



**KOLKATA PORT TRUST
HALDIA DOCK COMPLEX**

AN ISO-9001: 2015 ORGANISATION
Office of Plant & Equipment Division
Operational Administrative Building (1st Floor),
P.O.Haldia , Dist. Purba Medinipur,
West Bengal, Pin: 721 604



No. SDM (P&E)/ 924/ 984

Dated: 14.11.2018

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Sub: Enquiry for obtaining **budgetary quotation** for the work of “33KV, 3C, 240Sqmm. HT Cable laying work between Intake sub-station to Master control sub-station of Haldia Dock Complex, KoPT”.

Haldia Dock Complex (HDC), Kolkata Port Trust (KoPT) intends to engage reputed firms to undertake “33KV, 3C,240Sqmm., HT Cable laying work between Intake sub-station to Master control sub-station” at Haldia Dock Complex, KoPT”.

A technical estimate, in this regard, is enclosed herewith for ready reference, Please.

Budgetary offers, along with comments / suggestions (if felt necessary), are invited from experienced / reputed firms, for the subject work, with in Nov.30, 2018.

(R.N.Roy)
Sr. Dy. Manager (P&E)

SCOPE OF WORK AND TECHNICAL SPECIFICATION

1. GENERAL:

- a. All materials required for the entire work should be as per latest Indian Standard (IS), issued by Bureau of Indian Standard, if not specified otherwise in this tender document.
- b. The entire job should be executed in accordance with the requirements of following Acts and Rules, including latest amendments :-
 - a) Indian Electricity Rules – 1956
 - b) Electricity Laws (Amendment) Ordinance, 1997
 - c) Central Electricity Authority Rules, 1977
 - d) Central Electricity Authority Regulations, 1979
 - e) Indian Electricity Act, 2003.

The supply, installation, testing and commissioning of all items required for this work should be complied with the above Acts & Rules and relevant Code of Practice of the Bureau of Indian Standard, including National Electrical Code, if not specified otherwise.

- c. Relevant aspects of following Rules/ Code of Practices should also be followed and complied with :
 - i) Indian Factories Act.
 - ii) Dock Workers (Safety, Health & Welfare) Act 1987.
 - iii) The Workmen's Compensation Act, 1923.
 - iv) The Minimum Wages Act, 1948.
 - v) The Contract Labour (Regulation & Abolition) Act, 1970.
 - vi) Other local regulations.
- d. **Laying of cables, cable end termination and straight through joints with the cables are to be executed by a Cable Jointer (having valid Electrical Workman's Permit, authorised for 33,000 Volts grade Cable laying and jointing, by the competent authority), under continuous supervision of the Contractor's Engineers/ Supervisors, holding certificate of competency.**
- e. **Obtaining necessary clearance/permission for Road Crossing/ Railway Track Line Crossing/Utility crossing need to be obtained from National Highway Authority of India (NHAI)/Haldia Development Authority (HDA)/ SE Railway (Indian Railway)/ Indian Oil Corporation Ltd. (IOC Ltd) is in the scope of the contractor.**

However, clearance for Road Crossing/ Railway Track Line Crossing under the jurisdiction of HDC, KoPT would be given by competent authority of HDC.
- f. Programme for Road Crossing, Railway Track Line Crossing wherever required (for Casing Pipe laying etc.), shall have to be coordinated
 - Through the authorized representative of the SE Railway (Indian Railway) / National Highway Authority of India (NHAI)/Haldia Development Authority(HDA) in advance, for having due clearance of blockage of Road/ Rail [for non Port Railway Track/ Road]
 - Through the authorized representative of the General Manager (Engg), HDC in advance, for having due clearance of blockage of Road/ Rail. Such clearance will be given within 7 (seven) days from the date of receipt of request from the contractor.

In case of Road Crossing, 50 % of the road width should be kept open for vehicular traffic movement. All roads so cut for the work, should be made good immediately after the purpose of road cutting is fulfilled.

