

## EAST IRONDEQUOIT CENTRAL SCHOOL DISTRICT ADMINISTRATIVE OFFICES 600 PARDEE ROAD ROCHESTER, NY 14609

(585) 339-1200 • FAX (585) 339-1209 http://eastiron.org

April 22, 2024

## **RFB-004-025** Data Cabling & Hardware

To Whom It May Concern:

In accordance with provisions of Municipal Laws regarding bidding, sealed bids will be publicly opened and read in the Business Office of the East Irondequoit Central School District, 600 Pardee Road, Rochester, New York 14609, on May 16, 2024, at 9:00 a.m.

Attached is a copy of each of the bid forms and specifications for **RFB-004-025 Data Cabling & Hardware** for which the district is advertising.

Those wishing to bid must submit a <u>sealed bid</u> with the following documents:

- 1. <u>Bid Certifications:</u> (Non collusion statement) must be signed by authorized person
- 2. Iranian Divestment Act Certification: Must be signed by authorized person
- 3. <u>Bid Prices Summary Document:</u> Must be filled out and signed by authorized person
- 4. <u>General Specifications and Instructions:</u> Must be signed by authorized person

If you have any questions regarding this bid, please call Kristen Munger at (585) 339-1260 or email kmunger@eastiron.org.

Sincerely,

Kristen Munger Purchasing Agent

IMPORTANT: MARK ON THE LOWER LEFT-HAND CORNER OF THE SEALED ENVELOPE THE FOLLOWING:

**RFB-004-025** Data Cabling & Hardware

# NON-COLLUSIVE BIDDING CERTIFICATION

First Name:	
Business Address:	
Telephone Number:	Date of Bid:

#### I. General Bid Certification

The bidder certifies that he/she will furnish, at the prices herein quoted, the materials, equipment and/or services as proposed on this bid

#### **II. Non-Collusive Bidding Certification**

By submission of this bid proposal, the bidder certifies that he/she is complying with Section 103-d of the General Municipal Law as follows:

Statement of non-collusion in bids and proposals to political subdivision of the state. Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statue, rule, regulation, or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

(a) By subdivision of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor:

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

(b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his/her designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of a new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning subparagraph one (a).

2. Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, or local law, and where such bid contains the certification referred to in subdivision one of the section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

Signature (Authorized)

#### Title

By signing and submitting this bid for consideration the vendor acknowledges that they have read, understand and agree to all aspects of the specifications.

## **IRANIAN DIVESTMENT ACT CERTIFICATION**

By submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, Bidder/Contractor (or any assignee) certifies that it is not on the "Entities Determined To Be Non-Responsive Bidders/Offerers Pursuant to The New York State Iran Divestment Act of 2012" list ("Prohibited Entities List") posted on the OGS website at: http://www.ogs.ny.gov/about/regs/docs/ListofEntities.pdf and further certifies that it will not utilize on such Contract any subcontractor that is identified on the Prohibited Entities List. Additionally, Bidder/Contractor is advised that should it seek to renew or extend a Contract awarded in response to the solicitation, it must provide the same certification at the time the Contract is renewed or extended.

During the term of the Contract, should East Irondequoit Central School District receive information that a person (as defined in State Finance Law §165-a) is in Violation of the above-referenced certifications, East Irondequoit Central School District will review such information and offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment activity which is in violation of the Act within 90 days after the determination of such violation, then East Irondequoit Central School District shall' take such action as may be appropriate and provided for by law, rule, or contract, including, but not" limited to, seeking compliance, recovering damages, or declaring the Contractor in default.

East Irondequoit Central School District reserves the right to reject any bid, request for assignment, renewal or extension for an entity that appears on the Prohibited Entities List prior to the award, assignment, renewal or extension of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the Prohibited Entities list after contract award.

Signature

Title

CompanyName

Date

#### **GENERAL SPECIFICATIONS AND INSTRUCTIONS**

## EAST IRONDEQUOIT CENTRAL SCHOOL DISTRICT 600 Pardee Road, Rochester New York 14609 (585) 339-1260

#### SEALED ENVELOPE

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Bids are to be placed in a sealed envelope and indicated by the words, "Bid Proposal for" Name and Item, Bid Opening Date. Bidders are to use the attached bid forms in submitting their bids. Bids must be received in the Business Office by the Purchasing Agent prior to the bid opening date and time.

All Bids received after the time stated in the Notice To Bidders may not be considered and will be returned unopened to the Bidder. The Bidder assumes the risk of any delay in the mail or in the handling of mail by employees of the School District. Whether sent by mail or by means of personal delivery, the Bidder assumes responsibility for having his Bid deposited on time at the place specified.

#### **NON-COLLUSION**

This bid shall be made without any previous understanding, agreement or connection with any other person, firm or corporation making a bid for the same purpose and is in all respects fair and <u>without collusion and fraud</u>. Bidders are also required to complete and sign the attached non-collusion statement entitled "Bid Proposal Certifications." Failure to complete, sign and attach this certification may disqualify the bid.

## TOTAL COST

Bid prices must include cost of furnishing, delivering and installing the items unless otherwise indicated and there must be no additional charges made. All costs incurred by the Bidders in preparation, estimating and submission of a Bid are the total responsibility of the Bidder.

#### PRICES

The bidder shall insert the price per stated unit.

#### TAXES

No charge will be allowed for Federal, State, municipal sales and excise taxes, for which the School District is exempt by statute.

#### **QUANTITIES**

Request for bids are based upon estimated quantities.

### INSURANCE

The successful bidder guarantees to furnish adequate protection from damage for all work and to repair damages of any kind for which he or his workmen are responsible, to the building or equipment, or to his own work.

The successful bidder guarantees to carry adequate insurance to protect the school district from loss in case of accident, fire, theft, etc., and will provide proof of such before commencing work.

## AWARD

Awards will be made to the lowest responsive and responsible Bidder. The Board of Education reserves the right to award this bid on either an "item" basis or an "entire bid" or by grouping one or more of various items.

Notification of bid award shall take the form of a purchase order or series of purchase orders referencing the bid. No other form of notification shall be considered valid or binding on the district without the written verification of the purchasing agent.

Payment will be made only after correct presentation of claim forms or invoices as may be required.

#### **RESPONSIBILITY TO PERFORM**

Vendor will promptly supply proof of the ability to perform under the bid specifications or contract upon request of the school district.

