

THE BRIHAN-MUMBAI ELECTRIC SUPPLY & TRANSPORT UNDERTAKING

(OF THE BRIHAN MUMBAI MAHANAGARPALIKA)



Prop. SPECIFICATION NO. : 0230115

FOR

**1.1kV, 1C X 400 sq.mm. Stranded
Copper conductor, XLPE insulated PVC
sheathed unarmoured cable**

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**SPECIFICATION FOR 1.1 KV, 1C X 400 SQ.MM.,
STRANDED COPPER CONDUCTOR , XLPE INSULATED, PVC SHEATHED,
UNARMoured CABLE**

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C O N T E N T S

Sr. No.	Description	Page No.
I	Instructions to Tenderers	2
Section-1	General	5
Section-2	Description of the Power System	8
Section-3	Prevailing Service Conditions	10
Section-4	Requirements	15
Section-5	Technical Specifications	16
Section-6	Tests and Dispatch Instructions	18
Section-7	Drawings and Documents	20
Section -8	Prices, Delivery and Validity	21
Section-9	Terms of Payment	22
Annexure A	Schedule of Guaranteed Performance & Other Particulars	23
Annexure E	Schedule of Departures from Specification	25
Annexure H	Details of Sub-Vendors for critical items	26

I - INSTRUCTIONS TO TENDERERS

1. The e-tender called for herein is for the supply of 1.1kV, 1C x 400 sq.mm., stranded Copper Conductor, XLPE insulated, PVC sheathed, Unarmoured Cable to the entire satisfaction of the General Manager, the B.E.S.&T. Undertaking, Mumbai, in accordance with the specification No. 0230115 and requirements accompanying these instructions.
2. The Bid opening date and bid ending date shall be as displayed on the e-tender site of this tender. The tenderers shall submit their offers in 'e' mode (i.e. soft mode), before the said bid ending date.
3. Tender documents received after the bid ending date in hard copy will not be considered unless the due date for submission of the tender is extended in which case due intimation would be given to individual participants through e-mail.
4. Tenderers shall submit particulars of similar equipments supplied by them to some of the important customers in India or abroad especially in the tropical regions. Preference will be given to the manufacturer having his own organization or accredited representatives of long standing possessing suitable technical and installation experience.
5. If the tenderer wishes to quote for any other alternative design, which in his own opinion would better serve the purpose or/and be more economical, he may do so by adding such items at the end of the Tender Form or on separate pages, which should be signed and attached to the Tender Form. The General Manager would consider the alternatives on their merits but it is expressly understood that he would be the sole judge.
6. Tender should be submitted complete in all respects and must be accompanied by descriptive and technical particulars, drawings and other data required for proper consideration of the tender. This information should be submitted alongwith the quotation before the due date. THE SUBMISSION OF MERE TELEGRAPHIC PRICES DELIVERY PARTICULARS OR SKELETON TENDERS BEFORE THE DUE DATE WHICH ARE TO BE CONFIRMED AND/OR SUPPLIMENTED SUBSEQUENTLY SHALL NOT RECEIVE CONSIDERATION.
7. For any technical information required regarding the tender may be obtained from the office of the **Divisional Engineer, Planning (Materials), B.E.S.&T. Undertaking, 3rd floor, Veej Bhavan, Gen. J. Bhosale Marg, Backbay Reclamation, Mumbai – 400 021**, on any working day during office hours, but after the Bid ending date of the tender, **No** representative of the tendering firm will be granted an interview for discussing matters connected with the tender.
8. ATTENTION OF THE TENDERERS IS PARTICULARLY DRAWN TO THE FACT THAT THEY SHOULD ACQUAINT THEMSELVES THOROUGHLY WITH THE INSTRUCTIONS ON THE **e-TENDER SITE**, THE PARTICULARS GIVEN, THE PROVISIONS OF THE

