



THIRUVANANTHAPURAM REGIONAL CO.OPERATIVE MILKPRODUCERS' UNION LTD.
KSHEERA BHAVAN, PATTOM, THIRUVANANTHAPURAM -695 004
Phone Nos. 2558850, 2446845 Fax: 2449567, E-mail ID - trcmpuproj@gmail.com

NOTICE INVITING TENDER

The Managing Director, Thiruvananthapuram Regional Co-operative Milk Producers Union Ltd (TRCMPU Ltd) invites online bids from Experienced and Qualified Bidders for the Electrical Installation works for installation of 20 Kl homogenizer at Thiruvananthapuram Dairy

1.	Tender No. & Date	735/TRU/PC/2024 Dated, 01.11.2024 / 2542
2.	Item of Work	Electrical Installation works installation of 20 Kl homogenizer at Thiruvananthapuram Dairy
3.	Tech. Specification & Conditions	Attached
5.	Estimated Amount	Rs.7 Lakhs (Approx.)
6.	Bid Submission Fee	Rs.1000/- (Rupees One Thousand only)
7.	Earnest Money Deposit	Rs.7000/- (Rupees seven Thousand only)
8.	Date and Time of Publication of e- tender.	01.11.2024 4 pm
9.	Date of Submission of e-tender	01.11.2024 5pm to 09.11.2024 11 am
10.	Date and time of opening of e-tender	11.11.2024 1 pm
11.	Place of Opening	TRCMPU Ltd., Ksheera Bhavan, Pattom Thiruvananthapuram-695004.
12.	Bid Validity	120 Days
13.	Warranty	12 months warranty from the date of commissioning.
14.	Completion period	Within 30 days from the date of Confirmed order.


MANAGING DIRECTOR

Terms & Conditions for e-Procurement

This tender is an e-Tender and is being published online for work / supplying of equipment as mentioned in the Invitation to bid. The tender is invited in two cover system from the registered and eligible manufacturers / suppliers through e-procurement portal of Government of Kerala (<http://www.etenders.kerala.gov.in>). Prospective bidders willing to participate in this tender shall necessarily register themselves with above mentioned e-procurement portal.

The tender timeline is available in the critical date section of this tender published in www.etenders.kerala.gov.in.

A) Online Bidders registration process:

Bidders should have a Class II or above Digital Signature Certificate (DSC) to be procured from any Registration Authorities (RA) under the Certifying Agency of India. Details of RAs will be available on www.cca.gov.in. Once, the DSC is obtained, bidders have to register on www.etenders.kerala.gov.in website for participating in this tender. Website registration is a one-time process without any registration fees. However, bidders have to procure DSC at their own cost.

Bidders may contact e-Procurement support desk of Kerala State IT Mission over telephone at 0471-2577088/188/388 or 0484-2336006, 2332262 or 0497-2764788, 2764188 or 0483-273294 or through e-mail: etendershelp@kerala.gov.in or helptender@gmail.com for assistance in this regard.

B) Online Tender Process:

The tender process shall consist of the following stages:

- i) **Downloading of tender document:** Tender document will be available for free download on www.etenders.kerala.gov.in from the date & time of publication of e-tender, till the last date & time for online submission of e-tender. However, tender document fees shall be payable at the time of bid submission as stipulated in this tender document. Downloading of tender documents will not be possible after the date specified above.
- ii) **Pre-bid meeting:** Refer page 3 of the tender document
- iii) **Publishing of Corrigendum:** All corrigenda shall be published on www.etenders.kerala.gov.in and shall not be available elsewhere.
- iv) **Bid submission:** Bidders have to submit their bids along with supporting documents to support their eligibility, as required in this tender document to www.etenders.kerala.gov.in. No manual submission of bid is allowed and manual bids shall not be accepted under any circumstances.
- v) **Opening of Technical bid and bidder short-listing:** Technical bids will be opened, evaluated and shortlisted as per the eligibility and technical qualification. All documents in support of technical qualification shall be submitted online as well as offline within the due date and time. Failure to submit the documents will attract disqualification. Bids shortlisted by this process will be taken up for opening the financial bid.
- vi) **Opening of financial bids:** Bids of the qualified bidders shall only be considered for opening and evaluation of the financial bid on the date and time mentioned in the critical date section.

C) Documents comprising bid:

- i) **First Stage (Pre qualification or Technical cover based on 1 cover or 2 cover tender system):** Pre-Qualification or Technical proposal shall contain the scanned copies of the following documents which every bidder has to upload.
 - A. Copies of original documents defining the constitution or legal status, place of registration and principal place of business of the company or firm or partnership or if a joint venture, of each party there to constituting the bidder.

