SECTION 03 01 30

MAINTENANCE OF CAST-IN-PLACE CONCRETE

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\*\* NOTE TO SPECIFIER \*\* MAPEI Americas; mortars and grouts for ceramic tile, stone, porcelain, and other materials.  
 .  
This section is based on the products of MAPEI Americas which is located at:  
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Web: [www.mapei.com/CA-EN](http://www.mapei.com/CA-EN)   
MAPEI is the global leader in the manufacture of installation materials for ceramic tile and stone, floor covering adhesives, and floor preparation for the construction industry. These materials include but are not limited to mortars, grouts, carpet and vinyl adhesives, self levelers, and concrete repair products. The company has 11 manufacturing facilities and employs approximately 600 people throughout North America.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Products for maintenance of concrete, including the following:
       1. Bonding agents.
       2. Patching mortar.
       3. Rapid-setting horizontal concrete repair.
       4. Rapid-setting vertical and overhead concrete repair.
       5. Vertical and overhead concrete repair.
       6. Polymer-modified vertical and overhead concrete repair.
       7. Polymer-modified horizontal repair.
       8. Self-leveling concrete toppings.
       9. Form and pour/pump concrete repair.
       10. Horizontal concrete repair.
       11. Silica-fume-enhanced concrete repair.
       12. Preplaced concrete materials.
       13. Epoxy crack-injection.
       14. Corrosion-inhibiting.
       15. Polymer-overlay.
       16. Polymer-sealer.
       17. Composite reinforcement.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ACI 503.3 - Specification for Producing a Skid-Resistant Surface.
    2. ASTM International (ASTM):
       1. ASTM C 33/C 33M - Standard Specification for Concrete Aggregates.
       2. ASTM C 109/C 109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
       3. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
       4. ASTM C 150/C 150M - Standard Specification for Aggregate for Masonry Mortar.
       5. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
       6. ASTM C 881/C 881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
       7. ASTM C 928/C 928M - Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs.
       8. ASTM C 937 - Standard Specification for Grout Fluidifier for Preplaced-Aggregate Concrete.
       9. ASTM C 1059/C 1059M - Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete.
       10. ASTM C 1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
       11. ASTM D 2240 - Standard Test Method for Rubber Property - Durometer Hardness.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: Manufacturer's data sheets on each product to be used, including:
        1. Preparation instructions and recommendations.
        2. Storage and handling requirements and recommendations.
        3. Installation methods.
     3. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.
  2. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
     2. Installer Qualifications: Minimum 2 year experience installing similar products.
     3. Source Limitations: For repair products, obtain each color, grade, finish, type, and variety of product from single source and from single manufacturer with resources to provide products of consistent quality in appearance and physical properties.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
       1. Finish areas designated by Architect.
       2. Do not proceed with remaining work until workmanship is approved by Architect.
       3. Refinish mock-up area as required to produce acceptable work.
  1. PRE-INSTALLATION MEETINGS
     1. Convene minimum two weeks prior to starting work of this section.
  2. DELIVERY, STORAGE, AND HANDLING
     1. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
     2. Handling: Handle materials to avoid damage.
  3. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
  4. SEQUENCING
     1. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: MAPEI Americas, 1144 E. Newport Center Rd., Deerfield Beach, FL 33442; ASD. Toll Free Tel: 888-365-0614; Fax: 954-246-8801; Email: CRS@mapei.com; Web: www.mapei.com/US-EN.
      2. Acceptable Manufacturer: MAPEI Americas, 2900 Francis-Hughes, Laval, PQ, Canada H7L3J5; ASD. Tel: 450-662-1212; Fax: 450-662-0444; Email: techservicerequests@mapei.com/CA-EN; Web: www.mapei.com/CA-EN.
      3. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete paragraph above or below; coordinate with Division 1 requirements.

* + 1. Substitutions: Not permitted.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs not required.

* 1. BONDING AGENTS
     1. 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. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
           1. Planibond 3C.

\*\* NOTE TO SPECIFIER \*\* Most products are 100 percent solids and free of VOCs.

* + 1. Epoxy Bonding Agent: ASTM C 881/C 881M, bonding system free of VOCs.
       1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.

\*\* NOTE TO SPECIFIER \*\* Delete product option not required.

* + - * 1. Planibond AE: Types I, II, IV and V.
        2. Planibond AE Fast: Types I, II, IV and V.
        3. Planibond SBA. Type VI: Normal set, segmental bridge adhesive.
        4. Planibond SBA SlowSet: Type VI: Slow set, segmental bridge adhesive.
    1. Latex Bonding Agent, Non-Redispersible: ASTM C 1059/C 1059M, Type II.
       1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.

