



**GOVERNMENT OF INDIA
CENTRAL PUBLIC WORKS DEPARTMENT
OFFICE OF THE EXECUTIVE ENGINEER (E)
Vijayawada.- 520007
Email: eeevja@gmail.com**

* * *

Notice inviting e-tender

NIT NO: - 19/EE (E)(Vijayawada)/e-tender/2026-27

Name of Work: - Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur.

NIT Amount: Rs.49,10,035/-

I N D E X

Name of work: Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur

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Certified that this draft N.I.T contains 1 to 66 pages only.

NIT approved for **Rs.49,10,035/-** (Rupees Forty Nine lakhs Ten Thousand and Thirty Five only)
vide NIT No.19/EE(E)(Vijayawada)/e-tender/2026-27

Executive Engineer (E)(Vijayawada)

AE(E)(P) EE(E)

NOTICE INVITING E-TENDER

The Executive Engineer (E)(Vijayawada), CPWD, Vijayawada invites on behalf of President of India online percentage rate bids from approved and eligible contractors of CPWD (Buildings & Roads category) in single bid system for the work of “Providing **1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur**”

NIT No. 19/EE(E)/Vijayawada/e-tender/2026-27

Estimated Cost Put to Tender: Rs.49,10,035/-

Earnest Money: Rs.98,201/-

Period of completion: 04 (four) Months

Last time and date of submission of bid: Up to 15:00 Hours on 22-07-2026.

The bid forms and other details can be obtained from the website <https://etender.cpwd.gov.in/>.



कार्यपालक अभियंता (विद्युत),
केंद्रीय लोक निर्माण विभाग,
प्लॉट सं. बी-2, 6th तल,
सी.जी.ओ. कॉम्प्लेक्स,
औद्योगिक एस्टेट, ऑटो नगर,
विजयवाड़ा- 520007



भारत सरकार
Government of India



Office of the EE (E) (Vijayawada),
Central Public Works Department,
Plot No. B-2, 6th Floor, C. G. O. Complex,
Industrial Estate, Auto Nagar,
Vijayawada, Krishna, A.P. – 520007.
e-mail Id e-mail: eeevja-cpwd@gov.in

स69(1)/2026/का.अ(वि)/ VJA/

दिनांक: /07/2026

Copy To: -

- 1) The Chief Engineer (Vijayawada), CPWD, Vijayawada.
- 2) The Executive Engineer, CPWD, Vijayawada.
- 3) The Assistant Engineer (E), CPWD, Guntur .
- 4) Notice Board
- 5) Website

Executive Engineer (E) (Vijayawada),
CPWD, Vijayawada

AE(E)(P)

EE(E)

INFORMATION & INSTRUCTIONS FOR BIDDERS FOR e-BIDDING
FORMING PART OF BID DOCUMENT AND TO BE POSTED ON WEBSITE
 (Applicable for inviting open bids)

The Executive Engineer (E)(Vijayawada), CPWD, Vijayawada invites on behalf of President of India online percentage rate bids from approved and eligible contractors of CPWD (Buildings & Roads category) in single bid system for the work of:-

NIT No	NIT No.19/EE(E)(Vijayawada)/e-tender/2026-27
Name of Work:	Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur
Location	CR Building, Guntur
Estimated cost put to tender	Rs.49,10,035/-
Period of Completion	04 (four) months
EMD shall be drawn in the name of Executive Engineer (C), CPWD, Vijayawada.	Rs.98,201/-
Last time & date of online submission of bid and other documents as specified in the press notice	Up to 15:00 Hours on 22-07-2026
Time and date of online opening of Financial Bids	15:30 Hours on 22-07-2026
Last date & time of submission of hard copies of Experience Certificates if any, copy of receipt of deposition of original EMD, Registration Certificates, Affidavit if any, Undertaking and other Documents as specified in the press notice to Division Office by the Lowest Tenderer Only	To be submitted during office hours within a week from the date of opening of Financial Bid.(only L1 bidder). In case the last day happens to be closed holiday, these documents shall be submitted on the next working day.

1. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
2. Information and Instructions for bidders posted on website shall form part of bid document.
3. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website <https://etender.cpwd.gov.in> or www.cpwd.gov.in free of cost. Applicants are advised to keep visiting the above mentioned web-sites from time to time (till the deadline for bid submission) for any updates in

respect of the tender documents, if any. Failure to do so shall not absolve the applicant of his liabilities to submit the applications complete in all respects including updates thereof, if any. An incomplete application may be liable for rejection.

4. But the bid can only be submitted after deposition of original EMD either in the office of Executive Engineer inviting the bids or division office of any Executive Engineer, CPWD within the period of bid submission and uploading the mandatory scanned documents such as Account Payee Demand Draft/ Fixed Deposit Receipt/ Banker's Cheque or Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks towards EMD drawn in favour of Executive Engineer, VJCD, CPWD, Vijayawada, receipt for deposition of original EMD to division office of any Executive Engineer, (including NIT issuing EE/AE)CPWD and other documents as specified.

A part of earnest money is acceptable in the form of Bank Guarantee also. In such cases 50% of earnest money or Rs.20 lakh whichever is less, will have to be deposited in shape prescribed above and balance can be accepted in form of Bank Guarantee issued by a Commercial Bank.

5. Those contractors not registered on the website mentioned above, are required to get registered before hand. If needed they can be imparted training on online bidding process as per details available on the website.
6. The intending bidder must have valid class-III digital signature to submit the bid.
7. On opening date, the contractor can login and see the bid opening process. After opening of bids he will receive the competitor bid sheets.
8. Contractor can upload documents in the form of **JPG** format and **PDF** format.
9. a) The column meant for quoting percentage rate in figures appears in pink colour and the moment percentage is entered, it turns sky blue.
 b) Tenderer shall quote the percentage rate above or below upto two places of decimals only.
 c) If a tenderer does not quote any percentage above/below on the total amount of the tender or any section/sub-head in percentage rate tender, the tender shall be treated as invalid and will not be pertained as lowest tenderer.
 d) It is mandatory to upload scanned copies of all the documents including GST registration. If documents are not uploaded, then bid will become invalid and shall summarily be rejected.
 e) Please read Para-9 of CPWD-6 for further details.

10. List of Mandatory Documents to be scanned and uploaded within the period of bid submission:

- i. Insurance Surety / Account payee Demand Draft / Fixed Deposit Receipt (FDR)/Banker's cheque or Bank Guarantee (as prescribed) issued by a Commercial Bank against EMD, as specified in Para 6 of CPWD - 6 for e-Tendering.
- ii. Copy of receipt for deposition of original EMD to division office of any EE, CPWD. (Form-D)
- iii. Enlistment order of the contractor
- iv. Compulsory ERP training Certificate.
- v. Electrical License issued by State of Andhra Pradesh. If the bidder has not obtained Electrical License issued by State of Andhra Pradesh, then in such a case the bidder shall scan and upload following undertaking along with other bid documents "If work is awarded to me I shall associate any electrical contractor having valid electrical license issued by State of Andhra Pradesh or I myself shall obtain Electrical license of State of Andhra Pradesh within 7 days from date of issue of letter of acceptance."
- vi. GST registration Certificate of Andhra Pradesh, if already obtained by the bidder.

If the bidder has not obtained GST registration in the State, then in such a case the bidder shall scan and upload following undertaking along with other bid documents." If work is awarded to me, I/We shall obtain GST registration Certificate of the State, in which work is to be taken up within one month from the date of receipt of award letter or before release of any payment by CPWD, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on a/c of the work executed and/or for any action taken by CPWD or GST department in this regard."

Executive Engineer (E)
CPWD, Vijayawada

CPWD-6 for e-Tendering

Online percentage rate bids are invited on behalf of President of India from approved and eligible contractors of CPWD (Composite Category) for the work of- **“Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur.”**

The enlistment of the contractors should be valid on the last date of submission of bids. In case the last date of submission of bid is extended, the enlistment of contractor should be valid on the original date of submission of bids.

The work is Estimated to Cost **Rs.49,10,035/-**

This estimate, however, is given merely as a rough guide.

The enlistment of the contractors should be valid on the last date of submission of bids. In case the last date of submission of bid is extended, the enlistment of contractor should be valid on the original date of submission of bids.

1. Intending bidder is eligible to submit the bid provided he has definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority, of having satisfactorily completed similar works of magnitude specified elsewhere in the tender.
2. Agreement shall be drawn with the successful bidder on prescribed Form No. CPWD 7 (or other Standard Form as mentioned) which is available at Govt. of India Publication and also available on website www.cpwd.gov.in. Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
3. The time allowed for carrying out the work will be **04 (four) Months** from the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.
4. The site for the work is available.
5. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen on website <https://etender.cpwd.gov.in> or www.cpwd.gov.in at free of cost.

The standard publications like General Conditions of Contract-2023, Delhi schedule of rates 2023/2025 (for civil and electrical), Specifications for Civil and Electrical works and Delhi analysis of rates 2023/2022 (for civil & electrical) with amendments / correction slips up to the last date of submission of tender can be seen free of cost from the website www.cpwd.gov.in.

6. After submission of the bid the contractor can re-submit revised bid any number of times but before last time and date of submission of bid as notified.
7. While submitting the revised bid, contractor can revise the consolidated percentage rate any number of times (he need not re-enter percentage rate of all the schedules or sub heads) but before last time and date of submission of bid as notified.
8. Earnest Money of **Rs.98,201/-** in the form of Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks (drawn in favour of **Executive Engineer, VJCD, CPWD, Vijayawada**) shall be scanned and uploaded to the e-Tendering website within the period of bid submission. The original EMD should be deposited either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD within the period of bid submission. The EMD receiving Executive Engineer (including NIT issuing EE/AE) shall issue a receipt of deposition of earnest money deposit to the bidder in a prescribed format (enclosed) uploaded by tender inviting EE in the NIT.

A part of earnest money is acceptable in the form of bank guarantee also. In such case, minimum 50% of earnest money or Rs. 20 lac, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee of any Commercial Bank having validity for six months or more from the last date of receipt of bids which is to be scanned and uploaded by the intending bidders. The earnest money given by all the tenderers except the lowest tenderer shall be refunded immediately after the expiry of stipulated bid validity period or immediately after acceptance of the successful bidder, whichever is earlier. However, in case of two/ three bid system, earnest money deposit of bidders unsuccessful during technical bid evaluation etc. should be returned within 30 days of declaration of result of technical bid evaluation.

Copy of Enlistment order and other documents as specified in the NIT shall be scanned and uploaded to the e-Tendering website within the period of bid submission. However, certified copy of all the scanned and uploaded documents as specified in NIT shall have to be submitted by the lowest bidder only along with physical EMD of the scanned copy of EMD uploaded within a week physically in the office of tender opening authority. Online bid documents submitted by intending bidders shall be opened only of those bidders, whose original EMD deposited with any division of CPWD and other documents scanned and uploaded are found in order.

The eligibility bid submitted shall be opened at **15:30 Hours on 22-07-2026**

9. The bid submitted shall become invalid and e-Tender processing fee shall not be refunded if:
 - a. The bidder is found ineligible.

- b. The bidder does not deposit original EMD with division office of any Executive Engineer, CPWD.
 - c. The bidder does not upload all the documents (including GST registration/GST undertaking) as stipulated in the bid document including the copy of receipt of deposition of original EMD
 - d. If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the lowest bidder in the office of bid opening authority.
 - e. In case of any discrepancy is noticed between the documents as uploaded at the time of submission of the bid online and hard copies as submitted physically in the office of Executive Engineer, then the bid submitted shall become invalid and the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid.
Further the tenderer shall not be allowed to participate in the retendering process of the work.
 - f. If a tenderer does not quote any percentage above/below on the total amount of the tender or any section/sub-head in percentage rate tender, the tender shall be treated as invalid and will not be entertained as lowest tenderer.
10. The contractor whose bid is accepted will be required to furnish performance guarantee at specified percentage of the tendered amount as mentioned in schedule E and within the period specified in Schedule F. This guarantee shall be in the form of Demand Draft, Fixed Deposit Receipt or Bank Guarantee from any of the Commercial Banks in accordance with the prescribed form. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F', including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The earnest money deposited along with bid shall be returned after receiving the aforesaid performance guarantee. The contractor whose bid is accepted will also be required to furnish either copy of applicable licenses/ registrations or proof of applying for obtaining labour licenses, registration with EPFO, ESIC and BOCW Welfare Board including Provident Fund Code No. If applicable and also ensure the compliance of aforesaid provisions by the sub contractors, if any engaged by the contractor for the said work within the period specified in Schedule F.
11. Site of CR Building, Guntur, Andhra Pradesh is available to execute the work.

12. Intending Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidders shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.
13. The competent authority on behalf of the President of India does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without the assignment of any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidders shall be summarily rejected.
14. Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable for rejection.
15. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidders shall be bound to perform the same at the rate quoted.
16. The contractor shall not be permitted to bid for works in the CPWD Circle (Division in case of contractors of Horticulture/Nursery category) responsible for award and execution of contracts, in which his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Gazetted officer in the Central Public Works Department or in the Ministry of Urban Development. Any breach of this condition by the contractor would render him

liable to be removed from the approved list of contractors of this Department.

17. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.
18. The bid for the work shall remain open for acceptance for a period of Thirty (30) days from the date of opening of bid. If any bidder withdraws his bid before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the bid which are not acceptable to the department, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the bidders shall not be allowed to participate in the rebidding process of the work.
19. This notice inviting Bid shall form a part of the contract document. The successful bidders/contractor, on acceptance of his bid by the Accepting Authority shall within 7 days from the stipulated date of start of the work, sign the contract consisting of: -
 - a. The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.
 - b. Standard C.P.W.D. Form- 7 or other Standard C.P.W.D. Form as applicable.
20. The intending bidders are required to update their profile in CPWD e-tender portal and to upload their bids well in advance of last date of submission of tender. Any issue related to updating profile/uploading tender can be resolved through ERP help line no. 18001803286 or email Id cpwd.support@techmahindra.com. The e-tendering bidders are also advised not to wait to raise any issue till the last date of submission of bid in their own interest.

Executive Engineer (E) (Vijayawada)
CPWD, Vijayawada
(For & on behalf of President of India)

AE(E)(P) EE(E)

C.P.W.D - 7
GOVERNMENT OF INDIA
CENTRAL PUBLIC WORKS DEPARTMENT

STATE : Andhra Pradesh
BRANCH : E&M

Zone : CE, Vijayawada
Division: EE (E)Vijayawada

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

Tender for the work of: Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur.

To be uploaded on line **up to 15:00** hours on 22-07-2026 through website <https://etender.cpwd.gov.in>

To be opened in presence of tenderer who may be present at **15:30** hours on 22-07-2026 in the office of Executive Engineer (E)(Vijayawada) CPWD, Vijayawada.

Issued to **

(Contractor)

Signature of Officer issuing the documents **

Designation: **

Date of issue: _____ **

**Not applicable for e- tendering

T E N D E R

I / We have read and examined the notice inviting tender, schedule, A, B, & C, Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, clauses of contract, Special conditions, Schedule of Rate & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/ We hereby tender for the execution of the work specified for the President of India within the time specified in Schedule 'F', viz., schedule of quantities and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of contract and with such materials as are provided for, by, and in respects in accordance with, such conditions so far as applicable.

I/We agree to keep the tender open for 30 days from the date of opening of bid.

If I/We, fail to furnish the prescribed performance guarantee within prescribed period, I/We agree that the said President of India or his successors, in office shall without prejudice to any other right or remedy. If I/We fail to commence work as specified, I/ We agree that President of India or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance guarantee absolutely. The said Performance Guarantee shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 and 12.3 of the tender form.

Further, I/We agree that in case of forfeiture of Performance Guarantee as aforesaid, I/We shall be debarred for participation in the re-tendering process of the work.

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/We shall be debarred for tendering in CPWD in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Performance Guarantee.

I/We hereby declare that I/We shall treat the tender documents drawings and other records connected with the work as secret/confidential documents and shall not communicate information/derived there from to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Dated _____

Signatures of Contractor

Postal Address

Witness:

Address:

Occupation:

ACCEPTANCE

The above tender (as by you as provided in the letters mentioned hereunder) is accepted by me for and on behalf of the President of India for a sum of Rs.....

(Rupees)

The letters referred to below shall form part of this contract

Agreement: -

(a)

(b)

(c)

For & on behalf of President of India

Signatures:

.....

Dated: *

Designation:*

* To be filled by the Executive Engineer (E)(Vijayawada) CPWD, Vijayawada.

PROFORMA OF SCHEDULES A to F

SCHEDULE 'A'

Schedule of Quantities : **Enclosed**
 Estimated Cost Put to Tender : Rs.49,10,035/-

SCHEDULE 'D'

Extra schedule for specific requirements / documents for the work, if any-

- a. Special Conditions for all specialized
 / E&M Components : Attached

SCHEDULE 'E'

Reference to General Conditions of contract: **GCC 2023 for Construction Works** as amended/modified up to last date of submission of tender.

Name of Work: Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur.

Estimated Cost Put to Tender : Rs.49,10,035/-

- (i) Earnest money : **Rs.98,201/-** (To be returned after receiving Performance Guarantee).
- (ii) Performance Guarantee :The contractor whose bid is accepted, will be required to furnish **Performance Guarantee of 5% (Five Percent)** of the tendered amount/estimated amount whichever is higher within the period specified in schedule F+(plus) Where the tendered amount is less than eighty percent (80%) of the ECPT amount the Performance Guarantee, in addition to the requirement mentioned above, shall be increased by an amount equal to the difference between eighty percent (80%)of the ECPT and the tendered amount.
- (iii)Security Deposits : 2.5%of tendered / accepted value.

SCHEDULE 'F'- General Rules & Directions:

Officer inviting tender: **Executive Engineer(E),
 CPWD, Vijayawada.**

Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3 : **See below under Clause 12.**

Definitions

- 2(v) Engineer-in-Charge : **Executive Engineer(E), CPWD, Vijayawada or his successor thereof.**
- 2(viii) Accepting Authority : **Chief Engineer, CPWD, Vijayawada, or his successor thereof.**
- 2(x) Percentage on cost of materials and labour to cover all overheads and profits. : **15% (7.5% for Profits + 7.5% for overheads)**
- 2(xi) Standard Schedule of Rates : **Delhi Schedule of Rates 2023 for Civil component, & for Electrical component: DSR 2022 & 2025 and Market Rates**
- 2(xii) Department : **Central Public Works Department.**
- 9(ii) Standard CPWD contract Form GCC 2023, CPWD-7 as modified & corrected up to : **GCC 2023 for Construction works & CPWD - 7 as amended/ modified up to last date of submission of e-tender.**

Clause I

- (i) Time allowed for submission of performance Guarantee, Programme Chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance. : **7 days.**
- (ii) Maximum allowable extension with late fee at 0.1% per day of performance Guarantee amount beyond the period as provided in (i) above : **3 days.**

Clause 2

Authority for fixing compensation under clause-2. : **Chief Engineer, CPWD, Vijayawada or his successor thereof.**

Clause 2A

Whether clause 2A shall be applicable : **Not Applicable**

Clause 5

Number of days from the date of issue of letter of acceptance for reckoning date of start : **7days**

Milestones for E&M Works

S. No	Description of Milestone (Physical)	Time allowed in percentage of days (from the date of start)	Amount to be withheld in case of non-achievement of milestone (% of tendered amount of respective E & M Component)
	-----NIL-----		

Time Period allowed for execution of work: 04 (four) months

Authority to decide:			
i)	Authority to convey the decision of shifting of milestone and extension of time	:	Executive Engineer(E), CPWD, Vijayawada or his successor thereof with prior approval of the Chief Engineer, CPWD, Vijayawada.
ii)	Rescheduling of Mile stones and Extension of Time	:	Chief Engineer, CPWD, Vijayawada or his successor thereof.
iii)	Shifting the date of start in case of delay in handing over of site	:	Chief Engineer, CPWD, Vijayawada or his successor thereof.

Clause 5.2

Documentation of Hindrances	1. The contractor has to first register himself through a registration form, available on CPWD website under 'Contractors Login' tab. After registration, User ID and password will be automatically generated and sent on his registered mobile and email ID. Using this User ID and Password he can access the module and view all the works which are being carried out by him in CPWD and he can register the hindrance against any particular work. After recording the hindrance by the contractor, it will be visible to all concerned officers (JE and above) of that work. An alert through text message and email will be sent to EE. 2. Executive Engineer will first assign the work to the JEs/AEs who will give their comments on the hindrance within 2 days. After that Executive Engineer of the work will have to take appropriate action on the hindrance within 2 days. The comments of JEs/AEs will not be visible to contractor, only the decision of the Executive Engineer on the hindrance will be visible to contractor under "Decision of the Engineer-in-charge."
Clause 5.4 Recovery per day for delay in submission of revised programme	Rs. 1,000/- per each day
Clause 6: Computerized Measure Book (CMB) / Electronic Measurement Book (EMB) Mode of Measurement:	CMB

Clause 7 Gross work to be done together with net Payment/adjustment of advances for material collected, if any since the last such payment for being eligible to interim payment	:	17.00 lakhs.
Clause 7A Whether clause 7A shall be applicable:	:	Yes.
Clause 7B Whether clause 7B shall be applicable:	:	Yes.
Clause 8A Authority to decide compensation on account if contractor fails to submit completion plans	:	Executive Engineer(E), CPWD, Vijayawada
Clause 10A List of testing equipment to be provided by the contractor at site lab.	:	Not Applicable
Clause 10 B(ii) Whether clause 10-B (ii) shall be applicable	:	Not Applicable
Clause 10C Component of Labour expressed as percent of value of work.	:	Applicable 15%
Clause 10CC	:	Not Applicable
Clause 11 Specifications to be followed for execution of work	:	CPWD Specifications 2023 up to date correction slips
Clause 12 Authority to decide deviation up to 1.5 times of tendered amount.	:	Chief Engineer, CPWD, Vijayawada. The Completion of Cost including extra items, deviations and admissible escalation shall, in no case, exceed 1.50 times the contract amount. Contractor has to devise a system to keep a watch on quantum of work taken up vis-à-vis balance items required to complete defined scope of work and will give the alerts to Engineer-In-Charge before taking up extra items, deviations so that completion cost including extra items, deviations and admissible escalation does not exceed 1.50 times the contract value. Work executed beyond above limit will neither be recorded nor be paid.
12.2& 12.3 Deviation limit beyond which clauses 12.2& 12.3 shall apply.	:	100% Deviation
12.5 i) Deviation limit beyond which clauses 12.2& 12.3 shall apply for all construction works	:	100% Deviation
Clause 16 Competent authority for deciding the reduced rates	:	Chief Engineer, CPWD, Vijayawada or his Successor thereof

Clause 18 List of mandatory machinery, tools & plants to be deployed by the contractor at site	:	T&P and machinery required as directed by the Engineer-in-charge.
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- Clause -19C: -** Authority to decide penalty : Executive Engineer(E),
for each default CPWD, Vijayawada
- Clause -19D: -** Authority to decide penalty : Executive Engineer(E),
for each default CPWD, Vijayawada
- Clause -19G: -** Authority to decide penalty : Chief Engineer,
for each default CPWD, Vijayawada
- Clause -19K: -** Authority to decide penalty : i. Chief Engineer,
for each default CPWD, Vijayawada
ii. Rs.1000/- per tradesman per day

Clause 25

i. Conciliator for settlement of Disputes	Additional Director General, Region Hyderabad, CPWD, Hyderabad or his successor thereof.
ii. Arbitrator Appointment Authority	Chief Engineer, CPWD, Vijayawada or his Successor thereof

Place of Conciliation: Hyderabad

Clause 32: Requirement of Technical Representative(s) and recovery rates

Sl. No.	Requirement of Technical Staff		Minimum experience (Years)	Designation of technical staff	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 32
	Qualification	Number (Of Major/ Minor Component)			
1	Graduate Engineer Or Diploma Engineer	1	2 or 5 respectively	Project Manager cum Planning / quality /Site/ billing Engineer	Rs.60,000/- per month per person.

Assistant Engineers retired from Government services those are holding Diploma will be treated at par with Graduate Engineers.

Diploma holders with minimum 10-year relevant experience with a reputed construction co. can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.

For works with estimated cost more than Rs. 10 crores and stipulated time period more than 6 months:

The contractor shall ensure that at least one deployed technical representative shall

be trained in courses related to CPWD specifications, labour laws, safety rules etc. of duration not less than 5 working days either through National CPWD Academy (NCA) or National Institute of Construction Management and Research (NICMAR) or CIDC or any other similar reputed and recognized Institute managed or certified by State/Central Government. The training cost and other cost related to training shall be borne by the contractor. The Contractor shall ensure that at least one technical representative is trained within six months of start of work. The time period of six months can be relaxed by the Engineer-in-charge depending upon the frequency of training course organized by NCA.

If the contractor fails to ensure that at least one technical representative is trained in the above mentioned course till completion of work or one year from start of work, whichever is earlier, then a non-refundable recovery of Rs. 50,000/- shall be made from the bill of the contractor. Decision of Engineer-in-charge in this regard shall be final and binding on the contractor.

Clause 38

- (i) (a) Schedule / statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates 2023 printed by C.P.W.D. with correction slips up to the last date of submission of bids.
- (ii) Variations permissible on theoretical quantities.
 - (a) Cement for works with estimated cost put to tender more than 25 lakhs : Not Applicable
 - (b) Bitumen for all works : Not Applicable
 - (c) Steel Reinforcement and structural steel sections for each diameter, Section and category : Not Applicable
 - (d) All other materials : Nil

Executive Engineer(E)
CPWD, Vijayawada

(FORM-D)**Receipt of deposition of original EMD****(Receipt No. /date)**

Name of Work: Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur

NIT No.:19/EE(E)/E-Tender(Vijayawada)/e-tender/2026-27

- | | | |
|------------------------------------|---|--------------------|
| 1. Estimated Cost | : | Rs.49,10,035/- |
| 2. Amount of Earnest Money Deposit | : | Rs.98,201/- |
| 3. Last date of submission of bid | : | 22-07-2026 |

(to be filled by Executive Engineer, CPWD)

- | | |
|----|---------------------------------------|
| 1. | Name of Contractor |
| # | |
| 2. | Form of EMD..... |
| # | |
| 3. | Amount of Earnest Money Deposit |
| # | |
| 4. | Date of submission of EMD |
| # | |

Signature, Name and Designation of EMD

Receiving officer (EE/AAO)

Along with Office stamp

(#To be filled by EMD receiving EE or
NIT issuing EE, as the case may be)

THE MINIMUM ELIGIBILITY CRITERIA FOR ELECTRICAL WORKS WHEREVER APPLICABLE

1. The applicant shall either himself may carryout works or otherwise, he will have to associate an agency meeting the eligibility requirements as given in this tender document and submit the details as per **Form "G"** given in this tender document within 07 days of award of work OR before start of minor component of work whichever is earlier.

