

**DEPARTMENT OF VETERANS AFFAIRS
VHA MASTER SPECIFICATIONS**

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**SECTION 09 69 00
ACCESS FLOORING**

PART 1 - GENERAL

1.1 1.1 DESCRIPTION:

- A. Access flooring is to 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 is to be gravity-held panels on stringerless understructure.

1.2 RELATED WORK:

- A. Concrete Floor Water-Based Curing and Sealing Compound: Section 09 91 00, PAINTING.
- B. Connection of access flooring systems to building ground: Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS, Section 28 05 26.
- C. Electrical distribution components: Refer to applicable construction documents.

1.3 DESIGN CRITERIA:

- A. Structural Performance per CISC 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 CISC A:
 - 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 CISC 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 CISC A/F Path A or B, whichever path produces the greatest top-surface deformation, according to CISC A/F, Section III, "Rolling Loads."

- 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 CISC 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 CISC 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.
- C. Panels:
 - 1. All panels are to be interchangeable except those altered to meet special conditions.
 - 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 CISC A/F, Section I, "Concentrated Loads."
 - a. 5560 N (1250 lbf).
- D. Installed access floor is to be level within plus or minus 1.59 mm in 3.05 m (1/16 inch in 10 feet), and plus or minus 3.18 mm (1/8 inch) over the entire area. Floor assembly to be rigid, free of vibration, rocking panels, rattles and squeaks.
- E. Grounding: Components to 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.
- F. Static Electricity Control: The acceptable resistance range is from not less than 0.5 megaohms minimum to not more than 20,000 megaohms maximum. Maximum electrical resistance is to 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. Flame Spread Rating: Provide assembly flame spread of 25 or less using ASTM E84 test method.

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. Manufacturer's Literature and Data: Access floor.
- E. Manufacturer's Certificates: Flame spread rating.
- F. Floor System Test Reports: Submit certified test reports, from a testing laboratory satisfactory to the COR, attesting that the floor system proposed for installation meets all specified requirements. Submit test reports with shop drawings.
- G. Manufacturer's Qualifications.
- H. Installer's Qualifications.
- I. Seismic Calculations.

1.5 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Manufacturer with three (3) years' experience in providing items of type specified.
- B. Installer's Qualifications: Installers who are trained and approved by manufacturer and have a minimum of three (3) years' experience installation of units required for this project.
- C. Obtain access flooring from single manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING:

- A. Delivery:
 - 1. Deliver materials to site in undamaged condition, in original containers or packages, complete with accessories and instructions. Label packages with manufacturer's name and brand designations. Package materials covered by specific references bearing specification number, type, and class as applicable.

- B. Storage:
 - 1. Store all materials in original protective packaging in a safe, dry, and clean location.
Store panels at temperatures between 4 and 32 degrees C (40 and 90 degrees F) and between 20 and 70 percent humidity. Replace defective or damaged materials.
- C. Handling:
 - 1. Handle and protect materials in a manner to prevent damage during the entire construction period.

1.7 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21, "Warranty of Construction".

1.8 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. ASTM International (ASTM):
 - E84-14..... Surface Burning Characteristics of Building Materials
 - E648-14c..... Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - F150-06(R2013) Electrical Resistance of Conductive and Static Resilient Flooring
- C. National Association of Architectural Metal Manufacturers (NAAMM):
 - AMP 500 Series..... Metal Finishes Manual
- D. National Electrical Manufacturers Association (NEMA):
 - LD-3.1-05 Application, Fabrication, and Installation of High-Pressure Decorative Laminates
- E. Ceilings and Interior Systems Construction Association (CISCA):
 - CISCA 2004 Recommended Test Procedures for Access Floors
- F. National Fire Protection Association (NFPA):
 - 75-13 Fire Protection of Information Technology Equipment
- G. Underwriters Laboratory (UL):
 - 94-06(R2014)..... Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

PART 2 - PRODUCTS

2.1 FLOOR COVERING:

- A. High Pressure Laminate: Conductive Plastic Laminate: NEMA LD3, High-Wear type, Grade HW-62 fabricated in one (1) 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.

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 (1) person using a tool furnished by the access floor manufacturer. Provide panels 610 by 610 mm (24 by 24 inches) in size.
- B. Filled Formed-Steel Panels: Contractor option of panel construction described below:
 - 1. 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.
 - 2. 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. Concrete Panels: Provide panels that are a minimum of 25 mm (1 inch) thick, molded from lightweight reinforced high strength concrete. Panel is to be a one (1) piece unit with a flat solid surface on top. Panel corners are to be radiused and perimeter is to be formed to receive pedestal locking mechanism.
- D. Provide perimeter of panels with continuous extruded vinyl edge strips. Top edge of strip to be flush with panel floor finish. Mechanically lock edge strips and fasten in place with adhesive.

