SECTION 09 69 00
ACCESS FLOORING

SPEC WRITER NOTES:
1. Delete between // --- // if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
2. Use stringer type construction in seismic zones or large floor areas 278m² (over 3000 sq. ft.) or where floor height is more than 300 mm (12 inches) above sub-floor.
3. Where more than one type of access flooring system is required consider developing separate narrow scope sections for each. The most commonly used underfloor system consist of a welded steel casing filled with lightweight concrete screwed down to an adjustable pedestal systems. For most office spaces, underfloor systems rated at 1000 to 1250 PSI concentrated load are adequate. For heavier traffic loads at loading docks, elevator entrances, and corridors underfloor systems rated at 1500 PSI are appropriate. Underfloor systems rated at 2500 PSI are available for heavy equipment.
4. From the stand-point of static build-up, high pressure laminate is most desirable floor covering, followed by carpet. Wax build up on vinyl tile is a prime cause of static problems.

PART 1 - GENERAL

1.1 DESCRIPTION

Access flooring shall consist of a series of modular, removable, interchangeable panels on an elevated support system forming an accessible underfloor cavity to accommodate electrical and mechanical services. System shall be bolted filled formed or cast panels on stringerless understructure // gravity-held panels on stringerless understructure // gravity-held panels on snap-on stringer understructure // gravity-held panels on bolted stringer understructure.

1.2 RELATED WORK

A. Color and texture of // conductive // vinyl tile, carpet, plastic laminate, vinyl edge strip, sealant, baked enamel and field paint: Section 09 06 00, SCHEDULE FOR FINISHES.

SPEC WRITER NOTE: Verify with Mechanical for requirements of active underfloor fire suppression system and coordinate document requirements.
//B. Underfloor Fire Suppression System: Refer to Mechanical Contract documents. //

B. Connection of access flooring systems to building ground: Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS / Section 27 05 26, GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS / Section 28 05 26, GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY.

C. Electrical distribution components: Refer to Electrical Contract documents.

1.3 DESIGN CRITERIA

A. Structural Performance per CISCA A/F: Provide access flooring systems capable of withstanding the following loads and stresses within limits and under conditions indicated, as determined by testing manufacturer's current standard products according to referenced procedures in CISCA A/F, "Recommended Test Procedures for Access Floors":

1. Ultimate-Load Performance: Provide access flooring systems capable of withstanding a minimum ultimate concentrated load equal to value obtained by multiplying specified concentrated floor panel design load by a factor of 2.5, without failing, according to CISCA A/F, Section II, "Ultimate Loading." Failure is defined as the point at which access flooring system will not take any additional load.

2. Rolling-Load Performance: Provide access flooring systems capable of withstanding rolling loads of the following magnitude applied to non-perforated panels, with a combination of local and overall deformation not to exceed 1.02 mm (0.040 inch) after exposure to rolling load over CISCA A/F Path A or B, whichever path produces the greatest top-surface deformation, according to CISCA A/F, Section III, "Rolling Loads."

   SPEC WRITER NOTE: Use below when only move-in rolling loads tested at 10 passes are anticipated.

   a. CISCA A/F Wheel 1 Rolling Load: // 2669 N (600 lbf) // 3559 N (800 lbf) // 4448 N (1000 lbf) // 5338 N (1200 lbf). //

   SPEC WRITER NOTE: Use below when frequent rolling loads tested at 10,000 passes is anticipated.

   b. CISCA A/F Wheel 2 Rolling Load: // 2224 N (500 lbf) // 2669 N (600 lbf) // 3559 N (800 lbf) // 4448 N (1000 lbf). //
B. Pedestal Assembly:

1. Pedestal Axial-Load Performance: Provide pedestal assemblies, without panels or other supports in place, capable of withstanding a 22. kN (5000 lbf) axial load per pedestal, according to CISCA A/F, Section V, "Pedestal Axial Load Test."

2. Pedestal Overturning-Moment Performance: Provide pedestal assemblies, without panels or other supports in place, capable of withstanding an overturning moment per pedestal of 113 N x meters (1000 lbf x inches), according to CISCA A/F, Section VI, "Pedestal Overturning Moment Test."

