

TENDER No.

KAD/O&M/EXP/N-Procure/2026/05/No.00348 date. 01-05-2026 SR. NO.02

Tender for ARC work for for the Installation of Chemical Earthing at various Transformer Center Through out sourced agency for Existing DGVCL Network at jurisdiction of Kadodara-1 Sub division.

PART - II

TECHNICAL SPECIFICATIONS:

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1.0 Erection Specification.

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GENERAL INFORMATION (TECHNICAL):

1.1. CODES, STANDARDS & REGULATIONS

The design, manufacture, erection, cable laying and testing of the equipments and material to be supplied shall comply with latest revisions of relevant Indian Standards or equivalent IEC standards. In addition, the Indian Electricity Rules, Electricity Act 2003, Statutory requirements of Central Govt., GERC and State Government of Gujarat(applicable codes), shall also be complied with. Any complications arising out of it will be set right by the bidder without any implication to DGVCL. The bidder shall submit his offer as per information given in submission of tender.

Drawings, Data and Documents

The bidder shall furnish following documents/ information along with offer in spiral bound volumes. General description of equipment offered specifying the important features, make, technical parameters, materials of construction etc. To enable DGVCL to have proper understanding of the material offered and its operation.

The drawings and documents shall be furnished to DGVCL by the successful bidder for approval of DGVCL, within the period stipulated in the draft contract/mutually agreed terms at the time of placement of order, the bidder shall submit a list of all such drawings and documents he proposes to submit. The list will be approved by DGVCL and may be modified, if necessary. Each drawing /document in the list shall be identified with a serial number, description and scheduled date of submission. This should be submitted in a spiral bound volumes.

1.2. FOR REFERENCE

- OEM's Complete and comprehensive instruction manuals with drawings for operation and maintenance of the equipments supplied by the bidder.
 - Preventive maintenance schedule for each equipment.
 - Procedure for shutdown and HT equipment.
 - Safety procedures for safe operation of equipment and complete system.
 - Test procedure for site tests.

1.3. AS- BUILT DRAWINGS

On completion of installation, testing and commissioning, the bidder shall in Corporate visions/ modification if any, in the reproducible and submit 'as built' drawing for DGVCL's record in spiral bound volumes and soft copy. The drawings shall be in AutoCAD DXF format.

1.4. TEST AND INSPECTION FOR INDIVIDUAL ITEM

Routine test/ Acceptance tests shall be carried out on all equipment at manufacture's works/ ERDA as per appropriate IS/IEC. The bidder shall make reasonable facilities, at his cost for inspection and testing of the equipment/material by DGVCL's Officials. No equipment/item shall be dispatched to site without provisional certificates of acceptance issued by DGVCL. Inspection and test shall be carried out at the place of manufacture as well as on receipt of the equipment at site if required. Inspection and tests do not relieve the bidder of his contractual obligations regarding performance of the equipment at site/in actual use.

The bidder shall submit the brief summary of all type test certificates for similar equipment supplied by him elsewhere and the actual type test certificates as and when asked. In case type test certificates for similar equipment is not available, the same shall be conducted in the presence of DGVCL's Authorized representative if DGVCL so desires, without any financial implications to the DGVCL. The type test report shall not be older than 5 year from the date of tender opening (Technical bid opening). The supplier of the equipment shall ensure that the equipment available at his works for routine test/type test/acceptance test are duly calibrated and necessary certificate shall be made available to the inspecting officer of DGVCL.

As far as possible, the supplier of equipment shall give a minimum of 15 days notice of readiness of material and give the inspection call accordingly. If on arrival of inspecting officer at the works, the material is not found to be ready, the concerned supplier of equipment shall be liable for additional expenditure DGVCL may incur on account of retention or re-deputation of the inspecting officer.

The officer deputed for inspecting for particular lot of material according to intimation from you may also like to check Quality Control Plan and for that purpose he may demand the Test Reports of raw material being procured.

1.5. FUNCTIONAL AND COMPOSITE TESTING

Following test shall be conducted on equipment after completion of erection in the presence of Engineer-in-charge from point of view of completeness in the presence of DGVCL's Authorized Representative.