- 'CONDITIONS OF THE CONTRACT', THE SPECIFICATION, REQUIREMENTS, SCHEDULE OF GUARANTEED PERFORMANCE, ETC.
9. All the tenderers will have to deposit as described in the Conditions of Tender, Earnest Money with the Cash Department after giving reference of the tender number. Thereafter, the tenderer shall approach the TCU (Tender Control Unit) Section of the MATERIALS MANAGEMENT DEPARTMENT BIJLEE BHAVAN, 2ND FLOOR KUSSARA BUNDER ROAD, MAZGAON, MUMBAI – 400 010 with a copy of EMD receipt to obtain the tender access rights which will be issued only after verification of the EMD receipt & on payment of necessary tender cost at the TCU Section.
 10. The Earnest Money Deposit paid by Unsuccessful tenderers will be returned after finalization of the tender on production of the original receipt, to the Chief Accounts Officer.
 11. All subsequent tenderers connected with the tender rates/items on e-tender site (e.g. Schedule of guaranteed performance, Schedule of departures from specifications, Annexure 'A' duly filled in etc.) shall be submitted **in duplicate** on or before Bid ending date (in hard copies).
 - a) Type Test Certificates of NABL accredited laboratories.
 - b) List of past supplies (supplies to other utilities, etc.).
 - c) List of machineries.
 - d) Details of testing equipments.
 - e) Quality control measures.
 - f) Detailed cross sectional drawing.
 - g) Details of local representative, if any.
 - h) Details of manufacturing unit.
 - i) Schedule of departures from Specifications i.e. Particulars of materials proposed to be supplied (if the materials proposed to be supplied do not comply with the Specifications attached, the attention of the Deputy General Manager (Electric Supply) should be specifically drawn to this fact under the Schedule of Departures attached to the specification. Absence of such specific mention under the Schedule of Departures attached to the Specification will be taken to mean that the material proposed to be supplied is in accordance with the General Conditions of Contract and the accompanying specifications).
 - j) Certified copies of annual turnover for last three financial years.
 - k) Copy of the receipt for the Earnest Money.
 - l) Any other particulars which the tenderer may wish to furnish.
 12. The final acceptance of the tender rests with the General Manager, The B.E.S.& T. Undertaking (subject to the approval of appropriate authority) who reserves to himself the right to reject any tender without assigning any reason and does not bind himself to accept the lowest, the whole of a tender or any tender.
 13. The tenderers must furnish information about manufacturing unit as per proforma given in **Annexure 'A'** manually along with the other necessary documents before the Bid ending date.
 14. The acceptance of the tender shall be governed by the General Conditions of Contract and in particular by those relating to delivery, guarantee, execution of

contract and security deposit. The successful tenderer shall sign a contract agreement for the due execution of the work as accepted by the General Manager.

15. The tenderer shall specify against each item the delivery period as specified in the General Conditions of contract of the Specifications. In case of contract for erection & commissioning of the plant and equipment, the tenderers shall specify the working period for carrying out the work. These periods of time shall be specified in number of weeks, where week shall mean 7 days of the Calendar inclusive of Sundays & Holidays, if any.
16. Those tenderers who have fulfilled the eligibility criteria specified below in the last tender opened on _____ shall be given the rights (i.e. password & username) for participation in this tender.
All other tenderers i.e. both 'New' ones & those who were ineligible in the said last tender, shall submit documents for below mentioned eligibility criteria & then get same approved from DEPL(M), only then the tender rights (i.e. password & username) shall be given for participation in tender.
 - 16.1 Only those tenderers whose Minimum Annual Turnover is **Rs. 10 Crores** and above per year, for any one of the previous three financial years, shall quote against the tender. Certified copies of assessment of Annual Turnover from Chartered Accountant should be attached by the tenderers. The offers of the tenderers not fulfilling above requirements, will not be considered.
 - 16.2 The sum total quantity of similar cable (i.e. 185 sq.mm or above, Aluminium or Copper, XLPE, 1C or multicore, Armoured or Unarmoured) supplied or orders secured during previous 3 years should be minimum 25 kms.
 - 16.3 The tenderers have to quote for minimum 50% of the total tender Quantity and confirm the same otherwise their offer will not be considered.
17. All the successful tenderers, who are new supplied to the procured item (i.e. first time suppliers to BEST Undertaking) for part/full quantity against the tender shall note that they will be placed conditional order subject to inspection of their works/factory. Further, these tenderer/s will have to bear the full charges towards factory inspection which will include to and fro travelling expenses and other sundry/incidental charges during to and fro travelling and day of inspection for two officers. The convenient date and time for inspection of your factory will be decided mutually. Only after satisfactory inspection by the inspecting officers, the detailed order with terms and conditions will be placed.
18. Inspection and Testing:
The proto and / or Lot inspection by the undertaking's officers will be carried out as per Sr.No.5 of condition of supply.

THE BRIHANMUMBAI ELECTRIC SUPPLY & TRANSPORT UNDERTAKING
(of the BRIHAN MUMBAI MAHANAGARPALIKA)

Prop. Specification No.0230115

SECTION 1 : GENERAL

1.1 Tender document

- 1.1.1 This tender document shall be read and understood as a whole inclusive of all annexures, and every section or sub-section of this document shall be interpreted in proper context with other sections contained herein.
- 1.1.2 This specification covers design, manufacture, testing before dispatch and supply of 1.1kV, 1C x 400 sq.mm. Stranded Copper conductor, ***XLPE insulated, PVC sheathed, Unarmoured*** cable.
- 1.1.3 All supply covered by this Specification shall be carried out in accordance with the "General Conditions of Contract".
- 1.1.4 Wherever the directions to the tenderers embodied herein conflict with those specified in the General Conditions of Contract, the former shall be binding in preference to the latter.

