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USACE / NAVFAC / AFCEC / NASA **UFGS-09 66 23 (August 2016)**
Change 1 - 08/18

Preparing Activity: USACE **Superseding**
UFGS-09 66 23 (August 2010)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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08/16, CHG 1: 08/18

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SECTION 09 66 23

RESINOUS MATRIX TERRAZZO FLOORING
08/16, CHG 1: 08/18

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NOTE: This guide specification covers the requirements for resinous terrazzo flooring and conductive resinous terrazzo flooring.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
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PART 1 GENERAL

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NOTE: The resinous terrazzo floor systems covered by this guide specification may be used in lieu of portland cement terrazzo where the light weight of the thin set system would be advantageous.

The conductive resinous terrazzo flooring is primarily intended for use in areas where volatile materials are handled, clean-rooms, parachute assembly areas, etc. These systems, which have a wear factor four times better than cementitious terrazzo and five to six times better than vinyl may be used, when economically justified, in hard wear areas where there is a need for a high degree of cleanliness, a decorative effect, and some chemical resistance. These systems will not be used over

lightweight concrete and will not be used in lieu of quarry tile in kitchens.

The selection of a floor system for a location where resistance to specific conditions is important should be based upon the ability of the system to withstand required exposure conditions. For example, polyesters are suitable where resistance to detergents is required but should not be used in laboratory or other areas where spillage of sodium hydroxide or similar strong alkaline solution occurs; epoxies should not be used where resistance to oxidizing acids is required or where resistance to temperatures in excess of 54 degrees C 130 degrees F is required; latex mastic and resin emulsions should not be used where resistance to strong acids or alkalis is required. Each job should be evaluated on its own merits considering exposure conditions, costs, and local experience with the various systems.

Areas to receive terrazzo will be shown on the drawings. Color should be shown by specifying a selected plate number from the NTMA publication, "Terrazzo Information Guide." Example: NTMA terrazzo catalog, plate No. S-301-4. Colors selected may be any combination of standard marble granules of domestic origin available in the local market, but it is highly desirable that color combinations be designated by NTMA color plates.
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1.1 SUMMARY

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NOTE: Conductive floors will be used at operations where explosives having an electrostatic sensitivity of 0.1 joule or less such as primer, detonator, igniter, and incendiary mixtures are exposed. Conductive floors are also required where the following are performed:

a. Loose unpacked ammo with electric primers.
b. Exposed electro-explosive devices.
c. Electrically initiated items with exposed electric circuitry.
d. Hazardous materials that could be ignited by static discharge from humans.
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Apply resinous terrazzo flooring, in the colors indicated, in the areas shown on the detail drawings. Submit two 150 x 150 mm 6 x 6 inches, (minimum) samples of each color of resinous terrazzo and two 150 mm 6 inches lengths, of each type of strip. Flooring must be [[an epoxy terrazzo system that conforms to the requirements specified in paragraphs 2.01A and B of NTMA Info Guide][or][a polyester terrazzo flooring system that conforms to the requirements specified in paragraphs 2.01A and B of NTMA Info Guide.]] [a conductive [epoxy terrazzo system that conforms to the requirements specified in paragraphs 2.01A, B, and H of NTMA Info Guide.]

[or] [polyester terrazzo flooring system that conforms to the requirements specified in paragraphs 2.10A, B, and J of NTMA Info Guide].]

1.2 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D56	(2016a) Standard Test Method for Flash Point by Tag Closed Cup Tester

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

CDPH SECTION 01350	(2017; Version 1.2) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 99	(2021; TIA 20-1; TIA 21-2) Health Care Facilities Code

NATIONAL TERRAZZO AND MOSAIC ASSOCIATION (NTMA)

NTMA Info Guide	(2017) Terrazzo Reference Guide

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

SCAQMD Rule 1113	(2016) Architectural Coatings
SCAQMD Rule 1168	(2017) Adhesive and Sealant Applications

1.3 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings; G[, [_____]]

Strips; G[, [_____]]

Control Joint Strips; G[, [_____]]

SD-03 Product Data

Resin

Recycled Content for Marble Chips; S

Indoor Air Quality for Primer; S

Indoor Air Quality for Resin; S

Indoor Air Quality for Grout; S

Indoor Air Quality for Sealer; S

Mixing, Proportioning, and Installation

Cleaning and Sealing

SD-04 Samples

Resinous Terrazzo Flooring

SD-06 Test Reports

Certified Test Reports; G[, [_____]]

SD-07 Certificates

Qualifications of Installer; G[, [_____]]

1.4 QUALITY ASSURANCE

Applicator must be approved by the resin manufacturer and must have a minimum of 3 years experience in the application of the materials to be used and must have completed 8 successful installations within the past 2 years. Furnish a written statement from the manufacturer detailing the Qualifications of Installer.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the project site in manufacturer's original unopened containers. Keep materials in a clean, dry, area with temperatures controlled between 10 and 33 degrees C 50 and 90 degrees F.

1.6 ENVIRONMENTAL REQUIREMENTS

Maintain areas to receive terrazzo at a temperature above 10 degrees C 50 degrees F for 2 days prior to installation and for 7 days following installation.

