

City of Mississauga – Network Cabling Standards

**SCOPE OF SERVICES AND SERVICES LEVELS**

**1. GENERAL**

This document describes the products and execution requirements related to the installation and maintenance of the IT Network cable distribution systems for wireless, workstation, voice (VoIP) and data at City locations in accordance with the projects scheduled by the Customer.

**1.1 Scope of Service Requirements**

The Contractor will be responsible for cable installations at new facilities, service work, or total re-cabling of existing sites. Installations must conform to **Belden IBDN Certified System Vendor (CSV)**.

<http://www.belden.com/resourcecenter/prutnerportal/certifiedsystemvendor/Ce1tified-System-Vendor.cfm>

All cables and related terminations and support shall be furnished, installed, wired, tested, labeled, and documented by the Contractor as detailed in this document.

The Contractor shall have access to professional staff with an R.C.D.D. designation (The Registered Communications Distribution Designer) to review drawings to ensure that they conform to the wiring standards as indicated in this Document.

**2. SCOPE OF WORK**

Supply, install and test a complete Horizontal and Riser telecommunications system as specified herein and shown on the drawings provided.

The data cabling system shall comprise of the following subsystems, supplied unless noted otherwise.

- Termination of new or existing horizontal cabling on a patch panel in the network closet.
- Provision of the modular jacks and faceplates at the work area outlets.
- Electrical grounding of network rack, as per code.
- Physically secure the network rack to the floor or wall.
- Labeling and testing of all cabling systems as specified.
- Provision of all specified system documentation. (i.e. As-built drawings)
- Supply and installation of horizontal cable distribution system using J-Hooks or approved equivalent\* cable supporting structure (as required) beyond conduit system already installed.
- Provide Cat 6 Modular Patch Panels for termination (new install).
- Rack and Racking accessories to be installed
- Install UPS into base of rack

## 2.1 Quality Assurance

The equipment, material and installation shall conform to the latest version of the applicable codes, standards and regulations:

- ANSI/EIA/TIA 568A - Commercial Building Telecommunications Cabling.
- ANSI/EIA/TIA 606 - Administration Standard for the Telecommunications Infrastructure of Commercial Buildings (CSA T528).
- ANSI/EIA/TIA 607-Commercial Building Grounding and Bonding Requirements for Telecommunications (CSA T527).
- ANSI/EIA/TIA TSB 67-Performance Specification For Field Testing Of Unshielded Twisted Pair Cabling Systems.
- CSA C22.2 No.214 -Communication Cables.
- CENELEC EN 50173 -Performance Requirements for Generic Cabling Schemes.
- NEMA WC 63 -Performance Standard For Field Testing OD Unshielded Twisted Pair Cabling System.
- All UTP. (Unshielded twisted pair) products are to be produced from a single manufacturer unless otherwise stated.

## 3. PRODUCT

### 3.1 Data Cables

For all new applications a UTP cable shall be used. This cable shall consist of #24 AWG (CAT 6) solid conductors, formed into four individually twisted pairs and enclosed in a thermoplastic jacket. The cable shall be rated CMP FT-6 Belden/CDT. Performance shall comply with the latest draft of ANSI EIA/TIA **568-A**. Cat 6 Data cable jacket to be **Yellow in colour**.

### 3.2 End User Outlets

- GigaFlex PS6+ modules jacks **AX IOI 065 (White)**
- Wall faceplates shall be provisioned accordingly for single or multi-port outlets, Belden/CDT (White)
- Furniture outlet adapters shall be **MDVO Side Entry boxes A0645273** (White).
- Furniture outlet adapters to be determined for Floor Monuments. Where applicable, MDVO (Mobile Dynamic Virtual Organizations) blank inserts shall be used in empty ports in wall and furniture jacks. Blank covers to match faceplate colours.

### 3.3 Patch Panels

- 482 mm, 19" Rack Mountable, 48 / 24 port, 8 position RJ45 style, High Density patch panel (Belden/CDT)
- Category 6 Cables - Horizontal and Riser Terminations:  
GigaFlex PS6+ Belden/CDT, 2U, 48 Port, Black AX101458  
GigaFlex PS6+ Belden/CDT, 1U, 24 Port, Black AX101456
- Pinout Termination Sequence is **T-568-A**.

### 3.4 Patch Cords

- Patch cables to be supplied/procured by Vendor or General Contractor for use in the Network Closet only.
- All Patch cables should be **Belden/CDT** brand.
- Patch cable quantity should be equal to quantity of all ethernet cabling installed.
- City staff will be responsible for patch cable installation.
- Each patch cable should be Category 6 Ethernet cabling – **Ultra thin 28AWG** – length should be **7 feet**.
- Outer jacket for all patch cables should be **black** in color.