#### **NON-PERFORMANCE**

The district shall have the right to cancel this contract at any time during its term for failure on the part of the vendor to meet the requirements of bid specifications. The district shall make a reasonable attempt to provide the vendor with written notice of cancellation in advance. In the event of cancellation for non performance, the vendor shall be liable for all additional costs incurred by the district and any penalties imposed by the terms of these bid specifications.

#### **RESPONSIVENESS**

Bidders must respond to all specifications, including work and materials required. Only after the bidder responds to the specifications may he then suggest an alternate method or materials to be used.

#### **<u>RIGHT TO REJECT</u>**

The Board of Education reserves the right to reject all bid and re-advertise in the matter provided by Section 103 of the General Municipal Law. Also reserved is the right to reject, for cause, any Bid in whole or in part; to waive technical defects; qualifications, irregularities; and omissions if in its judgment the best interests of the School District will be served. Also reserved is the right to reject Bids and to purchase items on State, County, or Piggyback contracts if such items can be obtained on the same terms, conditions, specifications, and at a lower price.

#### LAWFUL AGE

Said bidder certifies that he is of lawful age. Bidder also certifies that he is the only one interested in this bid with the exception in the case of a partnership or corporation.

#### **CONFLICT OF INTEREST**

That no member of the Board of Education of East Irondequoit Central School District, nor any officer or employee or person whose salary is payable whole or in part from the treasury of said Board of Education is directly or indirectly interested in this bid or in the supplies, materials, equipment, work or services to which it relates, or in any portion of profits thereof.

## LISTING OF CUSTOMERS

The bidder will provide the District, with the bid submission, a listing of those schools presently being provided service indicating school contact person with address and telephone number.

## COMPLIANCE

The bidder has carefully examined and will comply with General Specifications, the instructions to bidders, schedules and specific specifications prepared under the direction of the Board of Education, and will, if successful in this bid, furnish and deliver at the prices bid and within the time stated, all the materials, supplies, apparatus, goods, wares, merchandise, services or labor for which this bid is made.

## **PIGGYBACKING PROVISION**

Other school districts, BOCES, or school district locations not listed in either the published Notice to Bidders and/or bid documents may participate only upon consent by both the East Irondequoit School District and the awarded vendor(s). Interested BOCES and/or school districts must first contact the East Irondequoit Business Office before making arrangements with the awarded vendor(s) to be serviced under the terms and conditions of this bid.

#### **EXTENSION**

The East Irondequoit Central School District reserves the right to extend the terms and conditions of this proposal for a period no greater than one (1) year from original date of award, upon mutual consent of the East Irondequoit Central School District and the awarded vendor(s).

## INTERPRETATION OF SPECIFICATIONS OR CONTRACT DOCUMENTS

No interpretation of the meaning of the specifications or other contract document will be made to any Bidder orally. Every request for such interpretation should be in writing, addressed to the East Irondequoit Central School District, not later than five (5) days prior to the date fixed for the opening of Bids. Notice of any and all such interpretations and any supplemental instructions will be sent to all Vendors on record by the East Irondequoit Central School District in the form of an addenda to the specifications. All addenda so issued shall become part of the contract documents.

#### ASSIGNMENT

It is mutually understood and agreed that the successful Bidder shall not assign, transfer, convey, sublet, or otherwise dispose of the Contract or the right, title, or interest therein, or the power to execute such Contract, to any other person, company, or corporation, without the previous written consent of the School District.

#### **INSURANCE**

Bidders shall maintain adequate insurance to protect them from all claims under the Workers' Compensation Act. If requested, a Certificate of Insurance shall be submitted verifying Liability and Commercial Automobile Insurance coverage.

# BIDDER'S ACKNOWLEDGEMENT OF GENERAL SPECIFICATIONS AND INSTRUCTIONS

By signing below and submitting this bid for consideration by the School District, the Bidder acknowledges that he/she has read, understood and agreed to all aspects of the General Specifications and Instructions as presented without reservation or alteration. The Bidder, Bidder's affiliates, and any other agency that intercedes on the bidder's behalf also agrees to hold the School District harmless and not responsible for any hardship that can or potentially could be caused, and subsequently impacts the Bidder(s), as a result of this Bid.

BIDDER

(Person, Firm or Corporate Name)

AUTHORIZED SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_

# East Irondequoit Central School District

# **Bid specs for:**

Data cabling services and associated hardware (2024-2025)

INTRODUCTION
GENERAL REQUIREMENTS
PRICING4
CABLE ASSOCIATED HARDWARE4
MAINTENANCE
EMERGENCY SERVICE
RATES FOR TRAVEL COSTS5
ESTIMATED QUANTITIES
QUALIFICATIONS OF BIDDERS5
REFERENCES6
CABLING INSTALLATION7
PLACEMENT OF CABLES7
CABLE IDENTIFICATION AND NUMBERING8
GENERAL UTP CABLE PLANT PARAMETERS8
FIELD TESTING TWISTED-PAIR CABLING SYSTEM9
CATEGORY 5E PERFORMANCE TESTS9
GENERAL TEST RESULT DOCUMENTATION11
GENERAL OPTICAL FIBER CABLING PLANT PARAMETERS12
GENERAL FIBER OPTIC CABLE CONSTRUCTION PARAMETERS12

FIBER OPTIC CABLING PERFORMANCE TESTS	.13
FIBER OPTIC PERFORMANCE TEST PARAMETERS	.14
FIBER OPTIC TEST RESULT DOCUMENTATION	.15
GENERAL COAXIAL CABLING PLANT PARAMETERS	.16
GENERAL COAXIAL CONSTRUCTION PARAMETERS	.16
CABLE CHARACTERISTICS	.16
DOCUMENTATION	17

# **Introduction**

The East Irondequoit Central School District (the "District") is seeking qualified and experienced Vendors to provide and install any combination of copper twisted pair, fiber optic, coaxial communications cable, or other low voltage cabling and various cable-associated hardware (the "Product"). These bid specs outline the terms and conditions, specifies the accepted communications cable, connection components and installation specifications the successful bidder (the "Vendor") will be required to adhere to. Compliance with bid requirements will prevent possible disqualification.

The intent of this bid is to secure the best possible labor and material rates for low voltage cable installation, and any cable-associated hardware (including LCD projector mounts, smartboard mounting and connections, and low voltage signal amplifiers).

All cable or fiber installation and testing or cabling documentation services will be provided on a time and materials (T&M) basis during the 2024-2025 school year (through June 30, 2025).

