

PROCEDURE TO BE FOLLOWED FOR EXECUTION OF ELECTRICAL WORK

- (1) The contractor whose tender is accepted shall have to enter in to agreement with the Executive Engineer, Panchayat (R&B) Division - Devbhoomi Dwarka.
- (2) The certified copies of the agreement shall be sent by the Executive Engineer, Panchayat (R&B) Division - Devbhoomi Dwarka to the Executive Engineer Electrical Division (R&B) Rajkot & Dy. Exe. En gr. Elec. (R&B) Sub-Division, Jamnagar.
- (3) The civil works as per Part-I of quantities shall be supervised, measured, billed for passed and paid by Executive Engineer, Devbhoomi Dwarka (R&B) Division - Khambhaliya.
- (4) The Electrical works as per part-II of Quantities shall be supervised measured, billed and passed by Executive Engineer, Electrical Division (R&B) Division, Rajkot.
- (5) The payment of bill of Electrical work duly passed by the Executive Engineer, Electrical (R&B) Division, Rajkot shall be made by Executive Engineer Devbhoomi Dwarka (R&B) Division, Khambhaliya [after performing required general scrutiny]
- (6) So far as the Electrical work is concern, the decision and instructions given by the Executive Engineer, Electrical (R&B) Division, Rajkot shall be binding to the contractor and he shall be liable to act in accordance with the instruction issued for the quality & workmanship etc.
- (7) Quality of work and part rate/reduce rate etc. for electrical work shall be decided by the Executive Engineer, Electrical (R&B) Division, Rajkot and shall be binding to the contractor.
- (8) The contractor shall observe the prevailing Rules and procedure for the Electrical work before, during and after execution of Electrical works as directed by the Executive Engineer, Electrical (R&B) Division, Rajkot.
- (9) Electrical work shall be carried out & completed simultaneously with civil work by contractor whose Tender is accepted as per electrical specification by electrical expert persons.
- (10) The General & technical specification given in the tender booklet shall be considered as part of agreement. The material shall be approved as per relevant I.S Specification & shall be approved by the electrical Engineer in Charge before executing the work.
- (11) The Electrical work should be carried out only by the Govt. Approved & Registered electrical contractor.

NOMINATED ELECTRICAL SUB-CONTRACTOR

[1] The main contractor shall identify in his bid/offer and name of Electrical contractor who will Execute Electrical item of the contract. Such Electrical contractor will be referred to as "**Nominated Electrical Sub-Contractor**". The electrical Sub-Contractor shall full fill the following condition.

(1.1.) He should be holding currently valid registration certification in approval Class as Electrical Contractor by any Electrical Division of Road and Building Department or Narmada and water Resources Department of Government of Gujarat.

(1.2) He should have spare capacity to execute the electrical component of the contract work taking into consideration him contract works on hand. For this purpose he should furnish the statement showing the details of contract works on hand, total value of such works executed up to the Month including the month of submission of this offer and the balance value of contract works in progress yet to be executed.

[2] The main contractor should produce with his offer "**Memorandum of Understanding**" with the Electrical Sub contractor disclosing the terms and conditions specifying the obligations regarding performance of the contract work pertaining to Electrical Portion of this tender. Such Memorandum of Understanding must contain besides other terms.

[3] The nominated Electrical Sub-Contractor shall be approved subject to the following conditions.

(3.1) The works, goods materials, services and electrical items to be executed by the nominated Electrical sub contractor will be subject to approval and supervision of Executive Engineer [Electrical]

(3.2) The rates, quantities as measured and amount payable for Electrical items of work will be certified by the Executive Engineer [Electrical] and the same will be paid in the running bills and final bill of the main contractor.

(3.3) The main contractor and nominated electrical sub contractor will be jointly responsible for quality of electrical portion of contractor work and for electrification of defective work upto defect liability period as per condition of contract i.e. in the tender document.

(3.4) Prior approval of the Engineer-in-charge will be necessary for relieving nominated Electrical Sub Contractor before contract work is accepted as completed and for appointment of new Electrical sub contract. The approval will be given subject to such conditions as the Engineer-in-charge may consider necessary for satisfactory and finely completion of Electrical portion of contract. The engineer -in-charge. will have powers to reject the premature relief of Nominated Electrical Sub-Contractor If he is not satisfied with reasons for relieving the nominated Electrical Sub contractor and after such refusal the main contractor shall be deemed to have committed default in performance of the contract if he do not restore the originally approved nominated Electrical Sub contractor The approval of new Electrical Sub Contractor will as subject to fulfilment of all requirements prescribed for approval of Electrical Sub contractor.

[4] The bidder shall have to conform that the Electrical Sub Contractor shall... to the electrical items of the contractor fulfilling following requirement.

(4.1) All equipment materials and other necessities to be provided by the contractor under the terms of this contract shall confirm to the relevant I.S.S. samples of materials and accessories to be supplied shall be Furnished for approval to the Engineer-in-charge well before they are used on

the work. The make of these shall be preferred from the approval list of material for used on works for relevant S.O.R. or at Appendix of the tender document as way apply.

