SECTION 096613 - PORTLAND CEMENT TERRAZZO FLOORING

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

See "Sustainable Design Considerations" Article in the Evaluations for a discussion of sustainable design requirements that may affect revisions to this Section.

1. GENERAL
   * + 1. RELATED DOCUMENTS
          1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
       2. SUMMARY
          1. Section Includes:

Poured-in-place portland cement terrazzo flooring.

Poured-in-place rustic terrazzo flooring.

Precast terrazzo units.

* + - * 1. Related Requirements:

Retain subparagraph below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Section 079200 "Joint Sealants" for sealants installed with terrazzo.

Allowances are sometimes used for special terrazzo patterns. If allowances apply to Work of this Section, insert article here to alert Contractor and reference appropriate Division 01 Section for specific details.

* + - 1. DEFINITIONS
         1. NTMA – National Tile and Mosaic Association, Inc.
      2. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at Project site.

If needed, insert list of conference participants.

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

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

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

Review special terrazzo designs and patterns.

Retain first subparagraph below for exterior rustic terrazzo applications.

Review procedures for coping with unfavorable forecasted weather conditions.

* + - 1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         4. Product Data: For each type of product.
         5. Sustainable Design Submittals:
         6. Shop Drawings: Include terrazzo installation requirements. Include plans, sections, component details, and relationship to other work. Show layout of the following:

Divider strips.

Control-joint strips.

Expansion-joint strips.

Accessory strips.

Abrasive strips.

Stair treads, risers, and landings.

Precast terrazzo jointing and edge configurations.

Terrazzo patterns.

Retain "Samples" paragraph below for single-stage Samples, with a subordinate list if applicable. Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs for two-stage Samples.

* + - * 1. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
        2. Samples for Initial Selection: NTMA's "Terrazzo Color Palette" showing the full range of colors and patterns available for each terrazzo type.
        3. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo Sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare Samples of same thickness and from same material to be used for the Work, in sizes indicated below:

Terrazzo: 6-inch- square Samples.

Precast Terrazzo: 6-inch- square Samples.

Accessories: 6-inch- long Samples of each exposed strip item required.

Coordinate "Qualification Data" paragraph below with qualification requirements in "Quality Assurance" Article.

* + - * 1. Qualification Data: For Installer.

Retain "Material Certificates" paragraph below to require submittal of material certificates from manufacturers.

* + - * 1. Material Certificates: For each type of terrazzo material or product.
      1. CLOSEOUT SUBMITTALS

NTMA publishes recommendations for minimum maintenance-program requirements.

* + - * 1. Maintenance Data: For terrazzo to include in maintenance manuals.
      1. QUALITY ASSURANCE

If applicable for Project location and if contractor membership is required, retain "Installer Qualifications" paragraph below. See "Installer Considerations" Article in the Evaluations. Consult NTMA for list of contractor members.

* + - * 1. Installer Qualifications: An installer who is a contractor member of NTMA.
        2. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

Build mockups for each type of terrazzo including accessories.

Size: Minimum 100 sq. ft. of typical poured-in-place flooring condition for each color and pattern [**in locations indicated**] [**in locations directed by Director’s Representative**].

Include [**base**] [**first three stair treads**].

Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Director’s Representative specifically approves such deviations in writing.

* + - 1. DELIVERY, STORAGE, AND HANDLING
         1. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.
         2. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
      2. FIELD CONDITIONS

Retain "Environmental Limitations" paragraph below for portland cement terrazzo, which is generally used at interior locations.

* + - * 1. Environmental Limitations: Maintain interior ambient temperature above 50 deg F for 48 hours before and during terrazzo installation.

Retain "Weather Limitations" paragraph below for rustic terrazzo, which is generally used at exterior locations.

* + - * 1. Weather Limitations: Proceed with rustic terrazzo installation only when forecasted weather conditions permit work to be performed according to NTMA's written recommendations and when temperatures remain above 45 deg F.

Retain "Field Measurements" paragraph below for precast terrazzo.

* + - * 1. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.
        2. Provide permanent interior lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.
        3. Close spaces to traffic during terrazzo installation and for not less than 24 hours after installation unless manufacturer recommends a longer period.

