SECTION 27 11 16

Communications Cabinets, Racks, Frames and Enclosures

[Specifier Notes] – This document uses hidden text to guide the specifier through various options while editing the document. Hidden text may be turned on two ways: with the “Show/Hide” symbol “¶” in the ribbon; or selecting “File” above the ribbon at the top left, then “Options” at the very lower left, then “Display” on the left side of the menu pop-up, and then check the box next to “Hidden Text.”

**Please delete this note before printing.**

1. GENERAL
	1. SECTION INCLUDES
		1. Rack Mountable Hardware.
		2. Wall Mountable Hardware.
	2. RELATED SECTIONS

[Specifier Notes]: Remove sections not required under project scope of work.

* + 1. Section 27 13 23 - Communications Optical Fiber Backbone Cabling.
		2. Section 27 13 23 13 - Communications Optical Fiber Splicing and Terminations.
		3. Section 33 82 23 - Optical Fiber Communications Distribution Cabling.
	1. SUBMITTALS
		1. Submit in accordance with requirements of Section 01 30 00 - Administrative Requirements.
		2. Submittals for Initial Selection:
			1. Product Data: Manufacturer's technical data sheets, specifications, performance data and installation instructions for all products referenced in the scope of work defined in this section.
			2. Shop Drawings: Submit shop drawings required to depict the requirements for fabrication and installation. Include the following drawings as applicable:
				1. Proposed riser and horizontal cabling diagram.
				2. Overlay of system components on floor plans.
			3. Sample Warranty Information:
				1. Submit confirmation and details of manufacturer’s warranty, extended warranty, and replacement policies.
		3. Closeout submittals
			1. Maintenance Contracts.
			2. Operation and Maintenance Data.
			3. Preventative Maintenance Instructions.
			4. Final Site Survey.
			5. Warranties for all manufactured components specified in this section.
	2. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Minimum 25 years in business manufactured at a facility in the United States.
		2. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of optical fiber.
	3. DELIVERY STORAGE AND HANDLING
		1. Deliver, store and handle materials and products in accordance with the manufacturer's instructions and recommendations and industry standards.
		2. Store all materials in the manufacturer’s original packaging until ready for installation. Protect all products from damage or exposure to adverse environmental conditions, including weather, humidity, and dust.
	4. Project Conditions
		1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
	5. Warranty
		1. Manufacturer’s Warranty: Manufacturer agrees to replace or refund the purchase price of products that fail from defects in material and workmanship within the specified warranty period.
			1. Warranty Period: One (1) year from date of Substantial Completion.
		2. Manufacturer’s Extended Warranty: Manufacturer agrees to replace or refund the purchase price of products that are installed by a manufacturer-certified installer that fail from defects in material and workmanship within the specified warranty period.
			1. Warranty Period: Twenty-five (25) years from date of Substantial Completion.
1. PRODUCTS
	1. MANUFACTURERS

[Specifier Notes] – Retain the following Paragraph if this document is a PROPRIETARY Specification, with Corning Optical products listed as the Basis of Design. Delete if not required.

* + 1. Basis of Design Manufacturer: Corning Optical Communications LLC.
			1. Address: 4200 Corning Place; Charlotte, NC 28216.
			2. Toll Free Phone: (800)743-2675.
			3. Phone: (828)901-5000.
			4. Fax: (828)325-5060.
			5. Website: [www.corning.com/opcomm](https://www.corning.com/opcomm)
			6. Email: ccsamericas@corning.com

[Specifier Notes] – Retain the following Paragraph if this document is written as a PERFORMANCE specification, without listing a manufacturer as a basis of design. Insert manufacturers that sell products comparable to those specified in this section. Delete if not required.