- g. During execution of the work, if any damage takes place in the existing utility, the same will have to be mended good by the contractor, at their risk, cost and arrangement. Otherwise, the same will be repaired/ replaced by HDC, either departmentally or through outside agency and the cost of repairing/ replacement will be recovered from the contractor, with departmental charges.
- h. The lengths of Reinforced Concrete Pipes, Galvanised Mild Steel Tubes, lengths of cable run through existing duct/ trench/ tunnel/ laid pipe/ installed cable tray inside the existing tunnel etc., as given in the Bill of Quantities are indicative only. The contractor shall have to ascertain the exact quantity and execute the work accordingly.
- i. The contractor should have valid Electrical Contractor's Licence and supervisors having Supervisory Certificate of Competency of relevant part, for carrying out such type of job.
- j. The Contractor should arrange, at their own risk & cost, all necessary tools, tackles, lifting machineries, different vehicular transport etc., required for execution of the total work.
- k. Danger Notice Plates (designed as per IS: 255) for the 33,000 Volts installations shall have to be affixed by the contractor, permanently, in a conspicuous position, as applicable, in accordance with Indian Electricity Rules, 1956.
- l. For the purpose of application (by HDC, KoPT) for obtaining necessary approval/ clearance from the Regional Inspectorial Organization, Central Electricity Authority / Statutory Authority, the contractor would have to submit/ deposit required documents, drawings, test certificates/ reports etc. to HDC, KoPT. The contractor along with the required documents, drawings, test certificates/ reports etc. would also have to be present during inspection by the Regional Inspectorial Organization, Central Electricity Authority / Statutory Authority.

The contractor should clearly understand that though the application would be made by HDC, KoPT to the Regional Inspectorial Organization, Central Electricity Authority / Statutory Authority, for obtaining necessary approval/ clearance from them, it is the responsibility of the contractor concerned to obtain the approval/ clearance from the Regional Inspectorial Organization, Central Electricity Authority / Statutory Authority against the work executed by the contractor.

- m. The items of work shall be executed as per detailed technical specifications and scheme. In case of contradiction between schedule of work with its Additional Specification and the General Specification, the former shall prevail.
- n. The work will be executed as per general arrangement drawing and detailed fabrication drawings duly approved by the Engineer-in-charge. The various items of equipment will be ordered only after the drawings are approved and quantities in detail of various items are ascertained as per actual requirements. Therefore the actual quantities / measurement may vary from the stipulated quantities, which are only estimate.
- o. The contractor/agency will engage suitable qualified/experienced/ licensed engineering supervisor for the work and suitable skilled personnel with required license for doing the erection work. Required special tools to be operated in the execution of the job.
- p. The work will be performed as per the day to day instruction and approval of the engineer-in-charge. All materials/ equipment will be used after taking approval of the Engineer-in-charge.
- q. Equipment will be duly inspected in the manufacturer's works / premises by TPI AGENCY before dispatch to the site.

- r. The rates are to be firm and inclusive of all taxes, levies, insurance, freight, octroi, Work Contract Tax, Service Tax etc. Service tax will be reimbursed by the department, in full, on presentation of receipted original deposit slip, against the work. Nothing extra will be paid.
- s. The work will be executed as per the programme of completion of the project. The delivery & erection schedule of various materials/ equipment will be as per approval of Engineer-in-charge.
- t. The contractor holds responsibility for the entire job as per relevant specifications. If any item is left out within the schedule of work but if it is considered essential for the completion of the job, the contractor has to carry out the items as extra substituted item.
- u. The contractor shall have to make arrangements, at his own risk and cost, for transportation of materials from the point of issue of stores to site of work, if any.
- v. The contractor shall ensure that the staff employed by him for execution of the electrical work, possess the valid electrical license issued by competent authority. Consequences arising due to the default of the contractor in not complying with the above condition shall be the entire responsibility of the contractor.
- w. Contractor shall have to check the site order Book for any instructions of Engineer-in-charge or his authorized representative and sign the site order book. He shall be bound to ensure compliance with the instructions recorded there in.
- x. **HT Cables will be inspected in the respective manufacturer works before dispatch and test reports as applicable as per BIS standards will be provided for each equipment to Third Party Inspection (TPI AGENCY) Agency.** The TPI AGENCY is appointed by the port and cost of TPI AGENCY is borne by the Port.
- y. The firm shall deploy only licensed personnel as required under IE Rules, for execution of the electrical works. The firm shall be liable to submit the list of such personnel along with the attested copy of the licenses at the time of execution.
- z. It is important that every equipment is tested fully before dispatch.
- aa. All materials for the work shall be supplied from approved list of manufacturer and any item, not covered in approved list, shall be supplied after getting approval from Engineer-in-charge or his authorized representative.
- bb. Any materials brought for work which is not matching with specification will be rejected and the rejected materials shall be removed from site on the same day.
- cc. All fees payable to concerned authorities and other local bodies if any shall be paid by the contractors.
- dd. Contractor shall obtain permit/approval from concerned authorities before commencement of work. All documents/drawings required for such permit/approval shall be prepared by the contractor.
- ee. Contractor shall have a valid "A" class electrical contract licence with HT installation issued by appropriate authorities.
- ff. Test certificates both type test and routine tests wherever required shall be furnished along with supply for all Electrical/Mechanical items.