PART 2 PRODUCTS

2.1 PRIMER

Primer must be a material recommended by the resin manufacturer which will penetrate the pores of the substrate and bond with the topping to form a permanent monolithic bond between the substrate and the topping. Primer products used on the interior of the building (defined as inside of the weatherproofing system) must meet either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1113. Provide validation of indoor air quality for primer.

2.2 RESIN

Resin for the specified terrazzo flooring must conform to the requirements shown in NTMA Info Guide. Submit resin manufacturer's descriptive data, plus mixing, proportioning, and installation instructions. Resin products used on the interior of the building (defined as inside of the weatherproofing system) must meet either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1113. Provide validation of indoor air quality for resin.

2.3 FILLERS

Fillers, if required, must be inert mineral or cellulosic material as recommended by the manufacturer and best suited for the resin binder used. Fillers must be furnished in the quantity necessary to impart the required color and physical characteristics.

2.4 MARBLE CHIPS

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NOTE: Use materials with recycled content where appropriate for use. Verify suitability, availability within the region, cost effectiveness and adequate competition before specifying product recycled content requirements.

Consider specifying marble chips as recycled materials. Research shows marble chips are commonly available from recycling operations. The designer of record needs to confirm local/regional availability that does not impact cost effectiveness.

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Marble chips must be of domestic origin of sizes and colors to match NTMA Info Guide color plate indicated [on the drawings] [in Section 09 06 00 SCHEDULES FOR FINISHES]. Chips must be a range of sizes up to and including the NTMA Standard No. 0 and Standard No. 1 for 6 mm 1/4 inch thick floors and Standard No. 0 through Standard No. 2 for 10 mm 3/8 inch thick floors.[

Provide Marble Chips with 100 percent recycled content. Provide data identifying percentage of recycled content for marble chips.]

2.5 STRIPS

Submit drawings indicating the type, size, and layout of divider strips and control joint strips.

2.5.1 Divider Strips

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NOTE: Location of strips will be shown on the drawings. Strips should be used at logical stops and expansion joints. Manufacturer's literature should be reviewed when making selections for strips.

Plastic divider strips and control joint strips should be used with conductive type terrazzo.

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Divider strips must be as deep as required, [_____] mm gauge and of [brass] [zinc] [plastic in color as indicated [in Section 09 06 00 SCHEDULES FOR FINISHES]].

2.5.2 Control Joint Strips

Control joint strips must be as deep as required, [_____] mm gauge and of [brass] [zinc] [plastic in color as indicated [on the drawings] [in Section 09 06 00 SCHEDULES FOR FINISHES]]. Provide neoprene filler [_____] mm inches thick in color as indicated [in Section 09 06 00 SCHEDULES FOR FINISHES].

2.6 GROUT

Grout must be as recommended by the manufacturer of the resin. Grout products used on the interior of the building (defined as inside of the weatherproofing system) must meet either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1168. Provide validation of indoor air quality for grout.

2.7 SEALER

Sealer must have a pH factor between 7 and 10 and must be a penetrating type specially prepared for use on terrazzo. The sealer must not discolor or amber the terrazzo and must produce a slip resistant surface. Flash point of sealer must be a minimum of 27 degrees C 80 degrees F when tested in accordance with ASTM D56. Sealer products used on the interior of the building (defined as inside of the weatherproofing system) must meet either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1113. Provide validation of indoor air quality for sealer.

PART 3 EXECUTION

3.1 PREPARATION OF CONCRETE SUBFLOOR

Do not commence installation of the floor topping until the concrete substrate has cured for at least 28 calendar days. Prepare the concrete surfaces in accordance with the instructions of the resin manufacturer.

3.2 MIXING, PROPORTIONING, AND INSTALLATION

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NOTE: Terrazzo topping thickness will be determined by the marble chip size indicated in the selected NTMA-01 color plate referenced in paragraph MARBLE CHIPS. If the cross-section is less than 10 mm 3/8 inch the use of No. 1 and No. 0 size chips will be required. Delete last sentence if resinous terrazzo bases are not required.

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Mixing, proportioning, and installing must be in accordance with the approved instructions of the manufacturer. Install strips in locations indicated. Appply the topping to give a finish thickness of [6] [10] mm

[1/4] [3/8] inch. Provide cove type bases cast-in-place with 25 mm 1 inch radius cove and [100] [150] mm [4] [6] inch high.

3.3 TESTING

Between 30 and 45 days after flooring installation is completed, and prior to its use, test the conductive resinous terrazzo flooring in accordance with paragraph 12-4.1.3.8(b)(7) of NFPA 99. The resistance of the conductive floor at any one location must be more than 5,000 ohms in areas with 110 volts service, more than 10,000 ohms in areas with 220 volt service, and average less than 1,000,000 ohms and more than 25,000 ohms in all areas. Submit certificates indicating conformance with specified requirements. Accompany certificates with certified test reports showing that the conductive resinous terrazzo floor has been tested and meets the requirements specified.

3.4 CLEANING AND SEALING

Wash the terrazzo with a neutral cleaner and where required, clean with a fine abrasive to remove any stains or cement smears. Rinse the cleaned surfaces. When dry, apply a terrazzo sealer in accordance with the manufacturer's directions. Submit maintenance literature for terrazzo cleaning and sealing.

3.5 PROTECTION

cover and protect the terrazzo work from damage until completion of the work of all other trades.

-- End of Section --