

SECTION 09 66 23 - RESINOUS MATRIX TERRAZZO FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes resinous matrix (epoxy) terrazzo.
- B. Refer to Division 01 Sections for requirements regarding:
 - 1. LEED credit achievement goals as summarized by the LEED Scorecard attached to Section 01 81 13 "Sustainable Design Requirements."
 - 2. Requirements for documentation of LEED credits.
 - 3. Payment application requirements as they relate to LEED documentation requirements..

1.2 PHASING

- A. Portions of the terrazzo work are required to be phased. The extent of the phased portions is described as follows:
 - 1. The existing escalator demolition work is to be phased in order that the airport can remain operational during construction. The terrazzo work identified as artwork infill (TZ) in the area of the escalator demolition work shall either be phased or follow the other terrazzo work. Phasing of this work requires protection of the terrazzo floor work for extended periods while the work is in progress. Final floor sealing of the new TZ terrazzo shall be coordinated with and blend into the larger area of existing TZ terrazzo artwork that is to remain.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. 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 special terrazzo designs and patterns

**RESINOUS MATRIX TERRAZZO
FLOORING**

09 66 23 - 1

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

1.4 ACTION SUBMITTALS

- A. Product Data: Submit product data for each material indicated.
- B. Sustainable Design Submittals:
 - 1. Completed "LEED Criteria Worksheet," for each material of the product, assembly, or used in the installation of Work of this section. Refer to Division 01 Section 01 81 13 "Sustainable Design Requirements."
 - 2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 3. Product Data: For adhesives, indicating VOC content.
 - 4. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
 - 5. Laboratory Test Reports: For sealers, indicating compliance with requirements for low-emitting materials.
 - 6. Environmental Product Declaration: For each product.
 - 7. Health Product Declaration: For each product.
- C. Shop Drawings: Submit shop drawings showing the extent of each terrazzo matrix, type, size and layout of divider strips, control joint strips, and edge strips.
 - 1. Indicate layout of abrasive strips at stair nosings .
 - 2. Indicate layout of stair treads, risers and landings.
 - 3. Large scale details of precast terrazzo jointing and edge conditions, including anchorage details.
 - 4. Indicate layout of tree leaf medallions for Art floor.
- D. Samples: Submit samples of each of the following items for each type, color, and pattern of terrazzo and accessory required and in size indicated below. Sample submittals shall be for color, pattern and texture only. Compliance with other requirements is the responsibility of the Contractor.
 - 1. Epoxy Terrazzo: 6-inch- square Samples.
 - 2. Precast Epoxy Terrazzo Base: 12-inch- long Samples.
 - 3. Precast Epoxy Terrazzo Tread: 12-inch- long Samples.
 - 4. Precast Epoxy Terrazzo Riser: 12-inch- long Samples.
 - 5. Accessories: 6-inch- long Samples of each exposed strip item required.
 - 6. Medallions: One full size tree leaf medallion.

RESINOUS MATRIX TERRAZZO FLOORING

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

09 66 23 - 2

1.5 INFORMATIONAL SUBMITTALS

- A. Field Testing: Submit pre-installation relative humidity probe readings and pH testing for information only. Readings shall be prepared in accordance with ASTM F2170.
- B. Warranty: Submit sample copies of the warranty to verify compliance with specification. Submit executed copies of epoxy terrazzo warranty as specified herein.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit copies of instructions for maintenance of each type of terrazzo.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Engage one of the following experienced Installers who are current NTMA members and NTMA Certified; who have completed terrazzo installations similar in material and extent to that indicated for Project, as determined by the Architect; and that have resulted in construction with a record of successful in-service performance:
 - 1. Original Art Work Floor Installer: Roman Mosaic and Tile Company, 9051 Red Branch Rd., E, Columbia MD 21045; Tel: (410) 884-4292; Contact: John Trevisan, Tel: (610) 692-3100; Email: johntrevisan@romanmosaic.com.
 - 2. Fantin Flooring Inc., 611 Duquesne Way, Rankin, PA 15104; Tel: (412) 271-8519. Contact: Michael Fantin; Email: fantinfloring@verizon.net.
 - 3. Allegheny Installations, 1039 North Canal Street, Pittsburgh, PA 15215; Tel: (412) 781-7570; Contact: AJ Fitzroy; Email: ajfitzroy@alleghenyinstallations.com.
 - 4. Youngstown Tile & Terrazzo Company, 7320 West Akron-Canfield Road, Canfield, OH 44406; Tel: (877) 248-7525; Contact: Josh Cohol, Tel: (877) 386-7525.
 - 5. Boatman & Mangani, 600 Ritchie Road, Capital Heights, MD. 20743; Tel: (301) 336-7700.
- B. Standard: Except as modified by governing codes and by the Contract Documents, comply with applicable provisions and recommendations of the NTMA Terrazzo Information Guide Specification.
- C. Sample Installations:
 - 1. Following acceptance of samples, provide sample installations of the following where directed by the Architect.
 - a. Typical Floors: Cast a typical module (minimum 10' x 10') of interior flooring including divider strips and at least three of the terrazzo mix designs.