(4.2) The Installation shall also be carried out strictly in conformity with the requirement of Indian Electricity Act-1910 as amended and the India electrical rules 1956 as well other statutory regulations that may be relevant to such electrical installations.

(4.3) In this electrical works erection, testing and commissioning shall comply with relevant India Standards and Code practice in force.

(4.4) Good workmanship is the essence of this contract and shall be observed during execution of work at all times. A qualified by the contractor as well any defect noticed by the Engineer-in-charge shall be rectified by the contractor immediately free-of-cost.

(4.5) After completion of works/installations necessary tests will be carried out as may require under relevant rules including.

[a] Insulation resistance test with 500 V/1000 V meg for 250 V / 415 V system respectively The rest result should not be less than 1 meg Ohm value.

[b] Resistance of earth of any point in grounding system, The result should not exceed on [1] Ohm.

(4.6) On completion of the Electrical installation work the contractor shall submit six copies of "RECORD, PLAN" indicating very clearly the runs of various sizes of mains, sub-mains Position and circuit of all points with their subjective controls supervisor & contractor under whose supervision this work has been carried out.

(4.7) The electrical contractor shall furnish the test certificate / Test reports in Prescribed Performa duly signed as may be required and arrange to obtain electrical power connection for the licensee of the region on completion of this work without any delay.

(4.8) Any other clause that may is thorough proper and applicable by the Govt. shall be binding on the bidder.

[5] The employer will not be responsible for financial settlements and disputes settlements between the main contractor and electrical sub contractor.

[6] Before issuing the completion certificate or preparation of the final bill the Engineer-in-charge shall be entitled to demand from the main contractor reasonable proof that all payments less retentions security for performance the deductions in respect of work or goods materials or services rendered by or supplied by nominated Electrical Sub Contractor have been paid or discharged by the contractor to nominated Electrical Sub Contractor. If the main contractor cannot satisfy the Employer by furnishing reasons for non-payment of dues to the nominated Electrical Sub contractor the Engineer-in-Charge shall be entitled to retain the disputed amount as security deposit which will be released only after production mutually agreed settlement of account or the award of the Arbitrator or the nominated by Engineer-in-charge for settlement of such dispute at the cost of main and nominated Electrical Sub-Contractor.

SPECIAL CONDITION FOR E. I. WORK

Name of work : Construction of Anganvadi No.111 Building at village Juni Dhrevad
Ta. Dwarka Dist. Devbhoomi Dwarka.

Total Provision : **Rs. 22,277.57**

Amt put to Tender : **Rs. 22,277.57**

PGVCL & Amt not put to Tender: **Rs.**

1. The above Electrical work must be carried out by the Gujarat approved electrical contractor having appropriate category of Class 'E-2' & above for, the said works.
2. Addition and alternation of E.I. is to be carried out due to change in design / or instruction from competent authority. In such case civil touching work / civil finishing work should be carried out by civil contractor if required.
3. Contractor should take approval of Electrical material before execution (Make of material).
4. A List of Engineer, Supervisor, and Electrician etc. should be submitted before execution.
5. Electrical Contractor's License should be submitted to Office before starting the work.

Specification of electrical items.

Point Wiring (Light/ Bell/Fan/Secondary/Two-Way/Separate plug point,

The point wiring shall be confirmed to IS: 5908-1970. A point shall consist of the branch wiring from the branch distribution board (switch board) together with a switch as required, as far as and including the ceiling rose or socket-outlet or suitable termination. A three-pin socket-outlet point shall include, in addition, the connecting wire or cable from the earth pin to the earth stud of the branch distribution board. The installation shall generally be carried out in conformity with the requirements of the Indian electricity act, 1910 as amended up to date and the Indian electricity rules-1956. The point wiring shall be carried out in the under mentioned manner:-

- (a) Supply, installation, fixing of conduits with necessary accessories, junction / inspection / switch /outlet boxes.
- (b) Supplying and drawing of wires of required size including insulated earth continuity wire.
- (c) Supply, installation and connection of flush type switches, sockets, cover plates, switch plates fan regulators etc. As specified.
- (d) The point shall be complete with branch wiring from the first switch board to the outlet point through other loop. Switch boards if necessary in a circuit, conduit with accessories, junction inspection boxes, control switch, socket outlet boxes, ceiling roses, connector etc. unless otherwise mentioned, the system of wiring shall consist of single core 650/1100 volt grade fr PVC insulated wire with copper conductor laid through exposed surface mounted / concealed in wall and ceiling rigid PVC pipe / rigid steel conduits / PVC oval conduit / PVC casing-n-capping / trucking etc. As specified. the rigid PVC pipe shall confirm to IS: 9537 with minimum wall thickness of 1.5mm. Dia. approved and ISI marked. The corresponding accessories shall confirm to IS: 3419. The minimum diameter of pipe shall be 20mm. The steel conduit and accessories shall confirm to IS: 1653 and is: 3837-1966 as amended up-to-date respectively. The PVC trucking (PVC casing-&-capping) shall be with double locking arrangement with grooves of size not below 1.5mm. In height confirm BS: 4678 part.4 of 1982 and with accessories of PVC / resin polypropylene not below 1.8mm. Thick duly sealed at joints.