- gg. Inspection / acceptance, in no way shall absolve the contractor from supplying material as per standards / codes and warranty or other obligations under the contract.
- hh. The contractor shall arrange the testing/measuring equipment by own cost to carry out pre-commissioning test of all equipment at site as per IER.
- ii. All electrical works shall be tested by the contractor in the presence of TPI AGENCY and to the entire satisfaction as per IE Rules.
- jj. Data to be furnished by the bidder after award of order
 - a) **Three** Set of copies of installation, operation and maintenance manuals, descriptive bulletins etc, shall be furnished prior to / at the time of despatch of all materials. Manuals shall include the following aspects:
 - i) Outline dimension drawing showing relevant cross sectional views, earthing details and constructional features including foundation drawing.
 - ii) Rated voltage, current, duty cycle and all other technical information which may be necessary for correct operation of the switchgear.
 - iii) Storage details for prolonged duration.
 - iv) Unpacking.
 - v) Handling at site.
 - vi) Erection
 - vii) Pre-commissioning test.
 - viii) Operating procedure.
 - ix) Maintenance procedures.
 - x) Precaution to be taken during operation and maintenance work.
 - b) Test Certificates

The contractor supplies HT cables from the Manufacturers, who are having type test certificate issued by CPRI / ERDA.
 - c) On completion of work the contractor shall submit all drawings, manuals and test certificates, etc. for all equipment / materials ordered and as specified by the Engineer-in-Charge. The contractor shall have to submit As Built Drawings in triplicate, which shall indicate the cable route so laid with reference to permanent installations en route, clearly marking position of the cable there at, sizes of the cables, locations of straight through joints, locations (with respective length) of Hume Pipes, GI Pipes & culverts/ tunnels/ trenches and other details, as found necessary
- kk. No project surplus material will be taken over by HDC/ KoPT after completion of the work. Contractor's Engineers/ Supervisors responsible for execution of the work at site shall have valid Electrical Supervisory License.
- ll. Quantity of different materials/ items mentioned in the Bill of Quantity – Un-priced of the tender document is indicative only. There may be variation depending upon site conditions. The contractor will have to submit the cable route diagram with details of quantity and locations of the Hume Pipes and GI Pipes to be used, position of the straight through cable joints etc. to the competent authority, HDC, in triplicate, for necessary approval.
- mm. For preparation of cable route diagram, plan drawings of the area of work will be provided by HDC, to the contractor, within 7 (seven) days, from the date of placement of order.

- nn. QAP/ Inspection Plan for different items should be submitted by the contractor, within 7 (seven) days, from the date of placement of order, for necessary approval by General Manager (Engg), HDC.
- oo. Bar Chart of the total work should also have to be submitted by the contractor, within 7 (seven) days, from the date of placement of order.
- pp. **Site Inspection:** It is requested to inspect the site of work and thoroughly familiarize with the nature of work, site conditions, access to the site and location before submission of the offer. It is also requested to contact with the concerned official(s) at the office of Plant & Equipment Division, Haldia Dock Complex, at Operational Administrative Building of HDC at Chiranjibpur, for collecting further information about the site, before submission of the offer.

