# general

## summary

### Provide all services labor, materials, tools, and equipment required for the complete and proper installation, splicing, and termination of new backbone cabling as called for in these specifications and related drawings.

### This section includes minimum requirements and installation methods for the following:

#### Copper Backbone Cabling

#### Copper Splices

#### Fiber Optic Backbone Cabling

#### Fiber Splices

#### Fiber Connectors

## system description

### Outside plant and inside plant copper will be designed and installed by the local telephone company. The outside plant copper cable will terminate in the main telecommunication room (TR) of the building. Confirm that the system design incorporates the pathway and termination requirements for the copper cabling.

### Outside plant fiber optic cable will be designed to connect new facilities to the campus data networking system in the closest data network core location. The location of the data network core location must be reviewed and approved by the UNL IS Project Manager. The outside plant fiber optic cable will terminate in the main TR of the building.

### Inside plant riser fiber optic cable for connecting each building main TR to the each other TR within the building

## submittals

### Product Data: Submit manufacturers’ product information.

## quality assurance

### Comply with section 270000.

### Acceptance of cabling installation will not be made unless all cable test results and as-built drawings are submitted and approved by the UNL IS Project Manager.

## delivery, storage & handling

### Comply with section 270000.

# products

## manufacturers

### Splicing material shall be made by Corning.

### Fiber optic cabling shall be OCC or Draka fiber optic cabling.

## materials & fabrication

### Outside Plant Fiber Optic Cable

#### All outside plant fiber optic cable shall be Single-mode 8.3/125 grade.

#### Cable shall be indoor, outdoor, rated and tight buffered.

### Inside Fiber Optic Backbone Cabling

#### All inside plant fiber optic cable shall be Single-mode 8.3/125 grade, riser-rated (OFNR).

### Fiber Splices

#### Provide all required hardware and kits for field fusion splicing in splice closures and for sealing and mounting the closures.

### Fiber Connectors

#### Use single-mode LC connectors.

#### Provide all other consumables and kits as required for field termination of fiber optic cable on connectors.

### Cable Installation Materials, Equipment and Tools

#### Furnish all required materials, equipment, and tools necessary to properly complete the backbone cabling system installation including, but not limited to, tools for pulling, splicing, and terminating the cables, mounting hardware, cable ties, bolts, anchors, clamps, hangers, kits of consumables, lubricants, communication devices, stands for cable reels, cable wenches, etc.

#### Use a pulling ‘mule’ tape for cable installation: Leave a pulling ‘mule’ tape in the conduits for future use after installing the outside plant cable.

#### Conduit caulking compound: Compounds for sealing conduit ducts shall have putty-like consistency workable with the hands at temperatures as low as 35 degrees Fahrenheit, shall not slump at a temperature of 300 degrees Fahrenheit, and shall not harden materially when exposed to the air. Compounds shall readily caulk or adhere to clean surfaces of plastic conduit, metallic conduits, or conduit coatings; concrete, masonry; any cable sheaths, jackets, covers, or insulation material, and the common metals. Compounds shall form a seal without dissolving, noticeably changing characteristics, or removing any of the ingredients. Compounds shall have no injurious effect on the hands of workers or upon materials.

#### “Caution Fiber” tags shall be installed at all locations where fiber optic cabling is visible entering a room or outside vault. Use 3M Scotchlite 5016-FO (or approved equal).

# execution

## examination

### Comply with section 270000.

### Verify that field measurements and cable routing and termination conditions are as shown on drawings. Provide notification, in writing, of conditions deviating from drawings.

## installation

### Perform all backbone cable installation in conformance with manufacturer’s installation guidelines.

### Ensure that maximum pulling tensions of specified cables are not exceeded and cable bends maintain the proper radius during placement.

### Field verify all cable measurements and install all backbone cables in such a manner as to avoid, if possible, mid-span splices.

### Pull new pulling ‘mule’ tape through all conduits while pulling new backbone cable.

### The Contractor shall be responsible for all damage to the cable during placement.

### Do not roll or store cable reels without an appropriate underlay.

### Clamp all new backbone cables at the entrance facilities for strain relief.

### Backbone telecommunications cabling shall be placed in dedicated pathways separate from horizontal and other cabling.

### Backbone cables and splice cases installed in manholes or pull boxes shall be strapped to the cable racks using stainless steel ties.

### Terminate cables so as not to pull tight on terminating equipment.

### Ensure that all splice closures are properly sealed for protection of the cable and splices.

### Neatly and permanently label all backbone cables with the approved UNL IS standard labeling scheme at both ends and at all splice locations.

### Firestop all sleeves and conduit openings after the cable installation is complete.

### Plug ends of conduit entering buildings with watertight conduit caulking compound after cable installation is complete to ensure foreign matter does not enter the buildings.

### Test and document the final backbone cable installation, including cable footages, on the as-built drawings. (Test using 2 point DB loss.)

### FIBER BACKBONE CABLE

#### Install fiber optic backbone cable through conduit, manholes, and other pathways as shown on the drawings.

#### Install service coils with a length of 20 feet and a diameter of 18 inches, at each end of all new backbone fiber optic cables to control excess cable lengths before terminating fiber strands. Do not leave cable slack on ladder racks.

#### Bind fiber cable service coils in 4 places with separation of 90 degrees and anchor to the wall with cable ties within 4 feet of the cable entrance per the drawings. Do not install cable coils on cable or equipment racks.

#### Install fiber connectors in the TRs as shown on the project drawings.

#### Terminate fiber strands on connectors and in termination equipment (shelves and panels) as specified in the manufacturer’s color code sequence.

#### Do not terminate, splice, or cut off “DEAD” cable strands. Neatly coil these un-terminated strands inside the shelves or panels with the proper bend radius to protect them for future termination or splicing.

#### Perform fusion splices for multimode and single-mode fiber strands at each splice location.

#### Perform fusion splices for single-mode fiber strands with splice loss ≤ 0.2 dB at 1310 nm.

#### Perform termination of single-mode fiber strands on LC connectors with loss ≤ 0.2 dB at 1310 nm.

#### Place “Caution Fiber” tags at all coils and every 50 feet along any exposed cable route.

### SAFETY

#### Guard maintenance hole and pull box openings.

#### Test for gas in maintenance holes and unventilated vaults.

#### Provision shall be made for adequate continuous supply of air. Note: the term “adequate” includes evaluation of both the quantity and quality of the air.

#### Employees shall not smoke in maintenance holes.

#### Where open flames must be used in maintenance holes or vaults, extra precautions shall be taken to ensure adequate ventilation.

### AS-BUILT DRAWINGS

#### (a) Mark the project drawings with notations reflecting actual cable lengths and any variations from the base specifications and drawings including as-built cable routing.

## adjustments

### Comply with section 270000.

END OF SECTION 271300