- B. Copies of Sales tax & service tax registration certificate.
- C. Details of experience and past performance of the bidder (or of each party to a joint venture) on works of similar nature, and details of current work in hand and other contractual commitments shall be submitted. Customer's full address, contact persons, contact telephone number and e-mail ID are to be furnished.
- D. The bidder should be in same business as Supplier / manufacturer for which the bid is invited for a minimum period of five years at the time of bid opening.
- E. The bidder's annual financial turnover during any one of the last two years shall not be less than twice the estimated cost as specified in the Invitation to Bid.
- F. The bidder shall have completed at least 5 number of works of similar nature for which this invitation to bid is issued during the last three years.
- G. The bidder shall furnish a copy of the Income tax Returns for the previous year in original or certified true copies.

The department doesn't take any responsibility for any technical snag or failure that has taken place during document upload.

ii) **The Second Stage (Financial Cover or as per tender cover system):**

The Bidder shall complete the Price bid as per format given for download along with this tender.

Note: - The blank price bid should be downloaded and saved on bidder's computer without changing file-name otherwise price bid will not get uploaded. The bidder should fill in the details in the same file and upload the same back to the website.

Fixed price: Prices quoted by the Bidder shall be fixed during the bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable/variable price quotation will be treated as non-responsive and rejected.

D) Tender Document Fees and Earnest Money Deposit (EMD)

The Bidder shall pay a tender document fee and Earnest Money Deposit or Bid Security as given in the Tender Inviting Notice. The Bid security is required to protect the purchaser against risk of Bidder's conduct, which would warrant the forfeiture of security.

Online Payment modes: The tender document fees and EMD can be paid in the following manner through e-Payment facility provided by the e-Procurement system.

State Bank of India Multi Option Payment System (SBI MOPS Gateway): Bidder are required to avail Internet banking facility in any of the below banks for making tender remittances in e-Procurement system.

A) Internet Banking Options (Retail)			
1	Allahabad Bank	29	Janata Sahakari Bank
2	Axis Bank	30	Karnataka Bank
3	Andhra Bank	31	Karur Vysya Bank
4	Bandan Bank	32	Kodak Mahindra Bank
5	Bank of Bahrain and Kuwait	33	Lakshmi Vilas Bank
6	Bank of Baroda	34	Mehasana urban Co-op Bank
7	Bank of India	35	NKGSB Co-operative Bank
8	Bank of Maharashtra	36	Oriental Bank of Commerce
9	Bassein Catholic Co-operative Bank	37	Punjab and Maharastra Co-operative Bank
10	BNP Paribas	38	Punjab National Bank

11	Canara Bank	39	Punjab and Sind Bank
12	Catholic Syrian Bank	40	RBL Bank
13	Central Bank of India	41	Saraswat Cooperative Bank
14	City Union Bank	42	Shamrao Vithal Cooperative Bank
15	Corporation Bank	43	South Indian Bank
16	Cosmos Bank	44	Standard Chartered Bank
17	DCB Bank	45	State Bank of India
18	Dena Bank	46	Syndicate Bank
19	Deutsche Bank	47	Tamilnadu Mercantile Bank
20	Dhanalaxmi Bank	48	Tamilnadu Cooperative Bank
21	Federal Bank	49	The Kalyan Janatha Sahakari Bank
22	HDFC Bank	50	TJSB Bank(Erstwhile Thane Janata Sahakari Bank)
23	ICICI Bank	51	UCO Bank
24	IDBI Bank	52	Union Bank of India
25	Indian Bank	53	Vijaya Bank
26	Indian Overseas Bank	54	YES Bank
27	Indus Ind Bank	55	United Bank of India
28	Jammu & Kashmir Bank		
B) Internet Banking Options (Corporate)			
1	Bank of Baroda	19	Karur Vysya Bank
2	Bank of India	20	Kodak Bank
3	Bank of Maharashtra	21	Lakshmi Vilas Bank
4	BNP Paribas	22	Oriental Bank of Commerce
5	Canara Bank	23	Punjab and Maharastra Coop Bank
6	Catholic Syrian Bank	24	Punjab and Sind Bank
7	City Union Bank	25	Punjab National Bank
8	Corporation Bank	26	RBL Bank
9	Cosmos Bank	27	Shamrao Vithal Cooperative Bank
10	Deutsche Bank	28	South Indian Bank
11	Development Credit Bank	29	State Bank of India
12	Dhanalaxmi Bank	30	Syndicate Bank
13	Federal Bank	31	UCO Bank
14	HDFC Bank	32	Union Bank of India
15	ICICI Bank	33	UPPCL
16	Indian Overseas Bank	34	Vijaya Bank
17	Janata Sahakari Bank	35	Axis Bank
18	Jammu & Kashmir Bank		

During the online bid submission process, bidder shall select SBI MOPS option and submit the page, to view the terms and condition page. On furtherer submitting the same, the e-Procurement system will redirect the bidder to MOPS Gateway, where two options, mainly **SBI** and **other banks*** will be shown. Here, bidder may proceed as per below.

