutions
 - i. Sika Corporation
 - j. Sto Corp.
 - k. US SPEC, Division of US MIX Company
 - l. W. R. Meadows, Inc
- 2. Capping Adhesive: Product manufactured for use with crack-injection adhesive by same manufacturer.
 - 3. Color: Provide epoxy crack-injection adhesive and capping adhesive that blend with existing, adjacent concrete and do not stain concrete surface as approved by Architect from full range of industry colors.

2.7 CORROSION-INHIBITING MATERIALS

- A. Corrosion-Inhibiting Treatment: Waterborne solution of alkaline corrosion-inhibiting chemicals for concrete-surface application that penetrates concrete by diffusion and forms a protective film on steel reinforcement.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ARDEX Americas
 - b. Cortec Corporation
 - c. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - d. MAPEI Corporation
 - e. Master Builders Solutions
 - f. Sika Corporation

2.8 POLYMER-OVERLAY MATERIALS

- A. Polymer Overlay: Epoxy adhesive complying with ASTM C881/C881M, bonding system Type III, with surface-applied aggregate for skid resistance; free of VOCs.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ChemCo Systems, Inc.
 - b. Dayton Superior Corporation
 - c. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - d. Kaufman Products, Inc
 - e. MAPEI Corporation
 - f. Master Builders Solutions

- g. Sika Corporation
 - h. Sto Corp.
 - i. US SPEC, Division of US MIX Company
- 2. Aggregate: ACI 503.3, oven-dried, washed silica sand.
 - 3. Color and Texture: Matching existing and as selected by Architect from full range of industry colors.

2.9 POLYMER-SEALER MATERIALS

- A. Epoxy Polymer Sealer: Low-viscosity epoxy, penetrating sealer and crack filler recommended by manufacturer for penetrating and sealing cracks in exterior concrete traffic surfaces; free of VOCs.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ChemCo Systems, Inc.
 - b. Dayton Superior Corporation
 - c. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - d. MAPEI Corporation
 - e. Master Builders Solutions
 - f. Sika Corporation
 - 2. Color: As selected by Architect from full range of industry colors.
- B. Methacrylate Polymer Sealer: Low-viscosity, high-molecular-weight methacrylate, penetrating sealer and crack filler recommended by manufacturer for penetrating and sealing cracks in exterior concrete traffic surfaces; free of VOCs
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. SIMIRON Inc.
 - b. Kwik Bond Polymers
 - c. Master Builders Solutions
 - d. Sika Corporation
 - e. Transpo Industries, Inc.
 - 2. Color: As selected by Architect from full range of industry colors.

2.10 COMPOSITE REINFORCEMENT MATERIALS

- A. Composite Structural Reinforcement: Manufacturer's system consisting of carbon-fiber or glass-fiber reinforcement in the form of tow sheet with field-applied saturant and epoxy primers, fillers, adhesives, saturants, and topcoats, designed for use as

externally bonded structural reinforcement for concrete.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Fyfe Co. LLC
- b. MAPEI Corporation
- c. Master Builders Solutions
- d. Schonox HPS North America, Inc.
- e. Sika Corporation
- f.

2.11 MISCELLANEOUS MATERIALS

- A. Curing Materials: For ready-mixed concrete or packaged repair materials.
- B. Formwork Materials: Form-facing materials must comply with ACI 301 requirements.
- C. Water: Potable.
- D. Cleaning Agent: Commercial muriatic acid solution.

PART 3 - EXECUTION

3.1 CONCRETE MAINTENANCE

- A. Have concrete-maintenance work performed only by qualified concrete-maintenance specialist.
- B. Comply with manufacturers' written instructions for surface preparation and product application.

3.2 APPLICATION OF BONDING AGENTS

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion System: Apply to reinforcing bars and concrete by stiff brush or hopper spray in accordance with 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. Epoxy Bonding System: Apply to reinforcing bars and concrete by brush, roller, or spray in accordance with manufacturer's written instructions, leaving no pinholes or other uncoated areas. Apply to reinforcing bars in at least two coats, allowing first coat to dry before applying second coat. Place patching mortar or concrete while epoxy is still tacky. If epoxy dries, recoat before placing patching mortar or concrete.
- C. Latex Bonding Agent, Type I: Apply to concrete by brush roller or spray. Allow to dry

before placing patching mortar or concrete.