RESINOUS MATRIX TERRAZZO
FLOORING

09 66 23 - 3

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

- b. Artwork Floors: Cast a typical module (minimum 10' x 10') of interior flooring including divider strips and at least three of the terrazzo mix designs.
2. Sample installations shall be complete with all bedding, jointing, tree leaf medallions, and sealants as shown in accordance with the final shop drawings.
3. Sample installations shall be reviewed by the Architect for acceptance of terrazzo assemblies including jointing and workmanship. Replace unsatisfactory work as directed.
4. Maintain sample installations during construction as a standard for judging acceptability of terrazzo work.
5. Properly finished and maintained sample installations shall be retained as a portion of the completed work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials, other than bulk materials, in manufacturer's unopened containers, fully identified with trade name, grade and color.
- B. Store materials above grade, protected from the weather, soiling or damage from any source. Store in accordance with manufacturer's instructions.
- C. Wrap precast units individually in polyethylene film or other nonstaining protective cover and mark each unit for proper identification of installed location.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.
- B. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.
- C. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.
- D. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.
- E. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

1.10 WARRANTY

- A. Special Warranty: Manufacturer and installer shall supply to the Owner a Joint and Several Warranty stating that the moisture vapor barrier shall protect the epoxy terrazzo installation from moisture related blistering or disbondment, and that in the event of defects related to moisture vapor transmission within the stipulated period, the manufacturer and installer shall jointly or severally effect all repairs or replacement necessary to remedy defects at the convenience of, and no additional cost to the Owner.

1. Warranty Period: Three years from date of Final Acceptance.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Dynamic Coefficient of Friction (DCOF): For terrazzo installed on walkway surfaces, provide finished installation with the following value as determined by testing by the DCOF AcuTest Method per ANSI A137.1

1. Walkway Surfaces: Minimum 0.42.

2.2 EPOXY TERRAZZO

- A. Basis-of-Design Epoxy Terrazzo Material Products and Manufacturers: The epoxy resin terrazzo specifications are based on Terroxy Resin System by Terrazzo and Marble (T & M) Supply Companies.

1. The following terrazzo systems and manufacturers are capable of providing epoxy resin terrazzo flooring complying with the requirements of the Contract Documents.
 - a. General Polymers div. of Sherwin-Williams; Thin-Set Epoxy Terrazzo #1100 Flooring System.
 - b. Crossfield Products Corp., Dex-O-Tex Division; Dex-O-Tex Cheminert Terrazzo.
 - c. Sika Corporation; Sikafloor Terrazzo.
2. System Performance: The epoxy resin flooring system shall possess the following minimum properties:
 - a. Compressive Strength: 10,000 psi per ASTM D 695, Specimen B cylinder.
 - b. Water Absorption: 0.10 percent per ASTM D 570.

RESINOUS MATRIX TERRAZZO FLOORING

09 66 23 - 5

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

- c. Tensile Strength: 3,000 psi per ASTM D 638 for a 2-inch specimen made using a C die per ASTM D 412.
- d. Flexural Strength: 4,500 psi per ASTM D 790.
- e. Adhesion: 300 psi in concrete according to ASTM D7234 (modified to cut slightly into concrete).
- f. Hardness: 65-85 Shore D, per ASTM D 2240.
- g. Abrasion and Impact Resistance: Loss of 40 percent or less when tested according to ASTM C 131 (LA Abrasion).
- h. Slip Resistance: Complies with performance requirements specified.
- i. Critical Radiant Flux: 0.90 per ASTM D 648.
- j. Thermal Coefficient of Linear Expansion: 25×10^{-6} in/in/deg F for temperature range of minus 12 to plus 140 deg F per ASTM D 696.
- k. Chemical Resistance: No deleterious effects by contaminants listed below after seven-day immersion at room temperature per ASTM D 1308:
 - 1) Distilled water.
 - 2) Mineral water.
 - 3) Isopropanol.
 - 4) Ethanol.
 - 5) 0.025 percent detergent solution.
 - 6) 1.0 percent soap solution.
 - 7) 5 percent acetic acid.
 - 8) 10 percent sodium hydroxide.
 - 9) 10 percent hydrochloric acid.
 - 10) 30 percent sulfuric acid.