- Visual inspection of total system.
- Checking of continuity of power and LT/HT cables.
- Checking of nameplate data of complete system.
- Verification and measurement of earthing resistance.
- Checking of cable terminations and laying, dressing etc. in the equipment kiosk.
- Checking of safe accessibility of components.
- All the equipments and materials shall be passed through checks and test as per approved Field Quality Plan.
- The insulation resistance test shall be carried out
- HV installation above 11 KV- by 2500V Megger
- Power circuit of voltage up to 1KV- by 1000 V Megger

1.6. BAR CHARTS

The Bidder shall furnish along with the bid, the bar charts in Project and project schedules indicating starting and completion dates of each activity, such as preparation & approval of drawings, manufacturing/supply/ delivery, civil works, Cable laying erection, testing, pre commissioning and commissioning etc. so that quarter wise completion activities suffice the purpose for releasing the connections.

1.7 GENERAL

Identification labels shall be provided on all equipments as per client's approval. All labels shall be engraved on plastic (white letters with black background) and all text shall be in English language.

Any exclusion /deviation from specification shall be clearly spelt out and listed at one place only and bidder shall substantiate the same with appropriate reasons. In the absence of clearly spelt out and mutually agreed deviation, it shall be considered that the bidder has undertaken to comply with the technical specification totally, in letter and spirit.

It will be responsibility of the successful bidder to obtain necessary approval of statutory authority as per rules of Govt. of Gujarat before energizing/ charging the equipment/system. However bidder shall be extended all assistance by the DGVCL in regard to application for the same. For installation work at site, the bidder shall be fully responsible for arranging the supply of required tools and tackles, welding sets, cable crimping tools, labours, scaffolding, ladders, etc.

The power connection will be provided by DGVCL at one point only at the prevailing tariff, from where the bidder has to arrange for temporary connection and further distribution of supply at his own cost. The installation of energy meter, cut out, switches etc. for construction power shall be as per prevailing norms of DGVCL. The test report and Various requirement to release the connection shall be as per prevailing rules of DGVCL.

On completion of the installation but before energizing the system, all installation shall be physically checked and properly tested. These checks and tests shall be conducted by the bidder under the supervision of Engineer In-charge and bidder shall furnish the final status and test results shall be made good by the bidder free of cost within contract completion period.

All clamps, brackets, bolts, nuts, screws, markers, ferrules, lugs and glands and Various hardware necessary for erection work, shall include in the scope of work and shall be arranged by the bidder.

1.8 APPROVED MAKES OF EQUIPMENTS /ITEMS OF SUPPLY.

Sr. No	Equipment	11KV
1	Packaged Sub Station (PSS)	ABB/Schneider/Siemens make or equivalent.
2	RMU	ABB/Schneider make or equivalent.
3	PVC Insulated Aluminium Conductor, armoured cable 650/ 1100 volt grade Power cable	Vaishali,Suyog,Chandresh,Ravi cable, NICCO,Uniflex or as approved by GUVNL
4	11 KV 3C, XLPE aluminum Cable.	Fort Gloster / Universal CCI/ RPG/ Nicco/ Torrent/ Uniflex./Polycab /Hindustan Vidhyut Registered vender & regular supplier of GUVNL

Notes

- (i)The DGVCL reserves the right to make changes (add or delete names of Various makes) in the list during execution of contract.
- (ii) If bidder wants to propose additional vendors for any of the items, same shall be stated along with the tender or within 30 days from the date of LOI & decision thereof will be conveyed within 30 days thereafter by DGVCL.

2..0 INSPECTION AND TESTING OF EQUIPMENT

Manufacturing Progress reviews, inspection & testing of equipment covered under the technical specification shall be carried out by the DGVCL's Authorized Representative at the manufacturer's works/premises prior to dispatch, to ensure that their quality & workmanship are in conformity with the contract specifications and approved drawings.

3..0 RESPONSIBILITY FOR INSPECTION

Any inspection by the DGVCL's Authorized Representative does not relieve the Bidder from his responsibility of quality assurance and quality control functions.

As such, any approval which the Inspecting Engineer of the DGVCL may have given in respect of equipment and Various particulars and the work or workmanship involved in the contract (whether with or without test carried out) shall not bind the DGVCL to accept the plant & equipment, should it on further tests at site be found not comply, with the requirements of the contract. If required, audit wing of DGVCL Inspection Department shall also be entrusted with inspection of particular item/equipment received at site. The bidder is to meet the inspection & testing

requirements for the equipment coming under the statutory regulations e.g. weights & measures, safety, IE rules, etc. and submit calibration certificates and documents from appropriate authority to the DGVCL Inspecting Engineer for the same, on demand.