This specification covers a point to point CAT5e/CAT6/CAT6a, 550mhz cabling infrastructure to be used when providing telephone and data drops in office and classroom locations as specified. The cabling infrastructure shall consist of any and all low voltage cables, terminations, patch panels, cross connects and associated hardware necessary to provide a completed and operational cabling system.

The contracts developed from the successful bid will contain this underlying agreement between the Vendor and the District as to the cabling system product and services the Vendor is qualified to provide and the best value pricing at which the Vendor is willing to offer said product and services to the District. The Vendor will offer their "best and final" price at or below the successful bid pricing and rates.

# **General Requirements**

Please note that the District retains the right to request any additional information pertaining to the prospective bidder's ability, qualifications, and procedures used to accomplish all work under this contract, as it deems necessary to ensure safe and satisfactory work.

- 1) For the purposes of this contract full service shall mean that the Vendor's bid price includes, all travel costs, parking fees, fines and any other ancillary fees and costs including permits, licenses, insurance, etc. Details of service not explicitly stated in these specifications, but necessarily attendant thereto, are deemed as understood by the Vendor and included herein.
- 2) Cable, as installed or subsequently modified by the Vendor (or others with its knowledge and consent) shall be suitable for connection to the Districts network or other equipment (as identified by District) and shall be provided with the guarantee that such interconnection will not in any way impair the quality of transmission or cause any harmful effects to such network or equipment. Vendor will save the District harmless from any action brought against the District to the extent that it is based on a claim that the cable at any time caused any such harmful effects, except to the extent that such damage was caused by acts or omissions of the District. The warranty, and remedy, set forth in this paragraph shall only be operable to the extent District informs the Vendor.
- 3) Vendor will utilize or supply product that is free of any liens or encumbrances.

- 4) The Vendor shall be completely responsible for their work, including any damages or breakdowns caused by their failure to take appropriate action.
- 5) Trained technicians are required to do all servicing. All technicians shall have at least two years of experience. Trained technicians must have successfully attended an appropriate training program and upon request of the District provide proof thereof. Appropriate training programs include but are not limited to installation certification programs provided by BICSI or the ACP (Association of Cabling Professionals).
- 6) Technicians will coordinate their activities with the District's representative. Failure to do so, whether intentional or not, shall be understood to mean that service was not performed.

# **Pricing**

Each bidder must submit pricing for all cabling-associated products offered (see Cable Associated Hardware below) and should indicate whether there is a uniform percentage discount in effect for the submitted price list. If a percent discount is offered, then it must be stated within two decimal places. Once awarded a contract, the percentage discount offered may, at the Vendor's option, be increased based on individual orders. Discounts may be greater, but in no instance may they be lower than the awarded discount.

The District reserves the right to accept or reject any or all bids or to accept or reject any or all products included in the bidders catalog and to add products, with the agreement of the bidder, if it is in the best interest of the District to do so. Bidders <u>MUST</u> provide with their bid a current dated price list, including a cost per foot for each cable type.

New products will be considered for inclusion provided they are pertinent to the award category description and offered to the District under the same terms, conditions and discount structure (or pricing deemed to be in the best interest of the District) as in the original bid.

Price revisions, new lists or supplements to an original list shall be submitted to the District for approval before the District will be bound to any such revisions. Price increases or decreases shall be binding under any contract five (5) days following written notification to the Vendor from the District that the price revision as submitted for approval has been accepted.

Given that all cable or fiber installation and testing services will be provided on a time and materials (T&M) basis, each bidder must offer hourly rates for regular, overtime, and emergency services.

Price shall include all shipping and handling charges to any destination point as designated by the District.

# **Cable Associated Hardware**

The District wishes to establish bid pricing for the following hardware associated with the installation and testing of cable and other telecommunications equipment. Bidders should submit a current price list for all components that fall into the following cable-associated hardware categories:

- 1) Cable Management
- 2) Installation Hardware (including low voltage signal amplifiers)
- 3) Racks/Cabinets
- 4) Power Protection

- 5) Tools
- 6) Installation Supplies
- 7) Patch Panels, Blocks/Jacks, patch cords
- 8) Cable Assemblies
- 9) Adapters
- 10) Connectors

# Maintenance

Maintenance of installed and existing cable or fiber and testing services will be provided on a time and materials (T&M) basis.

Unless the agreement between the District and the Vendor specify otherwise, Vendor guarantees that within forty-eight (48) continuous hours of its response for any maintenance as provided above that repairs will be successfully completed and that system service will be fully restored so long as the malfunction is attributable to Vendor's Product.

Where District elects support and maintenance services, Vendor shall maintain the Product to provide District with the ability to utilize the Product without interruption, delay or significant functional downtime to the District's ongoing business operations during the maintenance term in accordance with the terms and conditions of the applicable service descriptions.

Warranty will become effective subsequent to Acceptance of the Product.

Nothing in this Contract shall be construed to prevent the District from acquiring peripheral equipment from a Third Party. In the event the District acquires such equipment, Vendor shall be obligated to cooperate with the Third Party, as necessary, in the performance of each party's maintenance obligations.

## **Emergency Service**

The Vendor shall provide emergency service on an "as required basis."

Emergency service will be provided, as needed on a 24 hour, 7 days a week basis. The Vendor agrees to provide an emergency telephone service on a 24 hour, 7 days a week basis (at the appropriate T&M rate established from this contract).

# **Rates For Travel Costs**

All quoted rates must include travel time and all costs incurred for travel to the site.

# **Estimated Quantities**

The projected total estimated annual purchases for copper twisted pair, fiber optic, coaxial communications cabling, various components, installation and maintenance services is between \$10,000 and \$20,000. This is an estimate only, and does not commit nor restrict the district from purchasing any amount of these goods and services from the successful bidder or any other entity approved by the District Board of Education.

## **Qualifications Of Bidders**

The Bidder shall submit with its bid satisfactory evidence of previous experience and possess adequate resources and organization, as herein specified, to perform the type, magnitude, and quality of work specified.

Bidders are encouraged to submit evidence of any pertinent manufacturer certifications they may hold, as well as any training certifications they have received (individually or as a whole).

