

SPECIFICATION STANDARD

COPPER RISER AND INTRABUILDING CABLING 27 14 13

PART 1: GENERAL

1.01 SCOPE OF WORK

- A. The Designer and Contractor are responsible to be familiar with the provisions contained herein and with other Sections of this Specification as applicable to the completion of the installation.
- B. 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 installation, termination, and labeling of copper riser infrastructure as described on the Drawings and/or required by these specifications.
- C. The extent of the inter building Copper Riser and Intra-building Cabling System shall be as shown in the project drawings or as specified.
- D. **The Contractor shall complete all work and turn over a completed and standards compliant Copper Riser and Intra-building Cabling System to meet the requirements of the UNM IT network system. The scheduled date for completion of horizontal cabling and associated optical fiber, copper backbone and wireless systems shall incorporate the activation dates for services need to activate all networked services including voice, data, special systems needed for a Certificate of Occupancy, the testing and operation of Building Monitoring Systems, and Electronic Safety and Security Systems.**

1.02 RELATED SECTIONS

- A. The project's architects, engineers, contractor, manufacturer, and/or University employee are responsible to be knowledgeable with the provisions contained within the following and other related sections of these standards of the UNM IT department as they apply to the completion of the project's installation and design.
 - 1. Division 27 Section 27 00 00 Communications
 - 2. Division 27, Section 27 05 28 Pathways for Communication Systems.
 - 3. Division 27, Section 27 05 53 Identification for Communication Systems.
 - 4. Division 27, Section 27 11 16 Communications Cabinets, Racks, Frames, and Enclosures.
 - 5. Division 27, Section 27 11 19 Communications Termination Blocks and Patch Panels.

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6. Division 27, Section 27 13 13 Communications Copper Backbone Cabling.
 7. Division 27, Section 27 13 23 Communications Optical Fiber Backbone Cabling.
 8. Division 27, Section 27 13 33 Communications Coaxial Backbone Cabling.
 9. Division 27, Section 27 14 23 Communications Optical Fiber Riser Cabling.
 10. Division 27, Section 27 14 33 Communications Coaxial Riser Cabling.
 11. Division 27, Section 27 15 23 Communications Optical Fiber Horizontal Cabling.
 12. Division 27, Section 27 15 33 Communications Coaxial Horizontal Cabling.
 13. Division 27, Section 27 15 43 Communications Faceplates and Connectors.
- B. Design, manufacture, test, and install the project's data cabling systems in accordance to the UNM IT design guidelines and standards, industry standards, manufacturer's requirements and in accordance with NFPA 70 (National Electric Code), state codes, local codes, requirements of authorities having jurisdiction, and particularly the most recent editions of the following standards and specifications.
1. UNM IT Design Guidelines and Standards
 2. This Technical Specification and Associated Drawings
 3. ANSI/TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises, and its published addenda.
 4. ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard, and its published addenda.
 5. ANSI/TIA-568-C.2, Copper Cabling Components Standard, and its published addenda.
 6. ANSI/TIA-568-C.3, Optical Fiber Cabling Components Standard, and its published addenda.
 7. ANSI/TIA/EIA-569-B, Commercial Building Standard for Telecommunications Pathways and Spaces, and its published addenda
 8. ANSI/TIA/EIA-606-A, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings, and its published addenda
 9. ANSI/J-STD-607-A, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, and its published addenda.
 10. Building Industries Consulting Services International (BICSI) Telecommunications Distribution Methods Manual (TDMM)
 11. ANSI/TIA-942, Telecommunications Infrastructure Standard for Data Centers, and its published addenda
- C. Determine and adhere to the most recent edition of these specifications when developing responses and during the installation.

1.03 QUALITY ASSURANCE

- A. UNM IT shall inspect the project's design documents and installation while in progress.
- B. It is the responsibility of the Contractor to schedule regular and milestone inspection times with UNM IT. It is incumbent upon the Contractor to verify that the installation and

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material used has been inspected before it is enclosed within building features, buried, or otherwise hidden from view. The Contractor shall bear costs associated with uncovering or exposing installations or features that have not been inspected.

- C. The Contractor will provide electronic test results and a 5 year manufacturer's warranty with a copy of the warranty to be submitted to UNM IT at the completion of work.