* + 1. Manufacturer List:
			1. Manufacturer:
		2. Substitution Limitations:
			1. Submit substitution requests in accordance with provisions of Section 01 60 00.
			2. Single manufacturer will provide, from a single source, optical fiber and accessories.
	1. PERFORMANCE REQUIREMENTS
		1. Cabling System Hardware Requirements:
			1. General Requirements: Provide cabling system hardware able to support interconnections to active telecommunications equipment for voice and data applications in a multi-vendor, multi product environment.
			2. Structured cabling system hardware should adhere to the following:
				1. General: Provide cabling system hardware in compliance with ANSI/TIA-568-D and ANSI/TIA-570-D.
				2. Labelling: Provide cabling system labelled in compliance with ANSI/TIA-606-B.
				3. Pathways: Provide cabling system for pathways and spaces in compliance with ANSI/TIA-569-C.
				4. Grounding and Bonding: Provide cabling system grounded and bonded in accordance with ANSI/TIA-607-C.
				5. Color Coding: Provide cabling system color coded in compliance with ANSI/TIA-598-C.
				6. Data Centers: Provide cabling system in compliance with ANSI/TIA-942-B.
	2. Rack Mounted Hardware
		1. Closet Connector Housings.

[Specifier Notes] – Retain the following paragraph if this document is a PROPRIETARY Specification, with Corning Optical products listed as the Basis of Design. Delete if not required.

* + - 1. Basis of Design Product: Closet Connector Housing (CCH).
			2. General: Provide closet connector housings for interconnect or cross-connect capabilities between outside plant, riser or distribution cables and opto-electronics. Housings must accept CCH connector panels, cassettes, and modules. Provide strain relief brackets, routing clips and guides, and mounting brackets for proper installation. Provide removable tinted polycarbonate front door and field-installable lock kits for both front and rear doors.
			3. Capacity and Dimensions: Provide housing capable of being mounting in 19-inch standard width racks, or 23-inch racks with additional accessories.
				1. Panels per Housing: Up to 2; 1U Height.
				2. Panels per Housing: Up to 4; 2U Height.
				3. Panels per Housing: Up to 6; 3U Height.
				4. Panels per Housing: Up to 12; 4U Height.
			4. Operating Temperature: -40 °C to 70 °C (-40 F to 158 F).
	1. Closet Connector Housing Accessories
		1. CCH Splice Cassettes:
		2. Pigtailed Splice Cassettes:

[Specifier Notes] – Retain the following paragraph if this document is a PROPRIETARY Specification, with Corning Optical products listed as the Basis of Design. Delete if not required.

* + - 1. Basis of Design Product: CCH Pigtailed Splice Cassette, by Corning Optical.
			2. General: Provide cassettes pre-loaded and pre-routed for quick fusion splicing of either individual or ribbon fiber pigtails along with a 2-meter pigtail assembly with all pre-existing CCH panel connector options. Provide pigtailed cassettes with 900 µm at the connector panel for added durability and colored 250 µm for ease of splicing and for strain relief pre-applied to the assemblies from the manufacturing facility.

[Specifier Notes] – Retain one of the three following subparagraphs to meet project requirements.

* + - 1. Adapter Type: Standard SC Simplex.
			2. Adapter Type: ST Compatible.
			3. Adapter Type: Standard LC Duplex.

[Specifier Notes] – Retain one of the three following subparagraphs to meet project requirements.

* + - 1. Fiber Count: Minimum six (6).
			2. Fiber Count: Minimum twelve (12).
			3. Fiber Count: Minimum twenty-four (24).

[Specifier Notes] – Retain one of the five following subparagraphs to meet project requirements.

* + - 1. Fiber Category: 62.5 µm multi-mode (OM1).
			2. Fiber Category: 50 µm multi-mode (OM2).
			3. Fiber Category: 50 µm multi-mode (OM3).
			4. Fiber Category: 50 µm multi-mode (OM4).
			5. Fiber Category: Single-mode (OS2).
		1. LC Adapter Panels.

[Specifier Notes] – Retain the following paragraph if this document is a PROPRIETARY Specification, with Corning Optical products listed as the Basis of Design. Delete if not required.

* + - 1. Basis of Design Product: Closet Connector Housing (CCH) Panel, LC Adapters, by Corning Optical.
			2. General: Provide panels for interconnect or cross-connect capability in a housing at main cross-connects, intermediate cross-connects, telecommunication rooms or work areas.