The Bidder shall provide evidence that the Bidder has maintained an organization capable of performing the work hereinafter described in continuous operation for at least the past two years (complete the following):

Bidder has maintained an organization capable of performing the work for \_\_\_\_\_ years

Employees responsible for contract:

Name	Function	Title	Yrs of service
Name	Function	Title	Yrs of service
Name	Function	Title	Yrs of service
Name	Function	Title	Yrs of service
Main Contact Person	Name Address E-mail	Title Telepho Fax	ne

## References

Provide a list of three customer references for similar products or services that are being, or were, successfully administered by the bidder each within the last 2 years. Each reference must contain, at a minimum, the following information: company name, address, phone numbers, hours of operation, contact name and e-mail address (complete the following):

# (1) Reference Company Name: \_\_\_\_\_

Address:	
City:	State:
Zip Code:	_
Phone Number: ()	
Fax Number: ()	
Hours of Operation (EST):	
Main Contact:	E-Mail Address:
(2) Reference Company Name:	
Address:	<u>-</u>
City:	_State:
Zip Code:	
Phone Number: ()	
Fax Number: ()	
Hours of Operation (EST):	
Main Contact:	E-Mail Address:
(3) Reference Company Name:	
Address:	_
City:	_State:
Zip Code:	_
Phone Number: ()	
Fax Number: ()	
Hours of Operation (EST):	
Main Contact:	E-Mail Address:

# **Cabling Installation**

Each installed cable will be a homerun without splices. Taps, splices or splitters are not allowed unless approved by the District at the time of installation.

To conform to standards the maximum allowed total cable length of the terminated cable is 90 m (295 ft), independent of media type (UTP, coax, fiber, etc.). This allows 10 m (32 ft) for patch cords and equipment cables.

Three types of cables are acceptable (Copper, Optical Fiber and Coaxial):

- (a) 4-pair 100Ω Category 5e/6/6a STP/UTP
- (b)  $50/125 \ \mu m$  (or alternately  $62.5/125 \ \mu m$ ) Multi-Mode fiber
- (c) 8.3 µm Single Mode Fiber
- (d)  $75\Omega$  coaxial cable (RG-6/Series 6)

Do **NOT** use other types of cables unless directed by the District for special applications and then only in addition to the listed cable types above. Cables will be plenum-rated where cable traverses plenum pathways. All cables outer sheath will be factory marked.

Fiber optic cable installed in an indoor horizontal environment will meet UL or ETL vertical tray test and be Type OFN listed with UL or ETL. The outer sheath will be clearly marked. OFNR or OFNP are acceptable substitutes.

Selection of optical fiber connectors will be coordinated with, and approved by, the District.

Selection of coax RG6 connectors will be coordinated with, and approved by, the District.

Selection of faceplate manufacturer will be coordinated with, and approved by, the District.

## Placement Of Cables

Cables will be installed in a good workmanship manner. Cables and components will be visually inspected for proper installation. Cable stress such as tension in suspended cables or tightly cinched bundles shall not be acceptable. Velcro<sup>™</sup> straps will be used to bundle cables; never use metallic straps, scrap wires or cable ties. Cable sheath must not be deformed either by the straps or placement.

Outside Cable Plant:

Direct buried cable will be armored to prevent rodent damage and gel filled to prevent damage due to moisture contamination. The cable and fiber is to be buried at least six (6) inches below the frost line or three (3) feet, whichever is greater. The Vendor is required to bury 800% stretchable, brightly colored plastic tape thirteen (13) inches above the cable or fiber. Aerial cable will include a strength member or messenger capable to support the weight of the cable between the support components of an aerial cable run. Cable construction will be appropriate for the climate area installed. At the option of the District, these parameters may be adjusted to system and environmental situations.

## Grounding and Bonding:

The grounding and bonding will comply with specification of the NFPA NEC Article 250 and Chapter 8 and TIA/EIA-607.

Pathways and Spaces:

The commercial building standard for Telecommunications pathways and spaces will conform to the ANSI/TIA/EIA-569-A specifications.

# **Cable Identification And Numbering**

Sample system for labeling, unless otherwise specified by the District.

W – letter designation for wiring closet

P – letter designation for panel in wiring closet

## – port number on panel

All labels must be computer generated (not hand written). Cables will be labeled on the cable behind the faceplate, as well as on the faceplate itself.

## **General UTP Cable Plant Parameters**

Bend Radius:

The minimum bend radius, under no-load conditions, for 4-pair UTP cable will be four (4) times the cable diameter, eight (8) times for 4-pair ScTP cable, and ten (10) times for multipair cable. Maximum pulling tension for 4-pair UTP cable is 25 lb/f, use manufacturer's guidelines for other cable types.

Sheath Removal:

To maintain cable geometry, remove only as much cable sheath as necessary to terminate the cable pairs as per manufacturer instructions and Category specifications. Category 5e cable pair twists will be maintained to within 0.5 in from the point of termination. No more than 1 inch of jacketing should be skinned off.

Patch Cord:

Factory constructed patch cords compliant to the cable system will be utilized. Unjacketed field constructed jumpers will not be acceptable. Cross-connector jumper wires will be cross-connect wire of 1- to 4-pair construction.

Service Loops:

Whenever service loops for extra cable slack is desired, cable will be loosely coiled into figure eight's to prevent degradation of return loss and NEXT performance.

## EMI:

Pathways should cross perpendicular to fluorescent lighting and electrical power cables. Avoid proximity with potential sources of EMI (e.g., motors, lighting ballasts, transformers) wherever possible, especially with UTP cables. All pathways should provide clearances of at least:

- 4 feet from large motors or transformers
- 1 foot from cables used for electrical power distribution
- 5 inches from fluorescent lighting
- 2.5 inches from power cables if either UTP or power is in conduit.

# Field Testing Twisted-Pair Cabling System

Cabling link installations will be tested in accordance with the Telecommunications Industry Association (TIA) standard ANSI/TIA/EIA-568-C.2. Installed twisted-pair horizontal links will be tested from the telecommunications room to the telecommunication wall outlet in the work area against the "Permanent Link" performance limits specification as defined in ANSI/TIA/EIA-568-C.2. Any failing link must be diagnosed and corrected.

# **Category 5e Performance Tests Example**

Transmission performance depends on cable characteristics, connecting hardware, patch cords and cross-connect wiring, the total number of connections, and installation practices. All category 5e systems will be tested and the results submitted for system acceptance for each 4-pair UTP link.

- 1) Test results will also include the site information, cable number under test, and environmental conditions.
- 2) The test equipment (tester) will comply with or exceed the accuracy requirements for enhanced level II (Level II-E) field testers as defined in TIA-568-B; Annex I: Section I.4. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table I.4 of Annex I of TIA/EIA-568-B.2. (Table I.5 in the TIA document specifies the accuracy requirements for the Channel configuration.)
- 3) Test instruments will be field calibrated before testing begins The test instrument must be adjusted to the Nominal Velocity of Propagation NVP of the particular manufacturer's installed cable type.
- 4) A qualified technician will perform testing.
- 5) An acceptable test instrument would be a Level IIe certification tester than can print a hardcopy or send the test results to a computer/disc. All tests except wire map, length, and propagation delay will be sweep tested from 1 MHz to 100 MHz.

