SECTION 271300

COMMUNICATIONS BACKBONE CABLING

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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. Fiber Optic Cabling.
			2. Termination equipment.
			3. Patching equipment.
			4. Fiber Optic Testing.
		2. Related Documents:
			1. Specified in Section 270500 – Common Work Results for Communications.
		3. Related Sections:
			1. Specified in Section 270500 – Common Work Results for Communications
	2. REFERENCES
		1. Specified in Section 270500 – Common Work Results for Communications.
	3. SYSTEM DESCRIPTION
		1. Specified in Section 270500 – Common Work Results for Communications.
	4. SUBMITTALS
		1. Specified in Section 270500 – Common Work Results for Communications.
	5. QUALITY ASSURANCE
		1. Specified in Section 270500 – Common Work Results for Communications.
	6. DELIVERY, STORAGE, AND HANDLING
		1. Section 016000 – Product Requirements: Transport, handle, store, and protect Products.
		2. Deliver in accordance with NEMA WC 26.
2. PRODUCTS
	1. CONDUITS, BOXES AND CABLE TRAYS
		1. Specified in Section 260533 – Raceway and Boxes for Electrical Systems.
	2. OS2 ARMORED BACKBONE
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Belden.
			2. Berk-Tek.
			3. CommScope Uniprise.
			4. Corning Cable Systems.
			5. General Cable.
			6. Leviton.
			7. Optical Cable Corp.
			8. Ortronics (Legrand).
			9. Superior Essex
			10. Product options and substitutions. Substitutions: Substitutions: NOT permitted.
		2. Conductors: 24 / 48 strands
			1. Terminate fiber strands onto “LC” ports, vertically mount, ports 1 through 12, left to right.
			2. Fiber strands are required to be installed on Fiber Optic Interconnection panels based on the project requirements.
			3. The same port layout orientation must be preserved on the far end strand terminations. All ports must be installed vertically. No horizontal orientation allowed.
			4. All individual Armored Fiber runs are required to be bonded on the CCR end only, connected to the SBB in the CCR and clearly labeled with machine labels.
			5. All backbone fiber strands shall be installed using reverse-pair positioning which allows the use of A-B fiber patch cords. Refer to ANSI-TIA-568.3.D, Annex C.
			6. Provide individually insulated plenum rated strands under common plenum rated sheath.
			7. Complies with individual characteristics established in TIA-568-C including all addendums for fiber optic cable performance specification.
			8. All underground fiber cable shall be indoor/outdoor rated. Loose tube fiber cable, if utilized, shall be equipped with furcation kits.
	3. FIBER OPTIC RACK MOUNT INTERCONNECT CENTER
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. CommScope Uniprise.
			2. Corning Cable Systems.
			3. Ortronics (Legrand).
			4. Panduit.
			5. Product options and substitutions. Substitutions: Not permitted.
		2. Enclosure connector and adapter panels:
			1. LC type connectors.
			2. Rack mount enclosures shall be one RU, two RU or four RU style coupler panels based on the project requirements.
			3. Complies with TIA-568-C specification.
	4. OS2 FIBER OPTIC PATCH CORDS: 2 STRAND, TIGHT BUFFERED
		1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Belden.
			2. Berk-Tek.
			3. CommScope Uniprise.
			4. Corning Cable Systems.
			5. General Cable.
			6. Leviton.
			7. Optical Cable Corp.
			8. Ortronics (Legrand).
			9. Superior Essex.
			10. Product options and substitutions. Substitutions: Not permitted.
			11. Fiber patch cord manufacturer shall be the same manufacturer furnishing the backbone fiber. Mixing of manufacturers is not acceptable.
		2. Fiber optic duplex patch cords.
			1. USPS to specify connector type and length for patch cords based on the total number of fiber ports being installed. Connectors shall be LC/LC.
			2. Complies with individual characteristics established in TIA-568-C including all addendums for fiber optic patch cable performance specification.
			3. Patch cords shall be factory made and factory tested individually.
			4. Provide fiber patch cords for 75 percent of the total fiber ports installed. Example: 50 Duplex fiber ports (100 strands) installed, provide 75 Duplex fiber patch cords. All fiber patch cord colors, lengths and quantities shall be determined by USPS.
			5. Fiber optic patch cord connector types, lengths and quantities shall be specified by USPS prior to procurement.
			6. Match performance characteristics of installed fiber optic backbone.

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**NOTE TO SPECIFIER**

Type 1 Fiber Optic Point (FP-1) for workroom floor enclosures are typical for FSS sites. Delete the below if FP-1 is not used.