4..0 METHOD OF GIVING INSPECTION CALLS

Inspection calls shall be given by the Bidder to Chief Engineer DGVCL Surat in accordance with mutually agreed program with 15 days' clear time for all equipments. Four sets of relevant test certificates and inspection report of the Bidder/ Sub-bidder after satisfactory completion of internal inspection and test shall be submitted along with acceptance/routine test certificate of the tests witnessed by DGVCL Inspector.

The DGVCL reserves the right to visit at any stage of manufacture at plant and ask for additional inspection & tests if it is found necessary after completion of detailed design & engineering and approval of drawings. The DGVCL or his duly authorized representative shall on giving written instructions to the bidder, setting out any grounds of objection which he may have in respect of the work, be at liberty to reject all or any part of plant/equipment or workmanship which are not in conformity with the contract provisions.

5..0 BIDDER'S RESPONSIBILITY

The Bidder shall provide all reasonable facilities to the Inspecting Engineer of the DGVCL to the Bidder's or their sub-bidder's premises at any time during contract period, to facilitate him to carryout inspection & testing of equipment during manufacture of equipment.

The Bidder shall delegate a representative/coordinator to deal with DGVCL on all inspection matters. The Bidder shall comply with instructions of the DGVCL's Inspecting Engineer fully. The Bidder shall ensure that the equipment and materials once rejected by the Inspecting Engineer are not reused in the manufacturing of the equipment and materials. Where parts rejected by the Inspecting Engineer have been rectified as per agreed procedures laid down in advance, such parts shall be segregated for separate inspection and approval, before being used in the work.

6..0 INSPECTION WAIVER

For certain standard bought-out items and the products of reputed firms where the DGVCL has earlier experience on the quality of their products, the DGVCL may consider allowing of inspection waiver for such items. The Chief Engineer DGVCL, Surat shall issue approval of inspection waiver certificate after

scrutiny of bidder's internal inspection report, test certificates and Various documents. However, it is not binding upon DGVCL to give waiver on bidder's request. DGVCL may weigh the important issues like quantity of material, cost of material, importance of material, distance of travel & time of travel required to inspect before deciding the waiver of the inspection.

7..0 AUDIT INSPECTION

From the lots inspected by the DGVCL, the Inspector of DGVCL may pick up samples from the lots supplied at stores of contractor at random for quality check only.

The samples picked up will be tested for acceptance test / type test or as decided by DGVCL at Government/ NABL approved laboratory or ERDA laboratory at DGVCL RSO, in presence of representatives of contractor and DGVCL as per relevant ISS/BIS/ DGVCL specifications. The test results will be binding on the suppliers and DGVCL, in general will not allow re-sampling. If the material fails in any of the acceptance tests carried out, the full lot of materials will be considered as rejected, and if replacement is not possible due to consumption of the materials then in that case for whole of the rejected lot, DGVCL will deduct maximum up to 30% (Thirty) of the contractual order cost of that item. If the same are not utilized / consumed, then DGVCL may ask for replacement at sole discretion of DGVCL or may accept with maximum deduction up to 30% (Thirty) of the contractual order cost of that item, and all these will be binding on the contractor.

In case if the materials does not confirm to specifications or fails at Government approved laboratory or Various laboratory decided by DGVCL for testing and if subsequent testing are to be carried out (which will solely at DGVCL discretion), then all Testing fees, expenses of the inspector and Various expenses incurred by DGVCL will be to contractor's account. The decision in this regard for acceptance as above of DGVCL shall be final and this will be binding on the contractor.

8.0 VARIOUS CONDITIONS

Any clarification / amendment necessary, in any or more clauses incorporated in the present A/T, you will have to make a detailed reference to the DGVCL latest within ten days from the receipt of A/T. If you fail to do so, no request for any clarification / amendment shall be considered thereafter. Please also note that all the points which need clarification / amendment should be brought out at once. No piecemeal clarification/amendment will be entertained.

9.0 PRE INSPECTION AND VERIFICATION OF SITE BY BIDDERS

Bidder, if desire, may visit and inspect proposed work site of Kadodara-1 before bidding. Prospecting bidder may contact our Deputy Engineer (O&M) Kadodara-1 sub division with prior appointment and confirmation.