2. **SCOPE OF WORK**

At present, 33 KV power supply to Master Control Substation is fed through 2(two) Nos.3Core X240 Sq mm PILC cable (33 KV Grade).

Presently, 33 kV underground cable network are connected in between Intake Sub-station at Chiranjibpur and Master Control Sub-station at Coal Handling Plant, for feeding power supply to Coal Handling Plant & its adjacent area viz. Lock Entrance, 2nd Oil Jetty, 1st Oil Jetty, Lock Generating Station.

For the purpose of maintaining & augmentation of power supply at Coal Handling Plant & its adjacent area viz. Lock Entrance, 2nd Oil Jetty, 1st Oil Jetty, Lock Generating Station, new 33 kV grade XLPE insulated HT cable along with Hume Pipes & GI Pipes would have to be laid underground along with other allied work like termination of the said new cables with our existing system at both ends.

As such,2(two) Nos. 3CoreX240 Sq mm XLPE cable (33 KV Grade) is required to be laid from Intake Substation at Chiranjibpur to Master Control Substation at Coal Handling Plant via WB Fire Station, Gate No.6,Hindustan Gate, Wagon Tippler.

Each 3CoreX240 Sq mm XLPE cable (33 KV Grade) should pass through individual Hume Pipes & GI Pipes for Road Crossing/ Railway Track Line Crossing/Utility crossing. It may be mentioned herein that 02 Nos. spare length of GI Pipes need to be laid between Intake Substation to WB Fire Station at Chiranjibpur for future need. Horizontal directional drilling (HDD) method to be adopted for laying of GI Pipes across Road Crossing/ Railway Track Line Crossing/Utility crossing.

Details of the said items (including BoQ Item Ref. no. of the same, in the attached 'Price Schedule') are appended below:-

Sl. No.	Item Description	Quantity (in Mtrs.)
1.	3Core, 240Sqmm HT Cable, 33KV (E) grade, XLPE insulated, Aluminium Cable, Screened, PVC inner sheathed and PVC ST2 type outer sheathed, armoured, FR cables.	7750

Details of the job to be executed for different parts of the Bill of Quantities are appended below:-

Sl. No.	Job	Nature of Work
1.	Underground laying of 33 kV grade, XLPE insulated, HT Power Cable, along with Hume	Supply & underground laying of the new 33 kV grade, XLPE insulated, HT Power Cable,

Sl. No.	Job	Nature of Work
	Pipes & GI pipes etc.	along with Hume Pipes & GI Pipes etc.
2.	End Termination of the HT Cables and other allied work.	Supply & End termination of the newly laid 33 kV grade, XLPE insulated, HT Power Cable.
3	St.through Jointing of the HT Cables and other allied work.	Supply & St.through Jointing of the newly laid 33 kV grade, XLPE insulated, HT Power Cable.

3. WORK NOT IN THE SCOPE.

1. Supply and installation of HT PC VCB and VCB Panel at sub-stations.

4. H.T. CABLES

4.1 Scope

Supply, laying, inspection, testing, commissioning and jointing and terminations of 33kV(E) grade XLPE insulated power cables.

4.2 Codes & Standards

The design, construction, manufacture and performance of cables shall comply with all currently applicable statutes, regulations and safety codes of the locality where cables shall be installed. Nothing in this specification shall be construed to relieve the successful BIDDER of his responsibility.

All the cables shall conform to the latest applicable IS/IEC standards.

