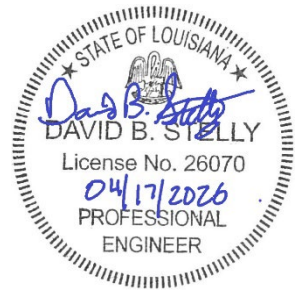


SECTION 28 05 13 - TELEPHONE/DATA/CATV COMMUNICATION SYSTEM(S)



PART 1 - GENERAL

- 1.1 The Contractor shall provide, install and connect the complete telephone/data system equipment, backboards, conduit, cable tray, j-hooks, wiring and testing as specified herein and shown on the drawings.
- 1.2 SCOPE OF WORK
- A. This installation includes the furnishing of labor, materials, and equipment required for the installation of all service, inside station, and riser cables for telephone and data use between distribution frames, and to each station outlet location required by the plans and specifications.
- B. The work shall include but is not necessarily limited to the following:
1. Furnish and install two (2) 4-pair EIA - Category 6a UTP telephone/data station cable to Tesla PSU shown on the drawing and specified herein. Coil 36" of spare cable (for each cable installed) and secure loop at quarter points of the loop. Extend cables to respective termination point(s).
- 1.3 APPLICABLE DOCUMENTS
- A. The following current issues of rules and regulations shall apply to this scope of work:
1. EIA/TIA 568, 569, 570, 606, TSB36, TSB40
 2. Building Industry Consulting Service (BICS)
 3. Telephone Standards Handbook GHB-155
 4. Planning Handbook CHB-156
 5. Design Handbook CHB-157
 6. REA Construction and Installation Manuals
 7. REA Specification PC4 for Acceptance Tests
 8. List of Materials Acceptable for use on telephone systems of REA borrowers
 9. National Electric Code (NEC)
 10. State and Local Codes
 11. Telco System Practices
 12. UL
- 1.4 GENERAL REQUIREMENTS
- A. Installation costs including all necessary materials, cables, closures, bridging clips, splice materials, and terminations are to be the responsibility of the Contractor.
- B. All cables, wires, and equipment shall be securely and neatly installed. Inside routings shall be installed parallel and perpendicular to existing structural lines and members.
- C. All cables, wires, and equipment shall be firmly held in place. Fastening and support shall be adequate to support their load with ample safety factors.
- D. The Contractor shall be responsible for replacing, restoring, or bringing to original condition any damage to floor, ceilings, walls, furniture, grounds, pavement, etc., caused by his personnel and operations. Contractor shall restore any damage or disfigurements at his expense.

- E. Cables shall be continuous; no splices will be allowed.
- F. The Contractor shall refer to the Construction Phasing Description section of these specifications for additional information and requirements. It is intended that the Telephone and Data Communications System be placed in service and be of beneficial use to the Owner at the completion of each construction phase of the work prior to occupancy by the Owner.
- G. The Contractor shall coordinate all of his work with the Owner's Information Network Department to maintain tele/data service to the old and new systems as may be required. The Contractor will provide all new services as specified and shown on the drawings in a timely manner.
- H. The Contractor shall not interrupt existing tele/data services and systems in any way until new facilities are in place and approval is received from the Information Network Department and the Architect/Engineer.

1.5 SUBMITTALS

- A. Submit to the engineer shop drawings, product data (including cut sheets and catalog information). Submit shop drawings, product data with such promptness and in such sequence as to cause no delay in the work or in the activities of separate contractors. The engineer will indicate approval of shop drawings and product data submitted to the engineer by stamping such submittals "APPROVED" with a stamp. Submitted shop drawings shall be initialed or signed by the contractor, showing the date and the contractor's legitimate firm name.
- B. By submitting shop drawings and product data, the contractor represents that he or she has carefully reviewed and verified materials, quantities, field measurements, and field construction criteria related thereto. It also represents that the contractor has checked, coordinated, and verified that information contained within shop drawings and product data conform to the requirements of the work and of the contract documents.
- C. The engineer remains responsible for the design concept expressed in the contract documents as defined herein.
- D. The engineer's approval of shop drawings and product data submitted by the contractor shall not relieve the contractor of responsibility for deviations from requirements of the contract documents, unless the contractor has specifically informed the engineer in writing of such deviation at time of submittal, and the engineer has given written approval of the specific deviation. The contractor shall continue to be responsible for deviations from requirements of the contract documents not specifically noted by the contractor in writing, and specifically approved by the engineer in writing.
- E. The engineer's approval of shop drawings and product data shall not relieve the contractor of responsibility for errors or omissions in such shop drawings and product data.
- F. The engineer's review and approval, or other appropriate action upon shop drawings and product data, is for the limited purpose of checking for conformance with information given and design concept expressed in the contract documents. The engineer's review of such submittals is not conducted for the purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the contractor as required by the contract documents. The review shall not constitute approval of safety precautions or of construction means, methods, techniques, sequences,

