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USACE / NAVFAC / AFCEA / NASA UFGS-09 66 16 (August 2010)  
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Preparing Activity: USACE Superseding  
UFGS-09 66 16 (May 2009)

## UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated April 2011

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08/10

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### SECTION 09 66 16

#### TERRAZZO TILE 08/10

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NOTE: This guide specification covers the requirements for cast marble or granite terrazzo tile of various sizes and thicknesses).

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 items(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

### 1.1 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 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 C 109/C 109M	(2008) Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens)
ASTM C 501	(1984; R 2009) Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser
ASTM C 97/C 97M	(2009) Absorption and Bulk Specific Gravity of Dimension Stone
ASTM D 2047	(2004) Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
ASTM E 648	(2010e1) Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
ASTM E 84	(2010b) Standard Test Method for Surface Burning Characteristics of Building Materials

GREENGUARD ENVIRONMENTAL INSTITUTE (GEI)

GEI	Greenguard Standards for Low Emitting Products
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SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS	Scientific Certification Systems (SCS) Indoor Advantage
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1.2 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only

delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation 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.

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" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.] [information only. When used, a designation following the "G" designation 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

Terrazzo Tile[; G][; G, [\_\_\_\_\_]]

#### SD-03 Product Data

Installation  
Certification

#### SD-04 Samples

Terrazzo Tile  
Resilient Base  
Terrazzo Base/Strips  
Metal Edge Strips

#### SD-07 Certificates

Terrazzo Tile  
Adhesive  
Resilient Base

#### SD-10 Operation and Maintenance Data

Manufacturer's Maintenance Instructions

### 1.3 QUALITY ASSURANCE

#### 1.3.1 Installer Qualification

Installer shall possess, to the satisfaction of the Contracting Officer, the technical qualifications, experience, trained personnel, and facilities to properly install the specified items.

#### 1.3.2 Sustainable Design Certification

Product shall be third party certified by GEI Greenguard Indoor Air Quality Certified, SCS Scientific Certification Systems Indoor Advantage or equal. Certification shall be performed annually and shall be current.

### 1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the jobsite in the manufacturer's original unopened containers marked with the manufacturer's brand name, color, and pattern. Store materials delivered and placed in storage protected from damage, weather, humidity and temperature variation, dirt and dust, or other contaminants. Temperature of storage area shall not be lower than 10 degrees C 50 degrees F or higher than 32 degrees C 90 degrees F.

### 1.5 SITE CONDITIONS

Do not install tiles until other work that could cause damage to the finished flooring has been completed. A temperature of not less than 21 degrees C 70 degrees F shall be maintained in all areas where tile is to be installed for a period of not less than [48] [\_\_\_\_\_] hours before, during and after laying of tiles. Tiles shall be brought into installation areas and allowed to condition at not less than 21 degrees C 70 degrees F for a period of [48] [\_\_\_\_\_] hours prior to installation. After installation of tiles, a minimum temperature of 13 degrees C 55 degrees F shall be maintained.

### 1.6 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a one year period.

## PART 2 PRODUCTS

### 2.1 STANDARD PRODUCTS

Provide materials which are the standard products of a manufacturer regularly engaged in the manufacture of the material and that essentially duplicate products that have been in satisfactory use at least 2 years prior to bid opening.

### 2.2 TERRAZZO TILE

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NOTE: Designer will select the chip requirements and also determine whether flexible or rigid resin is required, or give the Contractor the options.

Coordinate with manufacturer's data of terrazzo tile when determining the patterns, styles, sizes and thicknesses of tiles.

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Terrazzo tile shall be of the indicated colors and shall consist of [marble] [or] [granite] chips embedded in a [flexible] [or] [rigid] thermoset resin matrix. Submit drawings indicating pattern, size, style, and color of tiles and two 150 by 150 mm 6 by 6 inch minimum samples of each color and pattern of terrazzo tile to be used. Tiles shall be [5] [\_\_\_\_\_] mm [3/16] [\_\_\_\_\_] inch thick and nominal [300 by 300] [\_\_\_\_\_] mm [12 by 12] [\_\_\_\_\_] inches. Tiles shall have a [polished] [polished and honed] [textured] [honed] [textured] finish with uniform color distribution of chips. [Marble chips shall be graded to [16] [6] mm [5/8] [1/4] inch maximum size.] [Granite chips shall be manufacturer's standard gradation.] Tile shall have the following properties:

#### TERRAZZO TILE PROPERTIES

PROPERTY	TEST METHOD	VALUE
Compressive Strength	ASTM C 109/C 109M 20 MPa	3000 psi minimum
Water Absorption	ASTM C 97/C 97M	0.7 percent maximum
Abrasive Wear	ASTM C 501	Index 28
Coefficient of Friction	ASTM D 2047	0.5 wet
Flame Spread	ASTM E 84	Class A
Critical Radiant Flux	ASTM E 648	Class I

#### 2.3 ADHESIVE

Adhesive shall be flooring and resilient base manufacturer's standard product or a product recommended by the manufacturer. Submit certificates indicating that the materials conform to the specified requirements and flooring manufacturer's approval of underlayment, adhesive, and cleaners.