- D. Latex Bonding Agent, Type II: Mix with portland cement and scrub into concrete surface in accordance with manufacturer's written instructions. Place patching mortar or concrete while bonding agent is still wet. If bonding agent dries, recoat before placing patching mortar or concrete.
- E. Mortar Scrub Coat for Job-Mixed Patching Mortar and Concrete: Dampen repair area and surrounding concrete 6 inches beyond repair area. Remove standing water and apply scrub coat with a brush, scrubbing it into surface and thoroughly coating repair area. If scrub coat dries, recoat before placing patching mortar or concrete.
- F. Slurry Coat for Cementitious Patching Mortar: Wet substrate thoroughly and then remove standing water. Scrub a slurry of neat patching mortar mixed with latex bonding agent into substrate, filling pores and voids.

3.3 INSTALLATION OF PATCHING MORTAR

- A. Place patching mortar as specified in this article unless otherwise recommended in writing by manufacturer.
 - 1. Provide forms where necessary to confine patch to required shape.
 - 2. Wet substrate and forms thoroughly and then remove standing water.
- B. General Placement: 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.
- C. Vertical Patching: Place material in lifts of not more than 1 inch or less than 1/8 inch. Do not feather edge.
- D. Overhead Patching: Place material in lifts of not more than 1 inch or less than 1/8 inch. Do not feather edge.
- E. Consolidation: After each lift is placed, consolidate material and screed surface.
- F. Multiple Lifts: Where multiple lifts are used, score surface of lifts to provide a rough surface for placing subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.
- G. Finishing: Allow surfaces of lifts that are to remain exposed to become firm and then finish to a surface matching adjacent concrete.
- H. Curing: 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.

3.4 INSTALLATION OF DRY-PACK MORTAR

- A. Use dry-pack mortar for deep cavities. Place as specified in this article unless otherwise recommended in writing by manufacturer.
 - 1. Provide forms where necessary to confine patch to required shape.
 - 2. Wet substrate and forms thoroughly and then remove standing water.
- B. Pretreatment: Apply specified bonding agent, mortar scrub coat, slurry coat, bonding agent and slurry coat As required by manufacturer.
- C. Place dry-pack mortar into cavity by hand, and compact tightly into place. 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.
- D. 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.
- E. Wet-cure patch for not less than seven days by water-fog spray or water-saturated absorptive cover.

3.5 APPLICATION OF EPOXY CRACK-INJECTION MATERIALS

- A. Clean cracks with oil-free compressed air or low-pressure water to remove loose particles.
- B. Clean areas to receive capping adhesive of oil, dirt, and other substances that would interfere with bond.
- C. 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.
- D. Seal cracks at exposed surfaces with a ribbon of capping adhesive at least 1/4 inch thick by 1 inch wider than crack.
- E. Inject cracks wider than 0.003 inch to a depth of 8 inches.
- F. 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.
- G. After epoxy adhesive has set, remove injection ports and grind surfaces smooth.

3.6 APPLICATION OF CORROSION-INHIBITING MATERIALS

- A. Apply corrosion-inhibiting treatment to surfaces indicated on Drawings.
- B. Apply by brush, roller, or airless spray in two coats at manufacturer's recommended

application rate. Remove film of excess treatment by high-pressure washing before patching treated concrete.

3.7 APPLICATION OF POLYMER-OVERLAY MATERIALS

- A. Apply polymer overlay in accordance with ACI 503.3.
- B. Apply to traffic-bearing surfaces, including parking areas and walks.

3.8 APPLICATION OF POLYMER-SEALER MATERIALS

- A. Apply polymer sealer by brush, roller, or airless spray at manufacturer's recommended application rate.
- B. Apply to traffic-bearing surfaces, including parking areas and walks.