### 3.5 Distribution Racks and Accessories

New Communication racks to be supplied by the cabling contractor. And shall be:

Mandatory:

- Cable Talk CTR-1977C-P48-B (4-post rack w/ Vertical Cable Management) or approved equivalent by the City/Owner
- CableTalk CTR-1977-DS-B (2-Post Rack w/ Vertical Cable Management) or approved equivalent by the City/Owner.
- Cable Talk CTR-CMS-16-B vertical cable manager or approved equivalent by the City/Owner.
- CableTalk CTPBV-1277-SD-B 15 amp. Vertical power bar "switch disabled" or approved equivalent by the City/Owner.
- Cage nuts NUT-CAGED-10-32K (100 pack) for 4-post racks

Optional: (if requested by the City)

- Cable Talk CTRS-F-1812-B (Single sided fixed shelf) or approved equivalent by the City/Owner.
- Cable Talk CTRS-F-1820-B (Centre Mounted shelf) or approved equivalent by the City/Owner.

## 4. INSTALLATION

### 4.1 General

- Installation shall conform to the applicable codes and standards (as listed in 2.1.) manufacturer's recommendations, and best industry practices.
- **Grounding of each distribution rack** to the communications ground bus system shall be performed by the structured cabling contractor. Mounting and fastening of the distribution rack (where applicable) to the floor shall be performed by the cable contractor.
- Cables shall be installed in trays and or conduits as provided by the electrical contractor.
- **No splicing** of any structured cabling will be permitted.

### 4.2 UPS (Uninterruptible Power Supply)

- Structured Cabling contractor will install required UPS(s) and EBM(s) in the base of the IT Rack(s).  
APC UPS unit - 1.5 KVA model UPS (**SMX1500RM2UCNC**)  
APC EBM unit - Extended Battery Module (**SMX48RMBP2U**) compatible with 1.5 KVA UPS  
APC UPS unit – 3KVA model UPS (**SMX3000RMLV2UNC**)

#### 4.3 Data Cables

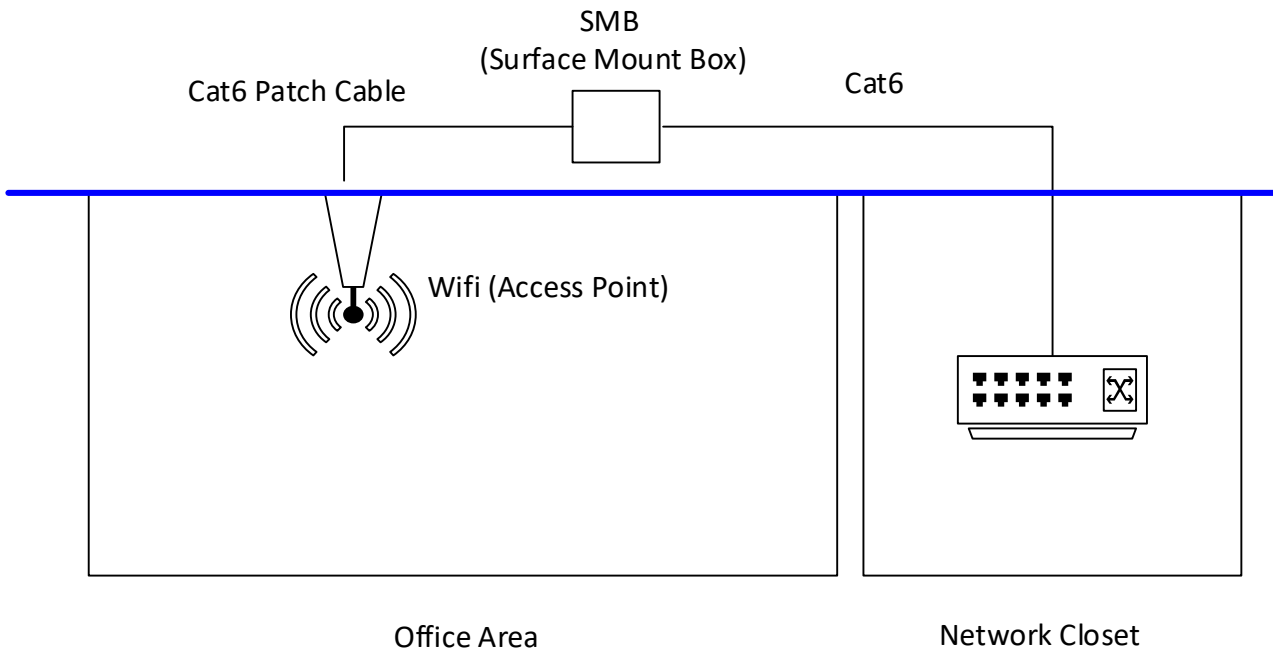
- All New LAN Data cable is to be Category 6 and is to be terminated on Category 6 connecting hardware at the wall termination for each location, and rack mounted patch panels in the communication closet.
- Label and test all cabling as detailed in this specification.

