

SECTION 271100 –COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Maryland Department of Transportation/Maryland Aviation Administration Standard Provisions for Construction Contracts Volume 1, Maryland State Highway Administration, Anne Arundel County and Interim Standard Provision Addenda, apply to this Section.
- B. Related Sections:
 - 1. 270526 Grounding and Bonding for Communications Systems
 - 2. 270528 Pathways for Communications Systems
 - 3. 270543 Underground Ducts and Raceways for Communications Systems
 - 4. 270553 Identification for Communications Systems
 - 5. 271300 Communications Backbone Cabling
 - 6. 271900 Exterior Communications Pathways

1.2 SUMMARY

- A. This Section includes:
 - 1. Equipment cabinets, racks, frames and enclosures
 - 2. Cable management and ladder racks
 - 3. Rack mounted power protection and power strips
 - 4. Plywood backboards

1.3 REFERENCES

- A. The publications listed below form a part of this specification. The publications are referred to in the text by basic designation only.
- B. Specific reference in specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the latest printed edition of each in effect at the date of contract unless the document is shown dated.

C. Conflicts:

1. Between referenced requirements: Comply with the one establishing the more stringent requirements.
2. Between referenced requirements and contract documents: Comply with the one establishing the more stringent requirements.

D. References:

1. Telecommunications Industry Association TIA-569-B-2004 Commercial Building Standard for Telecommunications Pathways and Spaces
2. American National Standards Institute/Telecommunications Industry Association/Electronic Industries Alliance ANSI/TIA/EIA-606-A-2002 Administration Standard for Commercial Telecommunications Infrastructure
3. International Standards Organization/International Electrotechnical Commission (ISO/IEC) DIS11801, January 6, 1994
4. National Electrical Manufacturers Association (NEMA)
5. American Society for Testing Materials International (ASTM)
6. National Electrical Code (NFPA-70)
7. Building Industry Consulting Service International (BICSI) Telecommunications Distribution Methods Manual (TDMM)
8. Local, county, state and federal regulations and codes in effect as of date of purchase
9. Equipment of foreign manufacture must meet U.S. codes and standards. It shall be indicated in the proposal the components that may be of foreign manufacture, if any, and the country of origin.

1.4 SUBMITTALS

- A. The Contractor shall perform no portion of the work requiring submittal and review of record drawings, shop drawings, product data, or samples until the respective submittal has been approved by the Owner. Such work shall be in accordance with approved submittals.
- B. Qualifications: The Contractor shall submit qualification data sheets for firms and persons as specified in the "Quality Assurance" article of this specification to demonstrate their capabilities and experience.

- C. Proposed product data sheets: The Contractor shall submit catalog cut-sheets that include manufacturer, trade name, and complete model number for each product specified. Model number shall be handwritten and/or highlighted to indicate exact selection. Identify applicable specification section reference for each product.
- D. MDF and Telecommunications Room Equipment Layout: Contractor shall submit shop drawings (floor plan and elevations) of each equipment and telecommunications room prior to installing connecting hardware, termination equipment, racks, cabinets, cable tray or other systems in the rooms.
- E. Record Drawings: Furnish CAD drawings of completed work including cable ID numbers following the Owner's labeling standards. Submit in hardcopy (two full size and two half size) and electronic formats.

1.5 QUALITY ASSURANCE

- A. Contractor Qualifications:
 - 1. The Contractor shall submit references and other related evidence of installation experience for a period of three years prior to the issue date of this Specification.
 - 2. All work shall be supervised on-site by a BICSI Registered Communications Distribution Designer (RCDD). Must demonstrate knowledge and compliance with all BICSI, TIA/EIA, UL, and NEC standards and codes. Contractor shall submit proof of RCDD designation.
- B. Provided products shall meet the following requirements: Items of the same classification shall be identical. This requirement includes equipment, assemblies, parts, and components.
- C. Assure that the "as installed" system is correctly and completely documented including engineering drawings, manuals, and operational procedures in such a manner as to support maintenance and future expansion of the system.
- D. Materials and equipment: Equipment shall be rated for continuous operation under the ambient environmental temperature, humidity, and vibration conditions encountered at the installed location. The equipment shall meet the following requirements:
 - 1. Interior controlled environment: 60 to 100 degrees F dry bulb and 20 to 90 percent relative humidity, non-condensing.
 - 2. Interior uncontrolled environment: 0 to 130 degrees F dry bulb and 10 to 95 percent relative humidity, non-condensing.
 - 3. Exterior environments: Minus 30 degrees to 130 degrees F dry bulb, and 10 to 100 percent relative humidity, condensing.