Retain paragraph below for portland cement terrazzo. Water and dust control is not required for rustic terrazzo because grinding operations do not apply.

* + - * 1. Control and collect water and dust produced by portland cement terrazzo grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and Masterworks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. MANUFACTURERS
         1. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.
      2. PERFORMANCE REQUIREMENTS
         1. NTMA Standards: Comply with NTMA's written recommendations for terrazzo type indicated unless more stringent requirements are specified.
      3. PORTLAND CEMENT TERRAZZO

Copy and re-edit "Portland Cement Terrazzo System" paragraph below for each type.

Insert drawing designation. Use designations on Drawings to identify each type.

* + - * 1. Portland Cement Terrazzo System <**Insert designation**>: [**Sand cushion**] [**Bonded**] [**Monolithic**].

Retain "Underbed Thickness" subparagraph below for sand-cushion and bonded terrazzo; delete for monolithic terrazzo.

Underbed Thickness: [**As indicated on Drawings**].

Terrazzo Topping Thickness: [**As indicated on Drawings**].

* + - * 1. Materials:

Portland Cement: ASTM C150, Type 1.

Color for Terrazzo Matrix: As required by mix indicated.

Water: Potable.

Retain "Sand" subparagraph below for sand-cushion or bonded portland cement terrazzo.

Sand: ASTM C33.

Aggregates: Comply with NTMA gradation standards for mix indicated and contain no deleterious or foreign matter.

Retain option in "Abrasion and Impact Resistance" subparagraph below for No. 5 marble chips, which are used in Venetian terrazzo, or other large-size coarse aggregates. See "Aggregates" Article in the Evaluations for a discussion of granular materials.

Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C131 and ASTM C535 for large-size coarse aggregates.

24-Hour Absorption Rate: Less than 0.75 percent.

Dust Content: Less than 1.0 percent by weight.

If needed for decorative effect, insert materials needed for toppings that include art objects or aggregates other than marble chips, such as granite, quartz, pea gravel, mother-of-pearl, or other suitable granules; consult NTMA for recommendations.

Matrix Pigments: Pure mineral or synthetic pigments, alkali resistant, durable under exposure to sunlight, and compatible with terrazzo matrix.

Retain "Underbed Bonding Agent" subparagraph below for bonded portland cement terrazzo.

Underbed Bonding Agent: Neat portland cement paste.

Retain "Topping Bonding Agent" subparagraph below for monolithic portland cement terrazzo.

Topping Bonding Agent: Neat portland cement paste, or epoxy or acrylic bonding agents formulated for use with monolithic terrazzo.

Retain "Underbed Reinforcement" subparagraph below for sand-cushion portland cement terrazzo.

Underbed Reinforcement: Galvanized welded-wire reinforcement, wire 2 by 2 inches by 0.062 inch in diameter, complying with ASTM A1064, except for minimum wire size.

Retain "Isolation Membrane" subparagraph below for sand-cushion portland cement terrazzo.

Isolation Membrane: Polyethylene sheeting, ASTM D2103, Type 13300, 4 mils thick; or unperforated asphalt felt, ASTM D226, Type I (No. 15).

* + - * 1. Mixes:

Retain "Underbed Mix" subparagraph below for sand-cushion and bonded terrazzo; delete for monolithic terrazzo.

Underbed Mix: One part portland cement to four parts sand and sufficient water to provide workability at as low a slump as possible.

Terrazzo Topping Mix: One 94-lb bag of portland cement per 200 lb of aggregate, matrix pigment if required by mix color, and sufficient water to produce a workable mix.

See "Mix Design" Article in the Evaluations for a comparison of NTMA series.

Mix Color and Pattern: [**As selected by Director’s Representative from NTMA's "Terrazzo Color Palette" CI Series**] [**As selected by Director’s Representative from NTMA's "Terrazzo Color Palette" CII Series**] [**As selected by Director’s Representative from NTMA's "Terrazzo Color Palette" CIII Series**] [**Match Director’s Representative's sample**] [**Match existing**].

