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|--|--|--|--|---|----------------------|--|
| <p align="center">Chhattisgarh State Industrial Development Corporation Limited Government of Chhattisgarh Undertaking (ISO 9001 : 2015 Certified) 1st Floor, Udyog Bhawan, Ring Road No.1, Telibandha, Raipur(C.G.) – 492006 CIN : U45203CT1981SG001853, PAN : AABCM6288N, GST Regn No22AABCM6288NSZY Phone : 0771-6621000 Fax : 0771-2583794 Website : www.csidc.in, Email address:csidc.cg@nic.in,csidc_raipur@yahoo.com</p> | | | | | | |
| <p align="center">NOTICE INVITING TENDER (2nd call) (Through e-Procurement Portal Only)</p> | | | | | | |
| <p>No.: 20 /CSIDC/E.E. Division-I/2026-27/</p> | | | | <p align="right">Raipur, dated 17 /06/2026</p> | | |
| <p>Online tenders are invited in Form-B Item rate basis, from "A" class Electrical license contractors' Registered in C & Above class in new registration system "Unified Registration System- (e-Registration)" with Chhattisgarh P.W.D website https://eproc.cgstate.gov.in at appropriate class, for the following works:-</p> | | | | | | |
| S.No. | Name of Work | Class of Contractor Eligible to Tender | Time allowed including rainy season | Estimated Cost (INR Lacs) | EMD (INR Rs.) | Cost of Tender Doc. (INR) including GST 18% |
| 1 | "Supply , Installation testing & Commissioning of 02 Nos 11 KV / 0.433 KV Sub-Station (2 x 500 KVA) Including Annual Maintenance Contract (AMC) for 3 Years for Electricity Connections at Working Women Hostel Koni & Uslapur , Bilaspur (C.G.)". | Registered in C class in new registration system "Unified Registration System- (e-Registration)" | 04 Months | 111.99 Lacs | 84,000/- | 3540/- |
| <p>The tender document and other details can be downloaded from the web portal (website) https://eproc.cgstate.gov.in from 17/06/2026 and shall be submitted online only. Amendment in tender, if any, will only be uploaded on the website and shall not be published in any newspaper.</p> | | | | | | |
| <p>NOTE:</p> <ol style="list-style-type: none"> 1) The interested tenderers for online submission of tender may contact CG eProc Helpdesk. Operated by Mjunction Services Limited., they may reach Helpdesk using 18002582502 (from 9 AM to 11 PM) (therein press 2 for CG e-Proc) or you can email them at Helpdesk.eproc@cgswn.gov.in. 2) Tenderer may contact to E.E., Div-I, CSIDC, Udyog Bhawan in working hours to clear their doubt if any before online submission of the tender. | | | | | | |
| <p align="right">Executive Engineer, Division-I</p> | | | | | | |



Chhattisgarh State Industrial Development Corporation Limited

(A Government of Chhattisgarh Undertaking)

(ISO 9001:2015 Certified)

1st Floor, Udyog Bhawan, Ring Road No.1, Telibandha, Raipur(C.G.) – 492006

CIN : U45203CT1981SG001853, PAN : AABCM6288N, GST Regn. No. 22AABCM6288N5ZY

Phone : 0771-6621000, Fax : 0771-2583794,

Website : www.csidc.in, Email address:csidc.cg@nic.in,csidc_raipur@yahoo.com

NIT No. 20/CSIDC/E.E./Division-I/2026-27

Raipur, Dated 17/06/2026

e-Procurement Tender Notice

Portal : <https://eproc.cgstate.gov.in>

(2nd Call)

Online Item Rates tenders for the work mentioned below are invited on behalf of the **M.D. CSIDC Raipur Chhattisgarh** in **Form B (Item Rate Basis)** from "A" class Electrical license Contractors Registered in C & Above class in new registration system "Unified Registration System-(e-Registration)" with Chhattisgarh P.W.D. and also get empanelled on <https://eproc.cgstate.gov.in> as per the Date Details mentioned below. All other condition for submission of tenders have been mentioned in the tender documents.

| Sr. No. | Name of work | Probable Amount of Contract | Earnest Money (EMD) | Cost of Tender Doc. (INR) | Bid Participati on Fees | Class of Contractor Eligible to tender | Time allowed for completion | Bank Solvency Certificate not older than 12 months |
|---------|--|-----------------------------|--|---|--|---|------------------------------------|--|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 |
| 1. | "Supply , Installation testing & Commissioning of 02 Nos 11 KV / 0.433 KV Sub-Station (2 x 500 KVA) Including Annual Maintenance Contract (AMC) for 3 Years for Electricity Connections at Working Women Hostel Koni & Uslapur , Bilaspur (C.G.)". | Rs. 111.99 Lacs | Rs. 84000/- (To be pledged in favour of M.D. CSIDC, Raipur | Rs. 3,000/- + GST 18% Rs. 540/- Total Rs. 3,540/- (To be Submitted in favour of M.D. CSIDC, Raipur | Rs. 311/- + payment gateway service charges as applicable. | Registered in C & Above class in new registration system "Unified Registration System-(e-Registration)" | 04 Months (including Rainy Season) | Rs. 16.80 Lacs |

The tender documents can be downloaded from the Portal (Website) <https://eproc.cgstate.gov.in> directly and shall be submitted online only after making the payment of Bid Participation fees online, but Earnest Money Deposit to be pledged in favour of **M.D. CSIDC Raipur** shall have to be submitted along with Affidavit (in given format) physically in Envelope D as per the Dates Details mentioned below.