4. Hazardous environment: All system components located in areas where fire or explosion hazards may exist because of flammable gas or vapors, flammable liquids, combustible dust, or ignitable fibers or flyings, shall be rated and installed according to Chapter 5 of the NEC and as shown.
5. Listing and Labeling: Provide products specified in this Section that are listed and labeled, as defined in the NEC Article 100.

E. Standard products:

1. Equipment and materials shall be standard products of a manufacturer regularly engaged in the manufacture of specified products and shall be the manufacturer's latest standard design.
2. Items of the same classification shall be identical. This requirement includes equipment, modules, assemblies, parts, and components.

1.6 WARRANTY

- A. General Warranty: Refer to MAA's General and Special Provisions Document for warranty requirements.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating units without field measurements. Coordinate supports, adjacent construction, and fixture locations to ensure actual dimensions correspond to established dimensions.

1.8 DELIVERY AND STORAGE

- A. Equipment shall be delivered in original packages with labels intact and identification clearly marked.
- B. Equipment shall not be damaged in any way and shall comply with manufacturer's operating specifications.
- C. Equipment and components shall be protected from the weather, humidity, temperature variations, dirt, dust, or other contaminants. Equipment damaged prior to system acceptance shall be replaced at no cost to the Owner.

1.9 COORDINATION

- A. Coordinate installation of all equipment cabinets and systems with special systems subcontractors, MAA Information Technology Department, and other trades, including mechanical, electrical and plumbing.
- B. Coordinate with all contractors providing equipment outside the scope of this contract.

PART 2 - PRODUCTS

2.1 TELECOMMUNICATION ROOM (TR) FITTINGS

A. Definition:

- 1. For the purpose of this document, the term “Telecommunication Room Fittings” defines a portion of BWI’s communication infrastructure. Telecommunication Room Fittings include products and configurations typically provided for the fit-out or finishing of a room in the facility that is dedicated to support of telecommunications equipment and associated signal distribution to work areas, service providers and/or other Telecommunication Rooms.

B. Primary Industry Standard Requirements for Telecommunication Room Fittings:

- 1. Comply with ICEA S-90-661 for mechanical properties.
- 2. Comply with TIA-569-B
- 3. Comply with TIA/EIA-568-B.1 & B.2.
- 4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70:

C. Coordination with Other Trades:

- 1. Power
- 2. Lighting.
- 3. HVAC.
- 4. Fire Suppression

2.2 EQUIPMENT RACKS AND CABINETS

- A. Telecommunications Room (TR) shall be equipped with 19” EIA relay racks and cabinets to house MAA termination systems and network equipment.

- B. Each rack and cabinet shall be mounted on an isolation pad and utilize non conductive washers to secure the rack to the floor.
- C. Each rack and cabinet shall be secured from the top rail to the cable tray, to prevent movement.
- D. Racks and cabinets shall be grounded to the isolated ground bar within the TR using a standard ground lug and #6 green jacketed cable ground wire.
- E. Provide equipment racks and cabinets in quantities and locations as indicated on the drawings.
- F. Design Selection:
 - 1. Racks: Self supporting EIA racks (19-inch) shall be 7 feet in height with 6 inch wide, side mount vertical cable management hardware, horizontal cable management, shelves and other accessories as required. Design selection: Ortronics MM or approved equal.
 - 2. Cabinets: Freestanding 19" EIA Cabinets, equipped w/ shelves vertical and horizontal cable management as required to support cable. Design selection Hoffman Proline or approved equals.

2.3 UNINTERRUPTIBLE POWER SUPPLY (UPS)

- A. Provide a rack mount UPS for each rack/cabinet illustrated with a UPS unit in the project drawings.
- B. Design Selection: APC Smart-UPS 1.4 kV P/N: SU1400RMNET or approved equal.

2.4 POWER STRIPS

- A. Power Strips: Comply with UL 1363.
 - 1. Rack mounting.
 - 2. 12, 20-A, 120-V ac, NEMA WD 6, Configuration 5-20R receptacles.
 - 3. As manufactured by Tripp Lite, Catalog Number PS3612-20HW, or Approved Equal.