Specification & General Conditions For

Erection of H. T. & L.T line

1. GENERAL:-

1. The work entrusted as per the contract should be soundly constructed in accordance with the best practice and should present a neat appearance when completed. All works have to be carried out according to the drawings & specifications and as per the instruction of engineer in charge. There should not be any damage or injury to material of Various property during transport to erection.
2. Before commencing erection of lines, the contractor will be provided, with the pole schedule and layout map with give type of the support number of guys, earthing etc at every one to the location marked in the layout map. The pole guy and earthing location will be available for the reference with the board's staff at site or at the Divisional office. Cutting of the tree or tree branches which come in the way of the line will be arranged by the board.
3. Marshy or water logged location must be avoided as far as possible if it becomes inevitable to locate poles at such points special pre-cautions about foundation will have to be taken and work carried out as per instruction of the engineer-in-charge.
4. The spans shall be as specified in the pole schedule and the minimum spacing between the power conductors and natural shall be shown in.

2. SUPPLY OF MATERIAL:-

All material such as rails and R. S. joints prestressed concrete or Various poles fabricated materials, copper, aluminum or A.C.S.R conductor V.I.R wire insulators, guy wire, cement and cement block etc. required for erection will be supplied at the company stores at only during working hours. PSC poles for the line support will be transported and stacked by the Board at one place near the side of the work for HT & LT line . The rates quoted should be inclusive of transportation and distribution to site from the above store and erection work. The line supports may be of Rail PSC wood or any Various type and be 28 to 42

feet in length and weight 40 to 100lbs/yd. The conductor will be either copper, aluminum or A.C.S.R and every in size from 0-075sq. in to 0.04 sq in copper, equivalent area. The conductors will be supplied in coils or in the drums as per standard packing received from supplier. The crates should be returned to the stores and stacked at the directed place.

3. POLE ERECTION:-The work includes shifting of supports particularly PSC poles from the stacking places as mentioned in clause 2 to the site of actual work excavation of pit, erection pole with the base plate (where required) top insulator fitting, V-orc Flat cross arms, packing (where required) , clamps numbering etc. complete and inclusive of painting (where required) fixing of danger on caution plates putting and (ant climbing) Devices wherever required for terminal location, tapping river crossing or transformer structures etc. the work further includes fixing of flat cross arm packing and distance pieces cross bracing GI pipe fitting , mounting such as AB switches , D type fuse units transformer distribution boxes HT metering equipment's etc but inclusive of painting (where required) and numbering and fixing of danger plate and putting ant climbing devices. Where the poles are to be sent in goods hard earth the depth of the pits shall be one sixth, height of the pole and if soft depth of the pit shall be 6 inches more than the above poles must not be erected along the edge of cutting or embankments or where the soil is liable to be washed away unless special precautions are taken to ensure durable foundation when setting the pole, the point shall be of ample size to allow easy entrance of the pole and base plate without an damage to it extra payment is payable for hard soil or rock under this item which may be quoted in the tender after the pole is erected vertically the pit is to be refilled with the excavated earth and properly rammed with rammers and watered at intervals and extra earth should be packed around the pole and rammed the erection cost of single double or triple pole structures, stay sets and angle type and pipe type earthing and inclusive of excavation of pit, refilling of excavated earth and cost in earthing arrangements as specified.

2. PAINTING & NUMBERING :-

Rail poles RS joints and or all the steel mounting shall be given one coat of approved red oxide paint and two coats of approved aluminum paint. There should be sufficient interval between every coats of painting in order to allow for drying. The bolts and nuts shall be dipped in anticorrosive oil before insertion

and all over lapping surface of steel should be given a time coat of red oxide paint before bolting for rails and RSJ the lower portion up to three ft. above the ground level shall be cleaned of rust, where concreting is not to be done this surface should be given coat of red oxide and an additional coat of black bit mastic paint which is to be extended above ground level or muffing before inserting in ground. the rest of the surface of the rails or RSJ to be cleaned of all rust and painted with with one coat of red oxide and two finished coats of approved aluminum paint. The paint should be with ISI marking should be got approved by the engineer in charge of works before using on works and will have to be arranged by the tender as painting is included in the offer, every pole after erection shall be numbered in the bold black figures both in English and gujarati at a height of about 8ft. from the ground level as per instruction of the engineer in charge PSC poles need not be painted but they should be properly cleaned and all accumulations of earth dirt etc should be removed.

