SECTION 271100

COMMUNICATIONS EQUIPMENT ROOM FITTINGS

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 3 Specification with primarily required text; therefore, most of the text cannot be edited, but there is editable text which is noted within the Section with a “Note to Specifier.” Do not revise the required paragraphs without an approved Deviation from USPS Headquarters, Facilities Program Management, through the USPS Project Manager.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

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1. GENERAL
	1. SUMMARY
		1. Section includes the following structured cabling system components:
			1. Table of Contents
				1. Open Relay/Equipment Racks for CCR/TR’s
				2. Category 6 / Category 6A (Wireless) 110 Style Copper Patch Panels
				3. Wire Management Panels
				4. PBB for TEF/CCR
				5. SBB for TR/TE’s
			2. Consolidated Computer Room (CCR).
			3. Telecommunications Room (TR).
			4. Telecommunications Enclosure (TE).
		2. Related Documents:
			1. Specified in Section 270500 – Common Work Results for Communications.
			2. USPS Structured Cabling System Best Practices, 01 October, 2022.
	2. REFERENCES
		1. Specified in Section 270500 – Common Work Results for Communications.
	3. SUBMITTALS
		1. Specified in Section 270500 – Common Work Results for Communications.
	4. QUALITY ASSURANCE
		1. USPS to approve all Rack Elevations before Issued for Construction (IFC) drawings are distributed.
		2. Specified in Section 270500 – Common Work Results for Communications.
2. PRODUCTS
	1. OPEN EQUIPMENT / RELAY RACKS WITH VERTICAL WIRE MANAGERS FOR CCR/TR’s
		1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Chatsworth Products, Inc.
			2. CommScope Uniprise.
			3. Great Lakes Case & Cabinet Co., Inc.
			4. Hoffman.
			5. Ortronics (Legrand) Corporation.
			6. Panduit.
			7. Rittal.
			8. Tripp-Lite by Eaton.
			9. Product options and substitutions. Substitutions: Not permitted.
		2. Constructed of aluminum extrusion framework. Dimensions: 84 inch high x 3 inch deep x 19 inch wide. Double sided, 10/24 tapped holes with universal EIA rack unit spacing. Black or Aluminum finish.
			1. Each equipment rack shall have two double depth vertical cable managers: Dimensions: No less than: 8 inch x 8 inch x 78 11/16 inch for the front side of the relay rack and no less than 8 inch x 8 inch x 78 11/16 inch for the back side of the relay rack. Black or aluminum finish. Attach to sides of relay racks. Must be able to cover and conceal patch cabling. Each end rack will have outside double depth vertical wire managers attached to each outside end.
			2. Each equipment rack shall be connected to the overhead cable tray/wire basket system for added rigidity. Equipment racks shall be properly supported to avoid wobbling.
			3. Vertical and horizontal wire managers shall be equipped with opaque covers to completely conceal the patch cords.
			4. Provide four post, open equipment racks within the CCR and two post style, open equipment racks within the TRs.
	2. CATEGORY 6/6A 8-PIN MODULAR (IDC) “110” STYLE PATCH PANELS FOR CCR/TR/TE’s
		1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. CommScope Uniprise.
			2. Hubbell, Inc.
			3. Ortronics (Legrand).
			4. Panduit.
			5. Product options and substitutions. Substitutions: Not permitted.
		2. 48-port/24-port/12-port, Category 6/6A Copper Patch Panels:
			1. Rack mounted 8-pin modular, Category 6/6A, non-keyed.
			2. Complies with ANSI/TIA/EIA-568-C “T568A” pinning configuration.
			3. Install manufacturer supplied strain relief bar assemblies for every 12, 24 and 48 port rear copper terminations. Secure Cat6/6A cable with hook and loop cable straps. Plastic tie wraps are not acceptable.
	3. WIRE MANAGEMENT PANELS
		1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Panduit: Preferred.
			2. Chatsworth Products.
			3. CommScope Uniprise.
			4. Leviton.
			5. Ortronics (Legrand).
			6. Product options and substitutions. Substitutions: Not permitted.