* + - 1. RUSTIC TERRAZZO

Rustic terrazzo, commonly used for exterior locations, is a variation of portland cement terrazzo in which the granular surface aggregate is left exposed instead of ground smooth. See "Rustic Terrazzo" Article in the Evaluations for a discussion of rustic terrazzo types.

Copy and re-edit "Rustic Terrazzo System" paragraph below for each type.

Insert drawing designation. Use designations on Drawings to identify each type.

* + - * 1. Rustic Terrazzo System <**Insert designation**>: [**Bonded**] [**Monolithic**].

Retain "Underbed Thickness" subparagraph below for bonded rustic terrazzo; delete for monolithic rustic terrazzo.

Underbed Thickness: As indicated on Drawings.

Terrazzo Topping Thickness: As indicated on Drawings.

* + - * 1. Materials:

Portland Cement: ASTM C150, Type 1.

Color for Terrazzo Matrix: As required by mix indicated.

Water: Potable.

Retain "Sand" subparagraph below for underbed of bonded rustic terrazzo.

Sand: ASTM C33.

Aggregates: As required for mix indicated, in sizes comply with NTMA gradation standards, with maximum 24-hour absorption rate of 0.25 percent, and containing no deleterious or foreign matter.

If needed for decorative effect, insert materials needed for toppings that include art objects or aggregates other than marble chips, such as granite, quartz, pea gravel, mother-of-pearl, or other suitable granules. Consult NTMA for recommendations.

Matrix Pigments: Pure mineral or synthetic pigments, alkali resistant, durable under exposure to sunlight and weather, and compatible with matrix binder.

Retain "Air-Entraining Admixture" subparagraph below for underbed of exterior bonded rustic terrazzo.

Air-Entraining Admixture: ASTM C260.

Retain "Underbed Bonding Agent" subparagraph below for bonded rustic terrazzo.

Underbed Bonding Agent: Neat portland cement paste.

Retain "Topping Bonding Agent" subparagraph below for monolithic rustic terrazzo.

Topping Bonding Agent: Neat portland cement paste, or epoxy or acrylic bonding agents formulated for use with topping indicated.

* + - * 1. Mixes:

Retain "Underbed Mix" subparagraph below for bonded rustic terrazzo; delete for monolithic rustic terrazzo.

Underbed Mix: One part portland cement to four parts sand and sufficient water to provide workability at as low a slump as possible and air entrainment agent to produce 6 percent plus or minus 1 percent air content at point of delivery.

Terrazzo Topping Mix: One 94-lb bag of portland cement per 200 lb of aggregate, matrix pigment if required by mix color, and sufficient water to produce a workable mix.

NTMA's "Terrazzo Color Palette" illustrates ground and polished finishes only.

Mix Color and Pattern: [**As selected by Director’s Representative from NTMA's "Terrazzo Color Palette" CI Series**] [**As selected by Director’s Representative from NTMA's "Terrazzo Color Palette" CII Series**] [**As selected by Director’s Representative from NTMA's "Terrazzo Color Palette" CIII Series**] [**Match Director’s Representative's sample**] [**Match existing**].

* + - 1. PRECAST TERRAZZO

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=515) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Angelozzi Precast Terrazzo Products LLC.

Concord Terrazzo Company, Inc.

[Precast Terrazzo Enterprises, Inc](http://www.specagent.com/Lookup?uid=123457043069).

[Wausau Tile Inc](http://www.specagent.com/Lookup?uid=123457043071).

Approved equivalent.

Copy and re-edit "Precast Terrazzo Base" paragraph below for each type.

Insert drawing designation. Use designations on Drawings to identify each type.

* + - * 1. Precast Terrazzo Base <**Insert designation**>: Minimum 3/4-inch- thick, reinforced, portland cement terrazzo units cast in maximum lengths possible, but not less than 36 inches. Comply with NTMA's written recommendations for fabricating precast terrazzo base units in sizes and profiles indicated.

Type: [**As indicated**] [**Coved with minimum 3/4-inch radius**] [**Straight**] [**Splayed**].

Retain first option in "Top Edge" subparagraph below if top edge is concealed.

Top Edge: [**Straight, unfinished**] [**Beveled with polished top surface**] [**Radius edge with polished top surface**].