B. Moisture Vapor Barrier: One of the following:

- 1. Terrazzo & Marble Supply Companies; Barrier Primer.
- 2. General Polymers div. of Sherwin Williams; FasTop MVT or AquArmorS.

C. Flexible Epoxy Membrane (Crack Bridging Membrane): 100 percent solids for crack preparation, the epoxy elastomer must be free of solvent, external plasticizers, coal tar, known carcinogens, rubber compounds or nitrile butadienes

1. Products: One of the following:

- a. Terrazzo & Marble Supply Companies; Isocrack Membrane.
- b. General Polymers div. of Sherwin Williams; 3556 EPO-FLEX Flexible Epoxy Membrane.

2. Physical Properties:

- a. Tensile Strength: 1,000 to 1,300 psi per ASTM D 412.
- b. Elongation at Break: 130 to 145 percent per ASTM D 412.

**RESINOUS MATRIX TERRAZZO
FLOORING**

09 66 23 - 6

- c. Adhesion: 300 psi, 100 percent concrete failure per ACI 503R.
 - d. Hardness: 23 Shore D per ASTM D 2240.
 - e. Thermal Cycling: No Cracking per ASTM C 884 (24 hours, -21 deg C to +25 deg C).
 - f. Flammability: Self-extinguishing over concrete.
 - g. VOC Content: Zero.
- D. Fabric Reinforcing: Fiberglass of type and manufacture recommended and acceptable to the matrix manufacturer.
- 1. General Polymers div.of Sherwin Williams; FS38-4.4 Fiberglass Scrim.
- E. Aggregates: Natural, sound, crushed stone chips, non-recycled glass, plastic, and metal filings with colors selected and graded to match Architect's samples, but with maximum size within limits of workability for terrazzo thickness indicated.
- 1. Sizes shall be #1's and #0's, conforming with N.T.M.A. standards.
 - 2. Abrasion and impact resistance shall not exceed 40 percent loss per ASTM C 131.
 - 3. 24 hour absorption rate not to exceed 0.75 percent.
 - 4. Chips shall contain no deleterious or foreign matter.
 - 5. Dust content less than 1 percent by weight.
 - 6. Obtain and stockpile each aggregate material from a single source of consistent quality in appearance and physical properties for the entire project.
 - 7. Recycled Content: Provide products with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 20 percent of the following aggregates:
 - a. North American chips.
 - b. Recycled Glass.
- F. Flooring products shall comply with the requirements of the California Department of Public Health's (CDPH) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers", Standard Method v1.2-2017.
- G. Epoxy Fill Mortar: 100 percent Solids fill mortar system including blended aggregate of a type recommended by the epoxy resin terrazzo manufacturer. One of the following:
- 1. Terrazzo and Marble Supply Companies; Terroxy Fill.
 - 2. General Polymers; Sherwin Williams; 3520 Epoxy Terrazzo Matrix as the binder resin mixed with dry silica sand.
- H. Finishing Grout: 100 percent solids resin-based grout with filler and pigments as recommended by matrix manufacturer. One of the following:

**RESINOUS MATRIX TERRAZZO
FLOORING**

09 66 23 - 7

1. Terrazzo and Marble Supply Companies; Terroxy Grout.
 2. General Polymers; Sherwin Williams; 3520 Epoxy Terrazzo Matrix with 5271 Terrazzo Grout Additive.
- I. Substrate Primer: 100 percent solids, moisture insensitive, two-component resin recommended by matrix manufacturer. No solvent containing primers are allowed.

