PART 1  GENERAL

1.1  WORK INCLUDED

A.  Epoxy terrazzo with divider and accessory strips.

1.2  RELATED SECTIONS

A.  Division 03 – Concrete.

B.  Division 15 - Mechanical:  Provide floor drains at epoxy terrazzo flooring.

C.  Division 16 - Electrical:  Electrical floor box devices.

1.3  DEFINITIONS

A.  NTMA:  National Terrazzo and Mosaic Association, Inc.

1.4  PRE-INSTALLATION MEETINGS

A.  Pre-Installation Conference:  The General Contractor shall conduct a conference at project site before Terrazzo Contractor begins installation.

1.  The General Contractor shall invite Terrazzo Contractor, the Architect and Owner's Representative.

2.  Review methods and procedures related to terrazzo including, but not limited to, the following:

a.  Inspect and discuss condition of substrate and other preparatory work performed by other trades.

b.  Review and finalize construction schedule and verify availability of materials, installer’s personnel, equipment and facilities needed to make progress and avoid delays.

c.  Review terrazzo mixes and patterns.

d.  Review custom terrazzo mixes, designs and patterns.

e.  Coordination with the work of other installers.

1.5  SUBMITTALS

A.  Product Data:  Submit product data for each type of product required for installation including:

1.  Strip materials.

2.  Sealer.

3.  Finish.

B.  Shop Drawings:  Prepare and submit shop drawings that include plans, elevations, sections, component details and attachments to other work. Include terrazzo installation requirements. Show layout of the following:

1.  Divider strips.

2.  Expansion joint strips.

3.  Accessory strips.
4. Abrasive strips.
5. Terrazzo patterns.

C. Samples:
   1. Contractor shall prepare and submit a maximum of three (3) samples, 6x6 inches in size, for each color and type of terrazzo specified.
   2. Accessories: 6 inch long samples of each type and kind of exposed strip item required.

D. Qualification Data: Terrazzo Contractor shall submit two (2) copies of qualification data.
   1. Include list of projects indicating name and location of project, name of Owner, name and contact information for General Contractor, and name and contact information for Architect.
   2. Include letter from NTMA with the name of the project and name of member, stating current member status.

E. Material Certificates:
   1. Epoxy Resin: For each type of resin required indicating that materials meet specification requirements, by manufacturer.
   2. Aggregate: For each type of aggregate required indicating compatibility with terrazzo mix, signed by aggregate supplier.

F. Maintenance Literature: Terrazzo Contractor shall submit two (2) copies of maintenance recommendations from NTMA.

1.6 QUALITY ASSURANCE

A. Acceptable Epoxy Resin Manufacturer: An Associate Member of the NTMA, experienced in manufacturing epoxy resin in accordance with NTMA standards and with a record of successful in-service performance, as well as sufficient production capacity to produce required materials.

B. Acceptable Terrazzo Contractor: A Contractor Member of NTMA whose work has resulted in construction with a record of successful in-service performance.
   1. Installer shall have completed terrazzo installations within the past five (5) years of scale and complexity similar to the proposed installation.

C. Terrazzo Standards: Terrazzo Contractor shall furnish materials and install terrazzo according to NTMA’s “Terrazzo Specifications and Design Guide” and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

D. Source Limitations for Aggregates: Terrazzo Contractor shall obtain each color, grade, type and variety of granular materials from sources with resources to provide materials of consistent quality in appearance and physical properties for the entire project, so there are no color variations.

E. Mockups: Terrazzo Contractor shall construct mockup to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build a detail mockup of 50 s.f. of each color specified with applicable divider strips and accessories.
   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
F. Contractor is to verify that substrate is level and acceptable for installation of product. If surface is not within tolerance, contractor is to provide cementitious acrylic filler and level out substrate.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered to project site in supplier’s original wrappings and containers, labeled with source or manufacturer’s name, material or product brand name, and lot number if any.

B. Materials shall be stored in their original, undamaged packages and containers, in a location where they will not be exposed to direct sunlight.
   1. Epoxy components shall be stored in a space where the ambient temperature can be maintained 60 and 90 deg. F before use.

1.8 PROJECT CONDITIONS

A. General Contractor shall provide sufficient water, temporary heat and light, and adequate electric power with suitable outlets connected and distributed for use within 100 feet of any working space.

B. General Contractor shall provide temporary enclosures and other suitable methods to protect adjacent spaces from damage during installation.
   1. Maintain ambient temperatures in the area to receive terrazzo at not less than 60 deg. F. or more than 90 deg. F.
   2. Maintain adequate ventilation in the area to receive terrazzo.

C. Terrazzo Contractor shall protect other adjacent work from water and dust generated by grinding operations. Provide a method of controlling the dust.