1.2 Standards

- 1.2.1 **The cables shall be designed, manufactured and tested in accordance with the following National Standards.**

IS:7098 Part-1:1988	Cross linked polyethylene (XLPE) insulated PVC sheathed cables for working voltages upto and including 1100 volts.
IS:5831 : 1984	PVC insulation & sheath of electric cables.
IS:10810:1984	Methods of test for cables.
IS:8130:1984	Conductors for insulated electric cables and flexible cords.
IS:10462 (Part 1)/ 1983	Fictitious calculation method for determination of dimensions of protective covering of cables.
IS:9938 : 1981	Recommended colours for PVC insulation for LF wires and cables.
IS:10418:1982	Specification for drums for electric cables.

- 1.2.2 Except as specified herein, all parts of the equipments shall comply with the latest published editions of International Standards Specifications (as amended to date), or equivalent national standards.
- 1.2.3 Where Indian Standards Specification does not exist, the Relevant British Standard Specification shall be taken as standard.
- 1.2.4 If the equipments offered is manufactured according to some other standard, it shall be clearly stated and a copy of the latest publication of the standard in English shall be forwarded with the offer.

1.3 Legislation

- 1.3.1 The whole of the cables shall comply in every respect with the provisions of relevant Government Legislations and / or Rules and Regulations governing manufacture, installation, operation and maintenance of the cables.
- 1.3.2 Tenderers shall ensure that all safety measures are extensively provided in the cables against hazards to life and property and that the proper installation and use of the cables under no circumstances shall contravene any enactments rules, laws and by-laws of the Government and the Local Authority.

1.4 Departure from Specification

- 1.4.1 If due to any reason, tenderers find it necessary to depart from the provisions of section of the specification, such departures shall be clearly stated and underlined giving full reasons.
- 1.4.2 If departures from the provisions of any section of this specification are not notified in writing, it will be presumed that tenderers will abide by this specification.
- 1.4.3 Any suggestion, comment, or advice to include in this document, additional provisions in respect of any special device or attachment necessary but not already specified herein, may be put forward by the tenderers giving full details of the special/additional features of the cables together with the justification for its inclusion.

1.5 Technical data

- 1.5.1 Tenderers shall give full specifications of the cable offered and shall supply technical literature and descriptive particulars together with cross sectional drawing of cable and illustrations to indicate the type and design of the cable.
- 1.5.2 Tenderers shall supply such technical data, characteristics and statistical information as required to supply comparative merits and performances of different types and designs of the cable and experience of other users of the cable.

1.6 Materials and Workmanship

- 1.6.1 The cables shall conform to the best engineering practice in design, usage of materials and fabrication so as to ensure reliability, economy and safe and convenient operation in the environment in which they are installed.
- 1.6.2 Manufacturers shall give details of the experience in the supply of similar type of cables. A list of important customers who have been supplied with similar cables with particulars of quantity, location and dates when supplied shall be furnished.

1.7 Guarantee

- 1.7.1 The cables shall be guaranteed against manufacturing and material defects for a period of 12 months from the date of installation or 15 months from the date of its acceptance whichever occurs earlier.
- 1.7.2 In case of failure of cable in the guarantee period, the successful tenderer shall have to replace the same free of cost.

1.8 Instructions for Erection / Installation

- 1.8.1 Tenderers shall furnish the necessary instructions for erection / installation of the cable and shall also state precautions / provisions, if any, to be made for proper use afterwards.
- 1.8.2 Tenderers shall also state precautions / provisions for the proper use and maintenance of the cable after commissioning and supply detailed guidelines for the safe operation and maintenance of the cable.

SECTION 2: DESCRIPTION OF THE POWER SYSTEM

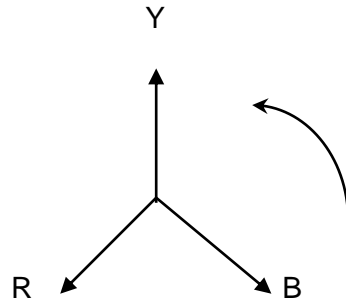
2.1 Grid

- 2.1.1 The Tata Power Company Ltd. (TPCL) and the Maharashtra State Electricity Generation Co. Ltd. (MSEGCL) have their generating stations located in different parts of Maharashtra State and form an interconnected transmission system in the Mumbai-Pune Region.
- 2.1.2 Power from this system is transmitted at 220 / 110kV through overhead conductors and underground cables amongst others to TPCL's five main receiving stations at Backbay, Carnac, Parel, Dharavi and Mahalaxmi situated in the island of Mumbai, where they have installed either delta/star or star/zigzag step down transformers with star point effectively earthed for making power available to their consumers at 110 / 33 / 22kV.