(a). **SBI Account holders** shall click **SBI** option to with its Net banking facility, where bidder can enter their internet banking credentials and transfer the tender fee and EMD amount.

(b). **Other bank account holders** may click **other banks** option t view the bank selection page. Here bidder can select from any of the 54 banks to proceed with its net banking facility, for remitting the tender payments.

*Transaction charges for other banks vide SBI Letter No. LHO/TVM/AC/2016-17/47- 1% of transaction value subject a minimum of Rs.50/- and maximum of Rs.150/-

Any transaction charges levied while using any of the above modes of online payment has to be borne by the bidder. The supplier/contractor's bid will be evaluated only if payment status against bidder is showing "Success" during bid opening.

E) SUBMISSION PROCESS:

For submission of bids, all interested bidders have to register online as explained above in this document. After registration, bidders shall submit their Technical bid and financial bid online on www.etenders.kerala.gov.in along with online payment of tender document fees and EMD.

For page-by-page instructions on bid submission process, please visit www.etenders.kerala.gov.in and click "Bidders Manual Kit" link on the home page.

It is necessary to click on "Freeze bid" link/icon to complete the process of bid submission otherwise the bid will not get submitted online and the same shall not be available for viewing/opening during bid opening process.

SPECIAL TERMS & CONITION

Tender for Electrical Works for installation of 20 KL Homogenizer at Thiruvananthapuram Dairy

Thiruvananthapuram Regional Co- op Milk Producers Union Ltd invites competitive rates for Electrical work for installation of 20 KL Homogeniser at Thiruvananthapuram Dairy, subject to the following terms and conditions.

1. Eligibility and qualification requirements:

1.1 To be eligible for the award of contract, bidder shall provide satisfactory evidence to the Thiruvananthapuram Regional Co-op Milk producers Union Ltd regarding their eligibility, capacity and adequacy of resources to carry out the contract effectively. To this end all bids submitted shall include the following information.

- A. Copies of original documents defining the constitution or legal status, place of registration and principal place of business of the company or firm or partnership or if a joint venture, of each party there to constituting the bidder.
- B. Copies of Sales tax & service tax registration certificate.
- C. Details of experience and past performance of the bidder on works of similar nature, and details of current work in hand and other contractual commitments shall be submitted. Customer's full address, contact persons, contact telephone number and e-mail ID are to be furnished.

1.2 For the purpose of this particular contract, bidder should meet the following qualifying criteria as minimum:

1. The bidder should be a Contractor of Electrical System installation for a minimum period of five years at the time of bid opening.
2. The bidder must be certified A class Electrical contractor or equivalent.
3. Annual financial turnover during the last two years shall not be less than twice the probable value of the contract as specified in the Invitation to Bid.
4. The bidder shall have completed at least five contracts of similar nature for which this invitation to bid is issued during the last five years.
5. The bidder shall furnish documentary evidence for the above including copy of Income tax Returns (certified true copies) for the previous two years failure of which will lead to disqualification.

2. Tender Fee & Earnest Money Deposit


- a) The Tender fee and EMD as given in the invitation to bid shall be accepted through online NEFT transaction through the site www.etenders.kerala.gov.in.
- b) The EMD of the successful bidder shall be released after the signing of the agreement and submission of performance security.
- c) EMD of the unsuccessful tenderer shall be released after the award of the contract and execution of agreement by the successful tenderer.
- d) No interest shall be paid for the EMD for the period for which it lies in deposit.

3. **Agreement** - The successful bidder has to execute a contract agreement on a Kerala stamp paper worth Rs.200/- within 15 days of receipt of order.