1.9 EXTRA MATERIAL

A. Provide 2% of each color epoxy resin and chip.

1.10 WARRANTY

A. One (1) year from date of substantial completion of terrazzo installation.

PART 2 PRODUCTS

2.1 PERFORMANCE

A. Epoxy Resin:
   1. Test Specimens: Mix resin materials according to manufacturer’s recommendation without aggregate added and cure for seven (7) days at 75 degrees plus/minus 2 deg. F and 50 percent plus/minus 2 percent relative humidity.
   2. Cured test specimens shall meet or exceed the following requirements:
      a. Hardness: 60 to 85 per ASTM D2240, Shore D.
      b. Minimum Tensile Strength: 3000 psi per ASTM D638 for a 2-inch specimen made using a "C" die per ASTM D412.
      c. Minimum Compressive Strength: 10,000 psi per ASTM D695, Specimen
B cylinder.

   d. Chemical Resistance: No deleterious effects by contaminants listed below after 7-day immersion at room temperature per ASTM D1308:
      1) Distilled water.
      2) Mineral water.
      3) Isopropanol.
      4) Ethanol.
      5) Soap solution at 1 percent.
      6) Sodium hydroxide at 10 percent solution.
      7) Hydrochloric acid at 10 percent solution.
      8) Hydrochloric acid at 30 percent solution.
      9) Detergent solution at 0.025.
     10) Acetic acid at 5 percent solution.

B. Epoxy Resin with Aggregate:
   1. Test Specimens:
      a. Mix epoxy resin according to manufacturer’s recommendations and blend 1 volume of epoxy resin with 3 volumes of marble aggregate, consisting of:
         1) 60 percent No. 1 chip.
         2) 40 percent No. 0 chip.
      b. Grind and grout with epoxy resin finished to a nominal 3/8 inch thickness.
      c. Cure specimens seven (7) days at 75 deg. F plus/minus 2 deg. and 50 percent plus/minus 2 percent relative humidity.
   2. Cured epoxy terrazzo specimens shall nominally meet the following requirements:
      a. Flammability: Self-extinguishing, extent of burning 1/4 inch maximum according to ASTM D635.
      b. Coefficient of Linear Thermal Expansion: 0.0025 inch/inch per deg F for temperature range of minus 12 to plus 140 deg F per ASTM D696.

C. Bond Strength of Epoxy Terrazzo: 300 lb. failure according to field test method for surface soundness and adhesion as described in ACI Committee No. 403 Bulletin.

2.2 MATERIALS

A. Epoxy Resin Matrix: Two-component, high solids product complying with specified performance requirements.
   1. Color: As required for mix indicated.

B. Primer: As recommended, manufactured and supplied by epoxy resin manufacturer.

C. Aggregates: Marble, glass, and Mother-of-Pearl.
   1. Comply with NTMA gradation standards.
   2. Abrasion and Impact Resistance: Loss of 40 percent or less when tested according to ASTM C131 (LA Abrasion).
   3. Aggregates shall contain no deleterious or foreign matter.

D. Divider Strips:
   1. Material: Aluminum.
   2. Strip Thickness: 16 gauge.
   3. Type: “L” strip: 3/8 inch by 1/2 inch.
   4. Heavy Top Thickness: 1/8 inch back-to-back at all joints and changes in color.
   5. Heavy Top Thickness: ¼ inch at edges of terrazzo.
E. Control Strips:
   1. Provide double L angles with caulk filled over all saw-cuts in the floor.

2.3 MISCELLANEOUS ACCESSORIES

A. Sealer: Spartan Terra Glaze Acrylic Polymer Terrazzo Seal - 5810, non-ambering, clear sealer that is chemically neutral; does not impair terrazzo aesthetics or physical properties; is recommended by terrazzo matrix manufacturer. Sealer shall comply with the following:
   1. Comply with requirements of authorities having jurisdiction.
   2. Surface Friction: Not less than 0.6 (ADA) according to ASTM D2047.
   3. Solvent Based Sealer Properties: Flashpoint at 80 deg. F or above according to ASTM D56.

B. Floor Finish: Spartan Floor Front.
   1. Applier to be certified by manufacturer.

C. Crack Suppression/Isolation Membrane: As recommended, produced and supplied by approved terrazzo resin formulator, having minimum 120 percent elongation potential per ASTM D412.

D. Leveling and Patching Mortar: Terroxy Fill – floor fill leveling under epoxy terrazzo per manufacturer’s install instruction.

E. Moisture Vapor Treatment: based on Koester VAP I pH by Koester American Corp. Install per manufacturer recommendation.