2.2 Existing B.E.S.T. System

- 2.2.1 The B.E.S. & T. Undertaking, on behalf of the Brihan Mumbai Mahanagarपालिका (who are the licensees for the distribution of electric power within the City limits of Mumbai receives power in bulk from the Tata Power Company Ltd. at 110 / 33 / 22kV, 3 Phase, 50 Hz.
- 2.2.2 Bulk power at 110 / 33 / 22kV is transmitted from TPCL's five main receiving stations through effectively earthed underground cables to BEST's receiving sub-stations situated at different localities in Mumbai where the BEST Undertaking has installed 110 / 33kV, 110 / 11kV, 22 / 11kV or 33 / 11kV, star – z, star/star, delta/star power transformers of vector group YNzn11, YNyn0, 31Dy1 with neutral earthed with / without a resistance. Where the transformation is 110/11kV or 110/33, 22/11kV or 33/11kV the starpoint of the transformers has been effectively earthed. The power transformers are provided with OLTC gear to regulate and maintain the 11kV voltage fairly constant.
- 2.2.3 Underground 11kV (effectively earthed) feeder cables radiate from the B.E.S.& T. Receiving Sub-stations to supply power to a large number of distribution substations and to certain consumer's substations. These feeders form a radial network under which each feeder supplies on an average 4 to 5 substations in series.
- 2.2.4 Power at 11kV is stepped down to 415/240V at the distribution substations where the various sizes of 11kV/415-240V delta/star transformers of vector group 41 Dy11 are installed. The star point of the transformer is solidly earthed and is also brought out to an insulated terminal for the 3 phase, 4 wire distribution system.
- 2.2.5 The 415/240V secondary distribution system comprises of a vast network of underground four core cables, suitably sectionalised by means of distribution pillars, to which service lines are teed off to supply power to medium and low voltage consumers.

2.2.6 The phase sequence of the 3 phases at the existing receiving sub-stations is in accordance with the International Standards as indicated below :



SECTION 3: PREVAILING SERVICE CONDITIONS

3.1 Climatological Data

3.1.1 The information given hereunder is based on data supplied by the Regional Meteorological Centre, Colaba, Mumbai – 400 001.

3.1.2 The information is based on the data collected over the years 1881 to **2007**.

3.1.3 The table below gives the climatological data for the city of Mumbai.

a) Air Temperature in Shade

Highest temperature recorded	:	40.6 ⁰ C
Lowest temperature recorded	:	11.7 ⁰ C
24 hours daily average	:	26.0 ⁰ C

b)

Mean highest temperature in sun	:	62.2 ⁰
Highest temperature in sun	:	64.0 ⁰ C

c) Relative Humidity

Lowest mean RH	:	62%
Highest mean RH	:	85%

d) Rainfall

Mean no. of rainy days in a year	:	75.9 days.
Mean rainfall in a year	:	2146.5 mm
Maximum rainfall recorded in a year	:	3481.6 mm
Heaviest rainfall in a day recorded	:	575.6 mm

e) Wind

Mean daily wind speed – min. in a year	:	9.8 km/hr
Mean daily wind speed – max. in a year	:	18.7 km/hr
Highest wind speed in gust	:	103 km/hr on 17/06/2004

3.2 Geographical Data

3.2.1 MUMBAI City is situated on the western coast of India and is the second biggest city in the country. It has an excellent sea port and is on the world's main routes by sea and air. It is well connected with the hinterland by road and railways.

Area	:	61 sq. km.
Population	:	38,00,000
Longitude	:	72 40' E
Latitude	:	18 54' N
Height above MSL	:	11 Metres

3.3 Local Conditions

3.3.1 MUMBAI is a densely populated city with large industries such as cotton mills, chemical factories, engineering workshops and several varieties of large and small industries occupied in the manufacture of consumer goods and other commodities.

3.3.2 Although certain areas are still undeveloped, the city is divided into several zones such as residential, commercial, industrial etc. with a view to minimise nuisance and localise the civil activities as far as practicable. Still there are several mixed localities where such zoning has not been done and two or more types of activities are allowed to continue. By and large, the heavy industries are gradually shifting from the city, to suburbs.

3.3.3 The city originally comprised of five islands separated by small creeks which were, in later years filled in and reclaimed. The city now stands as one large island separated from the mainland by creek, the shores of which more or less demarcate the boundaries of the city and suburban limits.

3.3.4 Because of large areas of reclaimed land, the soil conditions and the sub-soil water levels in the different parts of the city vary widely.

3.3.5 The sub-soil water level varies with the time and height of the tides and lies between 1 meter to 4 meters below ground level in the densely populated areas. The water has considerable salt content.

3.3.6 During rains, flooding of the roads takes place and water level in certain low lying areas may go up to about 1 meter above ground level.