3. Provide a means of leveling and locking the assembly at a selected height which requires deliberate action to change height setting and which prevents vibrating displacement.

4. Height between the finish floor and underside of panel/ stringer:
   a. Not less than ____ mm (inches).

//B. Stringer:

1. Stringer Concentrated-Load Performance: Provide stringers, without panels in place, capable of withstanding a concentrated load of 890 N (200 lbf) at center of span with a permanent set not to exceed 0.25 mm (0.010 inch), as determined per CISCA A/F, Section IV, "Stringer Load Testing."

C. Panels:

1. All panels shall be interchangeable except those altered to meet special conditions.

   SPEC WRITER NOTE: Concentrated load performance requirement is for filled formed steel panels and cast panels only.

2. Concentrated-Load Performance: Provide floor panels, including those with cutouts, capable of withstanding a concentrated design load of the following magnitude, with a top-surface deflection under load and a permanent set not to exceed, respectively, 2.03 and 0.25 mm (0.080 inch and 0.010 inch), according to CISCA A/F, Section I, Concentrated Loads.

   SPEC WRITER NOTE: lbf=PSI for ratings.

   a. 4448 N (1000 lbf) // 5560 N (1250 lbf) // 5783 N (1300 lbf) // 6672 N (1500 lbf). //
SPEC WRITER NOTE: Use below when routine impact loading is anticipated. This is not a CISCA tested characteristic.

/3. Floor Panel Impact-Load Performance: Provide access flooring system capable of withstanding an impact load of //334 N (75 lbf) //445 N (100 lbf) //566 N (125 lbf) //667 N (150 lbf) //778 N (175 lbf) when dropped from 914 mm (36 inches) onto a 6.5-sq. cm (1-sq. in.) area located anywhere on panel, without failing. Failure is defined as collapse of access flooring system. //

D. Installed access floor shall be level within plus or minus 1 in 2000 (0.060 inches in 10 feet), and plus or minus 2.5 mm (0.10 inches) over the entire area. Floor assembly to be rigid, free of vibration, rocking panels, rattles and squeaks.

SPEC WRITER NOTE: Use following subparagraph only when the air space below the finish floor is to serve as a plenum.

//E. Leakage: Air leakage through the joints between panels and around the perimeter of the floor system not to exceed .057 m³ (two cubic feet) of air per minute per linear 300 mm (foot) of joint subjected to 125 Pa (0.5 inch, water gage) positive pressure in the plenum. //

E. Grounding: Components shall be in direct positive contact for safe continuous electrical grounding of the entire floor system.

1. Panel to Understructure Resistance: Not more than 10 ohms.

SPEC WRITER NOTE: For computer rooms, electronic offices, data centers and control rooms provide resistance within range of 0.5 to 20,000 megaohms. For clean rooms and laboratories provide resistance range of 0.2 to 2.0 megaohms. For hospitals the resistance range is 0.025 to 1.0 megaohms.

F. Static Electricity Control: The acceptable resistance range is from not less than (___) megaohms minimum to not more than (___) megaohms maximum. Maximum electrical resistance shall be measured from the top of the panel to the grounded subfloor. Exposed metal will not be allowed at the wearing surface of the floor.

//G. Earthquake Load Performance: Provide access flooring capable of withstanding a lateral seismic force (Fp) in seismic zone applicable to this Project, according to requirements of __________ (Insert applicable code). //
//H. Flame Spread Rating: Provide assembly flame spread of 25 or less using ASTM E-84 test method. //

SPEC WRITER NOTE: Where elimination of interference from external radio signals, inductance caused by switching equipment, and electromagnetic effects of current flowing in wires is a design issue, specifying a reference grid may be a solution. Before specifying a reference grid or grounding system, obtain the advice of an engineer responsible for operation in establishing specification requirements to be referenced here.

//I. Electromagnetic Shielding:

1. Radio frequency shielding.

2. Equipment inductance shielding. //

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Samples: Full sized floor panel and each understructure component.

