
Part 1 General

1.1 RELATED REQUIREMENTS

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

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.
- .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 TIA TSB-140-2004, Telecommunications Systems Bulletin - Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems.
 - .6 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) and data.
- .2 Installed in physical star configuration with separate horizontal and backbone sub-systems.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 As-built Records and Drawings:
 - .1 Provide electronic drawings depicting all construction.

- .2 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.

Part 2 Products

2.1 MATERIALS

- .1 Conduit: PVC to Section 26 05 34 – Conduits, Conduit fastenings and Conduit Fittings.
- .2 Outlet boxes, conduit boxes and fittings: to Section 26 05 32
- .3 All Permanent Link components shall be from the same manufacturer.

2.2 FOUR-PAIR 100 Ω BALANCED TWISTED PAIR CABLE

- .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. Color to be decided by owner.
- .2 Acceptable manufacturers:
 - .1 Belden '2400' series.

2.3 WORK AREA UTP 4-PAIR MODULAR JACK

- .1 Eight-position modular jack ("RJ-45"), type T568A, Category 6 to: TIA/EIA-568- B.2:
 - .1 In self-contained surface-mount box, two jacks per box. Acceptable in electrical and mechanical rooms only.
 - .2 Mounted in compatible single gang faceplate, angle entry, four jack positions per faceplate, white finish.
- .2 Acceptable manufacturers:
 - .1 Belden 'MediaFlex' series.

2.4 TERMINATION AND CROSS-CONNECTION HARDWARE FOR UTP

- .1 MDVO patch panel, one rack unit high, 24 ports:
 - .1 Each port equipped with field installed "RJ-45" jacks, type T568A Category 6 to: TIA/EIA-568-B.2. Confirm modular RJ45 jacks color with owner.
 - .2 Supply CAT. 6 MDVO connectors as required to terminate all incoming cabling with 25% spare modules. Color to be determined by owner.
 - .3 Horizontal cable-management unit for every patch panel.
- .2 Acceptable manufacturers:
 - .1 Belden #AX101456.

2.5 UTP PATCH CORDS

- .1 factory-installed male plug at one end to mate with "RJ-45" jack and with factory-installed male plug at other end to mate with "RJ-45" jack Category 6, 4 pairs to: TIA/EIA-568-B.2. 1.5m in length. Color to be decided by owner.

2.6 UTP WORK AREA CORDS

- .1 end equipped with "RJ-45" plug Category 6 to: TIA/EIA-568-B.2. 3.0m in length. Color to be decided by owner.

2.7 OUTDOOR OPTICAL FIBER CABLE

- .1 Indoor/outdoor rated distribution cable, multi-mode OM3 50/125 micron, laser optimized, 6 strands to: TIA/EIA-568- B.3, flame test classification FT4, each end terminated with duplex LC connectors.
- .2 Acceptable manufacturers:
 - .1 Belden #FDX3D006R9.

2.8 INDOOR OPTICAL FIBER CABLE

- .1 Interconnect cable, multi-mode OM3 50/125 micron, laser optimized, 2 strands to: TIA/EIA-568- B.3, flame test classification FT4, each end terminated with duplex LC connectors. Used for fire alarm class A loop from data rack to fire alarm control panel/node.
- .2 Acceptable manufacturers:
 - .1 Belden #B9C002.

2.9 OPTICAL-FIBER PATCH PANEL

- .1 Mounted in rack, 482mm wide, 762mm depth, with lockable cover, equipped with duplex LC compatible adapters, capable of terminating 6 pairs of fiber.
 - .1 Acceptable manufacturer:
 - .1 Belden #FF3X12LD (faceplate),
 - .2 Belden # ECX-01U (patch panel housing)

2.10 OPTICAL-FIBER PATCH CORDS

- .1 Interconnect cable, 2 strand, 1 metre long, each end equipped with duplex LC connectors. Multi-Mode 50/125 micron, laser optimized to: TIA/EIA-568-B.3.

2.11 TELEPHONE BIX MOUNTS

- .1 250 pair bix mounts, cable management rings, with 25 pair IDC connector strips to: TIA 568.C.2.

