SPECIAL PROVISIONS
FOR
FIBER OPTIC CABLING

Linn County

Project Number
STP-A-1187(771)--86-57

Effective Date
January 20, 2016

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

156024.01 DESCRIPTION.

This work includes supply and installation of fiber optic cabling in an existing conduit system.

156024.02 MATERIALS.

A. Fiber Optic Cable.

Fiber Optic cable shall be as follows:

Manufactured by Prysmian Group

24 Strand SM Fiber Optic Cabling
Model No.: PRYSMIAN 24 LT DCM SJ NA GEL FREE SMF28E+
Product Code: FEDH1JKT12CE024E3

B. Fiber Optic Cable Testing.

The fiber loss in dB/km and the length of each reel shall be tested at both 1310 nm and 1550 nm and recorded in the documentation that accompanies each delivery. The maximum attenuation of the cable shall be 0.4 dB/km at 1310 nm and 0.3 dB/km at 1550 nm (1 km = 0.3077 KF where KF is 1000 feet). This test does not require an

electronic document; but is provided to insure that the fiber has been received in useable quality without shipment damage.

The test results of the received spools shall be provided to the Contracting Authority in a minimum of hard copy print, prior to receiving payment for the cable. Data documentation shall include for each test the length of fiber as measured by optical time domain reflectometer (OTDR), frequency used in on the OTDR by each fiber type, dB loss rating by manufacture from spool documentation, index of refraction by type of fiber in each spool, and the dB loss of each spool as measured in the final test for each fiber.

The launch attenuator shall be utilized for all OTDR tests. Only one launch cable shall be required when testing non-terminated fiber. The launch attenuator(s) shall be of the same fiber core size and type as the fiber under test. The attenuator shall emulate 900 feet length, minimum, for single mode fiber or as specified by the OTDR manufacturer for stabilization of the pulse generation. Launch cables shall be of identical length for incoming and outgoing light during tests. ST connectors shall be utilized with each attenuator to connect the device to the test device, OTDR.

The vendor shall provide all personnel, equipment, instrumentation and supplies necessary to perform all testing. All testing shall be performed in an accepted manner and in accordance with the testing equipment manufacturer's recommendations. All data shall be recorded and submitted to the Contracting Authority as hereinbefore specified. The Contracting Authority may perform or require supplemental testing at any time.

If the attenuation is found not to be within the acceptable nominal values, then vendor shall replace the damaged section of cable with no additional payment. Splices will not be allowed to repair the damaged section. A minimum of one fiber per tube per reel shall be tested.

156024.03 CONSTRUCTION.

A. Fiber Optic Cabling.

A suitable cable feeder guide shall be used between the cable reel and the face of the duct and conduit to protect the cable and guide it into the duct off the reel. It shall be carefully inspected for jacket defects. If defects are noticed, the pulling operation shall be stopped immediately and the Engineer notified. Precautions shall be taken during installation to prevent the cable from being "kinked" or "crushed". A pulling eye

shall be attached to the cable and used to pull the cable through the duct and conduit system. A pulling swivel shall be used to eliminate twisting of the cable. As the cable is played off the reel into the cable feeder guide, it shall be sufficiently lubricated with a type of lubricant recommended by the cable manufacturer. Dynamometers or breakaway pulling swing shall be used to ensure that the pulling line tension does not exceed the installation tension value specified by the cable manufacturer. The mechanical stress placed on a cable during installation shall not be such that the cable is twisted or stretched. The cable shall not be crushed kinked or forced around a sharp corner.

Lubricant shall be used on all pulls except when pulling into a building or equipment enclosure that are pulled by hand. Lubricant shall be of water based type and approved by the cable manufacturer. Sufficient slack shall be left at each end of the cable to allow proper cable termination (by others), minimum of 30 feet. This slack shall be in addition to installation slack as hereinafter specified. Additional slack cable shall be left in each hub or traffic signal cabinet, handhole, and at the top of each conduit riser. Excess slack at hub cabinets shall be re--pulled into the nearest handhole to provide a neat and orderly installation. The minimum slack amounts shall be as follows:

Hub/Signal cabinet – 100 feet
Fiber Handhole – 100 feet
Building Entrance – 100 feet

B. Storage of Slack Cable.

Storage of slack cable shall be coiled. The slack coils shall be bound at a minimum of three points around the coil perimeter and supported in their static storage positions. The binding material and installation shall not bind or kink the cable. Storage of additional slack cable adjacent to conduit risers and support poles shall be as visibly marked/tagged as “CAUTION – FIBER OPTIC CABLE”. Maximum length of cable pulling tensions shall not exceed the cable manufacturer’s recommendations.

All fiber cables shall be marked with a metallic identifier in the handhole adjacent to the traffic signal cabinet or hub cabinet and on the cable in the traffic signal cabinet or hub cabinet at the point of termination. The identifier, both in the cabinet and in the handhole, shall indicate the direction the cable is going, cable contents [SM or SM/MM], and the abbreviated location for the other end destination.

C. Minimum Bend Radius

For static storage, the cable shall not be bent at any location to less than ten times the diameter of the cable outside diameter or as recommended by the manufacturer. During installation, the cable shall not be bent at any location to less than twenty times the diameter of the cable outside diameter or as recommended by the manufacturer.

D. After Fiber Optic Cable Installation.

Each section of the cable shall be tested for continuity and attenuation as a minimum. All testing shall be performed by the Contractor. If the attenuation is found not to be within the acceptable nominal values, the Contractor shall use an OTDR to locate points of localized loss caused by bends or kinks. If this is not successful the Contractor shall replace the damaged section of cable with no additional payment. Cost of a new cable will be at Contractor's expense. Splices will not be allowed to repair the damaged section.

The Contractor shall provide the Contracting Authority with a listing of the end to end cable jacket markings and the entry and exit jacket markings at all handholes for each fiber run. This information must be submitted with the application for payment for each completed run.

E. Cable Termination.

Cable terminations shall be done by the Contracting Authority.

F. Splices.

Cable splices shall be done by the Contracting Authority.

156024.04 METHOD OF MEASUREMENT.

Measurement for Fiber Optic Cabling shall be on a linear foot basis for the plan quantity. No actual measurement will be made.

156024.05 BASIS OF PAYMENT.

For the plan quantity of Fiber Optic Cabling, the contractor shall be paid the bid unit price. This payment shall be full compensation for supplying and installing the fiber optic cable, pulling lubricants, cleanup of any waste materials from the installation, and any other materials, labor or equipment necessary to install the fiber optic cable in place per the plans.