2.5 GROUNDING

- A. Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems." for grounding conductors and connectors.
- B. Telecommunications Main Bus Bar:

1. Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
 2. Ground Bus Bar: Each communication room depicted in the drawings shall be provisioned with a Telecommunications Grounding Busbar (TGB) meeting or exceeding the following requirements:
 - a. Each bar shall be installed with isolated standoff mounts.
 - b. Minimal bar size is ¼” thick x 2” wide x 10” long.
 - c. The TGB’s shall be electroplated and pre-drilled for connector attachment to 6 AWG ground cables.
 - d. Holes spaced 1-1/8 inches (28 mm) apart.
 3. Stand-Off Insulators: Comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.
- C. A #6 AWG stranded copper wire cable shall be extended between TR’s Telecommunications Ground Busbars (TGB) and the Telecommunications Main Grounding Busbar (TMGB) (located in MDF) via conduit and cable tray systems as shown on the drawings.
- D. Ground conductor shall be provided, installed and utilized for equipment, termination, cable tray, equipment rack and computer equipment grounding, including telephone systems.
- E. All grounding material and work shall comply with the National Electric Code (NEC Chapter 8), Local and State regulations as well as ANSI-J-STD-607-A.
- F. Coordinate with the electrical power trades for grounding wiring interface to an approved connection to the building electrical power service panel ground source. Provide #6 AWG stranded copper bonding conductor extending from the electrical ground source to the Telecommunication Main Grounding Busbar (TMGB) located in the MDF.
- G. Provide ground cable #6 AWG stranded copper bonding conductor installed from the TMGB to each of the IDF’s as depicted in the project drawings ground wiring riser diagram.
- H. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Cooper B-Line P/N: SB-477 or Approved equal.

2.6 LABELING

- A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- B. Comply with MAA 2008 Design Standards, Volume II, Appendix E.

2.7 SURGE SUPPRESSION

- A. Surge suppression devices shall be furnished and installed on all copper wire analog and digital data circuits when the circuit enters a building or controls equipment located outdoors. Circuits that are routed wholly within a building do not require surge protection.
- B. Surge suppression devices shall be listed by Underwriter's Laboratories, Inc., according to Standard UL 1449.
- C. Surge suppression devices shall be tested against ANSI/IEEE 587 defined waveforms to simulate field conditions.
- D. Device performance shall be documented per ANSI/IEEE C62.41.
- E. Unit Performance ratings. The units published performance ratings shall be the UL 1449 listed suppression ratings tested and assigned by Underwriters Laboratories utilizing the test procedure described in this document titled UL 1449 Suppression Voltage Performance Testing.
- F. System Performance Ratings. Multiple suppression filter system units configuration shall have a published performance rating as a system. The systems published performance rating shall be the UL 1449 listed suppression ratings tested and assigned by Underwriters Laboratories utilizing the test procedure described in this document titled UL 1449 Suppression Voltage Performance Testing.
- G. Fuses shall not be used for surge suppression.
- H. Design selection:
 - 1. Low density cable (Pair count of 100 or less): ADC66XX building entrance terminals loaded with C3B 5-pin modules.
 - 2. High Density cable (pair counts in excess of 100): Commscope AT-9040 connectors, frames and stub cables. Load connectors with C3B 5-pin modules.

2.8 UNSPECIFIED EQUIPMENT AND MATERIAL

- A. Any item of equipment or material not specifically addressed on the contract drawings or in this document and required to provide a complete and functional Public Wide

Distribution System (PWDS) installation, shall be provided in a level of quality consistent with other specified items.

2.9 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers that may be incorporated in the work, include, but are not limited to the following:
- B. Equipment Racks and Cabinets
 - 1. Basis of Design: Chatsworth
 - 2. Acceptable substitutes:
 - a. DAMAC
 - b. Cooper B-Line
 - c. Great Lakes
- C. Distribution Frame
 - 1. Basis of Design: Homaco
 - 2. Submitted and owner-approved equivalent
- D. Ladder Rack
 - 1. Basis of Design: Chatsworth 12100-712 series
 - 2. Submitted and owner-approved equivalent
- E. Fiber Optic Cable Open Trough System
 - 1. Basis of Design:
 - a. Panduit Fiber Runner
 - b. ADC FGS Series
 - 2. Submitted and owner-approved equivalent

2.10 EQUIPMENT RACKS

- A. Universal EIA self-supporting all aluminum rack 84" H. x 19" W. x 6" D,
- B. Mounting holes
 - 1. Both sides (front and rear) of upright channels

2. 12-24 or 10-32 rolled threads in 5/8" - 5/8" x 1/2" hole pattern
 3. Heavy-duty assembly hardware,
- C. There shall be two top cross-angles 1-1/2" x 1-1/2" x 1/4".
 - D. Black in color with all mounting screws black.
 - E. Racks to come standard with minimum 3" vertical wire management full height both sides, one jumper tray installed in the uppermost position, and one heavy duty vented full size shelf (front/rear) installed in the bottom.
 - F. Basis of Design for Jumper Tray: Chatsworth 12183 series or approved substitution.

