

## **SECTION 09 66 13.26**

### **RUSTIC TERRAZZO FLOORING**

THIS GUIDE SPECIFICATION HAS BEEN PREPARED BY THE NATIONAL TERRAZZO AND MOSAIC ASSOCIATION, INC., AND IS DISTRIBUTED FOR USE BY ITS MEMBERS AND DESIGN PROFESSIONALS.

SPECIFIER'S NOTE: REVISE THIS SECTION BY DELETING AND INSERTING TEXT TO MEET PROJECT-SPECIFIC REQUIREMENTS.

SPECIFIER'S NOTE: RUSTIC TERRAZZO CAN UTILIZE ANY CEMENTITIOUS TERRAZZO SYSTEM. MOST RUSTIC TERRAZZO IS INSTALLED ON EXTERIOR, ON-GRADE LOCATIONS. NTMA CONSIDERS THE BONDED WITH UNDERBED AND MONOLITHIC SYSTEM SUITABLE FOR THIS TYPE OF INSTALLATION.

SPECIFIER'S NOTE: BONDED RUSTIC TERRAZZO FLOORING INSTALLATIONS ARE A MINIMUM OF 1-3/4 INCHES THICK (1/2 INCH NOMINAL TERRAZZO TOPPING, 1-1/4 INCH NOMINAL UNDERBED). SEE ARCHITECTURAL DETAILS. THIS SPECIFICATION DOES NOT INCLUDE PRE-CAST TERRAZZO UNITS.

SPECIFIER'S NOTE: DE-ICING CHEMICALS AND SALT CAN BE INJURIOUS TO PORTLAND CEMENT SURFACES AND SHOULD NOT BE USED ON RUSTIC TERRAZZO.

SPECIFIER'S NOTE: CONCRETE SUBFLOORS TO RECEIVE BONDED RUSTIC TERRAZZO FLOORING SHALL NOT VARY MORE THAN 1/4 INCH FROM TRUE PLANE IN 10 FOOT SPAN AND SHALL RECEIVE A FLOAT FINISH.

#### **PART 1 - GENERAL**

##### **1.01 SUMMARY**

- A. Section includes cementitious rustic terrazzo, **[bonded system] [monolithic]**.
- B. Related Requirements:

SPECIFIER'S NOTE: DELETE NONAPPLICABLE ITEMS.

- 1. Concrete slab, Section **<Insert Section No. Here>** for float finish and expansion joints in concrete substrate slab.

SPECIFIER'S NOTE: SURFACE OF CONCRETE SLAB MUST NOT BE CURED WITH A LIQUID MEMBRANE OR CONTAIN OTHER ADDITIVES WHICH COULD INHIBIT BOND OF TERRAZZO TOPPING.

- 2. Provide floor drains at rustic terrazzo flooring, Section **<Insert Section No. Here>**.

##### **1.02 DEFINITIONS**

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

- B. Marble: Metamorphic (recrystallized) limestone, composed predominantly of crystalline grains of calcite or dolomite or both, having interlocking or mosaic texture.

SPECIFIER'S NOTE: NTMA DOES NOT RECOMMEND THE USE OF GLASS OR PLASTIC CHIPS IN PORTLAND CEMENT TERRAZZO MIXES.

- C. Aggregate: Material other than marble, used in the topping which may include granite, abrasive, quartz, or river gravel.

### **1.03 PREINSTALLATION MEETINGS**

- A. Preinstallation 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 representatives of the Owner.
  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.
    - a. Coordination with the Work of other Installers.

### **1.04 ACTION SUBMITTAL**

- A. Product Data: Terrazzo Contractor shall submit Product Data for each type of product required for installation including:

SPECIFIER'S NOTE: RETAIN ONLY THOSE ITEMS WHICH APPLY TO PROJECT IN THE FOLLOWING LISTING.