\*\* NOTE TO SPECIFIER \*\* Delete product option not required.

* + - * 1. Planicrete AC. Application: For use at structural and exterior locations and where indicated.
        2. Planicrete UA.

\*\* NOTE TO SPECIFIER \*\* Retain "Mortar Scrub Coat" Paragraph below if patching with job-mixed patching mortar or concrete without using a manufactured bonding agent. Delete if not required.

* + 1. Mortar Scrub Coat: Mix consisting of 1 part Portland cement and 1 part fine aggregate complying with ASTM C 144 except 100 percent passing a No. 16 (1.18-mm) sieve.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs not required.

* 1. PATCHING MORTAR
     1. Patching Mortar Requirements:
        1. Only use patching mortars that are recommended by manufacturer for each applicable horizontal, vertical, or overhead use orientation.

\*\* NOTE TO SPECIFIER \*\* Consider retaining "Color and Aggregate Texture" Subparagraph below for patch repairs that are visible and important to Project's appearance. This can add expense; indicate on Drawings or by inserts the locations where color and aggregate matching is required. Delete if not required.

* + - 1. Color and Aggregate Texture: Provide patching mortar and aggregates of colors and sizes necessary to produce patching mortar that matches existing, adjacent, exposed concrete. Blend several aggregates if necessary to achieve suitable matches.

\*\* NOTE TO SPECIFIER \*\* Revise "Coarse Aggregate for Patching Mortar" Subparagraph below if another aggregate size is required. If more than one is required, indicate locations of each on Drawings or by inserts.

* + - 1. Coarse Aggregate for Patching Mortar: ASTM C 33/C 33M, washed rounded aggregate, Size No. 8, Class 5S. Add to patching-mortar mix only as permitted by patching-mortar manufacturer.
    1. Job-Mixed Patching Mortar: 1 part Portland cement and 2-1/2 parts fine aggregate complying with ASTM C 144, except 100 percent passing a No. 16 (1.18-mm) sieve.
    2. Cementitious Patching Mortar: Packaged, dry mix for repair of concrete. Compressive strength is tested according to ASTM C109 / C109M.
       1. Products: Subject to compliance with requirements. Provided by MAPEI Corporation.

\*\* NOTE TO SPECIFIER \*\* Delete product options not required. Delete the Compressive Strength paragraph for products if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. If necessary, insert data for other required characteristics to suit Project, such as bond strength, time of setting, and flexural strength.

* + - * 1. Mapecem Quickpatch.

Compressive Strength: Not less than 4000 psi (27.58 MPa) at 28 days.

* + - * 1. Topcem Premix.

Compressive Strength: Not less than 3000 psi (20.68 MPa) at 28 days.

* + - * 1. Topcem Pronto.

Compressive Strength: Not less than 4300 psi (29.65 MPa) at 28 days.

* + - * 1. Mapecem 102.

Compressive Strength: Not less than 5800 psi (39.99 MPa) at 28 days.

* + - * 1. Mapecem 202

Compressive Strength: Not less than 6100 psi (42.06 MPa) at 28 days.

* + - * 1. Planitop FD

Compressive Strength: Not less than 8000 psi (55.16 MPa) at 28 days.

* + - * 1. Planitop 11

Compressive Strength: Not less than 6000 psi (41.37 MPa) at 28 days.

* + - * 1. Planitop 11 SCC

Compressive Strength: Not less than 7000 psi (48.26 MPa) at 28 days.

* + - * 1. Planitop 12 SR

Compressive Strength: Not less than 10400 psi (71 71 MPa) at 28 days.

* + - * 1. Planitop 23

Compressive Strength: Not less than 7900 psi (54.47 MPa) at 28 days.

* + - * 1. Planitop 25

Compressive Strength: Not less than 7200 psi (49.64 MPa) at 28 days.

* + - * 1. Planitop Shotcrete

Compressive Strength: Not less than 7500 (51.71 MPa) at 28 days.

* + - * 1. Planitop 200

Compressive Strength: Not less than 2900 psi (19.99 MPa) at 28 days.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs not required. Manufacturers offer many products not identified according to ASTM C 928/C 928M.

* 1. RAPID-SETTING HORIZONTAL CONCRETE REPAIR PRODUCTS
     1. One-Component, Shrinkage-Compensated, Rapid-Strengthening, Horizontal Cementitious Repair Mortar: Packaged, dry mix for repair of concrete. Compressive strength is tested according to ASTM C109 / C109M.
        1. Products: Subject to compliance with requirements. Provide MAPEI Corporation.