		2. Cable Management Panels: Rack mounted horizontally and vertically. See the latest “USPS Structured Cabling System Best Practices” for guidelines on rack layouts.
			1. Horizontal management panel for use at top of each CCR equipment rack shall be two separate 2RU panels along the top of each equipment rack.
			2. Horizontal management panels for use at top of TR equipment racks shall be two 2RU panels along the top of each equipment rack.
			3. Each vertical wire management panel will be at least 8 x 8 inches deep on the front side and at least 8 x 8 inches deep on the back side of the equipment rack to form a Full Height Double-depth Vertical Wire Management system. No exceptions.
	4. PRIMARY BONDING BUSBAR - PBB for TEF/CCR (REFER TO TIA-607-D)
		1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Harger. P/N GBI/14424 TMGB.
			2. Chatsworth – P/N 40158-024.
			3. Legrand.
			4. Product options and substitutions. Substitutions: Not Permitted.
		2. Provide one PBB at the Telecom Entrance Facility (TEF), below ceiling acoustic tile, with all bonding leads clearly labeled by machine labeler. All bonding leads shall be 2 hole compression lugs. This PBB shall be bonded to the building grounding electrode system using minimum #1/0/AWG/CU conductor. Size according to number/size of Telecom Bonding Backbone (TBB) leads being attached to the PBB. Minimum size will be **4 inch H x 0.25 inch W x 24 inch L**. The PBB shall be mounted as close as possible to the building grounding electrode system busbar to keep the Telecom Bonding Conductor (TBC) as straight and as short as possible.
		3. Each 2-lug compression connector shall have antioxidant coating applied to lug and busbar prior to attachment.
		4. The maximum value of resistance between any point in the Telecommunications bonding system and the building electrical grounding electrode system shall be 100 Milliohms or .1 ohm to comply with TIA-607-D standard. This resistance value shall be tested and certified, in the presence of the Raleigh IT SME, by an independent third party testing agency, prior to applying power to any telecommunications equipment. Test meter shall be Micro-Ohmmeter Model 6240 manufactured by AEMC Instruments or approved equal.
	5. SECONDARY BONDING BUSBAR – SBB FOR CCR, TR/TE’s (REFER TO TIA-607-D)
		1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Harger – P/N GBI/14212 TMGB (TR/TE’s), P/N GBI/14424 TMGB (CCR).
			2. Chatsworth – P/N CPI 13622.
			3. Legrand – P/N OR-GB2X12TGB.
			4. Product options and substitutions. Substitutions: Not Permitted.
		2. Provide one SBB in the CCR and in every TR/TE, below ceiling acoustic tile (or within each TE), with all bonding leads clearly labeled by machine labeler. All bonding leads shall be 2 hole compression lugs. This SBB will connect to the PBB using minimum #1/0/AWG/CU via Telecom Bonding Backbone (TBB). Size according to number/size of bonding leads being attached to SBB. Minimum size will be 2 inch H x 0.25 inch W x 12 inch L. Provide 4 inch H x 0.25 inch W x 24 inch L secondary bonding busbar within the CCR.
		3. Each 2-lug compression connector shall have antioxidant coating applied to lug and busbar prior to attachment.
3. EXECUTION
	1. INSTALLATION
		1. Consolidated Computer Room (CCR):
			1. Do not use the CCR as a TR/TE. If utilized provide an additional, entirely separate wire basket or ladder tray to support all of the Cat6/6A copper for the TR/TE needs. Do not install Cat6/6A copper cabling inside wire basket used for any CCR equipment. Keep the two systems completely separate. A maximum fill ratio of 40% will be adhered to. No exceptions.
			2. Furnish, install, and bond, floor mounted, four post, 84 inch high x 3 inch deep x 19 inch wide relay racks shoulder-to-shoulder separated by 8 inch wide, double depth, full height, vertical wire managers perpendicular to wall housing plywood backboards.
				1. Mount relay racks in a “side by side” fashion with one double-depth vertical wire management channel between each rack, and one double-depth wire management channel on outside side rail of both end racks.

