

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-C22.2 No. 214, Communications Cables (Bi-National standard with UL 444).
 - .2 CSA-C22.2 No. 232, Optical Fiber Cables.
- .2 Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA)
 - .1 TIA/EIA-568-C.1, Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements.
 - .2 TIA/EIA-568-C.2, Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.
 - .3 TIA/EIA-568-C.3, Optical Fiber Cabling Components Standard.
 - .4 TIA/EIA-606-B, Administration Standard for the Commercial Telecommunications Infrastructure.
 - .5 TIA-607 (latest revision) – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
 - .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, Optical Fiber Cable Color Coding.

1.2 DEFINITIONS

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

1.3 SYSTEM DESCRIPTION

- .1 Structured telecommunications wiring system consist of unshielded-twisted-pair cables, terminations, connectors, cross-connection hardware, communications racks 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 Horizontal cables link work areas to telecommunications rooms located on same floor.
 - .2 Telecommunications rooms linked to main terminal/equipment room (MT/ER) by backbone cables.
 - .3 MT/ER also linked to Entrance Room by backbone cables.

1.4 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 .dwg format depicting all construction.
- .3 Provide two (2) bound complete hard-copy sets of as-built records to the Engineer.
 - .1 Provide and place one hard copy of as-built records for each telecommunications room in plan holder in each telecommunications room.

1.5 QUALITY ASSURANCE

- .1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 30 - Health and Safety Requirements.

1.6 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.

Part 2 Products

2.1 FOUR-PAIR 100 Ω BALANCED TWISTED PAIR CABLE

- .1 Four-pair, 100 ohm balanced unshielded-twisted-pair (UTP) cable, flame test classification FT6 or MPP or CMP to: CSA-C22.2 No. 214, Category 6 (Cat 6) to: TIA/EIA-568-C.2.

2.2 MULTI-PAIR 100 Ω BALANCED TWISTED PAIR CABLE

- .1 100 ohm, pairs as indicated, sheath consists of thermoplastic jacket with underlying metallic shield, Category 5 to: TIA/EIA-568-C.2, flame test classification FT6 or MPP to: CSA-C22.2 No. 214.

2.3 WORK AREA UTP 4-PAIR MODULAR JACK

- .1 Eight-position modular jack ("RJ-45"), type T568A Category 6 to: TIA/EIA-568-C.2:
 - .1 In self-contained surface-mount box, 2 jacks per box unless otherwise indicated.
 - .2 Mounted in compatible single gang faceplate, flush entry, 3 jack positions per faceplate unless otherwise indicated.
 - .3 Provide blank inserts for any unused ports

2.4 TERMINATION AND CROSS-CONNECTION HARDWARE FOR UTP

- .1 IDC Terminal strips, 25 pair, for terminating multi-pair 100 Ω balanced twisted pair cables and supporting cross-connections using jumper wires or compatible plug-ended patch cords: Category 6 to: TIA/EIA-568-C.2.
- .2 Mount or block for housing 10 IDC terminal strips, mounted on wall, rack or cabinet as indicated.
 - .1 Distribution rings or channels capable of externally mating with the above mount for managing cross-connection wires.

- .3 Patch panel, 2 rack units high, modular port 24 or 48 port configuration:
 - .1 Each port equipped with field installed "RJ-45" jacks, type T568A Category 6 to: TIA/EIA-568-C.2.
 - .2 Horizontal cable-management unit for every 48 ports.

2.5 UTP CROSS-CONNECT WIRE

- .1 Category 5, multi- pairs to: TIA/EIA-568-C.2.

2.6 UTP PATCH CORDS

- .1 2.0 meters long, with 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-C.2.

2.7 UTP EQUIPMENT CABLE

- .1 4 pair "cable", 2.0 meters long, with factory-installed male plug on one end to mate with "RJ-45" jack and other end equipped with factory-installed male plug to mate with terminal strip Category 6 to: TIA/EIA-568-C.2.

