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Preparing Activity: NASA Superseding
 NASA-10275S (December 2005)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are NOT in agreement with UMRL dated 01 April 2006

Revised throughout - changes not indicated by CHG tags

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DIVISION 09 - FINISHES

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04/06

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SECTION 09 69 00.00 40

ELEVATED FLOOR SYSTEM
04/06

NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers elevated floor systems structural supporting member only. It does not include the floor upon which the elevated floor is superimposed except to define the nature and condition of the supporting floor.

None of the mechanical and electrical services essential to the operation of equipment are included. Coordinate with mechanical and electrical to provide ventilation and cable openings which will be required.

Drawings must include details of panel-to-panel and panel-to-wall intersections, edge treatment at openings, expansion joints, above-floor elevations, and other special features of the elevated floor system.

Drawings must indicate floor pattern, color, and base. Coordinate the grounding system with electrical work to be performed, coordinate with structural grounding connections to the columns.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of [technical proponents](#), including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a [Criteria Change Request \(CCR\)](#).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

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.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A208.1 (1999) Standard for Mat-Formed Wood Particle Board

ASTM INTERNATIONAL (ASTM)

ASTM A 653/A 653M (2004a) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM B 85 (2003) Standard Specification for Aluminum-Alloy Die Casting

ASTM F 1066 (2004) Standard Specification for Vinyl Composition Floor Tile

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST PS 1 (1996) Construction and Industrial Plywood

U.S. DEPARTMENT OF DEFENSE (DOD)

MS MIL-C-22750 (1992e) Coating, Epoxy, High Solids

MS MIL-P-23377

(1989f) Primer Coatings: Epoxy, Chemical and Solvent Resistant

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS A-A-8

(Base) Shellac Varnish

FS DDD-C-001799

(Base) Carpet, Squares, Pile Surface, Tile Type, With or Without Attached Cushion

FS L-F-475

(1998) Floor Covering Vinyl, Surface (Tile and Roll), With Backing

FS TT-C-490

(1990; Am 2) Cleaning Methods for Ferrous Surfaces and Pretreatments for Organic Coatings

1.2 SYSTEM DESIGN

NOTE: These specifications provide optional systems with or without grid support systems. It is desirable to limit the design to one type.

[Elevated floor system shall consist of structural panels mounted on adjustable pedestals to provide an underfloor space for accommodating electrical wiring, mechanical service lines to serve as an air plenum.]

[Elevated floor system shall consist of structural panels mounted on a grid system with adjustable pedestals to provide an underfloor space for accommodating electrical wiring, mechanical service lines, and, when necessary, to serve as an air plenum.]

Elevated floor system shall include a supporting grid in those areas shown to accommodate special equipment installation. Lateral bracing of grid areas and equipment supports shall be as necessary.

Elevated floor system shall be structural panels on a rigid structural grid supported by adjustable pedestals. Stringer system shall be a grid network of minimum [_____] [1.8] [2] meter [6] foot long main stringers running in one direction with [_____] [600] millimeter [2] foot cross stringers running perpendicular to main stringers.

1.3 PERFORMANCE REQUIREMENTS

Certificates shall be submitted for the following:

Load-bearing capabilities of pedestals, floor panels, and pedestal adhesive resisting force

Supporting independent laboratory test reports. For panel loads, test results shall include concentrated loads at center of panel, panel edge midpoint, and uniform loads.

Floor electrical characteristics.

Material requirements

Elevated floor system will be free of defects in materials, fabrication, finish, and installation and that it will remain so for a period of not less than [_____] years after completion.

The Contractor warrants that, upon notification by the Government, they will immediately replace defective work with new work at no additional cost to the Government.

1.3.1 Elevated Floor Panels

Elevated floor panels shall be capable of supporting a uniform live load of a minimum 12 kilopascal 250 pounds per square foot with a deflection not to exceed 1.0 millimeter 0.040 inch. Floor shall also be capable of supporting a minimum 4500 newton 1,000-pound load concentrated on 650 square millimeter 1 square inch at any point on the panel area without deflecting more than 2.0 millimeter 0.080 inch with a safety factor of not less than 3 based on yield strength of the material being used. Floor system shall be laterally stable in all directions whether panels are in place or not. Finished assembly shall be rigid and free of vibration and rocking panels.

1.3.2 Pedestals

Each pedestal with components as assembled for the specified heights shall be capable of carrying a 22250 newton 5,000-pound axial load without permanent deformation.

