

SECTION VIII:

Technical Specifications

TECHNICAL SPECIFICATIONS FOR THE WORK TO BE CARRIED OUT For erection work 11 KV and L.T. Distribution lines and Transformer Centres

GENERAL:

The work should be strictly as per specifications and approved designs of the PGVCL. The inferior and unsatisfactory work is liable for rejection and to be rectified at the cost of contractor. The work will have to be carried out as per programmed laid down by department and under the entire instruction of engineer-in-Charge and contractor should employ supervisor who could supervise the works through out and he should remain present on site. No tools & Tackles will be supplied by the department.

(A) Erection of HT and LT Lines:

Site clearing and tree branches trimming which come in the way of line will be done by the contractor at his cost. The Company will assist the contractor in getting necessary permission for tree cutting etc. Any claim for compensation in above respect will have to be borne by contractor.

(B) Fixing: Pole Position:

The Points of pole structures, guys and earthing will be fixed by the department and will be shown to the contractor. He should adhere to these locations in all circumstances unless directed by the department to make any change. The Poles from One site to other site or at proposed locations must be carted by loading on Tractor or Hand-Cart. The Poles **shall not** be carted by **toeing/Dragging** with Tractor or Cart or with any other means.

(C) Pole setting:

Where poles are set in good solid ground the depth of pit shall be 1/6th of the height of the pole and for grounds of any other nature. The pit must be size of 2 X 2 X 5 feet. The poles and guys must not be set at the edge of cuts/at shore/embankment where the soil is liable to be washed or eroded out of such setting should be avoided. While back filling, earth must be packed tight and in no case earth be dumped to greater depth more than four inches without being rammed, hard before the next layer is thrown in. Extra earth should be packed around the poles and rammed.

The cost of damage done to the pole during erection will be recoverable from the contractor. No pole, which is out of plumb or out of alignment shall be accepted. The pole will be in his safe custody till erected and he is liable to compensate to the Company the full cost of pole along with supervision charges, if the pole is broken during erection, or stolen from his custody. He should be able to render full account of the poles entrusted to him whenever the Supervising Officer demands to scrutinizes the same.

(D) Erection of Complete single Pole Structure

Erection of single pole structure comprises of shifting of pole from the stacking place in the village, excavation of pit, erection in position (with base plate where required), of 8/10 meter PSC poles / 9 to 13 meter Steel Pole or any other suitable pole, fitting of clamps and cross arms and fabricated materials, fixing of caution board, anti-climbing device etc. complete as per drawing and specification inclusive of painting, numbering. Generally vertical formation will be used on each pole. However horizontal formation will have to be used in special circumstances as per instruction at Engineer in change.

(E) Double Pole (D. P.) Structure

Double poles structure such as for HT line tapping, Railway crossing, any other HT/LT or telephone line crossing, terminal structure for distribution transformer centre comprises of Excavation suitable pits and refilling of earth, erection in position of two Nos. of 8/10 meter PSC poles / 9 to 13 meter Steel Pole or any other suitable pole, fitting of clamps, cross arms, bracing cross arm bracing etc. as per drawing/ standards with mounting D.O. fuses/A.B. switches/HT metering equipment's etc., painting, Pole numbering, fixing of caution Board and anti-climbing devices. The D.P. must be properly aligned and must be in plumb. Special structure if included will be erected as per drawing supplied. Each Shackle Points must have "D" type Jumpers only.

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(F) Stringing of conductors

This includes stringing of stranded and solid bare conductor with fitting of necessary HT/LT pin and strain insulators, binding on insulators, jumpers, the jointing in HT line will be done by twisting sleeve joints as per standard practice. Care must be taken in handling the conductor to protect against cuts, scratches or kinks. The conductor must not be drawn over rough or rocky ground, when it is liable to be damaged. AAA/ACSR conductors must be drawn on wooden or aluminium pulley only. Wastage and cutting should be avoided as far as possible. Not more than 3 % sag will be accepted in the materials account. The sag and spans will be maintained as per drawing/standard. The cross arms insulators must be so fixed that neither tilts nor bands from position. The sagging should be uniform for all conductors and uneven sagging will not be allowed. The ground clearance to be maintained as per IE Rules 2010 Clause No. 58 as mentioned below.

