

**SECTION 096613 PORTLAND CEMENT TERRAZZO**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the Portland cement terrazzo (Admin Bldg) as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Cementitious terrazzo flooring.
  - 2. Precast stair treads.
  - 3. Divider and expansion strips.
  - 4. Sealer.

1.3 RELATED SECTIONS

- A. Concrete slab - Section 033000.
- B. Steel Pan Stairs - Section 055113.
- C. Gypsum Drywall - Section 092900.

1.4 QUALITY ASSURANCE

- A. Qualification of Installers: Use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.
- B. Comply with applicable specifications and recommendations of the National Terrazzo and Mosaic Association, Inc. (NTMA).

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information and installation instructions for each type of terrazzo, accessory item, and material required.
- B. Certification: Submit supplier's/manufacture's written certification that terrazzo materials meet or exceed specified NTMA properties.
- C. Shop Drawings: Submit shop drawings showing layout of divider strips, control joint strips and base and border strips if required.
  - 1. Submit shop drawings of precast work, showing large scale details of jointing and edge conditions, and showing elevations and plans for layout of work. Include details of anchorage and other special features required.

- D. Samples: Submit 12" square samples of each pattern, color and type of terrazzo required, together with minimum 6" long samples of each type accessory item.
- E. Maintenance Instructions: Submit two (2) copies of written instructions for recommended periodic maintenance of terrazzo.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Portland Cement: ASTM C 150, Type 1, except as otherwise modified. Obtain cement from a single source for all work of one color.
  - 1. Provide standard gray cement for underbed.
  - 2. Provide non-staining white cement for terrazzo matrix. Cement shall attain a minimum compressive strength of not less than 2800 psi at 3 days and 4000 psi at 7 days.
- B. Sand: ASTM C 33.
- C. Water: Clean, free of oil, soluble salts or other deleterious substances.
- D. Aggregates: Natural, sound, crushed marble chips sizes, 0 and 1 without excessive flats or flakes. Colors and gradation of aggregate to meet with accepted samples.
- E. Underbed Reinforcement: 2" x 2" x 16 ga. welded wire mesh, ASTM A 185, galvanized.
- F. Divider Strips: Depth and style as required for type and thickness of terrazzo.
  - 1. Provide 1/16" and 1/8" wide exposed top unless otherwise indicated. Comply with NTMA recommendations.
  - 2. Material shall be white alloy zinc.
- G. Control or Expansion Strips: Double or split units 1/8" wide, or same material and color as the divider strips. Provide 1/8" wide black neoprene filler of same depth as strips, laminated between the strips.
  - 1. Expansion Strip Filler: Removable wood strip to receive elastomeric sealant.
- H. Accessory Strips: Match width, material and color of divider strips. Provide the following accessory strips as required for a complete installation:
  - 1. Base beads.
  - 2. Cove base dividers.
- I. Curing Compound: Liquid membrane-forming compound, complying with ASTM C 309, Type 1.
- J. Cleaner: Neutral chemical cleaner, free from crystallizing salts or water-soluble alkaline salts, formulated for Portland cement terrazzo, equal to "Super Shine-All" made by Hillyard Chemical Co. or approved equal.
- K. Sealer: Provide two (2) coats of sealer equal to "Terrazine" as manufactured by Hillyard Chemical Co., or approved equal.

- L. Polish: "Top Shape" made by Hillyard Chemical Co. or approved equal.

## 2.2 MIXES

### A. Flooring Proportions

- 1. Underbed
  - a. Charge and mix sand and Portland cement.
  - b. Add water and mix.
- 2. Terrazzo Topping: Charge and mix marble chips, Portland cement and color pigment.

### B. Base

- 1. Proportions
  - a. Setting Bed: One-part Portland cement to 3-1/2 parts sand and sufficient water to provide workability at as low a slump as possible.
  - b. Terrazzo Topping: One 94 lb. bag of Portland cement per 200 lbs. of marble chips, 2 lbs. color pigment and approx. 5 gals. of water.
- 2. Mixing
  - a. Setting Bed
    - 1) Charge and mix sand and Portland cement
    - 2) Add water and mix.
  - b. Terrazzo Topping
    - 1) Charge and mix marble chips, Portland cement and color pigment.
    - 2) Add approx. 5 gals. water and mix to a uniform consistency.

## 2.3 PRECAST TERRAZZO

- A. Provide precast terrazzo stair treads as detailed on drawings with 3" abrasive nosings consisting of aluminum oxide or silicone carbide; color as selected by the Architect.
- B. Comply with NTMA specifications and recommendations for fabrication of precast terrazzo. Reinforce all precast terrazzo units.
- C. Match color and pattern of precast work with color and pattern of cast in place work, unless different color and pattern required.
- D. Materials shall conform to the requirements specified above in Para. 2.1.
- E. Furnish all inserts, anchors and accessories required for complete installation.