\*\* NOTE TO SPECIFIER \*\* Delete product option not required. Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, 28-day compressive strength, time of setting, and flexural strength to suit Project. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

* + - * 1. Planitop 18. Comply with ASTM C 928/C 928M R3.

Compressive Strength: Not less than 9400 psi (64.81. MPa) at 28 days.

* + - * 1. Planitop 18 TG. Product shall comply with ASTM C 928/C 928M R3.

Compressive Strength: Not less than 9400 psi (64.81. Mpa) at 28 days.

* + 1. One-Component, Extended-Set, High-Early-Strengthening, Horizontal Cementitious Repair Mortar Suitable for Sloped Conditions: Packaged, dry mix for repair of concrete. Compressive strength is tested according to ASTM C109 / C109M.
       1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
          1. Planitop 18ES. Comply with ASTM C 928/C 928M R3.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, 28-day compressive strength, time of setting, and flexural strength to suit Project. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 5000 psi (34.47 Mpa) at 28 days.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraph option not required. Manufacturers offer many products not identified according to ASTM C 928/C 928M.

* 1. RAPID-SETTING VERTICAL AND OVERHEAD CONCRETE REPAIR PRODUCTS
     1. Fiber-Reinforced, Shrinkage-Compensated, Rapid-Strengthening, Cementitious Vertical and Overhead Repair Mortar: Packaged, dry mix for repair of concrete. Compressive strength is tested according to ASTM C109 / C109M.
        1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
           1. Planitop X. Product shall comply with ASTM C 928/C 928M R2.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph below if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 6,600 psi (45.51 MPa) at 28 days.

* + 1. Fiber-Reinforced, Shrinkage-Compensated, Rapid-Strengthening, Cementitious Vertical and Overhead Repair Mortar: Packaged, dry mix for repair of concrete. Compressive strength is tested according to ASTM C109 / C109M.
       1. Product: Subject to compliance with requirements. Provide MAPEI Corporation.
          1. Planitop XS. Comply with ASTM C 928/C 928M R2.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph below if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 5000 psi (34.47 MPa) 28 days.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. VERTICAL AND OVERHEAD CONCRETE REPAIR PRODUCTS
     1. Sulfate-Resistant, Fiber-Reinforced, Shrinkage-Compensated, Cementitious Vertical and Overhead Repair Mortar: Packaged, dry mix for repair of concrete. Compressive strength is tested according to ASTM C109 / C109M.
        1. Product: Subject to compliance with requirements. Provide by MAPEI Corporation.
           1. Planitop 12SR.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph below if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 10450 psi (72.05 MPa) 28 days..

\*\* NOTE TO SPECIFIER \*\* Delete article if not required paragraph option not required.

* 1. POLYMER-MODIFIED VERTICAL AND OVERHEAD CONCRETE REPAIR PRODUCTS
     1. Two-Component, Fiber-Reinforced, Shrinkage-Compensated, Fast-Setting, Cementitious Vertical and Overhead Repair Mortar: Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing. Compressive strength is tested according to ASTM C109 / C109M.
        1. Product: Subject to compliance with requirements. Provide by MAPEI Corporation.
           1. Planitop 23.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph below if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 7975 psi (55 MPa) at 28 days.

* + 1. Polymer-Modified, Cementitious Vertical and Overhead Repair Mortar: Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing. Compressive strength is tested according to ASTM C109 / C109M.
       1. Product: Subject to compliance with requirements. Provides by MAPEI Corporation.

\*\* NOTE TO SPECIFIER \*\* Delete product options not required. Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

* + - * 1. Planitop X.

Compressive Strength: Not less than 6600 psi (45.51 MPa) at 28 days.

* + - * 1. Planitop XS.

Compressive Strength: Not less than 5000 psi (34.47 MPa) at 28 days.

* + - * 1. Planitop 23.

Compressive Strength: Not less than 7900 psi (54.47 MPa) at 28 days.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraph option not required.

* 1. POLYMER-MODIFIED HORIZONTAL REPAIR PRODUCTS
     1. Two-Component, Cementitious Flowable Repair Mortar for Resurfacing Horizontal Concrete: Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing. Compressive strength is tested according to ASTM C109 / C109M.
        1. Product: Subject to compliance with requirements. Provide MAPEI Corporation.
           1. Planitop 25.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 7000 psi (49 MPa) at 28 days.

* + 1. Polymer-Modified, Cementitious Horizontal Resurfacing Mortar: Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing. Compressive strength is tested according to ASTM C109 / C109M.
       1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation;

\*\* NOTE TO SPECIFIER \*\* Delete product option not required. Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

* + - * 1. Concrete Renew mixed with diluted Planicrete UA.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

Compressive Strength: Not less than 3600 psi (24.8 MPa) at28 days.