Place two 2RU horizontal wire managers at the top of each rack.

Supply four (4) 1RU wire managers within each rack for USPS use. These (4) 1RU wire managers are in addition to the 1RU wire managers placed between the patch panels and the 2RU wire managers at the top of each rack.

Supply (500) hook and loop cable straps for USPS use; Hellerman Tyton: P/N GT 50X60C2.

* + - * 1. The 12 inch wide ladder tray/basket tray shall be mounted to top of relay racks and extend to plywood backboard or other ladder rack/basket tray for each relay rack installed. This ladder rack serves as additional support for relay racks as well as cable routing from relay rack to backboard.
				2. Each rack will receive a separate #6 AWG bonding wire home run to the Secondary Bonding Busbar (SBB) in the CCR.
				3. Each rack shall be equipped with a factory manufactured power strip equipped with 12 NEMA5-20R receptacles. Preferred rack mounted power strip: Tripp-Lite #RS-1215-20.
				4. Each rack shall be provided with an installation kit and isolation pads for securing and isolating the rack to and from the floor.
			1. Provide a minimum of two 4 x 8 foot plywood backboards along walls behind and perpendicular to CCR racks and directly below the basket or cable tray. Provide quadraplex power receptacle and quad T/O each mounted 6 feet AFF and center within each sheet of plywood. Additional 4 x 8 foot plywood sheets may be required by USPS.
				1. Plywood: 48 inch x 96 inch x 3/4-inch A/C rated (A = smooth side; C = slight blemishes against wall), fire rated, void-free, smooth side out. Absolutely no knot holes or voids shall be visible on outer face of plywood.
				2. Install plywood with long dimension in vertical orientation with bottom of sheet 8 inches AFF.
				3. Field paint with white or gray enamel fire resistant paint prior to installation of equipment.
				4. Provide an industry approved Secondary Bonding Busbar (SBB) and attach minimum #6 AWG bonding conductors using 2 hole compression type fittings for all bonding needs within the CCR. All bonding cable connections shall be clearly labeled on the SBB indicating where the connection is coming from/going to via machine made labels. All metallic components of CCR shall be bonded to the installed Secondary Bonding Busbar (SBB). Interconnect the SBB to the PBB utilizing minimum ##1/0/AWG/CU bonding conductor.
			2. Install 12 inch wide ladder rack/basket tray with 2 inch side bars the entire width of plywood back boards at 7 feet 6 inches to 8 feet AFF (Racks are 84 inches high).
				1. Furnish and install 12 inch wide ladder rack/basket tray with 2 inch side bars at 7 feet 6 inches to 8 feet AFF between plywood backboards and relay racks (racks are 84 inches high). All sections of ladder rack and or basket tray shall be joined with manufacturer approved devices. No sections of ladder rack or basket tray shall be zip tied together. All sections of ladder rack and/or basket tray will be bonded. All wall connections will be made with factory wall mounts. No homemade connectors are permitted.
				2. Provide 2 factory manufactured cable “drop out” fittings at each rack within the “CCR”.
			3. Provide a minimum of two, four-post, floor mounted, Postal Furnished Equipment (PFE) racks for LAN, WAN electronic components. PFE racks shall be enclosed type with mesh louvered sides and plexiglass hinged door. USPS to specify equipment rack locations. Supply four 1-RU wire managers per rack in addition to the two 2-RU wire manager at the top of each rack and the 1 RU wire managers between the copper patch panels.
			4. Install Category 6 48-port patch panels in relay rack(s) that the 4-pair cables serving only the CCR are to be terminated. It is recommended that Telecommunications Outlets within the CCR be installed using the ladder rack/basket tray system. USPS IT will specify final termination points. Power for each MPE cabinet is to be served using a drop cord and 20A, 120 volt connector. The drop cords are to be extended down from outlet boxes secured to the ladder rack/basket tray. Provide one quad receptacle secured to the wire basket/ladder tray behind each USPS PFE rack.
			5. All metallic ladder tray, basket tray, equipment racks or enclosures shall be bonded using a #6 AWG stranded bond wire with green insulation using 2 hole compression type fittings approved for basket tray installation. All painted surfaces shall be fully burnished for paint removal to achieve maximum bonding connection. Provide all UL documentation on how the support system should be bonded to form a system.
			6. All bonding in CCR shall be made at the Secondary Bonding Busbar (SBB) installed by Contractor. This SBB shall be wall mounted below the acoustic ceiling if one is installed and shall not be installed on the plywood backboards. All bonding wires will be on two lug compression fittings with full machine-made labeling clearly showing where the bond originates.
			7. Contractor shall provide enough 10/24 mounting screws for 32 connections per equipment rack in CCR, TR or TE rack for the installation of USPS PFE active electronic components. Example: If 8 new relay racks are installed, provide 256 10/24 pitch screws.

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**NOTE TO SPECIFIER**

Resilient Quartz flooring is typically provided in the CCR. Include paragraph 3.1 A.10. below if the “CCR” has been determined to be critical and essential to the operation of the facility. Installation of static control resilient flooring requires an approved deviation.