1.3.3 Bonding Strength of Pedestal Adhesive

NOTE: Insert 125 newton-meter 1,000 inch-pounds for raise floor with a maximum height of 600 millimeter 24 inches and 250 newton-meter 2,000 inch-pounds for raise floor height greater than 600 millimeter 24 inches with 1200 millimeter 48 inches maximum. Raised floor height greater than 1200 millimeter 48 inches with appropriate bracing.

Adhesive for anchoring pedestal bases shall have a bonding strength capable of resisting an overturning moment of 125 newton-meter 1,000 inch-pounds [_____] when a force is applied to the top of the pedestal in any direction.

1.3.4 Stringers

Stringers shall provide seating for panels to preclude tilting, rocking, or vibrating when a live load is applied. Stringers shall be provided that can be added or removed after floor is in place. Each stringer shall support at least 2900 newton 650 pounds [_____] at mid-span without failure when tested. The yield strength of the material being used shall be at least 1100 newton 250 pounds at mid-span without failure when tested.

1.4 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.] [for 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

Installation drawings shall be submitted for elevated floor systems in accordance with the paragraph entitled, "Installation," of this section.

The following drawings shall be submitted by the Contractor in accordance with paragraph entitled, "Floor System," of this section.

Fabrication Drawings
Location Drawings
Detail Drawings

SD-03 Product Data

Manufacturer's catalog data shall be submitted for the following items:

Floor Panels
Die-Formed Steel Panels
Diecast Aluminum Panels

Finished Flooring
Registers and Grilles
Cutouts
Stringers
Edge Strips
Pedestals

SD-04 Samples

Completed pedestal-stringer assemblies shall be submitted with meeting specifications referenced to standards in paragraph entitled, "Installation," of this section.

Three complete Floor Panels shall be submitted.

Three separate samples of the specified Finished Flooring shall be submitted.

Full-sized samples may be installed in the work when they are properly identified and approved.

SD-07 Certificates

Certificates shall be submitted in accordance with paragraph entitled, "Performance Requirements," of this section.

1.5 DELIVERY, HANDLING, AND STORAGE

Materials shall be protected from weather, soil, and damage during delivery, storage, and construction.

Materials shall be delivered in the original unopened packages, containers, or bundles bearing the brand name and the name of the material.

1.6 FIELD MEASUREMENTS

Field measurements shall be taken prior to the preparation of shop drawings and fabrication to ensure proper fits.

1.7 PEDESTAL LOAD TEST

A static axial load of 22250 newton 5,000-pound shall be imposed on the pedestals. Should there be failure of any component of any pedestal, the remaining pedestals shall be so tested, and pedestals that have a component failure shall be replaced with pedestals that have withstood the 22250 newton 5,000-pound axial load test.

1.8 ELECTRICAL RESISTANCE

Electrical resistance between an individual stringer and pedestal shall be less than [100] [_____] microhms. Range of electrical resistance of the floor covering to ground shall be 0.5 to 20,000 megohms for humidity from 40 to 60 percent relative humidity. [A signal reference grid shall be provided as an equipotential surface for high frequency, low digital signals.]

PART 2 PRODUCTS

2.1 FLOOR SYSTEM

Fabrication Drawings shall be submitted for elevated floor systems consisting of fabrication and assembly details to be performed in the factory.

Location Drawings shall show location of pedestals, ventilation openings, cable cutouts, and the panel installation pattern.

Detail Drawings shall show details of the pedestals, pedestal-floor interlocks, floor panels, panel edging, floor openings, floor opening edging, floor registers, floor grilles, cable cutout treatment, perimeter base, expansion joints, and peripheral support facilities.

Design and workmanship shall be such that the floor, as installed, shall be completely planar within plus or minus 1.5 millimeter in 3050 millimeter, 2.5 millimeter 0.060 inch in 10 feet, 0.100 inch for the entire floor, and 0.7 millimeter 0.030 inch across panel joints.

Floor-panel joint-width tolerances shall be 0.20 millimeter 0.008 inch as measured with a feeler gage at any point in any joint when the panels are in the pressure contact required in final installation.

System assembly shall be based upon an interference fit of connections.

2.2 PANELS

NOTE: These specifications are based upon the assumption that either die-formed steel or diecast aluminum panels are acceptable, provided that they conform to the specified performance requirements. If the designer chooses another material, delete paragraphs entitled, "Floor Panels," and "Diecast Aluminum Panels."