The wiring shall be as per colour code viz. Red for r phase, yellow for y phase, blue for b phase, black for neutral, green for earth, grey for control, white for bell point and all off wires shall be same as phase wire. The wiring shall be done in a looping manner. All looping shall be made only in switch boards. The switches and socket outlets shall be shockproof flush type tissino type / modular type / moulded plate type with silver-coated contacts with ISI marked is: 3854. the conduit run on surfaces shall be supported on metallic 1.2mm. Thick saddles / heavy duty PVC saddles which in turn shall securely screwed to wall or ceiling. Saddles shall be at intervals of not more than 500mm. Fixing screws shall be with round or cheese head and of rust-proof materials. No cross-over of conduits shall be allowed unless it is unavoidable. The entire conduit installation shall be clean and neat in appearance. The conduits embedded into the walls shall be fixed by means of staples at intervals of not more than 500mm. Chases in the walls shall be neatly made with electrically operated masonry wall cutter and shall be refilled after laying the conduit with suitable mortar and brought to the finish of the wall. Conduit buried in concrete structure shall be put in position and securely fastened to the reinforcement. Proper care shall be taken to ensure that the conduits are neither dislocated nor choked out at the time of pouring concrete necessary fish wire shall be drawn in all conduit run.

the all materials and accessories used shall confirm to Indian standard specification. All types of wiring shall be capable of easy inspection. The open (unconcealed) wiring shall run along with walls should run as near the ceiling as possible. All runs of wiring and the exact positions of all points and switch boards shall be first marked on the building and got approved from the in charge electrical engineer before actual commencement of work.

The conduit for point wiring shall have a nominal cross-sectional area not less than either 1.50 mm² copper as specified. For open type switch boards shall not be erected within 2.5 meter of any washing unit or in bathrooms lavatories on toilets or kitchens. The switch block shall be pwd type with best Valsadi seasoned teak wood or other durable wood with solid back thoroughly protected both inside and outside with good insulating varnish shall be provided. There shall be a clear distance of not less than 25mm. between the teak wood board and cover. All the joints of board shall be dovetailed. The wooden block shall be covered with 3mm. Thick laminated sheet firmly screwed on four corners with the help of chrome plated counter shunt round headed steel screws. For large size switch boards laminated sheet shall be screwed at six plates. Where so specified, the switchboards shall be recessed in the wall for concealed type wiring. The front shall be fitted with 3mm. Thick laminated sheet. Ample room shall be provided at the back for connection and at the front between the accessories mountings. The concealed base shall be of either 16 gauge M.S. or teak wood as specified or instructed. The maximum load of each circuit shall not exceed 800 watts and maximum points of each circuit shall not exceed 10 points. Where wiring passes through wall, care shall be taken to see that wire pass very freely through protective pipe (rigid steel conduit / rigid PVC pipe /porcelain tube) and that the wires pass through without any twist or cross in wires, or either ends of holes. The general and technical specification given in the tender booklet shall also be considered as a part of agreement. All the wiring materials shall be of approved make as specified in the tender booklet or as approved by in charge electrical engineer.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one point.

Separate point

Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories. [I] For 6A Plug and 6 a switch with 2-1.5 sq.mm Cu. Wire from nearby switchboard/mcb db board (f) with medium class Rigid PVC pipe and accessories erected concealed in wall/ceiling complete Cat-III

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one point.

Looped plug

Point wiring for on board Looped Plug with 6A Modular type switch & 5 pin socket erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured / metallic/white front plate modules erected on / in wall / ceiling with following type accessories cat-III

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one point.

Modular accessories.

Providing following type of modular type accessories mounted with PVC / metallic box covered with appropriate front plate modules erected with necessary connection. As desire by engineer in charge. (7) blank

plate single, (10) 6/16amp. Universal socket, (9) 16 Amp. SP one way switch (14) 6A/ 10A/ 16A/ 20A/ 25A/ 32A Double Pole Modular MCB Switch cat-III

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Rigid PVC pipe

The rigid PVC pipe shall confirm is: 2506 and dia. approved ISI marked a specified rigid PVC pipe shall be 1.5mm. To 1.6mm. Thick manufactured from high grade virgin PVC. The diameter of PVC pipe shall be as per specified. Fitting for rigid PVC pipe such as bends, elbows, nipples, couplings, reducers, plugs etc. Shall be specifically designed and manufactured for their particular application. All fittings shall confirm to IS: 3415.the rigid PVC pipe shall be erected on wall / ceiling with properly screwed heavy duty rigid PVC saddles at the intervals not more than 500mm. And pipes to Pipes and pipes to fittings shall be fixed with adhesive solution. 16 gauge G.I. fish wire shall be erected with erection of pipe as a drawer wire. The installation of pipes shall be as per is: 4648, is: 732 and is: 1646.the PVC pipe shall concealed in wall / ceiling or for open execution as specified and as per instruction of in-charge-electrical engineer. The general specifications given in the tender booklet shall also be considered as a part of agreement. The PVC pipe and fittings shall be of approved make as specified in tender booklet or as approved by in-charge-electrical engineer.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one Mtr.