2.3 MIXES

- A. Toppings: Adjust topping mixes as required to obtain Architect's acceptance for each type, color, pattern and finish. Refer to the Drawings and Finish Schedules for each topping mix design and the extent of each. Each precast terrazzo unit shall be composed of a single mix design prepared using the matrices specified. Precast units consisting of a face mix and a backup mix shall not be permitted. Adjust Portland cement mixes for precast units, as required to obtain Architect's acceptance for matching the type, color, pattern, and finish of the epoxy matrix type, color, pattern, and finish indicated on the Drawings for precast base, tread, and riser units. Premix all terrazzo ingredients which are able to be combined prior to installation. This premix process shall occur in a controlled factory or laboratory environment. Quantities shall be carefully measured on certified/calibrated scales. The premixed ingredients shall then be packaged in clean, clearly labeled, hard sided containers in ratios whereby field installers may combine the premix ingredients with liquid components with little or no field calculation or measurement. There are three types of topping mix series which are summarized as follows:
1. TE Series: 3 mix designs for the New Terminal.
 2. TZ Series: 13 mix designs for the 2015 Terrazzo Artwork Design for infill at existing concrete plank floor. These were developed by Roman Mosaic and Tile Company.
 3. TA Series: Multiple mix designs for the 2020 Terrazzo Artwork Design for area of new elevated slab, (to be developed by Artist - to be coordinated between 90%-100% submission).
- B. Precast Terrazzo Base and Stair Tread/Riser Setting Beds:
1. Cement Setting Bed Mix: Laticrete International Inc.; 226 Thick Bed Mortar Mix.
 2. Liquid Latex Additives: Laticrete International Inc.; Laticrete 3701 Liquid Latex Mortar Admix.
 3. Mixing: Comply with the manufacturers printed recommendations for either machine or hand mixing of setting bed mixes.
 - a. Mix 6 bags of cement setting bed mix to 5 gal.- of liquid latex additive. Adjust quantity of liquid latex additive to bring the cement setting bed to the proper consistency for placing.

RESINOUS MATRIX TERRAZZO FLOORING

09 66 23 - 8

4. Welded Wire Fabric for Setting Bed Reinforcement at Metal Stair Risers and Treads: ASTM A185, 2-inch x 2 inch x 16 ga., galvanized.
- C. Grout for Precast Items: Polymer-modified tile grout composed of ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients to which only water must be added at Project site, and complying with ANSI A118.6, custom colored to match adjacent precast terrazzo tile units.
- D. Underbed Setting Materials at Existing Concrete Plank Substrates Only:
1. Sand Cushion Materials: Clean, dry sand complying with ASTM C33 for fine aggregate.
 2. Isolation Membrane: 6 mil polyethylene sheet.
 3. Isolation Membrane Tape: High density polyethylene type with pressure sensitive adhesive or double sided mastic tape, minimum 4 inches wide.
 4. Welded Wire Reinforcement: ASTM A185, 2-inch x 2 inch x 16 ga., galvanized.
 5. Underbed Mix:
 - a. Materials:
 - 1) Sand: ASTM C33 for fine aggregate.
 - 2) Cement: Portland cement complying with ASTM C150, Type I, non-air entraining, nonstaining.
 - 3) Water: Fresh, clean, potable.
 - b. Mix: One part Portland cement to 4 parts sand and sufficient water to provide workability as at low a slump as possible. Charge and mix sand and Portland cement. Add water and mix.

2.4 ACCESSORIES

- A. Divider and Stop Strips: Aluminum, 1/8 inch - thick x depth as indicated for terrazzo topping. Angle or "T" - types with wide oversized hole or slot punched horizontal bases to prevent tipping during installation and to allow matrix penetration for maximum adhesion. Divider and edge strips to be fabricated from one metal piece to avoid strip splitting or separation during grinding. Verify compatibility of divider and stop strips with resin supplier prior to ordering.
1. Control Joint Strips: Laminations of 16 ga.- aluminum, back to back strips infilled with Flexible Epoxy Membrane pigmented to match resin color of epoxy terrazzo.
 2. Manufacturer References: One of the following:
 - a. National Metal Shapes, Inc., Delaware, OH.

RESINOUS MATRIX TERRAZZO FLOORING

09 66 23 - 9

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

- b. Manhattan American Terrazzo Strip Company, Staley, NC.
 - c. Domus Terrazzo Supply Co., Toronto, ON, Canada.
- B. Tree Leaf Art Medallions: Custom fabricate tree leaf medallions to the sizes, shapes and profiles shown on teh drawings from Type 304 or 316 stainless steel plate complying with ASTM A666. Fabricators known to be capable of fabricating the tree leaf medallions include the following:
- 1. Manhattan American Terrazzo Strip Company, Staley, NC.
 - 2. National Metal Shapes, Inc., Delaware, OH.
 - 3. Creative Edge Metal Shop, Inc., Fairfield, IA.
- C. Cleaner: A neutral chemical cleaner, specially compounded for cleaning terrazzo of the types indicated, as recommended by the manufacturer of the cleaner with the following minimum characteristics.
- 1. Ph factor between 7 and 10.
 - 2. Biodegradable and phosphate free.
 - 3. Free form crystallizing salts or water soluble alkaline salts.
- D. Floor Sealer: Waterbased, colorless, scuff and stain-resistant penetrating sealer with Ph factor between 7 and 10, that does not affect color or physical properties of terrazzo surface, and which will provide an anti-slip dynamic coefficient of friction of greater than 0.42.
- E. Joint Sealants: Two-Part Polyurethane Sealant (Self Leveling), refer to Section 07 92 00 "Joint Sealants."
- F. Channels to receive abrasive inserts at Precast Stair Nosings : 16 ga.- aluminum channel. Factory fabricate channels with anchor holes and foam filled to prevent entrance of terrazzo matrix.
- G. Abrasive Inserts: One line composition strips filled with 100 or finer carborundum, aluminum oxide or silicone carbide, black, mixed 4 parts to 1 with a binding material.
- H. Reinforcing, Anchors and Fasteners for Precast Units:
- 1. Reinforcing for Treads and Risers: ASTM A 615, grade as selected by fabricator. Reinforcing adjacent to the exposed surface of panels is to be positioned and firmly held in place by hangers, or other means without the use of form-contact bar supports.
 - 2. Welded Wire Fabric for Treads and Risers: ASTM A 1064, 2-inch x 2 inch x 16 ga.-, galvanized.
 - 3. Anchors and Fasteners: All anchors, clips, shapes, fasteners, dowels, cramps, and accessories for erecting precast terrazzo units shall be galvanized steel devices of grade, type, size and number required to attach precast terrazzo to supporting stair substrates.

