

SECTION 27-13-13 COMMUNICATIONS COPPER BACKBONE CABLING

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The work covered by this section of the Specifications shall include all labor necessary to perform and complete such construction, all materials and equipment incorporated or to be incorporated in such construction and all services, facilities, tools and equipment necessary or used to perform and complete such construction. The work of this section shall include, but is not limited to, the following:
 - 1. A complete copper twisted pair backbone cabling system to support voice circuit distribution as well as data communications with cables, termination hardware, splices, and necessary installation and supporting hardware.

1.02 QUALITY ASSURANCE

- B. Refer to Section 27-00-00 for general details.
- C. As noted in Section 27-00-00, all contractors and installers working on structured cabling system elements shall hold a current manufacturer's certification for each individual component they install.

1.03 CODES, STANDARDS, AND GUIDELINES A. UL 444

- A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations in Section 27-00-00.
- B. Cal Poly ITS Telecomm group, Telecommunications Standards Document and the Labeling, Design & Syntax Standards in Appendix B.

1.04 SUBMITTALS

- A. Refer to Section 27-00-00 for general details.
- B. Shop Drawings:
 - 1. Shop drawings shall show cable routing details.
- C. Submit Manufacturer's Cut Sheets for the following:
 - 1. Any products not specifically listed in the PRODUCTS section shall require a submittal of the manufacturer's cut sheets and approval by the Cal Poly ITS Telecomm group.
- D. Manufacturers Testing:
 - 1. Submit as testing results as required by Section 27-08-13.
 - 2. Multi-pair copper riser cables: The Contractor shall submit two (2) sets of the manufacturer's test results for continuity, shorts and breaks.

1.05 IDENTIFICATION

- A. Machine generated, 1", nylon labels with black lettering shall be placed on all copper backbone and riser cables.

- B. Labels containing a unique cable ID designator developed by the contractor using the Cal Poly ITS Labeling, Design & Syntax Standard in Appendix B and approved by a Cal Poly ITS Telecomm group shall be placed on both ends of all cables, 6 inches from the termination and/or terminal block, and in all pull boxes in the pathway.
- C. ***Subsequent to placing and terminating cables, the Contractor shall place the appropriate labels as indicated above.***
- D. If at any time during the job the label becomes illegible or removed for whatever reason, the Contractor shall immediately replace it with a new label at the Contractor's expense.
- E. ***All labels shall be easily accessible, both physically and visually, upon completion of the job.***
- F. Refer to Section 27-05-53 for additional details.

1.06 DEFINITIONS

- A. Backbone Cable as defined in this section shall be intra-building riser cable for use between EFs/TRs/ERs
- B. OSP Cable as defined in Section 27-13-14 is inter-building cable for use between EFs.

1.07 WARRANTY

- A. Refer to Section 27-00-00 for general details.

PART 2 – PRODUCTS

2.01 PRODUCT CONSISTENCY

- A. Product Consistency: Any given item of equipment or material shall be the product of one manufacturer throughout the facility. Multiple manufacturers of any one item will not be permitted.

2.01 COPPER CABLES – GENERAL

- A. Cable jacket marking: Must be legible and shall contain the following information:
 - 1. Manufacturer's name
 - 2. Copper Conductor Gauge
 - 3. Pair Count
 - 4. UL and CSA listing
 - 5. Manufacturer's Trade Mark
 - 6. Category rating
 - 7. Sequential foot markings, in one foot increments

2.02 COPPER CABLE (BACKBONE)

- A. Cable jacket shall be white, plenum rated, with black lettering.
- B. Cable must be ARMM riser rated.
- C. Cable construction specifications:
 - 1. Core wrap – Polypropylene Film.

2. Shield – Corrugated Aluminum tape bonded to riser rated jacket.
- D. The cables consist of 22 AWG foam polyethylene insulated conductors with plenum rated skin formed into binder groups of 25 pairs using standard PIC color coding.
- E. Approved Manufacturer: Superior Essex or Cal Poly ITS Telecomm group approved equal

PART 3 – EXECUTION

3.01 GENERAL

- A. Location and placement of backbone cables shall be shown on the Drawings. **Submit Shop Drawings to the ITS Telecomm group for approval of block field, protector and splice case layouts and locations as well as OSP cable routing before starting work.**
- B. Backbone copper cabling shall not share pathways with backbone fiber cabling or any horizontal cable unless approved in advance by the Cal Poly ITS Telecomm group.
- C. Backbone copper cabling shall be installed point to point. **Terminating a subgroup of conductors from a cable within a conduit and continuing to another location shall not be allowed.**
- D. **Absolutely no in-line splicing of backbone copper cabling shall be allowed.**
- E. Contractor is to verify (in advance) sufficient end to end pathway fill ratios for cable runs prior to installation.
- F. **No cross-connects shall be installed until after the backbone cable test reports have been reviewed and accepted by the Cal Poly ITS Telecomm group representative. All cross-connects shall typically be installed by the Cal Poly ITS Telecomm group.**

3.02 QUANTITIES

- A. Quantities of system elements shown on the drawings are illustrative only and are meant to indicate the general configuration of the work. The Contractor shall be responsible for providing the correct quantities of materials to construct a system that meets the intent of these Specifications and the relevant codes.

3.03 INSTALLATION

- A. Cabling:
 1. Unless otherwise noted, all backbone cables shall be routed through continuous conduit from point to point.
 2. All backbone cable, once exposed, shall be provided with appropriate support.
 3. **At the same time cable is pulled into a conduit also install a pull rope to facilitate future cable pulls along those pathways. Pull rope shall be (minimum) nylon ¼" with 600 lb. pulling tension.**
 4. Cables running on ladder racking within an EF/TR/ER shall be neatly placed and lashed to the horizontal and vertical ladder racking with wire ties at every rung.
- B. Cable Terminations
 1. All riser cables shall be "punched down" on 66 blocks in the EF/TR/ER.
 2. Cable pair twists shall be maintained up to within 1/2 in. of the point of termination for backbone cables. For other backbone cables, maintain twists as close as practicable to the point

of termination. Under no circumstances shall cable pairs be untwisted or otherwise altered prior to termination.

3. All terminations shall follow industry standard uniform color codes.

3.04 GROUNDING & BONDING

- A. All termination locations for backbone copper cable shall bond the cable shield to the TGB/TMGB with a #6 AWG copper bonding conductor.
- B. Refer to Section 27-05-26 for additional details.

3.05 TESTING

- A. For testing details see Section 27-08-13

3.06 ACCEPTANCE

- A. Upon receipt of the Contractor's documentation of testing, the Cal Poly ITS Telecomm group representative shall review/observe the installation and may randomly request tests of the cables/wires installed. Once the installation and testing has been completed and the Cal Poly ITS Telecomm group representative is satisfied that all work is in accordance with the Contract Documents, the Cal Poly ITS Telecomm group representative shall notify the Contractor and/or Cal Poly Project Manager in writing or via email.

3.07 RECORD (AS-BUILT) DRAWINGS

- A. *The Project Record Drawings shall show the types and locations of all backbone cabling. Drawings shall include identifying information from the cable identification labels.*

END OF SECTION

DOCUMENT VERSION CONTROL

REVISION	DATE	AUTHOR	REASON
1	02/20/2014	R. VOLK	INITIAL DOCUMENT DEVELOPMENT
	02/20/2014	DW & MH	PRIMARY REVIEW COMPLETE