4.3 Power Cable

Power cables should be multicore aluminium stranded conductor colour coded, triple extruded XLPE insulated, extruded semi-conducting screened over each core and insulation, Additional copper tape screened, galvanised steel strip armoured and overall extruded black sheath with Flame retardant property conforming to IS-7098 Part II. Armouring of multicore cable shall be of single layer, galvanised steel round wire or flat strip. The Cables shall be suitably designed for variation in power supply as follows:

The voltage variation $\pm 10\%$

Freq. variation $\pm 5\%$

Following cable size shall be supplied:

- 3Core, 240Sqmm HT Cable, 33KV (E) grade, XLPE insulated, Aluminium Cable, Screened, PVC inner sheathed and PVC ST2 type outer sheathed, armoured, FR cables.

4.4 Quality of Cables

Each cable length shall have relevant ISI certification mark as stipulated by Bureau of Indian Standards.

4.5 Laying of Cables.

For laying cables along building steel structures and technological structures the cable shall be taken by clamping with **Aluminium** saddles screwed to the GI flats welded to the structure. **The** flats are of **hot** dip galvanised after fabrication.

For laying cables along concrete walls, ceilings etc. the cables shall be taken by clamping with **Aluminium** saddles screwed to the **hot dip GI** flat welded on to the inserts. Where inserts are not available the saddles shall be directly fixed in the walls using metallic anchor fasteners and **GI** flat spacers of minimum 6 mm thick.

The **Aluminium** saddles shall be placed at an interval of not less than 500 mm both for horizontal and vertical runs. However, at the bends it shall be placed within 300 mm and where terminating to the equipment/junction box the cable shall be clamped immediately before such termination.

Cable Net Work shall include Power Cables, which shall be laid in buried trenches/ cable trays / through G.I. Pipes & Hume Pipes, rising main etc. whichever is applicable.

Cable routing shall be checked in the field to avoid interference with structures, heat sources, drains, piping etc. as far as possible and minor adjustments shall be done to suit the field conditions, wherever deemed necessary without any extra cost.

The HT cables while laying will have to be separated from existing HT, LT, Telecommunication, OFC Cables by adequate spacing or running through independent pipes, trenches or cable trays, as applicable.

All cable routes shall be carefully measured and cables cut to the required lengths leaving sufficient lengths for the final connections of the cables to the terminal of the equipments.

The various cable lengths cut-off from the cable reels shall be carefully selected to prevent undue wastage of cables. The quantity indicated in the Bill of Quantity is only approximate. The Contractor shall ascertain the exact requirement of cable for a particular feeder by measuring at site and avoiding interference with structure, foundation, pipelines or any other works as far as possible. Before starting Cable Laying, Cable Drum Schedule shall be prepared by contractor and get that approved by competent authority.

Cable as far as possible shall be laid in complete, uncut lengths from one termination to other. Cable shall be neatly arranged in the trenches/ trays/ pipes in such a manner so that crisscrossing is avoided and final take- off to the equipment/switch gears is facilitated.

Arrangement of cables within the trenches/ trays/ pipes shall be the responsibility of the contractor.

Removal of concrete covers for purposes of cable laying and reinstalling them in their proper positions after the cables are laid shall be done by the contractor extra cost.

In case of Laying of Cable through RCC cable trench, it shall be filled with 100mm fine grain sand.

Cable shall be handled carefully during installation to prevent mechanical injury to the cables. During laying of cables, Cable Drum Lifting Jacks, sufficient numbers of Cable Rollers and other materials etc. as necessary must be used to avoid any mechanical injury to the cables.

Directly buried cable shall be laid underground in Cable Trenches duly excavated by the contractor as shown in the enclosed Drawing No. SK- 334.

The width of the trench shall vary depending upon the number of cables and diameter of each cable. Width of the Cable Trench should be such that all cables should be

correctly spaced and arranged. The cables shall be laid in trenches as shown in the enclosed sketch. Before cables are placed, the bottom of the trench shall be leveled and filled with a layer of silver sand as shown in the Drawing No.: SK- 334. This sand shall be leveled and the cables shall be laid over it. Bricks are to be placed at both sides of the cable. Then the cable inside the brick walls to be covered with sand up to the height of walls and sand shall be pressed lightly. A protective covering of Bricks shall be placed on top of protective Bricks placed at both sides of Cable. The remainder of the trench shall then be back filled with soil rammed and leveled. After laying of the cables in the trench and before placement of protective covering by brick, every cable shall be given an insulation test in presence of site engineer/ authorized representative of Competent authority. Also after back filling the trench with soil, rammed and leveled, insulation test of the cable shall be carried out in presence of Site Engineer/Authorized representative of Competent authority.

