

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results - for Electrical.

1.2 REFERENCES

- .1 CAN C22.1-2015 - Canadian Electrical Code.
- .2 National Building Code of Canada 2015.
- .3 National Fire Code.
- .4 TBITS 6.9 - Treasury Board Guidelines for Telecommunications Installation.
- .5 TIA/EIA-568 Commercial Building Telecommunications Cabling Standard.
- .6 TIA/EIA-569 Commercial Building Standard for Telecommunications Pathway and Spaces.
- .7 TIA/EIA-606 Administration Standard for Commercial Telecommunications Infrastructure.
- .8 TIA/EIA-607 Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
- .9 TIA/EIA-758 Customer Owned Outside Plant Telecommunications Cabling Standard.
- .10 TIA/EIA-942 Telecommunication Infrastructure Standard for Data Centre.
- .11 BICSI - Outside Plant Design Manual.
- .12 BICSI - Telecommunication Distribution Methods Manual.
- .13 BICSI - Information Transport System Installation.
- .14 BICSI - Wireless Design Reference Manual.
- .15 BICSI - Network Design Reference Manual.

NOTE: The above standards and codes apply to specifications and

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drawings.

In the event of conflict, the most stringent and recent requirements SHALL apply.

### 1.3 DEFINITIONS

- .1 Refer to TIA/EIA-598-C, Appendix M-1 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 terminations, connectors, cross-connection hardware and related equipment installed inside building for occupant's telecommunications systems, including voice (telephone), data, and image.
- .2 Installed in physical star configuration with separate horizontal and backbone sub-systems.
  - .1 Horizontal cables link work areas to telecommunications rooms located on same floor.

### 1.5 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 As-built Records and Drawings:
  - .1 Provide Microsoft Access database reflecting cable installation and cross-connections.
  - .2 Provide electronic drawings in AutoCAD 2015 format depicting all construction.
  - .3 Provide two (2) bound complete hard-copy sets of as-built records to the Departmental Representative.
    - .1 Provide and place one hard copy of as-built records for each telecommunications room in plan holder in each telecommunications room.

### 1.6 QUALITY ASSURANCE

- .1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.
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#### 1.7 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

#### 1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material for recycling in accordance with Waste Reduction Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

### PART 2 - PRODUCTS

#### 2.1 HORIZONTAL DISTRIBUTION CABLE

- .1 CAT 6 cable, 4 pair, 100 ohm, 24 AWG, thermoplastic insulated, solid copper conductor unshielded twisted pair (UTP), formed into four individually twisted pairs and enclosed by a thermoplastic jacket, sheath colour purple. Cable category indentified on sheath.
  - .2 Cable certified as CMP per CSA Standard C22.2 No. 214094 and listed as NEC Type CMP per UL Standard 444.
  - .3 Cable jacket in conformance with CSA 22.2 No. 214 FT-6 fire rating.
  - .4 Cable in conformance with requirements of TIA-EIA-568-C.2.- 1 and ISO/IEC 11801 Category 6 specification using Power Sum NEXT and ACR calculations.
  - .5 Cables provided by single manufacturer.
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## 2.2 HORIZONTAL TERMINATION

- .1 CAT 6 cables shall terminate to existing box or owners active equipment as required for voice and data.

## 2.3 OUTLET CONNECTORS AND FACEPLATES

- .1 Faceplates shall be modular and in Keystone format opening to allow the possibility of changing connector types in the future without replacing the entire unit.
- .2 Faceplates shall be equipped with keystone format connectors to fit the individual outlet's requirements (RJ45 and Dual LC bulkheads).
- .3 Faceplates shall be equipped with a minimum of four (4) angled keystone openings. Contractors are to equip the faceplate with the required amount of blank inserts as required.
- .4 Outlets to be weatherproof as indicated.

## 2.4 NUMBERING AND LABELLING

- .1 Labelling of Telecommunication outlets shall be in accordance with the latest version of TIA/EIA-606.
- .2 Each cable shall be clearly marked with permanent numerical identifier at each end of the cable.
- .3 Outlets shall be clearly and permanently marked with alphanumeric identification labels indicating the cable terminating room, rack, patch panel and port.
- .4 All cables shall have permanent labels at each end of the cable identifying the cable number and pair count and where the cable terminates.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES

- .1 Install horizontal cables as indicated in conduits from box or owners active equipment to individual outlets. Identify and label as indicated to: TIA/EIA-606-A.
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- .2 Terminate cables at outlets in conformance with CAN/CSA C22.2 No. 182.4. indicating the telecommunications room rack, patch panel, and part.
- .3 Cables should be loosely bundled and secured using Velco or another similar product. Cables bundles may not be stressed or over cinched. Cables terminating at the patch-panel shall be dressed-in following standard craft practice. Hook and loop fasteners are acceptable.
- .4 When terminating the UTP cable, the length of the cable twist (twist/cm) shall be identical to that of the remainder of the cable. This twist shall be maintained up to 12mm from the terminate point of the cable at the patch panel and the outlet jacks.
- .5 When terminating the UTP cable, the maximum length of sheath removed shall be 19mm.

### 3.2 INSTALLATION OF EQUIPMENT CABLES

- .1 Install equipment cables from equipment terminal strips patch panel as indicated.
  - .1 Identify and label as indicated to: TIA/EIA-606-A.

### 3.3 FIELD QUALITY CONTROL

- .1 Copper Tests
    - .1 Each pair of each cable installed shall be tested using a "green-light" test set that shows opens, shorts, polarity, and pair-reversals. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicated by the test in accordance with the manufacturers recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
    - .2 Each installed cable shall be tested for length using a TDR type device. The cable shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the TIA/EIA-568-A.2 Standard. Cable number and circuit or pair number.
    - .3 Cable shall be tested for permanent link.
    - .4 The test set to be used shall be Level 3 or above. Test sets to have been calibrated within the last 12 months and a copy of the test set "Certificate of Calibration" to be provided to the Departmental Representative.
    - .5 Category 6 data cable shall be performance verified using an
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automated test set. This test set shall be capable of testing for the continuity and length parameters defined above, and provide results for the following tests:

- .1 Near End Crosstalk (NEXT)
- .2 Attenuation
- .3 Ambient Noise
- .4 Attenuation to Crosstalk Ratio (ACR)
- .5 Far End Crosstalk (FEXT)
- .6 Test results shall be automatically evaluated by the equipment using the most up-to-date criteria from the TIA/EIA Standard and the result shown as pass/fail.
- .7 Test results shall be printed directly from the test unit or from the test unit or from a downloaded file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result and the actual test result achieved.