
USACE / NAVFAC / AFCEA / NASA UFGS-09 65 36 (November 2010)

Preparing Activity: USACE Superseding
UFGS-09 65 33 (August 2010)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated October 2010

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11/10

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SECTION 09 65 36

STATIC-CONTROL RESILIENT FLOORING 11/10

NOTE: This guide specification covers the requirements for static-control resilient flooring over a concrete surface.

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 \(CCR\)](#).

PART 1 GENERAL

1.1 REFERENCES

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.

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 D 5603	(2001; R 2008) Rubber Compounding Materials - Recycled Vulcanizate Particulate Rubber
ASTM E 2129	(2005) Standard Practice for Data Collection for Sustainability Assessment of Building Products
ASTM E 648	(2010) Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
ASTM F 150	(2006) Electrical Resistance of Conductive and Static Dissipative Resilient Flooring
ASTM F 1700	(2004) Solid Vinyl Floor Tile
ASTM F 1861	(2008) Resilient Wall Base
ASTM F 1869	(2010) Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
ASTM F 2170	(2009) Determining Relative Humidity in Concrete Floor Slabs in situ Probes

ELECTROSTATIC DISCHARGE ASSOCIATION (ESD)

ESD S6.1	(2009) Grounding
ESD S7.1	(2005) Floor Materials Characterization of Materials

GREEN SEAL (GS)

GS-36	(2000) Commercial Adhesives
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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

SCAQMD Rule 1168	(1989; R 2005) Adhesive and Sealant Applications
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U.S. GREEN BUILDING COUNCIL (USGBC)

LEED	(2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)
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1.2 SUBMITTALS

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.

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-03 Product Data

Conductive Vinyl Tile and Accessories[; G][; G, [____]]
Static-Dissipative Vinyl Tile and Accessories[; G][; G, [____]]
Environmental Data[; G][; G, [____]]
Adhesives[; G][; G, [____]]

Manufacturer's descriptive data, documentation stating physical characteristics, and mildew and germicidal characteristics. Provide Material Safety Data Sheets (MSDS) for all primers and adhesives to the Contracting Officer. Highlight VOC emissions.

SD-04 Samples

Conductive Vinyl Tile and Accessories[; G][; G, [____]]
Static-Dissipative Vinyl Tile and Accessories[; G][; G, [____]]

Three samples of each color and type of flooring and base.
Sample size shall be minimum 75 x 75 mm 3 x 3 inch.

SD-06 Test Reports

Testing[; G][; G, [____]]
Moisture, Alkalinity And Bond Tests[; G][; G, [____]]

SD-07 Certificates

Conductive Vinyl Tile
Static-Dissipative Vinyl Tile
Adhesives
Qualifications of Applicator

SD-08 Manufacturer's Instructions

Surface Preparation[; G][; G, [____]]
Installation of Static-Control Resilient Flooring[; G][; G, [____]]
]
Installation of Wall Base[; G][; G, [____]]

Manufacturer's preprinted material describing floor surface preparation and product installation. Cleaning and maintenance instructions shall be included.

SD-10 Operation and Maintenance Data

Conductive Vinyl Tile[; G][; G, [____]]
Static-Dissipative Vinyl Tile[; G][; G, [____]]

Submit Data Package 1 in accordance with Section 01 78 23
OPERATION AND MAINTENANCE DATA.

SD-11 Closeout Submittals

Local/Regional Materials
Other Sustainable Requirements

1.3 QUALITY ASSURANCE

The flooring manufacturer will approve the [Qualifications of Applicator](#) and certify that he/she has a minimum of 3 years experience in the application of the materials to be used.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the building site in original unopened containers. Store materials in a clean dry area with temperature maintained above 21 degrees C 70 degrees F for two days prior to installation.

1.5 SCHEDULING

Schedule static-control vinyl flooring work after any other work which would damage the finished surface of the flooring.

1.6 WARRANTY

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

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

2.1.1 Local/Regional Materials

NOTE: Using local materials can help minimize transportation impacts, including fossil fuel consumption, air pollution, and labor. Using materials harvested and manufactured within a 800 km (500 mile) radius from the project site contributes to the following LEED credit: MR5. Coordinate with Section 01 33 29 LEED(tm) DOCUMENTATION. Use second option if Contractor is choosing local materials in accordance with Section 01 33 29 LEED(tm) DOCUMENTATION. First option will not be used for USACE projects. Army projects will include second option only if pursuing this LEED credit.

[Use materials or products extracted, harvested, or recovered, as well as manufactured, within a [800] [_____] km [500] [_____] mile radius from the project site, if available from a minimum of three sources.] [See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local/recycled material requirements. Flooring materials may be locally available.] Flooring and accessories may contain post-consumer or post-industrial recycled content.