C. Shop Drawings:

1. Floor panel layout, including railing, step and ramp location.

2. Detail components of assembly, anchoring methods and edge details, including cut-out details, method of grounding.

D. Manufacturers' Literature and Data: Access floor.

E. Manufacturers' Certificates: Flame spread rating.

F. Floor System Test Reports: Submit certified test reports, from a testing laboratory satisfactory to the Government, attesting that the floor system proposed for installation meets all specified requirements. Submit test reports with shop drawings.

SPEC WRITER NOTE:

1. Make the referenced Applicable Publications agree with material requirements specified in Part 2. Update and specify only that which applies to the project.

2. The editor of this specification shall update publications to current issue at time of preparation of project specifications.
**1.5 APPLICABLE PUBLICATIONS**

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

B. American Association of Textile Chemists and Colorists (AATCC):

134-11 .................. Electrostatic Propensity of Carpets

C. Architectural Aluminum Manufacturers Association (AAMA):

2604-10 ............... High Performance Organic Coatings on Aluminum Extrusions and Panels.

D. American Society for Testing and Materials (ASTM):

E84-10 ................. Surface Burning Characteristics of Building Materials
E648-10 ............... Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
F150-06 ............... Electrical Resistance of Conductive and Static Resilient Flooring
F1066-04(R2010) ....... Vinyl Composition Floor Tile
F1700-04(R2010) ....... Solid Vinyl Tile

E. National Association of Architectural Metal Manufacturers (NAAMM):

AMP 500 Series ....... Metal Finishes Manual

F. National Electrical Manufacturers Association (NEMA):

LD-3.1-05 ............... Application, Fabrication, and Installation of High-Pressure Decorative Laminates

G. Ceilings and Interior Systems Construction Association (CISCA):

CISCA 2004 .............. Recommended Test Procedures for Access Floors

H. Underwriters Laboratory (UL):

94-96(R2010) ........... Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

**PART 2 - PRODUCTS**

SPEC WRITER NOTE: Make material requirements agree with applicable requirements specified in the referenced Applicable Publications. Update and specify only that which applies to the project.

**2.1 FLOOR COVERING**

A. //Conductive // Vinyl Tile:

09 69 00 - 6
1. Solid Vinyl Tile: ASTM F1700, Class 1 Type A (Smooth Surface), fabricated in one piece to cover panel face within plastic edging. Thickness: 2 mm (0.80 inch).

2. Vinyl Composition Tile: ASTM F1066, Class 1 (solid-color tile) // 2 (through-pattern tile) // 3 (surface-pattern tile) //, wearing Surface // Smooth // Embossed. // Thickness: 3.2 mm (0.125 inch).

3. Static-Conductive Floor Covering Surface-to-Ground Resistance: Not less than 25,000 ohms nor more than 1 megohm, as determined by testing identical products according to test method for conductive flooring specified in ASTM F150 but modified to place one electrode on floor surface and to attach the other electrode to understructure. //

B. High Pressure Laminate

Conductive // Plastic Laminate: NEMA LD3, High-Wear type, Grade HWH except with a maximum dimensional change in machine direction of 0.35 percent // HDS //, fabricated in one piece to cover each panel face within perimeter plastic edging or with integral trim serving as edging. // Static decay of 5000 to 0 V in less than 0.5 seconds per FS 101C/4046 at 15 percent relative humidity. //

C. Carpet: Carpet shall be nylon filament, loop pile, minimum //0.81// // ____ // kg per sq m // 24 // //____ // oz per sq yd, minimum density 135 4000, without cushion. Carpet shall have flame propagation index of less than 4.0 or conform to ASTM E 648 with minimum average critical radiant flux of 0.25 watts per sq cm. Static electricity propensity shall be less than 2.0 kV at 20 percent relative humidity and 21 degrees C (70 degrees)) when tested in accordance wit AATCC 134. Provide vinyl edge trim to prevent unraveling.