1. Strip materials.
2. Sealer.
3. Cement.

- B. Shop Drawings: Terrazzo Contractor shall 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:

SPECIFIER'S NOTE: RETAIN ONLY THOSE ITEMS WHICH APPLY TO PROJECT IN THE FOLLOWING LISTING.

1. Divider strips.
2. Expansion-joint strips.
3. Accessory strips.
4. Abrasive strips.
5. Stair treads, risers, and landings.

6. Terrazzo patterns.
7. <Insert requirements>.

SPECIFIER'S NOTE: KEEP PARAGRAPH BELOW FOR RELATIVELY SMALL AND SIMPLE PROJECTS WHERE TERRAZZO COLORS AND PATTERNS HAVE ALREADY BEEN SELECTED. DELETE PARAGRAPH IF KEEPING "SAMPLES FOR INITIAL SELECTION" OR "SAMPLES FOR VERIFICATION" PARAGRAPHS BELOW.

- C. Samples: Terrazzo Contractor shall prepare and submit a maximum of three samples, sizes [6 by 6 inches] [12 by 12 inches] for each color and type of terrazzo specified.

SPECIFIER'S NOTE: KEEP PARAGRAPH BELOW FOR PROJECTS WHERE TERRAZZO COLORS WILL BE SELECTED DURING CONSTRUCTION FROM NTMA "COLOR PLATTE BROCHURE" WHICH ARE VERY LIMITED. CONSULT WITH TERRAZZO CONTRACTOR FOR AVAILABLE AGGREGATE COLORS. DELETE PARAGRAPH WHERE TERRAZZO COLORS HAVE BEEN SELECTED AND ARE INDICATED ON THE DRAWINGS AND SPECIFICATIONS.

- D. Samples for Initial Selection: Terrazzo Contractor shall submit NTMA "Color Palette Brochure" showing full range of colors and patterns available for each terrazzo type.

SPECIFIER'S NOTE: KEEP PARAGRAPH BELOW FOR LARGER AND MORE COMPLEX PROJECT. DELETE PARAGRAPH WHERE TERRAZZO COLORS HAVE BEEN SELECTED AND ARE INDICATED ON THE DRAWINGS AND SPECIFICATIONS.

- E. Samples for Verification: Terrazzo Contractor shall prepare and submit samples for each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Each terrazzo sample shall be labeled to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Each Sample shall be of same thickness and prepared from same material to be used for the Work, in size indicated below:

1. Terrazzo: 12 by 12 inch Samples with divider strips 4 inches from each edge.
2. Accessories: 6 inch long Samples of each type and kind of exposed strip item required.

### **1.05 INFORMATIONAL SUBMITTAL**

- A. Qualification Data: Terrazzo Contractor shall submit two copies of qualification data.
1. Include list of projects with photographs 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.

### **1.06 CLOSEOUT SUBMITTAL**

SPECIFIER'S NOTE: DE-ICING CHEMICALS AND SALT CAN BE INJURIOUS TO PORTLAND CEMENT SURFACES AND SHOULD NOT BE USED ON RUSTIC TERRAZZO.

- A. Maintenance Literature: Submit two copies of maintenance recommendations of NTMA or maintenance product members of NTMA.

**1.07 QUALITY ASSURANCE**

- A. Acceptable Suppliers: A firm experienced in manufacturing products 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 years of scale and complexity similar to the proposed installation.
- C. Source Limitations for Aggregates: Terrazzo Contractor shall 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.

SPECIFIER'S NOTE: SIZE OF MOCKUP SHOULD BE DEPENDENT TO NUMBER OF COLORS AND PATTERNS. USUALLY A MOCKUP OF 50 TO 100 SQ. FT. SHOULD BE SUFFICIENT. DETAIL MOCKUP DESIRED ON DRAWINGS. KEEP REQUIREMENTS FOR MOCKUP FOR LARGER AND MORE COMPLEX PROJECTS.