2.8 COMMUNICATIONS RACKS/CABINETS

- .1 Wall mounted 19", open frame rack, minimum eight (8) rack units, horizontally mounted power strip/bar with 6 receptacles.

2.9 CONDUIT SYSTEMS

- .1 Install conduit systems and pull boxes for data wiring including:
 - .1 Vertical stubs in walls from outlets into accessible ceiling space.
 - .2 Zone conduits for collection of UTP wiring in ceiling spaces.
 - .3 Pull boxes.

Part 3 Execution

3.1 GENERAL INSTALLATION

- .1 Ensure that manufacturer's bending radius limitations are adhered to.
- .2 Protect all cables from damage during installation.
- .3 Provide insulated conduit bushing at open end of wall stub-up.
- .4 Turn over UTP patch cords to Owner.

3.2 INSTALLATION OF TERMINATION AND CROSS-CONNECT HARDWARE

- .1 Install termination and cross-connect hardware on wall, in rack, or in cabinet as indicated and according to manufacturers' instructions. Identify and label as indicated to: TIA/EIA-606-B.

3.3 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES

- .1 Install horizontal cables as indicated in conduits, cable trays, perimeter raceways, "J" hooks from telecommunication rooms to individual work-area jacks. Identify and label as indicated to: TIA/EIA-606-B.
- .2 Support horizontal cables at intervals not exceeding 2 meters.
 - .1 Where raceways are used to distribute cables to each zone, provide supplementary "J" hooks to support cables at intervals not exceeding 2 meters.
- .3 Terminate horizontal cables in telecommunications room and at individual work-area jacks.
 - .1 Identify and label as indicated to: TIA/EIA-606-B.
- .4 Coil spare cables and store in ceiling space in zone.
- .5 Harness slack cable in cabinets, racks, and wall-mounted termination and cross-connection hardware.

3.4 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-B.
- .2 Install backbone cables from MT/ER to carrier demarcation point in Entrance Room as indicated and according to manufacturer's instructions.
 - .1 Identify and label as indicated to: TIA/EIA-606-B.

3.5 IMPLEMENT CROSS-CONNECTIONS

- .1 Implement cross-connections using patch cords as specified.
- .2 Implement cross-connections using jumper wires as specified.

3.6 FIELD QUALITY CONTROL

- .1 Test horizontal UTP cables as specified below and correct deficiencies provide record of results as hard copy and electronic record on CD.
 - .1 Perform tests for Permanent Link on installed cables, including spares:
 - .1 Category 6 using certified level IV tester to: TIA/EIA-568-C.2.
 - .2 Perform tests for Channel on 20% of cross-connected data horizontal cabling installed from each telecommunications room, including shortest and longest drops from each telecommunications room: should more than 5% of tested cables fail, test remaining cross-connected data cables.
 - .1 Category 6 using certified level IV tester to: TIA/EIA-568-C.2.
- .2 Test backbone UTP cables as specified below and correct deficiencies: provide record of results as hard copy and electronic record on CD.
 - .1 Perform tests for Permanent Link on 4-pair cables:
 - .1 Category 6 using certified level IV tester to: TIA/EIA-568-C.2.
 - .2 Perform Wire Map tests on multi-pair UTP cables to: TIA/EIA-568-C.1.

- .3 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.
- .4 Provide record of results as hard copy and electronic record on CD to: TIA/TSB-140.
- .5 No conditional PASS or FAIL results shall be accepted.
- .6 Replace cable and/or connection equipment that fails tests.

3.7 INSTALLATION OF RACKS/CABINETS

- .1 Install racks/cabinets as per manufacturer's recommendations.
- .2 Provide grounding and bonding of racks/cabinets to: TIA-607.

3.8 CONDUIT SYSTEM

- .1 Do not provide conduit raceways that exceed 30 m or contain more than two 90⁰ bends (or equivalent) between pull points or pull boxes.
- .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.

END OF SECTION