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* + - 1. The floor surface of the “CCR” shall be covered with static control resilient flooring. A sealed concrete floor is not acceptable. Refer to specification section 096536 for grounding provisions.
		1. Telecommunications Room (TR):
			1. Provide appropriate number of 4-pair Category 6 UTP cables from each office area and workroom column mounted T/O (telecommunications outlets) to Telecommunications Rooms as indicated on drawings. Terminate 12 each 4-pair Category 6 UTP cables from each Type 1 Consolidation Point to Telecommunications Room as indicated on drawings.
			2. Provide one 4-pair Category 6A UTP cable from each Wireless Access Point (WAP) to Telecommunications Enclosures/Rooms as indicated on drawings to 12 or 24 port Category 6A copper patch panels.
			3. Provide a minimum 20 foot service loop in a figure eight coil, in the ceiling/wire basket for all copper cables terminated in TE/TR’s.
			4. Provide and bond, floor mounted, 84 inch high x 3 inch deep x 19 inch wide relay racks shoulder-to-shoulder, separated by double-depth vertical wire managers, perpendicular to wall housing plywood backboards with double-depth vertical wire managers on each outer end of equipment racks.
				1. Racks will be used to house fiber/copper wiring and PFE.
				2. Allow a minimum 16 empty rack units per rack for PFE data equipment.
				3. Provide one factory manufactured cable “drop out” fitting at each rack within the “TR”.
				4. Each rack shall be equipped with a rack mounted power strip equipped with 12 NEMA5-20R receptacles. Mount power strip below last 48 port copper patch panel. Preferred: Tripp-Lite #RS-1215-20.
				5. Provide a minimum of 2 racks within each TR.
				6. Each rack shall be provided with an installation kit and isolation pads for securing and isolating the rack to and from the floor.
			5. Provide one 2RU rack mounted wire manager at top of rack.
			6. Provide one rack mounted, 24 strand fiber optic interconnect, center below 2RU wire manager.
			7. Provide needed 48-port Copper Patch Panels separated by 1RU Wire Managers.
			8. Provide the following within the Telecommunications Room:
				1. Each rack shall be equipped with separate #6 AWG bond conductor homerun to the Secondary Bonding Busbar (SBB) in that TR.
				2. Provide an industry approved copper Secondary Bonding Busbar (SBB) and attach minimum #1/0 AWG bond conductor from this SBB to the “PBB” in the TEF using the Telecom Bonding Backbone (TBB) and 2 hole compression type fittings. All bonding cable connections shall be clearly labeled on the busbar indicating where the connection is coming from/going to via machine made labels. All metallic components of the “TR” shall be bonded to the installed SBB inside that TR.
			9. Provide a minimum of one 3KVA (120V - input/output) uninterruptible rack mountable power supply with 30 minute battery reserve in each TR. Mount on the lowest RU of the right-most open relay rack and ensure power plug is wired as NEMA 5-30P, 3 wire.
			10. Contractor shall provide enough 10/24 screws for 32 connections per rack for the installation of USPS PFE active electronic components. Example: If 3 new relay racks are installed, provide 96 10/24 pitch screws.
		2. Telecommunications Enclosure (TE) for Column Mounted Applications
			1. Constructed of steel or aluminum with Safety Glass or Plexiglas front doors. Cabinet must be rated NEMA-12, designed for front and rear access, have forced fan with filtration for intake and exhaust ventilation, and adjustable vertical mounting rails. The intake fan with filter will be mounted 5 inches from the top center of the rear metal door and a filtered louvered exhaust vent will be mounted 4 inches from the bottom center of the rear door. The fan must be oriented to blow filtered air into the cabinet to create a positive pressure within the cabinet and will be plugged into the power strip (min. 12 outlet NEMA 5-20R with power switch guard) mounted inside of the cabinet; Basis of Design: Tripp-Lite #RS-1215-20. Dimensions: 86 inches high x 36 inches deep x 24 inches wide with 19 inch EIA rack width. The Telecommunications Enclosure and the installation of the enclosure must comply with area seismic zone rating.
				1. Provide appropriate number of conduit risers equipped with 90 degree bends and bushings/collars for incoming backbone and outgoing horizontal cables. Conduit risers shall be minimum 2 inch diameter and sized for 40 percent fill and shall be sealed to maintain positive air pressure within the TE. Provide one spare 3 inch conduit riser sealed with threaded cap for future cabling.
				2. Allocate 16 RU’s within the rack for PFE and provide a second separate NEMA 12 cabinet if less than 16 RU’s for PFE is available in first TE. Two units can be “ganged/married” together (inner side panels removed and doors adjusted to open from center) to form one TE for workroom floor applications. The doors shall be adjusted to open in opposite directions from the center. Cabinets shall be bolted together in such a manner to maintain the NEMA-12 compliance, and the inner side panels will be removed from each unit creating an open pathway between cabinets. All copper connections will be placed in the left-most cabinet and the fiber along with the 1.5 kVA UPS will be installed in the right-most cabinet.