- D. Mockups: Terrazzo Contractor shall construct mockup if required in bid or scope of work documents to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockup as indicated on Drawings.
  - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**1.08 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.
  - 1. Cement materials shall be stored inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

**1.09 FIELD CONDITIONS**

SPECIFIER'S NOTE: KEEP FOLLOWING PARAGRAPH AND ASSOCIATED SUBPARAGRAPH FOR EXTERIOR RUSTIC TERRAZZO INSTALLATIONS.

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit terrazzo flooring to be installed according to NTMA standards.
  - 1. Where existing and forecasted weather conditions do not comply with NTMA standards, the General Contractor shall provide enclosure with temporary heat maintained at a minimum of 50 deg F.

SPECIFIER'S NOTE: KEEP OPTION IN FOLLOWING PARAGRAPH FOR INTERIOR RUSTIC TERRAZZO INSTALLATIONS.

- B. 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.

SPECIFIER'S NOTE: KEEP FOLLOWING PARAGRAPH FOR INTERIOR RUSTIC TERRAZZO INSTALLATIONS.

- C. 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 50 deg. F.
  2. Maintain adequate ventilation in the area to receive terrazzo.
- D. Terrazzo Contractor shall protect other adjacent work from water and dust generated by grinding operations.

#### **1.10 GUARANTEE**

- A. One year from date of substantial completion of Terrazzo installation.

### **PART 2 - PRODUCTS**

#### **2.01 MATERIALS**

SPECIFIER'S NOTE: SELECT WHITE OR GRAY CEMENT. BOTH WHITE AND GRAY PORTLAND CEMENT MAY NOT BE UNIFORM IN COLOR AND MAY PRODUCE A VARIATION OF SHADE IN THE MATRIX. WHERE CLIMACTIC CONDITIONS DO DEMAND, SPECIFY AN AIR ENTRAINING AGENT (6 PERCENT AIR PLUS OR MINUS 1 PERCENT) FOR STRUCTURAL SLAB TO MINIMIZE FREEZE-THAW CYCLE DAMAGE. PACKAGE AIR ENTRAINING CEMENT MUST NOT BE USED.

- A. Portland cement: ASTM C 150, Type I, [**white**][**gray**]
- B. Sand: Coarse, clean, washed, locally available sand.

SPECIFIER'S NOTE: SELECT HARD, DURABLE AGGREGATES, PARTICULARLY IN AREAS WHERE FREEZING OCCURS. CONSULT LOCAL TERRAZZO INSTALLER. IN AREAS SUCH AS SWIMMING POOLS DECKS, WHERE A SMOOTHER FINISH MAY BE DESIRED, OVAL AGGREGATE SHOULD BE CONSIDERED.

- C. Marble, Quartz, Granite or Gravel:

SPECIFIER'S NOTE: STANDARD MARBLE AGGREGATES ARE NO. 1 AND NO. 2 SIZE UNLESS SPECIFIED OTHERWISE.

1. Size: Conform to NTMA standards.
2. Abrasion and Impact Resistance: Not more than 40 percent loss when tested in accordance with ASTM C 131
3. Chips shall contain no deleterious or foreign matter.

- D. Colorant: Alkali-resistant color stable pigments
- E. Strips:
  - 1. Expansion joints: Zinc with a cap strip top with a depth of 1-1/4 inches.
    - a. Thickness: <insert thickness>.
    - b. Color: <insert color>.

SPECIFIER'S NOTE: SPECIFY MATERIAL AND SIZE. USE ETHAFOAM, BUTYL RUBBER OR CORK. 1/2 INCH IS RECOMMENDED WIDTH, FULL DEPTH OF UNDERBED AND TERRAZZO TOPPING. PLACE DIRECTLY ABOVE EXPANSION JOINTS IN CONCRETE STRUCTURAL SLAB. SEE STRIP GUIDE.

