

## **1 General**

### **1.1 RELATED SECTIONS**

- .1 Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
- .2 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

### **1.2 WASTE MANAGEMENT AND DISPOSAL**

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
- .2 Fold up metal banding, flatten and place in designated area for recycling.

## **2 Products**

### **2.1 MATERIAL**

- .1 Conduits: EMT type, in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
- .2 Outlet boxes 120mm x 120mm x 54mm deep with single gang raised plaster ring in accordance with Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
- .3 Pull boxes shall be Type D & E of minimum length eight times the internal diameter of the largest conduit.
- .4 Wire basket as per electrical drawings.
- .5 J-Hooks as per electrical drawings.

## **3 Execution**

### **3.1 INSTALLATION**

- .1 Install raceway system, including outlet boxes, pull boxes, coverplates, conduit, wire basket, miscellaneous and positioning material to constitute complete system. Conduits shall be reamed to ensure all burghs are removed and fit with an insulated bushing to prevent cable damage.
- .2 Conduits shall enter outlet boxes to either side or centre, to prevent cable damage by coverplate retaining screws.
- .3 Install pull boxes in runs at 30M (100') intervals, or lesser distances, as dictated by the number of bends.

- .4 No more than two 90 degree bends between pull boxes is allowed. The use of "condulets" or "LB" type fittings is not allowed unless they are designed to provide proper bend radius for cable being installed.
- .5 Flexible conduits are not acceptable. If it is necessary (upon consultation with the Departmental Representative) to use a flexible conduit, the conduit shall be increased by one trade size.
- .6 A 1/4" stranded nylon pull rope, or equivalent, shall be supplied and installed in each conduit run.

**END OF SECTION**

## **1 General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 01 - Common Work Results - Electrical.
- .2 Section 27 05 28 - Pathways for Communications Systems

### **1.2 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-C22.2 No. 214-02, Communications Cables (Bi-National standard with UL 444).
  - .2 CSA-C22.2 No. 232-M1988(R2004), Optical Fiber Cables.
  - .3 CAN/CSA-C22.2 No. 214-02 (R2006), Communications Cables.
  - .4 CAN/CSA-C22.2 No. 182.4-M90(R2010), Plugs, Receptacles, and Connectors for Communication Systems.
- .2 Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA)
  - .1 TIA/EIA-568-B.1-(2001), Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements.
  - .2 TIA/EIA-568-B.2-(2001), Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.
  - .3 TIA/EIA-568-B.3-(2000), Optical Fiber Cabling Components Standard.
  - .4 TIA/EIA-606-A-(2002), Administration Standard for the Commercial Telecommunications Infrastructure.
  - .5 ANSI/NECA/BICSI-607, Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
  - .6 TIA TSB-140-2004, Telecommunications Systems Bulletin - Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems.
  - .7 TIA-598-C-(2005), Optical Fiber Cable Color Coding.

### **1.3 DEFINITIONS**

- .1 Refer to TIA/EIA-598-C, Annex A for definitions of terms: optical-fiber interconnect, distribution, and breakout cables.

### **1.4 SYSTEM DESCRIPTION**

- .1 Structured telecommunications wiring system consist of unshielded-twisted-pair and optical fiber cables, terminations, connectors, cross-connection hardware and related equipment installed inside building for occupant's telecommunications systems, including voice (telephone), data, and image.

## **1.5 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Submit shop drawings and product data in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit product data sheets for patch cords, cabling, jacks, frames, patch panels, blocks and racks exit signs. Include product characteristics, performance criteria, physical size, limitations and finish.

## **1.6 QUALITY CONTROL**

- .1 The termination and testing of the copper cabling is the responsibility of the Electrical contractor.

## **2 Products**

### **2.1 TERMINATIONS AND CROSS-CONNECTION SYSTEM FOR UTP**

- .1 RJ45 jacks for communication outlets and modular patch panels shall be Cat.6 series with colors as listed below:
  - .1 Data: Grey
  - .2 Voice: Blue
- .2 In general, each communication outlet consists of one, two or three category 6 (refer to drawings), RJ45 jacks on a single plate and installed in a 4" square box with raised single gang plaster ring or on modular plate as indicated on the drawings. Jacks shall be EIA/TIA568A configuration complete with coverplates and icons. Provide matching cover plate.
  - .1 Each single communication outlet shall consist of one RJ45 jack and a 2-port, single gang faceplate installed on a 4" square box with single gang tile ring. One blank shall be provided to fill the unused port.
  - .2 Each double communication outlet shall consist of two RJ45 jacks, and a 2-port, single gang faceplate, on a 4" square box with single gang tile ring.
  - .3 Each triple communication outlet shall consist of three RJ45 jacks, and a 4-port, single gang faceplate, installed on a 4" square box with single gang tile ring. One blank shall be provided to fill the unused port.
  - .4 Each quad communication outlet shall consist of four RJ45 jacks, and a 4-port, single gang faceplate, installed on a 4" square box with single gang tile ring.
  - .5 In exposed areas without a ceiling provide and install a 4" square backbox complete with flat single gang tile ring, flush wall mounted 8'-0" a.f.f.. Terminate the jack directly to the cable without the use of a faceplate. Provide 10' slack cable coiled at the last accessible location for on-site adjustment. Provide 6" slack cable within the 4" backbox.
  - .6 Leave a 10 foot cable slack loop at the Access point end coiled on a J-hook for on-site adjustment.