Panel design shall provide for convenient panel removal for underfloor servicing and for openings for new equipment. Design shall also provide necessary panel support where required openings entail cutting panels.

Floor panels shall be machined square to within plus or minus 0.13 millimeter 0.005 inch with edge straightness plus or minus 0.064 millimeter 0.0025 inch. Tolerances shall apply to the panel before the plastic edging is applied.

2.2.1 Floor Panels

Floor panels shall be fabricated from plywood conforming to NIST PS 1 or particle board conforming to ANSI A208.1, structurally bonded to 0.70 millimeter 24-gage (0.0276-inch) zinc-coated sheet steel on both top and bottom. Plywood or particle board shall be 25 millimeter 1 inch thick and shall extend to the nominal panel dimension allowing a maximum void at panel edge of 3 millimeter 0.125 inch. Sheet shall conform to the requirements of ASTM A 653/A 653M. Exposed edges of the panels shall be sealed with shellac conforming to FS A-A-8.

2.2.2 Die-Formed Steel Panels

Floor panels shall be constructed of die-formed steel of physical properties and thickness to satisfy the load-bearing requirements of these specifications. A flat upper sheet, a die-formed lower sheet, and any auxiliary reinforcing shall be spot-welded into a rigid composite which shall withstand specified tests without failure of any weld. When the panels are to be grid-supported, panels shall be further tested by supporting them at two opposite edges and applying a 2225 newton 500-pound load at the center of a panel selected; the panel shall be similarly tested while supported at the other two edges. There shall be no weld failure at any point under this loading. This additional test shall be applied to one panel 46.45 square meter 500 square feet of floor in the system, but in no case less than two panels. When any weld fails, that number of panels designated by the Contracting Officer shall be similarly tested, and those that have a weld failure shall be replaced at no cost to the Government.

Before fabrication, steel used in constructing floor panels shall have been cleaned in accordance with FS TT-C-490 and given a Type I pretreatment. After fabrication, surfaces except those to receive floor covering shall be primed with 0.051 millimeter 2 mils of epoxy polyamide conforming to MS MIL-P-23377 followed by a top coat of 0.05 millimeter 2 mils of MS MIL-C-22750.

2.2.3 Diecast Aluminum Panels

NOTE: Delete the paragraph heading and the
following paragraphs if diecast aluminum panels are
not to be used.

Diecast aluminum floor panels shall be made of aluminum alloy conforming to ASTM B 85.

Panels shall be machined to approved dimensional tolerances. Unmachined underside of the panels shall present a visually homogeneous texture free from chill swirls and voids.

Underside of each panel at each corner shall have an integrally cast female socket which interlocks with the pedestal head.

2.3 FINISHED FLOORING

NOTE: Delete the inapplicable finished flooring
material from the following paragraphs or rewrite to
suit project requirements. Pattern and color must
be specified.

[Panels shall be covered with vinyl reinforced tile flooring conforming to ASTM F 1066.]

[Panels shall be covered with vinyl flooring conforming to FS L-F-475.]

[Panels shall be covered with 3 millimeter 1/8 inch melamine phenolic laminate manufactured specifically for computer room floors.]

Floor covering shall be factory-attached to the floor by a noncreep conductive adhesive selected by the manufacturer.

NOTE: Carpet is one of the materials listed in the EPA's Comprehensive Procurement Guidelines (CPG) (<http://www.epa.gov/cpg/>). If the Architect/Engineer determines that use of certain materials meeting the CPG content standards and guidelines would result in inadequate competition, do not meet quality/ performance specifications, are available at an unreasonable price or are not available within a reasonable time frame, the Architect/Engineer may submit written justification and supporting documentation for not procuring designated items containing recovered material. Written justification may be submitted on a Request for Waiver Form to the NASA Environmental Program Manager for approval. The Request for Waiver Form is located in the NASA Procedures and Guidelines (NPG 8830.1) (<http://nodis3.gsfc.nasa.gov>).

[Panels shall be covered with short pile carpeting conforming to FS DDD-C-001799, Type 1, Class [4] [5] [6], without cushion. Carpet shall be static dissipative designed for elevated floor panels.]

[Polyester carpet face fiber shall contain 25-100 percent of postconsumer content and 25-100 percent of total recovered materials content.]

Contractor shall provide two floor lifters, and wall hangers for them, per 55 square meter 600 square feet of flooring.