Mains: 2 x 1.5 / 2 x 2.5 / 2*4 / 4 x6 mm² cu mains

The mains shall be with 1.1 kv. Grade FRLS PVC insulated ISI marked stranded copper conductor as specified. The size of phase and neutral shall be same while the size of earth conductor shall be as specified in the items. The number and size of conductor shall be as specified in the item. All wires shall be single core multi-strand FRLS PVC insulated as per is: 634 and shall be 660v. / 1100v. Grade. All wires shall be as per colour code viz. Red for r phase, yellow for y phase, blue for b phase black for neutral, green for earth conductor. The necessary connections to control switchgear, MCB dist. Board, plug etc. shall be made firmly as per requirement and as instructed by in-charge-electrical engineer. The general specification given in the tender booklet shall also be considered as a part of agreement. The wires shall be of approved make as specified in the tender booklet or as approved by in-charge-electrical engineer.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one Mtr.

One Wire

providing and erecting Mains with ISI marked, 1.5KV grade electrolyte multi stranded, annealed copper conductor with heat resistant PVC insulated conforms to IS 694, IEC - 227 erected in existing pipe of following size (Specifically for control panel, relays, power switchgears, motor starters & control wiring) with required size of copper lugs, nuts and bolts if required. Size mentioned in tender

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one Mtr.

#Telephone cable

Supplying & erecting approved make Telephone Cable electrolytic copper conductor PE insulation twisted in two pairs, & wrapped with FRLS PVC tape & sheathed with FRLS PVC or HFFR outer Jacket suitable for telephone wiring & confirming to C-DOT erected in existing pipe. of following size of conductors & nos. of pairs. With necessary connections.[A] Conductor Size 0.5 mm. Size Mentioned in Tender

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one Mtr.

TV Cable

Providing & Erecting approved make following size of TV Co-axial flexible cable comprising inner conductor of solid bare copper insulated with Foam PE & Secondary conductor made of poly - Aluminium film bonded Al. Braids @ suitable coverage overall sheathed with black PVC insulation.(e) RG-11

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one Mtr.

LED fixtures / LED Street light

Led fixtures/ led street light shall have following specifications with all required accessories, driver etc. Complete with in all respect with five years guarantee/ warranty with replacement of fitting and agency has to produce quality certificate & report.

1.1 The electrical specifications

Parameter	value
Input voltage	ac 120 to 260 v
Input frequency	50 Hz + / 3 Hz
Power factor	20.8
Usage hours	dusk to dawn (12 hours)
Distortion current	< 10 @
Voltage	< 3%
Working humidity	10% to 90% rh

1.2 Led luminaries specification

Life expectancy to the product at least 50,000 hrs maintaining lumen output at 70% or above compared with the luminaries initial output.

Colour temperature minimum 4,000 k

Colour rendering index > 70%

Lumen/watt (luminary) lead wire with minimum 1m long

Lamp housing high quality housing such as pressure die cast aluminium with smooth finish powder coated for better environmental protection.

Efficiency of driver 100%

Junction temp 65 oc

Uniformly ratio >0.45

Maintenance factor 0.8

Index of protection level IP 66

1.3 particulars and details to be submitted by the in order to properly assess and due diligence submission the proponent should provide following information on the quality and photometric o proposed luminaries.

1.4 general descriptions

Following details of the proposed luminaire shall be submitted as per annexure-i

1. Luminaire manufacture
2. Luminaire model name
3. Wattage
4. Stated lumen output
5. Ip rating
6. Lumen output (as per lm 79 report, mentioning current in ma)
7. Lumen deprecation (70 mentioning temperature in oc and current in ma)
8. Correlated colour temperature (cct)
9. Colour, rendering index (cri)

1.4.2 Electrical specification

Electrical ratings of the proposed luminaire prod for the following criteria shall be submitted in annexure

1. Voltage range or rating on single phase ac
2. Amperage range or rating
3. Frequency range
4. Power factor
5. Total harmonic distortion
6. Working humidity
7. Working temperature
8. Ingress protection
9. Electrical connector
10. Ability to operate under conditions of unpredictable voltage variations

Submit the information whether and how the proposed luminaire product might accommodate adaptive controls that allow remote dimming or switching on, off and indicate what types of controls may be integrated if to the proposed luminaire product.