RESINOUS MATRIX TERRAZZO
FLOORING

09 66 23 - 10

- I. Precast Portland Cement Terrazzo Base, Tread and Riser Materials (To be used when proposing Alternate):
 1. Portland Cement: ASTM C 150, Type I, nonair entraining, nonstaining white and gray as required to match Architect's epoxy terrazzo samples. Obtain cement from a single source for all work of one color.
 2. Sand: ASTM C 33 for fine aggregates as required to match Architect's epoxy terrazzo samples.
 3. Water: Fresh, clean and potable.
 4. Aggregates, Glass, Plastic and Shell Materials: As required to match Architect's epoxy terrazzo samples.
 5. Pigments: Pure mineral pigments, resistant to alkalies, nonfading and weatherproof, colors as required to match Architect's epoxy terrazzo samples.

2.5 PRECAST UNIT FABRICATION

- A. Precast Terrazzo Bases: Fabricate precast terrazzo bases from epoxy terrazzo materials to the sizes, shapes and profiles shown and from the terrazzo mix(es) indicated.
 1. The minimum thickness of the precast terrazzo base shall be 1/2-inch.
 2. Forms: Construct forms of non-staining metal, fiberglass reinforced polyester, plywood, or other acceptable material. Fabricate and reinforce forms for close control of dimensions and details. Construct forms tightly to prevent leakage of mixes. Form joints will not be permitted on faces exposed to view in the finished work.
 3. Mixing and Placing: Mix terrazzo mixes to distribute fine and coarse aggregate evenly throughout. Place terrazzo so as to prevent segregation in the forms.
 4. Curing: Allow units to cure.
 5. Casting Tolerances: As required to achieve installation tolerances. Units which have bowed, warped, or curled shall not be acceptable.
- B. Precast Terrazzo Treads and Risers: Fabricate precast terrazzo treads and risers from epoxy terrazzo materials to the sizes, shapes and profiles shown to match the epoxy terrazzo mix indicated for treads and risers.
 1. The minimum thickness of the precast terrazzo stairs and treads shall be 1-1/2-inch. Provide 2 lines of abrasive insert at stair tread nosing.
 2. Forms: Construct forms of non-staining metal, fiberglass reinforced polyester, plywood, or other acceptable material. Fabricate and reinforce forms for close control of dimensions and details. Construct forms tightly to prevent leakage of mixes. Form joints will not be permitted on faces exposed to view in the finished work.

RESINOUS MATRIX TERRAZZO FLOORING

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

09 66 23 - 11

3. Reinforcement: Place welded wire and reinforcing bars of size and spacings as required to resist shrinkage, temperature and handling stresses. Support and space reinforcement using devices to ensure that it will remain positioned in the precast terrazzo units as required. Keep reinforcement from the edges and surfaces of the units.
4. Mixing and Placing: Mix terrazzo mixes to distribute fine and coarse aggregate evenly throughout. Place terrazzo so as to prevent segregation in the forms.
5. Curing: Allow units to cure.
6. Casting Tolerances: As required to achieve installation tolerances. Units which have bowed, warped, or curled shall not be acceptable.

