SECTION 271525 - OPTICAL FIBER CABLES

Use this section in conjunction with fire alarm systems or direct digital building control systems.

Optical fiber cables are not approved in NYC where 150 degree wiring is required (Class “E” Fire Alarm Systems). Optical fiber cables are not generally rated over 80 degrees c. Higher ratings are available special order and will not have UL approval.

1. GENERAL
	* + 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 013300 does not apply to this Section.
				5. Submittals Package: Submit the shop drawings, product data, samples, and quality control submittals specified below at the same time as a package.
				6. Shop Drawings:

Complete manufacturer’s construction details and specifications for the cables, including physical characteristics of optical fiber, strength members, and jackets.

Overall dimension of cable.

Termination data, including the following:

List of materials.

Method of terminating cables.

Details of cable preparation.

Method of applying materials (including quantities).

Precautionary measures.

Drawings showing method of termination, complete with dimensions.

Written statement from cable manufacturer that terminations submitted are acceptable.

Written statement from termination manufacturer that terminations submitted are suitable for the proposed application.

Cable manufacturer’s certified test data (attenuation, bandwidth).

Maximum pulling strain allowed for each type cable.

* + - * 1. Product Data:

Catalog sheets, specifications and installation instructions for all products.

Statement from the Company providing the system for which the optical fiber cables are proposed to be used, indicating that the optical characteristics meet the requirements of the Company.

Written statement from cable manufacturer indicating recommended pulling compounds.

* + - * 1. Samples:

Two 2-foot samples of each type cable.

Samples of termination materials.

* + - * 1. Quality Control Submittals:

Installers’ Qualifications Data: Include the following for each person who will be performing the Work:

Name.

Employers name, business address and telephone number.

Name and addresses of the required number of similar projects worked on which meet the experience criteria.

Company Field Advisor Data: Include:

Name, business address and telephone number of Company Field Advisor secured for the required services.

Certified statement from the Company listing the qualifications of the Company Field Advisor.

Services and each product for which authorization is given by the Company, listed specifically for this project.

Cable Terminator’s Resume: Name and address of each person who will be performing cable terminations with resume of terminator’s experience (include details of types of terminations, types of cable, job locations and number of years performing terminations).

* + - * 1. Contract Closeout Submittals:

After installation test report.

* + - 1. QUALITY ASSURANCE
				1. Equipment Qualifications For Products Other Than Those Specified:

At the time of submission provide written notice to the Director of the intent to propose an “or equal” for products other than those specified. Make the “or equal” submission in a timely manner to allow the Director sufficient time to review the proposed product, perform inspections and witness test demonstrations.

If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Director's Representative and the Company Field Advisor.

Make arrangements with the owners of 2 installations (selected by the Director) for inspection of the installations by the Director's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Director a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.

Only references from the actual owner or owner’s representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.

Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.

The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.

Make arrangements with the test facility for the Director's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Director a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.

Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.

* + - * 1. Installers’ Qualifications: The persons installing the Work of this Section, and their supervisor, shall be personally experienced in optical fiber cable systems and shall have been engaged in the installation of optical fiber cable systems for a minimum of 3 years.

Furnish to the Director the names and addresses of 5 similar projects that the foregoing people have worked on during the past 3 years.

Edit number of hours to suit.

* + - * 1. Company Field Advisor: Secure the services of the cable manufacturer’s Company Field Advisor for a minimum of 40 working hours at the contract site for the following:

Render advice regarding method of installing cable.

Inspection of equipment for installing cable.

Witness representative amount of cable pulling.

Witness installation of at least one termination by each cable terminator who will be doing the actual cable termination.

If the terminations are other than the cable manufacturer’s, secure the services of the termination manufacturer’s Company Field Advisor to concurrently witness installation of the terminations and also certify with an affidavit that the terminations were installed in accordance with the termination manufacturer’s recommendations.

Witness after installation test.

Certify with an affidavit that the aforementioned particulars are satisfactory and the cable is installed in accordance with cable manufacturer’s recommendations.

* + - 1. DELIVERY, STORAGE AND HANDLING
				1. Cable Delivery:

No cable over one year old when delivered to the site will be accepted.

Keep ends of cables sealed at all times, except when making terminations. Use methods approved by cable manufacturer.

Include the following data durably marked on each reel:

Facility name and address.

Contractor’s name.

Project title and number.

Date of manufacture.

Manufacturer’s name.

Linear feet.

Location where cable is to be installed (Example: Between manholes No. \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_).

* + - * 1. Cable Storage: Store where cable will be at temperature recommended by cable manufacturer for optimum workability.
1. PRODUCTS
	* + 1. 62.5 MICRON/125 MICRON (CORE/CLAD) OPTICAL FIBER CABLES

Type LAN-O is suitable for use outdoor (underground) or indoor.

* + - * 1. Type LAN-O: 2 optical fibers, each fiber in an individual gel filled loose tube, suitable for indoor use as OFNP plenum type cable and outdoors for aerial and underground applications. General Cable’ CT0023MID.

2 optical fibers.

Each fiber in an individual gel filled loose tube.

Fiber diameter (core/clad): 62.5 micron/125 micron.

Fiber type: Graded index multimode fiber.

Maximum Fiber Attenuation:

3.5 dB/km (@850nm).