1.5 Led chips and driver information : details to be filled up by bidder

Led chips and driver information of the proposed luminaire product for the following criteria in annexure iii

1. Of the led chips manufacturer
2. Led chips model name and number
3. Lm 80 report from the led chips manufacturer on the lumen deprecation characteristics of the specific led chips employed in the proposed luminaire product.
4. Junction temperature (oc)
5. Information on drivers employed in the proposed luminaire
6. Name of the manufacturer.
7. Model name and number.
8. Expected lifetime of the led driver used in the proposed luminaire

9. Estimated cost of driver replacement by your company, including component and installation cost
10. Name of the led chips manufacturer.

Luminaire specification others

The proponent shall provide information and certifications

1. Luminaries general requirements tests, and certifications specified in is 10322
2. Electrical safety certifications such as ISI and cii
3. Ingress protection certificate IP 66

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Switch Disconnecter Fuse Unit Cubical type

Approved make Three Phase & Neutral LT Heavy Duty Switch Disconnecter Fuse Unit Cubical type for panel mounting complete with operating mechanism suitable to operate on 415V A.C. 23A duty With HRC fuses of suitable load confirming to I.S. 13947 (Part I & III). of following capacities.(C) 100/125 Amp cat-III

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

MCCB panel mounting type

Supplying and erecting approved make four pole moulded case circuit breaker having breaking capacity icu of 35 KA at 415 V having normal current rating 25A to 100A. With fixed thermal & magnetic release suitable to work on a.c. supply 50 cys. With all internal connections & complete erected in 16 g.m.s. housing on angle frame. ICS=100% of ICU only cat III

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Change over 63A panel mounting type

Supplying & erecting approved make four pole 415v change over switch interior for panel mounting with operating mechanism A.C.23 duty confirming to IS. for 63 Amp cat-III.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Distribution Board

Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs. (The DBs should be used of same company of MCB to be used) suitable for single/Three Phase (Single door/Double Door) which mentioned in Tender

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.

2. The rate shall be for unit of one no.

Busbar panel mounting type

The busbar shall conform is: 375. The busbar shall be air insulated and made of high quality, conductivity and strength copper as specified conforming to relevant Indian standards and shall be of sufficient cross section as specified. The busbar shall be of 3 phases and neutral system with separate neutral and earth bar. The cross section of the neutral busbar shall be the same as that of the phase busbar for the capacities. The busbar shall be of rectangular cross-section designed to withstand full load current at the rated voltage. The busbar shall have uniform cross section throughout the length. The busbar shall be warped with collared heat shrinkable insulated PVC sleeves / tape. The busbar shall be firmly fixed on supports constructed from suitable insulated materials such as phenolic lamination / dmc. The busbar supports shall be unbreakable, non-hygroscopic and sufficiently robust to withstand electro mechanical stresses produced in the event of short circuit. The busbar shall be placed at sufficiently close intervals to prevent busbar sag. The minimum clearance to be maintained for rated voltages up to 600 volts shall be between phase to phase 32mm. And phase to earth 25mm. The busbar shall be isolated with 3mm. Bakelite sheet to avoid any accidental contract. The connections to busbar of ratings more than 200 amps. Shall be made with clamping arrangement with bolts and nuts and for busbar of sammler ratings, use of holes drilled into the busbar shall be made. The bolts and nuts used for connections to busbar shall be of aluminium alloy or tinned forged brass or tinned copper, suitable precaution shall be taken against heating due to bimetallic contact. Tapping of connections from busbar shall be made with PVC insulated wire of suitable size for current capacities up to 100 amp. And for higher current capacities solid conductor strip suitably insulated with PVC sleeve tape with soldered or crimped lugs. The general and technical specifications given in the tender booklet shall also to be considered is a part of agreement. The busbar shall be approved make as per category specified or as approved by in-in-charge electrical engineer.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one Rmtr.

MCB SP 6 to 25A

Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 v a.c. system and having breaking capacity 10 ka to be erected in existing box. Confirming to is 8828/1996 with ISI mark cat-III

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

MCB DP

Providing & erecting 240 V MCB double pole switch for lighting Load (B Curve) having 10 KA breaking capacity & confirms to IS : 8828 in existing box having following capacity(B) 40 Amp. Cat-III

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

MCB FP

Providing & erecting 415 v mcb four pole for motor & inductive load (c curve) having 10ka breaking capacity & confirms to is :8828 in existing box having following capacity (a) 6 to 32 amp (b) 40 amp cat-III

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Metal clad distribution boards

The metal clad distribution boards shall have incoming of mcb 63 amp. four pole switch & outgoing mcb of 6amp to 32amp operating & short circuit tripping elements of breaking capacity of 10ka conforming to IS 8828 / 1996 with ISI mark suitable size of neutral link of tinned copper busbar link with all necessary interconnecting. Mcb should be erected in surface type in 16g. M.S. sheet cover complete suitable integral single piece construction with suitable category mentioned in tender schedule "b" and approved make as per list of tender booklet should be given on angle iron frame with necessary earthing. The general and technical specification given in the tender booklet shall also to be considered as a part of agreement. The mcb db shall be of approved make and category as specified or approved by in-charge-electrical engineer.