3.3.7 The chemical composition of soil obtained from typical samples is given below :

Appearance	<u>Sample No.1</u> A mixture of clay, Stones, some clinker & coal bits & other organic matter.	<u>Sample No.2</u> Mainly clay with a few small stones & a few bits of organic matter.
Moisture	2.00%	7.20%
<u>Analysis on dry soil</u>		
Organic matter	14.20%	3.00%
Combined Water	4.00%	3.60%
Carbon dioxide	NiL	3.70%
Total Water Solubles (100 gms. in 500 cc Water).	0.1075%	0.1855%
Reaction of water	pH Value	pH Value
Extract	7.5%	7.6%
<u>Analysis of water solubles</u>		
Silicon SiO ₂	0.0100	0.0065
Lime CaO ²	0.0060	0.0104
Magnesia MgO	0.0101	0.0109
Sulphur Trioxide SO ₃	0.0065	0.0143
Sodium Oxide Na ₂ O	0.0149	0.0138
Chlorine Cl ₂	0.0340	0.0221
Nitrogen Na ₂ O ₅	0.0040	0.0078
Pentoxide		

The above radicals are probably combined as follows:

Calcium Sulphate	CaSO ₄	0.0146	0.0253
Magnesium Chloride	MgCl ₂	0.0428	0.0257
Sodium Chloride	NaCl	0.0035	0.0049
Sodium Silicate	Na ₂ SiO ₃	0.0203	0.0132
Sodium Nitrate	NaNO ₃	0.0063	0.1040
Total Inorganic Salts		0.0875	0.0815
Water Soluble Organic matter		0.0200	0.1040
Total Water soluble Matter		0.1075	0.1855

The mean ground temperature may be taken as 30⁰ C and the thermal resistivity of soil $\rho = 120^0$ C watt per cm³.

3.4 Existing Practice

- 3.4.1 All the cables are laid direct in the ground except for small length laid in duets, earthenware or R.C.C. pipes inside the receiving stations, sub-stations and across carriage ways.
- 3.4.2 The cables are normally laid along footpaths according to standard alignments decided upon by the local authority to bring about uniformity and proper co-ordination between the underground services of different utilities such as gas mains, water mains, electric mains, telephone, etc. The minimum clearance between electric cables and the mains of other utilities when they run parallel to each other is generally 45 cms. but in certain cases electric cables have been laid almost touching the water mains or sewer due to congestion.
- 3.4.3 The city has suburban and main line electric rail traction system operating at 1500 volts D.C. which are subject to problem involving electrolytic corrosion and vibration.
- 3.4.4 The underground utility services are laid in close proximity of chemical corrosion and microbiological action at these places.

3.4.5 The standard depths below the surface of ground at which the cables are generally laid are as follows :-

Type of Cables	Depth below Ground Level
33,000 / 22,000 Volt Cable 11,000 Volt Cable 1,100 Volt Cable Communication Cable	1,070 mm 910 mm 760 mm 910 mm

3.4.6 Where the cables cross railway tracks, they are generally laid in R.C.C. pipes, the depth being such that clear minimum distance of 1,220 mm is left from the bottom of the sleepers to the top of pipes.

3.4.7 The number of cables in any one section of the trench of sub-stations or distribution pillars, any number upto 20 may be side by side or in special configuration. The spacing between cables may be 23 Cms., 17 Cms., or 11 Cms., depending upon the number of cables and availability of spaces.

SECTION 4: REQUIREMENTS

4.1 Type & Quantity Required

The following type of cable is required :

Type	Quantity in Meters
1.1kV, 1C x 400 sq.mm. stranded Copper Conductor XLPE Insulated, PVC Sheathed Unarmoured Cable, conforming to IS:7098(Part-I)/1988, amended to date and as per our specification No. 0230115 .	

4.2 Quantity variation

The General Manager at his discretion may alter the above quantity by –25% or +25% after the contract is awarded and before delivery of material is completed.

4.2.2 The length of cable in each drum shall be 500 mtrs.

A tolerance not exceeding +/- 5% shall be permitted on standard drum length.

**SECTION 5: TECHNICAL SPECIFICATION FOR 1.1kV, 1C X 400 SQ.MM.
Stranded COPPER CONDUCTOR, XLPE INSULATED,
PVC SHEATHED, UNARMoured CABLE.**

5.1 General:

5.1.1 This specification covers requirement of 1.1kV, 1C x 400 sq.mm., Stranded copper conductor, cross-linked polyethylene insulated and PVC sheathed unarmoured cable generally conforming to IS:7098(Part-I)/1988, amendment upto date for interconnecting distribution transformers and it's associated LV Board (LVB) or Auxiliary Distribution Pillar (ADP).

5.1.2 All cables shall be suitably tropicalised and rated for the service conditions on site. The cables shall be liberally designed and manufactured from the best materials for satisfactory operation under onerous service conditions without causing any permanent injury or shortening of the life.

5.1.3 The tenderer who had supplied specified material in past to the Undertaking and carried out any changes in design.

AND

The tenderer who have not supplied the specified material to the Undertaking in the past i.e. New supplier shall submit Type test certificates with the offer, for the records of the purchaser.

