

**SECTION 09 66 13
PORTLAND CEMENT TERRAZZO FLOORING**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between //---// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section covers the requirements for poured-in-place cementitious terrazzo including adhesively bonded monolithic terrazzo.

1.2 RELATED WORK

- A. Concrete Sub Floor: Section 03 30 00, CAST-IN-PLACE CONCRETE.
- B. Color and Location of each Terrazzo Formula: Section 09 06 00, SCHEDULE FOR FINISHES.
- C. Precast Terrazzo: Section 09 66 16, TERRAZO FLOOR TILE//Section 09 66 13, PORTLAND CEMENT TERRAZO FLOORING.

1.3 QUALITY ASSURANCE

- A. Comply with recommendations of National Terrazzo and Mosaic Association, Inc. (NTMA).
- B. Provide certification that materials provided meet or exceed specified NTMA properties.

1.4 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project // local/regional materials, // low-emitting materials, // recycled content, // _____// requirements.

1.5 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish following:
1. Samples: Preliminary samples for approval: Each terrazzo formula size 300 mm x 300 mm (12 x 12 inches) not more than 25 mm (1 inch) thick. Divider strips: one, 150 mm (6 inch) length of each type and kind of divider strip as herein specified.
 2. Manufacturer's Literature and Data:
 - a. Cleaning and preservative solutions for terrazzo.
 - b. Terrazzo formula.
 - c. Nonslip aggregate.

- d. Divider strips.
- e. Adhesive for adhesively bond monolithic terrazzo.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

- B. American Society for Testing and Materials (ASTM):

C33/C33M-18	Concrete Aggregates
C150/C150M-22	Portland Cement

- C. National Terrazzo and Mosaic Association (NTMA):

Terrazzo Specifications and Design Guide

1.7 DELIVERY, STORAGE, AND HANDLING

- A. 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.
- B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT

- A. ASTM C150, Type 1, non-staining, white.

2.2 SAND

- A. ASTM C33 for fine aggregate.

2.3 MARBLE GRANULES

- A. Comply with NTMA requirements.
- B. Crushed marble chips cannot contain any foreign matter.
- C. Uniformly grade from 3 mm to 9 mm (1/8 inch to 3/8 inch).

2.4 COLORANT

- A. Alkali resistant and nonfading mineral oxide pigment.

2.5 NONSLIP AGGREGATE

- A. Aluminum oxide or carborundum particles, uniformly graded from 0.8 mm to 6 mm (1/32 to 1/4 inch) and black or dark color.

2.6 BASE BEADS

- A. Flush // projecting // type with // zinc-alloy // brass // nosing, and 24 gage galvanized steel backing.

2.7 METAL STRIPS

- A. //Zinc alloy // Brass // types specified below.
- B. Base Divider Strips: One piece, 3 mm (1/8 inch) thick, shaped to profile of base from top edges to toe edge of base.
- C. Floor Divider Strips (Strips): 32 mm (1-1/4 inch) deep strip with // 3 mm // 6 mm // (// 1/8 // 1/4 // inch) thick top and // 20 // 16// gage bottom member.
- D. Floor Divider Strips (T-Strips): // 3 mm // 6 mm // (// 1/8 // 1/4 // inch) thick top with // 16 // 12 // gage backing 38 mm (1-1/2 inches) wide.
- E. Floor Divider Strips (Special): // 3 mm // 6 mm // (// 1/8 // 1/4 // inch) thick top with offset on one side to provide bearing surface for resilient flooring 32 mm (1-1/4 inches) deep.
- F. Floor Divider Strips (Adhesively Bonded Monolithic Terrazzo): 16 (B&S) gage, folded, T-type formed for double expansion 16 mm (5/8 inch) deep.

2.8 ADHESIVE FOR MONOLITHIC TERRAZZO

- A. Liquid polymer formulation, modified with epoxy resin, mixed in accordance with manufacturer's recommendations; adhesive to have properties which resist brittleness, remain flexible and resistant to impact.
- B. Provide low VOC products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.9 CLEANING SOLUTION

- A. Terrazzo cleaner to be biodegradable, phosphate free and have a Ph factor between 7 and 10 and be of a type specially prepared for use on terrazzo.

2.10 SEALER

- A. Sealer to have a pH factor between 7 and 10 and be a penetrating type specially prepared for the terrazzo trade; sealer must not discolor or amber the terrazzo. Select sealer product which produces a slip resistant surface.
- B. Provide low VOC products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.11 TERRAZZO PROPORTIONS

- A. Underbed: Compose of one part Portland cement to 4-1/2 parts sand and sufficient water to provide workability at as low a slump as possible.
- B. Terrazzo Topping: Follow NTMA recommendations for mixes.

PART 3 - EXECUTION**3.1 INSTALLING METAL STRIPS**

- A. Set strips with close, butt joints, true and square; hold in place with cement mortar, except where specified to be held with adhesive.
- B. Use floor divider strips //, T-strips, // 3 mm (1/8-inch-thick top) between cast-in-place terrazzo base and floors, and to divide floors into approximately 750 mm (30 inch) squares, or pattern shown.
- C. Use floor divider strips //, T-strips, // 6 mm (1/4-inch-thick top) where terrazzo abuts cement or ceramic tile. Where joints occur at door openings, set strips directly under center of doors.
- D. Use special floor divider strips where cast-in-place terrazzo abuts resilient flooring.
- E. Set base divider strips plumb for cast-in-place base. Anchor and space them not over 1500 mm (5 feet) on centers, or to align with floor divider strips. Set them symmetrically at door and other openings and wall breaks and in line with field divider strips of floor.