- 2. Divider Strips:
    - a. Materials: [**White alloy of zinc**].
    - b. Thickness: 16 gauge.
- F. Curing Materials: Water or polyethylene sheeting.

## **2.02 MISCELLANEOUS ACCESSORIES**

- A. Sealant: Polyurethane with appropriate backer rod.
- B. Sealer: Terrazzo Contractor shall provide a penetrating, non-ambering, clear sealer that is chemically neutral; does not impair terrazzo aesthetics or physical properties; is specifically recommended for rustic terrazzo. Sealers shall comply with the following:

SPECIFIER'S NOTE: SOLVENT ACRYLIC TYPE PREFERRED.

- 1. Solvent-Based Sealer Properties: Flashpoint at 95 deg. F according to ASTM D 56.

## **2.03 MIXES**

- A. Terrazzo Selection: Terrazzo Contractor shall provide terrazzo mix(es) according to the following:

SPECIFIER'S NOTE: USUALLY KEEP ONLY ONE OF THE FOLLOWING SUBPARAGRAPHS FOR SPECIFYING TERRAZZO MIX COLOR.

SPECIFIER'S NOTE: RETAIN FOLLOWING IF SPECIFYING A COLOR FROM A NTMA PLATE NO.

- 1. NTMA Plate No. <Insert rustic terrazzo plate no.>

SPECIFIER'S NOTE: RETAIN FOLLOWING IF COLOR WILL BE CHOSEN FROM A NTMA PLATE NO. AFTER CONTRACT IS AWARDED. ANY DEVIATION FROM NTMA PLATE MUST BE CLEARLY STIPULATED.

- 2. Mix Color: [**As selected by Architect from NTMA rustic-terrazzo plates**] <Insert NTMA color plate designation>

SPECIFIER'S NOTE: RETAIN FOLLOWING IF A CUSTOM COLOR HAS BEEN CHOSEN AND A MIX WILL BE SPECIFIED. MODIFY AS REQUIRED FOR DESIRED MIX. PERCENTAGES MUST ADD UP TO 100 PERCENT. COPY IF ADDITIONAL MIX REQUIREMENT ARE NEEDED. DO NOT KEEP THE FOLLOWING IF CHOOSING FROM NTMA'S STANDARD TERRAZZO PLATES.

3. Custom Mix Color and Pattern:

a. Color No. 1:

- 1) Cement Color: [White][Gray].
- 2) Chips: [No. 1][No. 2], <insert name of chip>, <insert percentage> percent.
- 3) Chips: [No. 1][No. 2], <insert name of chip>, <insert percentage> percent.
- 4) Chips: [No. 1][No. 2], <insert name of chip>, <insert percentage> percent.

b. Color No. 2:

- 1) Cement Color: [White][Gray].
- 2) Chips: [No. 1][No. 2], <insert name of chip>, <insert percentage> percent.
- 3) Chips: [No. 1][No. 2], <insert name of chip>, <insert percentage> percent.
- 4) Chips: [No. 1][No. 2], <insert name of chip>, <insert percentage> percent.

c. Color for Base:

- 1) Cement Color: [White][Gray].
- 2) Chips: No. 1, <insert name of chip>, <insert percentage> percent.
- 3) Chips: No. 1, <insert name of chip>, <insert percentage> percent.
- 4) Chips: No. 1, <insert name of chip>, <insert percentage> percent.

SPECIFIER'S NOTE: RETAIN FOLLOWING IF A CUSTOM COLOR HAS BEEN CHOSEN AND MATCHING AN APPROVED SAMPLE WILL BE REQUIRED OR IF TERRAZZO IS REQUIRED TO MATCH AN EXISTING INSTALLATION.

4. Custom Mix Color and Pattern: [Match Architect's sample] [Match existing].

B. Proportions:

SPECIFIER'S NOTE: DELETE FOLLOWING PARAGRAPH FOR MONOLITHIC RUSTIC TERRAZZO.