* + - * 1. Concrete Renew Fine mixed with diluted Planicrete UA.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

Compressive Strength: Not less than 3600 psi (24.8 MPa) at28 days.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraph option not required.

* 1. SELF-LEVELING CONCRETE TOPPINGS
     1. Self-Leveling, Self-Drying, Polishable, Concrete Topping: Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing. Compressive strength is tested according to ASTM C109 / C109M.
        1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.

\*\* NOTE TO SPECIFIER \*\* Delete product option not required. Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

* + - * 1. Ultratop NA.

Compressive Strength: Not less than 6100 psi (42.1 MPa) at 28 days.

* + - * 1. Ultratop SP.

Compressive Strength: Not less than 6000 psi (41.4 MPa) at 28 days.

* + 1. Self-Leveling, Quick-Setting, Exterior-Rated, Polishable, Concrete Topping: Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing. Compressive strength is tested according to ASTM C109 / C109M.
       1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
          1. Planitop EL.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraph option not required.

* 1. FORM AND POUR/PUMP CONCRETE REPAIR PRODUCTS
     1. Flowable, Shrinkage-Compensated, Concrete Repair Mortar: Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing. Compressive strength is tested according to ASTM C109 / C109M.
        1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.

\*\* NOTE TO SPECIFIER \*\* Delete product option not required. Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

* + - * 1. Planitop FD.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

Compressive Strength: Not less than 8000 psi (55.0 MPa) at 28 days.

* + - * 1. Planitop 15.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

Compressive Strength: Not less than 10875 psi (75 MPa) at 28 days.

* + 1. One-Component, Pre-Extended, Pumpable and Pourable, Cementitious Repair Material: Packaged, dry mix for repair of concrete. Compressive strength is tested according to ASTM C109 / C109M.
       1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
          1. Planitop 11.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 6000 psi (42 MPa) at 28 days.

* + 1. One-Component, Pre-Extended, Pumpable and Pourable, Self Consolidating, Cementitious Repair Material: Packaged, dry mix for repair of concrete, containing silica fume and corrosion inhibitor. Compressive strength is tested according to ASTM C109 / C109M.
       1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
          1. Planitop 11 SCC.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 7000 psi (49 MPa) at 28 days.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraph option not required.

* 1. HORIZONTAL CONCRETE REPAIR PRODUCTS
     1. Two-Component, Polymer-Modified, Fast-Setting, Cementitious Repair Material: Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing. Compressive strength is tested according to ASTM C109 / C109M.
        1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
           1. Mapecem 202.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 6000 psi (42 MPa) at 28 days.

* + 1. One-Component, Polymer-Modified, Fast-Setting, Cementitious Repair Material: Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing. Compressive strength is tested according to ASTM C109 / C109M.
       1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
          1. Mapecem 102.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 5500 psi (38.5 MPa) at 28 days.

* + 1. One-Component, Polymer-Modified, Fast-Setting, Cementitious Repair Material: Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing. Compressive strength is tested according to ASTM C109 / C109M.
       1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
          1. Topcem Premix with undiluted Planicrete AC.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

Product shall be non-redispersible.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

Compressive Strength: Not less than 5300 psi (36.54 MPa) at 28 days.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraph option not required.

* 1. SILICA-FUME-ENHANCED CONCRETE REPAIR PRODUCTS
     1. Silica-Fume-Enhanced, Fluid Cementitious Repair Mortar: Packaged, dry mix for repair of concrete and that contains silica fume complying with ASTM C 1240. Compressive strength is tested according to ASTM C109 / C109M.
        1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Planitop 12 SR.

\*\* NOTE TO SPECIFIER \*\* Delete compressive strength paragraph if not required. Consult Project's structural engineer for compatibility of patching-mortar's strength with existing concrete's strength. Insert other required characteristics such as bond strength, time of setting, and flexural strength to suit Project. See ASTM C 928/C 928M for compressive strengths required. Manufacturers offer many products that exceed ASTM C 928/C 928M compressive strengths.

* + - 1. Compressive Strength: Not less than 10800 psi (74.46 MPa) at 28 days.
    1. Silica-Fume-Enhanced, Pre-Extended, Self-Consolidating Concrete (SCC): Packaged, dry mix for repair of concrete and that contains silica fume complying with ASTM C 1240. Compressive strength is tested according to ASTM C109 / C109M.
       1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Planitop 11 SCC.