2.12 WALL MOUNTED DATA RACK

- .1 EIA compliant 482mm cabling wall mounted rack. 660mm W x 660mm D, with 610mm useable depth, 18 rack units, 200 lbs weight capacity, with the following options

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- .1 Six D rings
 - .2 Top fan kit
 - .3 Vertical and horizontal cable managers as indicated on drawings
 - .4 Bonding kit
 - .5 9 outlet, 15A, horizontal power distribution with surge protection

 - .6 1000VA UPS
 - .2 Acceptable manufacturers:
 - .1 Middle Atlantic 'CWR' series.
- 2.13 BACKBONE CABLE (VOICE)**
- .1 25 unshielded-twisted-pair (UTP) cable placed into a cable core, 24 AWG solid copper, flame test classification FT4 to: CSA-C22.2 No. 214, Category 3 (Cat 3).
 - .2 Acceptable manufacturer:
 - .1 Belden #1232A1.
- 2.14 NETWORK SWITCH**
- .1 Network switch to be supplied by user and installed by Contractor.
- Part 3 Execution**
- 3.1 INSTALLATION OF TERMINATION AND CROSS-CONNECT HARDWARE**
- .1 Install termination and cross-connect hardware in cabinet as indicated and according to manufacturers' instructions. Identify and label as indicated to: TIA/EIA-606-A.
- 3.2 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES**
- .1 Install horizontal cables as indicated in conduits from telecommunication rooms to individual work-area jacks. Identify and label as indicated to: TIA/EIA-606-A.
 - .2 Coil spare cables and store in ceiling space in zone.
 - .3 Harness slack cable in cabinets, racks, and wall-mounted termination and cross-connection hardware.
- 3.3 INSTALLATION OF BACKBONE CABLES**
- .1 Install backbone cables from each telecommunications room to main terminal/equipment room (MT/ER) as indicated and according to manufacturers' instructions.
 - .1 Identify and label as indicated to: TIA/EIA-606-A.
 - .2 Install backbone cables from MT/ER to carrier demarcation point as indicated and according to manufacturer's instructions.
 - .1 Identify and label as indicated to: TIA/EIA-606-A.

3.4 INSTALLATION OF EQUIPMENT CABLES

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

3.5 IMPLEMENT CROSS-CONNECTIONS

- .1 Implement cross-connections using patch cords as specified.

3.6 FIELD QUALITY CONTROL

- .1 Test horizontal UTP cables as specified below and correct deficiencies provide record of results as electronic record.
 - .1 Perform tests for Permanent Link on installed cables, including spares:
 - .1 Category 6 using certified level III tester to: TIA/EIA-568-B.2.
 - .2 Perform tests for Channel on all of cross-connected data horizontal cabling installed from each telecommunications room, including shortest and longest drops from each telecommunications room:
 - .1 Category 6 using certified level III tester to: TIA/EIA-568-B.2.
- .2 Test backbone UTP cables as specified below and correct deficiencies: provide record of results as electronic record.
 - .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 Test Optical-fiber strands for attenuation to: TIA/EIA-568-B.1 and correct deficiencies: provide record of results as electronic record.
 - .1 Test horizontal links need at only one wavelength (850 nm or 1300 nm) and in one direction.
 - .1 Attenuation to be less than 2.0 dB, unless consolidation point is used.
 - .2 If consolidation point is used, attenuation test result to be less than 2.75 dB when testing between horizontal cross-connect and telecommunications outlet/connector.
 - .2 Test backbone links in both directions. Backbone links:
 - .1 Test multi-mode fiber at both applicable wavelengths (850 nm and 1300 nm).
 - .2 Test single-mode fiber at both applicable wavelengths (1550 nm and 1310 m).
 - .3 Maximum attenuation: Cable attenuation + Connector loss + Splice loss.
 - .1 Multi-mode-fiber attenuation coefficients:
 - .1 3.5 db/km @ 850 nm; and
 - .2 1.5 db km @ 1300 nm
 - .2 Single-mode fiber attenuation coefficients at both 1310 nm and 1550 nm:
 - .1 1.0 db/km for inside plant cable; and

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- .2 0.5 db/km for outside plant cables.
 - .3 Maximum connector insertion loss: 0.75 db per pair and maximum splice insertion loss: 0.3 db.
 - .4 Perform additional Tier 2 tests using optical time domain reflectometer (OTDR) on backbone fiber pairs to: TSB-140.
 - .1 Correct deficiencies.
 - .2 Provide record of results as described in SUBMITTALS.
 - .5 Provide record of results as electronic record to: TIA/TSB-140.

END OF SECTION