2.2 FLOOR PANELS

A. Construct panels to be uniform in face dimensions, within a tolerance of plus or minus 0.38 mm (0.015 inches) of required size and be square within a tolerance of plus or minus 0.38 mm (0.015 inches), and flatness within a tolerance of plus or minus 0.5 mm (0.02 inches). Design individual floor panels to be easily placed and removed, without disturbing adjacent panels or understructure, by one person using a tool furnished by the access floor manufacturer. Panels shall be 600 mm by 600 mm (24 inches by 24 inches) // ____ mm (inches) by ____ mm (inches) // in size.
B. Filled Formed-Steel Panels: Contractor option of panel construction described below:

1. Particleboard core panels not less than 25 mm (one inch) thick laminated to top and bottom face sheets of zinc-coated steel not less than 0.45 mm (0.0179 inches) thick. Enclose edges of core with upturned, die formed edge of bottom sheet with perimeter channel welded to top and bottom sheets. The completed panels will have a flame spread rating of 25 or less when tested in accordance with ASTM E84.

2. Cementitious-filled panels fabricated with die-cut flat top sheet and die-formed and stiffened bottom pan formed from cold-rolled steel sheet joined together by resistance welding to form an enclosed assembly, with metal surfaces protected against corrosion by manufacturer's standard factory-applied finish.

3. Lightweight concrete filled panels fabricated with flat top sheet and bottom pan formed from electrolytic-zinc-coated, cold-rolled steel sheet joined together permanently and structurally by hemming and joined to concrete core by adhesive to form an enclosed assembly.

C. Aluminum Panels: Construct panel of one piece die cast aluminum configured with a series of major and minor ribs. //

C. Concrete Panels: Panels shall be a minimum of 25 mm (1 inch) thick, molded from lightweight reinforced high strength concrete. Panel shall be a one-piece unit with a flat solid surface on top. Panel corners shall be radiused and perimeter shall be formed to receive pedestal locking mechanism. //

C. Provide perimeter of panels with continuous extruded conductive vinyl edge strips. Top edge of strip to be flush with panel floor finish. Mechanically lock edge strips and fasten in place with adhesive.

D. Perforated Panels: Flat, perforated top surface with holes slots of number, spacing, and size standard with manufacturer to produce a nominal open area of (Insert value) percent and with a downward airflow with damper of insert value ___L/s (Insert value cfm) at Insert value ___Pa (Insert value inch wg) static pressure.

2.3 CUT-OUTS

A. Fabricate cut-outs in floor panels to accommodate cable penetrations and service outlets where shown or specified. Provide reinforcement or additional support to make panels with cut-outs perform the same as solid uncut panels. Fit cut-outs with manufacturers standard grommet.
For cut-outs larger than maximum size grommet, trim edge of cut-outs with plastic trim, molding and/or gaskets having tapered top flange. Provide removable twist close covers for grommets.

SPEC WRITER NOTE: Retain below if under floor cavity is used for air distribution.

1. Provide foam-rubber pads for sealing annular space formed in cutouts by cables and trim edge of cutout with molding having flange and ledge for capturing and supporting pads.

2.4 ACCESSORIES

A. Provide manufacturer's standard registers, grilles and plenum dividers as required. Design registers and grilles exposed to foot traffic, or the weight of equipment, to support the same load as the floor panel.

B. Plastic Floor Grilles with Dampers: Standard load-bearing grilles molded from polycarbonate plastic to produce removable one piece unit precisely fitted in factory prepared openings of standard field panels, with adjustable/removable damper blades and complying with requirements indicated below:

SPEC WRITER NOTE: Subparagraphs below are examples only. Revise to suit products selected. Types of diffusers and grilles required vary with ventilation system design and occupancy. Consult mechanical designer for type.


2. Structural Performance: Capable of supporting a 4448-N (1000-lbf) concentrated load.

3. Flammability Characteristics: Classified 94V-0 per UL 94.

SPEC WRITER NOTE: Delete paragraph below if not required.

C. Cavity Dividers: Provide manufacturer's standard metal dividers located where indicated to divide under floor cavities.