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* 1. TYPE 1 FIBER OPTIC POINT (FP-1) FOR WORKROOM FLOOR ENCLOSURES (TYPICAL FOR FSS SITES)
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Hoffman Enclosures, Inc.
			2. Rittal Corporation (AE, or EB Series enclosures).
			3. Product options and substitutions. Substitutions: Not permitted.
		2. Enclosures:
			1. Metal, no plastic allowed. Minimum 12 inches high x 12 inches wide x 8 inches deep sheet steel NEMA-12 enclosure with hinged, lockable door with rubber gasket, mounted at 14 feet AFF. Alternate size: 14 inches high x 16 inches wide x 6 inches deep.
			2. Door must be oriented so that it opens in a horizontal manner. Enclosure may not be mounted in a manner so that the door opens downward.
		3. Connectors and adapter plates:
			1. LC type connectors.
			2. 3 port coupler panel with LC adapters for each FP.
			3. 6 Strands x Number of FPs = size of enclosure needed, and amount of LC adapters for CCR.
			4. Rack mount enclosure is 1.75 inches high. (1 Rack Unit).
			5. Complies with TIA-568-C specification.
1. EXECUTION
	1. INSTALLATION - COMPONENTS

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* + 1. Type 1 Fiber Optic Point: Furnish and install 6 port fiber optic enclosures (FP-1) at each location identified on Electrical Drawings using NEMA 12 rated enclosures. Mount fiber optic points with uni-strut or equivalent fastening devices to steel ceiling structure (red iron) so that box is vertical and installed between 20 to 23 feet above the finished floor. Door must be oriented so that it opens in a horizontal manner. Enclosure may not be mounted in a manner so that the door opens downward. Contractor must ensure all minimum bend radius specifications for cables can be achieved inside the enclosures. All terminating components shall match the requirements/performance specifications of the cable specified. Install cables from Fiber Optic Points to CCR in wire basket tray, support loops or J-Hooks with a maximum span of 4 feet.
	1. FIBER OPTIC TESTING
		1. OS2 Single-Mode Fiber Optic Cable Testing
			1. Fluke testers are the only allowed fiber tester manufacturer. Tester must be Encircled Flux Compliant.
			2. Test Reference Cords (TRC’s) must be used. Test Reference Cord verification must be shown in the final test result submission.
			3. Tier 1, Tier Method B (one jumper) and Tier 2 OTDR testing is required. The Tier 2 OTDR requires bi-directional testing.
			4. The installer shall Set a Reference based on Method B (Single Jumper) which includes both mated connector losses and the loss of the link under test.
			5. The installer shall perform Tier 1 Testing with Optical Loss Test Set (OLTS) that includes testing for length.
			6. The installer shall perform Tier 2 testing with OTDR to show all splices.
			7. The supplier shall perform Bi-directional testing on all installed fiber optic cabling. Supplier test equipment shall perform testing of fiber in accordance with the fiber type being tested, TIA-526-7 for Single mode fiber.
			8. The fiber testers and test heads shall have passed calibration within one year of actual test date. Any calibration in excess of one year is not acceptable. Each test set and fiber head must have the recent calibration paper printout from the calibration lab for inspection by USPS, prior to testing. The calibration printout must show actual serial numbers of test sets (main and remote and each fiber tested).
				1. The current calibration for the main and remote fiber units MUST be supplied to USPS prior to any testing.
				2. USPS RITSC representative will determine test labeling format inside the fiber tester prior to actual testing. The Main Unit must be in the CCR.

Example for fiber strand test: CCR to TE 1-06 14 (for strand 14). All fiber strands will be tested bi-directionally. Any fiber test results that only show testing in one direction will be rejected.

* + - 1. Single mode fiber optic cable shall be tested bi-directionally at 1310 nm and 1550 nm.
			2. Cable tester test parameter shall be set to correct values for:
1. Actual manufacturer of fiber being installed. Tester to be specific to the manufacturer’s model of fiber cable being tested; tester cannot be a generic fiber type.
2. Index of Refraction based on manufacturer specifications for cable type being tested.
3. Quantity of adapters: Test Method B, one Jumper, 2 adapters.
4. Fiber Type.
5. Test to Tier 1 as mandated by TIA-568-C.4.
6. Preferred tester is Fluke Versiv series with Encircled Flux.
	* + 1. The Low Voltage Installer shall provide all Fiber tests in one, single file. No multiple files will be accepted.
			2. The Supplier shall review test settings with the USPS technical representative. Supplier shall have cable specifications on site for USPS technical review to verify settings are correct on test equipment.
			3. Fiber optic cables shall pass all attenuation tests referenced to formulas presented in the listed standards.
			4. Perform end-to-end tests of each fiber optic backbone cable as follows (applies to CCR/TR/TE applications only):
				1. Tier 1 Test: Light Source Power meter tests per TIA-568-C specification.
				2. Optical Time Domain Reflectometer (OTDR) tests per TIA-568-C specification including all addendums.
				3. Both the Tier 1 test and the Tier 2 OTDR test results must be uploaded to the “Link Ware Live” cloud based repository for USPS RITSC access.
				4. Performing one test and not the other does not satisfy a complete fiber test. Both tests must be submitted in one file, all at the same time.
				5. Measured effective cable run length.
			5. Optical photographs of each fiber end shall be submitted for documentation and warranty purposes.
	1. CONSTRUCTION
		1. Specified in Section 270500 – Common Work Results for Communications.
	2. FIELD QUALITY CONTROL
		1. Specified in 270500 – Common Work Results for Communications.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022