#### 2.4 RESILIENT BASE

Resilient base shall be [[rubber] [or] [vinyl] type, coved style.] [butt toe cove installed with 3 mm 1/8 inch thick flooring.] Base shall be 100 mm 4 inches high and a minimum 3 mm 1/8 inch thick. [Preformed outside] [Job formed] corners shall be furnished. Submit two 100 mm 4 inch long samples of each type and color of base. Submit certificates indicating that the materials conform to the specified requirements and flooring manufacturer's approval of underlayment, adhesive, and cleaners.

#### 2.5 TERRAZZO BASE/STRIPS

Provide terrazzo base/strips of colors as indicated, meeting the requirements of paragraph TERRAZZO TILE and being a manufacturer's standard product. Base/strips shall be [10] [19] mm thick by [\_\_\_\_\_] mm wide by [\_\_\_\_\_] mm long [3/8] [3/4] inch thick by [\_\_\_\_\_] inch wide by [\_\_\_\_\_] inch long. Base/strips shall have [polished] [honed] [textured] finish. Submit two 100 mm 4 inch long samples of each type and color of trim pieces.

## 2.6 METAL EDGE STRIPS

Metal edge strips shall be extruded aluminum, butt type, approximately 40 mm 1-1/2 inches wide with thickness to set top surface flush with top of tile and with bevel at exposed edge. Edge strips shall have countersunk holes near each end and spaced not more than 200 mm 8 inches on center for securement. Submit one 150 mm 6 inch long sample of metal edge strip

## 2.7 COLOR

Color shall be [in accordance with Section 09 06 90 COLOR SCHEDULE] [\_\_\_\_\_].

## PART 3 EXECUTION

### 3.1 EXAMINATION

After becoming familiar with details of the work, verify dimensions in the field, and advise the Contracting Officer of any discrepancy before performing the work.

### 3.2 GENERAL

Flooring and base shall be provided on floor surfaces and walls where indicated. Resilient base required over metal base of casework shall be as specified in Section [\_\_\_\_\_]. Except as required for installation of new tile, traffic shall be kept off new tile for at least [24] [\_\_\_\_\_] hours after installation.

### 3.3 SUBSTRATE PREPARATION

Fill holes and cracks with mortar. Floors shall be free of curing compounds, grease, dirt, loose particles and other foreign matter that would prevent adhesion. Projecting irregularities shall be chipped or ground smooth. Depressions shall be filled and uneven surfaces leveled. Subfloors shall then be rinsed and allowed to dry prior to applying adhesive.

### 3.4 INSTALLATION

Submit the manufacturer's printed installation instructions for the conditions indicated.

#### 3.4.1 Tile

Install tile in accordance with the manufacturer's approved installation instructions, except as specified herein. Tile shall be laid symmetrical about center lines of rooms or areas. Joints shall be tight, inconspicuous as possible, and in alignment. Tile shall be cut to fit snugly at pipes and other vertical surfaces. Joints at pipes shall be sealed with adhesive. Remove spots or smears of adhesive immediately. Entire surface of finished tile floor shall be smooth, straight, and free from bleeding adhesive, buckles, waves, or projecting tile edges upon completion. Bleeding of adhesive on finished floors is cause for rejection by the Contracting Officer. Damaged or rejected tiles shall be removed and replaced.

#### 3.4.2 Metal Edge Strips

Edge strips shall be secured with No. 10 aluminum alloy, counter-sunk,



flathead machine screws with expansion sleeves. Exposed edges of tile shall be provided with one-piece metal edge strips.

#### 3.4.3 Terrazzo Base/Strips

Terrazzo base/strips shall be continuous and adhesively applied. Joints shall be tight and inconspicuous in same manner as floor tile.

#### 3.4.4 Base

Standard length resilient base of height shown shall be set straight, level and with close flush joints hermetically sealed by adhesive. Wherever resilient base is used in conjunction with wall covering, adhesive shall be spread to within 6 mm 1/4 inch from top of base and wall covering shall be cut off at a point 6 mm 1/4 inch below top of base. Straight base shall be used in rooms or areas that have carpets. All spots or smears of adhesive shall be immediately removed from exposed surfaces.

#### 3.5 MOISTURE TEST

After concrete floor surfaces have been cleaned, small patches of adhesive to be used shall be spread in several locations in each room or area to receive tile and allowed to dry overnight. If the adhesive can be peeled easily from the floor surfaces, the surface is not sufficiently dry. The steps shall be repeated until the adhesive adheres properly. Tiles shall not be applied until adhesive adheres tightly to the floor.

#### 3.6 CLEANING

Upon completion of the installation and after adhesive has cured, flooring shall be thoroughly cleaned in accordance with the manufacturer's recommendations.

#### 3.7 PROTECTION

The terrazzo tile work shall be covered and protected from damage until completion of the work of all other trades. Defects which develop, such as loose, broken, or curled tiles, shall be removed and replaced. Submit [six] [\_\_\_\_\_] copies of the [Manufacturer's Maintenance Instructions](#).

-- End of Section --