

**FIBER OPTIC CABLE
BID DOCUMENTS**



BID OPENING:

THURSDAY, NOVEMBER 3, 2016, 2:00 P.M.

CITY OF LAURINBURG

PUBLIC WORKS

503 HALL STREET

LAURINBURG, NC 28352

ADVERTISEMENT FOR BIDS

**City of Laurinburg
503 Hall Street
P.O. Box 249
Laurinburg, North Carolina 28353**

Sealed bids for furnishing Fiber Optic Cable will be received by The City of Laurinburg, North Carolina at Public Works, 503 Hall Street, Laurinburg, NC 28352, at or before 2:00 P.M. local time on Thursday, November 3, 2016, at which time and place the bids shall be publicly opened and read in the Conference Room of Public Works. Proposals shall be addressed to the City of Laurinburg, 503 Hall Street, Laurinburg, NC 28352, Attention: Mr. Robert Smith.

The Bid Documents may be examined at the following locations:
City of Laurinburg Public Works Laurinburg, North Carolina

Copies of the Bid Documents may be obtained by contacting the office of the General Services Director, City of Laurinburg, 503 Hall Street, Laurinburg, NC, (910) 276-2364, email hhaywood@laurinburg.org, or by visiting the City's website <http://www.laurinburg.org/purchasing>.

Bid proposals may not be withdrawn for thirty (30) days after the date of the bid opening.

The City of Laurinburg reserves the right to reject any or all bid proposals and/or to accept any combination of proposals, which are deemed to be in the best interest of the City.

CITY OF LAURINBURG

By: Harold W. Haywood

Title: General Services Director

GENERAL CONDITIONS

1. Bids shall be made in strict accordance with the specifications prescribed by the City.
2. Specifications are available at the Public Works Department, 503 Hall Street, Laurinburg, North Carolina 28352.
3. Sealed envelope containing bid must be marked on the outside:

Sealed Bid on Fiber Optic Cable

To be opened Thursday, November 3, 2016 at 2 o'clock P.M.

Addressed to:

**City of Laurinburg
Attn: Robert Smith
503 Hall Street
Post Office Box 249
Laurinburg, North Carolina 28353**

4. Bidders must use the attached bid form.
5. No alternate bids will be accepted unless otherwise provided for in the specifications.
6. Bidder shall note all exceptions to specifications on the bid form. Only those exceptions which are deemed by the City of Laurinburg to be consistent with the intent of these specifications and not to the detriment of any other bidder will be accepted.
7. Time, in connection with discount offered, will be computed from date of delivery of articles or equipment at destination and after final inspection and acceptance at that point, or from the date correct invoice is received if latter is later than the date of delivery and acceptance. Guaranteed maximum price must be shown in all bids. Bids shall not reflect any taxes from which a North Carolina municipality is exempt.
8. In case of default of the contractor, the City may procure the articles or equipment from other sources and hold the contractor responsible for any excess cost occasioned thereby.
9. The City of Laurinburg will honor accepted terms of payment under which any cash discount if offered. If no cash discount is offered, payment by the City shall be due within thirty (30) calendar days after delivery, inspection and acceptance at destination point.

10. The City of Laurinburg has established as a matter of policy that all contractors doing business with the City shall extend equal employment opportunities to all employees and applicants for employment and shall not discriminate against any person or group of persons in regard to selection for employment, compensation, training, tenure, term promotion and other conditions of employment on the basis of race, sex, color, religion, or national origin. It shall be understood that compliance with this policy shall be a condition of any contract arising from this bid invitation.
11. Silence of Specifications: The apparent silence of these specifications, supplemental specifications, and addenda as to any detail, or the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that accepted practice is to prevail, and that only materials and workmanship of first quality are to be used. All interpretations of these specifications shall be made upon the basis of this statement.
12. Addenda: Addenda issued prior to the bid opening are considered part of this bid invitation and are binding on all bidders. Each addendum will be sent to each bidder by Certified Mail.
13. The contractor shall defend any and all suits and assume all liability for any and all claims made against the City or any of its officials or agents for the use of any patented process, device or article forming a part of the articles or equipment furnished under this contract.
14. Bids shall be considered active, firm, and binding upon bidders for thirty (30) calendar days from the date of bid opening.
15. Bids shall be FOB Laurinburg, North Carolina, unless otherwise specified herein.
16. The City of Laurinburg hereby notifies all bidders that it will affirmatively insure that minority business enterprises will be afforded full opportunity to submit bids, and that in regard to any contract entered into pursuant to this invitation for bids, will not be discriminated against on the grounds of race, color, religion, sex or national origin in consideration for an award.

INSTRUCTIONS TO BIDDERS

1. Samples of items, when required, must be furnished, free of expense, prior to the opening of bids, and if not destroyed, will upon request, be returned at the bidder's expense. Request for the return of samples must be made within 10 days, following opening of bids. Each individual sample must be labeled with the bidder's name and item number.
2. Prices should be stated in units of quantity specified with packing included.
3. If the item bid upon has a trade name or brand, such trade name or brand must be stated in the bid.
4. Attach complete specifications for any substitution offered, or when amplification is desirable or necessary.
5. If descriptive matter is attached to bid, bidder's name must be on each separate sheet.
6. Where a brand or trade name appears in the specification it is understood that it refers to that material or its equivalent.
7. Bidder shall return on signed copy of this form.
8. Please address and mark your bids as follows:

City of Laurinburg, Laurinburg, North Carolina

Sealed bid on Fiber Optic Cable

To be opened Thursday, November 3, 2016 at 2 o'clock P.M.