**PART 3 - EXECUTION**

**3.1 INSPECTION**

- A. Examine the areas and conditions where Portland cement terrazzo is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

**3.2 PREPARATION**

- A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.
  - 1. Roughen concrete substrates before installing terrazzo system according to NTMA's written recommendations.
- B. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
  - 1. Moisture Testing: Perform tests indicated below.
    - a. Calcium Chloride Test: Perform anhydrous calcium chloride test per ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of [3 lb. of water/1000 sq. ft. in 24 hours.
      - 1) Perform tests so that each test area does not exceed 200 sq. ft., and perform not less than two tests in each installation area and with test areas evenly spaced in installation areas.
    - b. In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative-humidity-level measurement.
- C. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.

**3.3 INSTALLATION**

- A. General
  - 1. Finish surface shall not exceed 1/8" in 10'-0" run, any direction;  $\pm$  1/8" at any location; 1/32" offset at any location.
  - 2. Comply with NTMA specifications and recommendations for preparation of substrate, proportioning mixes, installation of metal strips, and for placing curing, grinding, grouting and finishing.
  - 3. Provide terrazzo bases and stair landings, as shown, without interruptions or seams, except where divider strips, control joints and expansion joints are required as shown on drawings. Place and finish terrazzo around obstructions to achieve continuous color, pattern and finish throughout the work.
  - 4. Complete terrazzo installation before the application of other items which might be damaged by this work.

- B. Expansion Joints: Where expansion joints are shown, install two (2) divider strips, separated by the joint width shown with removable strip, extending the full depth of the topping and underbed. Do not bridge expansion joints with reinforcement or cross strips.
- C. Underbed
  - 1. Cover slab with clean dry sand to a depth of 1/16". Cover sand with 4 mil polyethylene sheet lapping ends and edges 3"; over sheet lay mesh reinforcing.
  - 2. Place concrete underbed.
  - 3. Screed underbed to 1/2" below finished floor level.
  - 4. Install divider strips as shown on drawing in semi-plastic underbed and trowel firmly along edges to assure positive anchorage.
  - 5. Install control joint strips precisely above expansion joints, taking care that control joint strip is full depth of underbed.
- D. Placing Terrazzo
  - 1. Slush underbed with neat cement paste same color as specified for the topping including pigment if contained in topping.
  - 2. Broom paste into underbed surface.
  - 3. Place terrazzo mixture in panels formed by divider strips.
  - 4. Trowel mixture to level of top of strips.
  - 5. Seed troweled surface with additional chips in same proportions as contained in terrazzo mix and trowel.
  - 6. Roll seeded surface with heavy rollers until all excess water has been extracted.
  - 7. Trowel to uniform surface disclosing lines of divider strips.
- E. Curing
  - 1. After completing placement of terrazzo, install curing material in accordance with manufacturer's recommendations.
  - 2. Cure until topping develops sufficient strength to prevent lifting or pulling of terrazzo chips during grinding.
- F. Finishing
  - 1. Rough Grinding
    - a. Grind with 24 or finer grit stones or with comparable diamond plates.
    - b. Follow initial grind with 80 or finer grit stones.
  - 2. Grouting
    - a. Cleanse floor with clean water and rinse thoroughly.
    - b. Remove excess rinse water and machine or hand apply grout using identical Portland cement, color and pigments as used in topping, taking care to fill all voids completely.
  - 3. Curing Grout
    - a. As soon as grout has attained initial set, apply curing material.
    - b. Cure grout a min. of 72 hrs. unless a cement modifier is used.

4. Fine Grinding
  - a. Grind with 80 or finer grit stones until all grout is removed from surface.
  - b. Upon completion terrazzo shall show a min. of 70% to 75% of marble chips.

G. Base

1. Setting Bed
  - a. Thoroughly saturate substrate with water, slush and broom with neat cement paste.
  - b. Screed setting bed to elevation 3/8" below finish.
  - c. Install divider strips as shown on drawing in semi-plastic setting bed and trowel firmly along edges to assure positive anchorage.
2. Placing Terrazzo
  - a. Slush setting bed with neat cement paste same color as specified for topping including pigment if contained in topping.
  - b. work paste into setting bed surface.
  - c. Trowel terrazzo mixture to shape as detailed between strips.
3. For curing and finishing, follow procedures specified herein for flooring.

3.4 INSTALLATION OF PRECAST TERRAZZO

- A. Install precast terrazzo as shown in accordance with NTMA specifications. Tamp units into setting bed to achieve a full bond without voids. Level units at joints. Finish grind at joints if required to remove any minor discrepancies in level of units. Replace warped, stained, damaged and non-matching units as directed. Grout joints with a mixture of Portland cement, pigment and water, matching the matrix of the joints.

3.5 FINAL CLEANING AND FINISHING

- A. Clean terrazzo just prior to substantial completion of project; when dry, apply two (2) coats of sealer using lambswool applicator at the rate of 1000 square feet per gallon/coat.
- B. When dry, polish floor with polishing compound specified herein following manufacturer's instructions.

END OF SECTION 096613