The applicant/ main contractor has to submit consent letters as per **Form "H"**, given in Part C of this tender document from at least one eligible associate agency of the respective component of E&M work for each of the component of E& M works by clearly indicating the component of work within 07 days of award of work OR before start of minor component of work whichever is earlier.

The main contractor will submit Affidavit of MOU signed with eligible associated contractor. The Affidavit of MOU in the enclosed Form "I" shall be signed by both contractors, Main contractor as 1st party and associated contractor as 2nd party, independently for **"Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur."**

If the main contractor fails to associate agency for execution of minor components of work within 07 days of award of work OR before start of minor component of work whichever is earlier or furnishes incomplete details or furnishes details of ineligible agencies even after the tenderer is given due opportunity, the entire scope of such component of work shall be withdrawn from the tender and the same shall be got executed by the Engineer-in-Charge at the risk and cost of the main contractor.

THE MINIMUM ELIGIBILITY CRITERIA FOR E&M COMPONENTS AND SPECIALIZED WORKS WHEREVER APPLICABLE

Sl. No	Component of E&M works	Estimated cost in Rs.	Eligibility
1.	Substation	Rs.49,10,035/-	The main contractor shall have to associate with agency fulfilling the following eligibility criteria processing valid HT electrical license issued by competent authority (if he himself does not fulfill the eligibility criteria) and having successfully completed works during last seven years ending up to previous day of last date of submission of tender as given below with completion certificate issued by an officer not below the rank of Executive Engineer or equivalent duly attested: - Three similar completed works each of value not less than Rs.19.64 Lakhs or

			Two similar completed works each of value not less than Rs.29.46 Lakhs or One similar completed work of value not less than Rs.39.28 Lakhs Similar work shall mean "SITC of Substation with capacity of Individual transformer not less than 200 KVA" The Main contractor is also be eligible to carry out himself/ herself any or all of these works without associating any specialized agency provided: (a) He fulfills the prescribed eligibility criteria respectively for these work(s).
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Executive Engineer (E)(Vijayawada)

FORM -G**PROPOSAL FOR ELIGIBLE ASSOCIATING AGENCIES FOR ELECTRICAL WORK**

Name of work: Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur.

I/we hereby propose the following agencies as per mentioned against each for executing corresponding minor components of work. Their consent letters are also attached.

Sl.No	Name of Associated Contractor	Category and Class of registration	Enlistment copy/completion Certificates attached	Monetary Limit of work	Validity of registration	Consent letter attached (Yes/No)
1	Substation					

Note: Self Attested photocopies of enlistment order, valid electrical contractor license, work experience certificates of each agency for each component of E&M work shall be submitted.

Signature of contractor

FORM -H**CONSENT LETTER FROM ELIGIBLE ASSOCIATE AGENCY OF
ELECTRICAL WORK**

Name of work: Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur.

I / We hereby give my consent to associate with ----- for executing the minor component work of **“Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur”**.

1. I / We will execute the work as per specifications and conditions of the agreement and as per directions of the Engineer -in-Charge for the corresponding minor work till the completion of the work.
2. I / We will be responsible for necessary action to handover the installations and for rectification of defects and repair during the maintenance / warranty period.
3. Also I / We will employ full time technically qualified Engineer / supervisor for the minor component of the work as required for the work. I / We will attend inspection of officers of the department as and when required.

Date:

Signature with date of Major component

Signature with date of Associate/
Minor

Component
Contractor
Address

Witness with address
(From major component contractor side)
side)

Witness with address
(From minor component contractor

FORM-"I"AFFIDAVIT OF MEMORANDUM OF UNDERSTANDING (MOU)
(to be submitted for each and every E&M component)

1. M/s. (Name of the firm with full address)
Enlistment Status
Valid Up to:
(Henceforth called the main Contractor)
2. M/s. (Name of the firm with full address)
Enlistment Status
Valid Up to:
(Henceforth called Associated Contractor)

For the execution of E & M Work

Name of work: Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur

We state that M.O.U between us will be treated as an agreement and has legality as per Indian Contract Act (amended up to date) and the department (CPWD) can enforce all the terms and conditions of the agreement for execution of the above work. Both of us shall be responsible for the execution of work as per the agreement to the extent this MOU allows. Both the parties can be paid consequent to the execution as per agreement to the extent this MOU permits. In case of any dispute, either of us will go for mediation by the Engineer In charge. Any of us may appeal against the mediation to the Chief Engineer, CPWD, Vijayawada. His decision shall be final and binding on both of us.

We have agreed as under:

1. The Associated Contractor will execute all civil works in the wholesome manner as per terms and conditions of the agreement.
2. The Associated Contractor shall be liable for disciplinary action if he fails to discharge the action(s) and other legal action as per agreement.
3. All the machinery and equipment, tools and tackles required for execution of the Civil works, as per agreement, shall be the responsibility of the Associated Contractor.
4. The site staff required for the Civil work shall be arranged by the Associated Contractor as per terms and conditions of the agreement.
5. Site order book maintained for the said work shall be signed by the main contractor as well as by the Engineer of the Associated Contractor and by Associated Contractor himself.

6. All the correspondence regarding execution of the Civil work shall be done by the department with the Associated Contractor with a copy to the main contractor. In case of non-compliance of the provisions of agreement, the main contractor, as well as the associated contractor shall be responsible. The action under clauses 2 and 3 shall be initiated and taken against the main contractor.

SIGNATURE OF MAIN CONTRACTOR
ASSOCIATED

Date:
Place:

SIGNATURE OF
CONTRACTOR

Date
Place:

1. Witness with address

(From major component contractor side)
contractor side)

2. Witness with address

(From minor component

NOTE: Affidavit to be furnished on a 'Non-Judicial' stamp paper worth Rs.100/-

On Non – Judicial stamp paper of minimum Rs. 100/-

Form for Bank Guarantee for Earnest Money Deposit/Performance Guarantee / Security Deposit / Mobilization Advance / for release of amount withheld for Milestones

1. Whereas the Executive Engineer (Name of Division) CPWD on behalf of the President of India (hereinafter called "The Government") has invited bids under (NIT Number) dated for (Name of work)

..... The Government has further agreed to accept irrevocable Bank Guarantee for Rs. (Rupees Only) valid upto (date) * As Earnest Money Deposit from (Name and Address of Contractor) (herein after called "the contractor") for compliance of his obligations in accordance with the terms and conditions of the said NIT. ** or **

Whereas the Executive Engineer (Name of Division) CPWD on behalf of the President of India (hereinafter called "The Government") as entered into an agreement bearing number With (name and address of the contractor) (Hereinafter called "the Contractor") for execution of work (Name of work)

..... The Government has further agreed to accept an irrevocable Bank Guarantee for Rs. (Rupees only) valid upto (date)

..... As Performance Guarantee / Security Deposit / Mobilization Advance from the said Contractor for compliance of his obligations in accordance with the terms and conditions of the agreement. 2. We, (Indicate the name of the bank) (hereinafter referred to as "the Bank"), hereby undertake to pay to the Government an amount not exceeding Rs. (Rupees Only) on demand by the Government within 10 days of the demand.

We, (Indicate the name of the Bank), do here by undertake to pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said amount due from the said Contractor. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. (Rupees only).

4. We, (Indicate the name of the Bank), further undertake to pay the Government any money so demanded notwithstanding any dispute or dispute raised by the contractor in any suit or proceeding pending before any Court or Tribunal, our liability under this Bank Guarantee being absolute and unequivocal. The payment so made by us under this Bank Guarantee shall be valid discharge of our liability for payment there under and the Contractor shall have no claim against us for making such payment. 5. We, (indicate the name of the Bank), further agree that the Government shall have the fullest liberty without our consent and without affecting any manner our obligation here under to vary any of the terms and conditions of the said agreement or to extend time of performance by the said

Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us. 6. We, (Indicate the name of the Bank), further agree that the Government at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor at the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee the Government may have in relation to the Contractor's liabilities.

This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor. 8. We, (Indicate the name of the Bank), undertake not to revoke this guarantee except with the consent of the Government in writing. 9. This Bank Guarantee shall be valid up to Unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs.(Rupees only) and unless a claim in writing is lodged with us within the date of expiry or extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Date

Witness: 1. Signature

Authorized signatory

Name and address

Name Designation

Staff Code no.

3. Signature Bank Seal

Name and Address

Note:

1. *Date to be worked out on the basis of validity period of 90 days where only financial bids are invited and 180 days for two / three bid system from the date of submission of tender.

2. ** In paragraph 1, strike out the portion not applicable. Bank Guarantee will be made either for earnest money or performance guarantee / security deposit / mobilization advance, as the case may be.

3. The Bank Guarantee shall be drawn on non-judicial stamp paper of minimum Rs.100.

GENERAL TERMS AND CONDITIONS APPLICABLE FOR ALL E&M COMPONENTS

1 GENERAL

- 1.1 The work shall be generally carried out in accordance with tender/bid specifications and the following specifications / rules with up-to-date amendments.
- a) CPWD General Specifications for Electrical work Part I Internal – 2023, as amended up to date
 - b) CPWD General Specifications for Electrical work Part II External– 2023, as amended up to date
 - c) CPWD General Specifications for Electrical work Part IV (Substation) – 2013, as amended Up to date
 - d) CPWD General Specifications Part-VII (D.G Sets) - 2013 as amended up to date.
 - e) Commercial and Additional conditions for this work.
 - f) The Indian Electricity Act, 2003, as amended up to date.
 - g) Indian Electricity Rules 1956 amended up to date.
- 1.2 Order of Preference:
- Should there be any difference or discrepancy between the description of items as given in the Schedule of Quantities, technical specifications for individual items of work (including additional and commercial conditions) and IS Codes etc., the following order of preference shall be followed:
- a) Description of Schedule of quantities.
 - b) Commercial and Additional conditions for this work.
 - c) Drawings.
 - d) CPWD General Specifications of that particular work.
 - e) Relevant IS or any other international code in case IS code is not available.
- Commercial and Additional conditions of that particular work are to be read in conjunction with above and in case of variations, specifications given in these additional conditions shall apply. However, nothing extra shall be paid on account of these additional specifications and conditions, as the same are to be read along with schedule of quantities for the work.
- 1.3 This specification covers manufacture, testing as may be necessary before dispatch, delivery at site, all preparatory work, assembly and installation, commissioning putting into operation of equipment of all E&M components of the tender.
- 1.4 The tenderer should in his own interest visit the site and get familiarize with the site conditions before tendering.
- 1.5 No T&P shall be issued by the Department and nothing extra shall be paid on account of this.

2 COMMERCIAL CONDITIONS

Type of Contract: The work to be awarded by this tender shall be treated as indivisible works contract.

Income tax, GST, labour cess & other statutory deductions etc. shall be made at source as per the prevalent laws. The deductions of Security Deposit, Income-Tax etc. shall be done as applicable on the gross payments and net payment shall be paid accordingly.

3 RATES

The rates quoted by the tenderer, shall be firm and inclusive of all taxes (including GST, labour cess etc.), and all charges for packing forwarding, insurance, freight and delivery, installation, testing, commissioning etc. at site including temporary construction of storage, risks, overhead charges, general liabilities/obligations and clearance from CEA. However, the fee for the CEA inspections shall be reimbursed/ borne by the department. EPF & ESI contributions are to be made by the contractor. The department will not issue Octroy exemption certificate.

4 DEFECT LAIBILITY PERIOD

- 4.1 The contractor has to carry out maintenance as per CPWD General Specifications / manufacturer's standards for a period of 12 months or as decided by the Engineer -in - Charge from the date of handing over. Nothing extra shall be paid on this account.
- 4.2 In case of Specialized E&M works if Engineer-in-charge desires, the tenderer should submit the following documents from OEM for that particular minor component
 - a) Authorization certificate.
 - b) The OEM is unconditionally support the lowest tenderer technically throughout the execution of contract as well as for Maintenance/Comprehensive Maintenance Contract for the useful life of the system, and
 - c) OEM is providing all the spares required for healthy functioning of the equipment for at least seven years from the date of supply of equipment.
- 4.3 In case the same item appears more than once in the schedule of work under the same sub head or among the different subhead of works, the lowest rate quoted for that item elsewhere shall be considered for other items also during evaluation of tender.

5 COMPLETENESS OF TENDER

All sundry equipment, fittings, unit assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections, and all other items which are useful and necessary for efficient assembly and installation of equipment and components of the work shall be deemed to have been included in the tender irrespective of the fact whether such items are specifically mentioned in the tender documents or not.

6 STORAGE AND CUSTODY OF MATERIALS

The agency has to make his own arrangements. No storage accommodation shall be provided by the department. Watch and ward of the stores and their safe custody shall be the responsibility of the contractor till the final taking over of the installation by the department/client.

7 CARE OF THE BUILDING:

Care shall be taken by the contractor while handling and installing the various equipments and components of the work to avoid damage to the building. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove at his cost all unwanted and waste materials arising out of the installation from the site of work.

8 COMPLETION PERIOD

The completion period indicated in the tender documents is for the entire work of planning, designing, approval of drawings etc., arrangement of materials & equipments, delivery at site including transportation, installation, testing, commissioning and handing over of the entire system to the satisfaction of the Engineer-in-charge.