Across a street	For lines of voltage not exceeding 650 Volts	5.8 Meters
	For lines of voltage exceeding 650 Volts but not exceeding 33 kV	6.1 Meters
Along any street	For lines of voltage not exceeding 650 Volts	5.5 Meters
	For lines of voltage exceeding 650 Volts but not exceeding 33 kV	5.8 Meters
Elsewhere than along or across any street	For lines of voltage up to and including 11,000 Volts	If bare - 4.6 Meter If insulated- 4.0 Meter
	For lines of voltage exceeding 11,000 Volts but not exceeding 33 kV	5.2 Meter

- **An overhead line shall not cross over an existing building as far as possible and no building shall be constructed under an existing overhead line.**

Where an overhead line of **voltage not exceeding 650 V** passes above or adjacent to or terminates on any building, the following **minimum clearances** as per IE Rules 2010 Clause No. 60 from any accessible point, on the basis of **maximum sag**, shall be observed, namely:-

- for any flat roof, open balcony, varandah roof and lean-to-roof and Pitched Roof-**
 - when the line passes above the building a vertical clearance of highest part of building immediately under such line **2.5 meters** from the highest point,
 - When the line passes adjacent to the building a horizontal clearance of **1.2 meters** from the nearest point
- Where an overhead line of voltage exceeding 650 V passes above or adjacent to or terminates on any building, the following minimum clearances as per IE Rules 2010 Clause No. 61 from any accessible point, on the basis of maximum sag, shall be observed, namely:-
 - when the line passes having voltage 650 V and up to and including 33000 V above the building a vertical clearance of highest part of building immediately under such line **3.7 meters** from the highest point,
 - When the line having voltage 650 V and up to and including 11000 V passes adjacent to the building a horizontal clearance between nearest Conductor and any part of such building on the basis of maximum deflection of wind must be **1.2 meters**
- Minimum clearances in **meters** between lines crossing each other as per IE 2010 Clause No. 69 are as below.

Sr. No.	Nominal System Voltage	11-66 kV	110-132 kV	220 kV	400 kV	800 KV
1	Low and Medium	2.44	3.05	4.58	5.49	7.94
2	11-66 kV	2.44	3.05	4.58	5.49	7.94

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In case of illegal construction / structure on the line under erection, the same is to be put in written notice to the Engineer-In-charge.

(G) Erection of Stay Set:

The erection of stay set comprises of anchor rod, turn buckle, eye bolt and excavation of suitable pit size of 2 X 2 X 5 foot, fixing of stay clamp on pole, binding of GI stay wire. The stay insulators must be inserted in the stay wire on all stays as per drawing. The wrapping of the Guy wire strands at both ends the stay insulator must be even and must presents neat appearance and good workmanship. No stay should be left loose but should be tight and straight to withstand in say cyclone or sand storm, the item includes refilling of earth and painting of fabrication material. If stays are not required to be concreted, a pre casted cement concrete block will be supplied by the department from his division store which the contractor will have to transport at his own cost to the site of work and will have to use for fixing of anchor rod at site.

(H) Earthing:

A pits of 2 X 2 X 5 foot is to be dig about 4 foot away from the pole on which earthing is required to be carried out. The earthing pipe/earthing plate/earthing coil supplied by the company shall be used as per specification and drawing. GI wire no. 8 SWG for earthing should be bolted with earthing pipe/earthing plate/earthing coil. G. I. Wire must be passed through PVC rigid Pipe which must be buried at least 0.5 Meter in ground and to be kept 2.0 Meters above ground along the Pole. The earthing are to be done at place as indicted in the pole schedule or as selected by the field Engineer. The coke and salt will have to be supplied by the contractor at his cost. Erection of earthing should be carried out under the supervision of the Engineer in charge or nominated Supervisors. At least 20 KG of salt and 20 KG of coal per earth on alternate layers (as per drawing) will be used by contractor. No amount will be paid if the work is not done in accordance with these specification.

