**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 1 of 14**

## 1.0 GENERAL

## 1.1 DOCUMENTS

    .1    This section of the Specification forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

## 1.2 SUMMARY

    .1    Section Includes:

| | |
|---|---|
| 1.0 | GENERAL |
| 1.1 | DOCUMENTS |
| 1.2 | SUMMARY |
| 1.3 | OVERVIEW |
| 1.4 | DESCRIPTION OF SYSTEM |
| 1.5 | OTHERS IN INFORMATION TECHNOLOGY PATHWAY |
| 2.0 | PRODUCTS |
| 2.1 | MANUFACTURERS |
| 2.2 | MATERIAL |
| 2.3 | HANDLING AND PROTECTION OF EQUIPMENT AND MATERIALS |
| 3.0 | EXECUTION |
| 3.1 | PROTECTION OF OWNER'S FACILITIES |
| 3.2 | PRE-INSTALLATION SITE SURVEY |
| 3.3 | INSTALLATION - GENERAL |
| 3.4 | COMMUNICATIONS CABLE – GENERAL |
| 3.5 | UTP/STP INSTALLATION |
| 3.6 | MISCELLANEOUS CABLES |
| 3.7 | CABLE SUPPORT |
| 3.8 | BIX CONNECTORS |
| 3.9 | FIBRE OPTIC INSTALLATION |
| 3.10 | TERMINATIONS |
| 3.11 | TESTING |

## 1.3 OVERVIEW

    .1    This Section includes equipment, materials, labour and services to provide telephone and data distribution systems including, but not limited to:

        .1    Installation, termination, testing and labeling of horizontal and backbone UTP/ STP, Coaxial CATV and Fibre Optic cabling.

        .2    Disconnection and removal of existing voice or data cables.

        .3    Equipment cabinet and or rack installation.

        .4    System testing and labeling

        .5    Documentation and submissions.

    .2    Contractors shall provide all equipment, consumable materials, labour and services, not specifically mentioned or shown, which may be necessary to complete or perfect all parts of the installation. Contractors shall ensure that they are compliant with requirements stated or reasonably inferred by the contract documents.

**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 2 of 14**

**1.4**    **DESCRIPTION OF SYSTEM**

.1    The Number of voice and data jacks in work areas is not typical and is based on information supplied by the end user and the UBC Information Technology Representative.

.2    The determination of typical communication outlet cable counts will be in consultation with UBC Information Technology during the design phase of each building or renovation. It is not to be assumed that one cable is sufficient for typical installations. A detailed needs assessment could be carried out by the UBC Information Technology Representative to determine the customer's requirements, which will affect the design.

.3    When it is determined that a typical work area outlet will consist of only one (1) four-pair FTP Category 6A cable, this cable will be dedicated to the Data network by default. Typically, four-pair FTP Category 6A cables dedicated to Voice use will be quantified during the detailed design process and added as required. Terminate data cables on wall/rack mounted modular patch panels located in the appropriate LCR / MCR. Terminate the voice cables on GigaBIX termination blocks located in the same LCR / MCR. ITSTD-32

.4    Each Wireless Access Point (AP) outlet shall consist of a minimum of two (2) four-pair FTP Category 6A cables, installed from the indicated AP outlet location to the zone Local Communication Room (LCR) unless otherwise specified. ITSTD-50-54

.5    Voice backbone cabling shall consist of multiples of 25 pair Category 3 unshielded twisted pair cables and shall be installed from the Main Communication Room (MCR) to each Local Communication Room (LCR.) ITSTD-13, 32, 64

.6    Fibre Data backbone cabling consisting of a minimum of 12 strands of multi-mode, laser optimized 50/125um OM4 and a minimum of 12 strands of single mode optical cable shall be installed from MCR to each zone LCR. Required strand count to be determined as needed per installation. It is expected that these are to be separate cables, one for each type of fibre. All connections regardless of fibre type will be SC, UPC form factor. ITSTD-32, 56, 63