SPEC WRITER NOTE: Revise paragraph below if special finish or specific type of metal is required.

D. Vertical Closures (Fascia): Where under floor cavity is not enclosed by abutting walls or other construction, provide manufacturer's standard metal closure plates with factory applied finish.
SPEC WRITER NOTE: For computer rooms to comply with NFPA 75, item below must be located and well marked within computer room.

E. Panel Lifting Device: Manufacturer's standard portable lifting device of type required for lifting panels with floor covering provided. Provide four lifting devices of each type required.

SPEC WRITER NOTE: Pedestals are generally used for perimeter support. If special extrusion or other means are required, show details on Drawings and revise below accordingly.

F. Perimeter Support: Where indicated, provide manufacturer's standard method for supporting panel edge and form transition between access flooring and adjoining floor covering at same level as access flooring.

G. Floor Cleaner: Type recommended by the floor covering manufacturer.

2.5 PEDESTALS

Provide manufacturer's standard pedestal assembly including base, column with provisions for adjustment, locking device, head and pad.

1. Base: Provide pedestal base with not less than 100 mm by 100 mm (4 inches by 4 inches) of bearing area.

2. Column: Hollow shaft of appropriate length fitted with threaded rod and leveling nut.

3. Provide vibration proof mechanism for making and holding fine adjustments in heights for leveling purposes over a range of not less than 50 mm (2 inches). Include means of locking mechanism at a selected height.

4. Heads: Heads shall be of a type designed // to accommodate snap-on stringers // to accommodate bolted stringers // to hold panels in place in a freestanding stringer less understructure. //

5. Pads: Provide sound dampening pad for each pedestal head.

6. Fabricate units of sufficient height to provide required under floor clearance shown on drawings.

2.6 PEDESTAL BASE ADHESIVE

Type recommended by manufacturer.

//2.7 STRINGERS

Form stringers from extruded aluminum or zinc coated steel in 600 mm (2 foot) lengths. Stringers shall attach to pedestals with // no n-bolted
interlocking connections. // threaded fasteners accessible from above. // Stringer system to form a grid pattern with members under edges of floor panels and with pedestals under adjacent panel corners. //

2.8 // RAMPS // AND // STEPS //
A. Bolt, // ramps, // and // steps // to framing. Form step nosing, threshold strip, and floor bevel strip from extruded or cast aluminum, with non-slip traffic surface. Close exposed sides of // ramp // and // step // with not thinner than 18 gage aluminum, reinforced on the back to prevent warp. Install ramp shoes to meet main and raised access floor.

B. Ramps: Manufacturer's standard ramp construction of width and slope indicated, but not steeper than 1:12, with raised-disc rubber or vinyl floor covering, and of same materials, performance, and construction requirements as access flooring.

C. Steps: Provide steps of size and arrangement indicated with floor covering to match access flooring. Apply non-slip aluminum nosing to treads, unless otherwise indicated.

2.9 RAILING AND POSTS
A. Construct rails and posts from 32 mm (1-1/4 inch) round extruded aluminum tube shapes. Weld all joints and finish to texture of tubing. Flanges may be welded, or bolted to rails and supports.

B. Railings: Standard extruded aluminum railings, at ramps and open sided perimeter of access flooring where indicated. Include handrail, intermediate rails, posts, brackets, end caps, wall returns, wall and floor flanges, plates, and anchorage where required. Provide railings that comply with structural performance requirements mandated by Local Code.

SPEC WRITER NOTE:
1. This article is for railings, posts, and other exposed metal parts. If more than one finish is used on project, precede finish paragraph with "Finish for (list items):"
2. Coordinate with Section 09 06 00, SCHEDULE FOR FINISHES and drawings. Clearly identify locations of different colors or finish on the same item.