or procedures. The engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

- G. Perform no portion of the work until the engineer has approved the respective submittal. Such work shall be in accordance with approved submittals.
- H. Submit shop drawings and product data as a complete set within thirty (30) days of award of contract.
- I. For initial submission and for re-submission required for approval, submit one (1) electronic copy of each item. Make reproductions as required for your use and distribution to subcontractors. Reproduction of documents will be at contractor's expense. Illegible submittals will not be checked by the engineer.
- J. General: Submit the following:
 - 1. Bill of materials, noting long lead time items
 - 2. Project schedule including all major work components that materially affect any other work on the project
- K. Shop drawings: Submit the following:
 - 1. Backbone (riser) diagrams.
 - 2. System block diagram, indicating interconnection between system components and subsystems.
- L. Product Data -- Provide catalog cut sheets and information for the following:
 - 1. Wire/Cable.
 - 2. Outlets, jacks, faceplates, and connectors.

1.6 QUALITY ASSURANCE

- A. Commscope cabling systems, Hubbell Premise Wiring Cat 6 Cabling, and Com Tran Cable - Signamax connectivity are approved for the work of this section.
- B. The contractor shall be an authorized Manufacturer's cabling system contractor.
- C. The contractor shall have worked satisfactorily for a minimum of five (5) years on systems of this type and size and be currently operating service organization within 50 miles of project site.
- D. Material and equipment shall be new, and conform to grade, quality, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout.
- E. Subcontractors shall assume all rights and obligations toward the contractor that the contractor assumes toward the owner and engineer/designer.

1.7 WARRANTY

- A. Unless otherwise specified, unconditionally guarantee in writing the materials, equipment, and workmanship, of all cabling system components, for a period of not less than twenty-five (25) years from date of acceptance by the owner.

- B. Transfer manufacturer's warranties to the owner in addition to the General System Guarantee. Submit these warranties on each item in list form with shop drawings. Final payment shall not relieve contractor of these obligations.
- C. Installation costs including all necessary materials, cables, closures, bridging clips, splice materials, and terminations are to be the responsibility of the Contractor.
- D. Installer Qualifications:
 - 1. The Data Cable System Installer shall be licensed and shall meet all applicable regulations of the local and state authorities insofar as they apply to this type of system. The proposer shall be a firm normally employed in the low voltage and data cabling industry and shall provide a reference list of ten (10) large-scale projects and contact names confirming successful Category 6 premises wiring system installations.
 - 2. The Installer shall be a local area, integrator of the manufacturer's product and must provide the manufacturer's maximum available warranty on the entire system. The contractor's certification must have been obtained and held within 75 miles of the project's location.
 - 3. The installing contractor must have a full-time employed RCDD (Registered Communications Distribution Designer) on staff. Current RCDD certification shall be provided in the product submittals.
 - 4. All individuals must be employees of the certified installer and at least 25% of the installing staff shall have undergone a training class given by the manufacturer. Current certification indicating the successful completion of the training course shall be available upon request at the project and submitted in the contractor's product submittals.

PART 2 - PRODUCTS

2.1 MATERIAL SPECIFICATIONS

- A. Inside Unshielded Twisted Pair (UTP)
 - 1. All unshielded twisted pair requirements for use shall meet EIA Category 6a specifications (plenum rated when installed in plenum spaces).
 - a. NEC
 - b. UL
 - c. ANSI/ICEA Publication S-80-576
 - d. EIA/TIA 568, 569, 570, 606, TSB 36, TSB 40
 - 2. Multi-pair Riser Cables
 - a. Cables from the MDF shall be further distributed to each of the other closets and terminated on 110 block in the IDFs there. The intra-building inter-IDF cables shall be of the multi-pair type, conforming to or exceeding the following EMMA 568 physical specifications of CAT 6a physical specification.