.7    All FTP Category 6A horizontal cable lengths shall not exceed 90 meters. All FTP Category 6A cables will be bonded to ground at the local consolidation point, for example a communications room or cabinet. All FTP Category 6A patch panels must be bonded to the cabinet or room bonding point at the time of installation of the panel. ITSTD-32

.8    Local Lighting Controller Systems – A minimum of (1) FTP Category 6A cable for data connection shall be installed from the MCR or LCR to any local lighting controller that is intended to be controlled by the integrated AV system of that room. This connection is in addition to, and independent of, any BMS requirements for lighting controllers (see section 26 51 00 for AV integration).

.9    BMS Systems - A minimum of (1) FTP Category 6A cable for data connection and (1) FTP Category 6A cable for voice connection shall be installed from MCR or LCR to specified demarcation locations for centralized BMS panels. There may be more than one location per building. ITSTD-22

.10    Security Systems– System specific cables for Security shall be installed as per UBC Access Control drawings and specifications and are not addressed in this document. Typical Communications cable installations for the Security system to communicate with the Network will consist of a minimum of one (1) FTP Category 6A cable for data communications installed within 300mm of designated security panels in a surface mounted outlet. Typically, there will be more than one location per building, and common

**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 3 of 14**

locations are: a - on the communications room wall behind entrance door, b – in elevator machine rooms, c – above Proxsafe key lock boxes. However it is possible for Secure Access to request any location in any given building. ITSTD-22,23,24,25

.11 Fire Alarm System - Communications cables for the Fire Alarm system to communicate with the Network or remote location are to be a minimum of (1) FTP Category 6A cable for data communications and (1) FTP Category 6A cable for voice communications. These cables shall be installed from MCR, or LCR to the specified demarcation location for the central fire alarm panel. Typically, there will be only one location per building. ITSTD-22

.12 Clock/ Bell System - System specific cables for Clock Bell system shall be installed by others and are not addressed in this document. Communications cables for the purposes of delivering a synchronous correction signal to the clock system of a building will consist of a minimum of (1) FTP Category 6A cable for voice communications. The cable shall be installed from the MCR, or LCR to specified demarcation location for the central Clock / Bell panel. Regardless of the intention for the system to use wireless synchronization, this demarcation shall be installed. Typically, there will be only one location per building. ITSTD-22

.13 Elevator Systems:

1- Phone – A minimum of (1) FTP Category 6A cable for voice communications shall be installed from the MCR or LCR, to a specified elevator phone demarcation location. Typically, there will be one cable installed per elevator car in a building, unless a third-party elevator communications system is used (for example a Webb System). If a third-party elevator communications system is used in a building, then one (1) FTP Category 6A cable for voice communications will be installed at a demarcation point agreeable to both UBC IT and the company installing the third-party system, typically the UBC IT MCR. Regardless of the inclusion of a third-party system the standard elevator communications demark cables shall be installed. ITSTD-22

2- Access Control – A minimum of (1) FTP Category 6A cable for data communications shall be installed from the MCR or LCR to a specified elevator Access control demarcation location. Typically, there will be one cable installed per elevator car in a building. ITSTD-22

3- Typically, these two elevator specific services will appear in separate demarcation locations within the elevator machine rooms due to the nature of the equipment that will be connected

.14 PML/ Water Meter - A minimum of (1) FTP Category 6A cable for data communication and (1) Category 6A cable for voice communication shall be installed from the MCR, or LCR to specified meter locations. There may be more than one per building. ITSTD-22

.15 The Contractor shall install equipment racking in Communication rooms to UBC Information Technology's specifications and satisfaction. ITSTD-04, 11

.16 The Contractor must finalize equipment layouts of Communication rooms with UBC Information Technology Representative before installation can proceed. ITSTD-04, 05, 11, 12

.17 The Div 27 Contractor must fire-stop the inside of all conduit or cable tray penetrations of fire rated barriers (floors and walls). Div 26 Contractor must fire-stop the outside of all conduit and cable tray penetrations of fire rated barriers. See Section 27 05 07 for Fire-stop information.