9 GUARANTEE

9.1 All equipment shall be guaranteed for a period of 12 months from the date of taking over the installation by the department, against any unsatisfactory performance and/or breakdown due to defective design, workmanship, or materials. However, LED fittings shall carry a minimum guarantee of 5 years, while ceiling fans, pumps, and motors shall be guaranteed for a period of 2 years. The equipments or components, or any part thereof, so found defective during guarantee period shall be repaired or replaced free of cost, to the satisfaction of the Engineer-in Charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor. The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.

9.2 The tender shall guarantee among other things, the following:

- a. Quality, strength and performance of the materials used as per manufacturers standards.
- b. Safe mechanical and electrical stress on all parts under all specified conditions of operation. Satisfactory operation during the maintenance period.

10 POWER SUPPLY:

The contractor has to make its own arrangement for power supply required for execution of the work.

11 WATER SUPPLY:

The contractor has to make its own arrangement for water supply required for execution of the work.

12 ACCEPTABLE MAKES OF VARIOUS EQUIPMENTS:

The acceptable makes of various equipments/components/accessories have been indicated in "Acceptable Makes" appended with the tender documents. The tenderer shall work out the cost of the offer on this basis. Alternate makes are not acceptable.

13 DATA MANUAL AND DRAWINGS TO BE FURNISHED BY THE TENDERER:

After award of work

The successful tenderer would be required to submit the following drawings after award of work for approval as per mile stones of tender.

- a) General arrangement drawing, including detailed shop drawings of all E&M components, conduit size and route layout, Panel Drawing, Light Fitting Distribution Drawing, Fire Alarm and Fire Fighting Layout, VRF AC Distribution Layout and other drawings of all E&M components to be submitted by the agency well in advance to get the approval from the JE(E)/AE(E)/EE (E) and care shall be taken not to avoid any delay in the slab casting for all individual E&M component.
- b) Details of foundations for the equipments and the weights of assembled equipments.
- c) Any other drawings necessary for the job.
- d) Reflected Ceiling Plan (RCP) for all floors by incorporating all equipments likely to come in ceiling/false ceiling shall be submitted for approval before casting of slabs by considering all E&M components.

14. The successful tenderer should furnish well in advance of start of work, three copies of detailed instructions and manufacturer's manuals of all equipments regarding installation, operation and maintenance, preventive maintenance & trouble shooting with all the relevant data sheets, spare parts catalogue, etc.

15. EXTENT OF WORK

- 15.1 The work shall comprise of entire labour including supervision, all materials necessary to make a complete installation, tests and adjustments and commissioning, as may be required by the department. The term complete installation shall not only mean major items of the plant and equipments covered by specifications but all incidental sundry components necessary for complete execution and satisfactory performance of installation with all layout charts whether or not been mentioned in details in the tender document in connection with this contract as this is a turnkey job.
- 15.2 The cables and all other items shall be brought to site only after taking correct measurements as per actual requirement of work. Excess quantities shall not be accepted and paid. i.e., Quantity of item brought to site and used in work as per actual requirement shall only be measured and paid irrespective of quantities of BOQ / work schedule. **The item brought at site and paid, if not used in the project have to be taken back by the contractor and deductions in the payment shall be adjusted in subsequent bills.** The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.
- 15.3 In addition to supply, installation, testing and commissioning, of all E&M equipment, following works shall be deemed to be included within the scope of work to be executed by the tenderer.
 - a) Minor building works necessary for installation of equipments, foundation, making of opening in walls or in floors and restoring them to their original condition finish and necessary grouting etc. as required.
 - b) All necessary supports may be arranged.
 - c) Testing of PTs/CTs for metering & protection purpose & relay calibration &

- setting.
- d) Getting inspection done & obtaining approval from Central Electrical Authority and local fire authority for energizing the installation. However, necessary fees for inspection shall be borne by the Department.
- 16** Exclusion and work to be done by other agencies:
The following shall be excluded from the scope of the work:
- a) Major dismantling of any existing building work.

17. INSPECTION AND TESTING

- 17.1 All major equipments like Transformers/DG sets/LT panels/HT panels/HVAC Equipments/Lifts etc (as per the guidelines of **Quality Assurance Policy & Check List of E & M Services/specifications**) shall be offered for initial inspection contractor will intimate the date of testing of equipments at the manufacturer's works before dispatch. The successful tenderer shall give advance notice of minimum two weeks regarding the dates proposed for such tests to the department's representative to facilitate his presence during testing.
The Engineer-in-charge or his representative may witness such testing. The cost of the Engineer's visit to the factory will be borne by the Department. Equipments will be inspected at the manufacturer/ Authorized Dealers premises, before dispatch to the site by the contractor if so desired by the Engineer-in-charge. Engineer-in-charge at his discretion may waive off inspection at factory /at the manufacturer's works before dispatch.
- 17.2 Copies of all documents of routine and type test certificates of the equipment, carried out at the Manufacturer's premises shall be furnished to the Engineer-in-charge. The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.
- 17.3 After completion of the work in all respects the contractor shall offer the installation for testing and operation. The contractor should submit all the related documents of completed E&M equipment to the department for further handing over to client department.

18. COMPLIANCE WITH REGULATIONS AND INDIAN STANDARDS

- All works shall be carried out in accordance with relevant regulation, both
- 18.1 statutory and those specified by the Indian Standards related to the works covered by this specification.
- In particular, the equipment and installation will comply with the following:
- i) Factories Act.
 - ii) Indian Electricity Rules.
 - iii) B.I.S. & other standards as applicable.
 - iv) Workmen's compensation Act.
 - v) Statutory norms prescribed by local bodies like CEA, Power Supply Co., Fire authorities, etc.
- 18.2 After completion of the installation, the same shall be offered for inspection by the representatives of the Central Electricity Authority if required and local fire authority. The contractor will extend all help including test facilities to the

representatives of CEA/Local fire authority. The observations of CEA/Local fire authority will be attended to by the contractor. The installation will be commissioned only after getting clearance from CEA/Local fire authority. Contractor should get inspection done & obtain approval from Central electrical Authority and local fire authority.

- 18.3 Nothing in this specification shall be construed to relieve the successful tenderer of his responsibility for the design, manufacture and installation of the equipment with all accessories in accordance with currently applicable statutory regulations and safety codes.

19. INDEMNITY:

The successful tenderer shall at all times indemnify the department. Consequent on this works contract, the successful tenderer shall be liable, in accordance with the Indian Law and Regulations for any accident occurring due to any cause and the contractor shall be responsible for any accident or damage incurred or claims arising there during the period of erection, construction and putting into operation the equipments and ancillary equipment under the supervision of the successful tenderer to the extent the latter is responsible. The successful tenderer shall also provide all insurance including third party insurance as may be necessary to cover the risk. No extra payment would be made to the successful tenderer on account of the above.

20. ERECTION TOOLS:

No tools and tackles either for unloading or for shifting the equipments for erection purposes would be made available by the department. The successful tenderer shall make his own arrangement for all these facilities.

21. COOPERATION WITH OTHER AGENCIES:

The successful tenderer shall co-ordinate with other contractors and agencies engaged in the construction of buildings, if any, and exchange freely all technical information so as to make the execution of this work/contract smooth. No remuneration should be claimed from the department for such technical cooperation. If any unreasonable hindrance is caused to other agencies and any completed portion of the work has to be dismantled and re-done for want of cooperation and coordination by the tenderer during the course of work, such expenditure incurred will be recovered from the successful tenderer if the restoration work to the original condition or specification of the dismantled portion of the work was not undertaken by the tenderer himself.

The work will be carried out with least disturbance during shifting & shut down taken in consultation with the client department.

22. INSURANCE AND STORAGE:

All consignments are to be duly insured upto the destination from warehouse at the cost of the contractor. The insurance covers shall be valid till the equipment is handed over duly installed, tested and commissioned.

23. VERIFICATION OF CORRECTNESS OF EQUIPMENT AT DESTINATION:

The contractor shall have to produce all the relevant records to certify that the genuine equipments from the manufacturers has been supplied and erected to the satisfaction of the Engineer-in-charge.

24. PAINTING:

This shall include cost of painting of the entire installation. The major equipments like HT panel, transformers, L T panel, bus duct, cable trays, HVAC equipment, etc. shall be factory final finish painted. The agency shall be required to do only touching to the damages caused to the painting during transportation, handling & installation at site, if there is no major damage to the painting. However, hangers, supports etc. of bus trunking & cable tray etc. shall be painted with required shade including painting with two coats of anticorrosive primer paint at site.

25. TRAINING:

The scope of works includes the on job technical training of two persons of Department at site as decided by Engineer – in - charge. Nothing extra shall be payable on this account.

26. MAINTENANCE:

Sufficient trained and experienced staff shall be made available to meet any exigency of work during the guarantee period of two years from the handing over of the installation.

The maintenance, routine as well as preventive, for two years from the date of taking over the installation as per manufacturer's recommendation.

27. Approval of drawings, makes and models of equipment/materials for all E&M components:

26.1. The agency shall submit drawings and details such as makes and models of the equipments/materials offered by him along with specifications for all E&M components to the Engineer-in-charge of the work, before ordering the equipment/materials for approval of the department.

26.2. The Engineer-in-charge shall scrutinize the proposal and approve the makes and models which are acceptable as per the schedule, specifications, conditions of the agreement and inform the agency for procurement.

26.3. After approval of the equipment/materials by the department the agency shall procure the equipment/materials from the OEM/authorized distributor/dealer as the case may be.

28. Adequate care that only tested and genuine materials of proper quality are used in work shall be ensured by firm. The firm shall also ensure that:

- i. Material will be ordered & delivered at site only with the prior approval of the department to ensure timely delivery.
- ii. As and when the order is placed for the fittings/ fixtures, cables, switchgears, poles, other main items etc, its copy shall be endorsed to the Engineer-in-charge of work.
- iii. The contractor will submit makes & brands of electrical fittings wires & cables, conduits and switchgears, rising mains, poles, outdoor fittings etc. of preferred make list as per tender documents for approval of Engineer-In-Charge, whose decision will be final in the matter.
- iv. The firm will be required to procure material directly from the manufacturer/ authorized dealers to ensure genuineness & quality and as per the approved

- makes only. Proof in this regard shall be submitted by the contractor if required by the department.
- v. Inspection at factory or at godown, as required, shall be arranged by the firm for a mutually agreed date.
 - vi. Delivery of material shall be taken up only with the consent of department, after clearance of the material.
 - vii. Department shall reserve the right to waive off inspection in lieu of suitable test certificate, at its discretion.
 - viii. All the materials to be supplied by the contractor shall be procured & brought to site as per requirement at site of work in consultation with department so that these materials are not damaged & their manufacturer's warrantee.

29. Safety Codes & Statutory Regulations:

- a. Nothing in this specification shall be construed to relieve the successful tenderer of his responsibility for the design, manufacture and installation of the equipment with all accessories in accordance with currently applicable statutory regulations and safety codes.
- b. Successful tenderer shall arrange for compliance with statutory provisions of safety regulations and departmental requirements of safety codes in respect of labour employed on the work by the tenderer. Failure to provide such safety requirement would make the tenderer liable for penalty of Rs.1000/- for each default. In addition, the department will be at liberty to make arrangement for the safety requirements at the cost of tenderer and recover the cost thereof from him.

30. Payment terms

On account payments for part work (after stipulated and statutory deductions) as assessed by the Engineer – in-charge for the applicable items in the Contract shall be payable at part rates not exceeding the percentage indicated against the stages of work.

S.No.	Stage of work	Percentage of Rate	
		Transformer	All other Items
A	After initial inspection (wherever specified) & delivery at site in good condition on pro-rata basis	70%	75%
B	On completion of pro-rata installation	20%	15%
C	On commissioning and completion of successful running in period & taking over of the equipments by the department.	5%	5%
D	At the time of payment of final bill	5%	5%

Executive Engineer (E)

AE(E)(P) EE(E)

TECHNICAL SPECIFICATIONS FOR 11KV HT VCB PANEL

1. SCOPE

These specifications cover the detailed requirements for supply, installation, testing and commissioning of Substation equipments (Transformers, HT Panels, Bus Trunking / Rising Mains and other related items).

2 TYPE OF PANELS:

a) Vacuum circuit breaker.

VACUUM CIRCUIT BREAKER/ H.T. PANEL

- 2.1** The panel shall be indoor and outdoor type, having the incoming sectionalization and outgoing switch gears as per **IS 13118-1991 of VCB, IEC 62271-100 for Breakers and - 200 for Panels / IS 3427 of switch board**. The degree of enclosure protection shall be IP-4X for indoor panel and IP-67 for SF6 gas filled stainless steel tank and IP54 for outer enclosure of outdoor type panel.

Updated and current Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 2003, Indian Electricity Rules 1956, National Building Code 2016, National Electric Code 1985, Code of Practice for Fire Safety of Building (general): General Principal and Fire Grading - IS 1641 - 1988 as amended up to date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable. Detailed requirements shall be in accordance with the schedule of works.