5. CONCRETING:-The proportion of concrete mixture and the quality of the sand, metal of bricks bat should be as below:

- (a) Cement concrete proportion for concreting of rail RSJ and stay rods should be cement one parts and 1-1/2" metal brunt bricks bat six parts (1:3:6)
- (b) The sand shall be clean grippy and composed of hard strong durable graints it shall be free from clay or organic matter if there is any trace of earthy should be got approved from engineer in charge
- (c) Metal should be of sound and durable stone to pass through a mesh of 2.5" as far as possible all metal must be perfectly clean , being washed if necessary and free from any surface size of metal must be got approved from the engineer in charge
- (d) Unless Various wise specified the concrete shall be mixed in the above proportion and should be thoroughly mixed at least three times in a dry state before water is added and as far as possible finely wet mixture must be used. All concrete must be mixed on a water tight platform in any case finishing work must be mixed be absolutely true in line and level and finished off smooth once finishing coat of cement plaster should be applied on an Various surface of muffing (as soon as the surface cannot be rubbed off by the figure catering of blocks must be commenced) the concrete block must be kept wet continuously for a period of seven days.

- (e) If the engineer in charge of the work or the supervisor finds that cement concrete is not of the above quality and as specified the same will be rejected.
- (f) The contractor will be supplied cement by the board and its cost will be recovered from the contractor at the rate decided by the board time to time. All the empty bag will have to be returned in good condition. Various wise, a recovery of Rs. 1 per bag will be made. The contractor should procure metal and sand himself as specified above. Only steel poles and stays along the roads and in the illage area are to be muffed and the size of the muffing for the steel pole should be 12" x 24" (12" above ground level and 12" below ground level) stay road should be provided with the cement concrete for muffing only metal is to be used and not bricks bats or gravel.

6. STRINGING OF CONDUCTOR ONE (I) STRINGING OF BARECONDUCTOR:

Stringing of standard and solid bare copper A.S.S.R of aluminum , conductor includes the erection of necessary H. T and L.T strain and pin insulator as per schedule, jumpering binding, with binding wire anchor , plate joining etc. complete inclusive of providing guard loops on L.T lines. The rate quoted should be per conductor route kilometer inclusive of this to be employed to protect again cuts, Scratches or kinds. The contractor should particularly follow the instruction of engineer in charge while marking jumpers, joints and binding and adoption of sag.

Stringing of V. I. R wires of different sizes wiring from 3/20 to 19/16 should be complete with G.I bearer wire and rell insulator (spaced 3ft) as supports.

7. ERECTION OF STAY SET:-

The Erection of stay set may be of A or B type, complete, with stay clamp binding GI wire at either and, turn buckle anchor plate with rod, binding of Guy insulator. The stay shall be erected suitable for local condition. The rate should be quoted for erection of complete set inclusive of excavation of pit and refilling of earth and painting, and using cement blocks supplied by the co.

8. EARTHING :-

The earthing device shall be of pipe type as indicated in the pole schedule. The work of earthing must be carried out as per drawing at the place selected by the field engineer. Coke & charcoal powder and salt will have to be produce by the contractor. Erection of earthing should be carried out under the supervision of the representative of the engineer in charge no amount will be paid if the work is not done in accordance with these instruction.

9. GUARDING:-

Guard cradle will be provided between HT & LT lines, carried on the same poles, guarding must also be provided when crossing any railway tracks telegraph lines, telephone line and licensees HT LT lines are passing below boards HT line. The for the above comprises fixing of guard cross arm eye bolt the guard cradle consisting of G I main bearer wire and GI binding wire etc complete. The work has to be carried out as per drawing specifically prepared for the purpose. The cradle guard consist of two no. of wire No.8 SWG GI main bearer wire no. 10SWG GI lacing wire inter spaced about 10ft ad art and no. 14 SWG GI wire for binding Guarding for Rly, Crossings is to be carried out as per instruction of Engineer in charge

10. Erection of Transformer Sub Station :-

Transformer substation will be of the outdoor type as shown in the drawing and will consist of the following erection

- (i) One 25 to 100 KVA transformer complete with its accessories. The transformer to be repainted with one coat of battleship gray paint of approved make with SIS marking.
- (ii) One Set : of HT Distribution type lighting Arrestors.
- (iii) One set : of LT distribution type lighting arrestors.
- (iv) One distribution box of MS sheet and suitable iron clad three no, LT taken of one no. incoming ironclad triple pole switch with fuse and neutral link fuse carriage and necessary wiring inclusive of 2" to dia

GI pipe for incoming leads from transformer side to distribution box and 1" to dia GI pipes for LT take offs with suitable VIR cables. (v)
Pipe earthing to be provided on either side of the sub station providing earth conductor for lightening arrestors , transformer tank and distribution box with 6S. WG copper conductor. The rate should quoted inclusive of painting (where required) and transportation and distribution to side from relative stores to the site of erection.