The following test parameters at ambient temperature are required of each category 5e permanent link. The 100 MHz expected results are shown below.

<b>Test Parameter</b>	Results
Wire map	All 8 conductors terminated on the proper T568A pins
Length	Maximum of 90 m (295 ft) – NVP adjusted for cable type
Insertion loss	Maximum of 21.0 dB at 100 MHz
NEXT loss	Maximum of 32.3 dB at 100 MHz (worst case, pair-to-pair)
<b>PSNEXT</b> loss	Maximum of 29.3 dB at 100 MHz
ELFEXT	Maximum of 18.6 dB at 100 MHz (worst case, pair-to-pair)
PSELFEXT	Maximum of 15.6 dB at 100 MHz
Return loss	Maximum of 12.0 dB at 100 MHz
Propagation delay	Maximum of 498 ns at 10 MHz
Delay skew	Maximum of 44 ns (worst case, pair-to-pair)

# WIRE MAP

Wire Map will report Pass if the wiring of each wire-pair from end to end is determined to be correct. The Wire Map results will also include the continuity of the shield connection if present. [As defined in TIA/EIA-568-B.1; Section 11.2.4.2]

## LENGTH

The field tester will measure the length of all pairs of a permanent link or channel based

on the propagation delay measurement and the average value for NVP. The physical length of the link will be calculated using the pair with the shortest electrical delay. This length figure will be reported and will be used for making the Pass/Fail decision. The Pass/Fail criteria are based on the maximum length allowed for the permanent link configuration (90 meters – 295 ft) or the channel (100 meters – 328 ft). [As defined in TIA/EIA-568-B.1; Section 11.2.4.3)]

## **INSERTION LOSS (ATTENUATION)**

Insertion Loss will be tested from 1 MHz through 100 MHz in maximum step size of 1 MHz. It is required to measure attenuation at the same frequency intervals as NEXT Loss in order to provide a more accurate calculation of the Attenuation-to-Cross talk Ratio (ACR) parameter. [As defined in TIA/EIA-568-B.1; Section 11.2.4.4] Minimum test results documentation (summary results): Identify the worst wire pair (1 of 4 possible). The test results for the worst wire pair must show the highest attenuation value measured (worst case), the frequency at which this worst-case value occurs, and the test limit value at this frequency.

# NEXT LOSS, PAIR-TO-PAIR

Pair-to-pair near-end cross talk loss will be tested for each wire pair combination from each end of the link. This parameter is to be measured from 1 through 100 MHz. The maximum step size for NEXT Loss measurements will not exceed the maximum step size defined in the standards. [as defined in TIA/EIA-568-B.1; Section 11.2.4.5] Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst case NEXT margin and the wire pair combination that exhibits the worst value of NEXT (worst case). NEXT is to be measured from each end of the link-under-test. These wire pair combinations must be identified for the tests performed from each end. Each reported case will include the frequency at which it occurs as well as the test limit value at this frequency.

# **PSNEXT Loss**

Power Sum NEXT Loss will be evaluated and reported for each wire pair from both ends of the link-under-test (a total of 8 results). The test parameter must be evaluated from 1 through 100 MHz and the step size may not exceed the maximum step size defined in the standards. [as defined in TIA/EIA-568-B.1; Section 11.2.4.6] Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PSNEXT. These wire pairs must be identified for the tests performed from each end. Each reported case will include the frequency at which it occurs as well as the test limit value at this frequency.

## ELFEXT LOSS, PAIR-TO-PAIR

Pair-to-pair FEXT Loss will be measured for each wire-pair combination from both ends of the link-under-test. ELFEXT is to be measured from 1 through 100 MHz and the maximum step size for FEXT Loss measurements will not exceed the maximum step size defined in the standards. [as defined in TIA/EIA-568-B.1; Section 11.2.4.7] Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst-case margin and the wire pair combination that exhibits the worst value for ELFEXT. These wire pairs must be identified for the tests performed from each end. Each reported case will include the frequency at which it occurs as well as the test limit value at this frequency.

# **PSELFEXT Loss**

Power Sum ELFEXT is a calculated parameter that combines the effect of the FEXT disturbance from three wire pairs on the fourth one. This test yields 8 wire-pair combinations. Each wire-pair is evaluated from 1 through 100 MHz in frequency increments that do not exceed the maximum step size defined in the standards. [as defined in TIA/EIA-568-B.1; Section 11.2.4.8]

Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PSELFEXT. These wire pairs must be identified for the tests performed from each end. Each reported case will include the frequency at which it occurs as well as the test limit value at this frequency.

# **RETURN LOSS**

Return Loss is to be measured from both ends of the link-under-test for each wire pair. The parameter is to be measured form 1 through 100 MHz in frequency increments that do not exceed the maximum step size defined in the standards. [as defined in TIA/EIA-568-B.1; Section 11.2.4.9]

Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for Return Loss. These wire pairs must be identified for the tests performed from each end. Each reported case will include the frequency at which it occurs as well as the test limit value at this frequency.

## **PROPAGATION DELAY**

Propagation Delay measurement is to be performed for each of the four wire pairs. Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay. The report will include the propagation delay value measured as well as the test limit value. [as defined in TIA/EIA-568-B.1; Section 11.2.4.10]

## **DELAY SKEW**

Delay skew measurement is to be performed between the four wire pairs. The pair with the shortest propagation delay is the reference pair with a delay skew value of zero. Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay (the longest propagation delay). The report will include the delay skew value measured as well as the test limit value. [as defined in TIA/EIA-568-B.1; Section 11.2.4.11]

## **General Test Result Documentation**

- 1) The test results information for each installed or repaired link will be recorded in the memory of a field tester upon completion of the test.
- 2) The test results records saved by the tester will be transferred into a Windows<sup>™</sup>-based database utility that allows for the maintenance, inspection and archiving of these test records.
- 3) Measurement results should be transferred to the PC unaltered, i.e., "as saved in the tester" at the end of each test.
- 4) The database for the completed job will be stored and delivered on computer/disc including any proprietary non-Microsoft based software tools required to view, inspect, and print any selection of test reports.