The type test should have been conducted during the period not exceeding 5 years from the date of opening the bid. The minimum test certificate requirements are given below:

Sr.No.	Offered Cable	Minimum type test required
1	1.1 kV, 1C/400 sq.mm. Cu. Cond. XLPE unarmoured cable.	1.1kV, 1C/400 sq.mm. or above size, Cu. / Alu. Cond., XLPE insulated, PVC sheathed armoured / unarmoured cable

5.1.4 Voltage Grade

The cable shall be suitable for use on medium voltage three phase system where the voltage between conductor and earth does not exceed 650 Volts (i.e. solidly earthed 1,100 volts system).

5.1.5 Short Circuit Level

The maximum symmetrical short circuit level on the 415 Volt system will be 35 MVA. The cable insulation shall withstand the stresses and the resultant increase in temperature caused by the flow of short circuit currents.

5.1.6 Method of Installation:

The cables shall be required to be laid partly underground, partly in duct and partly in air. The formation shall be generally horizontal, side by side, touching.

5.2 Conductor:

The conductor of the cable shall be stranded construction and composed of high conductivity, annealed copper wire, conforming to Clause 4.1 of IS:8130/1984. The conductor shall preferably have 91 nos. of strands.

5.3 Insulation:

The insulation shall be of cross-linked polyethylene suitable for 90° C operation conforming to Clause 4 of IS:7098(Part-I)/1988. The thickness of insulation shall conform to Table-3 of IS:7098(Part-I)/1988 and shall be applied by extrusion process. The colour of XLPE insulation shall be "Natural".

5.4 Outer Sheath:

5.4.1 The outer sheath shall be PVC compound Type ST2 of IS:5831/1984 and thickness shall be conforming to Table - 8 of IS:7098 (Part-I)/1988 and shall be applied by extrusion process over the insulation. **The colour of the outer sheath shall be black as per IS:9938/1981 (amended to date).**

5.4.2 The word "BEST – LV", manufacturer's brand name and year of manufacture (size 5 mm x 5 mm) shall be embossed on the outer sheath every one meter length. Entire length of cable should be marked progressively either by embossing or by punching at every meter, so that, final position should indicate total drum length of cable.

5.5 Cost Data Sheet:

As and when required by Undertaking, the bidder shall submit the cost data sheets indicating the break up prices and quantity of each raw material and components along with the unit rates required for manufacturing 1 km length of the offered cable. The cost data sheet format is enclosed herewith.

Sr.No.	Particulars	Unit	Unit rate in Rs.	Qty. per Kms.	Amount in Rs.
1	Copper	Kgs.			
2	XLPE Insulation	Kgs.			
3	Outer sheath	Kgs.			
4	Drum	Nos.			
5	Manufacturing and other expenses				
Total					

SECTION 6: TESTS AND DESPATCH INSTRUCTIONS

6.1 Tests

6.1.1 Tests at manufacturer's works

Type Tests, Acceptance Tests and Routine Tests shall be carried out at manufacturer's works as specified in IS:7098(Part-I)/1988 and in accordance with General Conditions of Contract .

6.1.2 Test Certificates

While delivering each cable lot, the contractor shall furnish duly certified triplicate copies of test certificate showing the results of tests mentioned above and the test results shall conform to the requirements laid down in the relevant standard.

6.1.3 Additional Tests

In addition to the tests specified above, the purchaser reserves the right of carrying out any inspection or tests at manufacturers of the cable as well as such inspection and tests as may be considered necessary after laying at site.

6.2 Packing and Marking for Despatch

6.2.1 All the cables shall be securely packed and protected by the contractor. The contractor shall be held responsible for the efficiency of the packing and protection to ensure safe transport from the manufacturer's works to Materials Management Department, Bijlee Bhavan, Kussara Bunder Road, Mazgaon, Mumbai – 400 010.

6.2.2 The cables shall be wound securely and in an approved manner on non-returnable strong wooden drums conforming to IS:10418/1982 which will have been treated previously with Pest Control Process (PCP) or with other fungicides to ensure long life of the drums in tropical climates and which shall be specifically suited for transport.

6.2.3 The drums shall be fitted with spindle plates. It should be ensured that screws holding the spindle plate to the planks shall not be fixed on the joints of two planks. Drums may be made with nails provided that any nails which come through into the cable space shall be properly and efficiently clinched.

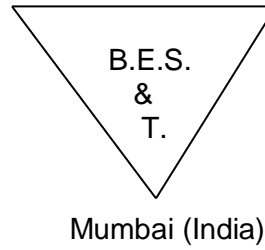
6.2.4 The drum shall be effectively lagged with stout close fitting battens so as to effectively prevent damage to the cable during transit or storage.

6.2.5 Both ends of the cable on each drum shall be easily accessible for testing and if brought through the drum face, shall be protected by a steel cover plate (or plates) rigidly fixed on the drum face with screws or nails.

6.2.6 The two cable ends shall be so fastened and secured to the drums that during the process of transit, rolling etc. the cable does not get loosened or displaced.