11. Fixing of Street Light Fixtures :-

The street light fixtures of A or B type consist of $\frac{3}{4}$ " GI pipe. This should be properly-fitted with clamps on the poles. The brass holder Brass nipple, reflector are also to be fitted properly, on one end fixture T. W. or synthetic material bush should be provided. The VIR wires should be kept in sufficient length to provide jumpers etc. The height of the fixtures from the ground level should be kept as per the instruction of engineer in charge. The aerial fuse or kit kat fuse should be fixed on the wooden co. which is to be fixed on the pole by clamp and bolts , these shall be supplied by the contractor.

12. Laying of 1 & 3 Service Lines:-

(1) This will consist of overhead VIR line with GI bears wire pipe wiring of batten wiring fixed of I.C. cut outs or switch i.e meter Bard earthing etc. The twin or single core wire available in existing stock should have to be utilized. The GI wire no. 8 or 10 would be provided at equal intervals of suitable size as per drawing. The aerial or kit kat fuse should be provide on the wooden board which is to be fixed on the pole by clamps and bolts and same would be supplied by the contractor sufficient VIR wire should be kept at terminal pole end for jumpering. The GI bearer wire should be connected with main earth wire to get the continuous earthing.

(2) There should not be any joint in service line.

- (3) conduct pipe should be fixed in a decent way in the premises of the consumer. Any damage occurring to the premises due to fixing of pipe or taking the service line in to the premises shall be borne by the conductor.
- (4) Meter cut outs , pipe should be earthed properly. Earthing clip for earth wire and TW or synthetic material, bush should be inserted in either end of pipe.
- (5) The measurement would be taken not as per actual length of line but it will be taken on the projection of the line according ly the payment, would be made
- (6) In case of 3 phase the service line would have to be laid up to metering point only and inner will be installed by department. The meter meter box should be fixed up as per directive of engineer in charge.

13. General condition of contract:-

- (1) All single pole structure, special structures are fitting of cross arms earthing, etc should be carried out according to standard drawing available for reference in the Boards Divisional office.
- (2) The Quantities mentioned in the accompanying schedule are only approximate. Actual quantities may increase decrease according to the local conditions. The Co. reserves the right of revising or deleting any of the quantities to be erected during the execution of the contract and the final quantities actually erected by the contractor will be calculated and paid for the rates given in the contract schedule of rates.
- (3) Whenever there is excess work carried out by a contractor beyond the technically sanctioned amount against the work order, the approval for the excess quantity work done should be obtained from the competent authority as per Co .rules
- (4) Dakshin Gujarat vij Company Ltd. Does not bind itself to accept the lowest or any lender
- (5) Closing down and recommencement of works at all stages must be intimated by the contractor to engineer in charge or vice versa in writing with reasons if any failing which their clais for extension of time limit will not entertained.

- (6) The work will have to be carried out as per program laid out by the co. and the contractor should employ proper and competent supervisors who should thoroughly supervises the execution of works by being present on the work site throughout.
- (7) No tools will be supplied except jointing dies by the Co. and the contractor should make his own arrangements to get adequate quantities of all Various tools in free of charge order to complete the job within the prescribed period jointing dies will be supplied free of charge.
- (8) The contractor shall be supplied except jointing dies by the co. and the contractor should make his own arrangements to get adequate quantities of all Various tools in free of charge order to complete the job within the prescribed period jointing dies will be supplied free of charge
- (9) The contractor shall be responsible for breakage loss or theft of materials during transit or erection issued to him from stores till the time the work is handed over to and taken over by the co.
- (10) Starting of work and commenced period : The erection work should be commenced within 7 days from the date specified in the order to commence work issued by the executive engineer and should be completed within the prescribed period for each work.
- (11) Minimum period of guarantee if during 12 calendar months from the date of handling over charge after completion of work the erected lines are found defective in anyway, the same should be rectified by the contractor.
- (12) All the general conditions of the contract to the co. will be applicable to this tender. An agreement is to be signed in the prescribed form.
- (13) RA Bill : Bills will be prepared once a month looking to the progress of the work and payment will be made as under :
 - (a) Running bill may be paid on the work carried out after measurements are recorded upto 80% and on submission of material account by thru contractor.