1.04 COOPER RISER AND INTRA-BUILDING CABLING SYSTEM DESCRIPTION

- A. The main Equipment Room (ER) and each Telecommunications Room (TR) shall house both voice and data backbone cabling and active equipment to support networking requirements. The ER in most cases shall be the main point of entry for network services as well as main distribution point for all backbone cabling to the TR.
- B. Copper Riser and Intra-building Cabling system shall consist of rated Category 3 or Category 5E riser cables and connectors, pathways, patch panels, terminations, equipment racks, cable management labeling and documentation. (IDC). Riser cables shall terminate in the designated equipment cabinet, TR or ER. All components shall be of the same manufacture's warranted cabling system. All cables shall be supported in the equipment racks and pathways accordance with the manufacturer's specifications and recommendations.
- C. All cables and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. Testing shall be done for category compliance to UNM IT requirements. All conductors and system components of each installed cable link shall be verified useable prior to system acceptance.
- D. Any defect in the cabling system installation including but not limited to cable, connectors, patch panels, termination blocks and all associated system components and parts shall be repaired or replaced at the providers expense in order to ensure 100% useable conductors in all installed cables.

PART 2: PRODUCTS

2.01 COPPER RISER CABLING

- A. Riser Cable - Provide riser cables from the ER/BDF to each TR/IDF as indicated on Drawings or as indicated herein.
- B. Riser cables shall consist of twenty-five pair bundled shielded twisted pairs, 24 gauge, solid copper Category 3 rated. Jacket shall be CMR (ARMM) or CMP rated to meet the application of the environment. The size of the cables and shielding will be determined in accordance with the projects requirements.
- C. Category 5E Power Sum Riser Cables requirements are project specific Approved manufacturers shall be AMP, Belden, CommScope, Berk-Tek, Superior Essex, General

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Cable, Mohawk or UNMIT approved equal. All manufacturers and products provided shall be recognized as an approved to meet the cabling system warranty provided by the system manufacturer.

D. Riser Termination Blocks and Patch Panels

1. See Section 27 11 17 Termination Blocks and Patch Panels for installation requirements.

PART 3: EXECUTION

3.01 TELECOMMUNICATIONS INSTALLATION

A. General:

1. This Section describes the installation locations for the products and materials, as well as methods and UNM IT Standards associated with the Telecommunications Installation portions of the Project. These Specifications, along with the drawings and other UNM supplied specifications shall be followed during the course of the installation.
2. The Contractor is instructed to coordinate his efforts with the other tradesmen who may be working within the same vicinity to avoid conflict and lost time.
3. The Contractor is required to supply all necessary tools, equipment, accessories, safety equipment, protective clothing, etc., as customary for the craft and necessary for the installation.
4. The Contractor shall verify space requirements and locations with UNM IT before starting cable installations and terminations.
5. The Contractor shall verify the cable type and jacket rating meets code and specifications requirements before installation.
6. The Contractor shall verify new conduit cable fill in riser conduit so as not to exceed 40% cable fill. Contractor shall notify UNM IT if existing riser conduit will meet or exceed the 60% cable fill. UNM IT will determine if additional conduits are required.

3.02 RISER CONDUITS

- A. Provide a measure marked 1320 tensile strength mule tape in each empty conduit to facilitate future installation of cables.
- B. Communication pathways requiring fire stopping shall utilize re-enterable fire stopping systems as per section 27 05 28 Pathways.
- C. All fire stopping penetrations shall conform to the recommended practices

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listed in UL1479 or ASTM E814 and must be labeled with the UL1479 or ASTM E814 reference number, dated, and signed by the technician who installed the fire stopping material.

- D. The cabling installation contractor is responsible ensure all penetrations requiring firestop are completed.

3.03 RISER COPPER CABLING

- A. The category 3 copper riser cabling will be terminated at the ER/BDF and TR/IDF on 110 type wiring blocks.
 - 1. A second set of 110 blocks shall be installed where the 25 pair pre-connectorized tails go to a voice rated patch panel located near the top of the racks, and above the horizontal cable patch panels.
 - 2. A third set of 110 blocks shall be installed where life safety cables are installed.
 - 3. These blocks utilize cross connection wires to complete the circuits.
- B. Category 5E Power Sum cabling shall be terminated such that wire pair twists are maintained as closely as possible to the point of mechanical termination. No greater than 0.5. Maintain cable sheath to leading edge of connector block.

