

## SECTION 16705

### COMMUNICATIONS CABLE AND EQUIPMENT

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
1. Telecommunication cable.
  2. Termination equipment.
  3. Patching equipment.

##### 1.2 REFERENCES

- A. Electronic Industries Association (EIA):
1. ANSI/TIA-568 - Commercial Building Wire Standard (1995).
- B. National Electrical Manufacturer's Association (NEMA):
1. NEMA WC 26 - Wire and Cable Packaging.
- C. National Fire Protection Association (NFPA):
1. NFPA 70 - National Electrical Code.

##### 1.3 SYSTEM DESCRIPTION

- A. Telecommunication system for entire building consisting of cables, connectors, faceplates, termination patch panels, patch cords, wire management panels, and cable supports. System serves the following:
1. Telephone.
  2. Data.
  3. Modem.
  4. Printer.
  5. Facsimile.
  6. Point-of-sale.
- B. Cable conductors continuous from originating termination equipment to destination termination equipment.

##### 1.4 SUBMITTALS

- A. Submittal Procedures: Procedures for submittals.
1. Product Data: Provide for each material or equipment item specified.
  2. Shop Drawings:
    - a. Point-to-point wiring diagrams for cables installed under this Section.
    - b. Detailed plan views and elevations of telecommunications spaces showing racks, termination blocks, and cable paths.
    - c. Minimum Scale for Details: 1/4 inch.
  3. Termination Schedule: Indicate the following.
    - a. I/O information outlet identification.
    - b. Cable identification number.
    - c. Room location.
    - d. Patch panel identification number.
    - e. Patch panel port identification number.
  4. Assurance/Control Submittals:
    - a. Sample Forms: Submit proposed format for cable test reports.

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- b. Test Reports: Submit the following reports directly to from Testing Laboratory, with copy to Contractor. Prepare reports in conformance with Section 01450 - Quality Control.
  - 1) End-to-end tests.
- c. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
- d. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.

#### B. Closeout Submittals: Procedures for closeout submittals.

- 1. Project Record Documents: Accurately record the following:
  - a. Cable pulling schedules, in printed form and on 3-1/4 inch electronic data diskettes.
- 2. Operations and Maintenance Data: Data including wiring diagrams, parts lists, shop drawings, product data, and manufacturer's instructions for cables and equipment

### 1.5 QUALITY ASSURANCE

#### A. Single Source Responsibility: Furnish and install Products of one manufacturer for each Product type. Multiple manufacturers not permitted.

#### B. Qualifications:

- 1. Manufacturer: Company specializing in manufacturing Products specified with minimum 5 years documented experience.
- 2. Installer: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

#### C. Regulatory Requirements:

- 1. Conform to requirements of NFPA 70.
- 2. Products: Listed and classified by Underwriter's Laboratories Incorporated as suitable for the purpose specified and indicated.
- 3. Perform Work that interfaces with Telephone Utility Company in accordance with Telephone Utility Company rules and regulations.

#### D. Pre-Installation Meetings:

- 1. Convene a pre-installation meeting one week prior to commencing Work of this Section.
- 2. Require attendance of parties directly affecting Work of this Section.
- 3. Review conditions of operations, procedures and coordination with related Work.
- 4. Agenda:
  - a. Tour, inspect, and discuss building conditions relating to communications cable and equipment and coordination with Telephone Utility Company and telecommunications system representative through .
  - b. Review exact location of each item within building construction, casework, and fixtures. and their requirements.
  - c. Review required submittals, both completed and yet to be completed.
  - d. Review Drawings and Specifications.
  - e. Approve proposed equipment.
  - f. Review and finalize construction schedule related to telephone data and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
  - g. Review required inspections and testing.