2.1.2 Environmental Data

[Submit Table 1 of ASTM E 2129 for the following products: [____].]

2.1.3 Fire Resistance Testing Requirements

NOTE: Choice of critical radiant flux level as it applies to building type and area of application will be made in accordance with the latest edition of UFC 3-600-01 and NFPA 101. Wherever the use of Class II (0.22) watts finish is required, Class I (0.45) watts will be permitted. Critical radiant flux will be a minimum average of 0.45 watts when used in corridors in bachelor enlisted quarters, bachelor officer quarters, hospital, child care centers, temporary lodging facilities, and new construction detention and correctional facilities. Generally the critical radiant flux will be a minimum of 0.22 for corridors of other type facilities. Where an approved automatic sprinkler system is installed, Class II interior floor finish may be used where Class I floor finish is required, and where Class II is required, no critical radiant flux rating is required. Omit paragraph if not

applicable.

Provide a minimum average critical radiant flux of [0.22] [0.45] watts per square centimeter for flooring in corridors and exits when tested in accordance with [ASTM E 648](#).

2.1.4 Other Sustainable Requirements

The following shall be submitted in accordance with [LEED](#):

- a. Documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project.
- b. Documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site. Indicate relative dollar value of local/regional materials to total dollar value of products included in project.
- c. Documentation relative to local/regional materials credit in accordance with LEED Reference Guide. Include in LEED Documentation Notebook.
- d. Documentation relative to recycled content credit in accordance with LEED Reference Guide. Include in LEED Documentation Notebook.
- e. Documentation relative to low-emitting materials credit in accordance with LEED Reference Guide. Include in LEED Documentation Notebook.

2.2 STATIC-CONTROL RESILIENT FLOORING

NOTE: Vinyl is a high charging material. Street shoes generate static electricity. Special footwear should always be worn on the static-control vinyl floor and the vinyl floor and conductive shoes should be tested as a whole system. Verify with the user if and what type of special footwear will be used in this application. If proper footwear will not be worn on the static-control vinyl floor, another type of static-control flooring should be specified. In addition, rooms requiring special handling considerations for devices (for handling, repair, manufacturing and assembly) due to extreme device sensitivity (sometimes called Class 0) may require an alternative flooring that is low charging; additional research to determine appropriate flooring type is required. In this instance, extreme device sensitivity (or Class 0) is defined as having a HBM (Human Body Model) or CDM (Charged-Device Model) threshold less than 250 volts. This specification does not address testing of flooring and footwear together. This is testing which is not the responsibility of the Contractor. User is encouraged to test flooring and footwear together in method as referenced in ESD S20.20.

Heat welding adds cost to a project and is often

reserved for clean rooms and wet lab type applications. Tile 12" x 12" in size is not normally heat welded, 24" x 24" tile is occasionally heat welded and 36" x 36" tile is more typically used for heat weld applications.

This specification does not address applications requiring static-control during explosives handling. For this application, the designer is encouraged to research DOD 4145.26-M to determine the specific requirement of explosive handling versus static mitigation for electronic parts handling.

2.2.1 Conductive Vinyl Tile

NOTE: Coordinate requirements for conductive vinyl tile with an Electrical Engineer.

Conductive vinyl tile shall be a homogeneous vinyl product and conform to [ASTM F 1700] [____]. Electrical resistance from floor to ground shall be 25,000 ohms (2.5 x 10 to the 4th) to 1,000,000 ohms (1.0 x 10 to the 6th) when tested in accordance with [ASTM F 150] [or] [ESD S7.1]. Tile shall be [12] [24] [36] [____] inches square and 1/8 inch thick. [Tile shall be pregrooved for heat welding of seams. As required, provide welding rods as recommended by the manufacturer.]

2.2.2 Static-Dissipative Vinyl Tile

NOTE: Coordinate requirements for static dissipative vinyl tile with an Electrical Engineer.

Static-dissipative vinyl tile shall be a homogeneous vinyl product and conform to [ASTM F 1700] [____]. Electrical resistance from floor to ground shall be 1,000,000 ohms (1.0 x 10 to the 6th) to 100,000,000 ohms (1.0 x 10 to the 8th) when tested in accordance with [ASTM F 150] [or] [ESD S7.1]. Tile shall be [300] [600] [900] [____] mm [12] [24] [36] [____] inches square and 3 mm 1/8 inch thick. [Tile shall be pregrooved for heat welding of seams. As required, provide welding rods as recommended by the manufacturer.]