- 5) A paper copy of the test results will be provided that lists all the links that have been tested with the following summary information.
- 6) The identification of the link in accordance with the naming convention defined in the overall system documentation.
- 7) The overall Pass/Fail evaluation of the link-under-test.
- 8) The date and time the test results were saved in the memory of the tester.
- 9) General Information to be provided in the electronic data base with the test results information for each link:
  - a) The identification of the customer site as specified by the District
  - b) The identification of the link in accordance with the naming convention defined in the overall system documentation
  - c) The overall Pass/Fail evaluation of the link
  - d) The name of the standard selected to execute the stored test results
  - e) The cable type and the value of NVP used for length calculations
  - f) The date and time the test results were saved in the memory of the tester
  - g) The brand name, model and serial number of the tester
  - h) The identification of the tester interface
  - i) The revision of the tester software and the revision of the test standards database in the tester

## **General Optical Fiber Cabling Plant Parameters**

**Bend Radius** 

The bend radius for intra-building 2- and 4-fiber horizontal optical fiber cable will not be less than 1 inch under no-load conditions. When under a maximum tensile load of 50 lb/f, the bend radius will not be less than 2 inches. The bend radius for intra-building optical fiber backbone cable will not be less than that recommended by the manufacturer. If not known, then the bend radius will not be less than ten (10) times the cables outside diameter under no load and not less than 15 times under tensile load.

Service Loops

Whenever service loops for extra cable slack are required, Optical Fiber cable will be loosely coiled into figure eight's.

Patch Cord

Optical fiber patch cords will consist of 2-fiber cables of the same type as in the optical fiber channel with factory-installed connectors on each end.

## **General Fiber Optic Cable Construction Parameters**

Fiber optic cables consisting of less than eight (8) fibers will have a dielectric strand member to provide tensile strength for the cable. Aramid yarn will surround the fibers to provide additional tensile strength. A ripcord will be included between the Aramid yarn and the outer jacket to facilitate jacket removal.

Fiber optic cables of eight (8) to 24 fibers will have fibers stranded around a central strength member. A ripcord will be included between the aramid yarn and the outer jacket to facilitate jacket removal.

Riser cables of more than 24 fibers will have the buffered fibers grouped in sub units of six to twelve fibers. Individual fibers will be stranded around a dielectric central member and surrounded by an aramid yarn. A ripcord will be included in the sub unit to facilitate access to the individual fibers and each sub unit will have a jacket to provide additional physical and environmental protection. The sub units will be stranded around a central strength member to provide antibuckling protection to assure consistent attenuation performance across the operating temperature range of the cable. The stranded sub units will be surrounded by an aramid yarn and covered by an extruded jacket to provide additional physical and environmental protection. A ripcord will be included to facilitate the removal of the outer jacket.

The cable jacket will be continuous, seamless and free of pinholes, splits, blisters and other imperfections that may allow the ingress of moisture. Jacket material will comply with the mechanical and flammability requirements as specified by the NEC, UL or ETL, and any other standard codes in effect at the time of purchase.

Outside cables will be gel filled to prevent moisture contamination. The gel will be non-nutritive to fungus, and electrically non-conductive. A polyethylene UV stabilized jacket will protect all outside fiber optic cable. The jacket will be applied directly over the strength members and gel. Bidders offering alternatives to cable must supply complete technical testing data and criteria. Acceptance or rejection will be made at the sole discretion of the District.

Outside plant cable will be certified as having passed the following performance tests:

- FOTP-82 Fluid Penetration Test for Filled Fiber Optic Cable
- FOTP-81 Compound Flow (Drip) Test for Filled Fiber Optic Cable
- FOTP-41 Compressive Loading Resistance of Fiber Optic Cables
- FOTP-104 Fiber Optic Cable Cyclic Flexing Test
- FOTP-25 Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies
- FOTP-33 Fiber Optic Cable Tensile Loading and Bending Test

Fiber optic riser cable is required to meet UL or ETL flame test and be Type OFNR listed with UL or ETL. The outer sheath will be clearly marked "Type OFNR . Type OFNP is an acceptable substitute for riser applications.

Plenum fiber optic cable is required to meet NFPA 262-1985 standards and is listed as Type OFNP with the UL or ETL. The outer sheath will be clearly marked "Type OFNP". Substitutions for plenum installations are not permitted.

# Fiber Optic Cabling Performance Tests

Every fiber optic cabling link in the installation will be tested in accordance with the field test specifications defined by the Telecommunications Industry Association (TIA) standard ANSI/TIA/EIA-568-B. ANSI/TIA/EIA-568-B, defines the passive cabling network, to include cable, connectors, and splices (if present), between two optical fiber patch panels (connecting hardware). Any failing link must be diagnosed and corrected. The corrective action will be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links will be provided in the test results documentation. Testing will be performed by a qualified technician.

Field test instruments for multimode fiber cabling will meet the requirements of ANSI/TIA/EIA-526-14A. The light source will meet the launch requirements of ANSI/EIA/TIA-455-50B, Method A One reference jumper. This launch condition can be achieved either within the field test equipment or by use of an external mandrel wrap (as described in clause 11 of ANSI/TIA/EIA-568-B.1) with a Category 1 light source. Field test instruments for single mode fiber cabling will meet the requirements of ANSI/EIA/TIA-526-7. The tester will be within the calibration period recommended by the manufacturer in order to achieve the Vendor-specified measurement accuracy. The fiber optic launch cables and adapters must be of high quality and the cables will not show excessive wear resulting from repetitive coiling and storing of the tester interface adapters.

# Fiber Optic Performance Test Parameters

ANSI/TIA/EIA standard 568-B prescribes that the single performance parameter for field-testing of fiber optic links is link attenuation when installing components compliant with this standard. (EIA-445 Fiber Optic Test Procedures (FOTPs)) The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter.

The link attenuation will be calculated by the following formulas specified in ANSI/TIA/EIA standard 568-B.