Retain "Metal Toe Strip" subparagraph below for coved-toe bases. Insert metal-divider requirements if needed.

Metal Toe Strip: [**Zinc**] [**Brass**].

Outside Corner Units: With finished returned edges at outside corner.

Color, Pattern, and Finish: [**As selected by Director’s Representative from full range of industry colors**] [**Match Director’s Representative's sample**] [**Match adjacent poured-in-place terrazzo flooring**].

Retain "Precast Terrazzo Units" paragraph below for precast terrazzo tiles, planks, stair treads, thresholds, sills, benches, planters, and other custom units. Detail profile, anchorage, and other requirements on Drawings or insert below.

Copy and re-edit "Precast Terrazzo Units" paragraph below for each product.

Insert drawing designation. Use designations on Drawings to identify each product.

* + - * 1. Precast Terrazzo Units <**Insert designation**>: Minimum 2-inch- thick, reinforced, portland cement terrazzo units. Comply with NTMA's written recommendations for fabricating precast terrazzo units in sizes and profiles indicated. Reinforce units as required by unit sizes, profiles, and thicknesses and as recommended by manufacturer. Finish exposed-to-view edges and reveals to match face finish. Ease exposed edges to 1/8-inch radius.

Color, Pattern, and Finish: [**As selected by Director’s Representative from full range of industry colors**] [**Match Director’s Representative's sample**] [**Match adjacent poured-in-place terrazzo flooring**].

* + - 1. STRIP MATERIALS

See "Strip Materials" Article in the Evaluations for discussion of strip-material types, finishes, and placement. Heavy-top divider strips and heavy-top angle divider strips have a more visible top-section width than standard divider strips.

* + - * 1. Standard Divider Strips: One-piece, flat-type strips for grouting into sawed joints prepared in substrate.

Material: [**As indicated**] [**White-zinc alloy**] [**Brass**].

Depth: [**As indicated**] [**3/4 inch**] [**1-1/4 inches**] [**2 inches**].

Width: [**As indicated**] [**0.05 inch**] [**1/8 inch**] [**1/4 inch**].

* + - * 1. Heavy-Top Divider Strips: One-piece, flat-type strips for grouting into sawed joints prepared in substrate.

Base-Section Material: [**As indicated**] [**White-zinc alloy**] [**Galvanized steel**].

Top-Section Material: [**As indicated**] [**White-zinc alloy**] [**Brass**] [**Plastic, in color selected from full range of industry colors**].

Depth: [**As indicated**] [**3/4 inch**] [**1-1/4 inches**] [**2 inches**].

Top-Section Width: [**As indicated**] [**1/8 inch**] [**1/4 inch**] [**1/2 inch**].

* + - * 1. Heavy-Top Angle Divider Strips: One-piece, L-type angle strips with anchoring device and in depth required for topping thickness indicated.

Material: [**As indicated**] [**White-zinc alloy**] [**Brass**] [**Plastic, in color selected from full range of industry colors**].

Top-Section Width: [**As indicated**] [**1/8 inch**] [**1/4 inch**] [**3/8 inch**] [**1/2 inch**].

* + - * 1. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material and color of divider strips and in depth required for topping thickness indicated.

Retain "Expansion-Joint Strips" paragraph below for rustic terrazzo.

* + - * 1. Expansion-Joint Strips: [**Brass**] [**Plastic strips in color selected from full range of industry colors**], with removable zip-strip top for installing sealant.

Width: [**As indicated**] [**Minimum 1/2 inch**].

* + - * 1. Accessory Strips: Match divider-strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:

Base-bead strips for exposed top edge of terrazzo base.

Edge-bead strips for exposed edges of terrazzo.

Nosings for terrazzo stair treads and landings.

Retain "Abrasive Strips" paragraph below for terrazzo stair treads and landings.

* + - * 1. Abrasive Strips: [**Three-line**] [**Two-line**] [**One-line**] [**Abrasive nosing strip and two-line**] abrasive inserts at nosings. Silicon carbide or aluminum oxide, or combination of both, in epoxy-resin binder and set in channel.

Width: 1/2 inch.