3.04 CABLE INSTALLATION

- A. The contractor shall verify that all cables are free from damages or defect prior to installation.
- B. All damaged or defective cabling shall be replaced with new product.
- C. Cable bends shall not be greater than that recommended by the manufacturer of the cable. Ensure the cable sheath is not deformed, perforated, kinked or damaged in any manner.
- D. Care shall be taken so as not to damage cable during the installation process and that manufacturer's pull tension specification is not exceeded.
- E. Terminate all cable pairs and binders in numerical order by color code.
- F. When breaking out any multi-pair copper cable of 25 pairs or greater for splicing or termination, the binder groups shall have PIC color coded cable ties attached to the cable at the point of fan out from super groups for splicing, and at the point of fan out for termination on termination blocks. (Panduit Part Number PAN-TY PPC25X50F). Provide splice diagrams for all splices in the project's IT deliverables package.

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- G. Bond all metallic cable sheaths to the room's Telecommunications Main Ground Bar.
- H. Provide individual riser cable to each floor, IT room or specified equipment cabinet.
- I. Label all cables as direct by UNM IT and in accordance with Division 27, Section 27 05 53 Identification for Communication Systems.
- J. Within TRs, cables shall be snugly wrapped and attached using Velcro reusable cable ties, a minimum of every 3feet-0 inches for cable organization. Metallic tie wraps shall only be used on OSP cables or in environments that degrade plastics and shall be tightened so as not to deform cable jackets and thus affect cable performance.
- K. Cable fill in riser conduits shall not exceed 40% cable fill on initial installation.
- L. All riser and horizontal backbone conduits in the work areas shall be environmentally sealed or fire rated sealed as applicable. Including those cables and pathways which exist and are not directly included in the scope of work. The work area defined for these requirements includes IT Rooms, hallways and other spaces which cables were installed.
- M. 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 cables. The door with a sweep or threshold into the telecommunication rooms must be installed and closed during termination.

3.05 CABLE TESTING AND ACCEPTANCE

- A. The vertical multiple pair copper riser cables shall be tested and documentation should be provided to UNM IT.
- B. Physical inspection requirements include:
 - 1. Installation evaluation
 - 2. Placement and support
 - 3. Conduits seals
 - 4. Splices – bonding, color coding, neatness, fold back
 - 5. Splice cases – NEC and Manufacturers instructions
 - 6. Grounding and bonding
 - 7. Waterproofing compound
 - 8. Labeling
 - 9. Cleanup
- C. Testing and documentation requirements include:
 - 1. Line mapping result: Pass/Fail
 - 2. Proper wiring configuration for cable pairs and bundles
 - 3. Open conductors- Shall be repaired
 - 4. Split pairs

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5. Reversed pairs
6. Shorts – provide ohms & provide loop resistance in ohms
7. Grounds – provide ohms & distance to fault on failures
8. Crossed pairs
9. Pair Integrity- UNM IT expects 100% Pair Integrity.
10. Verify red lines or provide as-builts to submittals of the installation.
11. Test Category 5E in accordance to the test requirements in TIA 568 for category 5E cabling. Provide these test results in a format directly downloaded from the cable tester.
12. Provide all test results in electronic test reports directly from the cable tester. Handwritten reports are not acceptable.

3.06 EQUIPMENT INSTALLATION AND CABLE TERMINATIONS

- A. All equipment shall be installed in a neat and workmanlike manner, arranged for convenient operation, testing and future maintenance.
- B. All paired cables shall be installed and terminated by technicians experienced in the termination of cables on 110/66 connector blocks in proper color code sequence.
- C. The Contractor shall employ manufacturer certified system installation technicians and have at least 5 years experience in the installation of similar and equivalent systems. The Contractor shall supply verification of experience, for this type of work, to the UNM IT for approval before performing any work.
- D. All cable shall be installed, terminated and labeled in sequential order.

3.07 AS-BUILT INFORMATION

- A. Contractor shall provide as-built information to UNM IT to accompany all test result information. Provide an As Built drawing and summary of work performed page submitted in an accepted readable format to UNM IT.
- B. As-built information shall be submitted to UNM IT in electronic PDF format. In the drawing indicate location of all riser conduit routes, distribution cable trays, junction boxes, and all additions and deletions pertaining to telecommunications. Include riser labeling next to all telecom symbols (symbols are from the national CAD Standard and BICSI).
- C. If construction drawings are not utilized, Contractor shall provide all telecommunications location information on an accurate scaled floor plan.
- D. The Contractor shall perform all labeling requirements and provide testing documentation for verification as described herein.
- E. Contractor shall submit cable records to reflect all moves, adds, and changes

3.08 SYSTEM WARRANTY REQUIREMENTS

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- A. The Contractor shall provide a five year warranty document for parts and labor on all riser cable installations.

END OF SECTION