- 2.2 Rating:** All panels assembled to form a board shall be suitable for the nominal operation voltage and rupturing capacity as specified. They should be rated as specified with a minimum of 630 Amps. And suitable for operation on 11 KV, 3 phase 50 Hz system. Type test certificate for the breaking capacity of the panel shall be supplied. A circuit breaker for a given duty in service is best selected by considering the individual rated values required by load conditions and fault condition.
- 2.3 Type:** The HV panel Board shall be metal clad, indoor/outdoor, floor mounting, free standing type. It shall be totally enclosed dust, damp and vermin proof.
- 2.4 General Construction:** Separately earthed compartments shall be provided for circuit breakers, bus bars, relay & instruments, CT & PT and cable boxes, fully and effectively segregating these from one another so that fault in anyone compartment do not cause damage to equipment(s) in other compartment(s).
The housing shall be of bolted construction to ensure compact and rigid structure, presenting a neat and pleasing appearance. The sheet steel used should not be less than 2mm. thick.
The panels shall be bolted together to form a continuous flush front switch gear suitable for front operation of board and for extension at both ends. For Outdoor panel suitable size of brick / RR masonry / cement concrete plinth shall be provided at site as per OEM standards and to suit easy access and operational convenience.
- 2.5 General Design Aspects:** The HV panel board shall be designed such that the switchgear, instruments, relays, bus bars, small wiring etc. are arranged and mounted with due consideration for the followings:
- i) Facility for inspection, maintenance and repairs of testing terminals and terminal boards for ease of external connection.
 - ii) Minimum noise and vibrations.

- Risk of accidental short circuits and open circuits.
- Secured and vibration proof connections for power and control circuits.
- iii) Risk of accidental contact and danger to personnel due to live connections.
 - a) Mountings at approachable height.

3 CIRCUIT BREAKER:

3.1 General Arrangements: The circuit breaker panels shall be complete with the following:

- a) Racking in / Racking out mechanism.
- b) Isolating plugs and sockets.
- c) Mechanical inter-locks and safety shutters.
- d) Mechanical ON/OFF indicator.
- e) Minimum of 4 NO and 4 NC Auxiliary contacts directly operated by the circuit breaker. **Additional NO & NC contacts can be provided with auxiliary contactors.**
- f) Anti condensation space heaters suitable for operation on 240V, 1 Ph 50 Hz A.C. for each panel wherever specified.
- g) Suitable tripping arrangement
- h) Mechanical counter to assess the total number of operations of the breaker (if asked for specifically).

3.2 Type: The circuit breaker shall be of horizontal isolation, horizontal draw out pattern.

3.3 Breaker Truck: The breaker carriage shall be fabricated from steel, providing a sturdy vehicle for the circuit breaker and its operating and tripping mechanism. The carriage shall be mounted on wheels, moving on guides, designed to align correctly and allow easy movement of the circuit breaker and for removing the carriage for inspection and maintenance purposes.

Vacuum interrupters shall be hermetically sealed and shall be designed for minimum contact erosion, fast recovery of dielectric strength, maintenance free vacuum interrupter, suitable for auto-reclosing. The drive mechanism shall preferably be provided with facility for pad locking at any position namely, "Service", "Test" and "Fully Isolated". It should be possible for testing the circuit breaker for its operation without energizing the power circuit in the "Testing" position. The contacts shall be made only after the breaker is inserted into service position. Interlocking should prevent contacts from being disconnected if circuit breaker is tried to be moved from service position.

3.4 General Features: Single break contacts are provided in sealed vacuum interrupter.

3.5 Rating:

The circuit breakers shall be continuously rated as specified with a minimum rated current of 630 Amps with voltage rating and breaking capacity as specified.

3.6 Operating Mechanism: The operating mechanism shall be one of the following as specified:

- a) Manually operated spring charged / motor wound spring charged with both mechanical and electrical release for closing. The operating mechanism shall be trip free.
- b) External auxiliary supply shall be made available for charging motors & heaters operation.

4 BUS BAR SECTION:

General Requirement: The switch board shall be single bus bar pattern with air insulated encapsulated bus bars housed in a separate compartment, segregated from other compartments.

Material: The bus bars shall be of high conductivity electrolytic copper rated as specified. The bus bars shall be sized for carrying the rated and short circuit current without over-

heating. Maximum bus bar temperature shall not exceed 95 degree C.

5 CURRENT TRANSFORMER:

5.1 General Requirements: Accommodation shall be provided in the circuit breaker panel to mount one set of three numbers dual core dual ratio CTs for metering and protection purposes. Access to the CTs for cleaning, testing or changing shall be from the front, back or top of the panel.

5.2 Rating: Dual core & dual ratio CTs of suitable burden (15 VA/Suitable VA burden as per OEM

standard design) shall be preferred:

- | | | | | |
|-----|-------------|-----|------------------------|-------------|
| (a) | 400/200/5/5 | (b) | 300/150/5/5 | 200/100/5/5 |
| (c) | 100/50/5/5 | (d) | such other as required | |

CT ratio shall be compatible with the loading pattern on HV side.

The CTs shall conform to relevant Indian Standards. The design and construction shall be robust to withstand thermal and dynamic stresses during short circuits. Secondary terminals of CTs shall be brought out suitably to a terminal block which will be easily accessible for testing and terminal connections. The protection CTs shall be of accuracy class 5 P 10 of IS 2705 Part III-1992.

The metering CTs shall conform to the metering ratio and accuracy class 0.5 of IS 2705-1992 for incomer and class 1 for outgoing Panels.

6 VOLTAGE TRANSFORMERS:

General Requirements: A voltage transformer of burden not less than 100 VA and of proper ratio as specified shall be provided at the incoming panel. The accuracy class for the VT shall be class 0.5 as per IS 3156 parts I to III for incomer and class 1 for outgoing Panels.

The transformer shall be of cast epoxy resin construction. It shall be fixed / withdraw able type. HRC fuses / MCBs shall be provided on both HV and LV sides.

7 PROTECTION AND TRIPPING ARRANGEMENT:

7.1 Protection: The Relays shall be microprocessor based numerical relays with O/L , E/F and S/C protection Tripping relay shall be used for tripping signal to the Shunt Trip Coil of Circuit Breaker operating on 24V/30V DC supply / Power pack / 110 V VT supply.

Alternatively Power Pack converters fed through PT / 230V externally could be provided with 2 Nos., 12/15 volt, 7 AH SMF batteries (Power pack with condenser / capacitor backup are also available which do not need batteries, these should not be used) for tripping. In cases where tripping is fed through PT, VA burden of PT shall be suitably increased (say 200 VA) as recommended by the manufacturer depending upon the number of panels and connected controls. In addition external 24 volt / 30 volt DC supply shall be provided for indications etc. through 2 Nos. SMF batteries of 12/15 volts of minimum 26 AH capacity with a battery charger as per recommendation of the manufacturer.

Note: - 24V / 30V DC shall be provided through 2 Nos. SMF batteries of 12/15 volts of minimum 26 AH capacity with a battery charger as per recommendation of the manufacturer both for protection as well as indications.

7.2 Relays: Over current Relays shall have adjustable setting for current from 50% to 200% and earth fault from 10% to 40% or 20% to 80%. These should be of manual reset type. All relays shall have a LED indicator which will indicate operation for each function. It shall be possible to reset it only by manual operation. The number and types of relays

shall be as specified.

8 SMALL WIRING

The small wiring shall be carried out with minimum 1.5 sq.mm FRLS / HFFR insulated copper conductor cables. CT wiring shall be done with minimum 2.5 sq mm wires with colour code: R Y B, Gray for auxiliary DC circuits and Black for auxiliary AC circuits. The wiring shall be securely fixed and neatly arranged to enable easy tracing of wires. Identification tags shall be fitted to all wire terminals to render identification easy and to facilitate checking in accordance with IS 375. Necessary terminal blocks and cable entries shall be provided for RTD relay wiring, power supply etc.

9 METERING INSTRUMENT, PANEL ACCESSORIES (DIGITAL):

9.1 Metering: Energy metering shall be done either on the incomers or on the feeders as specified in schedule of work.

9.2 Voltage Selection Scheme: Where a bus coupler is incorporated and only one incomer feeder (out of two available) is intended to be operated at a time, a VT Transfer Relay shall be incorporated to provide necessary potential for metering. This will be necessary when energy metering is done on individual feeders or where VT supply is used for trip circuits. Alternatively PTs shall be provided on both the bus sections (incomers) with individual metering on each incomer.

9.3 Instrument Panels: The instrument panel shall form part of the housing. Relays, meters and instruments shall be mounted as per general arrangement drawings to be submitted by the tenderer. They shall be preferably of flush mounting type at a maximum height of 1800 mm.

9.4 Instrumentation:

- a) A voltmeter of class 1.5 accuracy as per IS-1248 shall be provided at each incomer panel, with selector switch. The instrument shall be calibrated for the ranges specified.
- b) Energy meters of class 1.0 conforming to IS - 722 (Part IX) and power factor meter of class of accuracy of 2 shall be provided, if specified.
- c) Ammeter of specified range of class 1.5 accuracy as per IS-1248 shall be provided at both incomer and outgoing panels along with necessary selector switches.
- d) The panel assembly shall also take care of the following requirements:
 - (i) Lamp indication shall be provided to indicate ON / OFF (BY red / green respectively) of switch gear.
 - (ii) Panel illuminating lamp.
 - (iii) Mechanical indication for spring charged status. If possible, an indicating lamp could be provided.
 - (iv) Lamp indicating tripping at fault status.
 - (v) Healthy trip supply shall be indicated by clear lamp.
 - (vi) Separate fuses / MCBs. shall be provided for lamps, heaters, voltmeters and other instrumentation etc. on each panel.
 - (vii) Anti-condensation space heaters shall be provided, and shall be suitable for operation on 240 V, 1 phase, 50 Hz A.C. for each panel if specified.
 - (viii) Where there is more than one incomer and bus sections, these shall be castle key interlocked as per interlocking scheme as specified.

10 CABLE BOXES

Cable boxes shall be situated in a compartment at the rear / side of the housing as specified / OEM standards.

11 Cable Entry:

Provision for top (bus ducts preferred for top entry) / bottom or such other side entry shall be made as per requirement with sufficient head room for cable termination. 3mm thick removable gland plate shall be provided for cable termination.

12 Earthing: The earthing of the breaker body and moving portion shall be so arranged that the earthing of the noncurrent carrying structure to the frame earth bar is completed well before the main circuit breaker plugs enter the fixed house sockets.

The entire panel board shall have a common tinned copper earth bar of suitable section with 2 earth terminals for effectively earthing metallic portion of the panels. The frame earthing of the panel shall be in accordance with the CPWD specifications.

13 Installation: The installation work shall cover assembly of panels lining up, grouting the units etc. In the case of multi panels switch boards after connecting up the bus bar all joint shall be insulated with HV insulation tape or with approved insulation compound. A common earth bar shall be run preferably at the back of the switch board connecting all the sections for connecting the earth system. All protection, indications & metering connections and wirings shall be completed. Where trip supply battery is installed the unit shall be commissioned, completing initial charging of the batteries.. All relay instruments and meters shall be mounted and connected with appropriate wiring. Calibration checks of units as necessary and required by the licensee like CTs , VTs, Energy Meters etc. shall be completed before pre-commission checks are undertaken.**14. Test at Manufacturers Works**

Copies of type tests and of routine tests carried out at manufacturer's works shall be furnished along with the delivery of the panels. Engineer-in-Charge reserves the right to get the panels inspected by their representative at manufacturer's works prior to dispatch to site to witness the routine tests, for which purpose the manufacturer / supplier shall provide the necessary facilities and also give due notice.

15. Tests at Site

Pre-commissioning tests as per manufacturer's recommendations shall be carried out on the panels at site after installation including but not restricted to the following
Physical checking of the panels including checking for damage or cracks in components, bolt tightness, gasketting etc. Checking of vacuum bottles to ensure leak tightness'
Insulation testing of Bus bar supports by 5 kV megger Insulation testing of Control wiring by 5 kV megger.

Testing of relays and CTs with secondary injection kit.

Checking of breaker operation.

The agency has to arrange for all the T&P, testing equipment required for such testing.

Checking of earth continuity.

16. TESTING AND COMMISSIONING

Procedure for testing and commissioning of relay shall be in general accordance with good practice.

Commissioning checks and tests shall include in addition to checking of all small wiring connections, relays calibration and setting tests by secondary injection method and primary injection method. Primary injection test will be preferred for operation of relay through CTs. Before panel board is commissioned, provision of the safety namely fire extinguishers, rubber mats and danger notice board shall be ensured. In addition all routine megger tests shall be performed. Checks and test shall include following.

a) Operation checks and lubrication of all moving parts.

b) Interlock function checks.

- c) Continuity checks of wiring, fuses etc. as required.
- d) Insulation tests.
- e) Trip test and protection gear tests.
- f) The complete panel shall be tested with 5000V megger for insulation between poles and poles to earth. Insulation test of secondary of CTs and VT to earth shall be conducted using 500 V megger.
- g) Any other tests as may be required by the Licensee / Inspector shall be conducted.
- h) Where specified, the entire panels shall withstand high voltage test after installation.

TECHNICAL SPECIFICATIONS OF TRANSFORMERS

2 SCOPE

This section covers the detailed requirements regarding supply, installation, testing, commissioning and handing over of ONAN type transformers as per schedule of quantities required for the sub-station.

3 OIL COOLED TRANSFORMERS

3.1 General Construction

The oil filled Transformers shall comply with the following Indian Standards as amended upto date:

- i) IS 1180 (Part 1-2014) level 2.
- ii) IS 335 - Transformer oil
- iii) IS 10028 (Part II & III) - Installation and Maintenance of Transformers.
- iv) IS 2099 - Bushings
- v) IS 2705 - Current Transformers.
- vi) IS 6600 - Guide for loading of oil immersed transformers.

3.2 Insulation Oil

Insulation oil shall conform to IS 335. Transformer oil to be supplied with initial fill of filtered oil.