1. Underbed: One part portland cement to 4 parts coarse sand. Air entrainment agent (6 percent plus / minus 1 percent air).

SPECIFIER'S NOTE: NTMA RECOMMENDED MIX IN FOLLOWING PARAGRAPH WITH 4-1/2 TO 5 GALLONS OF CLEAN WATER. DEPTH OF TOPPING 1/2 TO 3/4 INCH, DEPENDING ON THE SIZE OF AGGREGATE. CLEAN WHITE FINE SAND MAY BE ADDED TO MIX.

2. Terrazzo Topping: One 94-lb. bag of portland cement per 200 lb. of aggregate and sufficient potable water to produce a workable mix.

C. Mixing: Terrazzo Contractor shall mix underbed and topping as follows:

SPECIFIER'S NOTE: DELETE FOLLOWING PARAGRAPH FOR MONOLITHIC RUSTIC TERRAZZO.

1. Underbed:
  - a. Charge and mix sand and Portland cement.
  - b. Add water and mix.
2. Terrazzo Topping:
  - a. Charge and mix aggregate and portland cement.
  - b. Add water and mix to a uniform workable consistency.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. The General Contractor 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. Verify that concrete surfaces to receive [**bonded**] [**monolithic**] terrazzo flooring are sound, free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil and other contaminants incompatible with terrazzo flooring materials. Concrete substrate shall have a float finish.

SPECIFIER'S NOTE: STRUCTURAL CRACKS IN SUBSTRATE WILL USUALLY BE TRANSMITTED THROUGH TOPPING TO SURFACE.

- B. Terrazzo Contractor shall proceed with installation only after unsatisfactory conditions, including levelness tolerances, have been corrected.

### **3.02 PREPARATION**

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

### **3.03 INSTALLATION**

SPECIFIER'S NOTE: DELETE FOLLOWING PARAGRAPH FOR MONOLITHIC RUSTIC TERRAZZO.

- A. Concrete Underbed:
  1. Set expansion material around building perimeter, around all column bases, and directly above expansion joints in concrete structural slab.
  2. Thoroughly saturate concrete subfloor with water, slush and broom with neat cement paste.
  3. Place concrete underbed and screed to an elevation of 1/2- to 3/4-inch below finished surface, depending on size of aggregate.
  4. Install divider strips before concrete hardens.
- B. Placing Rustic Terrazzo Topping:



SPECIFIER'S NOTE: RUSTIC TERRAZZO TOPPING WILL BE 1/2- TO 3/4-INCH THICK DEPENDING ON SIZE OF AGGREGATE.

SPECIFIER'S NOTE: DELETE FOLLOWING PARAGRAPH FOR MONOLITHIC RUSTIC TERRAZZO.

1. Soak underbed surface thoroughly with clean water.
  2. Place rustic terrazzo mixture in panels formed by divider strips and trowel mixture to top of strips.
  3. Roll and compact surface until all excess cement and water has been extracted.
- C. Finishing: Expose aggregate by hosing, absorbent rolling, or use of a retarder.
- D. Curing: After completing placement of terrazzo and composition has sufficiently set, Terrazzo Contractor shall cure the terrazzo topping by flooding with clean water, or covering with polyethylene sheeting.

SPECIFIER'S NOTE: ACID WASH NO SOONER THAN 7 DAYS AFTER INSTALLATION.

- E. Cleaning: When topping is sufficiently cured, in the opinion of the Terrazzo Contractor, apply cleaner, scrub with a stiff broom to remove all laitance and rinse immediately with clean water to remove all traces of cleaner.
- F. Sealing:
1. Rinse floor with clean water and allow to dry.
  2. When floor is thoroughly dry, apply the sealer in accordance with manufacturer's directions for use on rustic terrazzo.
- G. Joint Sealants: Place sealant in joints with backer rod as required.

### **3.04 REPAIR**

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

### **3.05 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.

## **END OF SECTION**