\*\* NOTE TO SPECIFIER \*\* Retain "Compressive Strength" Subparagraph below if required; revise to suit Project. Consult Project's structural engineer for compatibility of the patching-mortar's strength with the existing concrete's strength. Insert subparagraphs for other required characteristics to suit Project, such as bond strength, time of setting, and flexural strength. Delete if not required.

* + - 1. Compressive Strength: Not less than 7000 psi (49 MPa) at 28days when tested according to ASTM C 109/C 109M.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. PREPLACED CONCRETE MATERIALS

\*\* NOTE TO SPECIFIER \*\* First option in "Preplaced Aggregate" Paragraph below is coarser aggregate than second option and may be infeasible if space is congested with reinforcement.

* + 1. Preplaced Aggregate: Washed aggregate, ASTM C 33/C 33M, Class 5S, with 95 to 100 percent passing a 1-1/2 inches (37.5 mm) sieve, 40 to 80 percent passing a 1-inch (25 mm) sieve, 20 to 45 percent passing a 3/4 inch (19-mm) sieve, zero to 10 percent passing a 1/2 inch (12.5 mm) sieve, and zero to 2 percent passing a 3/8 inch (9.5 mm) sieve.
    2. Preplaced Aggregate: 100 percent passing a 1-1/2 inches (37.5 mm) sieve, 95 to 100 percent passing a 1 inch (25 mm) sieve, 40 to 80 percent passing a 3/4 inch (19 mm) sieve, zero to 15 percent passing a 1/2 inch (12.5 mm) sieve, and zero to 2 percent passing a 3/8 inch (9.5 mm) sieve.
    3. Fine Aggregate for Grout: Fine aggregate according to ASTM C 33/C 33M, but with 100 percent passing a No. 8 (2.36 mm) sieve, 95 to 100 percent passing a No. 16 (1.18 mm) sieve, 55 to 80 percent passing a No. 30 (0.6 mm) sieve, 30 to 55 percent passing a No. 50 (0.3 mm) sieve, 10 to 30 percent passing a No. 100 (0.15 mm) sieve, zero to 10 percent passing a No. 200 (0.075 mm) sieve, and having a fineness modulus of 1.30 to 2.10.
    4. Grout Fluidifier for Grout: ASTM C 937.
    5. Pozzolans for Grout: ASTM C 618.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. JOINT FILLER

\*\* NOTE TO SPECIFIER \*\* Retain "Epoxy Joint Filler" or "Polyurea Joint Filler" Paragraph below for replacing control-joint filler in non-moving joints at slabs-on-grade; revise to suit Project. If retaining more than one type, indicate location of each on Drawings or by inserts.

* + 1. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A Shore durometer hardness of at least 80 according to ASTM D 2240.
       1. Product: Subject to compliance with requirements. Provide by MAPEI Corporation.
          1. Mapeflex Joint Filler EP 90/50.
    2. Polyurea Joint Filler: Two-component, semirigid, 100 percent solids, polyurea resin with a Type A Shore durometer hardness of at least 75 according to ASTM D 2240.
       1. Product: Subject to compliance with requirements. Provide by MAPEI Corporation.
          1. Mapeflex Joint Filler PO 95/100

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. EPOXY CRACK-INJECTION MATERlALS

\*\* NOTE TO SPECIFIER \*\* In "Epoxy Crack-Injection Adhesive" and "Epoxy Crack Adhesive" paragraphs below, Type I is for non-load-bearing applications and Type IV is for load-bearing applications. If retaining more than one type, indicate location of each on Drawings or by inserts. Most products are 100 percent solids and free of VOCs. Consult manufacturers for names of compliant products.

* + 1. Epoxy Crack-Injection Adhesive: ASTM C 881/C 881M, bonding system. Free of VOCs.
       1. Product: Subject to compliance with requirements, provide MAPEI Corporation;
       2. Epojet LV.
       3. Type I or Type II: Non-load-bearing applications.

\*\* NOTE TO SPECIFIER \*\* Always retain paragraph below.

* + - 1. Capping Adhesive: MAPEI Corporation; Planibond AE or Planibond AE Fast product manufactured for use with crack-injection adhesive by same manufacturer.
    1. Epoxy Crack Adhesive: ASTM C 881/C 881M, bonding system. Free of VOCs.
       1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Planibond AE: Type I, II, IV and V.

\*\* NOTE TO SPECIFIER \*\* Delete type not required.

* + - 1. Type I or Type II: Non-load-bearing applications.
      2. Type IV: Load-bearing and structural applications.
    1. Epoxy Crack Adhesive: ASTM C 881/C 881M, bonding system. Free of VOCs.
       1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Planibond AE Fast: Type I, II, IV and V.