.18    The Div 27 Contractor is responsible for the 'air stopping' the inside of all conduit or cable tray penetrations of any areas that require airborne isolation or air pressure isolation. Div 26 Contractor must 'air-stop' the outside of all conduit and cable tray penetrations.

.19    The Integrity of the UBC structured cable system must be preserved in all aspects of the installation. All cables installed for UBC IT must appear in designated UBC communications rooms and use UBC IT designated pathways unless instructed otherwise. UBC IT cables should not be installed in shared pathways when UBC IT dedicated pathways are available. UBC IT cables should not travel (exposed) through shared communications spaces or shared utility spaces. All UBC IT communications rooms should be linked to each other with continuous riser pathway dedicated to UBC IT.

## 1.5    OTHERS IN INFORMATION TECHNOLOGY PATHWAY

.1     All other cable systems that have been pre-approved by UBC IT to share the IT designated pathways must install their cables in accordance with the UBC IT Division 27 guidelines.

.2     All other cables systems that have been pre-approved by UBC IT to share the IT designated pathways must keep their cable bundles separate from the IT cable bundles.

.3     No other cable systems that have been pre-approved by UBC IT to share the IT designated pathways will cause any IT pathway to be over filled or reduce future capacity of the functional IT infrastructure.

.4     UBC IT cabling will always take precedent over other cabling systems within IT pathways.

.5     UBC IT will have first choice of pathways. If another cable system has prematurely used the IT pathway that UBC IT requires, then that system will remove their cables or provide alternate pathway at no cost to UBC.

.6     Zone pathways are the only pathways that are suitable for cable system sharing.

.7     Conduits designated to be 'drop' conduits or conduits with a dedicated purpose are not suitable for cable system sharing.

.8     UBC IT network cabling system J-Hooks are not suitable for sharing and will not be used by other systems.

.9     Examples of other cable systems that will need authorization before they will be allowed to share IT pathways on any given project are:

- Security cabling
- BMS cabling
- Access control cabling
- RF distribution cabling (Cellular, Radio, Microwave)
- Intercom cabling
- Audio Video cabling

.10    Coordinate with UBC IT representative on site if required.

.11    Pathway that is to be used for communications room riser shall be enclosed when passing through shared spaces such as utility rooms and other non UBC IT communications rooms.

Communications Guideline Specifications
UBC Vancouver
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 5 of 14**

## 2.0    PRODUCTS - INSIDE PLANT

### 2.1    MANUFACTURERS

.1      All horizontal cable and associated jacks, connectors, patch panels and faceplates shall be FTP Category 6A appropriate and manufactured by CommScope, Uniprise SLX series.

.2      All voice backbone (Riser) cables shall be Category 3, however termination hardware located in MCRs and LCRs shall be Category 6 - GigaBIX.  The termination hardware shall be manufactured by BELDEN – GigaBIX IDC system.

.3      All fibre cables and pigtails shall contain glass manufactured by Corning.

.4      All fibre termination hardware shall be manufactured by Corning- CCH System, or as directed by UBC Information Technology.

### 2.2    MATERIAL

.1      This section specifies various manufacturers' materials including, but not limited to, cable, jacks and outlet plates, patch panels, equipment racks, GigaBIX blocks, and other Communications components used in Communications infrastructure installations at UBC.

.2      The Contractor shall install and connect voice and data network using Contractor supplied material. Typically, data patch cords are not included as part of the contractor's scope.

.3      The Contractor shall replace and connect existing voice and data cabling where applicable with FTP Category 6A cable and termination hardware.

.4      The Contractor shall return all removed hardware and accessories to UBC Information Technology for re-tasking or disposal, unless otherwise agreed. All removed redundant and abandoned cable will be disposed of by the contractor at no cost to UBC and in accordance with applicable environmental regulations.

