PLANITOP SHOTCRETE
Silica-Fume-Enhanced Shotcrete Mix

SECTION 03 01 30
MAINTENANCE OF CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products for maintenance of concrete, including the following:
   A. Horizontal, vertical and overhead concrete repair.
   B. Silica-fume-enhanced concrete repair.

1.2 RELATED SECTIONS
A. Section 03 30 00 - Cast-in-Place Concrete.
B. Section 03 41 00 – Precast Structural concrete

1.3 REFERENCES

A. ASTM International:
   A. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
   B. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   A. Preparation instructions and recommendations.
   B. Storage and handling requirements and recommendations.
   C. Installation methods.

C. Verification Samples: For each finish product specified, two samples, minimum size 6" (150 mm) square representing actual product, color and patterns.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 years’ experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 years’ experience installing similar products.

C. 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.

D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   A. Finish areas designated by Architect.
   B. Do not proceed with remaining work until workmanship is approved by Architect.

C. Refinish mock-up area as required to produce acceptable work.

1.6 PRE-INSTALLATION MEETINGS

A. Convene at least two weeks prior to starting work of this section.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.8 PROJECT CONDITIONS

A. 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.

1.9 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Product Performance:

Compressive strength – ASTM C109
1 day > 3,000 psi (20.7 MPa)
7 days > 6,000 psi (41.4 MPa)
28 days > 7,500 psi (51.7 MPa)

Flexural strength – ASTM C348
7 days > 775 psi (5.34 MPa)
28 days > 1,100 psi (7.59 MPa)

Splitting tensile strength – ASTM C496
28 days 500 psi (3.45 MPa)

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B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

C. Substitutions: Not permitted.

2.2 SILICA-FUME-ENHANCED CONCRETE REPAIR PRODUCTS

A. Silica-Fume Enhanced, Cementitious Horizontal, Vertical and Overhead Shotcrete Repair Mortar: Packaged, dry mix for repair of concrete.
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Planitop Shotcrete.
   2. Compressive Strength: Not less than 8,000 psi (55.2 MPa) within 28 days when tested according to ASTM C109.

2.3 MISCELLANEOUS MATERIALS

A. Portland Cement: ASTM C150/C 150M, Type I, II or III unless otherwise indicated.

B. Water: Potable.

2.4 MIXES

A. General: Mix products in clean containers according to manufacturer's written instructions.
   A. Do not add water, thinners or additives unless recommended by manufacturer.
   B. 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 shovels or trowels as units of measure.
   C. Do not mix more materials than can be used within time limits recommended by manufacturer. Discard materials that have begun to set.

B. Concrete: Comply with Section 03 30 00 - Cast-in-Place Concrete.

PART 3 EXECUTION

3.1 EXAMINATION

A. Properly prepared concrete at least 28 days old, stable, sound and dry.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Concrete surface must be and free of loose particles, efflorescence, paints, tars, grease, asphaltic materials, bond breakers, curing compounds, wax, and any foreign substance or any conditions that may affect product performance or proper bonding.

B. For repair applications, saw-cut the perimeter of the repair area into a square to a minimum depth of 3/8" (10 mm).

C. Mechanically profile and prepare concrete surfaces by engineer-approved methods in accordance with the most current ICRI 310.2R guidelines.

D. Ensure that all reinforcing steel is prepared in accordance with the most current ICRI 310.1 guideline and coated with either Planibond 3C or Mapefer 1K.

E. Ensure that the concrete substrate is saturated surface-dry (SSD) before installation of Planitop Shotcrete.

3.3 MIXING

A. Before product use, take appropriate safety precautions. Refer to the Safety Data Sheet for details.Dry process: Set up dry-process shotcrete equipment convenient to the placement site. Gauge water in the nozzle and adjust to the desired consistency. The mixing ratio is 2.91 to 3.43 U.S. qts. (2.75 to 3.25 L) of clean, potable water per 55 lbs. of Planitop Shotcrete.

B. Wet process: Set up conventional wet-process spray equipment and add water. The mixing ratio is 2.91 to 3.43 U.S. qts. (2.75 to 3.25 L) of clean, potable water per 55 lbs. of Planitop Shotcrete.

C. Mix for about 3 minutes to obtain a smooth, homogenous consistency.

3.4 INSTALLATION

A. Read all installation instructions thoroughly before installation. Refer to ACI 506-R85, “Guide to Shotcrete” for shotcrete procedures.

B. Dry process: Use conventional dry-shotcrete equipment and spray at a distance of 2 to 6 feet (0.61 to 1.83 m) from the repair area, with the nozzle perpendicular to the surface. Monitor mortar consistency, which should be in a plastic state immediately after application and before the product sets.

C. Wet process: Shoot at a distance of 18" to 24" (46 to 61 cm) from the repair area with the nozzle perpendicular to the surface to minimize rebound, producing a flatter surface and reducing bumps in the material. Ensure that the distance is sufficient to encase any rebar present.

D. Allow Planitop Shotcrete to stiffen for about 5 to 10 minutes and then smooth out any bumpy areas with a trowel or a vertical screed/darby. Before applying a second layer, ensure that the material has reached initial set, typically after 2 to 4 hours depending on jobsite conditions, and that the surface of the initial layer is cross-hatched.

E. Planitop Shotcrete can be applied in thickness up to 1.6" (4 cm) per coat without forms. For thickness more than 1.6" (4 cm), apply in several coats, up to a maximum of 6" (15 cm).

3.5 CURING

A. Keep Planitop Shotcrete from high winds and direct sunlight while it cures.

B. Moist-cure Planitop Shotcrete with a fine mist of water, with burlap and polyethylene or an appropriate ASTM-C309-referenced curing compound.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch up, repair or replace damaged products before substantial completion.

END OF SECTION