4. Delivery Address: -

Thiruvananthapuram Dairy
PB. No.4 Ambalathara, Poonthura P.O
Thiruvananthapuram-695 026
PH: 0471-2382148,2382562
GST No.32 AAAAT9795J3ZV

5. **Terms of payment**
- 50% of the order value shall be released on supply of the item at the Dairy.
 - 30 % of the order value shall be released on completion of installation and commissioning of the system satisfactorily.
 - 10 % after obtaining Energization certificate and all necessary statutory mandatory certifications.
 - 10% of the total value will be released on satisfactory completion of guarantee period of twelve months from the date of commissioning in all respect. However the said amount will be paid against a Bank guarantee valid for twelve months from the date of commissioning.
6. **Scope of work:** The Scope of work includes supply installation and commissioning of complete electrical systems connected with installation of 20 KL Homogeniser at Thiruvananthapuram Dairy. The work includes supply and laying of new electrical cable from main MV panel to process hall through new cable tray
Supply and Installation of one change over switch in process hall and electrical connection from change over switch to two 20 kl homogenizers.
Supply and installation of one isolator for new 20 kl homogenizer.
It shall also include obtaining of approval from Electrical Inspectorate / KSEB.
7. **Price Basis:** All prices must be quoted on FOR plant basis including Packing, Forwarding, GST, Transit Risk Insurance, Freight, Unloading charges etc. Nothing shall be paid extra. The supply rate and charges towards erection, testing and commissioning shall be furnished separately. All the tools and tackles required for the work to be arranged at the risk and cost of the contractor.
8. **Make:** The details such as make, model, technical details/specification, etc, of the item/equipments intend to supply, should be furnished with the offer.
9. **Completion period:** The materials required for the work should be delivered in one lot within 2 week and the erection testing and commissioning to be completed within 3 weeks from the date of issue of clearance. Total works must be completed within one month of issuance of site clearance.
10. **Guarantee:** You shall give guarantee for the performance of the items supplied and work carried out for a period of 12months from the date of commissioning. The entire expenditure towards replacement/repair in this regard shall be borne by you.
11. **Arbitration:** In case of any dispute, The Registrar of Co-operative societies of Kerala State shall be the sole Arbitrator as per the provisions of Kerala Co-operative Societies Act 1969.
12. **Jurisdiction:** Thiruvananthapuram (Kerala) only.


MANAGING DIRECTOR



TECHNICAL SPECIFICATIONS

1 ERECTION OF SWITCH BOARDS, DISTRIBUTION BOARDS

Switchboards shall be aligned, leveled on the base channels and bolted or tach welded to the foundation channels to be grouted in the flooring. After the erection the switchboard shall be inspected for dust and vermin proof ness. Any holes which might allow insects shall suitably closed. Before the energisation of SB/DB etc the insulation resistance value shall be measured, operation of circuit breakers if any, shall be verified and ascertain its performance. Also confirm the satisfactory operation of the electrical equipment alarm, relays etc.

2 POWER AND CONTROL CABLES- SUPPLY INSTALLATION TESTING AND COMMISSIONING

2.1 Power Cables (L.T)

Power cables for use on 415 V systems shall be of 1100-volt grade, aluminium conductor, PVC insulated, PVC sheathed, armoured any overall PVC sheathed, strictly as per IS: 1554 (Part I) - 1976. Unarmored cable to be used only if specifically mentioned in schedule of quantities. The size of these cables shall be as specified in schedule of quantities or as per erection drawings.

2.2 Cable Glands

Cable glands shall be of heavy-duty compression type of brass, chrome plated. These shall have a screwed nipple with conduit electrical thread and check nut. These shall be suitable for armoured/unarmored cables, which is being used.

2.3 Cable Connectors

Cable connectors, lugs/sockets, shall be of copper/aluminium alloy, suitably tinned, solder less, crimping type. These shall be suitable for the cable being connected and type of function (such as power, control or connection to instruments, etc.)

2.4 Cable Indicators

These shall be self-sticking type and of 2 mm thick lead strap for overall cable. PVC identification numbers, ferrule shall be used for each wire.

2.5 Installation of cable network

Cable network shall include power, control and lighting cables which shall be laid in underground trenches, hume pipes, open trenches, cable trays GI pipes, or on building structure surfaces as detailed in the relevant drawings. Cable schedules or as per the Engineer-in charge's instructions. Supply and installation of cable trays, GI pipes/conduits, cable glands sockets at both ends, isolators, junction boxes, remote push buttons stations, etc. shall be under the scope of the Contractor.

2.6.0 General requirements for handling of cables

2.6.1.1 Before laying cables, these shall be tested for physical damage, continuity absence of cross phasing, insulation resistance to earth and between conductors. Insulation resistance tests shall be carried out with 500/1000 Volt Megger.