(b) Final bill for contract will be paid after completion of works and recording measurement and after submission of material account by the contractor.

(14) No material of the co. should be left on the lines without supervision.

(15) For stringing of aluminum or ACSR conductor aluminum or wooden pulley must be used for supporting the conductor on poles

(16) All conductor earth wire and stay set must be tight

(17) Stay rod must be as per instruction

(18) All the poles must be in plumb

(19) Fabrication fitting on pole must be tight

(20) Generally following span should be kept on HT line

28 ft long pole -300ft

33ft long pole -350ft

(21) All road crossing must be provided with binding arrangement and minimum 22 ft clearance must be kept between conductor and road level

(22) While executing the stringing work the conductor will have to use proper device for rotating the conductor drum required for unwinding the conductor

(23) The payment through RA bill shall be made only to the extent of 80% of the total value of the work done. The amount so withheld will be released on furnishing by the contractor the material account statement of the relative RA bill

(24) The contractor shall on completion of work prepare & render the final detailed material account of the material received by him from the co. stores within one month from the date of completion of work. If however the contractor does not render the material account a registered AD notice will be issued to him if within ten days from the date of issue of such notice there is no reply from the contractor, the material account will be finalized and

recoveries made as per co. account which shall have to be accepted by the contractor, disputes if any raised later shall not be entertained

- (25) The contractor is bound to complete the work within the specified period for each work, given by the executive engineer
- (26) Priority of work shall be decided by the Executive engineer and contractor shall carry out the work within stipulated period for the order issued by the EE.
- (27) The contractor must have adequate resources and gang of unskilled and skilled persons to undertake the work at different place.
- (28) The soil may be hard or normal the tenderer should fill in the rates after seeing the site

2.0 Earthing

1.0 INSTALLATION SPECIFICATION FOR EARTHING: GENERAL:

All the non-current metal parts of electrical installation (Cables terminals) shall be earthed properly. All metal conduits, trucking, cable sheaths, switchgear, distribution fuse boards, lighting fittings & fixtures and all Various parts made of metal shall be bonded together and connected by means of specified earthing system. All earthing will be conformed to Indian Standard Specifications IS: **3043 - 1987**. The bidder shall measure the resistivity of various places in the proposed sub stations and design suitable earthing system and get it approved from DGVCL.

EARTHING CONDUCTORS:

All earthing conductors shall be of high conductivity G.I./Aluminum/copper and shall be protected against mechanical injury or corrosion.

CONNECTION OF EARTHING CONDUCTORS:

- (i) Main earthing conductors shall be taken from the earth connections at the main switchboards to an earth electrode with which the connection is to be made. Sub- main earthing conductors shall run from the

main switchboard to the sub- distribution boards. Final distribution boards earthing conductors shall run from sub- distribution boards.

- (ii) Circuit earthing conductor shall run from the exposed metal of equipment and shall be connected to any point on the main earthing conductor or its distribution boards or to an earth leakage circuit breaker. Metal conduits, cable sheathing and armouring shall be earthed at the ends adjacent to switchboards at which they originate or Variouswise at the commencement of the run by an earthing conductor in effective electrical contact with cable sheathing. Where equipment is connected by flexible cord, all exposed metal parts of the equipment shall be earthed by means of an earthing conductor enclosed with the current carrying conductors within the flexible cord. Switches, accessories, lighting fitting etc. which are rigidly secured in effective electrical contact with a run of metallic conduit shall not be considered as a part of earthing conductor for earthing purposes, even though the run of metallic conduit is earthed.
- (iii) All metal clad switches and Various equipment carrying single phase current shall be connected to earth by a single connection. All metal clad switches, carrying medium voltages and high voltage shall be connected with earth by two separate and distinct connections. The earthing conductors inside the building, wherever exposed, shall be properly protected from mechanical injury by running the same in GI pipe of adequate size.
- (iv) Earthing conductors, outside the building, shall be laid as per IS motioned above below the finished ground level.
- (v) In case of copper earthing strips, the cover lapping at joints (wherever required), shall be of minimum 75 mm. Sweated lugs of adequate capacity and size shall be used for all termination of wires above 6 sq. mm size and bare copper wire above 2.5 mm dia. Lugs shall be bolted to the equipment body to be earthed after the metal body is cleaned of paint and Various oily substance and properly tinned.