- 6.2.7 If the ends are left inside the drum the batten or battens which are necessary to be removed to obtain access to the ends, must be marked clearly with red paint.
- 6.2.8 An arrow shall be painted in indelible paint on both sides of the drum to indicate the direction in which the drum shall be rolled.
- 6.2.9 All drums shall be stenciled in indelible paint as follows:

ORDER No. _____



- 6.2.10 The following information shall be painted on both sides of each drum and also be embossed on atleast two metal labels on each side of the drum.
- a) Size and type of cable
 - b) Number of cores
 - c) Length
 - d) Drum Number
 - e) Gross Weight
 - f) Net Weight
 - g) Year of Manufacture
 - h) Name of Manufacture
 - i) Trade mark, if any

The drum shall also be marked with ISI certificate mark.

- 6.2.11 Each drum shall have clearly stenciled on it in good paint “Not to be slung except by bar through the centre” and in addition to it, it should be marked “store away from boiler”.
- 6.2.12 Each drum flange shall be painted with black colour.
- 6.2.13 The spindle hole diameter shall be 80 mm (min.)
- 6.2.14 The stranded drum length shall be 500 mtrs. A tolerance not exceeding +/- 5% shall be permitted.

SECTION 7: DRAWINGS & DOCUMENTS

Following documents shall be prepared based on the BEST specifications and statutory requirements and shall be submitted with the bid:

- a) Completely filled-in Guaranteed Technical Particulars in format specified by BEST in Annexure 'A' of specification.
- b) Type test Certificates.
- c) List of orders executed.
- d) Cross sectional Diagram of the cable

Drawings/Documents to be submitted after the award of the contract:

Sr. No.	Description	For approval	For review information	Final Submission
1	Guaranteed Technical Particulars	√		√
2	Manual/Catalogues		√	
3	Cross sectional drawing		√	√
4	Technical details and test certificate of XLPE compound		√	√
5	Installation instructions		√	√
6	Type test certificate	√	√	√
7	List and address of raw material suppliers and purchase details as per annexure 'H'		√	√

All the documents shall be in English language.

The drawings shall be to scale and fully detailed. All important dimensions shall be given and the material of each component shall be indicated.

All the above mentioned drawings/documents are required to be submitted and get approved from the Divisional Engineer, Planning materials, within 15 days from the placement of purchase order.

SECTION 8: PRICES, DELIVERY AND VALIDITY

8.1 Prices

- 8.1.1 The prices of cable shall be quoted on variable price basis as per IEEMA Price Variation Clause applicable for 1.1 kV, Copper XLPE cable (please refer clause no. 2.7 of condition of tender) and shall be for free delivery to our Materials Management Dept., Bijlee Bhavan, Kussara Bunder Road, Mazgaon, Mumbai – 400 010, including arrangement for unloading of the cable drums by crane and stacking them at the proper place. The freight, insurance and unloading charges payable shall be quoted separately. The prices shall however be exclusive of Excise duty, S.T. / C.S.T. and Octroi. The percentage of which shall be mentioned clearly. The tenderers shall also state Ex-Works price for Excise Duty purpose.
- 8.1.2 These goods are meant for use in generation / distribution of electrical energy. Form `C' is applicable and the tenderers should indicate the exact Sales Tax/ Central Sales Tax that will be charged against issue of Form `C' by us.
- 8.1.3 It will be the responsibility of the manufacturer for safe transport of cable drums including arrangement for unloading and keeping the same at proper place. The freight charges, insurance and unloading charges shall be clearly quoted in the Schedule of prices and delivery. The offers of tenderers, who quote only Ex-Works prices will be overlooked.

8.2 Delivery

- 8.2.1 The delivery shall commence within 8 weeks from the date of receipt of our Acceptance Letter and quantity to be supplied @ _____ Mtrs. per month.
- 8.2.2 The delivery schedule given above is tentative and may be revised by us at our option. However, notice of 30 to 40 days will be given for the change in delivery schedule. Therefore, the tenderers shall specifically confirm that they would agree to our deferred delivery schedule.
- 8.2.3 Before delivering each lot as specified above, successful tenderers shall offer these cable drums for inspection and testing at your works. In this connection, you will have to give an advance intimation of 15 days to our Divisional Engineer, Planning (Materials), 3rd Floor, Backbay Veej Bhavan, 149/150, Backbay Reclamation, Gen. J. Bhosale Marg, Mumbai – 400 021, who will arrange to depute engineers to your works for inspection and testing.

8.3 Validity

The offer shall be valid upto _____. The offers with lesser validity period may be overlooked.

SECTION 9: TERMS OF PAYMENT

- a) 95% Payment within 30 days from the date of submission of the bills duly accompanied by a copy of our Stores Received Note to the Administrative Officer, Materials Management Department, Parivahan Bhavan, 4th floor, Colaba, Mumbai - 400 001.

AND

- b) Balance 5% payment after expiry of 12 months from the date of installation but not later than 15 months from the date of acceptance.