3.3 General Requirements

The transformer shall be indoor or outdoor type as specified. Unless otherwise specified the transformer in addition shall have thermal and dynamic ability to withstand external short circuit as per clause 9 of IS 2026 (Part I) 1977.

3.4 Capacity and Rating.

The KVA ratings for three phase transformers shall be as specified in the schedule of work and shall be irrespective of tapping position:

TEMPERATURE RISE

The reference ambient temperatures assumed for the purpose of this specification are as follows:

Maximum ambient air temperature 50° C.

Maximum daily average ambient air temperature 40° C.

Maximum yearly weighted average ambient temperature 32° C.

Minimum yearly weighted average ambient temperature (-)5° C

The temperature rise at the above conditions and at the altitude not exceeding 1000 meters shall be as follows:

~~By resistance method 45° C (maximum temperature being 95° C).~~ By thermometer 45° C. If the site conditions indicated for a particular job is more severe than the refereed ambient temperature mentioned above, the temperature rise shall be suitably scaled down such that the hot spot temperature shall not exceed the values for the reference conditions.

3.5 Tap Changing Device

Tap changing device shall be provided on H.V side, On load type.

Unless otherwise specified, the transformer shall be suitable for a voltage ratio of 11 KV/433V.

VECTOR GROUP

In case of step-down transformers, the winding connections shall conform to vector group dyn11 unless otherwise specified. In case of step-up transformer, the vector

group unless otherwise specified shall be Star delta.

3.6 Cooling

Unless otherwise specified, the transformer shall be oil immersed natural air-cooled type (ONAN).

3.7 Accessories

The transformer shall be a single tank type with termination on bushings or cable end box as specified both on HV and MV side. The MV side shall be suitable to receive bus bar trunking or MV cable inter-connection suitable for full load current of the transformer.

FITTINGS

The transformer shall be complete with the following fittings:

- a) Oil conservator with oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above.
- b) Off circuit type tap changer with position indicator and locking arrangement for all transformers.
- c) Thermometer pocket with plug for all transformers of capacity 100 KVA and above.
- d) 100 mm dial type /stem type thermometer with metal guard Dial type thermometer may have max. Temperature indicator and resetting device for all transformers of capacity 250 KVA and above.
- e) Lifting lugs for all transformers.
- f) Bi-directional / Unidirectional Rollers to be specified.
- g) Rating diagram and terminal marking plate for all transformers.
- h) Explosion vent for all transformers of capacity 400 KV A and above.
- i) Additional Neutral separately brought out on a bushing for earthing for all transformers.
- j) Earth terminals (2 Nos.) for body earthing for all transformers.
- k) Valves for filtration, drainage and filling etc. with necessary plugs for all transformers.
- l) Radiator assembly for all transformers.
- m) Silica gel breather for all transformers.
- n) Air release plug for all transformers.
- o) First filling of oil to IS 335/1993 including make-up fill during installation for all transformers.
- p) Facility to connect up Buchholtz relay for all transformers of capacity 800 KV A and above.
- q) Inspection covers on tank cover for access to terminal connections for all transformers.
- r) Bushing terminations or cable box terminations as specified.
- s) Necessary hardware, clamps, lugs etc. for termination on HV /MV etc. for all transformers.

3.8 Explosion Vent

Explosion vent or pressure relief device shall be provided of sufficient size for rapid release of any pressure that may be generated within the tank and which might result in damage to the equipment. The device shall operate at a static pressure less than the hydraulic test pressure for transformer tank. Means shall be provided to prevent the ingress of moisture and of such a design to prevent gas accumulation.

3.9 Accommodation/or Auxiliary Apparatus

Where specified, such as, for restricted earth fault protection, facilities shall be provided for the mounting of a neutral current transformer.

RATING AND DIAGRAM PLATES

The following plates shall be fixed to Transformer in a visible position.

- a) A rating plate of weather proof material bearing the data specified in the appropriate clauses of IS: 2026/1977.
- b) A diagram plate showing the internal connection and also the voltage vector relationship of the several windings in accordance with IS: 2026-1977 and I plan view of the transformer giving the correct physical relationship of the terminals.

3.10 Joints and Gaskets

All gaskets used for making oil tight joints shall be of proven material such as granulated cork bonded with synthetic rubber gaskets or synthetic rubber or such other good material.

GAS AND OIL ACTUATED (BUCH HOLTZ RELAYS)

Buchholtz Relay shall be provided for transformers of capacity 800 KVA and above. The design of the relay mounting arrangements, the associated pipe work shall be such thermal-operation of the relays shall not take place under normal service. The pipe work shall be arranged that all gas arising from the transformer shall pass through the gas and oil actuated relay. The oil circuit through the relay shall not form a delivery path in parallel with any circulating oil pipe, nor shall it be tied into or connected through the pressure relief vent, Sharp bends in the pipe work shall be avoided.

All wiring connections, terminal boards, fuses and links etc. connected with gas actuated relays shall be suitable for tropical atmosphere. Any wiring liable to be in contact with oil shall have oil resistant insulation and the bared ends of stranded wire shall be sealed together to prevent seepage of oil entering connection boxes used for cables or wiring.

3.11 Cable Box

Cable box shall not be mounted on the tank covers. It shall be feasible to remove the tank covers for inspection during maintenance etc. without recourse to breaking the joints or disturbing the cables already terminated. Necessary removable links in oil approachable through inspection cover in tank cover etc. after lowering oil shall be provided for test purpose.

3.12 Tests

3.12.1 Tests at Works

All routine and other tests prescribed by IS 2026 shall be carried out at the manufacturer's works before dispatch of the transformer in the presence of inspecting officer if required. Copies of the test certificates shall be furnished to the department. In addition to the prescribed routine tests, temperature rise test shall be invariably done on one transformer of each design. A copy of the impulse test certificate done on the same type/design of the transformer shall be furnished in accordance with IS for purpose of record. If no impulse test was done in an earlier unit of the same design and capacity, one transformer will be subjected to impulse test in consultation with the Inspector at the firm's cost. Copies of the certificates for

pressure test, test for bushings, and type test for short circuit shall be supplied to the Department.

3.12.2 Tests at Site

In addition to tests at manufacturer's premises, all relevant pre-commissioning checks and tests conforming to IS code of practice No.10028 (Part II & III) shall be done before energization. The following tests are to be particularly done before cable jointing or connecting up the bus bar trunking.

- a) Insulation test between HV to earth and HV to MV with 5000 volts Megger.
- b) Insulation test between MV to earth with 500 volts Megger.
- c) Di-electric strength Test on oil.
- d) Buchholtz relay operation by simulation test when fitted. All test results are to be recorded and reports should be submitted to the department.

3.13 Installation and Commissioning

3.13.1 The transformer shall be installed in accordance with IS 10028 (Part II & III)-Code of practice for Installation and maintenance of transformer. Necessary support channels shall be grouted in the flooring.

3.13.2 The Transformer shall be moved to its location and shall be correctly positioned. Transformer wheels shall be either locked or provided with wheel stoppers. All parts of the transformers which are supplied loose, such as conservator, radiator banks, Buchholtz relay, dial thermometer, bushing etc. shall be fitted on the transformer. Transformer oil supplied in drums shall be topped up into the transformer after duly testing/ filtering upto the correct level required.

3.13.3 Wiring of devices such as Buchholtz relay, dial thermometer etc. shall be carried out as per drawings, earthing of neutral and body of the transformer shall be done in accordance with section (7) of these specifications.

3.13.4 Drying out of transformer winding will be necessary when the di-electric strength of the oil is lower than the minimum value as per IS-I0028 or the transformer has not been energized within 6 months of leaving the works or where the radiator assembly is done at site. The transformer shall be dried out by one of the methods specified in IS -10028. Drying out with, centrifugal or vacuum type filters will, however, be preferred. The contractor shall carry out the process of drying without interruption and shall maintain a log sheet indicating time, oil temperature and insulation resistance.

3.13.5 After complete drying out of the transformer, oil sample shall be collected by the contractor and shall be tested for dielectric strength as specified in IS:335-1993 with approved test kit.

3.13.6 All devices such as dial type thermometers, Buchholtz relays and main alarm and trip contacts shall be checked for satisfactory operation.

3.13.7 All tests specified in these specifications shall be carried out by the contractor in the presence of inspecting officer/ consignee free of cost.

3.14 Guaranteed Technical Data

Guaranteed technical particulars shall be supplied as per CPWD Specifications

TECHNICAL DETAILS OF 250 KVA ONAN TYPE TRANSFORMER WITH ECBC LOSSES		
S.No.	Details of particulars	
1	Type	ONAN type, 11 KV/0.433KV Step down, Distribution type
	a) Type of winding	Copper
2	Output in KVA (Continuous rating)	250
3	Frequency	50 Hz
4	Voltage between phases (HV on no-load)	11000 Volts
5	Voltage between phases (MV on no-load)	433 Volts
6	Impedance at normal voltage ratio at 75°C	4 to 5%
7	Total maximum losses at 50% loading	BEE 3 star rating
8	Total maximum losses at 100% loading	As per BEE 3 star rating

TECHNICAL SPECIFICATIONS OF MV / LT PANELS

1. **Scope**

This Section covers the detailed requirements of medium voltage switch Panel for 433V, 3 phase 50 Hz 4 wire system. All switchgears shall be fully rated at an ambient of 40° C.

2. **Type of Panel**

The medium voltage switch board panel shall comprise of anyone of the following types of switchgears or combination thereof as specified.

a) Air Circuit breakers shall be draw out type.

b) MCCBs of suitable Ics ratings. MCCBs shall invariably be Current Limiting type. Features like Double Break, Positive Isolation functions shall be preferred. The Panel shall be indoor /outdoor type having incoming sectionalization and outgoing switchgears as specified. The design shall be cubical type. The degree of enclosure protection shall be IP 42 for indoor and IP 54 for outdoor panels as per IS: 13947 (Part-I).

3 **M. V. Panel**

3.1 **General Construction**

The switchboard shall be floor mounted free standing totally enclosed and extensible type. The switch board shall be dust & vermin proof and shall be suitable for the climate conditions as specified. The design shall include all provisions for safety of operation and maintenance personnel. The general construction shall conform to IS: 8623/1993 for factory assembled switch board.

3.2 **Cubicle Type Panels**

3.2.1 Cubical type panels shall be fabricated out of sheet steel not less than 2.0 mm thick. Wherever necessary, such sheet steel members shall be stiffened by angle iron frame work. General construction shall employ the principle of compartmentalization and segregation for each circuit. Unless otherwise approved, incomer and bus section panels or sections shall be separate and independent and shall not be mixed with sections required for feeders. Each section of the rear accessible type panel shall have hinged access doors at the rear. Overall height of the panel shall not exceed 2.4 meters. Operating levers, handle etc. of highest unit shall not be higher than 1.7 meters.

Multi-tier mounting of feeder is permissible. The general arrangement for multi-tier construction shall be such that the horizontal tiers formed present a pleasing and aesthetic look. The general arrangement shall be approved before fabrication. Cable entries for various feeders shall be either from top or bottom. Through cable alleys located in between two circuit sections, either in the rear or in the front of the panel. All cable terminations shall be through gland plates. There shall be separate gland plate for each cable entry so that there will not be dislocation of already wired circuits when new feeders are added. Cable entry plates shall therefore be sectionalized. The construction shall include necessary cable supports for clamping the cable in the cable alley or rear cable chamber.

Cubicle panels with more than 1000 Amps BUS shall be made of tested structural modular sections.

3.2.2 Bus Bar and Connections

The bus bars shall be of copper of high conductivity electrolytic quality and of adequate section. Current density shall not exceed 160 amps for copper /sq. cm. The bus bar system may comprise of a system of main horizontal bus bars and ancillary vertical bus bars run in bus bar alleys on either side of which the circuit could be arranged with front access cable entries. In the case of rear access, horizontal bus system shall run suitably either at the top or bottom. All connections to individual circuits from the bus bar shall preferably be solid connections; however flexible connections shall also be permitted as per recommendations of the Panel Manufacturer. All bus bars and connections shall be suitably sleeved / insulated in approved manner.

Busbar should be 100% Neutral

3.2.3 Incomer / Termination

Incomer termination shall be suitable for receiving bus trucking / underground cables. Cable terminations shall invariably be through terminal blocks (Polyamide or superior) or brought out solid terminals.

3.2.4 Instruments

All voltmeters, ammeters and Multi-function meters shall be flush mounted as specified in schedule of work, conforming to class 1.5 of IS:1248 for accuracy. All meters shall be protected with MCB

3.2.5 Indicating Lamps

On all the incomers of M.V panels, ON/OFF indicating LED lamps shall be provided and shall be suitable for operation on AC supply.

3.2.6 Small Wiring

All small wiring for Controls, Indication etc. shall be of with suitable FRLS/HFFR (halogen free fire retardant) copper conductor cables. Wiring shall be suitably protected within switch board. Runs of wires shall be neatly bunched, suitably supported and clamped. Means shall be provided for easy identifications of the wires. Where wires are drawn through steel conduits, the works shall conform to CPWD General Specifications for Electrical works (Part 1- Internal) - 2005 and IS: 732 as the case may be. Identification ferrules shall be used at both ends of the wires. All control wiring meant for external connections are to be brought out of terminal board.

The equipment shall be designed to confirm to the below requirements for LT Panels.

