

**Part 1 GENERAL**

**1.1 SYSTEM DESCRIPTION**

- .1 Data system includes data outlets and wiring for building applications.
- .2 Data system equipment consists of:
  - .1 Data outlets.
  - .2 UTP cabling.
  - .3 Patch Panels.
  - .4 Patch Cords.
  - .5 Line Cords.
  - .6 Conduit System.

**1.2 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.

**1.3 REFERENCES**

- .1 Codes and standards referenced in the section refer to the latest edition thereof and include all addenda.
- .2 ANSI/TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises
- .3 ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard
- .4 ANSI/TIA-568-C.2, Balanced Twisted-Pair Telecommunications Cabling and Components Standard
- .5 ANSI/TIA-568-C.3, Optical Fiber Cabling Components Standards
- .6 ANSI/TIA-606, Administration Standard for Commercial Telecommunications Infrastructure
- .7 ANSI/TIA-1152, Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
- .8 ANSI/TIA-942, Telecommunications Infrastructure Standard for Data Centers
- .9 ANSI/TIA-1005, Telecommunications Infrastructure Standard for Industrial Premises
- .10 TIA TSB-162, Telecommunications Cabling Guidelines for Wireless Access Points
- .11 ANSI/NECA/BICSI 568, Standard for Installing Commercial Building Telecommunications Cabling

## **1.4 SUBMITTALS**

- .1 Shop drawings to include the following items as minimum:
  - .1 Outlets.
  - .2 UTP Patch Panels.
  - .3 Labels.
  - .4 UTP Wire.
  - .5 Patch Cords.
  - .6 Line Cords.

## **1.5 MAINTENANCE AND OPERATION**

- .1 Provide maintenance and operation data for incorporation in manual specified in Section 01 78 00 – Closeout Submittals.

## **1.6 WARRANTY**

- .1 Ensure each piece of equipment installed including wiring is warranted by the manufacturer to be free of defects in operation, material and workmanship for a period of 15 years from date of Substantial Completion.

## **Part 2 PRODUCTS**

### **2.1 OUTLETS**

- .1 Provide single data outlets as indicated.
- .2 Single flush mounted data outlets:
  - .1 One (1) 8 position RJ45 jack with T586A (ISDN) wiring.
  - .2 Three (3) blank inserts.
  - .3 Color: blue
  - .4 Acceptable product: Belden AX101071.
- .3 Acceptable alternate manufacturers: Panduit, AMP, Lucent, Hubbel, Ortronics. (must have transmission performance equal to or better than specified product).

### **2.2 COVER PLATES**

- .1 Provide flush mount type to accept four (4) modular data outlets.
- .2 Indicate outlet number of "Data" cover plate. Provide labeling as indicated and to Departmental Representative's requirement.
- .3 Color: grey.
- .4 Construction: Thermo – plastic.

- .5 Acceptable product: Belden AX101435.

## **2.3 PATCH PANELS**

- .1 Modular (RJ45) style patch panels.
- .2 Designed for high speed data, cross connect and interconnect specifications.
- .3 24 ports per panel suitable for modular jacks.
- .4 Provide each port with a T568A (ISDN) eight pin jack as per par. 2.1 – outlets as necessary to accommodate number of runs.
- .5 Designed for mounting in rack.
- .6 Retaining rings on panel to facilitate patch cord management.
- .7 Provide one patch panel in each existing data rack for new metering system as noted on the drawings.
- .8 Acceptable product: Belden AX101571 (24 port) patch panels.
- .9 Acceptable manufacturers:
  - .1 Ortronics.
  - .2 Belden.
  - .3 Tyco.
  - .4 Panduit.

## **2.4 DATA RACKS**

- .1 Existing and in place.

## **2.5 PATCH AND LINE CORDS**

- .1 Provide patch and line cords for connection of individual room equipment and for connection of equipment in data rooms.
- .2 Provide 3 m long line cords. 24 gauge, solid conductor, category 6 T586A ISDN wired.  
Acceptable Product: Belden AX350052.  
Quantity: one per data outlet.
- .3 Provide patch cords. 24 gauge, solid, conductor, category 6 T586A ISDN wired.  
Quantity: one per data outlet, 1.2 m long. Acceptable Product: Belden AX350052.
- .4 Cords must be from same manufacturer as connectivity components.