(I) Guarding:

The guarding will have to provide at crossing of lines, telephone line crossing, road crossing and any accident prone places as indicated by the Engineer in Charge. The work comprises of fixing of guard cross arms, eye bolts, guard cradle as per design, GI cross lacing wires complete. Any special type of guarding if required will be designed by the department. Binding cross arms must be used where the HT line crosses the road. The ground clearance, line to line clearances etc. to be maintained as per IE Rules 2010 69 and 70. The poles for road crossing may be concreted as instructions of the Engineer In-charge. The work has to be carried out as instructions of the Engineer In-charge.

(J) Painting and Numbering:

Rail poles and girder poles shall be given one coat of approved red-lead paint and two coats of approved aluminium paint. All fabricated material will also be painted with two coats of approved aluminium paint and there should be sufficient interval between every coat of painting in order to allow for drying. The bolts and must shall be dipped in anticorrosive oil before insertion. The lower portion of steel poles up 3 foot above ground level shall be cleaned of all dust and rust. This surface should be given a base coat of red lead and an additional coat of black bituminous paint before inserting in the ground. The good quality paint will be supplied by the contractor and should be of I.S.I mark and will be got approved from Executive Engineer, prior to starting work.

Name of the feeder and pole number has to be written on all the poles in English/Gujarati as per instruction of Engineer In-charge. The colour of back ground and name/number must be of contras colour. Prior to apply Colour for Numbering on P.S.C poles, it should be properly cleaned and all accumulations of earth, dirt etc. should be removed.

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(K) Concreting:

Unless Specified concreting is to be done for Girder Poles/Guys only. No any PSC Pole/Guys to be concreted without any special reason. The Concreting of **PSC Poles** must be approved by concerned **Executive Engineer** prior to execution as per Tender Condition mentioned under Section III Clause No. 2 and sub clause No. 8. Certificates for special Reason and approvals must be submitted with detail Bill.

Cement concrete for any pole / stay should be carried out as per specification given by Engineer In-Charge as and where required. Concreting should be with one part of cement, two part of specified quality sand and four parts of well burnt Brice bats (1:2:4). The mixture should be prepared on GI sheet and should be free from the dust. Cement, river sand and metal should be used by contractor at his own cost. The finishing coat of cement plaster shall be applied on outer surface Concreting and boxing for smoothness.

The normal size of concreting of pole shall be 2 X 2 X 2 Feet (0.226 cmt) & that for stay 2 x 2x 1 Feet (0.113 cmt). In case of Boxing for pole, it shall be 18" dia. x 3 feet (h) (2' above and 1' below ground) (0.15 cmt).

(L) Distribution Transformer Centre:

The distribution transformer centre (10 KVA to 200 KVA) will be of outdoor type on two poles structures as per standard drawing and 5 KVA Transformers are to be on Single Pole. This work include erection of special two pole structure as per Item No. 2 and fixing of all fabricated material for support of line, L.A., HG Fuse/AB Switch, Transformer, LT Dist. Box, cable wiring, anti-climbing devices etc. The works includes of transportation and hoisting of transformer, numbering and painting of all fabricated materials. For transformer having capacity of 100 KVA and above MS channel shall be utilize which will be supplied by the company. Three Earthing are to be provided on each Transformers.

- 1) Earthing of LA on One side.
- 2) Earthing of all Metal Parts from Top angle and Transformer Body and Dist. Box on other side.
- 3) For neutral, two separate Earth wire on both side of Transformer and to be common at ground.

All three earthing are to be done as in Delta Formation as shown in the attached Drawing. All earthing wires are to be connected by proper size of lug and bolted at each earthing points properly. The Earthing of Transformer Body must be done with lug only. Looping or winding with Earthing Bolt on Transformer Body is not allowed. Earthing wire Lugs are to be brought by Contractors. No any extra cost will be paid for this material.

Extra payment for hard soil or rock is payable as per SOR as per committee report to be formed to decide hard soil or rock which shall consists of Concerned SDO, Deputy Engineer (Tech) and Executive Engineer.

The cost of damage done to the transformer while erection/Transportation is recoverable from contractor.

IMPORTANT:

Before starting the work (new, alteration or addition) and during the works the contractor must obtain line clear wherever necessary for the concerned officer of this office of other Office. For any damage done to the Men, Materials and/or property due to non-observance of rules, the contractor will be solely responsible.

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