1.0 dB/km(@1300nm).

Minimum Fiber Bandwidth:

160 MHZ-km (@850nm).

500 MHZ-km (@1300nm).

Central strength member: Epoxy/fiber glass rod or equal.

Inner Jacket: Polyvinyl chloride (PVC) or polyethylene (PE).

Outer strength member: Aramid yarn.

Outer Jacket: Ultraviolet and moisture resistant black high-density polyethylene.

Suitable for direct burial.

 Breakout Kits: General Cable’ BOKL-02/C.

Type LAN-O is suitable for use outdoor (underground) or indoor. Use 6 fiber when spare is required with two in use and four spares if 4 fiber is more expensive or unavailable.

* + - * 1. Type LAN-O: 6 optical fibers, each fiber in an individual gel filled loose tube, suitable for indoor use as OFNP plenum type cable and outdoors for aerial and underground applications. General Cable’ CT0023MID.

6 optical fibers.

Each fiber in an individual gel filled loose tube.

Fiber diameter (core/clad): 62.5 micron/125 micron.

Fiber type: Graded index multimode fiber.

Maximum Fiber Attenuation:

3.5 dB/km (@850nm).

1.0 dB/km(@1300nm).

Minimum Fiber Bandwidth:

160 MHZ-km (@850nm).

500 MHZ-km (@1300nm).

Central strength member: Epoxy/fiber glass rod or equal.

Inner Jacket: Polyvinyl chloride (PVC) or polyethylene (PE).

Outer strength member: Aramid yarn.

Outer Jacket: Ultraviolet and moisture resistant black high-density polyethylene.

Suitable for direct burial.

Breakout Kits: General Cable’ BOKL-06/C.

Type LAN-I is suitable only for use indoor.

* + - * 1. Type LAN-I: 2 optical fiber, OFNP plenum type breakout cable; General Cable’ CT0021B1U.
			1. CONNECTORS
				1. General: Furnish connectors and components, and use specific tools and methods as recommended by connector manufacturer to form complete connector system:

Terminations: To suit requirements of optical fiber video transmitter and receiver.

Body Material: Steel.

Ferrule Material: Stainless steel.

* + - 1. ACCESSORIES
				1. Pulling Compounds: As recommended by cable manufacturer.
				2. Tags: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inches high.

Phenolic: Two color laminated engraver’s stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).

Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.

* + - * 1. Markers:

Premarked self-adhesive; W. H. Brady Co.’s, B292, B708; Ideal Industries’ Mylar/Cloth wire markers; or Markwick Corp.’s permanent wire markers; Plastic Extruded Parts, Inc.’s Flexible Sleeve or ID Band Markers; or Thomas and Betts Co.’s E-Z Code WSL self-laminating.

Other Styles: To suit application by W. H. Brady Co., Ideal Industries, Marwick Corp., Plastic Extruded Parts, Inc., or Thomas and Betts Co.

1. EXECUTION
	* + 1. PREPARATION
				1. Before installing cable, test the cable on the reels to verify that the cables’ parameters are in accordance with the manufacturers’ certified test data.
			2. INSTALLATION
				1. Installing Cables:

Install cables in conduit after conduit system is completed.

Keep ends of cables sealed watertight at all times, except when making terminations.

No grease, oil, lubricant other than approved pulling compound may be used to facilitate the pulling-in of cables.

Use pulling attachment connected to the cable strength member for pulling in cables. Seal pulling attachment watertight.

Incorporate into the pull line at the pulling attachment a tension-control swivel containing a shear pin designed to fail if the pre-determined maximum cable strain is applied.

Pull cables with a dynamometer or strain gage incorporated into the pulling equipment. Do not pull cables unless the Director’s Representative is present to observe readings on the dynamometer or strain gage during the time of actual pulling. Do not exceed cable manufacturer’s recommended pulling strain.

* + - * 1. Terminations and Splices:

Terminate cable in accordance with manufacturer’s approved installation instructions.

No splicing of optical fiber cables will be allowed.

* + - * 1. Identification of Optical Fiber Cables: Identify cables in manholes, pullboxes and in equipment to which they connect:

Install tags on each cable indicating cable number, date installed (month, year), type of cable, and manufacturer. Attach tags to cables with non-ferrous metal wire or brass chain.

Use markers to identify each optical fiber in equipment to which they connect.

* + - 1. FIELD QUALITY CONTROL
				1. After Installation Test:

Perform test on each active and spare optical fiber after cable has been installed complete with connectors, and prior to placing cable into service.

Demonstrate that the amount of power coupled into each optical fiber by its transmitter, the attenuation and connector losses, and the power received at the detector in the receiver is no greater than 75 percent of the parameters required by the transmitter/receiver manufacturer.

Perform test in the presence of the Director’s Representative.

Supply equipment necessary for performing test.

In subparagraph below, change “Fire Command Station” to suit system application.

Submit written report of test results signed by Company Field Advisor and Director’s Representative. Mount a copy of the final report in a plexiglass enclosed frame assembly adjacent to the Fire Command Station.

* + - 1. OPTICAL FIBER CABLE SCHEDULE
				1. Type LAN-O: Use for exterior underground or interior communication bus circuits.
				2. Type LAN-I: Use for interior communication bus circuits.

END OF SECTION 271525