## **2.6 LABELS**

- .1 Provide indicating labels on UTP wiring and outlet assemblies.

- .2 Labels to be:
  - .1 Outlet identification labels. Computer printable type: indicating "Data Outlet".
  - .2 Labeling on wire from outlet to patch panel: heat shrink labels sized for data cables indicating data outlet # and port # on respective ends.
  - .3 Coordinate labeling with Departmental Representative prior to fabrication.

## **2.7 UTP WIRING**

- .1 4 pair, 24 gauge, solid conductor, unshielded twisted pairs, CSA FT6 fire rating, Category 6, guaranteed for 2.4 Giga bytes per second transmission/receiving rate.
- .2 Provide one cable from each single outlet back to patch panel.

## **2.8 CONDUIT SYSTEMS**

- .1 Install conduit systems and pull boxes for data wiring as outlined on the drawings.

## **Part 3 EXECUTION**

### **3.1 INSTALLATION**

- .1 Install data system wiring and components.
- .2 Install patch panels in data racks at data closet locations as indicated.
- .3 Terminate UTP cables at outlets and patch panel as indicated. Ensure that the minimum number of twists per inch in the cable pairs is maintained at each connection point.
- .4 Ensure that manufacturer's bending radius limitations are adhered to.
- .5 Protect cables from damage during installation.
- .6 Conduits to be installed, as indicated, running back to patch panel location.
- .7 Turn over UTP patch and line cords to Departmental Representative.

### **3.2 CONDUIT SYSTEM RESTRICTIONS**

- .1 Do not provide conduit raceways that exceed 30 m or contain more than two 90° bends (or equivalent) between pull points or pull boxes. Advise the owner in advance of any such potential installations. The owner will then provide clarification.
- .2 Do not provide pull boxes in lieu of conduit bends.
- .3 LB connectors not permitted.
- .4 Provide inside radius bends to a minimum of 6 times the internal diameter for conduits 50 mm and smaller. For larger conduits provide inside radius bends to a minimum of 10 times the internal diameter of the conduit.

- .5 Ensure conduits terminations are free from sharp edges and fitted with insulated bushings.
- .6 Ream individual lengths of conduit to remove sharp edges.
- .7 Provide sufficient conduit size to permit maximum 50% fill capacity.
- .8 Provide and install #12AWG copper bonding conductors in all conduits.

### **3.3 TESTING GENERAL**

- .1 Cabling and connectors to be tested by an experienced company employing trained technicians with minimum 5 years experience in data cabling industry. Experience to be acceptable to the Departmental Representative.

### **3.4 TESTING UTP CABLING**

- .1 System to meet continuity and attenuation tests outlined in IBDN Testing Note: IBDN-TESTS-9104.
- .2 Category 6 cable to meet ANSI standard x3T9.5 (capable of data transmission up to 2.4 G. bps).
- .3 Perform system and channel tests after UTP cable installation to ensure that installation meets standard indicated above and values indicated in the IBDN design guide issue 2 (IBDN-DG-9202). Tests to be performed using a Level IV tester. Minimum tests to be performed.
  - .1 Continuity.
  - .2 Attenuation.
  - .3 Near and Crosstalk.
  - .4 Resistance.
  - .5 Pair Assignment Test.
  - .6 Low Band Noise.
  - .7 High Band Noise.
  - .8 Mid Band Noise.
  - .9 Length of Cable.
  - .10 Return loss
  - .11 ELFEXT
  - .12 Propagation delay.
  - .13 Delay skew.

Perform permanent link tests to cover all equipment wiring including patch panels and line cords. Perform tests from data closet outwards to data outlet line cord.

- .4 Provide to Departmental Representative written copy of the testing sequence to be performed, testing equipment to be used, and standards to which cable is being tested.

- .5 Provide a written report to the Departmental Representative indicating each cable tested and the results of the testing. Provide printout from the Level IV tester for each cable.
- .6 Replace cable and/or connection equipment that fails tests.
- .7 Provide additional testing in accordance with Section 01 91 13 – General Commissioning (Cx) Requirements.

**END OF SECTION**