### 1.6 DELIVERY, STORAGE, AND HANDLING

#### A. Product Requirements: Transport, handle, store, and protect Products.

#### B. Deliver in accordance with NEMA WC 26.

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#### PART 2 PRODUCTS

##### 2.1 4-PAIR CABLE UNSHIELDED TWISTED PAIR - CMP

- A. Manufacturers: Subject to compliance with project requirements, manufacturer's offering Products which may be incorporated in the Work include the following:
1. Belden Corporation.
  2. Berdek, Incorporated.
  3. Comm/Scope, Incorporated.
  4. Lucent Technologies.
  5. Mohawk/CDT, Incorporated.
  6. Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Conductors: 4 twisted pair - 24 AWG, solid copper.
1. Individually insulated plenum rated conductors under common plenum rated sheath.
  2. Complies with individual characteristics established in EIA/TIA 568A for category 5 cable performance specification.
  3. Nominal Impedance: 100 ohms plus or minus 15 percent.

##### 2.2 PATCH CORDS

- A. Subject to compliance with project requirements, manufacturer's offering Products which may be incorporated in the Work include the following:
1. AMP Incorporated.
  2. Interlink Technologies.
  3. Lucent Technologies.
  4. Siemon Company.
  5. Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Conductors: Straight through type 4 twisted pair - 24 AWG, braided copper.
1. Terminated with male 8-pin modular plugs.
  2. Complies with individual characteristics established in EIA/TIA 568A for category 5 cable performance specification.
  3. Nominal Impedance: 100 ohms plus or minus 15 percent.

##### 2.3 8-PIN MODULAR OUTLETS

- A. Subject to compliance with project requirements, manufacturer's offering Products which may be incorporated in the Work include the following:
1. AMP Incorporated.
  2. Interlink Technologies.
  3. Levitan Corporation.
  4. Lucent Technologies.
  5. Ortronics Corporation.
  6. Pandit Corporation.
  7. Siemon Company.
  8. Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Outlets:
1. 8-pin modular, Category 5, non-keyed.
  2. Complies with ETA/EIT 568A-A pinning configuration.
  3. Color: Selected by .

##### 2.4 OUTLET FACEPLATES/MOUNTING FRAMES

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- A. Wall mounted, or raceway mounted outlet faceplates or mounting frames, suitable for the following:
  1. Mounting required number of 8-pin modular outlets.
  2. Use with approved 8-pin modular outlets.
  3. Installation over single gang junction box, double gang junction box, or raceway knockout as indicated on Drawings.

- B. Color: Selected by .

#### 2.5 8-PIN MODULAR PATCH PANELS

- A. Subject to compliance with project requirements, manufacturer's offering Products which may be incorporated in the Work include the following:
  1. AMP Incorporated.
  2. Interlink Technologies.
  3. Levitan Corporation.
  4. Lucent Technologies.
  5. Ortronics Corporation.
  6. Pandit Corporation.
  7. Siemon Company.
  8. Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Panels:
  1. Rack mounted 48 port 8-pin modular, Category 5, non-keyed.
  2. Complies with ETA/EIT 568A-A pinning configuration.

#### 2.6 WIRE MANAGEMENT PANELS

- A. Subject to compliance with project requirements, manufacturer's offering Products which may be incorporated in the Work include the following:
  1. Interlink Technologies.
  2. Ortronics Corporation.
  3. Pandit Corporation.
  4. Siemon Company.
  5. Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Panels: Rack mounted with horizontally mounted split d-rings.

#### 2.7 WALL MOUNT BRACKETS

- A. Subject to compliance with project requirements, manufacturer's offering Products which may be incorporated in the Work include the following:
  1. Interlink Technologies.
  2. Ortronics Corporation.
  3. Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Brackets: Bottom hinged, wall mounted, suitable to mount approved 48-port 8-pin modular patch panels and wire management panels.

#### 2.8 CONDUITS AND BOXES

- A. Refer to existing.

#### 2.9 TELEPHONE AND INTERCOMMUNICATION SYSTEM

- A. Refer to existing.

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#### PART 3 EXECUTION

##### 3.1 EXAMINATION

- A. Execution Requirements: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
- C. Report in writing to prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the .