- Link Attenuation = Cable Attenuation + Connector Attenuation + Splice Attenuation
- Cable Attenuation (dB) = Attenuation Coefficient (dB/km) \* Length (Km)

<b>Type of Optical Fiber</b>	Wavelength	Attenuation	Bandwidth
	(nm)	Coefficient (dB/km)	(IVITIZ-KIII)
Multimode 62.5/125 µm	850	3.5	500
	1300	1.5	500
Multimode 50/125 µm	850	3.5	160
	1300	1.5	500
Single-mode (Inside)	1310	1.0	N/a
	1550	1.0	N/a
Single Mode (Outside)	1310	0.5	N/a
	1550	0.5	N/a

The values for the Attenuation Coefficient are listed in the table below:

- Connector Attenuation (dB) = number of connector pairs \* connector loss (dB)
- Maximum allowable connector loss = 0.75 dB
- Splice Attenuation (dB) = number of splices (S) \* splice loss (dB)
- Maximum allowable splice loss = 0.3 dB

Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

<u>Horizontal link (multimode)</u>: acceptable link attenuation for a multimode horizontal optical fiber cabling system is based on the maximum 90 m (295 ft) distance. The horizontal optical fiber cabling link segments need to be tested at only one (1) wavelength. Because of the short length of

cabling [90 m (295 ft) or less], attenuation deltas due to wavelength are insignificant. The horizontal link may be tested using a fixed upper limit for attenuation of 2.0 dB. This value is based on the loss of two (2) connector pairs, one (1) pair at the telecommunications outlet/connector and one (1) pair at the horizontal cross-connect, plus 90 m (295 ft) of optical fiber cable.

<u>Backbone link (multimode)</u>: will be tested at 850 nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A. Because backbone length and the potential number of splices vary depending upon site conditions, the link attenuation equation will be used to determine limit acceptance values.

<u>Backbone link (single mode)</u>: will be tested at 1310 nm and 1550 nm in accordance with ANSI/TIA/EIA-526-7, Method A.1 one reference jumper. All single mode links will be certified with test tools using laser light sources at 1310 nm and 1550 nm.

<u>Optical Fiber Gigabit Ethernet:</u> will be tested compliant to certification IEEE std 802.3z, test equipment that uses a VCSEL (Vertical cavity surface emitting laser) at 850 nm (compliant with 1000BASE-SX) and an FP laser at 1310 nm (compliant with 1000BASE-LX) will be used.

<u>Cable Plant Testing Equipment</u> All single-mode outside cable plant and long distance (1,000+ ft) inside networks shall be tested with a Optical Time Domain Reflectometer (OTDR). The test results shall identify any splices and the performance results are within previously defined parameters. Cable plant loss shall be tested using a source and power meter.

## Fiber Optic Test Result Documentation

The test result information for each link will be recorded in the memory of the field tester upon completion of the test. The test result records saved by the tester will be transferred into a Windows<sup>TM</sup>-based utility that allows for the maintenance, inspection and archiving of these test records. Measurement results should be transferred to the PC unaltered, i.e., "as saved in the tester" at the end of each test.

The database for the completed job at the option and request of the District will be stored and delivered on computer disc; this disc will include the software tools required to view, inspect, and print any selection of test reports. A paper copy of the test results will be provided that lists all the links that have been tested with the following summary information.

- 1) The identification of the link in accordance with the naming convention defined in the overall system documentation.
- 2) The overall Pass/Fail evaluation of the link-under-test including the Attenuation worst-case margin.
- 3) The date and time the test results were saved in the memory of the tester.
- 4) General Information to be provided in the electronic data base containing the test result information for each link:
  - a) The identification of the customer site as specified by the District.
  - b) The insertion loss (attenuation) measured at each wavelength, the test limit calculated for the corresponding wavelength and the margin (difference between the measured attenuation and the test limit value).

- c) The link length will be reported for each optical fiber for which the test limit was calculated.
- d) The cable type and the value of the 'index of refraction' used for length calculations
- e) The brand name, model and serial number of the tester
- f) The revision of the tester software and the revision of the test standards database in the tester

# **General Coaxial Cabling Plant Parameters**

**Bend Radius** 

The bend radius for intra-building Series 6 (RG-6) coaxial cable will not be less than 15 times the cable diameter of the OD of the cable.

Service Loops

Whenever service loops for extra cable slack are required, Coaxial cable will be loosely coiled into figure eight's.

# **General Coaxial Construction Parameters**

A solid bare Copper Covered Steel conductor is covered with solid polyethylene insulation. A foil with Aluminum bonded to both sides of a polypropylene or polyester tape and a Foam Polyethylene insulation, Bonded Aluminum Foil, Aluminum Braid shield, Aluminum Foil, Aluminum Braid shield then a PVC or FEP jacket.

# **Cable Characteristics**

# 100Ω Unshielded Twisted Pair (UTP) Category 5e Specifications

- Cable Gauge: 24 AWG
- Conductor: Solid Bare Copper
- Strand Insulation: Polyolefin
- Frequency Range: ≥ 100 MHz
- Attenuation:  $\leq 22 \text{ dB}$
- NEXT: ≥ 35.3 dB
- PSNEXT:  $\geq$  32.3 dB
- ELFEXT: ≥ 23.8dB/100m
- PSELFEXT:  $\geq 20.8$ dB/100m
- Return Loss:  $\geq 20.1$ dB
- Delay Skew:  $\leq 45$ ns
- Jacket Material Non-Plenum version: PVC
- Jacket Material Plenum version: FEP and NEC Plenum certified
- UL or ETL Verified

# 100Ω Unshielded Twisted Pair (UTP) Category 6 Specifications

- Cable Gauge: 24 AWG
- Conductor: Solid Bare Copper
- Strand Insulation: Polyolefin
- Frequency Range: ≥ 100 MHz
- Attenuation:  $\leq 19.8 \text{ dB}$
- NEXT: ≥ 44.3 dB
- PSNEXT:  $\geq$  42.3 dB
- ELFEXT: ≥ 27.8 dB/100m

- PSELFEXT:  $\geq 24.8$ dB/100m
- Return Loss:  $\geq 20.1$ dB
- Delay Skew:  $\leq 45$ ns
- Jacket Material Non-Plenum version: PVC
- Jacket Material Plenum version: FEP and NEC Plenum certified
- UL or ETL Verified