PART 3 - EXECUTION

3.1 PAIR IDENTIFICATION

- A. The following room recording procedure shall be completed after each wire or cable has been pulled:
 - 1. Terminations: Telephone station cables, CATV station cables and data station cables shall be tagged at backboards with cable tags indicating telephone or data

and marked with room number to which it is connected. In rooms where more than one jack exists, the jacks are to be numbered sequentially and indicated on the cable tag. The outlet number shall also be indicated on the faceplate of the jack.

- a. Each pair terminated shall be legibly labeled on the terminal blocks according to the room number and jack with which it is associated.
- b. Each station wire shall be plainly marked at its backboard end with the room number to which it is connected and terminated on the Type 110 termination blocks.
- c. All cables will be legibly and permanently numbered at each end. String tags are not acceptable.

3.2 TESTING

- A. All conductors in every cable shall be tested end-to-end to prove that they meet the cable specifications described in EIA standards and this document. The tests shall be conducted in the presence of a Telecommunications Specialist. All tests shall be completed first before any corrective action is taken. Corrected conductors shall be tested again. The Telecommunications Specialist reserves the right to request that the conductors passing the previous tests be tested again after corrective action has been taken on the faulty conductors. Conductors not passing the tests shall also be documented together with the corrective action taken. Test results shall be documented and supplied before the installation is considered for acceptance.
- B. The following tests shall be conducted as a minimum:
 1. Compliance with color coding
 2. Tip and ring polarity
 3. Neatness of cable routing and tie downs
 4. Continuity
 5. Shorts, grounds and opens
 6. Crosses (shorts to other pairs)
 7. Rolls (reversed polarity)
 8. Splits

3.3 ACCEPTANCE TESTING

- A. When the Contractor has completed all cable installation and termination, and he is ready for testing, he shall inform the Architect/Engineer of the intent. The Architect/Engineer shall assign the Telecommunications Specialist who shall monitor the Contractor testing. The Architect/Engineer has the authority to accept or reject any test and request, and, at his discretion, complete retesting of any portion of the plant if there are an unreasonable number of pairs not passing tests indicated above. The Architect/Engineer may request the Contractor to replace any portion of the plant if the tests indicate faulty or improper installation, or numerous repairs are necessary to pass the tests. The plant shall be accepted by the Architect/Engineer after the Contractor has demonstrated that all the pairs have passed all the tests, all the tests have been documented, the plant is labeled and recorded, and all plant records have been provided in accordance with the requirements of the Documentation Sub-Section later in this document. The Contractor shall comply with any and all warranties required by the general contract agreement with the Architect/Engineer.

3.4 CABLE TESTS

- A. Contractor shall perform testing of all pairs for each cable installed as directed by these specifications. Post construction cable acceptance tests consist of conductor continuity

tests, and conductor insulation resistance tests. These tests assure that the cable has been terminated properly and has not been damaged during construction. An Owner's representative will be required to witness these tests.

- B. Each cable pair shall be tested for shorts (T to R and T&R to ground), continuity, and loop resistance. Maximum loop resistance from the main telephone/data panel to each jack shall be within 5% of the calculated value based on the actual length of cable installed, and the loop ohms/1000 ft. for copper conductors.

3.5 DEFECTIVE CABLE PAIRS

- A. The vendor shall test all cable pairs and shall record, on the pair assignment record, the nature of the defect for each pair found to be defective and remedies used to clear the defect. In order for the cable distribution system to be considered acceptable, there shall be no defective pairs in any cable. Any cable having defective pairs shall not be used and shall be replaced at Contractor's expense.

3.6 INSPECTIONS

- A. Routine on-site construction inspections by the Architect/Engineer and/or an Owner's representative will involve trips to the complex to inspect construction, so as to assure adherence to standard construction practices. The number of such inspections will be at the Architect/Engineer's discretion.

3.7 ACCEPTANCE

- A. The project shall be considered acceptable based upon the following:
 - 1. Contractor has furnished and installed all equipment and materials and performed all work in accordance with these specifications.
 - 2. Contractor has successfully completed all the required testing assuring compliance with the required specifications.
 - 3. Contractor has removed all trash and debris by contractor from the area and restored site to original condition.
 - 4. Contractor has submitted the required documentation to state officials.

END OF SECTION 28 05 13