2.3 WALL BASE

2.3.1 Resilient Base

NOTE: Delete this paragraph if Section 09 65 00 RESILIENT FLOORING is used, it also specifies resilient base.

Job formed corners are recommended. The return on preformed corners is not always long enough to hold the piece in place and the corners can be knocked

off during vacuuming and other cleaning operations.

Base is available in different lengths ranging from 1220 mm (4 feet) pieces to 30480 mm (100 feet) or 36576 mm (120 feet) rolls. Availability and roll lengths vary dependent on manufacturer. Identify required length if it impacts design intent. Some manufacturers of Type TS (vulcanized thermoset rubber) base offer only 1220 mm (4 feet) lengths and not roll goods.

Wall base shall conform to ASTM F 1861, [[Type TS (vulcanized thermoset rubber)][,][or][Type TP (thermoplastic rubber)][, or][Type TV (thermoplastic vinyl)], [Style A (straight - installed with carpet)][,][and][Style B (coved - installed with resilient flooring)][,][and][Style C (butt toe cove installed with 3 mm 1/8 inch thick flooring)]. Provide [100] [150] mm [4] [6] inch high and a minimum 3 mm 1/8 inch thick wall base. Provide [preformed][job formed] corners in matching height, shape, and color.[Rubber shall contain a minimum of [90][100][_____] percent post-consumer recycled material. With Vulcanizate Particulate Rubber, use recycled tire treads in accordance with ASTM D 5603, fine mesh size particulate, [Grade 1, 2, or 3][Grade 4][Grade 5][Grade 6].][See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total recycled content requirements. Rubber sheet flooring may contain post-consumer or post-industrial recycled content.]

2.3.2 Self-Coving

NOTE: Self-coving will be used when highest standard of cleanliness is required.

Consider specifying corner protectors in high traffic areas and areas that may receive some abuse.

Corner protectors are preferred in Naval installations.

Self-coving shall consist of static-control resilient flooring over a cove stick and shall have [cove cap][and metal corner] as recommended by the manufacturer of the flooring. Self-coving base material shall be same as floor material.

2.4 ADHESIVES

NOTE: Conformance with South Coast Air Quality Management District (SCAQMD) Rule 1168 as noted complies with LEED requirements.

Adhesives may be a source of VOCs. Using low-VOC products contributes to the following LEED credit: EQ4. Coordinate with Section 01 33 29 LEED(tm) DOCUMENTATION. Designer must verify availability and adequate competition (including verification of bracketed VOCs included in this guide specification) before specifying product VOC requirements. Army

projects shall specify bracketed LEED VOC option
only if pursuing this LEED credit.

Provide conductive adhesive as recommended by the manufacturer of the static-control flooring[and self-coving base]. Adhesive for [vinyl][or] [rubber] wall base shall be as recommended by the wall base manufacturer. Provide adhesives that comply with local indoor air quality standards. [Adhesives shall meet the requirements of LEED low emitting materials credit.] [VOC content shall be less than [50 grams/L] [the current VOC content limits of [GS-36][and] [SCAQMD Rule 1168]].]

2.5 ACCESSORIES

Use accessories recommended by the manufacturer of the flooring.

2.6 ELECTRICAL GROUND CONNECTION

NOTE: The static-control resilient flooring is installed in a conductive adhesive. The floor system is grounded to an external ground by a short grounding strip, usually on a room-by-room basis. Designer must provide for connection to an external ground and should coordinate with static-control tile manufacturers during design stage regarding connections to external ground. Designer will show ground connection to the external ground on the drawings.

Provide an electrical ground connection that meets the requirements of ESD S6.1. Connection between the static-control floor system and the external grounding system shall be provided. Contact with the static-control floor system shall be with conductive grounding strip and shall have the greater of the following: a minimum contact area of 5800 square mm 9 square inch or the dimensions recommended by the manufacturer. The grounding conductor shall be as recommended by the manufacturer of the flooring.

2.7 MANUFACTURER'S COLOR, PATTERN AND TEXTURE

NOTE: Editing of color reference sentence(s) shall be coordinated with the Government. Generally the Section 09 06 90 COLOR SCHEDULE or drawings are used when the project is designed by an Architect or Interior designer. Color shall be selected from manufacturer's standard colors or identified in this specification only when the project has minimal finishes.

When the government directs that color be located in the drawings, a note will be added that states:
"Where color is shown as being specific to one manufacturer, an equivalent color by another manufacturer may be submitted for approval. Manufacturers and materials specified are not intended to limit the selection of equal colors from

other manufacturers. The word "color" as used herein includes surface color and pattern."

When more than one type, pattern or color is specified identify location.