##### 3.2 INSTALLATION

- A. Support cables installed in ceiling spaces with J-hooks or bridal type devices anchored to roof structure.
  - 1. Maximum Spacing Between Supports: 5 feet.
  - 2. Maximum Number of Cables Each Support: 25.
  - 3. Furnish and install additional supports as required.
  - 4. Install complete cable support device system before starting installation of cable.
    - a. Installation of cable before completion of support system not permitted.
    - b. Do not permit cable installed unsupported.
  - 5. Organize and group cables. Install cable group as single run through ceiling spaces following column lines.
  - 6. Do not install cable group runs diagonally across center of building.
- B. Route cable for I/O information outlets as follows:
  - 1. Wall Mounted: Through ceiling spaces to conduit stub-ups or junction boxes. Include drag lines.
  - 2. Furniture System Cable Raceway: Point of entry to outlet.
  - 3. Floor Outlet Box: Through under floor conduit to box.
- C. Separate communications cables from other cables and fixtures minimum distance as follows:
  - 1. Electrical Cables: 12 inches.
  - 2. Fluorescent Light Fixtures: 12 inches.
- D. Cross electrical cables with communications cable at 90 degrees only.
- E. Comply with cable manufacturers minimum bend radius requirements.
  - 1. Do not stretch, stress, tightly coil, bend or crimp cables.
  - 2. Replace cables that are severely stressed during installation at no additional cost to .
- F. Identification: furnish and install machine generated labels.
  - 1. Patch Panels and Outlet Faceplates: Display outlet or cable identification number in uppercase lettering on permanent adhesive label stock.
  - 2. Communications Cables:
    - a. Display cable identification number in black uppercase lettering on permanent adhesive white label stock covered with water resistant sealer.
    - b. Place labels on each end of cable, maximum 6 inches from cable termination.

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3.3 INSTALLATION - COMPONENTS

- A. Install 48-port, 8-pin module patch panels at main distribution frame for termination of cables installed as part of Work of this Section.
  - 1. Mount patch panel on wall mounting brackets.
  - 2. Furnish and install patch panels with cable designation strips.
  - 3. Furnish and install wire management panel on wall mounting brackets above and below each patch panel.
- B. Furnish and install communications Workstation One cables as specified, in accordance with Cable Pulling Schedules, manufacturer's published instructions, and as indicated on Drawings.
  - 1. Dress cable to final location, remove sheath to point allowing splaying of conductor, and terminate. Make each termination uniform and precise.
  - 2. Maintain sheath integrity. Remove minimum amount of sheath required for termination.
  - 3. Maintain manufacturer's twisting of wire pairs to termination point.
  - 4. Mechanical couplers or splices not permitted.
- C. Furnish and install 4-pair cables from each I/O information outlet to main distribution frame. Terminate each cable to 8-pin modular connector at workstation and to wall mounted patch panels at main distribution frame.
- D. Furnish and install female 8-pin modular connections and face plate at Workstations indicated on Drawings.
  - 1. Install faceplate over single duplex junction box, double duplex junction box, or raceway knockout, level and in alignment with adjacent faceplates.
  - 2. Coordinate color with .
- E. Furnish and install 4-pair UTP patch cords of equal number 4 foot and 6 foot lengths based on number of I/O information outlets in Project as follows, unless indicated otherwise.

NUMBER OF I/O OUTLETS	NUMBER OF PATCH CORDS
0 TO 10	10
11 TO 20	20
21 TO 30	30
31 TO 50	50
51 TO 75	75

- F. Firestop penetrations of fire-resistive rated assemblies as specified in Section 07840.

3.4 CONSTRUCTION

- A. Interface with Other Work:
  - 1. Provide information to affected trades regarding requirements and responsibilities for preparation of Work of a particular trade for installation of Work installed under this Section.
  - 2. Coordinate with Telephone Utility Company for interface of systems and required interconnections.

3.5 FIELD QUALITY CONTROL

- A. Quality Control: Field testing and inspection.
- B. Inspect installation of cables and equipment during and at completion of installation.

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- C. Perform end-to-end tests of each 4-pair cable as follows:
1. Pair/conductor for continuity,
  2. Ground fault.
  3. Proper termination.
  4. Shorts.
  5. Crossed pairs and bi-directional worst case near end cross talk (NEXT) at frequencies up to 100 MHz.

END OF SECTION