2.4 REGISTERS AND GRILLES

NOTE: Delete paragraph heading and paragraph if they are not applicable. Size of registers should be stated if applicable.

Registers and grilles and shall be [_____] millimeter inches by [_____] millimeter inches long with a minimum free area of [_____] square millimeter inches. Construction shall be extruded aluminum, in mill finish, to sustain point loads of 1100 newton 250 pounds per vane without failure or permanent deformation. No part of a grille or register shall project more than 3 millimeter 1/8 inch above the floor.

[Registers and grilles shall be used on carpeted floor tiles and not on laminate floor tiles.]

2.5 PERFORATED AIR SUPPLY PANELS

NOTE: Delete the paragraph heading and following paragraph if not applicable.

Air supply floor panels shall meet the design criteria specified for

standard panels. Air supply panels shall be fabricated of 2 millimeter 14-gage perforated steel sheet welded to minimum 1.6 millimeter 16-gage side channels, and shall be covered with plastic laminate to match standard panels, and shall have a uniform perforated pattern to allow even air distribution.

Air supply floor panels shall have galvanized dampers adjustable from the top of the panel, and shall provide minimum 25 percent free area.

Contractor shall furnish [_____] air supply floor panels.

2.6 CUTOUTS

NOTE: Delete the paragraph heading and paragraph if
cutouts are not applicable.

Cable cutouts shall be finished with rigid polyvinylchloride or molded polypropylene edging to conform to the appearance level of the floor surface and to cover raw edges of the cutout panel. This extrusion shall be of a configuration to permit its effective and convenient use when new cable openings are required. At least 7300 millimeter 24 feet of additional extrusion shall be provided for future use.

Non-metallic adapter shall be provided for openings less than 100 millimeter 4 inches wide.

Adapter shall be adhesively secured in cutout to preclude removal from panel. At least two adapters per 10 square meter 1000 square feet shall be provided for future use.

Opening larger than 100 millimeter 4 inches wide shall use the rigid polyvinylchloride or molded polypropylene edging.

Cutting of panels, including cutouts, shall be performed outside of the building.

When size of cutout reduces the performance requirement of panel, the Contractor shall provide intermediate stringers adjacent to cutouts.

2.7 STRINGERS

Stringers shall be [roll-formed painted] [galvanized steel channel sections] [extruded aluminum channels], having either conductive vinyl rib or a flat conductive vinyl gasket cemented on top surface of stringers to effect a complete air seal between the panels and the stringers and prevent slippage of floor panels horizontally.

Self-threading machine screws or clip nuts are not acceptable, only unistrut-type bolts and nuts shall be used for connection. Method of mechanical fastening of stringer to pedestal shall not cause buckling of the stringer cross section. Bolted connection shall attach the bottom of the stringer to the pedestal. Provisions shall be made to allow equipment located on the floor to be bonded to the stringer.

2.8 EDGE STRIPS

An extruded rigid [polyvinylchloride] [vinyl] conductive edge strip less

than 3 ohms shall be mechanically secured to the panel in a manner to preclude detachment under foot and wheel traffic after metal fabrication and machining have been completed. Top of the strip shall be flush with the top of the floor covering. Dimensional accuracy of the floor panel with the edge strip in place shall be such that, when installed, jointing shall be characterized by the interference fit of panel to panel.

2.9 PEDESTALS

NOTE: Use square steel base plate no less than 4 by 4 inches 100 by 100 millimeter for raise floor with a maximum height of 24 inches 600 millimeter and 5 by 5 inches 125 by 125 millimeter for raise floor height greater than 24 inches with 48 inches 600 millimeter with 1200 millimeter maximum. If base plate is adhered to water proofing system applied to concrete slab, the size of the base plate may be required to be large. Specify test method to be used by Contractor to validate base plate size.

Pedestals shall consist of a square steel base at least [100 by 100] [4 by 4] [_____] millimeter inches that is designed to be attached to the subfloor with the manufacturer's recommended adhesive or by mechanical fasteners for the intended installation.

Vertical adjustment of pedestals shall be by threaded steel rod with a positively locking vibration proof elevating nut to control the height of the pedestal head.

Pedestal rods shall be cast-in with the base or welded to the base. Mechanical connections will not be permitted. All sliding surfaces in the elevating mechanism, such as threads, collars, sockets, and shafts, shall be machined to an interference fit. All welds shall be cleaned and a corrosion preventative coating applied.