2.3 CUT-OUTS:

- A. Fabricate cut-outs in floor panels to accommodate cable penetrations and service outlets where shown on construction documents or specified. Provide reinforcement or additional

support to make panels with cut-outs perform the same as solid uncut panels. Fit cut-outs with manufacturer's 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.

2.4 ACCESSORIES:

- A. Panel Lifting Device: Manufacturer's standard portable lifting device of type required for lifting panels with floor covering provided. Provide two (2) lifting devices of each type required.
- B. Perimeter Support: Where indicated on construction documents, 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.
- C. Floor Cleaner: Type recommended by the floor covering manufacturer.

2.5 PEDESTALS:

- A. 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 101 by 101 mm (4 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: Provide heads designed 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 indicated in construction documents.

2.6 PEDESTAL BASE ADHESIVE:

- A. Type recommended by manufacturer.
 - 1. Adhesive to have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, (EPA Method 24).

2.7 FINISHES:

- A. General: Apply finishes in factory after products are fabricated. Protect finishes on exposed surfaces with protective covering before shipment.
 - 1. 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 0.05 mm (2.0 mils).
 - 2. Steel Panels:
 - a. Conductive epoxy paint.
- B. Pre-cast Concrete Panels:
 - 1. Exposed face is to be ground smooth and polished.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Install floor sealer, required for dust or vapor control, prior to installation of pedestals, only if the pedestal adhesive will not damage the coating. If the coating and adhesive are not compatible, apply the coating after the pedestals have been installed and the adhesive has cured.
- B. Prior to installation, subfloor is to be dry and free of any surface irregularities that will 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 and to sizes not less than 1/2 half width to the greatest extent possible. 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 sub-base with an adhesive in full and firm contact with the subbase. Set pedestals plumb, and in true alignment.
- C. 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.

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

- A. 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:

- A. 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:

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

--- E N D ---

SECTION 23 22 23
STEAM CONDENSATE PUMPS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Steam condensate pumps for Heating, Ventilating and Air Conditioning.

1.2 RELATED WORK

- A. Section 01 00 00, GENERAL REQUIREMENTS.
- B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC and STEAM GENERATION.
- D. Section 23 05 12, GENERAL MOTOR REQUIREMENTS FOR HVAC and STEAM GENERATION EQUIPMENT.
- E. Section 23 05 41, NOISE and VIBRATION CONTROL FOR HVAC PIPING and EQUIPMENT.
- F. Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING.

1.3 QUALITY ASSURANCE

- A. Refer to Paragraph, QUALITY ASSURANCE in Section 23 05 11, COMMON WORK RESULTS FOR HVAC and STEAM GENERATION.
- B. Design Criteria:
 - 1. Pumps design and manufacturer shall conform to Hydraulic Institute Standards.
 - 2. Pump sizes, capacities, pressures, operating characteristics and efficiency shall be as scheduled.
 - 3. Select pumps so that required net positive suction head (NPSHR) does not exceed the net positive head available (NPSHA).
 - 4. Pump Driver: Furnish with pump. Size shall be non-overloading at any point on the head-capacity curve including one pump operation in a parallel or series pumping installation.
 - 5. Provide all pumps with motors, impellers, drive assemblies, bearings, coupling guard and other accessories specified. Statically and dynamically balance all rotating parts.
 - 6. Furnish each pump and motor with a nameplate giving the manufacturers name, serial number of pump, capacity in GPM and head in feet at design condition, horsepower, voltage, frequency, speed and full load current and motor efficiency.
 - 7. Test all pumps before shipment. The manufacturer shall certify all pump ratings.

8. After completion of balancing, provide replacement of impellers or trim impellers to provide specified flow at actual pumping head, as installed.
9. Furnish one spare seal and casing gasket for each pump to the KC VAMC Project Manager.
- C. Allowable Vibration Tolerance for Pump Units: Section 23 05 41, NOISE and VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Manufacturer's Literature and Data:
 1. Pumps and accessories.
 2. Motors and drives.
- C. Manufacturer's installation, maintenance and operating instructions, in accordance with Section 23 05 11, COMMON WORK RESULTS FOR HVAC and STEAM GENERATION.
- D. Characteristic Curves: Head-capacity, efficiency-capacity, brake horsepower-capacity, and NPSHR-capacity for each pump.