- (vi) Neutral conductor, sprinkler pipes or pipes conveying gas, water or flammable liquid, structural steel work, metallic enclosures for cables and conductors, metallic conduits and lightning protection stem conductors shall not be used as a means of earthing an installation or even as a link in an earthing system. The electrical resistance of metallic enclosures for cables and conductors measured between earth connections at the main switchboard shall be low enough to permit the passage of current necessary to operate fuse or circuit breakers and shall not exceed one ohm.

PROTECTION FROM CORROSION:

Connections between copper and galvanized equipment shall be made on vertical face and protected with paint and grease. Galvanized fixing clamps shall be used for fixing earth conductors. When there is evidence that the soil is aggressive to copper, buried earthing conductors shall be protected by suitable serving and sheathing.

PLATE ELECTRODE EARTHING:

Earthing electrode shall consist of plate, not less than 600 mm x 600 mm x 12 mm thick. The plate electrode shall be buried as far as practicable below permanent moisture level but, in any case, not less than 3 meters below ground level. Wherever possible, earth electrodes shall be located as near the water tap, water drain or near down take pipe. Earth electrodes shall not be installed in proximity to a metal fence. It shall be kept clear of the buildings foundations and in no case it shall be nearer than 2 meters from the outer face of the wall. The earth plate shall be set vertically and surrounded with 150 mm thick layer of charcoal dust and salt mixture. 20 mm GI pipe shall run from the top edge of the plate to the ground level. The top of the pipe shall be provided with a G.I. threaded cap for watering the earth through a pipe. The G.I. cap over the GI pipe shall be housed in a masonry chamber, approximately 300 mm x 300 mm x 300 mm deep. The masonry chamber shall be provided with a cast iron inspection cover resting over a GI frame, embedded in masonry.

PIPE ELECTRODE EARTHING:

Earthing electrode shall consist of a GI pipe (class B of approved make), not less than 40 mm dia. and 3 meters long. G.I pipe electrode shall be cut tapered at the bottom and provided with holes of 12 mm dia. drilled at 75 mm interval upto 2.5 meters length from bottom. The electrode shall be buried vertically in the ground as far as practicable below permanent moisture level, but in any case not less than 3 mtr. below ground level. The electrode shall be in one piece and no joints shall be allowed in the electrode. Wherever possible, earth electrodes shall be located close to water tap, water drain or a down take pipe. Earth electrode shall not be located in proximity to a metal fence. It shall be kept clear of the building foundations and in no case; it shall be nearer than 2 meters from the outer face of the wall.

The pipe earth electrode shall be kept vertically and surrounded with 150mm thick layer of charcoal dust and salt mixture upto a height of 2.5 meters from the bottom. At the top of the electrode a G.I. threaded cap shall be provided for watering the earth. The main earth conductors shall be connected to the electrode just below the G.I. cap, with proper terminal lugs and check nuts. The G.I. cap over the CL pipe and earth connection shall be housed in a masonry chamber, approximately 300 mm length x 300 mm wide and 300 mm deep. The masonry chamber shall be provided with a cast iron inspection cover resting over a C.I. frame, embedded in masonry.

COIL TYPE EARTHING:

In this method G.I. wire No.8 SWG is used in coil form instead of G.I.pipe. The pit for earthing may be only 1800mm deep and 600mm section. The G.I. earth wire is wound in the form of a coil of 50mm dia. and 450mm length (approx 115 turns) and placed at the bottom end of earth wire embedded in the P.S.C. pole. The surrounding space around the coil upto 350mm dia. is filled up by 300mm alternate layers of salt and coke/charcoal upto 1500mm from the bottom. The top and surrounding remaining space of the pit is filled up with loose earth.

EARTH RESISTANCE:

The earth resistivity result of the soil where the earthing stations are located shall be submitted to the engineer-in-charge before the earthing work starts. If

the earth resistance is too high and multiple electrode earthing does not give adequate low resistance to earth, the soil resistivity immediately surrounding the earth electrodes shall be reduced by adding sodium chloride, calcium chloride, sodium carbonate, copper sulphate, salt and soft coke or charcoal in suitable proportions as required.

RESISTANCE TO EARTH:

The resistance of each earth system shall not exceed 1 ohm in the case of M.V. system and 0.5 ohm in the case of H.V. system.

The separate earthing shall be provided for incoming and outgoing cable.

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