[Specifier Notes] – Retain one of the two following subparagraphs to meet project requirements.

* + - 1. Adapter Type: Standard LC Duplex.
			2. Adapter Type: Standard LC Duplex shuttered.

[Specifier Notes] – Retain one of the six following subparagraphs to meet project requirements.

* + - 1. Fiber Count: Minimum six (6).
			2. Fiber Count: Minimum eight (8).
			3. Fiber Count: Minimum twelve (12).
			4. Fiber Count: Minimum sixteen (16).
			5. Fiber Count: Minimum twenty-four (24).
			6. Fiber Count: Minimum one hundred twenty (120).

[Specifier Notes] – Retain one of the five following subparagraphs to meet project requirements.

* + - 1. Fiber Category: 62.5 µm multi-mode (OM1).
			2. Fiber Category: 50 µm multi-mode (OM2).
			3. Fiber Category: 50 µm multi-mode (OM3).
			4. Fiber Category: 50 µm multi-mode (OM4).
			5. Fiber Category: Single-mode (OS2).

[Specifier Notes] – Retain one of the five following subparagraphs to meet project requirements.

* + - 1. Number of Adapters per Panel: Minimum three (3).
			2. Number of Adapters per Panel: Minimum four (4).
			3. Number of Adapters per Panel: Minimum six (6).
			4. Number of Adapters per Panel: Minimum eight (8).
			5. Number of Adapters per Panel: Minimum twelve (12).

[Specifier Notes] – Retain one of the five following subparagraphs to meet project requirements.

* + - 1. Adapter Housing Color: Blue.
			2. Adapter Housing Color: Green.
			3. Adapter Housing Color: Black.
			4. Adapter Housing Color: Beige.
			5. Adapter Housing Color: Aqua.
		1. SC Adapter Panels.

[Specifier Notes] – Retain the following paragraph if this document is a PROPRIETARY Specification, with Corning Optical products listed as the Basis of Design. Delete if not required.

* + - 1. Basis of Design Product: Closet Connector Housing (CCH) Panel, SC Adapters, by Corning Optical.
			2. General: Provide panels for interconnect or cross-connect capability in a housing at main cross-connects, intermediate cross-connects, telecommunication rooms or work areas.

[Specifier Notes] – Retain one of the two following subparagraphs to meet project requirements.

* + - 1. Adapter Type: Standard SC Duplex.
			2. Adapter Type: Standard SC Simplex.

[Specifier Notes] – Retain one of the three following subparagraphs to meet project requirements.

* + - 1. Fiber Count: Minimum six (6).
			2. Fiber Count: Minimum eight (8).
			3. Fiber Count: Minimum twelve (12).

[Specifier Notes] – Retain one of the four following subparagraphs to meet project requirements.

* + - 1. Fiber Category: 62.5 µm multi-mode (OM1).
			2. Fiber Category: 50 µm multi-mode (OM2).
			3. Fiber Category: 50 µm multi-mode (OM3).
			4. Fiber Category: Single-mode (OS2).

[Specifier Notes] – Retain one of the five following subparagraphs to meet project requirements.

* + - 1. Number of Adapters per Panel: Minimum three (3).
			2. Number of Adapters per Panel: Minimum four (4).
			3. Number of Adapters per Panel: Minimum six (6).
			4. Number of Adapters per Panel: Minimum eight (8).
			5. Number of Adapters per Panel: Minimum twelve (12).

[Specifier Notes] – Retain one of the five following subparagraphs to meet project requirements.

* + - 1. Adapter Housing Color: Blue.
			2. Adapter Housing Color: Green.
			3. Adapter Housing Color: Black.
			4. Adapter Housing Color: Beige.
			5. Adapter Housing Color: Aqua.
		1. ST Compatible Adapter Panels.

[Specifier Notes] – Retain the following paragraph if this document is a PROPRIETARY Specification, with Corning Optical products listed as the Basis of Design. Delete if not required.