\*\* NOTE TO SPECIFIER \*\* Delete type not required

* + - 1. Type I or Type II: Non-load-bearing applications.
      2. Type IV: Load-bearing and structural applications.
    1. Epoxy Crack Adhesive: ASTM C 881/C 881M, bonding system. Free of VOCs.
       1. Product: Subject to compliance with requirements, provide MAPEI Corporation;
       2. Epojet: Type I, II and IV.
       3. Epojet LV: Type I, II and IV.

\*\* NOTE TO SPECIFIER \*\* Delete type not required.

* + - 1. Type I or Type II: Non-load-bearing applications.
      2. Type IV or Type V: Load-bearing and structural applications.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. CORROSION-INHIBITING MATERlALS
     1. 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. Products: Subject to compliance with requirements. Provided by MAPEI Corporation.
           1. Mapeshield CI 100.
           2. Mapeshield CI 110. With integrated water repellant.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. POLYMER-OVERLAY MATERlALS

\*\* NOTE TO SPECIFIER \*\* Most polymer overlay products are 100 percent solids and free of VOCs. Determine the VOC limit established by authorities having jurisdiction, consult manufacturers for names of compliant products, and revise "Polymer Overlay" Paragraph below accordingly.

* + 1. Polymer Overlay: Epoxy adhesive complying with ASTM C 881/C 881M, bonding system Type III, with surface-applied aggregate for skid resistance; free of VOCs.
       1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Planiseal Traffic Coat.
       2. Aggregate: ACI 548.8, oven-dried, washed, angular aggregate with a Mohs hardness scale > 6 conforming to aggregate gradation as follows:
          1. No. 4 Mesh Size: 100 percent passing.
          2. No. 8 Mesh Size: 30 to 75 percent passing.
          3. No. 16 Mesh Size: 0 to 5 percent passing.
          4. No. 30 Mesh Size: 0 to 1 percent passing.

\*\* NOTE TO SPECIFIER \*\* Consider retaining "Color and Texture" Subparagraph below for polymer overlays that are important to Project's appearance. Delete color and texture not required.

* + - 1. Color and Texture: As indicated by manufacturer's designations.
      2. Color and Texture: Matching existing.
      3. Color and Texture: As selected by Architect from full range of industry colors.
    1. Polymer Overlay: Epoxy adhesive complying with ASTM C 881/C 881M, bonding system Type III, with surface-applied aggregate for skid resistance; free of VOCs.
       1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Planiseal Traffic Coat FS.
       2. Aggregate: ACI 548.8, oven-dried, washed, angular aggregate with a Mohs hardness scale > 6 conforming to aggregate gradation as follows:
          1. No. 4 Mesh Size: 100 percent passing.
          2. No. 8 Mesh Size: 30 to 75 percent passing.
          3. No. 16 Mesh Size: 0 to 5 percent passing.
          4. No. 30 Mesh Size: 0 to 1 percent passing.

\*\* NOTE TO SPECIFIER \*\* Consider retaining "Color and Texture" Subparagraph below for polymer overlays that are important to Project's appearance. Delete color and texture not required.

* + - 1. Color and Texture: As indicated by manufacturer's designations.
      2. Color and Texture: Matching existing.
      3. Color and Texture: As selected by Architect from full range of industry colors.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. POLYMER-SEALER MATERIALS

\*\* NOTE TO SPECIFIER \*\* Many sealers are 100 percent solids and free of VOCs. "VOC content 100 g/L or less" option in "Epoxy Polymer Sealer" and "Methacrylate Polymer Sealer" paragraphs below corresponds to the SCAQMD limit on VOCs, while "VOC content 400 g/L or less" option corresponds to the EPA and OTC limit. Determine the VOC limit established by authorities having jurisdiction, consult manufacturers for names of compliant products, and revise text accordingly.

* + 1. Epoxy Polymer Sealer: Low-viscosity epoxy, penetrating sealer and crack filler recommended by manufacturer for penetrating and sealing cracks in exterior concrete traffic surfaces
       1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Planiseal LVB.
       2. VOC Content: 240 g/L or less.

\*\* NOTE TO SPECIFIER \*\* Consider retaining "Color and Texture" Subparagraph below for polymer overlays that are important to Project's appearance. Delete color and texture not required.

* + - 1. Color and Texture: As indicated by manufacturer's designations.
      2. Color and Texture: Matching existing.
      3. Color and Texture: As selected by Architect from full range of industry colors.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. COMPOSITE REINFORCEMENT MATERlALS

\*\* NOTE TO SPECIFIER \*\* Retain required options in "Composite Structural Reinforcement" Paragraph below; availability varies with manufacturer and product.