# Multi-Mode Fiber 50/125 $\mu M$

- Fiber Type: All Glass Graded Index
- Core Diameter: 50 +/- 3 μm
- Cladding Diameter: 125 +/- 2 μm
- Coating: 900 μm
- Numerical Aperture: 0.200 +/- 0.015
- Core Cladding Concentricity:  $\leq 3 \mu m$
- Cladding Non-Circularity: <2.0%
- Core Non-Circularity:  $\leq 5\%$
- Cabled Fiber Attenuation:  $\leq 3.5 \text{ dB/km} @ 850 \text{nm}, \leq 1.5 \text{ dB/km} @ 1300 \text{nm}$
- Attenuation uniformity: no point discontinuity greater than 0.2 dB
- Jacket Material non-Plenum general version: PVC and NEC certified
- Jacket Material non-Plenum riser version: PVC and NEC certified
- Jacket Material Plenum version: FEP and NEC Plenum certified
- Rip cord: Aramid fiber
- UL or ETL Verified
- Outside Specifications (includes all above specifications with the addition or substitutions of the following)
  - o Coating: 250µm
  - o Rodent Protection: Steel or Aluminum Armor
  - o Ariel: Self supporting
  - Jacket Material (Inner/Outer): Medium Density Polyethylene / UV stabilized Polyethylene
  - o Buffer: Loose tube
  - o Buffer tube filling: Non-hazardous gel

## Multi-Mode Fiber 62.5/125 µM

- Fiber Type: All Glass Graded Index
- Core Diameter: 62.5 +/- 3 μm
  - Cladding Diameter: 125 +/- 2 μm
  - Indoor Coating: 900 μm
- Numerical Aperture: 0.275 +/- 0.015
- Core Cladding Concentricity:  $\leq 3 \mu m$
- Cladding Non-Circularity: <2.0%
- Core Non-Circularity:  $\leq 5\%$
- Cabled Fiber Attenuation:  $\leq 3.5 \text{ dB/km} @ 850 \text{nm}, \leq 1.5 \text{ dB/km} @ 1300 \text{nm}$
- Attenuation uniformity: no point discontinuity greater than 0.2 dB
- Jacket Material non-Plenum general version: PVC and NEC certified
- Jacket Material non-Plenum riser version: PVC and NEC certified
- Jacket Material Plenum version: FEP and NEC Plenum certified
- Rip cord: Aramid fiber

- UL or ETL Verified
- Outside Specifications (includes all above specifications with the addition or substitutions of the following)
  - Coating: 250µm
  - Rodent Protection: Steel or Aluminum Armor
  - Ariel: Self supporting
  - Jacket Material (Inner/Outer): Medium Density Polyethylene / UV stabilized Polyethylene
  - Buffer: Loose tube
  - Buffer tube filling: Non-hazardous gel

# Single-Mode Fiber

- Fiber Type: All Glass uniform refractive index
- Core Diameter: 8.3 +/- 0.1 µm, nominal
- Cladding Diameter: 125 +/- 1 µm
- Coating: 900 μm
- Numerical Aperture: 0.14
- Core Cladding Concentricity: < 12µm
- Cladding Non-Circularity: <1.0%
- Core Non-Circularity:  $\leq 5\%$
- Cabled Fiber Attenuation:  $\leq 0.7 \text{ dB/km} @ 1310 \text{nm}, \leq 0.7 \text{ dB/km} @ 1550 \text{nm}$
- Attenuation uniformity: no point discontinuity greater than 0.2 dB
- Minimum Bend Radius: >25mm
- Strength member: high strength aramid yarn (Kevlar®)
- Buffer: Tight tube style
- Jacket Material non-Plenum general version: PVC and NEC certified
- Jacket Material non-Plenum riser version: PVC and NEC certified
- Jacket Material Plenum version: FEP and NEC Plenum certified
- Rip cord: Aramid fiber
- UL or ETL Verified
- Outside Specifications (includes all above specifications with the addition or substitutions of the following)
- Coating: 250µm
- Cabled Fiber Attenuation:  $\leq 0.5 \text{ dB/km} @ 1310 \text{nm}, \leq 0.4 \text{ dB/km} @ 1550 \text{nm}$
- Strength member: Fiberglass rod
- Rodent Protection: Steel or Aluminum Armor
- Ariel: Self supporting
- Buffer: Loose tube
- Buffer tube filling: Non-hazardous gel
- Jacket Material (Inner/Outer): Medium Density Polyethylene / UV stabilized Polyethylene

# **RG6/Series 6 Coaxial Specifications**

- Cable Gauge: 18 AWG
- Conductor: Bare Copper Covered Steel
- Maximum operating voltage: 300 vrms
- Impedance:  $75 \pm 3\Omega$
- Attenuation:  $\leq 1 dB/100 ft @ 10 MHz$
- Nominal Inductance: 0.093 Micro-h/ft

- Nominal Capacitance Conductor to shield: 16.5 pf/ft
- Nominal Velocity of Propagation: 82%
- Nominal Delay: 1.24 NS/Ft
- Shield Type: 1st layer: Foil 2nd layer: Braid 3rd layer: Foil
  - 4th layer: Braid
  - Bend Radius:  $\geq 10$  times diameter
- Non-Plenum Jacket Material: PVC
- Plenum Jacket Material: FEP
- Insulation (Dielectric): FEP
- Jacket Material Non-Plenum version: PVC
- Jacket Material Plenum version: FEP and NEC Plenum certified
- UL or ETL Listed
- Sweep tested from 5MHz 1 GHz, 20 dB min.
- Outside Specifications (includes all above specifications with the addition or substitutions of the following)
  - Strength member: Fiberglass rod
  - Rodent Protection: Steel or Aluminum Armor
  - Buffer: Loose tube
  - Corrosion Protection: non-hazardous gel between the braid and the jacket
  - Jacket Material (Inner/Outer): Medium Density UV stabilized Polyethylene

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# **Documentation**

Upon completion of work, and at the discretion of the District, the Vendor will provide floor plans depicting the location of the cables installed by Vendor. Cable identification on this documentation must be consistent with the cable identification and numbering scheme identified in the CABLE IDENTIFICATION AND NUMBERING section on page 8. District will provide, if needed, composite floor plans for the area in which the cables are being installed.

# **BID PRICES SUMMARY DOCUMENT**

## EAST IRONDEQUOIT CENTRAL SCHOOL DISTRICT 600 Pardee Road, Rochester, NY 14609 (585) 339-1260

The undersigned bidder agrees to furnish Data Cabling Services and Hardware as described on the attached sheets at the prices indicated.

The labor rates bid pricing is as follows:

\$\_\_\_\_\_ Hourly charge

Prices are to be in effect for the period of July 1, 2024 through June 30, 2025

Comments:

It is understood that the bid price includes all costs of furnishing and delivering the items to location specified and there will be no additional charges, pursuant to and in compliance with all terms and conditions set forth in the Bid.

The Board of Education reserves the right to reject all bids.

Company
Address
Phone
Authorized Signature
Date
Email
Contact person (if different from authorized signat

Contact person (if different from authorized signature)