.5      All materials used must be CSA approved or Electrical Safety Authority of British Columbia recognized standard association approved and installed in accordance with manufacturers' specifications and recommendations.

.6      Where substitutions of specified materials are allowed, they must at all times meet or exceed the specifications given by the manufacturers listed and be subject to approval by the UBC Information Technology Representative in writing prior to their use.

.7      The Contractor shall ensure that the completed project includes installation of all materials required to fulfill the Contract as detailed on IT drawings and in the Contract Documents.

.8      The following material shall be supplied by the Contractor.

**Commscope Uniprise SLX List**

Category 6A CMR/P, 4 PR, 23 AWG (CS44 BLU C6A 4/23 F/UTP, UN884018404)

Category 6A - T568-A SLX Jacks (USL10G-SHLD, A.WHT,760238128, Alpine White is default colour for field installation, metal or black colour is acceptable for comm room installation)

SG/DG faceplates and blank inserts - Alpine White (21110XX-3)

**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 6 of 14**

Category 6A - 24 port patch panels (CPP-SDDM-SL-1U-24,760237046 c/w all jacks supplied)

Cable management panels (if requested)

2-port modular box (1-1933668-3 or 1-1116698-3 for wireless and special systems demarcations)

Patch panel bracket kits (if requested)

Decora 2/3/4 -port strap kits (SL or 110, straight, Alpine white)

Modular furniture faceplates (SL or 110, straight, colour to match furniture)

### BELDEN - GigaBIX List

25 Pr 24 AWG CMR/P Cat 3 Backbone cable

GigaBIX 300 Pr Mounts (AX101472)

GigaBIX termination strips (AX101447, AX101448)

GigaBIX designation strips and labels (AX101483)

GigaBIX distribution rings (AX101478)

GigaBIX wire guards (AX101486)

### CORNING List

24 strand (Typical count) MM laser optimized 50/125 micron MIC for backbone cables.  All dielectric, OFNR/P – CMR/P, certified for 10 Gigabit @ minimum of 500 Meters, OM4.

24 stand (Typical count) SM 8.3 micron MIC for backbone cables. All dielectric, OFNR/P – CMR/P OS2.

2 strand MM or 4 strand MM composite OM4 MIC 50/125 micron CMR/P for horizontal cables if specified.

Pigtails must use Corning glass and SC connectors

Fibre panels shall be of the CCH System:

- Rack mounted distribution panels are typically CCH-02U or CCH-04U
- Multimode splice modules are typically CCH-CS12-E7-P00TE
- Singlemode splice modules are typically CCH-CS12-59-P00RE

### CABINET – APPROVED PARTS

.1      In new buildings, all cabinets shall be of the same manufacturer.

.2      Cabinet layouts include:

Four (4) 19" TIA mounting rails, tapped,

One (1) mid mounted minimum 50 mm D x 150 mm W vertical channel

**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 7 of 14**

for incoming cable dressing and

Two (2) horizontal (front and rear mounted) cable manager.

Optional price for top, ventilated sides, front and or back door only when specified.

**Electron Metal** – Part number CB4-0049378-001  Series 4000 cabinet – includes:
- 24" x 83" x 36" – 44RU
- 2 pairs of 19" mounting rails TAPPED 12-24 c/w RU markings
- 1 universal accessory channel
- 1 LH rear vertical cable manager
- 1 RH rear vertical cable manager
- Qty 100 12-24 screws
- No doors / No side panels / No top

## J-HOOK SYSTEM

.1 Panduit J-Mod Cable support system for spurs from main tray system to outlet location.  Maximum of 2" cable bundle per J-hook. Minimum of 2-J hooks per bracket otherwise additional brackets and J-hooks required to complete system.  Bracket mounting to suspended ceiling drop wires is not allowed.  Ensure equipment meets all applicable codes when installed in plenums.

. 2  J-Hooks should not be utilized in new buildings or large-scale renovations. J-Hook usage is reserved for small renovations or localized additions where it is not economically feasible to install the preferred forms of pathway.

**The following consumable materials shall be supplied by the Contractor at the Contractor's expense**.

Pulling lubricants

Pull tapes

Cable Ty raps

Velcro fasteners

Cable labels

All designation labels

Fibre termination consumables

Any miscellaneous material to facilitate cable system installation

**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 8 of 14**

**2.3     HANDLING AND PROTECTION OF EQUIPMENT AND MATERIALS**

.1      The Contractor shall be responsible for safekeeping his own and any subcontractors' property, such as equipment and materials, on the job site.  UBC assumes no responsibility for protection of above-named properties against damage, fire, theft and deterioration from inclement environmental conditions.

**3.0     EXECUTION**

**3.1     PROTECTION OF OWNER'S FACILITIES**

.1      The Contractor shall effectively protect the Owner's facilities, equipment and materials from dust, dirt and damage during construction.

.2      The Contractor shall remove protection at completion of the Work.  In areas that are continued to be used during construction, protection material and clean up shall be done at the end of each day.

**3.2     PRE-INSTALLATION SITE SURVEY**

.1      Prior to start of systems installation, the Contractor shall meet at the project site with the UBC Information Technology Representative, the Consulting Engineer, and representatives of trades performing related work to co-ordinate efforts.  The Contractor shall review areas of potential interference and resolve conflicts before proceeding with the work.  Facilitation with other trades shall be necessary to plan the crucial scheduled completions of the equipment room and Communication rooms.

.2      The Contractor shall examine areas and conditions under which the system is to be installed.  The Contractor shall not proceed with the work until satisfactory conditions have been achieved.

**3.3     INSTALLATION - GENERAL**

.1      The Contractor shall Supply all materials, labour, tools and services required to install a complete cabling system

.2      The Contractor shall perform all work of installation of components, cable terminations, bonding, testing, of cables and racks as indicated to provide a complete voice and data cabling network as specified by the manufacturer

.3      The Contractor under Division 26 shall provide all pathway and raceway systems for the Communications cables. All pathways and raceways will be installed for the purpose of installation of high-performance communications cable and the installation may be required to supersede any Code safety limitations to maintain the performance aspects of the communications cables. (Refer to Section 27 05 28)

.4      The Contractor shall supply & install interconnecting Backbone cabling between floors as indicated.

.5      The Contractor shall supply & Install horizontal cabling between MCR or LCR, and Communication outlets.

.6      The Contractor shall support cabling in cable tray and drop conduit, or J-hooks runs to Communications outlets.

**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 9 of 14**

.7     The Contractor shall not carry out any cable terminations until acceptance of the methodology has been obtained.

.8     Cable supported by J-hook run shall be bundled with Velcro tape at maximum 300 mm on center, after leaving the cable tray.

.9     Cables on plywood backboards in Communications Rooms shall be supported with J-Mod system and or Velcro tape at maximum 600 mm on center or closer as necessary to dress installed cables in neat and tidy bundles as per Section 27 15 00.

.10    The Contractor shall install equipment and wiring in Communications Rooms to provide a logical progression for cabling and to minimize cables crossing.

.11    Cables, installed on J-hooks, shall follow building lines and be anchored where a change of direction occurs to avoid excessive slack, or sags. Cables shall be bundled at J-hooks per Section 27 15 00.

.12    J-Hooks should not be utilized in new buildings or large-scale renovations. J-Hook usage is reserved for small renovations or localized additions where it is not economically feasible to install the preferred forms of pathway.

.13    The Contractor shall maintain manufacturer's minimum bending radius for all cables. At initial cable installation on tray, run cables parallel to each other with a minimum of crossovers.

.14    Defective material and or cabling installed shall be replaced at no cost to UBC.

.15    The Contractor shall leave data wiring system in complete and operating condition.

.16    Layouts may not show countertops, benches, and baseboard heaters.  The Contractor shall locate voice/data outlets above countertops and baseboard heaters and in benches next to power outlets.

.17    The Contractor shall locate voice/data outlets adjacent to existing power outlets where possible.

**3.4     COMMUNICATION CABLE - GENERAL**

.1     All cables shall run without a splice between a communications room and a communication outlet via cable tray, conduit, J-hook, pack pole, cable channel, or surface raceway.

.2     All cables shall be CSA-CMR/P rated as required to meet any and all applicable codes and as dictated by each project's particular requirements.

.3     The Contractor shall ensure that there is no rough handling, kinking, denting or abrasion of the cable, and that the cable shall not be left on the ground where it may be stepped on or run over by vehicles.

.4     Cable shall not be pulled through 90$^\circ$ conduit fittings such as an LB type joint. LB type fittings are not acceptable in Communications pathways. When installing cables, care shall be exercised to avoid sharp bends, protruding metal edges and unnecessary stress.  The minimum bending radius of Category 6A cables shall be 25 mm and minimum bending radius of other cables shall be 10 times of outside jacket diameter. Sharp metal edges in cable trays which could cut the cable shall be smoothed and the cable dressed away from these edges.  Dropouts shall be provided for cables leaving horizontal trays.

**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 10 of 14**

.5     Unless specified otherwise, all intra-building cable shall be pulled by hand.  Excessive pulling force will cause alteration of the cable's transmission characteristics to the extent that the installed system may not operate within the specified limits and the cable run will have to be replaced at no cost to UBC.

.6     The Contractor shall ensure that the cable runs freely from the reel or box, without excessive back pull and that all slack is taken up slowly.  Precautions shall be taken to protect reeled and unreeled cable from any source of possible damage while attended or unattended.

.7     If cable lubricants are necessary, ensure that they are compatible with the cable's outer sheath.  Refer to the lubricant and cable manufacturer's specification sheet to ensure compatibility.  Detergent-based lubricants shall not be used.

.8     When multiple pathways are available from one location to another, the Contractor shall fill up one pathway before installing cables in other pathways, choosing UBC IT designated pathway over shared pathway.

.9     The Contractor shall leave the manufacturer recommended amount of slack within the outlet box following termination, as too much slack at the point of termination may result in testing failures and too little slack can compromise future maintenance. No slack loops are permitted in any part of the system.

.10    Communications cables of all types must not be painted as at a minimum it will void the manufacturer warranty. Any cables that are painted will be immediately replaced at no cost to the University.

## 3.5     UTP/STP INSTALLATION

.1     All UTP/STP cable system work completed by the Contractor must be approved by the UBC Information Technology Representative.  The following basic requirements must be met to gain system acceptance.

   .1     Receive, check, unload, handle, store and adequately protect equipment and materials to be installed as part of the Contract.  In existing buildings, store in areas as directed by the UBC Information Technology Representative.   Installation includes setting in place, fastening to walls, floors, ceilings, cabinets or other structures where required, interconnecting cabling of system components if specified, equipment alignment and adjustment and other related work whether or not expressly defined herein.

   .2     Install materials and equipment in accordance with applicable standards, codes, requirements and recommendations of national, provincial and local authorities having jurisdiction and with manufacturer's printed instructions.

   .3     Adhere to manufacturer's published specifications for pulling tension, minimum bend radii and sidewall pressure when installing cables.

   .4     Install horizontal cabling from outlets to the nearest Communications closet in a continuous run without a splice, unless otherwise noted.

   .5     Most designs call for a cable tray/zone conduit, and J-hook support structure to facilitate cable system installation.  When installing, ensure cable is not subjected to stress due to contact with tray/conduit support mechanisms, bonding lugs or any metal burrs within the support structure.  Particular care must be taken when working around corners and offsets.  Pulling lubrication must be used at all times

**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 11 of 14**

to ensure a stress-free installation.

.6     Cable forming and termination procedures shall conform to the following requirements:

.1     All cable installation shall be done in a neat and tidy fashion, with cable routing closely following building lines.  All cable forming within the MCR's and LCR's shall also follow building lines.

.2     Cable shall be neatly arranged by full cable combing with no crossovers within the bundle. The UBC Information Technology Representative shall have final approval of cable forming quality and any workmanship issues. Bundles may be formed in Communication rooms using Velcro fasteners. Cables must not exhibit sheath deformation due to over-tightening.  If cable forming is not performed to the satisfaction of the UBC Information Technology Representative, the Contractor shall be responsible to re-form the bundles at no cost to the Owner.

.3     Termination practices must strictly comply with manufacturers' recommendations. Particular care must be taken to limit sheath removal length and pair un-twist at point of termination.  The TE cable termination tool – PN-1725080-1 or similar must be used for all Category 6A terminations. Use of 110 Impact tools is not acceptable. .4     Cables shall be terminated in sequential order on patch panels and on GigaBIX termination hardware.

.5     At each Communication outlet, follow the same termination practices as stipulated for the Communication room.  The Contractor shall leave the manufacturer recommended amount of slack within the outlet box following termination, as too much slack at the point of termination may result in testing failures and too little slack can compromise future maintenance.

.6     The Contractor shall neatly dress all cables within the Communications room to follow building lines.  The objective being, to provide a reasonable amount of slack into each cable run, while at the same time provide neatness and promote order as the cables migrate from the point-of-entry to the termination point. No slack loops are permitted.

.7     The UBC Information Technology Representative must give final approval to cable forming in the Communications rooms and termination quality at the outlets and in the Communications rooms before the work can be deemed as completed.

.8     In Communication rooms, horizontal cables shall be bundled separately from entrance and backbone cables. Cable bundles are not to exceed 24 cables per bundle in any communications room, and are not to exceed 40 cables per bundle in any other location.

**3.6     MISCELLANEOUS CABLES**

.1     UBC IT does not accept or employ; hybrid, under-carpet, or flat cables.

**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 12 of 14**

**3.7**   **CABLE SUPPORT**

.1      Cables must be properly supported at all times.  Cables shall not be left on floors of Communication rooms, or hallways, and shall be installed in a manner that will not allow deformation of the cable over time.

.2      Unless specified otherwise, all cables shall be bundled and supported to the walls at maximum intervals of 600 mm with Panduit J-mod system and Velcro type straps.

.3      Do not deform the cable jacket, specifically when using cable fasteners or ties.

.4      When installing Communications cables in long vertical drops in a building, the bundle of cables shall be rotated horizontally 180º every fourth floor.

.5      J-Hooks should not be utilized in new buildings or large scale renovations. J-Hook usage is reserved for small renovations or localized additions where it is not economically feasible to install the preferred forms of pathway.

**3.8**   **BIX CONNECTORS**

.1      The Contractor shall install GigaBIX distribution rings to support jumper wire, in a configuration that allows for the future expansion of the bix field. See ITSTD-13 for details.

.2      Only BIX punch tools shall be used when terminating cables on GigaBIX connector.

.3      Multi-pair cable bundles entering GigaBIX mounts and the hinging of GigaBIX connectors shall be on the jumper side of the mount.

.4      Backbone 25-pair UTP cables from the same Communication room must be grouped together and terminated sequentially on the GigaBIX connectors; group the cables from each Communications room together.  Once the first riser is terminated and numbered, every other riser in its group continues the number sequence.

.5      Backbone 4-pair UTP/STP cables are terminated directly on patch panels.  Four-pair backbone cables are terminated sequentially.

.6      Horizontal 4-pair UTP/STP cables are terminated with a maximum of six (6) cables per GigaBIX connector.

.7      Space for the protectors shall be provided to the left of the GigaBIX connector mounts.

**3.9**   **FIBRE OPTIC INSTALLATION**

.1      All fibre optic cable system work completed by the Contractor must meet quality approval as stipulated by the UBC Information Technology Representative and consulting Engineer. The following requirements must be met to gain system acceptance.

   .1      Receive, check, unload, handle, store and adequately protect equipment and materials to be installed as part of the Contract.  In existing buildings, store in areas as directed by the UBC Information Technology Representative and Consulting Engineer.  Installation includes setting in place, fastening to walls, floors, ceilings, cabinets or other structures where required, interconnecting cabling of system components, equipment alignment and adjustment and other related work whether or not expressly defined herein.

   .2      Install materials and equipment in accordance with applicable standards, codes, requirements and recommendations of national, provincial and local authorities

**Communications Guideline Specifications**
**UBC Vancouver**
**November 2023 Revision**

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 13 of 14**

having jurisdiction and with manufacturers' printed instructions.

.3 Adhere to manufacturers' published specifications for pulling tension, minimum bend radii and sidewall pressure when installing cables.

.4 The typical fibre backbone cables shall consist of a 24 strand – laser optimized – OM4 50/125 micron multimode cable and 24 strand single mode cable. All fibre shall be terminated using SC UTP connectors or SC UTP pigtails. Only pre-polished connectors will be accepted, UBC will not accept on site polished connectors. There shall be spot inspections by the UBC Information Technology. Any re-termination is done at no cost to UBC.

.5 No manual fusion splicing shall be performed.

.6 Fibre cable preparation, pigtail routing, and forming within the splice or distribution panel shall be as per manufacturer printed instructions.

.7 When splicing, all 900um fibre strands transitioning from cable sheath to splice tray and splice tray to bulkheads must be bundled inside protective tubing.

.8 After testing is complete all connector end faces will receive a final cleaning with a Cle-top or equivalent cleaning device. Alcohol wipes shall not be used.

.9 Dust caps must be present and installed on all fibre connectors and adapters that are not properly mated.

**3.10    TERMINATIONS**

.1 All cables shall be terminated in Communication rooms and at Communications outlets.

.2 The Contractor will not leave any cables un-terminated unless directed to do so by UBC Information Technology.

**3.11    TESTING**

.1 Category 6A UTP/STP testing shall conform to current ANSI/TIA/EIA-568-C Standard. Every cabling link in the installation shall be tested to the most current version of the ANSI/TIA/EIA Standard. Testing shall be accomplished using a CommScope Approved field tester with the appropriate permanent link adapters. Permanent link testing procedures shall be used to certify the system.

.2 25-pair Category 3 backbone cable testing shall consist of testing each cable pair for opens, shorts, grounds, crosses and pair reversal. Only a 100% pair pass rate will be accepted.

.3 Initially test every fibre within the fibre optic cable with a light source and power meter utilizing procedures as stated in TIA/EIA-526-14-A. Measured results shall be within manufacturers' loss budget calculations. If loss figures are outside this range, test cable with optical time domain reflectometer to determine cause of variation. Correct improper splices and replace damaged cables or connectors at no cost to UBC.

.1 Cables shall be tested at 850 nm and 1300 nm for multimode fibre optic cables.

.2 Testing procedures shall utilize "Method 1" – one jumper reference.

.3 Bi-directional testing of optical fibres is required.

**Communications Guideline Specifications**
**U.B.C Vancouver**
November 2023 Revision

**Section 27 05 08**
**CABLE INFRASTRUCTURE DESIGN GUIDELINE**
**Page 14 of 14**

.4       Random testing on all cabling mediums shall be done by UBC.  Where any portion of the system does not meet the specifications, the Contractor shall correct the deviation and repeat all applicable testing at no additional cost to UBC.

.5       Supply a complete set of electronic test results for all UTP/STP and fibre optic tests performed.

.6       After testing is complete all connector end faces will receive a final cleaning with a Cle-top or equivalent cleaning device. Alcohol wipes shall not be used.

.7       Dust caps must be present and installed on all fibre connectors and adapters that are not properly mated.

**END OF SECTION  27 05 08**