NOTE:

- 1) KINDLY NOTE THAT OFFERS WITH ADVANCE PAYMENT CONDITIONS SUCH AS PAYMENT AGAINST DOCUMENTS THROUGH BANK, PAYMENT AGAINST DELIVERY, ETC. AND ALSO WITH LESSER VALIDITY PERIOD WILL BE OVERLOOKED.
- 2) OFFERS OF TENDERERS WHO DO NOT ACCEPT OUR COMMERCIAL CONDITIONS IN TOTO, WILL NOT BE CONSIDERED FOR RANKING.

Annexure 'A'

**SCHEDULE OF GUARANTEED PERFORMANCE AND OTHER PARTICULARS OF
1.1kV, 1C x 400 SQ.MM. COPPER CONDUCTOR, XLPE INSULATED, PVC SHEATHED
UNARMoured CABLE**

(Must be filled in by the tenderer)

The particulars given in this schedule will be binding upon the tenderer **and** must not be departed from without the written permission of the General Manager.

Sr. No.	Description	As specified by BES&T	As furnished by Bidders
1	Service voltage	1100 Volts	
2	Make of cable	To be furnished by bidder	
3	Name of the firm & address from which cable shall be delivered	To be furnished by bidder	
4	Type of cable	2XY	
5	I.S. & IEC specifications to which cable is manufactured.	IS: 7098 Part I amended to date	
6	Conductor material & it's grade	High conductivity annealed copper confirming to IS:8130 amended to date	
7	Number of strands and Dia of each strand in mm.	Preferably 91 Nos.	_____ Nos. / _____ mm
8	Sectional area of conductor in sq.mm.	400 sq.mm.	
9	Material used for insulation	XLPE confirming to IS:7098 part I amended to date	
10	Thickness of insulation in mm	2.0 mm (Min)	
11	Material used for outer sheath	Extruded PVC Type ST2 confirming to IS:5831 amended to date	
12	Thickness of outer sheath in mm	2.2 mm (Nom.)	
13	Diameter over conductor in mm	To be furnished by bidder	
14	Diameter over insulated conductor in mm	To be furnished by bidder	
15	Overall diameter of cable in mm	35 mm Approx	
16	Weight of copper in cable per 1000 mtrs. in Kg.	To be furnished by bidder	
17	Weight of cross-linked polyethylene insulation in cable per 1000 mtrs. in Kg.	To be furnished by bidder	
18	Weight of PVC in cable per 1000 mtrs. in Kg.	To be furnished by bidder	
19	Total length of cable in each drum in mtr.	500 mtrs \pm 5%	
20	Total Weight of finished cable in Kg./ meter	To be furnished by bidder	

Sr. No.	Description	As specified by BES&T	As furnished by Bidders
21	Total weight of each drum length of cable including drum in Kg.	To be furnished by bidder	
22	Whether the cable shall be wound on wooden drums	Yes / No	
23	Size of each drum. i) Flange diameter ii) Barrel diameter iii) Overall width	To be furnished by bidder	
24	Spindle hole diameter	80 mm (Min)	
25	Whether wooden drums shall be treated with Pest Control Process (PCP)	Yes / No	
26	Whether each drum flange shall be painted with Black colour	Yes / No	
27	Continuous current carrying capacity - a) In air b) In ground with 3 cables touching each other		
28	Maximum permissible temperature rise of the conductor for continuous capacity	90 °C	
29	Short time overload capacity and duration.	Can be overloaded for conductor temperature of 130 °C for duration of max. 100 hrs in any 12 consecutive months and for a max 500 hrs during the entire life time of cable	
30	Short circuit rating	57.2 KAmps. For 1 Sec.	
31	Insulation resistance in Mega-Ohms per Km at 20° C.	To be furnished by bidder	
32	Conductor resistance in Ohms per Km at 20° C.	0.047 Ω/kms.	
33	Conductor reactance in Ohms per Km at 20° C.	To be furnished by bidder	
34	Inductive capacity in micro-farads at 1000 mtrs at 20° C.	To be furnished by bidder	
35	No. of years the design of the cable offered is in service	To be furnished by bidder	
36	Details of type test certificates from NABL accredited laboratory like CPRI / ERDA etc. submitted.	To be furnished by bidder	

Signature & Seal
of the Tenderer _____

Date _____

Annexure 'E'

SCHEDULE OF DEPARTURES FROM SPECIFICATION

Tenderer shall mention in this schedule all departures from the various sections of the specification. In the absence of any mention in this schedule, the sections of this specification shall be binding on the tenderers.

Sr. No.	Reference to Section No. of Specification	Departures

Signature & Seal
of the Tenderer _____

Date _____

Annexure – H**Details of sub-vendors for critical items**

Tenderers shall submit details of sub-vendors for the critical items listed below, which can be verified at any stage after award of the contract.

Sr.No.	Description of material	Details of sub-vendor
1	XLPE compound	
2	E.C. Grade Copper rod	
3	PVC compound	
4	PVC Resin	

Signature & Seal
of the Tenderer _____

Date _____