Mode of measurement & payment:-

1. The rates include cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

ELCB DP

Approved make ELCBs / RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 6 KA and suitable for operation on single phase 240 V. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component. for following Max. rating erected as directed (i) 25 Amps. DP cat-III

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Earthing wire

Providing and erecting Annealed bare Copper wire 8 to 16 SWG.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one Kg.

Earthing chemical type

Supplying & erecting earth pit of minimum bore dia.150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free hot dipped G.I. Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications with chamber and heavy duty cover.(approved make OEM has to submit test certificate) & having back filling compound of (B) Inner chemical (CCM Compound)- Resistivity:- 0.2 Ω / meter testing as per IEC 62561-2017, Voltage drop:- < 1 volt at no load & dry form, Sulphur content:- <2%(C) Back fill Compound :- Earthing compound should be capable to retain moisture for long time Necessary test report must be submitted. (a) For Electrical Installation up to 440V in normal soil, Length of pipe - 1 Mtr ,Back filling compound - 1 Nos Bag of 15 Kg.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Panel fabrication

Providing & erecting weather proof, dust & vermin proof, floor mounted front operated indoor type cubical panel board necessary IP-42 and above protection as per approval from engineer in charge made from 14 SWG thick CRC M.S. sheet for outer body & doors, 16 SWG thick CRC M.S. sheet for internal partitions with necessary accessories, supporting angles/ flats channel including cutting, bending, drilling, welding, riveting with internal partitions & cable alley as per requirements & instruction of engineer-in-charge with erection of .supplied switch gears, BUSBARS, suitable size of inter connecting PVC copper wire / copper-aluminium strips, rubber grommets, rib, Bakelite control fuses/MCB for measuring instruments, earth bus & earth bolts, foundation flange - bolts-base Plates, sufficient nos. of hinged doors, handles with locking arrangement and rubber gasket, heavy duty end terminal connection, danger notice board, necessary ventilation, earthing strip complete. The Panel shall be painted with epoxy powder coating.(The rates excludes the cost of switchgears, bus bars, inter connecting mains & Copper Aluminium strips, meters, Fuses etc. The dimension shall be measured excluding base beams) The panel shall be supplied with following approved manufacturers with following size. (B) Locally fabricated panel board (i) with 350 mm depth

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one sq. mtr

XLPE cable

Scope: - The scope of work shall cover supply, laying, connecting, testing and commissioning of low and medium voltage power cabling. All cables shall be as per relevant Indian standard with ISI mark. (IS: 7098) (i) -88.

Materials: - all cables shall be 1100 volt grade xlpe sheathed aluminium or copper conductor with or without armouring as specified and with an outer PVC protective sheath heavy duty. Cables shall have high conductivity stranded aluminium or copper conductors and cores colour coded to the Indian standard. Type designation and core identification of cables shall be as per relevant Indian standard. All cables shall be new without any kind of visible damage. The manufactures name, insulating materials, conductor size, voltage class and IS mark shall be marked on the surface of the cable at every 600mm. Length.

General :- The cable shall be supplied in single length i.e. Without any intermediate joint. The cable ends shall be suitably sealed against entry of moisture, dust, water etc. With cable compound as per stranded practice.

Installation :- cable shall be laid in the routes as directed by in-charge-electrical engineer. Cable running indoors shall be laid on walls or ceiling as per the site situation. Cables shall be fixed directly to wall or ceiling and supported with g.i. saddles / clamps at not more than 500mm. Interval with chrome plated screws. in case of cables buried directly in ground, cables shall be laid in an executed trench not less than 900mm. From g.l. over a sand or soft earth cushion to provide protection against abrasion. in case cables entering the building or one room to another it would be done through porcelain / PVC pipes. After erection the pipes shall be sealed with m-seal.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one Mtr.

DWC Pipe

Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene(conforming to IS 14930 II)with necessary connecting accessories of same material at required depth in existing trench for laying of cable below ground / road surface for enclosing cable (A)50 mm outer dia

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one Mtr.

Cable glands & lugs.

The cable gland shall be of polished brass, double compression type and ends shall be surrounded. The inner size of gland should be suitable to received suitable size of cables. The cable glands shall be heavy duty and shall be fixed with switch fuse unit with suitable brass washers with rubber ring / gasket. The gland shall be erected with outgoing tails, insulating tape etc. Complete in appropriate manner. The contractor shall drill holes for fixing glands. aluminium lugs conforming to is suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass / cadmium plated nut bolts in as approved manner.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Ceiling fan