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 Iron and Steel Institute (AISI):
AISI 1045 Cold Drawn Carbon Steel Bar, Type 1045
AISI 416 Type 416 Stainless Steel
- C. American National Standards Institute (ANSI):
ANSI B15.1-00(R2008).... Safety Standard for Mechanical Power Transmission Apparatus
ANSI B16.1-05 Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250
and 800
- D. American Society for Testing and Materials (ASTM):
A48-03(2008) Standard Specification for Gray Iron Castings
B62-09 Standard Specification for Composition Bronze or Ounce Metal
Castings
- E. Maintenance and Operating Manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS.

1.6 DEFINITIONS

- A. Capacity: Liters per second (L/s) (Gallons per minute (GPM)) of the fluid pumped.

- B. Head: Total dynamic head in kPa (feet) of the fluid pumped.

PART 2 - PRODUCTS

2.1 CONDENSATE PUMP, PAD-MOUNTED

- A. General: Factory assembled unit consisting of vented receiver tank, motor-driven pumps, interconnecting piping and wiring, motor controls (including starters, if necessary) and accessories, designed to receive, store, and pump steam condensate.
- B. Receiver Tank: Cast iron with threaded openings for connection of piping and accessories and facilities for mounting float switches. Receivers for simplex pumps shall include all facilities for future mounting of additional pump and controls.
- C. Furnish seals for condensate pump with a minimum temperature rating of 121 degrees C (250 degrees F).
- D. Centrifugal Pumps: Bronze fitted with mechanical shaft seals.
 - 1. Designed to allow removal of rotating elements without disturbing connecting piping or pump casing mounting.
 - 2. Shafts: Stainless steel, AISI Type 416 or alloy steel with bronze shaft sleeves.
 - 3. Bearings: Regreaseable ball or roller type.
 - 4. Casing wearing rings: Bronze.
- E. Motors: Refer to Section 23 05 12, GENERAL MOTOR REQUIREMENTS FOR HVAC and STEAM GENERATION EQUIPMENT.
- F. Pump Operation:
 - 1. Float Switches: NEMA 1, mounted on receiver tank, to start and stop pumps in response to changes in the water level in the receiver and adjustable to permit the controlled water levels to be changed. Floats and connecting rods shall be copper, bronze or stainless steel.
 - 2. Alternator: Provide for duplex units to automatically start the second pump when the first pump fails in keeping the receiver water level from rising and to alternate the order of starting the pumps. For units 0.25 kW (1/3 horsepower) and smaller, the alternator may be the mechanical type for use in lieu of float switches.
- G. Control Cabinet for 3 Phase (0.37 kW (1/2 hp) and larger) Units: NEMA 1, UL approved, factory wired, enclosing all controls, with indicating lights, manual switches and resets mounted on the outside of the panel. Attach cabinet to the pump set with rigid steel framework, unless remote mounting is noted on the pump schedule.

1. Motor starters: Magnetic contact types with circuit breakers or combination fusible disconnect switches. Provide low voltage control circuits (120 volt maximum) and "hand-off-automatic" (H-O-A) switches for each pump.
 2. Indicating lights for each pump: Green to show that power is on, red to show that the pump is running.
- H. Electric Wiring: Suitable for 93 degrees C (200 degrees F) service; enclosed in liquid-tight flexible metal conduit where located outside of control cabinet.
- I. Receiver Accessories:
1. Thermometer: 34-216 degrees C (100 - 420 degrees F), mounted below minimum water level.
 2. Water level gage glass: Brass with gage cocks which automatically stop the flow of water when the glass is broken. Provide drain on the lower gage cock and protection rods for the glass.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Follow manufacturer's written instructions for pump mounting and start-up. Access/Service space around pumps shall not be less than minimum space recommended by pumps manufacturer.
- B. Sequence of installation for base-mounted pumps:
1. Level and shim the unit base and grout to the concrete pad.
 2. Shim the driver and realign the pump and driver. Correct axial, angular or parallel misalignment of the shafts.
 3. Connect properly aligned and independently supported piping.
 4. Recheck alignment.
- C. Pad-mounted Condensate Pump: Level, shim, bolt, and grout the unit base onto the concrete pad.
- D. Coordinate location of thermometer and pressure gauges as per Section 23 22 13, STEAM and CONDENSATE HEATING PIPING.

3.2 START-UP

- A. Verify that the piping system has been flushed, cleaned and filled.
- B. Lubricate pumps before start-up.

- C. Prime the pump, vent all air from the casing and verify that the rotation is correct. To avoid damage to mechanical seals, never start or run the pump in dry condition.
- D. Verify that correct size heaters-motor over-load devices are installed for each pump controller unit.
- E. Field modifications to the bearings and or impeller (including trimming) are not permitted. If the pump does not meet the specified vibration tolerance send the pump back to the manufacturer for a replacement pump. All modifications to the pump shall be performed at the factory.

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