2.6.1.2 The cables shall be supplied at site, wound on wooden drum as far as possible. For smaller length and sizes, cables in properly coiled form can be accepted. The cables shall lay by mounting the drum of the cable on drum carriage. Where the carriage is not available, the drum shall be mounted on a properly supported axle, and the cable will be rolled on, as it produces kinks, which may damage the conductor.

- 2.6.1.3 Sharp bending and kinking of cables shall be avoided. The bending radius for PVC insulated and sheath armored cable shall not be less than $10 D$ where 'D' is overall diameter of the cable.
- 2.6.1.4 While drawing cables through GI pipes, conduits, RCC pipe, ensure that size of pipe is such that, after drawing cables, 40% area is free. After drawing cable, the end of pipe shall be sealed with cotton/bituminous compound.
- 2.6.1.5 High Voltage (11 KV and above), medium voltage (230 V and above) and other control cables shall be separated from each other by adequate spacing or running through independent pipes/trays.
- 2.6.1.6 Armored cables shall never be concealed in walls/floors/roads without GI pipes, conduits RCC pipes.
- 2.6.1.7 Joints in the cable throughout its length of laying shall be avoided as far as possible and if unavoidable, prior approval of site Engineer shall be taken. If allowed, proper straight through epoxy resin type joint shall be made, without any additional cost.
- 2.6.1.8 A minimum loop of 3 M shall be provided on both ends of the cable, or after every 50 M of enjoined length of cable and on both ends of straight through cable joint. This additional length shall be used for fresh termination in future. Cable for this loop shall be paid for supply and laying.
- 2.6.1.9 Cable shall be neatly arranged in the trenches/trays in such a manner so that criss-crossing is avoided and final take off to the motor/switchgear is facilitated.

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

- 2.6.1.10 All cable routes shall be carefully measured and cable cut to the required lengths and undue wastage of cables to be avoided. The routes indicated in the drawings are indicative only and the same may be rechecked with the Engineer-in-charge before cutting of cables. While selecting cable routes, interference with structures, foundations, pipeline, future expansion of buildings, etc. should be avoided.
- 2.6.1.11 all temporary ends of cables must be protected against dirt and moisture to prevent damage to the insulation. For this purpose, ends of all PVC insulated cables shall be taped with an approved PVC or rubber insulating tape. Use of friction type or other fabric type tape is not permitted. Lead sheathed cables shall be plumbed with lead alloy.
- 2.6.1.12 Wherever cable rises from underground/concrete trenches to motors/switchgears/push buttons, these shall be taken in G.I. Pipes of suitable size, for mechanical protection upto 300 mm distance of concerned cable gland or as instructed by the Engineer-in-charge.
- 2.6.1.13 where cables pass through foundation/walls of other underground structures, the necessary ducts or openings will be provided in advance for the same. However, should it become necessary to cut holes in existing foundations structures the electrical contractor shall determine their location and obtain approval of the Engineer-in-charge before cutting is done.

2.7. Laying of cables (underground system)

- 2.7.1 Cables shall be so laid in ground that these will not interfere with other underground structures. All water pipes, sewage lines or other structures which become exposed by excavation shall be properly supported and protection from injury until the filling has been rammed solidly in places under and around them. Any telephone or other cables coming in the way are to be properly shielded diverted as directed by the owner.
- 2.7.2 Cables shall be laid at minimum depth of 750 mm in case of LT & 1200 mm in case of HT, from ground level. Excavation will be generally in ordinary alluvial soil. The width of the trench shall be sufficient for laying of required number of cables.
- 2.7.3 Sand bedding 75 mm thick shall be made below and above the cables. A layer of bricks (full size) shall be laid on the edge, above sand bedding on the sides of cables and a flat brick to cover cable completely. More than one cable can be laid in the same trench by providing a brick on edge between two cables. However the relating location of cables in

trench shall be maintained till termination. The surface of the ground after back filling the earth shall be made good so as to conform in all respects to the surrounded ground and to the entire satisfaction to the Engineer-in-charge.

2.7.4 For all underground cables, route markers should be used.

- i. Separate cable route markers should be used for LT, HT and telephone cables.
- ii. Route markers should be grounded in ground with 1:2:4 cement concrete pedestal size 230 x 230 x 300 mm.
- iii. Cable markers should be installed at an interval not exceeding 50 M along the straight routes of cables at a distance of 0.5 M away from centre of cable with the arrow marked on the cable markers plate indicating the location of cable. Cable markers should also be used to identify change in direction of cable route and for location of every joint in underground cable.

2.7.5 RCC hume pipe for crossing road in cable laying shall be provided by Owner. No deduction shall be made for cable laying in hume Pipe for not providing bricks, sand and excavation. RCC hume pipe at the ends shall be sealed by bituminous compound after laying and testing of cable by electrical contractor without any extra charge.