When a manufacturer's name, stock number, pattern, and color is specified for color, be certain that the product conforms to the specification, as edited.

NOTE: Drawings are required for projects with floor patterns.

Provide color, pattern and texture in accordance with [Section 09 06 90 COLOR SCHEDULE] [the drawings] [_____]. Provide flooring in any one continuous area or replacement of damaged flooring in continuous area from same production run with same shade and pattern.

PART 3 EXECUTION

3.1 CONDITIONS REQUIREMENTS

3.1.1 Temperature

Areas to receive static-control resilient flooring shall be maintained at a temperature above 21 degrees C 70 degrees F for two days before, during, and after application. A minimum temperature of 13 degrees C 55 degrees F shall be maintained thereafter.

3.1.2 Surface Preparation

NOTE: Curing and sealing compounds should not be used on concrete surfaces to receive static-control resilient flooring. If a curing compound is required, it must be coordinated for compatibility with the flooring adhesive.

Before any work under this section is begun, defects such as rough or scaling concrete, low spots, high spots, and uneven surfaces shall have been corrected, and damaged portions of concrete slabs shall have been repaired in accordance with flooring manufacturer's recommended instructions. Floor shall be in a level plane with a maximum variation of 3 mm 1/8 inch every 3 m 10 feet, except where indicated as sloped. Repair cracks and irregularities and prepare the subfloor in accordance with flooring manufacturer's recommended instructions. Curing and sealing compounds should not be used on concrete surfaces to receive static-control resilient flooring. In addition, remove paint, varnish, oils, release agents, sealers, waxes, and adhesives, as required by the flooring product in accordance with manufacturer's printed installation instructions. If a curing compound is required, it must be coordinated for compatibility with the flooring adhesive.

3.2 MOISTURE, ALKALINITY AND BOND TESTS

Determine the suitability of the concrete subfloor for receiving the flooring with regard to moisture content and pH level by moisture and

alkalinity tests. Conduct moisture testing in accordance with ASTM F 1869 or ASTM F 2170, unless otherwise recommended by the flooring manufacturer. Conduct alkalinity testing as recommended by the flooring manufacturer. Determine the compatibility of the flooring adhesives to the concrete floors by a bond test in accordance with the flooring manufacturer's recommendations.

3.3 INSTALLATION OF STATIC-CONTROL RESILIENT FLOORING

Static-control resilient flooring[,] [and] ground connections[and heat welded joints] shall be installed in accordance with the approved manufacturer's installation instructions. Tile lines and joints shall be kept square, symmetrical, tight, and even. Tile at the perimeter of the area to be finished shall vary as necessary to maintain full-size tiles in the field, but no perimeter tile shall be less than one-half the field tile size, except where irregular shaped rooms make it impossible. Tile shall be cut, fitted, and scribed to walls, partitions, and projections after field flooring has been applied. A grounding strip shall be installed in accordance with manufacturer's installation instructions. Submit manufacturer's preprinted material describing product installation. Cleaning and maintenance instructions shall be included.

3.4 INSTALLATION OF WALL BASE

3.4.1 Resilient Base

NOTE: Delete this paragraph if Section 09 65 00
RESILIENT FLOORING specifies resilient base.

Install wall base in accordance with manufacturer's printed installation instructions. Prepare and apply adhesives in accordance with manufacturer's printed directions. Tighten base joints and make even with adjacent resilient flooring. Fill voids along the top edge of base at masonry walls with caulk. Roll entire vertical surface of base with hand roller, and press toe of base with a straight piece of wood to ensure proper alignment. Avoid excess adhesive in corners.

3.4.2 Self-Coving

The static-control resilient flooring shall have a self-coving base and shall be installed in accordance with the flooring manufacturer's printed installation instructions. Extend the self-cove up the walls, columns and pilasters [100][150] mm [4][6] inch. Terminate the coving with a cove cap. Place a cove stick at the floor-wall junction to support the coving at the bend. Provide self-cove [at room perimeter and at fixed vertical interruptions to the flooring][as indicated]. [Provide protective metal corners at outside and inside corners.]

3.5 CLEANING AND PROTECTING

The flooring shall be cleaned in accordance with the manufacturer's recommendations. Flooring shall be protected by a covering of heavy-duty building paper before foot traffic is permitted. Boardwalks shall be placed over flooring in areas where subsequent building operations might damage the floor. Tiles that become loose, broken, or curled prior to acceptance, or tiles that do not conform to resistance requirements of [ASTM F 150][or][ESD S7.1] shall be removed and replaced.

3.6 TESTING

Test the flooring in accordance with and conform to the requirements of ESD S6.1 and ESD S7.1.

-- End of Section --