All wall openings/Pipe Sleeves shall be effectively sealed after installation of cables to avoid seepage of water inside buildings/lined trench. At road/drain/pavements crossing, suitable sizes of G.I. Pipes are to be used. After the cables are installed and all testing is complete, the conduit/pipe sleeve ends shall be plugged with a suitable weatherproof plastic compound/ PUTTI, for sealing purpose. The cost of the same shall be deemed to have been included in the installation of cable laying through pipe sleeves/conduits and no separate payment shall be made. When cables pass through foundation walls, or other underground structures, if necessary, ducts or opening shall have to be provided by the contractor.

However, shall it become necessary to cut holes in the existing foundations or structures, the contractor shall determine their locations and obtain approval from Competent authority or his authorized representative before cutting is done. Cutting, if necessary and mending good of any cut portion should be done by contractor without any extra cost. At Road Crossing and other places where cables enter pipe sleeves, adequate bed of sand shall be given so that the cables do not stack and get damaged by pipe ends. Drum number of each cable from which it is taken shall be recorded against the cable number in the cable schedule.

All G.I. Pipes shall be laid as per site requirements. The open ends of the pipes shall be suitably plugged after they are laid in final position. Laying of the cable will be as per the enclosed Drawing No. SK- 334. The contractor will have to submit the detailed cable route diagram, with detailing of the Hume Pipes & G.I. Pipes used, position of the straight through cable joints etc. for checking at our end and subsequent approval of the same. As built drawing (in triplicate) of the above cable route will have to be submitted after completion of the above work.

MEASUREMENT: Cable length should be measured jointly prior to giving clearance for earth back filling etc. Distance between Socket of one end and Socket of other end of the laid cable to be considered for payment against both supply & laying of cable.

4.6 Laying of Cables in Exposed/Embedded GI Pipes/Hume pipe

GI Pipes /Hume pipe for drawing cables in plant buildings shall be of **Heavy Duty**, galvanised, electric resistance welded, screwed type conforming to IS: 1239 (Part-I). GI Pipe/Hume pipe of the following sizes shall be used:

- a) 200 mm nominal bore GI pipe
- b) 200 mm dia. Heavy duty NP-4 Hume pipe.

For installation of cables in GI Pipe /Hume pipe. Complete system shall be installed first without cables but having suitable pull wires laid in the pipes to facilitate cable pulling.

Insulated type end bushings shall be used where conductors enter or leave GI pipe.

Ends of GI pipe shall be cut square and the threads out in the field shall have the same

effective length and the same dimensions and taper as specified for factory out threads. Ends of pipe shall be reamed to remove burrs and sharp edge after threads are cut.

Exposed GI pipes shall run parallel or perpendicular to column lines or building lines so as to match with the architectural arrangement of the building. Concealed GI pipes shall run in direct lines with minimum bends.

Laying of Reinforced Concrete Pipe and Galvanized Mild Steel Tubes should be done wherever necessary, such as at Road Crossing, Railway Crossing, Drains, Culverts or any similar concrete structure etc.

The scope includes cutting of road, Railway Crossing, Excavating of Trenches, etc. including mending good work. The depth of laying of the pipes should have to be matched with the underground cable trench, as far as possible and practicable. Making jointing between collars and pipes, with cement mortar (1 cement: 2 medium sand) and cutting the Reinforced Concrete Pipe to the required length, if necessary, to be done by the contractor at their own cost and arrangement.

Cutting of Galvanized Pipe to required length and threading, bending, jointing by Socket as required, supply and fixing of support clamps/ brackets should be under the scope of contractor. Re-filling of the trench after laying the reinforced concrete pipes and galvanized mild steel tubes are also to be done by the contractor.