Sl.No	Name of equipment	IS Code
1.	Air circuit breakers/MCCB	IS: 60947 (Part-II) & IEC 60947(2)
2.	Fuse switch and switch fuse units	IS: 13947 (Part-3) & IEC 947(3)
3.	HRC fuse links	IS: 13703
4.	Current Transformers	IS: 2705

5.	Voltage Transformers	IS: 3156
6.	Indicating instruments	IS: 1248
7.	Integrating instrument	IS: 722
8.	Control switches and push buttons	IS: 6875
9.	Auxiliary contactors	IS: 13947 (Part4/Sec-I) & IEC 947(4/1)
10	Relays	IS: 3231

OPERATIONAL REQUIREMENTS

The indoor/outdoor type MV panel shall conform to the following:

- a) The panel shall comprise of incomers, outgoing feeders and bus coupler as specified. The incomer shall be either a double break / contact repulsion MCCB or an Air Circuit Breaker. The bus coupler shall be either a circuit breaker or a double break / contact repulsion MCCB as specified. The outgoing feeders shall be circuit breakers/MCCBs as specified.
- b) Bus bars for phase and neutral shall have a rating as per specifications.
- c) The entire switch panel shall be cubical type generally conforming to IS: 86231-1993 for factory assembled switch board.
- d) The incomer panel shall be suitable for receiving bus trucking or MV cable of size specified either from top or from bottom.
- e) All incoming AIRCIRCUIT BREAKER/MCCB shall have suitable adjustable tripping current and the time delay settings.
- f) The entire panel shall have a common earth bar of size as specified with two terminals for earth connections.

A suitable size of brick / cement concrete plinth shall be provided for out door panels at site as specified and to suit easy access and operational convenience.

4 Rating and Requirements

4.1 Air Circuit Breaker

All Air Circuit Breakers shall be 3/4 pole with minimum 50 KA breaking capacity (35 MV A at 433V) conforming to IS/IEC 60947-2 & IEC 60947-2. Rated current shall be as per capacities specified. The equipment shall be complete with the following:

- a) Necessary circuit breaker carriage with 3 positions (isolate, test, service) draws out mechanism.
- b) Necessary isolating plugs and sockets.
- c) Necessary mechanism interlock and automatic safe shutters gear with arrangement for pad locking.
- d) Necessary independent manual spring mechanism with mechanical On/Off indication as well as electrical On/Off indication.
- e) Necessary bus bars with bolted type neutral links.
- f) ACB shall be provided with microprocessor-based releases having built in over load, short circuit & earth fault protection. Microprocessor release shall be EMI(electromagnetic induction)/EMC (electromagnetic compatible) certified.

- g) Necessary set of auxiliary switches.
- h) Necessary set of CTs with ratios as specified
- i) Necessary identification, metering requirements as specified i/c. ON/OFF indication lamps, selector switches, fuses, ammeter, voltmeter etc.
- j) In case of 4 pole breaker neutral shall be fully rated with adjustable settings from 50% to 100% of In.
- k) ACB terminals shall be suitable/suitably brought out for direct aluminum termination as per IS: 13947 Part-II.

4.2 MCCB

All MCCBs shall be current limiting type with features of load line reversibility and suitable for Horizontal / Vertical mounting without any derating. Beyond 300Amps capacity MCCBs shall have positive isolation and preferably double break contact repulsion & double insulation features. The MCCBs shall invariably be used with terminal spreaders. For all MCCBs, $I_{cs} = I_{cu}$.

4.3 Bus Bar Marking

Bus bars and main connections shall be marked by color or letter on MV Panels.

4.4 TESTS AT MANUFACTURERS WORK

All routine tests shall be carried out and test certificates produced to the department.

5 INSTALLATION, TESTING & COMMISSIONING

5.1 The installation work shall cover assembly of various sections of the panels lining up, grouting the units etc. In the case of multiple panel switch boards after connecting up the bus bars etc., all joints shall be insulated with necessary insulation tape or approved insulation compound. A common earth bar as specified shall be run inside at the back of switch panel connecting all the sections for connection to frame earth system. All protection and other small wirings for indication etc. shall be completed before calibration and commissioning checks are commenced. All relays, meters etc. shall be mounted and connected with appropriate wiring.

5.2 Commissioning checks and tests shall include all wiring checks and checking up of connections. Relay adjustment/setting shall be done before commissioning in addition to routine Megger tests. Checks and tests shall include the following:

- a) Operation checks and lubrication of all moving parts.
- b) Interlock function checks.
- c) Continuity checks of wiring, fuses etc. as required.
- d) Insulation test: When measured with 500V Megger the insulation resistance shall not be less than 100 mega ohms.
- e) Trip tests and protection gear test.

6 Earthing SYSTEMS:

Earthing system shall comprise earth electrodes in accordance with clause 8.2.1 of general specifications for elect. Works (Part I Internal) 2023. For every additional transformer 2 more separate and distinct earth electrodes shall be provided for neutral earthing. The body earthing for transformers, HV & MV

panels shall be done to a common earth bus connected to two separate and distinct earth electrodes.

Note: for a single transformer sub-station, the total number of earth electrodes shall be 4 (2 for neutral and 2 for connection to a common earth bus for body earthing). For a two transformers sub-station total number of earth electrodes shall be 6 (4 for neutral earthing, two each for two transformers, and 2 for connection to a common earth bus for body earthing).

6.1 ELECTRODES

The earth electrodes shall be as per CPWD General Specifications for Electrical Works (Part I Internal) 2023.

6.2 LOCATION of EARTH ELECTRODES

Normally an earth electrode shall not be situated less than 1.5m from any building. Care shall be taken that the excavation of earth electrode may not affect the column footings or foundation of the building. In such cases electrodes may be farther away from the building.

The location of the electrode earth will be a place where the soil has reasonable chance of remaining moist.

As far as possible, entrances, pavements and road ways, are to be definitely avoided for locating the earth electrode.

6.3 WATERING ARRANGEMENT

Method of watering arrangement shall comply with CPWD General Specifications.

6.4 SIZE OF EARTH LEAD

The recommended sizes of copper earth bus lead in case of sub-stations shall be accordance with clause 8.2.2 of General Specifications for electrical works (Part-I Internal) 2023 amended upto date. The minimum size of lead shall be 25mm x 5mm copper of equivalent GI strip.

6.5 INSTALLATION

All joints shall be riveted and sweated. Joints in the earth bar shall be bolted and the joints faces tinned. Where the diameter of the bolt for connecting earth bar to apparatus exceeds one quarter of the width of the earth bar, the connection to the bolt shall be made with a wider piece of flange of copper jointed to earth bar. These shall be tinned at the point of connection to equipment and special care taken to ensure a permanent low resistance contact to iron or steel.

All steel bolts, nuts, washers etc., shall be cadmium plated, main earth bars shall be spaced sufficiently on the surface to which they are fixed such as walls or the side trenches to allow for ease of connections. Copper earthing shall not be fixed by ferrous fittings. The earthing shall suitably be protected from mechanical injury by galvanized pipe wherever it passes through wall and floor. The portion within ground shall be buried at least 60cm deep. The earthing lead shall be securely bolted and soldered to plate or pipe as the case may be. In the case of plate earthing the lead shall be connected by means of a cable socket with two bolts and nuts. All washers shall be of the same materials as the plate or pipe. All iron bolts, nuts and washers shall be galvanized.

SAFETY REQUIREMENTS, TESTING, STANDARDS& APPROVALS

SCOPE (Relevant requirements, testing and standards are to be followed/submitted)

1. Quality Assurance Plans- Internal Electrical Installations

- a. The detailed instructions on safety procedures given in BIS code no. 5216:1982
- b. "Code of safety Procedures and Practices in Electrical works" shall be strictly followed.
- c. Safety procedures given in Chapter 10 of CPWD General Specifications for Electrical works Part-1 (Internal) shall be followed.
- d. Safety recommendation as per IE rules 1956 as per Appendix "C".
- e. The materials shall be tested from 3rd Party laboratories. Expenses of testing to be borne by contractor.
- f. Provisions and fixing of check-nuts for conduit work as per CPWD Specifications.
- g. No. of wires in one conduit shall be ensure as per CPWD Specifications.
- h. Colour coding of wires to be ensured.
- i. Lugs and thimbles at cable/ wire ends in switch boxes as per CPWD Specifications. Flexible GI conduits/PVC sleeve to be provided for the wiring wherever required, particularly for the light fittings below the roof and above the false ceiling areas, with proper coupling arrangements.
- j. Labeling of switch boxes shall be ensured.
- k. Termination of earth terminals in earth pits, switch box, DBs and accessories to be ensured. Earth chamber to be constructed and proper marking to be done.
- l. A comprehensive schematic diagram is prepared starting from the main board up to the final DBs. All such boards are duly marked and numbered.

2. Testing:

- a. After completing the work, necessary test results as envisaged in CPWD General Specifications Part-I (Internal)-2013 & CEA regulations 2023 shall be recorded and submitted to the department. The results shall be in the permissible limits. Test report forms duly signed by authorized person/owner shall be submitted to Electricity Company by the agency. It will be the responsibility of contractor to get provides electricity connections.
- b. The pre-commissioning testing of the installation shall be carried out such as
 - (i) Insulation resistance test.
 - (ii) Polarity test of switch.
 - (iii) Earth continuity test.
 - (iv) Earth electrode resistance test.
- c. All the tests at site shall be carried out for the completed installations, in the presence of and to the satisfaction of the Engineer in Charge by the contractor. All the test results shall be recorded and submitted to the Department.
- d. On completion of an electrical installation (or an extension to an installation), a certificate shall be furnished by the electrical contractor,

countersigned by the certified supervisor under whose direct supervision the installation was carried out.

- e. This certificate shall be in the prescribed form as given in Appendix "E" of CPWD
- f. General Specifications for Electrical Works Part-1(Internal) in addition to the test certificate required by the local electric supply authorities.
- g. All electrical & mechanical fittings / fixtures / appliances, to be provided for the work, should have latest minimum 5-star rating (of BEE) as available in market.
- h. The work of internal EI shall be carried out As per CPWD Specifications for Electrical Works Part I Internal Electrical - 2013, CPWD Specifications for Electrical Works Part II External Electrical and CPWD Specifications for Electrical Works Part IV Sub-station - 2013. Work shall be carried out with copper wires, double door DBs, steel/PVC conduit, indoor floor panels.

3. Drawings to be submitted for approval, before start of any work:

The contractor shall prepare and submit three sets of hard copy of following drawings and 2 sets in soft copy and get them approved from the Engineer -In -Charge before the start of the work. The approval of drawings however does not absolve the contractor not to supply the equipment / materials as per agreement, if there is any contradiction between the approved drawings and agreement.

- (i) Layout scheme, Plan and Elevations
- (ii) Conduit Layout, Circuit details with Loading
- (iii) Selection of cables and wires
- (iv) SLD detailed
- (v) TDS of equipments/material
- (vi) Drawings showing details of Foundation/Wall supports etc.
- (vii) Any other drawings relevant to the work.
- (viii) Data sheets of equipments

4. Drawings after completion of work

The contractor shall submit Six sets of as built drawings on white paper and 3 sets in soft copy to the owner/ Engineer-In-Charge after completion of the work. In addition following shall also be provided:

- a. Test Certificates
- b. Warrantee Certificates
- c. O&M Manuals of Equipments
- d. Any other information the Engineer-In-Charge may deem fit.

5. LIST OF INDIAN STANDARDS (IS) FOR INTERNAL ELECTRICAL INSTALLATION (for reference only)

IS : 374 - 1979	Ceiling fans and regulators (3rd revision)
IS : 694 - 1990	PVC insulated Electric cable for working voltage upto and including 1100 volts.
IS : 732 - 1989	Code of practice for electrical wiring and installation
IS : 1255 - 1983	Code of Practice for installation and maintenance of Power Cables upto and including 33 KV rating (Second Revision)
IS : 1258 - 1987	Bayonet lamp holders(Third revision)
IS : 1293 - 1988	Three pin plugs and sockets outlets rated voltage upto and including 250 volts and rated current upto and including 160 amps.
IS : 1646 - 1982	Electrical installation fire safety of buildings(general) Code of practice.
IS : 1885 - 1971	Glossary of items for electrical cables and conductors
IS : 1913 - 1978	General and safety requirements for fluorescent lamps luminaries Tubular.
IS : 2309 - 1989	Protection of building and allied structures against lightning
IS : 3043 - 1987	Code of practice for earthing.
IS : 3480 - 1966	Flexible steel conduits for electrical wiring.
IS : 3837 - 1976	Accessories for rigid steel conduit for electrical wiring.
IS : 4146 - 1983	Application guide for voltage transformers
IS : 4615 - 1968	Switch socket outlets.
IS : 5216 - 1982 (Part-I)	Guide for safety procedures and practices in electrical work.
IS : 8130 - 1984	Conductors for insulated electric cables and flexible cords
IS : 9537 - 1981	Rigid Steel Conduits for electrical wiring (Second Revisions)
IS : 13947 - 1993	General requirement for switchgear and control gear for voltage not exceeding 1000 Volts.