2.8 Laying of cables under Floors

2.8.1 GI class A pipe shall be used for laying of outgoing cables from distribution boards to motors, isolators/junction boxes of motors, starter of motors and push button stations. Preferably one cable shall be drawn through one pipe. Size of pipe shall be such that after drawing of cable 40% area is free. If length of pipe is more than 30 M, free area may be increased to 50%.

2.8.2 Use of elbows is not allowed at all and number of bends shall be kept minimum. Instead of using bends with sockets, pipe-bending machine shall be used for making long smooth bends at site.

2.8.3 Ends of pipe shall be sealed temporarily while laying with cotton/jute/rubber stopper etc. to avoid entry of building material.

2.9 Laying of cable in Masonry Trenches

2.9.1 Masonry/concrete trenches of laying of cable shall be provided by Owner. However steel members such as MS angles/flats etc. shall be provided & grouted by electrical contractor to support the cables without any extra charge. Cables shall be clamped to these supports with aluminium saddles/clamps. More than one tier of cables can be provided in the same trench if the numbers of cables are more.

2.9.2 Entry of cables in trenches shall be sealed with bituminous MASTIC compound to stop entry of water in trenches.

3.0 Laying of cables in cable Trays

3.1 Cable trays and supporting steel members such as MS angle/channel/flats etc. shall be provided and fixed by the Contractor.

3.2 Cables shall be fixed in cable trays in single tier formation and cables shall be clamped with aluminium flat clamps and galvanized bolts and nuts.

3.3 Earthing flat/wire can also be laid in cable tray along with cables.

3.4 After laying of cables minimum 20% area shall be spare.

3.5 Laying of cables on Building Surface/Structure

3.6 Such type of cable laying shall be avoided as far as possible and will be allowed only for

individual cables or small group which runs along structure.

3.7 Cables shall be rigidly supported on structural steel/masonry using individual cast/malleable iron galvanized saddles and these supports shall be approximately 400 to 500 mm for cables upto 25 mm overall diameter and maximum 1000 mm for cables larger than 25 mm. Unsightly sagging of cables shall be prevented. Only aluminium/GI clamps with GI bolts/nuts shall be used.

3.8 If drilling of steel structure must be resorted to, approval must be secured from the Engineer-in charge and steel must be drilled where the minimum weakening of the structure will result.

3.10 Termination and jointing of Cables

4.0 Use of Glands

All PVC cable upto 1.1 KV grade, armored or unarmored shall be terminated at the equipment/junction box/ isolators/push buttons/ control accessories, etc. by means of suitable size compression type cable glands. Armour of cable shall be connected to earth point. The Contractor shall drill holes for fixing glands wherever necessary. Wherever threaded cable gland is to be screwed into threaded opening of different size, suitable galvanized threaded reducing bushing shall be used for approved type.

4.1 Use of Lugs/Sockets

All cable leads shall be terminated at the equipment terminals, by means of crimped type solder less connectors unless the terminals at the equipment ends are suitable for direct jointing without lugs/ sockets.

The following is the recommended procedure for crimped joints and the same shall be followed:

- i. Strip off the insulation of the cable end with every precaution, not to sever or damage any strand. All insulations to be removed from the stripped portion of the conductor and ends of the insulation should be clean and square.
- ii. The cable should be kept clean as far as possible before assembling it with the terminal/socket. For preventing the ingress of moisture and possibility of re-oxidation after crimping of the aluminium conductors, the socket should be fitted with cross ion inhibiting compound. This compound should also be applied over the stripped portion of the conductor and the palm surface of socket.
- iii. Correct size and type of socket/ferrule/lug should be selected depending on size of conductor, and type of connection to be made.
- iv. Make the crimped joint by suitable crimping tool.
- v. If after crimping the conductor in socket/lug, same portion of the conductor remains without insulation the same should be covered sufficiently with PVC tape.

4.2 Dressing of cable Inside the Equipment

After fixing of cable glands, the individual cores of cable shall be dressed and taken along the cable ways (if provided) or shall be fixed to the panels with polyethylene straps. Cable shall be dressed in such a manner that small loop of each core is available inside the panel. For motors of 20 HP and above terminal box if found not suitable for proper dressing of aluminium cables, the Contractor shall modify the same without any additional cost. Cables inside the equipment shall be measured and paid for.

4.3 Identification of Cables/Wires/Cores

Power cables shall identified with red, yellow & blue PVC tapes for trip circuits

identification, additional red ferrules shall be used only in the particular cores of control cable at the termination points in the switchgear/control panels and control switches.