C. Surface Treatment:

1. Finish surfaces exposed to view to match accepted samples in all respects. Provide smooth joints and square edges.
2. Finish: Allow terrazzo to obtain sufficient strength prior to grinding and as required to withstand handling stresses and to produce a terrazzo finish consistent with the accepted samples. Protect corners and edges to preserve uniform, straight arrisses and corners. Grind in a continuous operation, using grinding equipment to achieve a uniform appearance. Do not change equipment, materials, procedure or operating personnel during the course of the grinding work for the entire Project. Discard and replace terrazzo units which develop any irregular penetration or appearance, or swirl marks as a result of grinding. Select type of grit gradation(s) and speed of operation to achieve the following:
 - a. Match finish of cast in place epoxy terrazzo as specified under Part 3 - Execution below.
3. Abrasive Inserts for Stair Treads:
 - a. Carefully mask terrazzo on either side of abrasive channel to protect finished terrazzo.
 - b. Clean all foreign matter from channel.
 - c. Trowel abrasive mix into channel with finished elevation approximately 1/16-inch-above terrazzo tread.
 - d. After abrasive mix has set, remove masking material and allow to cure.

PART 3 - EXECUTION

3.1 CONDITION OF SURFACES

- A. Examine the substrates and adjoining construction and the conditions under which the Work is to be installed. Do not proceed with the Work until unsatisfactory conditions have been corrected. Examine areas to receive terrazzo for:

RESINOUS MATRIX TERRAZZO FLOORING

09 66 23 - 12

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

1. Defects in existing work that affect proper execution of terrazzo work.
2. Deviations beyond allowable tolerances for the concrete slab work. The substrate shall not exceed 1/4-inch in a 10'-0"- span. When placing a 10 foot straightedge anywhere on the substrate, at no point shall the gap between the straightedge and the substrate exceed 1/4-inch.
3. Ensure that the building expansion joints in the floor area are raised or lowered to actual finish elevation of terrazzo.
4. Ensure that drains and cleanouts in installation area are functional and raised or lowered to actual finish elevation of terrazzo.
5. The Contractor is advised that the top of existing finished floor to top concrete plank structure varies between ½ inch and 2 inches. • Contractor to verify actual conditions where the work is to be executed.

3.2 PREPARATION

- A. General: Comply with NTMA specifications and recommendations, unless otherwise shown or specified for preparation of substrate.
- B. Substrates to Receive Epoxy Terrazzo: After the removal of existing floor coverings in areas to receive the terrazzo work, and before the terrazzo flooring installation, visit the jobsite to evaluate substrate condition. The evaluation shall include a determination of the suitability of the substrate to receive the epoxy terrazzo materials and to test for moisture and alkalinity of the substrate.
 1. Test for moisture by relative humidity probe and digital meter method according to ASTM F 2170 "Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-situ Probes" and the probe manufacturers instructions. Use a minimum of 1 probe for every 5,000 s.f. of surface to receive terrazzo flooring.
 - a. Probe Manufacturer: A relative humidity probe kit and manufacturer known to comply with the requirements includes "The Rapid RH Probe" manufactured by Wagner Electronic Products, Inc., Rogue River, OR. (800) 207-2164 (v).
 2. Proceed with the epoxy floor system installation only after substrates have a maximum relative-humidity-measurement reading of 75 percent in 24 hours. If the pH of the slab is 10 or lower, notify the manufacturer for preparations required to ensure a good bond.
- C. Underbed at Existing Concrete Plank Substrates Only:
 1. Cover entire surface to receive terrazzo with clean, dry, sand to a maximum thickness of 1/16" or sand dusting to a uniform thickness.

RESINOUS MATRIX TERRAZZO FLOORING

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

09 66 23 - 13

2. Install isolation membrane over sand, protect, and repair isolation membrane according to ASTM E1643; place sheets in position with longest dimension parallel with direction of underbed pour. Lap joints 6 inches and seal with manufacturers recommended tape.
3. Install welded wire reinforcement and overlap wire at edges and ends at least 2 squares.
4. Place underbed mix.
5. Screed underbed to elevation not exceeding 3/8 inches below finished floor elevation or slope. When placing a 10 foot straightedge anywhere on the substrate, at no point shall the gap between the straightedge and the substrate exceed 3/8 inch.
6. Allow the underbed to age a minimum of 30 days and achieve a moisture content acceptable to the epoxy terrazzo flooring manufacturer. If relative humidity measurement reading exceeds 75 percent in 24 hours, notify manufacturer for special drying procedures and moisture mitigation methods.