Executive Engineer(E)

List of acceptable makes for Substation

S. No.	Product	Make
1.	Transformer	Siemens/ABB/Voltamp/Kirloskar/Essennar/Schneider
2.	HT panels	ABB/Seimens/ L&K/Schneider/Kirolskar
3.	MV/LT Panels	Manufacturers having in House Facility for 7 tank process, Powder coating, CNC machine and CPRI Approved for relevant or above bus bar rating.
4.	MCCBs	Legrand (DPX ³)/ Schneider Electric (Compact NSX/Easy Pact CVS) / L&K (D Sine)/ ABB(T-Max) / Siemens (3VL)
5.	MCBs	Legrand/Schneider Electric/Hager/ L&K / ABB/Siemens
6.	Selector Switches	Kaycee BCH / L&K salzer / Siemens / HPL
7.	Contactors	Siemens / ABB / L&T / C&S / Schneider
8.	CT/PT	Kappa/ AE / Gilbert / L&T / Schneider
9.	Digital Panel Meter i/c Multifunction meters	Conzerv/ L&K / AE/MECO/Rishab/Prok Devices
10.	Gland/Lugs	Dowells/Comet/Jainson
11.	Indication Lamps (LED type), Push Buttons	Siemens/BCH/ L&K /Telemecanique/ Vaishnav/Emco/Kaypee
12.	Connectors/Terminal Blocks	Elmex/Connectwell/Essen
13.	1.1 KV/11KV grade aluminium conductor, XLPE insulated armoured UG cables	Havells / KEI / Gloster / Finolex /Havells/ Polycab
14.	GI Pipes	Tata / Jindal Hissar/ Surya / Sail
15.	MV Power Capacitors	Schneider/L&K/Siemens/Neptune Model LLM/Epcos/Eaton
16.	Change over switches	ABB/L&T/Schneider/Socomec
17.	11 KV Lightning Arrestor	OBLUM/IGEC/SEW/ELPRO
18.	APFC relay	L&K/Beluk/Siemens/Epcos/ ABB/Schneider/ Neptune
19.	Angle Iron/Channel Iron	Sail/TATA/HSL/Jindal (Hissar)/Zenith
20.	HT jointing Kit/End termination kit	3M/Tropolin/Densons/Raychem/M-seal/CCI-Xicon/Mahindra
21.	Power relays	SEGC/Crompton/Siemens/ ABB/Schneider/ L&K

22.	Electric Insulation mat with ISI mark	Dozz/Padmini/Raychem/Jothi rubber udyog
23.	ACB	L&T / Siemens / Schneider/Legrand
24.	All other items not covered above	As per approval of the Engineer-in-charge.

Note: -

1. Tenderers quoting for make & models other than above will be rejected.
2. The department, reserves the right to add or delete any materials and Brands in the list of approved materials/brands subject to financial implications, if any.

Executive Engineer (E)

SCHEDULE OF WORK (E&M)					
Name of Work: Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur					
S.No.	Description	Qty	Unit	Rate	Amount
	HT Panel				
1	Supplying, installation, testing and commissioning of outdoor type, floor mounted metal clad, 11 KV VCB Panel with 3 Nos VCBs (1 No. Incoming + 2 Nos. Outgoings), totally enclosed and fully interlocked, horizontal draw out, horizontal isolation type breaker as per IS 13118, as amended upto date and additional specifications, having capacities mentioned below, single break, trip free mechanism, manually charged and auto/ manually closing breaker suitable for use on 11KV, 3 Phase, 50 Hz, AC supply with short circuit fault level of 350 MVA, complete with self-contained,				
	fully interlocked, rack in and rack out mechanism, air insulated but encapsulated copper bus bars of 630 A capacity, breaker featured with mechanical ON/ OFF indicator with hand trip device, spring release coil, shunt trip coil and auxiliary switch of 4 NO + 4 NC and equipped with following switchgears and accessories including connections suitable for 3 X 240 sq. mm XLPE 11KV cable (cable entry from bottom), end termination with heat shrinkable jointing material etc. as required. (Cost of end termination is not included in this item).				
	(I) Incoming: - 1 No 630 A VCB				
	a) 1 No. 11KV/ $\sqrt{3}$ /110V/ $\sqrt{3}$ PT Class 0.2 accuracy and 50 VA burden and protection fuses/MCB for HT metering upto 12 KV on incomer				
	b) 1 No. Microprocessor based numerical relay with O/L, E/F and S/C protection				
	c) 1 Set of Dual Core Dual ratio 3 Nos. CTs 400/200/5/5 A of 15 VA burden and accuracy class- 0.5s for metering and class 5P 10 for protection.				
	(II) Outgoing: 2 Nos 630 A VCB's				
	a) 2 Nos. Digital Multi-function meter, class I, for measuring HT voltages upto 12KV, Current, Power Factor, KVA, KVAh, KW, KWh, Energy with suitable CTs & MCBs for protection.				
	b) 2 Nos. Microprocessor based numerical relay with O/L, E/F and S/C protection.				

	c) 2 Sets of Dual Core Dual ratio 3 Nos CTs 100/50/5/5 A of 15 VA burden and accuracy class 1.0 for metering and class 5P 10 for protection.				
	(III) Power pack: Power pack with 220 V AC input & 24 V DC continuous output suitable for closing/ tripping/ indication of 3 Nos. HT panel boards with 2 Nos. 12 V each, suitable SMF batteries of capacity charging unit, etc. as required. (Note: VCB panel shall be installed on Cement concrete foundation as per manufacturer's recommendations)	1	Each	1819354.00	1819354.00
	Transformer				
2	Supply, installation, testing and commissioning of following capacity (continuous loading) BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with Offload Tap Changer and manual operation of Offload Tap Changer on HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sq.mm XLPE cable of 11 KV grade, including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, including supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The permissible temperature-rise shall not exceed 40 degree 'C' for oil and 45 degree 'C' for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. Design ambient condition : a) air temperature 50 0C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized				

	aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked. Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve (¾" nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Arcing horns or suitable rating lightning arrestors for HT side - 3 Nos. p) Bird guard; q) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit r) Additional Neutral separately brought out on bushing for earthing. s) Non return valve (for conducting pressure test); t) Pressure relief device or explosion vent u). Monogram Plate v) Inspection cover w) .x) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. y) Necessary hardware, clamp, lugs etc. for termination on HV/MV etc. for all transformers.				
2.1	250KVA (Offload Tap Changer)	1	Each	2051497.00	2051497.00
	HT Cabling				
3	Supplying of aluminium conductor, XLPE insulated PVC sheathed armoured power cable of 11KV(Earthen) grade conforming to IS:7098/(Part-II)1988 amended upto date of following size.				
3.1	a) 3 X 120 sq mm	30	Meter	2515.00	75450.00
4	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
4.1	a) Above 120 sq. mm and upto 400 sq. mm	30	Meter	183.60	5508.00

5	supplying and making indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required:				
5.1	120 sq. mm	4	Each	17268.12	69072.00
6	Supplying and making outdoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required.				
6.1	120 sq. mm	2	Each	23059.08	46118.00
7	Excavation for foundation in soft soil including dressing of sides and ramming of bottoms, lift upto 1.5 m including getting out the excavated soil and disposal of surplus excavated soil as the excavated soil and disposal of surplus excavated soil as directed within ahead of 50 metres	2	Cum	290.85	582.00
8	Providing and laying in position cement concrete 1:3:6 (1 cement : 2 coarse sand : 6 graded stone aggregate 20 mm nominal size) in foundation of pump, DG set etc including form work etc as required.	3	Cum	8150.79	24452.00
9	Providing brick work (in width 225 mm or more) with F.P.S.bricks of class designation 7.5 in cement mortar 1:4 (1 cement :4 coarse sand) at all levels.	2	Cum	7969.28	15939.00
10	Providing 15mm thick cement plaster of mix 1:4 (1 cement : 4 fine sand) at all levels.	6	Sqm	427.95	2568.00
	Earthing				
11	Earthing with copper earth plate 600 mm x 600 mm x 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/coke and salt as required.	2	Each	16204.32	32409.00
12	Earthing with G.I earth plate 600 mm x 600 mm x 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/coke and salt as required.	2	Each	9019.08	18038.00

13	Providing and fixing 25 mm x 5 mm copper strip in 40 mm dia G.I. pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required.	30	Metre	1769.04	53071.00
14	Providing and fixing 25mm x 5mm copper strip on surface or in recess for connections etc. as required.	10	Metre	1345.68	13457.00
15	Providing and fixing 25 mm x 5 mm GI strip in 40 mm dia G.I. pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required.	30	Metre	815.40	24462.00
16	Providing and fixing 25mm x 5mm GI strip on surface or in recess for connections etc. as required.	10	Metre	309.96	3100.00
	LT Panel				
	NON ESSENTIAL PANEL				
17	Supplying, installation, testing and commissioning of suitable size outdoor type cubical LT Non-Essential panel (as per general arrangement drawing approved by engineer-in-charge) suitable for operation on 415V, 3 Phase, 4 Wire, 50 Hz, AC supply system, fabricated in totally enclosed compartmentalized flush finish design from CRCA sheet steel of 2 mm thick for frame work and covers, and top canopy & 3 mm thick for gland plates in split sections, including cleaning and finishing complete with 7 tank process for powder coating in approved shade, provision for incoming & outgoing termination from bottom, busbar chamber having TPN bus bars of 500 Amp capacity Aluminium bus bars of high conductivity and DMC/ SMC bus bar supports, having short circuit withstand capacity of 31 MVA for 1 Sec.,				
	and fabrication of the panel shall be done in transportable sections, entire width of the panel shall have a common GI earth bar of size 25 mm x 5 mm at the rear with 2 Nos. earth stud, connection and interconnections from main bus bar to switch gears with required size of AL bus bars and control wiring with 1.5 sq.mm & CT wiring with 2.5 sq mm FRLS PVC insulated copper conductor single core cable, cable alleys, detachable cable gland plates including providing and fixing the following MCCB/ Switchgears /metering accessories etc and Panel shall be erected on cement concrete or brick masonry foundation as per directions of Engineer-in-charge.				

	complete as required. Bottom base frame with MS channel (ISMC 100 designation) of section not less than 100 mm X 50 mm X 5 mm thick. The cubical panel shall generally confirm to CPWD General Specification for Electrical works, Part-I Internal 2023, Part II External 2023 and Part IV substation equipment 2013 as amended upto date.				
	Incoming				
	a) 400 Amps four pole, 50KA breaking capacity (Icu=Ics) at 415V short circuit current rating MCCB, microprocessor type release with over load and short circuit fixed, in-built earth fault protection, spreader links, rotary handle - 2 No's				
	b) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON, OFF & Trip LED indicating lamps with 2 Amp backup MCB - 2 Sets.				
	c) Digital type Multi-function meter - 2 Sets				
	Bus coupler				
	a) 400 Amps four pole, 50KA breaking capacity (Icu=Ics) at 415V short circuit current rating MCCB, microprocessor type release with over load and short circuit fixed, in-built earth fault protection, spreader links, rotary handle - 1 No				
	b) Breaker ON, OFF & Trip LED indicating lamps with 2 Amp backup MCB - 1 Set				
	Interlocking				
	Mechanical interlocking with Mechanical interlock for MCCBs so as to ensure that only one supply is available at a time on each section of bus and to eliminate any possibility of accidentally approaching two supplies at one bus section - 1 Set.				
	Bus Bars:				
	TPN Aluminium bus bars of 500 Amps capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bars supports at required intervals complete suitable for withstanding fault level of 31 MVA for 1 Sec. - 1 Set				
	Out going:				
	a) 400 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 50 KA breaking capacity (Icu=Ics) with Micro processor release, spreader links, rotary handle, ON/OFF indication lamps with MCB protection, digital ammeter etc - 1 Nos.	1	Job	497027.00	497027.00

18	Supplying of following sizes of XLPE insulated and PVC sheathed aluminium conductor armoured cable of 1.1 KV grade conforming to IS:7098 (Part-I) 1988 with upto date amendments duly ISI marked complete as required.				
18.1	a) 3 ½ x 300 sq.mm	30	Metre	3771.00	113130.00
19	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
19.1	Above 185 sq. mm and upto 400 sq. mm	30	Metre	183.60	5508.00
20	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
20.1	a) 3½ X 300 sq.mm (70mm)	6	Each	1442.88	8657.00
21	Providing, laying and fixing following dia RCC pipe NP 2 class (light duty) in ground complete with RCC collars, jointing with cement mortar 1:2 (1 cement : 2 fine sand) including trenching (120 cm deep) and refilling etc. as required.				
21.1	a) 300 mm dia	30	Metre	1544.00	46320.00
22	Dismantling of double pole structure Steel poles and cross members as is where is basis, including removing the Electrical connections, dismantle the structure, disposing from the site complete as required.	1	Job	6316.00	6316.00
	Credit Items				
23	Buy back of dismantled double structure AB switch with Steel poles and cross members from the site as is where is basis as required.	400	Kg	-55.00	-22000.00
	Total				4910035.00

Executive Engineer(E)

<u>ABSTRACT OF COST</u>					
NIT No: 19/EE(E)(Vijayawada)/E-tender/2026-27					
Name of the Work: Providing 1 No. additional 250 KVA Transformer and HT Panel along with augmentation of LT Distribution at CR building Guntur.					
S.No .	Name of Component	Estimated Cost	Percentage above or below the estimated cost	% in Figures	Total Cost
1	As per Schedule of Quantities	Rs.49,10,035/-			
	GRAND TOTAL	Rs.49,10,035/-			
Important Note: 1. The tenderer is to quote a single consolidated percentage only at par/above/below estimated cost to cover all the rates of all the items under the schedule of composite tender. This column should not be left blank, otherwise the tender shall be treated as INVALID. 2. If the percentage quoted is not clear, or if the rate is not quoted in percentage, the tender shall be treated as invalid and will not be entertained as lowest tenderer.					

Contractor

Executive Engineer (E)(Vijayawada)