In case of control cables all cores shall be identified at both ends by their wire numbers by means of PVC ferrules or self-sticking cable markers, wire numbers shall be as per schematic/connection drawing. For power circuit also wire numbers shall be provided if required as per the drawings of switchgear manufacturer.

4.5 Testing of Cables

4.6 Before energizing, the insulation resistance of every circuit shall be measured from phase to phase and from phase to ground. This requires 3 measurements if one side is grounded and 6 measurements for 3 phase circuits.

4.7 Where splices or terminations are required in circuits rated above 650 volts, measure insulation resistance of each length of cable before splicing and/or terminating. Report measurements after splices and/or terminations are complete.

5.0 Earthing Network

The entire earthing installation shall be done in accordance with the earthing drawings, specification and instructions of the Engineer-in-charge. The entire earthing system shall fully comply with the Indian Electricity Act and Rules framed there under. The contractor shall carry out any changes desired by the electrical inspector or the Owner in order to make the installation conform to the Indian Electricity Rules, at no extra cost. The exact location of the earth pits, earth electrode and conductors and earthing points of the equipments shall be determined at site, in consultation with the Engineer-in-charge. Any change in the methods, routing, and size of conductor etc. shall be subject to approval of the owner/Engineer-in-charge before execution.

5.1 Earth Pit with Electrode

Plate or pipe type earth electrode with earth pit shall be provided for this work unless other wise advised by the Engineer-in-charge due to typical site conditions. Earthing electrode and pit shall be as per IS 3043-1966 (code of practices for Earthing). For ready reference, sketches for pipes and plate type earth electrode earthing pit have been shown in Annexure. All earth electrodes shall preferably be driven to a sufficient depth to reach permanent moist soil. (The sketch shown for reference in the Annexure is for copper earthing)

PRIOR APPROVAL OF THE ENGINEER-IN-CHARGE SHALL BE TAKEN FOR SELECTING TYPE OF EARTH ELECTRODE (PIPE OR PLATE).

5.1.1 Earth pit centre shall be at a minimum distance of 2 m from nearest building, unless otherwise advised. The minimum 8 m distance shall be maintained between centers of 2-plate earth electrode and 5 m between centers of pipe earth electrode.

5.1.2 Earth Bus, Earthing Lead and Earth Wire/Strip

5.1.2.1 All electrical equipment is to be doubly earthed by connecting two earth strip/Wire conductor from the frame of the equipment to an earthing pit/main earthing ring. The earthing ring will be connected via links to several earth electrodes. The cable armored

will be earthed through the cable glands. Conductor size for connection to various equipments shall be as specified in the drawing as instructed by the Engineer-in-charge. However, the length of the branch leads from equipment to earthing grid/ring shall not be more than 10 to 15 meters.

- 5.1.2.2 All hardware for earthing installation shall be hot dip galvanized. Spring washers shall be used for all earthing connections of equipment having vibrations.
- 5.1.2.3 Size of earthing lead/wire shall be as specified below/or as given in schedule of quantities.

Control Switches	-	Cu. Wire 10 SWG
Motor upto 25 HP	-	Cu. Wire 10 SWG
Motor above 25 HP upto 50 HP	-	Cu. Wire 6 SWG
Motor above 50 HP upto 75 HP.	-	Cu. Wire 4 SWG
Motor above 75 HP upto 125 HP	-	Cu Wire 2 SWG
Switch Board		Cu. Strip 25 x 3 mm
Power control centre		Cu. strip 37 x 3 mm
LT panel of sub-station		Cu. strip 25 x 6 mm
HI switch yard etc		or as Approved By Ele. Inspectorate.

However, while deciding type & size of earth lead, the resistance between the earthing system and the general mass of the earth shall be as per IS code of practice. The earth loop impedance to any point in the electrical system shall not be in excess of 1.0 ohm in order to ensure satisfactory operation of protective devices.

- 5.1.2.4 Cu. wire shall be connected to the equipment by providing crimping type socket/lug.
- 5.1.2.5 Wherever earthing strip to be provided in cable tray, it shall be suitably clamped on cable tray and electrically boded to the cable tray at regular interval.
- 5.1.2.6 Excavating & refilling of earth, necessary for laying underground earth bus loops shall be responsibility of the contractor.
- 5.1.2.7 Wherever earth leads/strips/wire are laid in cable trenches, these shall be firmly and suitably cleared to the walls/supporting steel structure on which cable is clamped.
- 5.1.2.8 The neutral of the transformer shall be connected to earth pit independently.