Depth: As required by terrazzo thickness.

Length: [**4 inches less than stair width**] [**As indicated**].

Color: [**As selected by Director’s Representative from full range of industry colors**].

* + - 1. MISCELLANEOUS ACCESSORIES
         1. Strip Adhesive: Recommended by manufacturer for this use.
         2. Anchoring Devices:

Strips: Provide mechanical anchoring devices or adhesives for strip materials as recommended by manufacturer and as required for secure attachment to substrate.

Precast Terrazzo: Provide mechanical anchoring devices as recommended by fabricator for proper anchorage and support of units for conditions of installation and support.

Retain "Moisture-Retaining Cover" paragraph below for use during curing of terrazzo.

* + - * 1. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.
        2. Isolation and Expansion-Joint Material: Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, and non-outgassing in unruptured state; butyl rubber; rubber; or cork; [**in width indicated**] [**minimum 1/2 inch wide**].

Retain "Portland Cement Terrazzo Cleaner" paragraph below for portland cement terrazzo.

* + - * 1. Portland Cement Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by cleaner manufacturer for use on terrazzo type indicated.

Retain "Rustic Terrazzo Cleaner" paragraph below for rustic terrazzo.

* + - * 1. Rustic Terrazzo Cleaner: Solution of 1 part muriatic acid and 10 parts water.
        2. Sealer: Slip- and stain-resistant, penetrating-type sealer that is chemically neutral; does not affect terrazzo color or physical properties; is recommended by sealer manufacturer; and complies with NTMA's written recommendations for terrazzo type indicated.

Surface Friction: Not less than 0.6 according to ASTM D2047.

Acid-Base Properties: With pH factor between 7 and 10.

Rustic Terrazzo: Use solvent acrylic-type sealer.

1. EXECUTION
   * + 1. EXAMINATION
          1. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
          2. Proceed with installation only after unsatisfactory conditions, including levelness tolerances, have been corrected.
       2. PREPARATION
          1. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.

Retain subparagraph below for smooth concrete substrates or insert requirements for other substrates such as wood or quarry tile; consult manufacturers for recommendations.

Roughen concrete substrates before installing terrazzo system according to NTMA's written recommendations.

Retain paragraph below for portland cement terrazzo. Control of water and dust is not required for rustic terrazzo because grinding operations do not apply.

* + - * 1. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.

Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

* + - 1. INSTALLATION, GENERAL
         1. Comply with NTMA's written recommendations for terrazzo and accessory installation.

Coordinate concrete-slab flatness and levelness tolerances with NTMA recommendations, especially for monolithic portland cement terrazzo and for monolithic rustic terrazzo. See Section 033000 "Cast-in-Place Concrete" for floor and slab tolerances.

* + - * 1. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet; noncumulative.
        2. Rustic Terrazzo: Install isolation and expansion material where abutting adjacent construction and directly above substrate expansion joints.

Retain "Underbed" paragraph below for sand-cushion or bonded portland cement terrazzo or for bonded rustic terrazzo.

* + - * 1. Underbed:

Comply with NTMA's written recommendations for underbed installation.

Sand-Cushion Portland Cement Terrazzo:

Cover entire surface to receive terrazzo with dusting of sand.

Install isolation membrane over sand, overlapping ends and edges a minimum of 3 inches.

Install welded-wire reinforcement, overlapping at edges and ends at least two squares. Stop mesh a minimum of 1 inch short of expansion joints.

Bonded [**Portland Cement**] [**Rustic**] Terrazzo:

Saturate structural concrete substrate with water, and slush and broom with underbed bonding agent.

Place underbed and screed to elevation indicated below finished floor elevation.

Revise "Strip Materials" paragraph below to suit Project. Indicate location and spacing of strip materials on Drawings or insert below.

* + - * 1. Strip Materials:

Divider and Control-Joint Strips:

Locate divider strips [**directly over breaks and control joints in concrete slabs**] [**in locations indicated**].

Install control-joint strips [**back to back and directly above concrete-slab control joints**] [**in locations indicated**].

Install control-joint strips with 1/4-inch gap between strips, and install sealant in gap.

Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.