2.10 FINISHES
A. General: Apply finishes in factory after products are fabricated. Protect finishes on exposed surfaces with protective covering before shipment.
B. Aluminum Finishes:

1. In accordance with NAAMM AMP 500 series:

   //a. Clear anodized finish: AA-C22A41 // Chemically etched medium matte, clear anodic coating, Class I Architectural, 0.7 - mil thick. //

   //a. Color anodized finish: // AA-C22A42 // Chemically etched medium matte, integrally colored anodic coating, Class I Architectural, 0.7-mil thick // ;or // AA-C22A44 // Chemically etched medium matte, electrolytically deposited metallic compound, Class I Architectural, 0.7-mil thick finish. Dyes will not be accepted. //

   //a. Mill Finish: //

   //a. Fluorocarbon Finish: AAMA 2604, high performance organic coating. //

2. Factory-Primed Concealed Surface: Protect concealed aluminum surfaces that will be in contact with plaster, concrete or masonry surfaces when installed by applying a shop coat of zinc-molybdate primer to contact surfaces. Provide minimum dry film thickness of 2.0 mils.

3. Steel // Grate // Panels:

   a. Conductive epoxy paint.

   //b. Baked Enamel. //

C. Pre-cast Concrete Panels:

1. Exposed face shall be ground smooth and polished.

   SPEC WRITER NOTE: Select one type of flooring surface for each room. If there is more than one room then coordinate with Interior Design to locate each flooring surface type. Delete types not being used.

2.11 FLOOR FINISH

A. Surface panels with // carpet // conductive // vinyl tile // plastic laminate // conductive // vinyl composition tile // plastic laminate // in place with a waterproof adhesive to prevent delamination by use of the lifting tool, or by moving caster loads. Color as specified in Section 09 06 00, SCHEDULE FOR FINISHES.
B. Surface ramps with carpet, conductive vinyl tile, plastic laminate as specified for floor panels, with additional requirement that a non-slip surface be provided.

C. Bolt heads or similar attachments shall not pierce the traffic surface.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

A. Concrete sealers if used shall be identified and proven to be compatible with pedestal adhesive.

B. Prior to installation, subfloor shall be dry and free of any surface irregularities that could reasonably be anticipated to adversely affect access flooring system appearance or performance.

C. Clear the area in which the floor system is to be installed of debris. Clean floor surfaces and remove dust before the work is started.

**3.2 INSTALLATION**

A. Layout floor panel installation to keep the number of cut panels at the floor perimeter to a minimum. Scribe panel assemblies at perimeter and around column to provide a close fit with no voids greater than 6 mm (1/4 inch) where panels abut vertical surface.

B. Secure bases of pedestals to the structural subbase with an adhesive, mechanical fasteners in full and firm contact with the subbase. Set pedestals plumb, and in true alignment.

C. Where pedestal stringer system is used, join the stringers and other framing members with threaded fasteners for positive connection to the pedestals to preclude lateral movement. Uniformly space stringers in parallel lines, and place at the indicated elevation.

D. Provide auxiliary framing around columns and other permanent construction, at sides of ramps, at free ends of floor, and beneath floor panels that are substantially cut to accommodate utility systems.

E. Construct floor panels to lie flat without warp or twist and bear uniformly on supports without rocking, and without edges projecting above the floor plane. Panels to interlock with supports in a manner that will preclude lateral movement.

F. Provide free ends of floor with positive anchorage and rigid support where floor system does not abut wall or other construction.

G. Cover exposed ends of floor system with aluminum closures. Closures to consist of complete trim and fascia assemblies.
3.3 REPAIR OR WELDED GALVANIZED SURFACES
Use galvanized repair compound where galvanized surfaces are scheduled to receive field or shop coatings, and apply in accordance with manufacturers printed instructions.

3.4 CLEANING
Remove debris accumulated during installation from beneath the raised floor system. Immediately after completion of the floor installation, apply floor cleaner in accordance with the floor covering manufacturer's instruction. Do not allow any cleaner to remain between individual panels.

3.5 PROTECTION
Cover cleaned floors with clean building paper before construction traffic is permitted. Remove protective covering at completion of Work.

3.6 LIFTING DEVICES
Provide four floor panel lifting device for each individual floor area.

3.7 EXTRA STOCK
Furnish six floor panels and six complete pedestal assemblies and store where directed by the Resident Engineer.

--- END ---