* + - 1. Basis of Design Product: Closet Connector Housing (CCH) Panel, ST Compatible Adapters, by Corning Optical.
			2. General: Provide panels for interconnect or cross-connect capability in a housing at main cross-connects, intermediate cross-connects, telecommunication rooms or work areas.

[Specifier Notes] – Retain one of the two following subparagraphs to meet project requirements.

* + - 1. Adapter Type: Standard SC Duplex.
			2. Adapter Type: Standard SC Simplex.

[Specifier Notes] – Retain one of the three following subparagraphs to meet project requirements.

* + - 1. Fiber Count: Minimum six (6).
			2. Fiber Count: Minimum eight (8).
			3. Fiber Count: Minimum twelve (12).

[Specifier Notes] – Retain one of the four following subparagraphs to meet project requirements.

* + - 1. Fiber Category: 62.5 µm multi-mode (OM1).
			2. Fiber Category: 50 µm multi-mode (OM2).
			3. Fiber Category: 50 µm multi-mode (OM3).
			4. Fiber Category: Single-mode (OS2).

[Specifier Notes] – Retain one of the three following subparagraphs to meet project requirements.

* + - 1. Number of Adapters per Panel: Minimum six (6).
			2. Number of Adapters per Panel: Minimum eight (8).
			3. Number of Adapters per Panel: Minimum twelve (12).

[Specifier Notes] – Retain one of the five following subparagraphs to meet project requirements.

* + - 1. Adapter Housing Color: Blue.
			2. Adapter Housing Color: Green.
			3. Adapter Housing Color: Black.
			4. Adapter Housing Color: Beige.
			5. Adapter Housing Color: Aqua.
		1. MTP Adapter Panels.

[Specifier Notes] – Retain the following paragraph if this document is a PROPRIETARY Specification, with Corning Optical products listed as the Basis of Design. Delete if not required.

* + - 1. Basis of Design Product: Closet Connector Housing (CCH) Panel, MTP Adapters, by Corning Optical.
			2. General: Provide panels for interconnect or cross-connect capability in a housing at main cross-connects, intermediate cross-connects, telecommunication rooms or work areas.
			3. Adapter Type: MTP.

[Specifier Notes] – Retain one of the four following subparagraphs to meet project requirements.

* + - 1. Fiber Count: Minimum thirty-six (36).
			2. Fiber Count: Minimum seventy-two (72).
			3. Fiber Count: Minimum ninety-six (96).
			4. Fiber Count: Minimum one hundred forty-four (144).

[Specifier Notes] – Retain one of the four following subparagraphs to meet project requirements.

* + - 1. Fiber Category: 62.5 µm multi-mode (OM1).
			2. Fiber Category: 50 µm multi-mode (OM2).
			3. Fiber Category: 50 µm multi-mode (OM3).
			4. Fiber Category: Single-mode (OS2).

[Specifier Notes] – Retain one of the four following subparagraphs to meet project requirements.

* + - 1. Number of Adapters per Panel: Minimum three (3).
			2. Number of Adapters per Panel: Minimum six (6).
			3. Number of Adapters per Panel: Minimum eight (8).
			4. Number of Adapters per Panel: Minimum twelve (12).

[Specifier Notes] – Retain one of the five following subparagraphs to meet project requirements.

* + - 1. Adapter Housing Color: Blue.
			2. Adapter Housing Color: Green.
			3. Adapter Housing Color: Black.
			4. Adapter Housing Color: Beige.
			5. Adapter Housing Color: Aqua.
		1. Keyed-Keyed LC Adapter Panels.

[Specifier Notes] – Retain the following paragraph if this document is a PROPRIETARY Specification, with Corning Optical products listed as the Basis of Design. Delete if not required.

* + - 1. Basis of Design Product: Closet Connector Housing (CCH) Panel, Keyed-Keyed LC Adapters, by Corning Optical.
			2. General: Provide panels for interconnect or cross-connect capability in a housing at main cross-connects, intermediate cross-connects, telecommunication rooms or work areas.
			3. Adapter Type: Keyed LC Adapters.

[Specifier Notes] – Retain one of the two following subparagraphs to meet project requirements.

