

PART 1: GENERAL

PART 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 and/or required by these specifications.

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

1.03 COORDINATION

- A. 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 with regard to coordination shall be directed to the UNM IT.

1.04 SUBMITTALS

- A. All submittals for substitutions or modifications shall be made to the UNM IT for approval prior to 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 1313 following:
 - 1. Each cable run and route.

2. Date and duration of the pull.
3. Pulling methodology and equipment setups.
4. Pulling methodology and equipment setups.
5. Safety issues and precautions to be taken.

1.05 SUBSTITUTIONS

A. Intent of Specifications:

1. Where specified only by reference standards, select any product meeting standards by 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 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 discretion: UNM IT reserves the right to determine suitability of the substitute product and reject any and all materials submitted for substitution. All substitute products and materials must be approved for substitution by UNM IT in writing prior to 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 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 has been inspected 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. Cable construction shall be as follows:
 - 1. Conductor - Solid annealed copper in 24 AWG.
 - 2. Insulation - Dual expanded high density polyethylene (foam skin) with outer skin color coded in accordance with 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. Prior to the application of the outer sheath, and jacket, the core is completely filled with 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.
8. Identification and Length Marking – Manufacturer’s cable code pair size, manufacturing plant location, month and year of manufacture, sequential length markings and telephone handset symbol are imprinted onto jacket every two feet.
9. Provide special use cables where required i.e. aerial, armored, tunnels, air core, 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 PROTECTOR PANELS

- 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 ITS/CNS approval.

PART 3: EXECUTION

3.01 CABLE INSTALLATION

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

- C. Cable Pulling Tension Limitations
1. Refer to ANMA Pulling Tension Specification Sheet.
- D. The Cable shall be General Cable, Superior Essex 24 AWG Filled Alpth or approved Equivalent, Cable Code ANMA.
- E. Install shield bond connectors to the shields of all cables thru splicing and terminations at the Protector Panels. Verify continuity from end to end.
- F. 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.
- G. Prior to 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.
- H. All pairs spliced shall be tested and all splice-related faults cleared prior to sealing the closure assembly.
- I. The Copper Backbone cables shall be tested and documentation should be provided to UNM IT.
1. Physical inspection requirements include:
 - a. Installation evaluation
 - b. Placement and support
 - c. Conduits seals
 - d. Splices – bonding, color coding, neatness, fold back
 - e. Splice cases – NEC and Manufacturer’s instructions
 - f. Grounding and bonding
 - g. Waterproofing compound
 - h. Labeling
 - i. Cleanup
 2. Testing and documentation requirements include:
 - a. Line mapping result: Pass/Fail
 - b. Proper wiring configuration for cable pairs and bundles
 - c. Open conductors- Shall be repaired
 - d. Split pairs
 - e. Reversed pairs

- f. Shorts – provide ohms & provide loop resistance in ohms
- g. Grounds – provide ohms & distance to fault on failures
- h. Crossed pairs
- i. Pair Integrity- UNM IT expects 100% Pair Integrity.
- j. Verify red lines or provide as-builts to submittals of the installation.

J. All test results are to be recorded and turned over to UNM IT for verification.

3.02 CABLE AND TERMINATION PANEL LABELING

- A. Label the installed cables in accordance with UNM IT Division 27, Section 27 05 53.

3.03 CABLE SUPPORT

- A. Provide cable supports and clamps to attach cables to backboards and walls.
 - 1. Attach horizontal and vertical backbone cables at a maximum of three foot intervals using UNM IT approved supports in order to avoid cable sagging.
 - 2. All entrance cable shall have a minimum of a six foot slack loop up to the protector block.
- B. Attach cables to manhole racks using UNM IT approved methods.

END OF SECTION