			2. Each NEMA 12 TE Cabinet shall be attached to Work Room Floor Column via double-nutted 5/8-inch. All-Thread/Uni-Strut or a metal platform welded to the column. The bottom of each NEMA-12 cabinet shall be 9 feet AFF. Install a Uni-Strut/All-Thread/Platform designed to support a minimum of 1000 lbs., firmly connected to the column and or the overhead building support structure that meets all codes and seismic requirements. Provide a structural engineer approved platform solution during the Design Review Process and before the Issued For Construction drawings are distributed. There shall not be any installed Bollards blocking or interfering any Verti-Lift access into either the front or rear of the NEMA-12 cabinet TE. The mounted TE shall not sway or swing in any manner.
				1. TE’s shall not be mounted on the Workroom floor. TE’s shall be column mounted. No exceptions.
				2. The front rails of the TE shall be positioned to avoid the patch cords from contacting with the front plexiglass door.
			3. Provide appropriate number of 4-pair Category 6 UTP cables from each office area and workroom T/O (telecommunications outlet) to Telecommunications Enclosure as indicated on drawings. Terminate 12 each 4-pair Category 6 UTP cables from each Type 1 Consolidation Point to Telecommunications Enclosure as indicated on drawings.
			4. Provide one rack/cabinet mounted, 1RU, 24 strand fiber optic interconnect, center at top of cabinet. Fiber ports will be laid out ports 1-12, left to right on 1RU only. Duplex ports to be mounted vertically: Ports 1-12; left to right.
			5. Provide one 4-pair Category 6A UTP cable from each Wireless Access Point (WAP) to Telecommunication Enclosure as indicated on drawings to Cat6A 24 port Copper Patch Panel, the bottom-most Copper Patch Panel.
			6. Provide a minimum 10 foot service loop for all copper cables. Service Loop shall be placed inside TE in between the side TE panel and mounting railing with no obstruction to PFE.
			7. All metallic basket tray, equipment racks or enclosures shall be bonded and grounded using a #6 AWG stranded bond wire with green insulation using 2-hole compression type fittings or bond fitting approved for basket tray installation. All painted surfaces shall be fully burnished for paint removal to achieve maximum bonding connection.
			8. Provide an industry approved Secondary Bonding Busbar (SBB) and attach minimum #1/0 AWG bond conductor from this SBB to the PBB in the TEF using the Telecom Bonding Backbone (TBB) and 2 hole compression type fittings. All bonding cable connections shall be clearly labeled on the busbar indicating where the connection is coming from/going to via machine made labels. All metallic components of the TE shall be bonded to the installed SBB inside that TE.
			9. Provide a minimum 1.5kVA uninterruptible power supply with 30 minute battery reserve rack mounted at the backrail within each TE.
			10. Install conduit/EMT through top of cabinet to allow cable entry as needed. Seal openings with an intumescent fire-stop putty when all cables have been installed. Spray foam sealants not permitted.
			11. Contractor shall provide enough 10/24 screws or screws/square cage nuts for 32 connections per rack for the installation of USPS PFE active electronic components. Example: If 2 new relay racks are installed, provide 64 10/24 pitch screws.
			12. Maximum horizontal cabling distances shall not exceed 230 feet for CP-1 Consolidation Points. This horizontal distance is to include all vertical distances plus required service loops. Total workroom floor coverage is required when designing the TE placements throughout the workroom floor environment.
			13. Maximum horizontal cabling distances for telecommunication outlets shall not exceed 295 feet, including vertical distances and required service loops.
			14. CCTV or ISIP equipment components of any kind shall not be mounted within a TE.
		3. Patch Panels: Install 12-port, 24-port and 48-port, 8-pin module Category 6/6A patch panels at main cross-connect and horizontal cross-connect for termination of cables installed as part of Work of this Section.
			1. Install patch panels inside wall mounted data enclosure for retrofit column mounted TE applications. Install patch panels on floor mounted 19 inch wide by 84 inch high open relay racks at CCR and TR room locations, only.
			2. Provide wire management panel (1RU) on rack or cabinet mounting rails above and below each patch panel for all locations.
			3. Provide 4 additional 1RU wire managers to be used in between PFE.
			4. Provide manufacturers strain relief bars sufficient to maintain UTP bend radius at rear of panels.
			5. Terminate all 4 pairs of each horizontal 4 pair cable to each 8 pin (“T568A”) patch panel port.
			6. Consolidation Point One (CP-1) cabling will terminate starting on the first Category 6 copper patch panel followed by the T/O cabling in consecutive order.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022