D. Surface Treatment:

1. Prepare underbed and slab substrates to "open" surface pores by means of light scarification, medium shot blast or medium scarification with a vacuum unit. Surface preparation results shall achieve a minimum Concrete Surface Profile (CSP) of 5 according to International Concrete Repair Institute Guideline 310.92 - 1997 "Selecting and Specifying Concrete Surface Preparation for Coatings, Sealers, and Polymer Overlays."
 - a. Remove all contaminating or bond breaking substances including but not limited to dust, laitance, curing compounds, coatings, sealers, oil, grease, existing floor coverings, and floor covering adhesives and mastics.
 - b. Remove oil or grease not removed by scarification or blasting by either detergent scrubbing with heavy duty cleaner/degreaser, low pressure water cleaning, steam cleaning, or chemical cleaning methods in accordance with the manufacturer's written instructions.
 - c. Mechanically remove spalled or deteriorated slab surfaces by scabbling or chipping hammers. Acid etching is not permitted.
2. Apply moisture vapor barrier across the entire area to receive the epoxy terrazzo in accordance with the manufacturer's recommendations.
3. Cracks and non-expansion joints greater than 1/16 inch- wide after surface preparation shall be prepared until sound and treated with membrane materials in accordance with the instructions of the epoxy terrazzo manufacturer and as follows. Allow in base bid for above crack detailing as follows - 10 percent of lineal footage of total project square footage for combined Type 1 & 2, and 3 percent of lineal footage of Type 3. (i.e., a 10,000 s.f.- project would allow for a combined 500 lineal feet- of Type 1 & 2 repairs and 300 lineal feet - of Type 3 repairs.
 - a. Type 1 Crack Detailing: Hairline cracks shall receive detail coat of epoxy primer with 6-inch- fabric reinforcement.

**RESINOUS MATRIX TERRAZZO
FLOORING**

09 66 23 - 14

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

- b. Type 2 Crack Detailing Fill cracks greater than hairline but less than 1/16 inch-wide after surface preparation with neat, epoxy membrane. Place detail coat of epoxy membrane over crack and embed 12 inch- fiberglass cloth. Lightly abrade or solvent wipe treated cracks prior to applying primer.
 - c. Type 3 Crack Detailing Fill cracks greater than 1/16 inch- with flexible epoxy membrane. Place 25 -30 mil- detail coat so that flexible epoxy membrane extends at least 9 inch to 12 inch- on each side of crack or joint. After flexible epoxy membrane has leveled, lay precut reinforcing fabric into wet membrane. Smooth cloth with a flat steel trowel, allowing cloth to be encapsulated but remain exposed on the surface of flexible epoxy membrane. Lightly abrade or solvent wipe treated cracks prior to applying primer.
4. Except at Existing Concrete Plank Substrates, level non-slab surfaces, and fill pits with epoxy fill mortar. For bid purposes the installer shall assume a 5/8-inch minimum continuous layer of epoxy floor fill. Latex fills or self leveling underlayments are not acceptable.

3.3 INSTALLATION

- A. General: Comply with NTMA specifications and recommendations, unless otherwise shown or specified for installation of strips, placing, curing, grinding, and finishing of terrazzo. Make provisions for protecting adjacent work from terrazzo placement and finishing.
 1. Extend terrazzo work into recesses and under equipment in the spaces shown or scheduled to receive terrazzo. Form a complete covering without interruptions or seams, except provide divider strips where shown. Place and finish terrazzo uniformly and neatly around obstructions so as to achieve continuous color, pattern and finish throughout the Work.
 2. Complete terrazzo work prior to contiguous work which might be damaged by water or other materials used.
- B. Epoxy Terrazzo:
 1. Control Joints, Stop Strips and Divider Strips:
 - a. Control Joints: Place back to back angle divider strips directly over concrete control joints and expansion joints leaving a space appropriate for anticipated movement - typically 1/4 inch - 1/2 inch-. Fill gap between control joints with divider strip joint sealant. Adhere divider strips with substrate primer - do not fasten to concrete. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo. Where two control joints are to be butted, the ends shall touch and align.