The ceiling fans shall confirm Indian standard specification is: 374-1979. The enclosure of motors of ceiling fans shall be of the totally enclosed type.. The stamping of fan motors shall be made from electrical steel sheet. The ceiling fans shall have three numbers well balanced blades made from metal or other suitable materials. The blades and motors shall be securely fixed so that they do not loosen in operation. The size of ceiling fans shall be as specified. The ceiling fans shall be suitable for operation on electric a.c. single phase 230volts. 50hz. Power supply. Proper type of lubrication bearings shall be used to ensure a reasonable amount of silent operation. Energy saver fans having 50watt power consumption. The earthing terminal shall be provided on the suspension system. The live parts shall not be accessible in the assembled fan and regulator, capacitor of the fan shall conform is: 1709-1960. The suspension system shall be either bolted or screwed at the motor end and the suspension system shall be either bolted or screwed at the motor end the suspension end. The suspension system of the ceiling fans shall be of adequate strength to with stand a tensile load of 1000kg. Without breakage and a torsion load of 500kg. Without breakage current carrying parts and other metal parts shall be corrosion resistant under normal conditions.

The terminals shall be prepared from stainless steel or other corrosion resistant alloys. Radio and television interference suppressors shall be fitted. The voltage drop across the electronic type regulators at the maximum speed position shall not exceed 2% of the service value at the test voltage and at full speed shall be as per IS. The ceiling fans shall be connected with ISI marked twin twisted flexible wire of size not less than 24 / 0.2 mm. The general technical specification given in the tender booklet shall also to be considered as a part of agreement.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Fan down rod

Supplying and erecting 19 / 20 mm. nominal bore Medium Class M.S. Pipe down rod erected duly painted for fan complete with proper insulation without leakage and earthing.

Mode of measurement & payment:-

1. The rates include cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one Mtr.

Concealed fan hook with M.S. / PVC box.

The dimensions M.S. /PVC box shall be 175 x 175 x 75mm. The wall thickness of the box shall be 16 gauges 15mm.dia. M.s. Rod in the shape of "u" with their vertical legs bent horizontally at the top at least 19mm. On either side or shall be inserted through M.S. Box on both sides. At the time of erection, the two ends of M.S. rod shall be bound to the top reinforcement of the roof. Necessary knockout on both sides in the centre shall be made in M.S. box for entry of conduit in the box. The entire fan hook shall be so fabricated that the fans revolve steadily. The size of fan hook shall be of such that the hook shall be completely hide by the top canopy of the fanned and the fans revolve steadily and bushing in the top suspension. The box shall be free from burns, fins and internal roughness. During erection care shall be taken the outer surface of the box shall properly flush with the ceiling. There shall be full threaded holes on four corners of box for fixing screws.

Mode of measurement & payment:-

1. The rates include cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

FRP pole

Supply of approved make FRP Pole having following specifications: FRP Light Pole made by CNC filament winding machine using thermoset resin polyester/epoxy resin system) having minimum 62% glass content. The pole should be in one piece and tapered round in shape, having smooth finish and should be totally free from corrosion as well as non-conductive & shock proof Pole should be provided with FRP Anchor Base and it should be heavy duty, or MS Material duly painted with Epoxy paint. Pole should be flame retardant as per IS 6746. Resin used shall be UV resistance and pigmented. A highly weather resistant polyurethane coating shall be applied to the pole after applying suitable primer system that ensures proper adhesion of the paint. Minimum coating thickness shall be 80 to 100 micron. Deflection of the pole shall not exceed more than 10% of the length of pole for the given load Pole should be generally made as per the dimensional data, performance criteria and some interchangeability features of poles as per standard ANSI C 136.20 latest version or ASTM D 4923/01 including cable termination box with necessary accessories. The size of pole and type of installation with foundation as per manufacturer details and site requirement are as below (1) Suitable for base plate mounting single arm Bracket.[H] Overall length of 6 Mtr. Average Thickness: 7.5mmTop/ Bottom OD Dia A/F 89mm ± 2mm approx. approx. Weight of Pole 32 kg approx. (Without Base) Anchor Base (Size 300X300 & 18mm Th.) with necessary M Bolts & J Bolts which use in erection of foundation & (2) Suitable for base plate mounting Double arm Bracket. [C] Overall length of 6 Mtr. Average Thickness: 8mm.Top/ Bottom OD Dia A/F 114/174 mm ± 2mm approx. approx. Weight of Pole 38 kg approx. (Without Base) Anchor Base (Size 300X300 & 18mm thk.) with necessary M Bolts & J Bolts which use in erection of foundation

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.

2. The rate shall be for unit of one no.

Junction box

Supplying & erecting approved make SMC press moulded composite FRP. loop-in, loop-out approx. 2mm thick box complete with Bakelite connector strip 5way(3P+N+E), DIN rail for mounting mob & hinged doors as per requirement having locking arrangements with mounting clamp with nuts, bolts & washers suitable for erection on pole with cable clamps & earth bolt of following size of box. (C)150mm x 125mm x 100mm [deep]

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Arm bracket for pole.