#### 4.4 Horizontal Distribution System

- Cabling contractor to supply and install a horizontal distribution system using J-hooks or approved equivalent supporting structure, beyond provided tray/conduit, as per provided drawings.
- Supporting cable structure is to be installed into steel support structure or concrete above.
- Distribution system to be designed and installed according to consultation with Customer.
- Cable distribution to be designed according to best practices and to maintain a clean ceiling space.
- J-Hooks distribution to be designed with cable spans not to exceed 4 Feet between Zone conduit and J-Hook or J-Hook to J-Hook where applicable.

#### 4.5 Access Point Installation

- Termination of cable for Access Point on **SMB (Surface mount box)** with **10 feet service slack** in ceiling, or secure to supporting structure (in case of no ceiling).
- Install Cisco access points by patching to installed SMB as per customers provided drawings. (Ref: Figure A)
  - Cabling for Wifi Access Points shall be **CAT6A, Plenum rated (FT6)**, jacket color shall be **yellow**.
  - Cabling for Wifi Access Points shall be terminated at the end of the patch panel, separate from the data jack cables. (ie on a 48-port patch panel, data jacks terminated on ports #1-40, AP's terminated on ports #41-48)



**Figure A**

#### 4.6 Labeling

- Provide adhesive cable labels to meet the legibility, defacement, and adhesion requirements specified in UL 969 (Ref. D 16). In addition the labels shall meet in the general exposure requirements in UL 969 for indoor use.
- Self-laminating vinyl construction cable labels with a white printing area and a clear tail that self laminates the printed area when wrapped around the cable. The clear area should be of a sufficient length to wrap around the cable at least one and a half times.
- Mechanically print labels using a printer and follow guideline in ANSJ/TIA/EIA 606 for colour codes. Hand written labels shall not be permitted.
- All cables shall be labeled at the following locations:
  - Each end of data cable lines;
  - Front of Patch Panel- Data patch panels;
  - Front of End User faceplates - All work area outlets;
- All Data and Analog Line horizontal UTP cables shall be labeled identically using the format as shown below

##### **C6-XX- AAA.**

C6 identifies Cat 6 cable.

XX - identifies the floor and particular Comm. Room, where applicable (ex. 4N – floor, North side, 3W – floor 3, west side)

AAA identifies the incremental cable number (i.e. 001, 002, 003 etc...)

#### 4.7 Testing

- Horizontal distribution shall be tested and certified in accordance with ANSI/EIA/TIA and BICSI standards.
- Copper cable testing equipment testing Cat 6 cable shall be performed in accordance with ANSI/BIA/TIA 568A standard, using level 3, Category 6 cable testers. All testing software shall be the latest version, and licensed.
- Tests shall include Wire Map, Length, Insertion Loss (Attenuation), NEXT, (pair to pair), PSNEXT, ELFNEXT (pair to pair) PSELFEXT, Return Loss, ACR, PSCAR, Propagation Delay, Delay Skew. Test results shall be recorded.
- 100% of cables must be tested. Up to 5% of test may be redone in the presence of the owner.
- Any failures shall be corrected expeditiously and retested. Record of test shall be submitted in both printed and soft copy. (MS Word or Excel Format only).

#### 4.8 Testing Results

- Cabling contractor shall submit test results in hard copy binder form which are to be left in the Communication closet. Electronic copies of the results are to be provided to the Customer in MS Excel, .pdf or Word format
- Cabling contractor to produce a cable test summary report based on the cable schedules.
- The report should indicate for each cable when it was tested successfully, the result and the length.
- The entire report must be signed by an authorized person for the cabling contractor and the end of the project.
- The test result documentation must be submitted to the owner for review no later than 10 working days following the completion of the installation.

#### 4.9 As Built Drawings

- Cabling Contractor is required to provide an As-Built drawing of the cable installations for all drawings included in this specification to the Customer. All drawings to be provided to the Customer at the end of the project for any changes due to site conditions.
- The As-Built drawings are to include: Cable routes and outlet locations. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided.
- Contractor shall annotate the base drawings provided by the Customer and return a hard copy (same plot size as originals) and 1 (one) electronic copy in Adobe Acrobat PDF format.
- All documentation shall be submitted to the Customer within 10 working days of the completion of the project.