INDIAN STANDARDS TO BE FOLLOWED FOR ELECTRICAL -ERECTION

1.	PVC insulated cables (light duty) for working voltage upto 1100 volts	- 694-1977 Part I & II
2.	PVC insulated cables (heavy) for voltage upto 1100 volts	- 1554 - 1976 Part I
3.	do do for voltage 3.3 KV to 11 KV	- 1554 - 1976 Part II
4.	Specification for polyethylene insulated PVC Sheathed heavy duty electric cables, voltage not exceeding 1100 V	- 5959 - 1970 Part I
5.	do do for voltage 3.3 KV to 11 KV	- 5959 - 1970 Part II
6.	Guide for marking of insulated conductors	- 5578 - 1970
7.	Code of practice for installation and maintenance of paper insulated power cables	-1255 - 1967
8.	Code of practice for earthing	- 3043 - 1966
9.	Guide for safety procedures and practices in electrical work	- 5216 - 1969
10.	Code of practice for installation and maintenance of AC induction motor starter	- 5214 - 1969
11.	Code of practice for installation and maintenance of induction motors	- 900 - 1965
12.	Code of practice for installation and maintenance of switchgears	- 372 - 1975
13.	Code of practice for installation and maintenance of transformers	- 1886 - 1967
14.	Code of practice for electrical wiring installation, voltage not exceeding 650 V	- 732 - 1963
15.	Code of practice for electrical wiring installation (system voltage exceeding 650 V)	- 2274 - 1963
16.	Guide for testing three phase induction motor	- 4029 - 1967

APPROVED MAKES OF ITEMS

No	Item Description	Approved makes
1.	Air Circuit breaker	L&T, Siemens, Schneider, ABB
2.	Switch fuse unit with HRC fuse/Isolator	L&T, Siemens, C&S, MG, Schneider, ABB
3.	Contactors and Starter Relays	L&T, Siemens, C&S, BCH, Schneider, ABB
4.	MCCB	L&T, Siemens, BCH, Schneider, ABB
5.	Energy Meter/Power Factor Meter	GE., AE, Enercon, HPL, L&T
6.	Measuring instruments	L&T, Schnieder, AE., MECO, IMP, Enercon, HPL
7.	Current Transformers	Current Electricals, Kappa Electricals, IMP, MECO, Kalpa Electricals, PGR Powertech
8.	Selector switches	Kaycee/Reco/L&T
9.	Push Button	L&T, BCH, C&S
10.	Protective relays	L&T, Schneider
11.	Indicating lamps(LED Type only)	C&S, L&T, Siemens, Schneider
12.	ELCB	Schneider, Legrand, Siemens
13.	MCB/DB	Legrand, L&T, Schneider, ABB, Siemens
14.	Aluminium Conductors power cable	Gloster, ICC, Unistar, CCI, Omega, Rallison, Sark, Polycab, Goldcab
15.	Copper conductor control cable	Gloster, Unistar ICC, CCI, Polycab, Rallison, Omega, Sark, Goldcab
16.	Cable glands	Power Engg. Co/Hirpara/Prabhat/Lapp, Kabel
17.	Soft starter	Siemens, Schneider, ABB, L&T
18.	Cable lugs	Dowels
19.	Telephone wires and cables	Delton, Reliance, Netco, Rallison, Sark
20.	Capacitors	Khatau/GEC, L&T, Crompton, Sprague
21.	PVC insulated flexible copper Conductor wire	Finolex, V Guard, Anchor, Gloster, Q-Flex, Rallison, RR Kabel
22.	Flush type piano switch, socket Outlets (5A/15A)	Anchor, Leader, Crabtree
23.	Industrial type switch, Metallic plug sockets	Crompton, Cutler Hammer, Best & Crompton, Standard

Note: No make is approved for following items. Drawings samples to be got approved by the contractor for these items

- a. Switch boxes and outlet boxes, Hylum cover plate for switch boxes, Distribution boards & Switchboards, Buzzers and bells, Copper wires and strips, MS conduit pipes, Street light poles and brackets.

TECHNICAL DEVIATION STATEMENT FORM

The following are the particulars of deviations from the requirements of the tender specifications.

CLAUSE	DEVIATION	REMARKS (Including justification)
--------	-----------	--------------------------------------

Dated

Signature and seal of the bidder

- NOTE: 1. where there is no deviation, the statement should be returning duly signed with an endorsement indicating "No Deviations".
2. The technical specifications furnished in the bidding document shall prevail over those of any other document forming a part of our bid, except only to the extent of deviations furnished in the statement