Retain "Expansion-Joint Strips" subparagraph below for rustic terrazzo.

Expansion-Joint Strips: Form expansion joints using divider strips and install directly above concrete-slab expansion joints.

Accessory Strips: Install as required to provide a complete installation.

Retain "Abrasive Strips" subparagraph below if required. Option is based on NTMA recommendations for precast terrazzo stair treads.

Abrasive Strips: Install with surface of abrasive strip positioned 1/16 inch higher than terrazzo surface.

* + - 1. POURED-IN-PLACE TERRAZZO INSTALLATION

Retain "Underbed Preparation" paragraph below for sand-cushion and bonded portland cement terrazzo and bonded rustic terrazzo.

* + - * 1. Underbed Preparation:

Sand-Cushion Portland Cement Terrazzo: Saturate underbed with water to produce a cement slurry.

Bonded [**Portland Cement**] [**Rustic**] Terrazzo: Dampen underbed with water.

* + - * 1. Monolithic [**Portland Cement**] [**Rustic**] Terrazzo: Apply topping bonding agent on concrete substrate.
        2. Place terrazzo mixture in panels formed by divider strips and trowel mixture to top of strips. Seed additional aggregates in matrix to uniformly distribute granular material and produce a surface with a minimum of 70 percent aggregate exposure. Roll and compact surface until excess cement and water have been extracted.

Portland Cement Terrazzo: Trowel to a dense, uniform, flat surface disclosing lines of divider strips.

* + - * 1. Portland Cement Terrazzo Stairs: Install and finish stairs at the same time that adjacent flooring is installed.
        2. Portland Cement Terrazzo Base: Install and finish base at the same time that adjacent flooring is installed.
        3. Portland Cement Terrazzo Finishing: Cover terrazzo topping with moisture-retaining cover and cure until topping develops sufficient strength to prevent lifting or pulling of aggregate during grinding.

Rough Grinding: Grind with 24-grit or finer stones or with comparable diamond plates.

Grouting: After rough grinding, clean terrazzo topping with water and rinse away residue. Remove excess rinse water, apply matrix mix to grout surface, and fill voids. After grouting, cover surface with moisture-retaining cover to cure grout until ready for fine grinding.

According to NTMA, the standard finish on portland cement terrazzo is an 80-grit carborundum polish. 120 grit produces a more highly polished surface and tends to deepen and darken the appearance of aggregates.

Fine Grinding and Polishing: Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted. Grind with [**80**] [**120**]-grit stones or with comparable diamond abrasives until grout is removed from surface.

* + - * 1. Rustic Terrazzo Finishing: Expose aggregate by hosing or other means recommended in writing by NTMA. Cure the terrazzo topping by flooding with water or covering with moisture-retaining cover.
      1. PRECAST TERRAZZO INSTALLATION
         1. Install precast terrazzo units using method recommended in writing by NTMA and manufacturer unless otherwise indicated.
         2. Do not install units that are chipped, cracked, discolored, or improperly finished.
         3. Seal joints between units with [**cement grout matching precast terrazzo matrix**] [**joint sealant**].
      2. REPAIR
         1. Cut out and replace terrazzo areas that evidence lack of bond with substrate or underbed, including areas that emit a "hollow" sound if tapped. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Director’s Representative.
      3. CLEANING AND PROTECTION
         1. Terrazzo Cleaning:

Remove grinding dust from installation and adjacent areas.

Wash surfaces with cleaner immediately after final cleaning of terrazzo flooring according to both NTMA's and manufacturer's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow them to dry thoroughly.

Retain "Rustic Terrazzo Cleaning" paragraph below for rustic terrazzo only.

* + - * 1. Rustic Terrazzo Cleaning: Clean surfaces with rustic terrazzo cleaner. Legally contain and dispose of runoff from cleaning operations. Rinse surfaces with water and allow them to dry thoroughly.

Retain "Sealing" paragraph below for portland cement terrazzo, rustic terrazzo, and precast terrazzo.

* + - * 1. Sealing:

Seal surfaces according to NTMA's written recommendations.

Apply sealer according to sealer manufacturer's written instructions.

* + - * 1. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.

END OF SECTION 096613