* + 1. Composite Structural Reinforcement:
       1. Manufacturer's system consisting of reinforcement and epoxy primers, fillers, adhesives, saturants, and topcoats, designed for use as externally bonded structural reinforcement for concrete.

\*\* NOTE TO SPECIFIER \*\* Delete reinforcement type not required.

* + - 1. Reinforcement: Carbon-fiber reinforcement in the form of tow sheet with field-applied saturant or preimpregnated sheet
      2. Reinforcement: Glass-fiber reinforcement in the form of tow sheet with field-applied saturant or preimpregnated sheet.
      3. Reinforcement: carbon-fiber or glass-fiber reinforcement in the form of tow sheet with field-applied saturant or preimpregnated sheet.

\*\* NOTE TO SPECIFIER \*\* Carboplate E 170 is a range of pultruded carbon fiber plates, with high resistance and flexibility, for plating pre-stressed reinforced concrete and steel structures. Carboplate E 170 is used for the repair and upgrade of beams and slabs with increased live loads, for reinforcing concrete structures damaged by time and natural causes, and for anti-seismic strengthening of structures built on earthquake zones. Some application examples include an increase in static and/or dynamic loads brought on by equipment and machinery in industrial and commercial structures, increased traffic volume on bridges, and vibrating.  
Maperoc C is a rage of pultruded carbon fiber rods, with high tensile strength and a modulus of elasticity of 22.5 x 106 psi (155,000 N/mm2). After the plastic film is removed, the Maperoc C "near surface-mounted" rods are used for structural repairs and strengthening of structural elements in reinforced concrete, brickwork, stone or volcanic ash that has been damaged by either physical/mechanical stresses or natural events. Maperod C may be used together with the fabrics from the MapeWrap™ range for stronger anchoring, particularly when flexural or shear strengthening operations are carried out.  
MapeWrap C Uni-Ax 300 is a high-strength, uni-directional carbon fiber fabric that, when used with the MapeWrap family of two-component epoxy adhesives, forms an externally bonded fiber-reinforced polymer (FRP) reinforcement system engineered to increase the strength of existing structural elements. MapeWrap C Uni-Ax 300 is applied to the surface of structural members in buildings, parking garages, bridges, marine piles and other structures to contribute significant strength, without increasing the dead load supported by the structure.

MapeWrap C Uni-Ax 600 is a high-strength, uni-directional carbon fiber fabric that, when used with the MapeWrap family of two-component epoxy adhesives, forms an externally bonded fiber-reinforced polymer (FRP) reinforcement system. MapeWrap C Uni-Ax 600 is part of an engineering solution that allows for an increase in the strength of structural elements without increasing the dead load supported by the structure. MapeWrap C Uni-Ax 600 has twice the weight to surface area and twice the thickness of MapeWrap C Uni-Ax 300.  
MapeWrap G Uni-Ax is a high-strength, uni-directional E-glass fiber fabric that, when used with the MapeWrap family of two-component epoxy adhesives, forms an externally bonded fiber-reinforced polymer (FRP) reinforcement system engineered to increase the strength of structural elements. When applied to the surface of structural members in buildings, parking garages, bridges, marine piles and other structures, MapeWrap G Uni-Ax improves the seismic performance of concrete columns, masonry and concrete walls, and concrete beam-column connections.  
MapeWrap Primer 1 is a two-component, super-fluid, solvent-free epoxy resin, formulated for the consolidation and priming of concrete, reinforced concrete, or masonry surfaces before bonding MapeWrap fabrics, Carboplate™ plates, or Maperod™ rods. MapeWrap Primer 1 is prepared by pouring Part B into Part A and mixing until the resin is completely homogeneous. The mixing ratio is 3 parts by weight of Part A to 1 part by weight of Part B. MapeWrap Primer 1 is then applied by a brush or roller onto a clean, dry and mechanically sound substrate. MapeWrap Primer 1 remains workable for 90 minutes at 73 degrees F (23 degrees C).  
MapeWrap 11 Normal-Setting, Thixotropic Epoxy Putty for Smoothing and Leveling Concrete Surfaces. MapeWrap 11 is a two-component, epoxy resin-based product with selected fine-graded aggregates and special additives developed in MAPEI's research laboratories. MapeWrap 11 is used to level concrete or reinforced concrete surfaces that need to be repaired or reinforced by bonding the MapeWrap fabrics, Carboplate carbon plates, and Maperod carbon rods, and as a structural adhesive for the Carboplate and Maperod systems.