Pedestal components, except rods and bearing pads, shall be diecast aluminum alloy or steel. Rods shall be rustproofed, after machining, by galvanizing in accordance with manufacturer's standards.

Pedestal cap shall be [die form] [a flat steel bracket] with suitable arrangements for fastening, floor stringers to pedestal cap, where the bolt and nut is installed from below the pedestal cap.

Pedestal design shall include devices for securely anchoring floor panels and supporting or stabilizing members of the system. Such devices shall be characterized by interference fits to preclude any metal-to-metal impact noises.

Any nonmetallic pads used on pedestal heads as bearing surfaces for floor panels shall be rigid conductive polyvinylchloride or vinyl.

Bolts, nuts, washers, and screws shall be cadmium-plated items.

At the periphery of the floor, full support shall be provided to the floor's extreme edge to ensure continuance of the specified strengths. Support system provided for this purpose shall not interfere with the free removal of affected panels.

2.10 ACCESSORIES

Ramps, steps, guardrails, perimeter fascia, plenum dividers, access grommets, underfloor service holes, core base and panel lifters shall be as shown. All accessories shall be provided by flooring manufacturer.

2.10.1 Ramp

Provide necessary brackets, clamps, shoe assembly, threshold, fascia, closure plates and supporting stringers for complete installation.

Closure plates shall be 1.5 millimeter 1/16 inch aluminum plate. Nose pieces shall be extruded aluminum.

Structural characteristics shall be equal to those specified under "Performance Requirements." Maximum slope shall be one in 12. Anchor closures securely to floor slab and to access floor system.

Surface of ramps shall be non-slip rubber.

2.10.2 Edge Closure

Provide 1.5 millimeter 1/16 inch aluminum closure plate and extruded aluminum nosing at exposed edge of floor. Back up the closure plates with aluminum or steel framing braced diagonally, or anchor at bottom to continuous angle.

2.10.3 Guard Railing

Railing shall be double-rail standard railing of access floor manufacturer, made of extruded architectural aluminum members, and approved as to design and installation by Contracting Officer.

Railing standards shall be spaced at not more than 1220 millimeter 4 feet on center, shall be firmly anchored to the concrete floor slab and penetrate the access floor. Provide escutcheons where standard penetrate floor surface.

Toprail shall be 1000 millimeter 42 inches above level of access floor surface.

PART 3 EXECUTION

3.1 INSTALLATION

Layout for the installation shall keep to a minimum the number of cut panels at the floor's periphery.

Panel assembly shall be scribed into place at the periphery so that no voids result between the floor panels and the contiguous vertical surface trim. Pedestal position shall be accurately located, and any necessary changes in subfloor surfaces shall be made before other installation work is started.

Pedestal heads and stringers must be cleaned before assembly to assure the proper electrical resistance between stringer and pedestals.

Before installation proceeds, the subfloor shall be cleared of dust and

construction debris, including a final cleaning with high-suction industrial vacuum equipment. No cutting, trimming, or other debris-producing operation shall be conducted within the room where the floor is being installed. As the installation of floor panels proceeds, the area under the installed floor shall be vacuum cleaned as each row of panels is completed. Cleaning shall extend at least 1200 millimeter 4 feet back from the completed edge where possible.

Pedestals shall be installed with an epoxy adhesive recommended by the elevated-floor manufacturer. Installation shall provide a full bearing of the pedestal base on the subfloor. Where the contour of the floor does not permit this, the floor and the base shall be primed with adhesive, a grout made by filling adhesive with clean sand shall be applied over the primed floor area, and the pedestal base shall be firmly seated in the grout.

Installation shall be such that a surveyor's level shall show the floor to be level within 2.5 millimeter 0.10 inch.

After installation has been completed, the floor shall be vacuum cleaned and covered with a continuous sheet of paper or plastic of sufficient strength to withstand traffic which may be imposed upon the floor before the final acceptance. Should any break in this covering occur, the covering shall be immediately repaired or the entire covering shall be immediately replaced.

3.2 CLEANING

3.2.1 Surplus Material Removal

Surfaces of the work, and adjacent surfaces soiled as a result of the work, shall be cleaned. Equipment, surplus materials, and rubbish from the work shall be removed from the site.

3.2.2 Testing

Installed floor system shall be tested for required electrical resistance by the Contractor before acceptance by the Contracting Officer. Unacceptable and damaged portions of the elevated floor system shall be corrected, removed and replaced at no additional expense to the Government.

-- End of Section --