4.7 Depth of laying

1.	HT Cable	Open cut excavation with brick protection	1200mm
		HDD through GI pipe	2500mm
		Open cut excavation through Hume / GI pipe	2000mm
		Through existing RCC trench / Hume pipe / GI Pipe.	As per available depth.

Note: Road level to be considered as reference level.

4.8 Bricks

Crushing strength, efflorescence shall conform to class designation 10 (as per IS 1077, 1986) and as per the specification, given below:

- i) The brick shall have clear ringing sound.
- ii) The average size of the bricks shall be in the range of 250 mm (± 4 mm) x 125 mm (± 2 mm) x 75 mm (± 2 mm).

4.9 Cable Termination and st. through jointing.

Termination of aluminium conductor power cables shall be by means of compression method using compression type Al. lugs.

All accessories shall be supplied in kit form and each component of the kit shall carry manufacturer's mark of origin.

The kit shall include all stress grading, insulating and sealing materials apart from conductor fittings and consumable items. The instruction pamphlet shall also be included in each kit.

The termination kit shall be suitable for termination of cables to Outdoor switchgear.

Additional length (Loop) of 5 mtrs. (approx.) cable should be kept at each end of the cables near the straight through cable joints.

It is required to measure the insulation resistances of the cables before and after straight through cable jointing.

This scope includes supply of all required materials including complete straight through cable jointing kits, with ferrules and all other accessories.

Cable Accessories		HT Cable
Type	i)	Heat Shrinkable end Termination and St. through jointing kits
	ii)	Tapex type St. through jointing kits.

4.10 Cable Tags

All cables will be identified close to their termination points by cable nos. Cable numbers will be punched on Aluminium strip/ PVC Strip {2mm. thick (approx.)} securely fastened to the cable and wrapped around it. Alternatively Cable Tags shall be circular in construction to which cable number can be conveniently punched.

Cable designations are to be punched with letter/number punches and the tags are to be tied to cables with piano wires of approved quality and size. Tags shall be tied inside the panels beyond the glanding as well as below the glands at cable entries. Along trays tags are to be tied at all bends.

Each underground cable shall be provided with Identification Tags (made of PVC) securely fastened at every 30 Mtrs. distance if the continuous length is more than 50 Mtrs. of its underground length. At least one tag at each end before the cable enters the ground will have to be provided. In unpaved areas, Cable Trenches shall be identified (by means of cable markers). These shall be placed at location of changes in the direction of cables and at intervals of not more than 30 Mtrs. and at Cable Joint Locations.

4.11 Packing and Markings

The cable shall be wound on a drum conforming to relevant BIS standard and packed. The ends of the cable shall be sealed by means of non-hygroscopic sealing material.

Cables to be supplied in steel drums only.

The cable drum shall carry the following information stencilled on the drum:

- i) Manufacturer's Name and Trademark
- ii) Type of cable and voltage grade.
- iii) No. of cores
- iv) Nominal cross-sectional areas of conductor
- v) Cable code
- vi) Length of cable on drum
- vii) No. of lengths on the drum if more than one
- viii) Direction of rotation of Drum
- ix) Gross weight
- x) Weight of Drum with Ballens (if any)
- xi) Weight of cable
- xii) Reference of any Indian standard
- xiii). ISI Marking on the drum
- xiv) Year of Manufacturing

5. LIST OF APPROVED MAKES

SL.No.	ITEM	Name of Manufacturers
1	HT Cable	RPG /TORRENT / HAVELLS / UNISTAR /NICCO /POLYCAB
2	Cable St.through jointing / end Termination Kit	3M / RAYCHEM
3	Structure	JINDAL/ SAIL / TISCO
4	GI Pipe	JINDAL/ SAIL / TISCO
5	Items not covered above	As per samples approved

6. INSPECTION AND TESTING

Equipment will be duly inspected in the manufacturer's works / premises **by TPI** before despatch to the site. **Cost of TPI will be borne by the Port.**

Inspection of the items to be supplied by the contractor will be carried out **by the TPI or representative of General Manager(Engg.) prior to despatch**, as per the procedure mentioned in the for the relevant Item. Such inspection will be carried out within 10 days from the date of receipt of Inspection Call from the contractor.