* + - 1. Fiber Count: Minimum twelve (12).
			2. Fiber Count: Minimum twenty-four (24).

[Specifier Notes] – Retain one of the two following subparagraphs to meet project requirements.

* + - 1. Number of Adapters per Panel: Minimum six (6).
			2. Number of Adapters per Panel: Minimum twelve (12).

[Specifier Notes] – Retain one of the five following subparagraphs to meet project requirements.

* + - 1. Adapter Housing Color: Blue.
			2. Adapter Housing Color: Red.
			3. Adapter Housing Color: Yellow.
			4. Adapter Housing Color: Green.
			5. Adapter Housing Color: Orange
			6. Adapter Housing Color: Black.
			7. Adapter Housing Color: Slate.
			8. Adapter Housing Color: Violet.
			9. Adapter Housing Color: White.
			10. Adapter Housing Color: Beige.
			11. Adapter Housing Color: Brown.
			12. Adapter Housing Color: Aqua.
		1. Keyed-Non Keyed LC Adapter Panels.

[Specifier Notes] – Retain the following paragraph if this document is a PROPRIETARY Specification, with Corning Optical products listed as the Basis of Design. Delete if not required.

* + - 1. Basis of Design Product: Closet Connector Housing (CCH) Panel, Keyed-Non Keyed LC Adapters, by Corning Optical.
			2. General: Provide panels for interconnect or cross-connect capability in a housing at main cross-connects, intermediate cross-connects, telecommunication rooms or work areas.
			3. Adapter Type: Keyed Non-Keyed LC Adapters.

[Specifier Notes] – Retain one of the two following subparagraphs to meet project requirements.

* + - 1. Fiber Count: Minimum twelve (12).
			2. Fiber Count: Minimum twenty-four (24).

[Specifier Notes] – Retain one of the two following subparagraphs to meet project requirements.

* + - 1. Number of Adapters per Panel: Minimum six (6).
			2. Number of Adapters per Panel: Minimum twelve (12).

[Specifier Notes] – Retain one of the five following subparagraphs to meet project requirements.

* + - 1. Adapter Housing Color: Blue.
			2. Adapter Housing Color: Red.
			3. Adapter Housing Color: Yellow.
			4. Adapter Housing Color: Green.
			5. Adapter Housing Color: Orange
			6. Adapter Housing Color: Black.
			7. Adapter Housing Color: Slate.
			8. Adapter Housing Color: Violet.
			9. Adapter Housing Color: White.
			10. Adapter Housing Color: Beige.
			11. Adapter Housing Color: Brown.
			12. Adapter Housing Color: Aqua.
		1. Power Panels.

[Specifier Notes] – Retain the following paragraph if this document is a PROPRIETARY Specification, with Corning Optical products listed as the Basis of Design. Delete if not required.

* + - 1. Basis of Design Product: Closet Connector Housing (CCH) Panel, Keyed-Non Keyed LC Adapters, by Corning Optical.
			2. General: Provide power panels to allow copper patching within a CCH panel footprint for remote power applications.
			3. Fiber Count: Minimum twelve (12).
1. EXECUTION
	1. EXAMINATION
		1. Verification of Conditions: Do not begin installation until substrates have been properly prepared.
		2. Evaluation and Assessment: If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
	2. PREPARATION
		1. Surface Preparation: Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
	3. INSTALLATION
		1. Install all products in this section following the product manufacturer’s published installation and application manuals and guidelines.
	4. FIELD QUALITY CONTROL
		1. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.
			1. Inspections: Fiber optic cables, accessories, and installation are subject to inspection for compliance with requirements and photograph documentation of conditions to be concealed by subsequent Work.
		2. Tests: As determined by Owner's testing agency from among the following tests:
			1. Optical Fiber Cabling Components: Test in accordance with ANSI/TIA 568.3-D.
			2. Optical Power Loss: Test in accordance with ANSI/TIA-526-14-C.
		3. Fiber optic cable will be considered defective if it does not pass tests and inspections.
	5. PROTECTION
		1. Protect installed products until substantial completion, replace damaged materials and retest.

End of Section