SPEC WRITER NOTES:

1. If floor divider spacing is not shown on drawings, consult Architect for spacing.
- F. Use floor divider, T-strips for adhesive bonded monolithic terrazzo floors, located as shown on drawings. Set strips with same adhesive

used for bonding terrazzo topping, and shim where necessary to produce a straight and level floor. Tightly butt strips at intersection and install 24 hours prior to floor installation.

3.2 INSTALLING TERRAZZO FLOORS

- A. Bonded to Concrete Terrazzo: Consists of an underbed and terrazzo topping on a rough concrete slab. Finish terrazzo floors a minimum of 44 mm (1-3/4 inches) above rough concrete slab. Surfaces of concrete slabs to receive terrazzo must be cleaned of plaster, oil, grease, and foreign matter. Saturate slabs with water, remove all excess and then, immediately before placing underbed, slush and broom concrete with neat cement. Provide underbed a minimum of 32 mm (1-1/8 inches) thick. Wet cement-sand mix to proper consistency and spread evenly over surfaces to receive terrazzo. Provide shrinkage reinforcement of 50 mm (2 inch) wire mesh (16 gage). Finish underbed to true, level surface, and prepare and condition it to receive terrazzo topping and ensure permanent bond.
- B. Monolithic Terrazzo: Consists of terrazzo topping placed integrally on prepared concrete slab. Broom clean concrete slabs to receive terrazzo. Before placing of terrazzo topping, saturate slabs with water until all absorption by concrete has stopped. Remove all excess water. Place terrazzo over prepared slab in one continuous operation.
- C. Adhesively Bonded Monolithic Terrazzo: Consists of terrazzo topping adhesively applied to concrete slab.
 - 1. Concrete slabs must be clean and free of dirt, dust, oil, paint and other foreign materials. Damp mop surface before applying adhesive. On porous concrete slabs, apply a prime coat of same adhesive used for bonding terrazzo topping, 24 hours in advance of application of bonding coat.
 - 2. Install specified divider strips.
 - 3. Apply adhesive evenly to concrete slabs to approximately 10 mils thickness. When spray or broom application is used reduce viscosity of adhesive as recommended by adhesive manufacturer. Allow minimum of 1/2 hour lapse before applying bond coat. Immediately broadcast marble chips over adhesive film and continue with placing terrazzo topping in one continuous operation.
- D. Topping: Spread topping to provide finished thickness of 10 mm (3/8 inch) (after grinding) on vertical surfaces, and 16 mm (5/8 inch) on horizontal surfaces. Provide topping in uniform composition and use

same marble granules that appear on surface for its entire thickness. Trowel and pack base to proper form and roll floor and thresholds with heavy roller so that terrazzo will be dense with even surface showing at least 70 percent marble granules. Lay terrazzo topping full above strips to permit grinding terrazzo down to finish floor level.

3.3 INSTALLING BASES

- A. Provide base as size as indicated. Make external corners of base conform to contour of wall finish above. Provide square toe or cove at corners of floor field.
- B. Round top of projecting base to 6 mm (1/4 inch) radius.
- C. At openings having metal door frames, return base on itself, with toe or cove in line with back edge of metal frame.

3.4 CURING

- A. Cure terrazzo topping at least six days before grinding and until it sets sufficiently hard to permit coarse stone grinding without dislodging surface aggregate. Curing time for terrazzo base may be reduced to four days, subject to approval of RE/COR. During curing period, cover terrazzo with waterproof paper, cotton mats, or one inch of clean wet sand. Lap and secure against displacement of joints in paper or mats. Keep sand (if used) wet by sprinkling with clean water at intervals of not more than eight hours. Do final grinding or rubbing of terrazzo before finish coat of plaster or other connecting wall finish is applied.

3.5 GRINDING

- A. After curing, wet-grind terrazzo to smooth even surface, then grout with neat white Portland cement paste of creamy consistency, filling voids. Leave grout on surfaces not less than two days and remove by final grinding. Grind terrazzo surfaces with electric grinding machines. Where impossible to use machines, hand rub surfaces. Dry grinding of terrazzo is prohibited.
- B. Perform final grinding or rubbing to terrazzo to remove scratches, and produce true surface of uniform color and texture, without irregularities. When tested with steel straight edge, terrazzo base surfaces cannot show wave exceeding 1.6 mm (1/16 inch) between divider strips. When tested with steel straight edge 900 mm (three feet) long, floor surfaces cannot show wave exceeding 0.8 mm (1/32 inch). Protect adjacent walls, floors, and other connecting work from rubbing stones and from splashing, while grinding is in progress.

3.6 CLEANING

- A. After final grinding, clean terrazzo and condition to counteract efflorescence. Apply mixture of not less than one part of liquid cleaner to three parts of water and allow it to soak uniformly into terrazzo from fifteen to thirty minutes, keeping surfaces wet.

3.7 SEALING

- A. After surfaces are dry, wash and rinse terrazzo and (except on terrazzo surfaces containing nonslip aggregate) apply coat of sealer. Buff terrazzo surfaces with a weighted polishing brush or electric buffing machine.
- B. After plastering work is completed and terrazzo cleaned, wash terrazzo work with soap and water and leave in finished, polished condition. Cover and protect terrazzo until completion of the work of all other trades.

3.8 ALTERATIONS

- A. In altered rooms and areas where terrazzo floors and base occurs, patch, repair and replace existing terrazzo, and provide new terrazzo to match existing similar work in composition, color, height, shape and finish.
- B. Use divider strips to match existing.
- C. Cure terrazzo at least six days before grinding. Then grout with neat Portland cement to fill voids.
- D. After two days, remove grout by final grinding. Dry grinding is prohibited.
- E. After final grinding, clean terrazzo. After surfaces are dry, wash and rinse terrazzo, and apply coat of sealer.
- F. Buff terrazzo surfaces with electric buffing machine.

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