MapeWrap 12 Slow-Setting Epoxy Putty for Smoothing and Leveling Concrete Surfaces. MapeWrap 12 is a two-component, epoxy resin for leveling concrete or reinforced concrete surfaces and as a structural adhesive for the Carboplate and Maperod systems. MapeWrap 12 is recommended in hot climates (applications at temperatures > 73 degrees F (23 degrees C), or when leveling large surface areas. MapeWrap 12 is prepared by pouring Part B into Part A and mixing until the resin is completely homogeneous. The mixing ratio is 3 parts by weight of Part A to 1 part by weight of Part B. MapeWrap 12 remains workable for about 60 minutes at 73 degrees F (23 degrees C).  
MapeWrap 21 Epoxy Resin for 'Wet-Layup' Saturation of MapeWrap Fabrics. MapeWrap 21 is a two-component, super fluid, solvent-free epoxy resin product, formulated for the saturation of MapeWrap fabrics, immediately before placing the fabric. The saturation is accomplished by dipping the fabric into a trough or other impregnation equipment. MapeWrap 21 is prepared by pouring Part B into Part A and mixing until the resin is completely homogeneous. The mixing ratio is 4 parts by weight of Part A to 1 part by weight of Part B. MapeWrap 21 remains workable for 40 minutes at 73 degrees F (23 degrees C). The impregnated fabric is applied over the still fresh MapeWrap 11 or MapeWrap 12, ensuring that it is laid without wrinkles.  
MapeWrap 31 Epoxy Resin for 'Dry-Layup' Saturation of MapeWrap Fabrics. MapeWrap 31 is a two-component, solvent-free epoxy resin product, formulated for the saturation of MapeWrap fabrics during application, using the "dry-layup" system. MapeWrap 31 is prepared by pouring Part B into Part A and mixing until the resin is completely homogeneous. The mixing ratio is 4 parts by weight of Part A to 1 part by weight of Part B. MapeWrap 31 remains workable for 40 minutes at 73 degrees F (23 degrees C). MapeWrap 31 is applied onto the still fresh MapeWrap 11 or MapeWrap 12 with a brush or short bristle roller, and the fabric is then placed over the concrete element, removing any wrinkles. Delete product not required.

* + - 1. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
         1. Carboplate E 170.
      2. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
         1. Maperoc C.
      3. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
         1. MapeWrap C Uni-Ax 300.
      4. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
         1. MapeWrap C Uni-Ax 600.
      5. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
         1. MapeWrap C Uni-Ax 1200.
      6. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
         1. MapeWrap G Uni-Ax 900.
      7. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
         1. MapeWrap C Bi-Ax 230.
      8. Product: Subject to compliance with requirements, provide MAPEI Corporation; MapeWrap Primer 1.
      9. Product: Subject to compliance with requirements, provide MAPEI Corporation; MapeWrap 11.
      10. Product: Subject to compliance with requirements, provide MAPEI Corporation; MapeWrap 12.
      11. Product: Subject to compliance with requirements, provide MAPEI Corporation; MapeWrap 21.
      12. Product: Subject to compliance with requirements, provide MAPEI Corporation; MapeWrap 31.
      13. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
          1. MapeWrap 31 Slow Set
      14. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
          1. MapeWrap C Fiocco
      15. Product: Subject to compliance with requirements. Provided by MAPEI Corporation.
          1. MapeWrap G Fiocco
  1. MISCELLANEOUS MATERIALS
     1. Portland Cement: ASTM C 150/C 150M, Type I, II, or III unless otherwise indicated.
     2. Water: Potable.
  2. MIXES
     1. General: Mix products, in clean containers, according to manufacturer's written instructions.
        1. Do not add water, thinners, or additives unless recommended by manufacturer.
        2. 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.
        3. Do not mix more materials than can be used within time limits recommended by manufacturer. Discard materials that have begun to set.

\*\* NOTE TO SPECIFIER \*\* Retain "Mortar Scrub Coat" Paragraph below if patching with job-mixed patching mortar or concrete without using a manufactured bonding agent.

* + 1. Mortar Scrub Coat: Mix dry ingredients with enough water to provide consistency of thick cream.
    2. Dry-Pack Mortar: Mix required type(s) of patching-mortar dry ingredients with just enough liquid to form damp cohesive mixture that can be squeezed by hand into a ball but is not plastic.
    3. Concrete: Comply with Section 03 30 00 - Cast-in-Place Concrete.
    4. Grout for Use with Preplaced Aggregate: Proportion according to ASTM C 938. Add grout fluidifier to mix.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until substrates have been properly prepared.
      2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
   2. PREPARATION
      1. Clean surfaces thoroughly prior to installation.
      2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   3. INSTALLATION
      1. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.
   4. PROTECTION
      1. Protect installed products until completion of project.
      2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION