

## **SPECIFICATION STANDARD**

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#### **PART 1: GENERAL**

The Design Team and/or Contractor are held responsible to be familiar with the provisions contained herein and with other Sections of this Specification as applicable to the completion of the installation. The approved vendor, designated agent, or employee is held responsible to be familiar with the provisions contained herein and is assumed to possess the knowledge, manpower, and material applied to the completion of the installation.

- A. This section describes the installation locations for the products and materials, as well as methods and UNM IT standards associated with the Information Technologies installation portions of the project. These specifications, along with the drawings and other UNM IT-supplied specifications shall be followed during the design, construction, and installation.
- B. The contractor is required to be currently listed as a registered Manufacturer Certified Installer and Warranty Provider of the products to be installed. They shall be an approved Contractor under UNM's current RFP - Information Technology Structured Cabling, Equipment, Installation, Maintenance, and Repair and subsequent versions.
- C. Contractors shall provide personnel for cabling and infrastructure installations who are trained and certified by the manufacturer in the installation of the submitted products, and requirements of this document.

#### **1.01 SCOPE OF WORK**

- A. Work covered by this Section shall consist of furnishing labor, equipment, supplies, materials, and testing unless otherwise specified, and in performing the following operations recognized as necessary for the construction, installation, termination, testing, and labeling of all IT infrastructure as described on the drawings and/or required by these specifications.
- B. The Design Team and Contractor are required to be knowledgeable in all of the related sections contained within the UNM IT Specifications Standard and Design Guidelines to ensure that common work results are achieved.
- C. In addition to the design, installation, and construction requirements of these documents, all project-related design and construction shall meet the requirements of the following documents: UNM PDC Design Guidelines, Facilities Management, Engineering & Energy Services Design Standards, Electrical Specifications for Contractors and UNM Personnel Doing Work at the University of New Mexico and the Utility Division's Utility Design Guidelines, and all other UNM requirements.

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#### 1.02 RELATED SECTIONS

- A. Division 26 00 00 Electrical
- B. Division 27 00 00 Communications
- C. Division 28 00 00 Electronic Safety and Security
- D. Division 31 00 00 Earthwork
- E. Division 33 00 00 Utilities
- F. Any CSI Division that impacts Division 27 Specifications

#### 1.03 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. These Specification Standards shall be used as guidelines to develop Project Specifications and Drawings that shall depict the Information Technology infrastructure and cabling requirements for UNM IT installations. Contractors shall furnish labor and material shown and/or called for on the Drawing but not mentioned in the Specifications, or vise/versa, that are necessary for the installation and support of communications cabling whether or not specifically called for in both documents. In addition, the Contractor shall provide incidental equipment and material required for the completion of systems included in this contract whether or not specified or shown on the drawings.

#### 1.04 DEFINITIONS

**Approved/Approval:** Written permission to use a material, installation method, or system agreed upon by the University of New Mexico Information Technology Facilities Group.

**Air Blown Fiber: - ABF:** Fiber Optic Cable designed to be installed in a Micro Duct system with air pressure.

**Bonding Conductor - BC:** An insulated copper conductor that bonds the TMGB to the Service Equipment (power) Ground.

**Backbone:** A facility (e.g., pathway, cable, or conductors) between telecommunications rooms, or floor distribution terminals, the entrance facilities, and equipment rooms, within or between buildings.

**Backbone Cabling:** Cabling and connections hardware that provides interconnections between telecommunications rooms, equipment rooms, and entrance facilities.

**Building Distribution Frame – BDF:** The BDF is designated as the point where the outside plant cable terminates on the building entrance terminal (first-level backbone).

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These Building entrance terminals include provisions for optical fiber/twisted-pair cabling coming from the campus telephone switch facility where the Main Distribution Frame (MDF) is located.

**Connector (Jack):** A female telecommunications connection that may be keyed or unkeyed and may have 2 to 8 contacts connections that may be positioned, but not all the positions need to be equipped with contacts. Jacks are typically used to terminate cable at the endpoint and are inserted into faceplates to create a connection point for the user's equipment cord.

**Electromagnetic Interference – EMI:** Radiated or conducted electromagnetic energy that has an undesirable effect on electronic equipment of signal transmission.

**Equipment Room – ER:** An environmentally controlled centralized space for telecommunications that houses a main or intermediate cross-connect. An ER can contain equipment to support all of the following: (BDF) entrance protection, cable infrastructure pathway, data, and voice services, PBX, demarcation point, wireless, paging, fire/smoke detection, security alarm systems, radio, area of rescue assistance equipment, CATV and video conference.

**Furnish:** Supply and deliver installed in the approved designated area.

**Horizontal Cabling:** The cabling between and including the work area telecommunications outlet connector and the horizontal cross-connect/patch panels in the telecommunications room. This is a typical Category 6, 6A, 4 pair cable, but can also include multiple fiber cables for the desktop, coaxial cables, and other multi-media types of cables that provide service to end-user equipment.

**Install:** Mount and connect equipment and associated materials ready for use.

**Intermediate Distribution Frame – IDF:** A frame, rack, or termination block that connects to the BDF with copper optical fiber riser cables and distributes horizontal wiring to rooms (Second Level). In some situations, a BDF may serve this function.

**Inter Building Cable Plant:** Outside plant cable or infrastructure connecting two or more buildings for distribution of telephone, data, video, and control signals.

**Intra-Building Cable Plant:** Inside cabling or infrastructure within a building for the distribution of telephone, data, video, coaxial, and control signals.

**Multi Duct - MD:** for UNM this is multiple small ducts typically 8mm OD by 6.5 mm ID within an outer duct used for air blow fiber made by Dura-Line. Materials are made to match NEC Code requirements.

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**Outside Plant:** Telecommunications infrastructure designed installation exterior to buildings.

**Power Over Ethernet – POE:** POE or “Active Ethernet” eliminates the need to run 110/120 VAC power to a Wireless Access Point and other devices on a wired LAN.

Using POE systems installers need to run only a single Communications cable capable to handle the power requirements of the network device, both data and power are carried on the cable. This allows greater flexibility in locating the WAPs and network devices and significantly decreases installation costs in many areas.

**Private Branch Exchange – PBX:** A private telecommunications switching system.

**Protector:** A device to protect facilities and equipment from abnormally high voltages or currents.

**Provide:** Furnish, install connect readily for use.

**Pull Point:** A Pull Point is a space or assessable electrical box used to access cabling between floors for backbone and horizontal cabling within a building riser system.

**Required:** Necessary mandatory must be done.

**Shall:** A required practice, procedure, or method, mandatory requirement.

**Should:** A recommended best practice, procedure, or method. For this purpose of this Document Should be interpreted as Shall unless approved by UNM IT.

**Structured Cabling System (Universal Cabling System):** The complete collective configuration of telecommunications cabling and associated hardware at a given location. A structured cabling system is a cabling system where voice, data, video, and other low-voltage services are provided over the same cable media. All new cabling systems shall be of a structured design. The purpose of a structured cabling system is to cable a building for information needs without knowing specifically what equipment or services will be utilized on it. A structured cabling system is geared toward long-term sustainability and flexibility.

**Telecommunications:** A branch of technology concerned with the transmission, emission, and reception of signs, signals, writing, images, and sounds: that is information, of any nature by cable radio, optical, or other electromagnetic systems.

**Telecommunications Bonding Backbone - TBB:** An insulated copper conductor that bonds all TGBs to TMGB.

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#### **Telecommunications Bonding Backbone Interconnecting Bonding Conductor –**

**TBBIBC:** An insulated copper conductor that bonds two or more TBBs together in a multistory building.

**Telecommunications Grounding Busbar – TGB:** A copper grounding busbar is installed in every TR and is bonded to the TMGB by the TBB. All metallic items in the TRs are connected to TGB.

**Telecommunications Main Grounding Busbar – TMGB:** A copper ground busbar installed in the BDF or EDF and is bonded to the Service Equipment (power) ground by the Bonding Conductor (BC). It serves as a dedicated extension of the building grounding electrode system for telecommunications.

**Telecommunications Outlet – TO:** The standard telecommunications outlet is a device in the work area where a horizontal cable is terminated. This outlet is typically provisioned with three ports and the unused ports are blanked. The maximum capacity is six ports of Category 6, 6 Augmented cables, optical fiber, and/or coaxial cables. Face plates should match existing face plates in the area and the electrical faceplates on new projects.

**Telecommunications Room – TR:** A TR is a special-purpose room designed to provide IT services on a single floor. In buildings with multiple floors, TRs shall be vertically stacked to form a backbone pathway. The TR is a termination point in the voice and data infrastructure that the backbone and horizontal distribution cabling are connected to each other. A TR can contain equipment to support all of the following: cabling infrastructure, data and voice communications, wireless (satellite), paging, fire/ smoke detection, security alarm systems, radio, area of rescue assistance equipment, CATV, and video conferencing. (may be listed as ITTR, IT Closet, Telecommunications Closet TC).

**Universal Cabling System - UCS:** A USC is a cabling system where voice, data, video, and other low-voltage services are provided over the same cable media. All new cabling systems shall be of a UCS design. The purpose of a UCS is to cable a building for information needs without knowing specifically what equipment or services will be utilized on it. A UCS is geared toward long-term sustainability and flexibility.

**Wireless Access Point – WAP or AP:** Wireless access points are specially configured nodes on wireless local area networks (WLANs). Access points act as the central transmitter and receiver of WLAN radio signals.

**Voice over Internet Protocol – VoIP:** VoIP is the transmission of voice traffic over IP-based networks.

## 1.05 ACRONYMS

**AFF** Above Finished Floor

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|               |   |
|---------------|---|
| <b>ARCH</b>   | Architectural                                   |
| <b>MEP</b>    | Mechanical, Electrical, Plumbing                |
| <b>CAT</b>    | Category  |
| <b>CATV</b>   | Cable Television                                |
| <b>ER</b>     | Equipment Room                                  |
| <b>EMI</b>    | Electromagnetic Interference                    |
| <b>F/UTP</b>  | Foiled Shield Twisted Pair                      |
| <b>MH</b>     | Maintenance Hole                                |
| <b>UNM IT</b> | University of New Mexico Information Technology |
| <b>PB</b>     | Pull Box  |
| <b>PP</b>     | Pull Point                                      |
| <b>TGB</b>    | Telecommunications Grounding Busbar             |
| <b>TMGB</b>   | Telecommunications Main Grounding Busbar        |
| <b>TR</b>     | Telecommunications Room                         |
| <b>PBX</b>    | Private Branch Exchange (Phone Switch)          |
| <b>UTP</b>    | Unshielded Twisted Pair                         |
| <b>WAP</b>    | Wireless Access Point                           |

Also see “normative reference” for additional codes, standards, acronyms, definitions, and examples.

The BICSI Telecommunications Manuals are available as references for additional definitions and acronyms.

## 1.06 SYMBOLS

Lists of telecommunications industry symbols that shall be used in developing project documents are available from the National CAD Standard, and BICSI manuals.

## 1.07 NORMATIVE REFERENCES

The following organizations publish telecommunications construction standards with provisions that, through reference in this text, constitute provisions of this Document. At the time of publication of this Document, the editions of the standard, published by the organizations indicated were valid. Designers and/or installers of telecommunications and Networking services at the University of New Mexico must adhere to the telecommunications standards published by these organizations, all standards are subject to revision, and agreements based on this Document shall apply the most recent edition of the standard published by the organizations indicated.

|   |             |
|---|-------------|
| UNM IT Specification Standards                      | (UNM IT SS) |
| UNM IT Design Guidelines                            | (UNM IT DG) |
| Building Industry Consulting Services International | (BICSI)     |
| Telecommunications Industry Association             | (TIA)       |

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|                                      |        |
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| Electronic Industry Alliance         | (EIA)  |
| National Electrical Code             | (NEC)  |
| National Electrical Safety Code      | (NESC) |
| National Fire Prevention Association | (NFPA) |
| American National Standard Institute | (ANSI) |

## 1.08 STANDARDS AND REFERENCES

The following list of methods and standards included in the Normative References are considered part of the requirements of this specification. This is a list of primary references and does not limit the applicability of other standards that are incorporated into the list of Normative References applicable to the work described in these practices, described in Standards documents (and addenda) published by recognized standard bodies and organizations. All references listed are considered to be of the latest edition printed. These include standards published by the Telecommunications Industry Association / Electronics Industries Alliance (TIA/EIA) and Building Industry Consultant Services International (BICSI).

UNM IT DG, University of New Mexico Information Technology, *Design Guidelines*.

UNM IT SS, University of New Mexico Information Technology, *Specification Standard*.

BICSI TDMM and Specialty Manuals, Building Industry Consultant Services International, *Telecommunications Distribution Methods Manual*: These are manuals of proven design guidelines and methods accepted by the telecommunications industry.

ANSI/TIA/EIA 568, *Commercial Building Telecommunications Cabling Standard*: This prescribes the requirements for the Intrabuilding copper and optical fiber cable performance, installation, and testing.

ANSI/TIA/EIA 569, *Telecommunications Standard for Pathways and Spaces*: This standard includes specifications for the design and construction of pathways and spaces within buildings required to support information technology equipment and cable media.

ANSI/TIA/EIA 607, *Commercial Building Grounding and Bonding Requirement*: This document includes the components of an effective grounding system for communications systems within public and commercial buildings.

ANSI/TIA/EIA 758, BICSI *Customer-Owned Outside Plant Telecommunications Cabling Standard*: This standard provides specifications for Interbuilding Communications Facilities that include cable media, pathways, and spaces.

ANSI/TIA/EIA 862 *Building Automation Systems Cabling Standard Cabling for Commercial Buildings*: This standard describes the generic cable system for building for



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automation systems (BSA) That is intended to support a multi-product, multi-vendor automation environment within public and commercial buildings.

ANSI/NFPA 70, National Electrical Code, (NEC) In addition to standards related to electrical safety, the NEC has several sections that specifically address low-voltage cabling installation.

## **Part 2: PRODUCTS**

### **2.01 PRODUCTS STANDARD**

- A. All materials shall conform to the currently applicable industry standard including, but not limited to:
  - 1. Electronic Industries Alliance (EIA)
  - 2. American National Standard Institute (ANSI)
  - 3. National Electrical Manufacturers' Association (NEMA)
  - 4. American Society for Testing and Materials (ASTM)
  - 5. Insulated Cable Engineers Association (ICEA)
  - 6. Institute of Electrical and Electronic Engineers (IEEE)
  - 7. National Electrical Safety Code (NESC)
- B. In addition, all material shall be Underwrites Laboratories Listed unless otherwise indicated.
- C. The approved product manufacturers are listed in the current UNM Information Technology RFP for Structured Cabling, Equipment, Installation, Maintenance, and Repair, and/or in the approved UNM IT approved project CSI Division Specifications and/or in the UNM IT Request for Quotes.
- D. All products must be unused.
- E. Products substitutions shall be managed according to the following guidelines:
  - 1. All product submittals shall be approved by UNM IT before purchasing by the Contractor.
  - 2. Where specified only by reference standard, select any approved product meeting standard of the manufacturer.
  - 3. Where specified by naming several products or manufacturers, select any product and manufacture named in the UNM IT Specification Standard.
  - 4. Where specified by naming one or more products or manufacturers, but indicating "or approved equivalent" after the specified listing, the specified product is the preferred quality standard. The Contractor shall submit a request for the equivalent product for approval.