2.4 MIXES

A. Terrazzo Selection: Terrazzo Contractor shall provide standard terrazzo mix(es) according to the following:
   1. Custom Mix Color and Pattern:
      a. As indicated on the documents

B. Proportions for Epoxy Terrazzo Topping: Comply with resin supplier’s recommendations.

C. Mixing of Terrazzo Topping: Mix epoxy components with aggregates in accordance with manufacturer’s recommendations.

PART 3 EXECUTION

3.1 EXAMINATION

A. The General Contractor, Owner’s Representative, and Architect shall examine substrates and areas, with Terrazzo Contractor present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
   1. Slab Flatness Tolerance: Subfloor is not to vary more than 1/4 inch from true plane in a 10 foot span.
      a. If required to prevent cracks in concrete substrates transmitting through epoxy terrazzo flooring, the Terrazzo Contractor shall make a written
recommendation to install a crack suppression membrane and include specific recommendations on type and location.

b. If membrane is not installed, the use of back to back angles is required.

B. The General Contractor shall retain the services of an independent testing laboratory to verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to epoxy resin manufacturer’s written instructions.

1. Perform relative humidity test using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

2. Perform anhydrous calcium chloride test, ASTM F1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.

C. Alkalinity and Adhesion Testing: The General Contractor shall retain the services of an independent testing laboratory to verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

D. The General Contractor shall be responsible for correcting non-conforming concrete substrates using materials compatible with epoxy terrazzo flooring system and as approved by the Terrazzo Contractor.

1. Materials used to correct non-conforming conditions must be compatible with the selected epoxy system and be approved by the manufacturer of epoxy resin materials and Terrazzo Contractor.

E. Terrazzo Contractor shall proceed with installation only after unsatisfactory conditions, including levelness tolerances, cracking, excessive moisture vapor transmission, and alkalinity have been corrected.

3.2 PREPARATION

A. General Contractor shall broom clean area to receive terrazzo to remove loose chips and all foreign matter.

B. Terrazzo Contractor shall provide moisture mitigation materials according to instructions and recommendations of moisture mitigation materials manufacturer. Cost for moisture mitigation materials and installation shall be included as a Unit Cost.

C. Terrazzo Contractor shall provide any filler to level floor to obtain the Y4:10’.

D. Terrazzo Contractor shall provide flexible epoxy crack isolation/suppression membrane. Cost for materials and installation for installation over not more than five percent of the floor area receiving epoxy terrazzo shall be included in the Base Bid.

E. Contractor shall provide means for fresh air supply return during finishing, cleaning, and sealing process.

3.3 Poured-in-Place Terrazzo Installation

A. Strip Materials: Terrazzo Contractor shall install strip materials as follows:

   1. Divider and Control Joint Strips:

      a. Locate divider strips in locations indicated.
      b. Install control joint strips back to back at joints in slab or where indicated.
      c. Install strips in epoxy adhesive without voids below strips.
2. Accessory Strips: Install as required to provide a complete installation.

B. Placing Terrazzo:
   1. Prime subfloor in accordance with manufacturer’s recommendations.
   2. Proportion and thoroughly blend the materials.
   3. Place mixture to achieve specified thickness.

C. Poured in Place Terrazzo Base: Terrazzo Contractor shall provide mix color for terrazzo base to match approved sample and mockup.
   1. Terrazzo Contractor shall place and finish terrazzo base at the same time the terrazzo floor is being installed.

D. Finishing: Terrazzo Contractor shall finish the terrazzo topping as follows:
   1. Rough Grinding:
      a. Grind with 24 or finer grit stones or with comparable diamond abrasives.
      b. Follow initial grind with 60/80 grit stones or with comparable diamond abrasives.
   2. Grouting:
      a. Clean terrazzo with clean water and rinse. Allow to dry.
      b. Apply epoxy grout per manufacturer’s instructions.
      c. Allow grout to cure.
   3. Fine Grinding/Polishing: Grind with 120 grit or with comparable diamond abrasives until all grout is removed from surface.

E. Terrazzo Cleaning: Terrazzo Contractor shall clean finished terrazzo as follows:
   1. Remove grinding residue from terrazzo surface.
   2. Wash terrazzo surfaces immediately after final grinding of terrazzo flooring with water and allow surfaces to dry thoroughly.

F. Sealing: Terrazzo Contractor shall seal terrazzo according to sealer manufacturer’s written instructions.

G. Finishing: Use standard mop and bucket technique. In heavy traffic areas, as indicated by normal path of travel, (for example walk areas), apply 4 medium coats of finish. The remainder of the floor to get 3 medium coats of finish. Allow 20 minutes between coats to dry. After each coat dries, buff it with a 27” propane buffer using a white poly pad to promote a complete cure. Dust mop floor after each buffing to remove dust generated by buffing process.

3.4 REPAIR

A. Terrazzo Contractor shall repair terrazzo areas that evidence lack of bond between topping and underbed according to NTMA’s written recommendations.

3.5 PROTECTION

A. After application of the sealer, the work shall be ready for final inspection and acceptance by the Owner or his agent.

B. The General Contractor shall protect the finished floor after the Terrazzo Contractor has completed final grinding and applied sealer to terrazzo surfaces.
3.6 TOLERANCE

A. Max variation from flat surface of terrazzo: 1/8 inch in 10 feet.

END OF SECTION