RESINOUS MATRIX TERRAZZO FLOORING

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

09 66 23 - 15

- b. Stop Strips: Install stop strips at perimeter of epoxy terrazzo flooring fields. Adhere stop strips with substrate primer - do not fasten to concrete. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo. Where two stop strips are to be butted, the ends shall touch and align.
 - c. Divider Strips: Place divider strips directly over concrete where indicated on the drawings. Adhere divider strips with substrate primer - do not fasten to concrete. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo. Where two divider strips are to be butted, the ends shall touch and align.
2. Placing Epoxy Terrazzo:
- a. Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean substrate of loose chips and foreign matter.
 - b. Priming: Apply epoxy primer evenly over prepared flexible membrane at the rate of 200 - 300 sq. feet- per gallon-, to thoroughly wet surface, but avoiding "ponding" the material.
 - c. For thinset terrazzo topping, comply with resin manufacturer's recommendations for proportioning mixes.
 - d. Comply with NTMA guide specifications previously referenced under "Thin-Set Terrazzo Materials" and with matrix manufacturer's directions for installing thin-set terrazzo. Match Architect's samples and provide total material thickness of not less than 3/8-inch-. Allow cure per manufacturer's recommendations prior to grinding operations.
3. Grinding: Exercise extreme care to ensure fluids from grinding operation do not react with dividers and strips to produce a stain on aggregate. Delay grinding until heavy trade work is completed and construction traffic through the area is restricted.
- a. Rough Grinding: Grind with 24 or finer grit stones or with comparable diamond plates.
 - b. Intermediate Grinding: Follow initial grind with 80 or finer grit stones.
 - c. Grouting: Cleanse floor with clean water and rinse thoroughly. Remove excess rinse water by wet vacuum and machine until completely dry. Apply epoxy grout to fill voids.
 - d. Fine Grinding: Grind with 120 or finer grit stones until all grout is removed from surface. Upon completion terrazzo shall show a minimum of 70 percent to 75 percent of marble chips. Surface shall be free of swirl marks, voids, and pits (honeycomb).

C. Precast Terrazzo:

**RESINOUS MATRIX TERRAZZO
FLOORING**

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

09 66 23 - 16

1. Preparation: Clean precast terrazzo surfaces which have become dirty or stained prior to setting to remove soil, stains and foreign materials. Clean precast terrazzo by thoroughly scrubbing with fiber brushes followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh filler or abrasives.
2. Installation, General:
 - a. Employ only skilled and experienced workmen to install the precast terrazzo work. Use carborundum or diamond tipped power saws to cut precast terrazzo units which need to be fitted to existing field conditions.
 - b. Set precast terrazzo units to comply with requirements indicated on drawings and final shop drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure precast terrazzo work in place. Shim and adjust anchors, supports and accessories to set precast terrazzo work accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned.
 - c. Installation Tolerances:
 - 1) Joint Widths: +/- 1/16 inch-.
 - 2) Variation from Plumb: +/- 1/16 inch-.
 - 3) Variation from Level: +/- 1/8 inch-in 20', non-cumulative.
 - 4) Piece Alignments (Edge to Edge): +/- 1/32 inch-.
3. Installation of Wall Base: Install base where indicated, after placing floors, and in accordance with NTMA, and the applicable provisions of TCNA W243 and ANSI A108.5. Tamp units into setting bed to achieve a full bond without voids. Level units at joints. Grind at joints to remove any minor discrepancies in level of units. Replace warped, stained, damaged and non-matching units as directed. Grout joints, except those shown to receive sealant or divider strips, with a mixture of Portland cement, pigment and water, matching the matrix of the unit being grouted.
4. Installation of Stair Tread/Risers: Place setting bed on steel pan and poured in place concrete type stairs where shown and in accordance with NTMA, and the applicable provisions of TCNA S151 Method F111 (for steel pan stairs) and Methods F112 and W211 (for concrete stairs) and ANSI A108.1A. Tamp units into setting bed to achieve a full bond without voids. Level units at joints. Grind at joints to remove any minor discrepancies in level of units. Replace warped, stained, damaged and non-matching units as directed. Grout joints, except those shown to receive sealant or divider strips, with a mixture of Portland cement, pigment and water, matching the matrix of the units being grouted.

**RESINOUS MATRIX TERRAZZO
FLOORING**

Package Number: T5
Package Name: Terminal Interiors, M-P-E-FP, AV/IT,
Security, Signage, and Landscape
ACAA Project Number: TBD
Project Manual Volume 3 of 3
Copyright 2020 Gensler

09 66 23 - 17

3.4 CLEANING AND SEALING

- A. Clean new terrazzo after installing and grinding operations are completed by thoroughly washing all terrazzo surfaces with a neutral cleaner. Rinse with clean water and allow surface to dry thoroughly. Apply sealer in two coats at the coverage rate of 500 sq. feet- per gallon- per coat in compliance with sealer manufacturer's instructions. After sealer cures uniformly grind to a 200 grit polish per manufacturers recommendations. After grinding burnish with fine grit 10,000 grit diamond pad.
 - 1. Scrub, strip and reseal existing TZ terrazzo flooring indicated to remain to match the cleaning and sealing requirements for new terrazzo flooring.

3.5 PROTECTION

- A. Protect terrazzo work throughout the construction period so that it will be without any indication of use or damage at the time of acceptance by the Architect.

END OF SECTION 09 66 23