2.11 FREESTANDING EQUIPMENT CABINETS

- A. Cabinets shall be sized according to Project design, with cabinets having internal vertical, horizontal, and inter-cabinet cable management.
- B. Footprint 24" wide by 32" deep standard, black, with internal vertical wire management.
- C. All cabinets to have louvered locking front and rear doors, no perforated covers, locks independently keyed to MAA PDS cabinet key.
- D. Cabinets and racks shall have overhead ladder rack and fiber trough installed to create connectivity paths to other racks and wall mounted communication equipment.
- E. All cabinets shall be provided with capacity for four fans in top. Provide four fans in all cabinets housing active equipment.

2.12 LARGE FRAME

- A. 110D Double-sided frame
- B. 6061-T6 structural grade aluminum uprights
- C. Drilled and tapped on both sides
- D. 5/8" floor anchoring holes on base feet
- E. Eight locations for attaching a ground
- F. Greystone finish
- G. Listed to UL 1863 Standard for Communication Circuit Accessory
- H. 7200 pair and 24 block capacity

- I. Dimensions: 84”H x 37.5”W x 21.25”D
- J. Fully loaded with 300-pair 110D blocks
- K. Built-in horizontal rings and 6” vertical channels
- L. 12” cable runway support

2.13 CABLE MANAGEMENT

- A. Horizontal Cable Management: Provide 19-inch rack mountable horizontal wire management below each copper termination panel, data switching equipment and as specified in Drawings.
- B. Vertical Cable Management:
 - 1. Provide minimum three-inch vertical cable managers on each side of 19-inch rack
 - 2. Provide two-inch vertical cable managers on each side of 19-inch frame within cabinets.

2.14 POWER STRIPS

- A. Provide and install two power strips in each vertical cabinet.
 - 1. 66 inches, 16 outlet vertical power strips
 - 2. 20 amp
 - 3. 10-foot cord length
 - 4. Surge protection
 - 5. 20 amp twist lock plug
 - 6. No on/off switch
 - 7. For wall-mounted cabinets, provide 28-inch, 8 outlet vertical power strip.

2.15 FIBER OPTIC CABLE OPEN TROUGH SYSTEM

- A. An overhead fiber optic trough system with an open channel design to protect and route fiber optic patch cords shall be installed where fiber jumpers will be deployed, yellow finish.
- B. Fiber trough shall have downspout jumper exit and other accessories required to support fiber jumpers at each rack rail and cabinet entry. Flex tubes are NOT required, shall

include all end caps and protective bushings. All downspouts and fiber trough ends shall have trumpet flares.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify backboards are properly installed.
- B. Verify telecommunications grounding system is properly installed and tested following Section 270526.
- C. Verify liquid-carrying pipes are not installed in or above voice and data system communications rooms. Do not proceed with installation in affected areas until removed.

3.2 INSTALLATION

- A. Install work following drawings, manufacturer's instructions and approved submittal data.
- B. Equipment Clearances
 - 1. Clearance distances are measured from the outermost surface of devices installed in rack or mounted on wall, rather than from the rack or backboard.
 - 2. Provide a minimum of three feet of space in front and rear of cabinets and racks.
 - 3. Provide a minimum of one-foot side clearance in corners.
 - 4. Provide a minimum of one-foot clearance above cable tray/ladder rack.
 - 5. Provide a minimum of one-foot clearance above top-most item (cable tray, ladder rack or fiber trough) to any ceiling or overhead condition.
- C. Rack and Cabinet Installation
 - 1. Shall be properly positioned, leveled, ganged, anchored, grounded and powered.
 - 2. Shall be populated as noted in drawings with termination hardware, equipment, proper patch cord lengths, and power outlets.
 - 3. Install and anchor all racks and cabinets to floor following the drawings and manufacturer's instructions.
 - 4. All cabinet doors shall be configured as shown in the drawings.
 - 5. All cabinet cable entrances shall be provided with bushings.

D. Grounding: Ground communications room components per Section 270526 Grounding and Bonding for Communications Systems

E. Identification: Per MAA standards.

3.3 CLEANING

A. Remove all unnecessary tools and equipment, unused materials, packing materials, and debris from each area where Work has been completed unless designated for storage.

3.4 ACCEPTANCE

A. Once all work has been completed, test documentation has been submitted and approved, and the Owner is satisfied that all work has been completed in accordance with contract documents, the Owner will notify Contractor in writing of formal acceptance of the system.

B. Acceptance shall be subject to completion of all work and submittal and approval of full documentation as described above.

END OF SECTION 271100