3.9 INSTALLATION OF COMPOSITE REINFORCEMENT MATERIALS

- A. Fiber Tow Sheet and Saturant: Unless otherwise recommended by manufacturer, install as follows:
 - 1. Apply epoxy primer using brush or short nap roller to prepared concrete surfaces in areas where composite structural reinforcement will be applied.
 - 2. After primer has set, patch surface defects with epoxy filler and allow to set before beginning reinforcement application.
 - 3. Apply epoxy saturant to fiber tow sheet or primed and patched surface using roller. Apply fiber tow sheet to primed and patched surface while saturant is still wet, using pressure roller to remove air pockets. Remove paper backing from fiber tow sheet and apply additional epoxy to fully saturate tow sheet.
 - 4. Apply additional layers using same procedure, fully saturating each layer with epoxy.
 - 5. After saturant has cured, apply protective topcoat.
- B. Preimpregnated Fiber Sheet: Unless otherwise recommended by manufacturer, install as follows:
 - 1. Patch surface defects with epoxy mortar and allow to set before beginning reinforcement application.
 - 2. Apply epoxy adhesive to a thickness of 1/16 inch to prepared concrete surfaces.
 - 3. Clean fiber sheet with acetone or other suitable solvent and apply epoxy adhesive to a thickness of 1/16 inch.
 - 4. Apply adhesive-coated fiber sheet to adhesive-coated concrete and roll with a hard rubber roller until fiber sheet is fully embedded in adhesive, air pockets are removed, and adhesive is forced out from beneath fiber sheet at edges.
 - 5. Apply additional layers using same procedure.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. Packaged, Cementitious Patching-Mortar Application: randomly selected sets of samples for each type of mortar required, tested in accordance with ASTM C928/C928M.
 - 2. Job-Mixed Patching-Mortar Application: randomly selected sets of samples for each type of mortar required, tested for compressive strength in accordance with ASTM C109/C109M.
 - 3. Concrete: As specified in Section 033000 "Cast-in-Place Concrete."
 - 4. Grout for Preplaced Aggregate: Tested for compressive strength in accordance with ASTM C942/C942M.
 - a. Testing Frequency: One sample for each 25 cu. yd. of grout or fraction thereof, but not less than one sample for each day's work.
 - 5. Joint Filler: Core-drilled samples to verify proper installation.
 - a. Testing Frequency: One sample for each 100 ft. of joint filled.
 - b. Where samples are taken, refill holes with joint filler.
 - 6. Epoxy Crack-Injection Materials: Core-drilled samples to verify proper installation.
 - a. Testing Frequency: one sample for each 100 ft. of crack injected.
 - b. Where samples are taken, refill holes with epoxy mortar.
 - 7. Product will be considered defective if it does not pass tests and inspections.
- C. Manufacturers Field Service: Engage manufacturers' factory-authorized service representatives for consultation and Project-site inspection and to provide on-site assistance when requested by Architect.
- D. Prepare test and inspection reports.

3.11 CONCRETE MAINTENANCE SCHEDULE

- A. Garage Level 1 Entrance Ramp: Perform the following as indicated on Drawings:
 - 1. Removal of deteriorated concrete and subsequent replacement and patching.
 - 2. Floor-joint repair.
 - 3. Epoxy crack-injection materials.
 - 4. Corrosion-inhibiting materials.
 - 5. Polymer-overlay materials.
 - 6. Polymer-sealer materials.
 - 7. Composite reinforcement on underside of slab.

- B. Elevated Warehouse Floors: Perform the following as indicated on Drawings:
1. Removal of deteriorated concrete and subsequent replacement and patching.
 2. Floor-joint repair.
 3. Epoxy crack-injection materials.
 4. Corrosion-inhibiting materials.
 5. Polymer-overlay materials.
 6. Polymer-sealer materials.
 7. Composite reinforcement on underside of slab.
- C. Concrete Walls and Floor in Salt Dome: Perform the following as indicated on Drawings:
1. Removal of deteriorated concrete and subsequent replacement and patching.
 2. Floor-joint repair.
 3. Epoxy crack-injection materials.
 4. Corrosion-inhibiting materials.
 5. Polymer-overlay materials.
 6. Polymer-sealer materials.
 7. Composite reinforcement of columns.

END OF SECTION 03 01 30