Providing FRP arm bracket of having 2 sets of suitable SS304 hardware for fixing the brackets & spread of 1.2 Mtr(Suitable for 89 to 114 mm pole top dia)(A) Single arm bracket & (B) Double arm bracket.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Foundation

Providing 1:2:4 cement concrete foundation & 70 % PCC from bottom including excavation for the pole of size 45 x 45 x 100 cm. Deep in below ground level with plinth of 45 cm x 45 cm (or 45 cm dia x 45 cm) high upper ground level with necessary curing and finishing in approved manner. (for 4 & 6 mtr. pole)

Mode of measurement & payment:-

1. The rates include cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Voltmeter

Supplying and erecting approved make panel mounting type digital Voltmeter having 3 1/2 digits LED display, 0 to 750 AC Volts range erected on existing panel board with all connection, wiring etc. with manufacturers calibration certificate.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Ammeter

Supplying and erecting approved make panel mounting type Digital Ammeter having 3 digits LED display, external CT operated, calibrated for 0 to 1000 Amps suitable to operate on 500 Volt AC , erected on existing panel board with all connection, wiring etc. .with manufacturers calibration certificate.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Selector switch

Supplying and erecting Ammeter / Voltmeter selector switch for 3 phase AC Supply 500 V on existing panel board with necessary connections.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Indicator lamp

Supplying and erecting approved make set of indicator lamps of led type lamp, lens cover, Bakelite holder complete erected with necessary connections.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Open well Motor

Providing & erecting open well horizontal mono block pump set with cast iron body, complete for three phase submersible motor having [C] For 3 HP 3 phase open well horizontal mono block pump set suitable for 85 LPM to 270 LPM @ 11 mtr to 33 mtr head suitable for 50/65 mm dia delivery pipe Cat-II

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Submersible pump set (0.5 h.p. To 30 h.p.)

The submersible pump set shall confirm relevant Indian standards. The submersible pump set shall be either open well type or bore well type. The pump set shall be horizontal or vertical mono block type as specified or instructed by in-charge-electrical engineer. The discharge and head of the pump set shall be as specified. The pump set shall be suitable for single phase a.c. 230/415volts., 50 Hz. Power supply. The pump set shall be installed with suitable diameter of delivery pipe. Necessary control panel with mcb-dp starter, indication lamp shall be installed & connected complete with incoming power supply and pump set with 10 mtr. Long 3-core 1.5mm2 flat submersible cable. The pump set shall be new one and not having any mark of used before. The pump set shall be electrically direct driver submersible type having completely waterproof motor and its connecting block. The general specification given in the tender booklet shall also be considered as a part of agreement. The submersible pump set shall be of approved make as specified in category as per tender booklet and approved by in-charge-electrical-engineer.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one no.

Motor starter panel type: (direct-on-line)

The cubical panel shall be made from 16 gauge crca sheet duly epoxy powder coated inside and outside. The panel shall have hinged doors and locking arrangement. The panel shall be designed to withstand the worst weather condition with maximum expected ambient temperature of 45c. & 90% humidity and salty, duty weather.

The panel shall be totally enclosed, complete dust and vermin proof rigid floor mounting, air insulated, bottom cable entry, cubical type suitable for

Operation on three phase 415 volt, 50 Hz. Power supply. The panel shall have ip-51 protection class construction. Neoprene / synthetic rubber gasket shall be provided between all adjacent units and beneath all cover.

The panel shall comprises suitable size of on - off isolator (ac- 3 / 23 duty) main fuses, indicating lamps for r-y-b phases, overload relay, ammeter , voltmeter each with two way selector switch, main contractor and start-stop push buttons. The isolator, overload relay and contactor shall be of I. & t. Siemens or cutter hammer make. The panel with d.o.l. starter shall be equipped with single phasing preventer while panel for automatic star-delta starter shall be equipped with single phasing preventer cum water level guard complete unit with toggle switch to bypass spp cum wlg. Thermal / electronic star-delta cut-off timer etc.

all the instruments shall be prewired with suitable size of marked PVC insulated control cables with tinned copper conductor . Terminals for both incoming and outgoing cable connections shall be suitable for 1100v. Grade.

the panel shall be connected, tested and commissioned as per the instruction of in-charge electrical engineer. The general specification given in the tender booklet shall also be considered as a part of agreement. The panel be of approved make as specified in the tender booklet.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. Required for satisfactory completion with testing of this item as described above.
- 2 The rate shall be for unit of one no.

Flat flexible cable 3 x 2.5 sq. Mm.

Providing and erecting ISI marked PVC insulated PVC sheathed flat flexible submersible copper cable approved make of following size. (b) 3 core x 2.5 sq. Mm.

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
- 2 The rate shall be for unit of one Mtr.

Top & Bottom accessories

Supply of following size of TOP & BOTTOM accessories i.e. Adaptor set (CI) long, pump guard set, starter pipe Rubber ring for submersible pump & UPVC column pipe as directed by Engineer - in - charge with necessary plumbing as desired. [B] 32 mm dia

Mode of measurement & payment:-

1. The rates includes cost of all labour, materials, tools, & plant etc. required for satisfactory completion with testing of this item as described above.
2. The rate shall be for unit of one No.