ITEM 683.97140104 – FIBER OPTIC CROSS-CONNECT CABINET – BASE MOUNTED
ITEM 683.97140204 – FIBER OPTIC CROSS-CONNECT RACK MOUNTED CONNECTOR
HOUSING
ITEM 683.97140304 – FIBER OPTIC CROSS-CONNECT PATCH PANEL w/ PATCH
CABLES

DESCRIPTION
This work shall consist of furnishing and installing the following items in accordance with the contract documents and as directed by the Engineer:

- Base mounted fiber optic cross-connect cabinet(s), cabinet base, and foundation work.
- Fiber optic cross-connect rack mounted connector housing(s), including all mounting hardware, and compatible with the cabinet rack configuration.
- Cross-connect patch panel(s) compatible with connector housing and configured for the termination type and quantity as shown in the contract documents and fiber optic splicing necessary to complete the connection between the fiber cables and patch panel connector.

MATERIALS
All materials furnished, assembled, fabricated or installed, shall be new, corrosion resistant, and in accordance with the details as shown on the Plans and as specified in these Contract documents.

Base Mounted Cross-Connect Cabinet:
The minimum cabinet dimensions shall be (H x W x D) 72.5 in. x 28.5 in. x 16.5 in. and meet or exceed the requirements of a NEMA 3R rating.

The cabinet shall be double sided so that the splicing area is accessible from one side while the feeder/distribution termination connectors are accessible from the opposite side. The cabinet shall have double full size front and rear doors and shall be gasketed to prevent the entrance of dust and moisture.

The cabinet space shall be sufficient to accommodate a minimum of SIX (6) connector housings.

The doors shall be provided with restraints to hold the door at 90° to prevent door movement during windy conditions and shall be attached to the cabinet with a continuous aluminum hinge with stainless steel pin. The hinge shall not be exposed when the cabinet door is closed. The cabinet doors shall use a telecommunication standard hex head door latches with padlock hasp and staple.

The cabinet shall contain a 19-in or 23-in equipment rack, grounding bar, bottom sealed cable access ports with a watertight compression fitting for each cable, fiber jumper cable troughs and routing guides. The cabinet shall contain cable strain relief, cable clamps, positive sealing on cable entry ports, and minimum bend radius limiters. Cables are routed out of the cabinet bottom through knockouts. The cabinet shall also offer base isolation to prevent insect, rodents, and moisture migration from entering the splice area.

All concrete foundation and work pads shall be in accordance with Section 680-3.27 of the NYSDOT Standard Specifications.
Cross-Connect Rack Mounted Connector Housing:
The rack mounted connector housing shall be mountable in 19-in or 23-in equipment rack as specified in the contract documents. The connector housing shall allow for a variety of patch panel configurations with support for up to 12 patch panels per unit. Each unused patch panel port location shall have a blank panel installed that is easily removed for future expansion.

The connector housing shall be compatible with a wide variety of splice trays, accessible from the rear of the cabinet. The housing shall have a door and a slide-out splice shelf with clips for routing and storing buffer tubes. Each housing may occupy one, two, or four rack units (RU) depending on the contract capacity requirements and cabinet layout.

All housings shall include mounting hardware, strain-relief brackets and clamps, and jumper routing guides.

The connector housing shall include a removable splice tray holder and buffer tube slack basket. The buffer tube slack storage basket shall provide slack storage and protect the buffer tubes from pinch points.

Cross-Connect Patch Panel and Patch Cables:
The fiber optic patch panel(s) and fiber connectors, including patch cables, shall be certified by the manufacturer for use in cabinets without environmental controls. To ensure consistent performance of the connector the Contractor shall use factory terminated pigtailed pigtails were practicable in each patch panel housing.

Each patch panel provided shall accommodate up to 12 singlemode fibers to meet the required fiber capacity as shown in the plans or elsewhere in the contract documents. Where factory terminated pigtailed pigtails cannot be used then each terminated connector shall use the fusion splice technique only and under no circumstances will mechanical connections be allowed.

Unless otherwise specified on the plans, all terminations for the patch panel connector plate shall be “ST” type. Substitutions to this style connector shall only be allowed with the approval of Engineer-In-Charge. End caps shall be provided for all connectors of each bulkhead with a BLACK dust cap. All remaining patch panel connectors without fiber terminations shall have a RED dust cap.

Patch cables shall be provided for each fiber that terminates in a patch panel to allow for a variety of connection options between cross-connect patch panel bulkheads. Each termination shall include the following factory UPC cables:

- TWO (2) – 3 FT patch cables,
- TWO (2) – 10 FT patch cables;
- ONE (1) – 25 FT patch cable.
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All patch cables, terminating fan-out kits, fusion splicing, labor, and other materials required to terminate the fiber cable to the patch panel shall be included in this bid item.

After the cable has been installed the Contractor shall thoroughly seal all conduit entering the foundation with a combination of stainless steel wool and foam expansion spray to prevent rodent access.

CONSTRUCTION DETAILS
The fiber optic cross-connect cabinet shall be installed in accordance with manufacturer’s instruction, as show on the Plans and as directed by the Engineer.

Splicing of the fiber optic cable to the fan-out kit shall be paid for under the Patch Panel item.

The legend for the patch panel identifiers shall be the fiber optic cable designations shown on the Plans, all proposed engraving shall be submitted to the Engineer for approval.

Fiber Optic Testing:
Upon completion of all fusion splices and installation of terminal connectors, the Contractor shall be required to verify the integrity of the fiber system by performing an “Optical Time-Domain Reflectometer” (OTDR) test to each fiber strand between the cross-connect cabinet connection and the nearest junction point or cross-connect cabinet. The OTDR test shall be performed in both directions to ensure the measured distances are equivalent. Each OTDR fiber strand trace shall be saved and provided to the Engineer as a record of successful completion. Any fiber port that fails shall be re-spliced and retested at no additional cost to the state.

Each fusion splice loss shall not exceed a mean of 0.05 dB per splice. If a fusion splice is measured to exceed 0.05 dB during the splicing process, it shall be remade until its loss falls below 0.05 dB or the Engineer waives the requirement. Each attempt shall be recorded for purposes of acceptance.

For single-mode fiber all splice losses shall be measured at 1310 nm and 1550 nm in both directions. Tabular recordings of the loss and chart recordings of the signature shall be submitted to the Engineer for approval with a record of the OTDR settings and the location of the OTDR locations written on the trace. The Contractor shall submit this information in digital format, on CD, that may be displayed on a PC operating under a Windows operating system. The Windows operating system version shall be submitted to the Engineer for approval as part of the cable plant design submission. The Contractor shall provide to the Engineer three copies on CD of any specialized software required to display the data. The State shall have the right to make additional copies of such software.

Upon successful testing, each fiber connector port shall be capped with an appropriate cover.
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Documentation:
The Contractor shall prepare a shop drawing submittal which will include copies of the Manufacturer’s descriptive literature for the components provided as part of these items.

METHOD OF MEASUREMENT
This work will be measured as the number of fiber optic cross-connect cabinets and/or bulkheads satisfactorily furnished and installed. The pay item quantity for each of the cross-connect items shall be as follows:

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ITEM 683.97140304 – EA

BASIS OF PAYMENT
The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work. Payment for the foundation work shall be included in the unit price bid for ITEM 683.97140104.

Fiber optic cable splicing and testing and necessary documentation for trunk or drop cables shall be paid for under separate bid items.

Progress payment will be made as follows:
Seventy-Five percent (75%) of the bid price for each item will be paid when the equipment is installed.

Twenty-Five percent (25%) of the bid price for each item will be paid having passed the Fiber Optic Testing procedures.