

SPECIFICATION STANDARD

Communications Copper Backbone Cabling

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PART 1: GENERAL

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 installation, termination, and labeling of copper backbone infrastructure as described on the drawings, project specifications, and/or required by these specification standards.

1.02 RELATED SECTIONS

- A. Division 26 Electrical
- B. Division 27 Communications Systems
- C. Division 28 Electronic Safety and Security

1.03 COORDINATION

- A. The contractor shall coordinate the work specified in this Section with the work in other parts of the Contract document.
- B. Plans in general are diagrammatic. It is the full responsibility of the Contractor to be familiar with the location of equipment involved under the work of other trades to eliminate conflicts between the multipair copper cable installation and the work of other trades.
- C. All questions and issues about coordination shall be directed to UNM IT.

1.04 SUBMITTALS

- A. All submittals for substitutions or modifications shall be made to the UNM IT for approval before the start of work. (See Section 27 0000)
- B. The Contractor shall submit a copper cable pulling plan for all multipair copper cables with a pair count of 25 pairs or greater, that includes, but is not limited to, the UNM IT Standard Specification Backbone Cabling 27 13 13 following:
 - 1. Each cable run and route.
 - 2. Date and duration of the pull.
 - 3. Pulling methodology and equipment setups.
 - 4. Safety issues and precautions to be taken.

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1.05 SUBSTITUTIONS

- A. The intent of Specifications:
1. Where specified only by reference standards, select any product meeting standards of any manufacturer.
 2. Where specified by naming several products or manufacturers, select any product and manufacturer named that meets the specified requirements. Other products and manufacturers will not be considered.
 3. Where specified by naming one or more products or manufacturers, but indicating "or equivalent" after the specified listing, the specified product is the preferred quality standard. The Contractor may submit a request for another product for acceptance.
 4. Where specified by naming only one product and manufacturer: There is no option and no substitution will be allowed.
- B. Submit requests for substitutions within 10 days of contract award, or sooner if required to maintain the construction schedule.
- C. The Contractor must submit sufficient information to show that a proposed substitute is equivalent to the item specified. Acceptance of substitutions is at UNM IT's discretion: UNM IT reserves the right to determine the suitability of the substitute product and reject any materials submitted for substitution. All substitute products and materials must be approved for substitution by UNM IT in writing before installation.
- 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 and replaced with UNM IT-specified and approved products at the Contractor's expense.
- D. 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 UNM IT University, including work under other divisions.

1.06 QUALITY ASSURANCE

- A. Verification: UNM IT will maintain inspection personnel on the job site. It is incumbent upon the Contractor to verify that the installation and material used have been inspected

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by UNM IT before it is enclosed within building features or otherwise hidden from view. The Contractor shall bear costs associated with uncovering or exposing installations or features that have not been inspected by UNM IT.

- B. Equipment Qualifications: The Contractor is to use equipment and rigs designed for pulling, placement, and termination of backbone cable; including reel trucks, mechanical mules, sheaves, shoes, anchors, etc., and equipment for drilling masonry, installing anchors, etc., to install support and cable management hardware.

PART 2: PRODUCTS

2.01 COPPER CABLE

- A. Outside plant copper cable shall be Bell Specification Filled Aluminum Polyethylene (ALPETH) Sheath cable with Dual Expanded Polyethylene (DEPIC) Insulated Conductors. or RUS PE 89 Equivalent or specified.
- B. Approved cable manufacturers are Superior Essex or General cable as specified; Cable Code ANMA, 24 AWG filled ALPETH.
- C. Cable construction shall be as follows or as specified:
1. Conductor - Solid annealed copper in 24 AWG.
 2. Insulation - Dual expanded high-density polyethylene (foam skin) with outer skin color-coded following telephone industry standards.
 3. Twisted Pairs – Individual conductors twisted into pairs with varying twists and lay to minimize crosstalk, and specified color combinations to provide pair identification.
 4. Core Assembly – Assembled in units, each individually identified by color-coded unit binders. Before the application of the outer sheath, and jacket, the core is filled with a filling compound that resists moisture penetration.
 5. Filling compound – 80 degrees F. expanded thermal plastic rubber, compatible with most commercially available encapsulants. Cleaning of conductors is required (Flexgel or equivalent).
 6. Shielding System – Corrugated 8 mil electrically contiguous aluminum tape applied longitudinally with overlapped edges over the core wrap. A polyolefin-based flooding compound is applied over the aluminum tape.
 7. Jacket – Black, polyethylene, or as specified or required by code.
 8. Identification and Length Marking – The manufacturer's cable code pair size, manufacturing plant location, month and year of manufacture, sequential length markings, and telephone handset symbol are imprinted onto the jacket every two feet.
 9. Provide special use cables where required i.e. aerial, armored, tunnels, air core,

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rated, etc. With the approval of UNM IT it is incumbent on the contractor to identify, design for, and provide special-use cables where required.