## **2.2 COPPER HORIZONTAL VOICE AND DATA COMMUNICATION WIRE**

- .1 Four-pair, 100 ohm balanced unshielded-twisted-pair (UTP) cable, flame test classification FT4 to: CSA-C22.2 No. 214, Category 6 (Cat 6) to: TIA/EIA-568-B.2. Cable shall be equal to Belden Gigaflex 2400.
- .2 Provide cable slack at each end of all horizontal cables, including three meters at the telecommunications room and one meter at the telecommunications outlet.
- .3 Provide colour coded horizontal cable jackets as follows:
  - .1 Data: Blue
- .4 Provide one thinwall Type EMT conduit (minimum 2") from the cable tray in the corridor to the accessible ceiling space of each room that contains telecommunications outlet(s).

## **3 Execution**

### **3.1 INSTALLATION OF TERMINATIONS AND CROSS-CONNECTION SYSTEM FOR UTP**

- .1 Supply and install ¾" thick plywood backboards treated with two coats of white, flame retardant finish in communications rooms, extending from 6" A.F.F. to 8'-8" A.F.F. around the perimeter of the room. Plywood shall be securely attached to support the weight of terminals, hardware and cables. No electrical conduits, junction boxes or any other equipment may be mounted on or across any backboard.
- .2 Install equipment racks as indicated on the drawings. Coordinate with other trades and provide additional blocking and support for wall mounted equipment racks. Blocking shall be installed to allow for both installed and future racks as noted in the communication room layouts. Racks should not rely on the plywood lining for support.
- .3 Install termination and cross-connect hardware in rack as indicated and according to manufacturers' instructions. Identify and label as indicated to: TIA/EIA-606-A with the following exceptions:

### **3.2 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES**

- .1 Install horizontal cables as in conduits, wire basket and "J" hooks from telecommunication rooms to individual work-area jacks. Identify and label as indicated to: TIA/EIA-606-A.
- .2 Where wire basket or raceways are used to distribute cables to each zone, provide supplementary "J" hooks in accessible ceiling areas to support cables at intervals not exceeding 39". J-hooks shall be sized for 50% fill to allow for future cables. Cables installed above T-bar ceilings are to be within reach of T-bar ceilings.
- .3 Cables shall be installed in conduit in rooms without suspended ceilings.

- .4 Cables shall be installed in conduit in areas with drywall ceilings.
- .5 Where conduit is used, no more than two 90 degree bends between pull boxes are allowed. The use of "condulets" or "LB" type fittings is not allowed unless they are designed to provide proper bend radius for cable being installed.
- .6 The use of flexible conduit is not acceptable. If deemed necessary (upon consultation with the Departmental Representative), to use a flexible conduit, the conduit diameter shall be increased by one trade size.
- .7 Voice and data cables installed concealed in partition wall systems (i.e. drywall and studs) or block wall assemblies or masonry or concrete construction require thinwall EMT conduit, 1" minimum from accessible ceiling space to the outlet. The conduit termination in the ceiling space shall be made with an insulated throat connector. The conduit stub shall be turned out into the accessible ceiling space (within the same room where possible).
- .8 Install horizontal cables from consolidation point to individual work-area jacks.
- .9 Terminate horizontal cables in telecommunications room and at individual work-area jacks.
- .10 Identify and label as indicated to: TIA/EIA-606-A.
- .11 The cable installer contractor will leave a 36" minimum of extra cable on the room end, coiled in the accessible ceiling space above the drop location.
- .12 The cable installer contractor will create a minimum 72" service loop at the TR site.
- .13 Coil spare cables and store in ceiling space in zone.
- .14 Harness slack cable in racks, and wall-mounted termination and cross-connection hardware

### 3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 01 - Common Work Results - Electrical.
- .2 Test horizontal UTP cables as specified below and correct deficiencies provide record of results electronic record on CD.
  - .1 Perform tests for Permanent Link on installed cables, including spares:
    - .1 Category 6 using a Fluke DTX certified level III tester to: TIA/EIA-568-B.2.
    - .2 Provide test results using Fluke Linkware files (.FLW)
  - .2 Test backbone UTP cables as specified below and correct deficiencies. Provide record of results electronic record on CD:
    - .1 Perform tests for Permanent Link on 4-pair cables:

- .1 Category 6 using certified level III tester to: TIA/EIA-568-B.2.
- .2 Perform Wire Map tests on multi-pair UTP cables to: TIA/EIA-568-B.1.
- .3 Colour code and identify all work in accordance with CAN/CSA-T528-97. Provide complete administrative records in accordance with the recommended practice for this Standard.

### **3.4 SYSTEM ADMINISTRATION**

- .1 Provide identification of telecommunications spaces, horizontal distribution, work area.
- .2 Telecommunications Spaces:
  - .1 Each telecommunications space shall be uniquely identified using a lamicoid nameplate, minimum size 300mm L x 50 mm H. The identifier shall have the format "TR – XYZ", where "XYZ" is the architectural room number.
  - .2 Each telecommunications rack and cabinet within a telecommunications space shall be uniquely identified using a lamicoid nameplate, minimum size 600mm L x 50 mm H. The identifier shall have the format "TR–XYZ RACK A", where "XYZ" is the architectural room number and "A" is the rack number.
  - .3 Each termination hardware component within a telecommunications space shall be uniquely identified using a self-adhesive thermal transfer type label placed appropriately to include all ports.
- .3 Horizontal Distribution
  - .1 Each horizontal cable shall be uniquely identified using a wrap type self-laminating adhesive label with mechanically generated identifier.
  - .2 Horizontal cable identifiers shall have the format "X-ABC", where "X" is the application (D=Data, V=Voice, DB=Data Backbone, VB= Voice Backbone, DMR=Demarcation Backbone) and "ABC" indicates the port number.
- .4 Work Area
  - .1 Each telecommunications outlet shall be uniquely identified using a lamicoid nameplate. The identifier shall have the format "TR-XYZ D1 D2 D3 D4", where "XYZ" is the architectural room number and "D1" through "D4" are data ports 1 through 4.

**END OF SECTION**