The Engineer of the Contract reserves the right to waive inspection at Manufacturer's premises (witnessing tests) and to inspect (physically) the materials at site, after delivery, against Manufacturer's Internal Test Certificate.

The job of installation and commissioning will be inspected by the **representative of General Manager (Engg.) in different stages** and also after completion of the job. For this, the contractor shall have to submit a **Field Quality Assurance Plan (FQAP)**, which will be subsequently approved by the Engineer and the inspection will be carried out in accordance with the approved FQAP.

Inspection and Testing by the representative of **General Manager (Engg.)** shall not relieve the successful bidder of their obligation for supplying the items and execution of the entire work in accordance with the **Contract Condition** and relevant **Acts, Rules and Codes of Practice**

6.1 HT XLPE Cables :

Following tests will be witnessed by **the TPI or the representative of General Manager (Engg.)** at Manufacturer's works before despatch :

a) **Routine Tests** as per IS:7098-II

b) **Acceptance Tests** as per IS:7098-II

Manufacturer's Certificate for **Type Test** (as per IS: 7098), for similar type cable, should be made available to **the TPI or the representative of General Manager (Engg.)** during the above inspection.

6.2 St. through and end termination jointing kits:

The kits will be inspected at site, after delivery, by **the TPI or the representative of General Manager (Engg.)** , based on Manufacturer's Internal routine Test Certificate as per IS:7098-II.

Financial estimate for HT cable laying from Intake Substation to Master Control Substation of HDC, KoPT.

Sl.No.	DESCRIPTION	UNIT	QTY	RATE PER UNIT (IN Rs)	AMOUNT (IN Rs)	REMARKS
				Excluding GST		
1	<u>33KV(E) XLPE, HT Cable:-</u> Supply and laying of 3C x 240 Sq.mm. HT Aluminum XLPE, Screened, armoured, cable as per Technical Specification.					
(i)	Supply of Cable	Mtrs.	7750			
(ii)	Laying of Cable through existing RCC trench/Hume Pipe/ GI Pipe.	Mtrs.	100			
(iii)	Laying of Cable by open cut excavating trench.	Mtrs.	6560			
(iv)	Laying of Cable through 200 mm dia. Hume pipe, to be laid, after open cut excavating including supply of Hume pipe.	Mtrs.	144			
(v)	Laying of Cable through 200 mm. Dia. GI Pipe, to be laid, after open cut excavation, including supply of Pipe	Mtrs.	60			
(vi)	Laying of cable through 200 mm GI Pipe(including supply of Pipe) by open cut method, after removal of existing paver blocks and refixing of paver blocks after laying of GI pipe.	Mtrs.	84			
(vii)	Laying of 200 mm. Dia. GI Pipe by HDD method, including supply of Pipe	Mtrs.	1014			
(viii)	Laying of Cable through GI Pipe mentioned at Sl.No. (viii) above	Mtrs.	702			
(ix)	Laying of cable through pre fabricated ladder type cable tray(600mm wide)	Mtrs.	100			
2	<u>33KV(E) XLPE, HT Cable end termination and straight through:-</u> Supply of heat Shrinkable type straight through jointing kit and end termination kit for 3C x 240 Sq.mm. HT Aluminum XLPE cable.					
(i)	Supply of Indoor/Out door end termination kit	Sets	4			
(ii)	Installation of indoor/outdoor end termination kit and testing and commissioning	Sets	4			
(iii)	Supply of straight through jointing kit	Sets	18			
(iv)	Installation of straight through jointing kit and testing and commissioning	Sets	18			
3	<u>Supply and fixing of GI cable tray and tray support channels.</u>					
(i)	Prefabricated cable tray(600 mm width) with bends and Tees.	Mtrs.	100			
(ii)	GI Channel(75x50x6 mm)	Kgs.	350			
(iii)	GI Plate(6 mm thick)	Kgs.	300			
Total-					-	

Total-	(Including GST)
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