Fiber Optic Cable Specifications

General

The intent of these specifications is to describe the minimum requirements needed for single-mode fiber optical cable. The fiber cable must be ITU-T Recommendation G.652.D-compliant and fully backward compatible with legacy standard single-mode fibers.

Optical Specifications

Maximum Attenuation

Wavelength (nm)	Maximum Value (dB/km)
1310	≤ 0.35
1383	≤ 0.35
1490	≤ 0.24
1550	≤ 0.20
1625	≤ 0.23

Attenuation vs. Wavelength

Range (nm)	Ref. λ (nm)	Max. α Difference (dB/km)
1285-1330	1310	0.03
1525-1575	1550	0.02

Macrobend Loss

Mandrel Diameter (mm)	Number of Turns	Wavelength (nm)	Induced Attenuation (dB)
32	1	1550	≤ 0.03
50	100	1310	≤ 0.03
50	100	1550	≤ 0.03
60	100	1625	≤ 0.03

Point Discontinuity

Wavelength (nm)	Point Discontinuity (dB)
1310	≤ 0.05
1550	≤ 0.05

Cable Cutoff Wavelength (λ_{cc})

$$\lambda_{cc} \leq 1260 \text{ nm}$$

Mode-Field Diameter

Wavelength (nm)	MFD (μm)
1310	9.2 ± 0.4
1550	10.4 ± 0.5

Dispersion

Wavelength (nm)	Dispersion Value [ps/(nm·km)]
1550	≤ 18.0
1625	≤ 22.0

Polarization Mode Dispersion (PMD)

	Value (ps/ $\sqrt{\text{km}}$)
PMD Link Design Value	≤ 0.06
Maximum Individual Fiber PMD	≤ 0.1

Dimensional Specifications

<i>Glass Geometry</i>	
Fiber Curl	≥ 4.0 m radius of curvature
Cladding Diameter	125.0 ± 0.7 μm
Core-Clad Concentricity	≤ 0.5 μm
Cladding Non-Circularity	$\leq 0.7\%$

<i>Coating Geometry</i>	
Coating Diameter	242 ± 5 μm
Coating-Cladding Concentricity	< 12 μm

Environmental Specifications

Environmental Test	Test Condition	Induced Attenuation 1310 nm, 1550 nm, and 1625 nm (dB/km)
Temperature Dependence	-60°C to $+85^{\circ}\text{C}$	≤ 0.05
Temperature Humidity Cycling	-10°C to $+85^{\circ}\text{C}$ up to 98% RH	≤ 0.05
Water Immersion	$23^{\circ}\text{C} \pm 2^{\circ}\text{C}$	≤ 0.05
Heat Aging	$85^{\circ}\text{C} \pm 2^{\circ}\text{C}$	≤ 0.05
Damp Heat	85°C at 85% RH	≤ 0.05

Mechanical Specifications

Proof Test: The entire fiber length is subjected to a tensile stress ≥ 100 kpsi (0.69 GPa).

Length: Fiber lengths available up to 63.0 km/spool.

Performance Characterizations

Characterized parameters are typical values.

Core Diameter	8.2 μm
Numerical Aperture	0.14 NA is measured at the one percent power level of a one-dimensional far-field scan at 1310 nm
Effective Group Index of Refraction (N_{eff})	1310 nm: 1.4674 1550 nm: 1.4679
Fatigue Resistance Parameter (N_d)	20
Coating Strip Force	Dry: 0.6 lbs. (3N) Wet, 14-day room temperature: 0.6 lbs. (3N)
Rayleigh Backscatter Coefficient (for 1 ns Pulse Width)	1310 nm: -77 dB 1550 nm: -82 dB

Exceptions

Exceptions to any of the equipment or functions specified herein shall be clearly stated in the bid proposal. If no exceptions are stated, it shall be understood that the equipment to be furnished meets or exceeds all of the requirements of these specifications.

Delivery

All fiber optic cable meeting or exceeding above specifications must be delivered within 30 days of the date of the bid award.

City of Laurinburg

Fiber Optic Cable Bid Form

BID OPENING: THURSDAY, NOVEMBER 3, 2016, 2:00 P.M.

Description	Quantity	Unit Price	Amount Bid
Single Mode 72 Fiber, Single Jacket, Light Armor	25,000 Feet		\$
Single Mode 96 Fiber, Single Jacket, Light Armor	25,000 Feet		\$
Single Mode 144 Fiber, Single Jacket, Light Armor	25,000 Feet		\$
Single Mode 96 Fiber, Dual Jacket, Light Armor (direct bury)	25,000 Feet		\$
Freight/Delivery			\$
TOTAL BID AMOUNT			\$

DELIVERY: ALL FIBER CABLE MUST BE DELIVERED WITHIN 30 DAYS OF THE DATE OF BID AWARD

Company Submitting Bid: _____

Address of Bidder: _____

Authorized Representative Signature: _____

Date: _____