2.02 CIRCUIT PROTECTION

- A. Circa 1880 ECA (110 to 110 connection) or 1880 B (cable stub) Type Multipair Protector Panels installed with Circa C3B1S 5 pin digital fault protected units or UNM IT approved equivalent. Install per manufacturer's instructions.
- B. The Contractor is required to confirm with UNM IT before purchasing to ensure proper application for PBX and Equipment Room installations.
 - a. See Section 27 11 13 Copper Splicing and OSP Protection

2.03 TERMINATION BLOCKS

- A. See Section 27 11 19 Termination Blocks and Patch Panels

2.04 PIC COLOR-CODED CABLE TIES

- A. Panduit PIC Color Coded Cable Ties - Panduit Part Number PAN-TY PPC25X50F or UNM IT approved equivalent.

2.05 SHIELD BOND CONNECTORS

- A. 3M Scotchlok 4460 Series Shield Bond Connectors, or UNM IT approved equivalent.

2.06 ENCAPSULANT

- A. 3M High Gel re-enterable Encapsulating Compound 8882 or UNM IT-approved equivalent.

2.07 SPLICE CASES

- A. Needs to match the application and environment that it is applied to. Per UNM IT approval

PART 3: EXECUTION

3.01 CABLE INSTALLATION

- A. The contractor shall submit the cable-pulling plan to UNM IT before the commencement of the operation.

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B. Cable Pulling Tension Limitations

1. Refer to ANMA Pulling Tension Specification Sheet.

C. Install shield bond connectors to the shields of all cables thru splicing and terminations at the Protector Panels. Verify continuity from end to end.

D. The Contractor shall apply an appropriate amount of damming/blocking compound injected into the filled copper cables in indoor or dry environments to prevent seepage of cable-filling compounds. This also can be accomplished by splicing a cable stub to transition to a dry cable. Either method needs to be approved by UNM IT.

E. Before splicing or terminating in dry or indoor installations, all exposed cable pairs shall have the filling compound thoroughly cleaned off the cable insulation using appropriate cleaning solvents.

F. All pairs spliced shall be tested and all splice-related faults cleared before sealing the closure assembly.

G. The Copper Backbone cables shall be tested, and documentation shall be provided to UNM IT.

1. Physical inspection requirements include:

- a. Installation evaluation of products installed to the applicable code and manufacturer's requirements.
- b. Place and support with stainless steel straps and support apparatus, proper bend radius with no kinks in the cable.
- c. Conduits seals
- d. Splices, bonding, color coding, neatness, fold back
- e. Splice cases – Install to the Manufacturer's instructions.
- f. Grounding and bonding
- g. Waterproofing compound
- h. Labeling
- i. Cleanup

2. Testing and documentation requirements include:

- a. Test and pictures of the cable bonding to the ground.
- b. Line mapping result: Pass/Fail
- c. Proper wiring configuration for cable pairs and bundles
- d. Open conductors- Shall be repaired
- e. Split pairs
- f. Reversed pairs
- g. Shorts – provide ohms & provide loop resistance in ohms

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- h. Grounds – provide ohms & distance to fault on failures
 - i. Crossed pairs
 - j. Pair Integrity- UNM IT expects 100% Pair Integrity.
 - k. Verify red lines or provide as-builts to submittals of the installation.
- J. All test results and pictures are to be recorded and provided to UNM IT for verification.

3.02 CABLE AND TERMINATION PANEL LABELING

- A. Label the installed cables following UNM IT Division 27,
Section 27 05 53.

3.03 CABLE SUPPORT

- A. Provide cable supports in UNM Tunnel System with a steel messenger cable to support the new cable. (Submittal approval is required from UNM IT)
- B. Stainless Steel strapping is required for cable banding applications that require various bundle sizes. (Submittal approval is required from UNM IT)
- C. Provide cable supports and clamps to attach cables to backboards and walls.
- D. Attach horizontal and vertical backbone cables at a maximum of three-foot intervals using UNM IT-approved supports to avoid cable sagging.
- E. All entrance cables shall have a minimum of a six-foot slack loop up to the protector block.
- F. Attach cables to manhole racks using UNM IT-approved methods.

END OF SECTION