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5. Where specified by naming only one product and manufacture: There is no option and no substitutions will be allowed without prior approval by UNM IT.
6. Submit requests for substitution within 10 days of contract award, or sooner if required to maintain the construction schedule.
7. The Contractor must submit sufficient information to show that a proposed substitute is equivalent to the item specified.
8. Acceptance of substitutions is at the discretion of UNM IT. UNM IT reserves the right to determine the suitability of the substitute product and reject any material submitted for substitution.
9. All substituted products and materials must be approved for substitution by UNM IT in writing before installation.
10. Products rejected or otherwise judged unsatisfactory by UNM IT will not be authorized for use in completing the work. Any unapproved products discovered as part of the installation will be removed by the Contractor and replaced with UNM IT-specified and approved products at the Contractor's expense.
11. Project Drawings may be based on the equipment configuration of a particular manufacturer. If a substitution is approved, the Contractor shall make changes needed to accommodate the substitution at no expense to the University of New Mexico, including work under other divisions.

## **PART 3: EXECUTION**

### **3.01 IT INSTALLATION**

- A. Each Contractor shall be knowledgeable of work to be performed by other trades and take necessary steps to integrate and coordinate common work results with all trades.
- B. The Contractor shall be responsible for furnishing all materials on the drawings, specifications,- and addendums as specified herein for a complete IT system.
- C. All IT infrastructures shall be installed in an aesthetically pleasing fashion. Acceptable to UNM IT.
- D. All work shall be completed in a "workmanlike manner" as specified by the NFPA standards.
- E. All work by the contractor must comply with standard listed Normative and Applicable Standards listed in this Specification.
- F. The contractor is required to provide all drawings and obtain all permits from the proper jurisdiction for all work associated with this specification.
- G. All IT infrastructures shall be installed to ensure optimal performance.

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- H. All IT infrastructure shall be designed and installed to accommodate new work and modifications
- I. All work performed in occupied space shall be in a manner that allows UNM IT to operate the existing facilities continuously.
- J. All work that will affect the user connectivity, including wireless access points, shall be submitted for approval to the UNM IT two weeks before starting.
- K. New TRs must be free from dust, dirt, and other foreign materials before the installation of any termination hardware or the termination of copper or fiber optic.
- L. The contractor shall provide a Manufacturer's Warranty of not less than 20 years on the structured cabling systems and components, or as specified by UNM IT.
- M. All work by the contractor must comply with the manufacturer's product-recommended installation and warranty requirements.
- N. The Contractor shall provide to UNM IT all redlines, station documentation, and test results two weeks before substantial completion or end user move-in, whichever is earliest.
- O. The Contractor shall abide by all work rules, safety and security requirements, schedules, and other requirements established by the University, IT, or the General Contractor related to the work area or project.

### **3.02 SCHEDULES**

- A. Information Technologies (IT) Milestones shall be included and updated in all project schedules. Updates for these (IT) Milestones shall be provided to UNM IT at all construction meetings.
- B. An IT project schedule shall be provided and approved by UNM IT before the commencement of any work.
- C. The Contractor is responsible for scheduling inspections with UNM IT which are required after the following milestones but not limited to:
  - 1. Site Utility Locations.
  - 2. Communication Site Utility Rough-in, before covering (Concrete/backfill, etc.).
  - 3. Pathways and Electrical Rough-in before covering (In-wall/Ceilings/Floors).
  - 4. IT room Rough-in.
  - 5. IT room to build out (i.e. Cable tray, grounding, equipment racks, sleeves, firestop systems, power, etc.).

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6. Cable installation.
7. Cable termination.
8. Labeling.
9. Testing.
10. IT punch list.
11. Final acceptance.

### **3.03 DELIVERABLES TO UNM IT**

- A. IT Subcontractor (before start)
  1. Qualifications
  2. Certifications
- B. Product Submittals including specification data. (before purchase)
- C. Schedules including timelines and milestones. (before the start and updated when changed.)
- D. Test Results. (after testing and a minimum of 2 weeks to planned activation)
- E. Telecommunications Outlet Numbering Plan/Intra Building Numbering Sheets (IBNS) and a copy of the working as-built drawings. (after testing and a minimum of 2 weeks before planned activation).
- F. Final As-built Drawings shall be delivered to UNM IT two weeks after occupancy in both hard and electronic format. Any new outside plant or specified project as-built drawings require Auto Cad update.

**End of Section**