Key Dates :-

| S. No. | Activity | Date & Time |
|--------|--|-----------------------------|
| 1. | Bid Submission Start Date | 17/06/2026 17.00 |
| 2. | Bid Submission due Date (Online) | 01/07/2026 17.00 |
| 3. | End date for Physical Document submission (EMD, and Affidavit in Envelope-D) (by Registered/Speed Post) | 03/07/2026 17.00 |
| 4. | Bid Opening Date (Scheduled) | 06/07/2026 14.00 |

The Bids of the contractors have to be digitally signed by the digital Certificate of the Contractor before submitting the bids online.

1. In case the Tender(s) is/are not registered in appropriate class of contractors in Chhattisgarh Public Works Department and Website <https://eproc.cgstate.gov.in> He/they shall not be eligible to participate in the above tender.
2. It is mandatory to submit the Following online:-
 - (A) Details of Earnest money in the form of FDR. In favour of M.D., C.S.I.D.C., Raipur from a **Nationalized bank/Scheduled Bank**
 - (B) Cost of tender document in the form of DD in favour of M.D. CSIDC, Raipur **from a Nationalized bank/ Scheduled Bank**
 - (C) Copy of Valid registration in CGPWD.
 - (D) Copy of valid 'A' Class Electrical License
 - (E) Valid Bank solvency Certificate not older then 12 Month of amount Rs. 16.80 Lacs.
 - (F) Affidavit in prescribed format attached in N.I.T. Documents. Original Notarized in Rs. 100/- (Rupees hundred only) Non Judicial Stamp Paper.
 - (G) Requirements for submission of GST Returns would be as follows. :-
 - (a) Bidders filing return on monthly basis must submit the GST Return for the month March-2026.
 - (b) Bidders filing GST return on quarterly basis must submit GST Return for the quarter ending March 2026
 - (H) IT Returns for last 3 Years from the date of NIT published
 - (I) Copy of Pan Card.
 - (J) All desired document should be self attested except affidavit should be Notarized.
 - (K) (i) Affidavit in prescribed format regarding that given all the information's are true must be attached on Rs. 100/- Non Judicial Stamp Paper.
(ii) Integrity Pact. Original Notarized pre-Integrity pact (Annexure-H) in Rs. 100/- (Rupees hundred only) Non Judicial Stamp Paper.
 - (L) All desired document of scan copy submitted Online & should also to be submitted physically DD, EMD & Affidavit by registered/ speed post in separate envelope A & D. Any additional documents which are not submitted online but submitted physically will not be accepted.
3. Conditional tenders are liable for rejection.
4. If any pre-qualified tenderer withdraws his offer before the validity period or makes/propose any modifications in the terms and conditions of the tender, the said earnest money shall stand forfeited.
5. Before the deadline for submission of tender, the E.E./C.E., CSIDC, Raipur can modify the tender document by issuing amendment.
6. For details on tendering procedure through the electronic tendering system, please refer to Guidelines to contractors for implementation of e-procurement system in CSIDC.
7. If any document as required is not received as desired then the bidder will be treated unqualified and his tender will not be opened.
8. All Tenders must be accompanied with the
 - a) **Earnest money** as mentioned above shall be payable in favour of *Managing Director CSIDC*, in the form of **Bank Draft payable at Raipur/ Fixed deposit Receipt (FDR)/Operatable/ Encashable at Raipur with their local branch address, drawn from a nationalized bank/Scheduled Bank. Bank Draft and FDR shall be valid for a period of 3 (three) months and 12(Twelve) months respectively from the date of submission of tender**
 - b) **Cost of tender** as mentioned above shall be payable in favour of *Managing Director, CSIDC* in the form of a **Bank Draft payable at Raipur drawn from a nationalized bank/ Scheduled Bank** which shall be valid for a period of **3 (Three) months** from the date of submission of tender.
9. (a) Tenders shall be **valid for 120 (one hundred twenty) days** from the last date of submission of the tender. CSIDC will not be responsible for any costs or expenses incurred by Tenderers in connection with the preparation or Online Tendering System. If any tenderer withdraws his tender before the said period

or issue of letter of acceptance/intent, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the CSIDC, then the CSIDC shall, without prejudice to any other right or remedy, be at liberty to forfeit entire amount of Earnest Money as aforesaid.

(b) Any bidder, who has withdrawn his proposal or have been disqualified on the basis of the above clause, shall not be eligible to submit the tender in the recall of such tender.

10. For technical qualification, eligibility criteria and earnest money-the document submitted online shall only be treated as final submission of document. Any physical submission of extra paper/document shall not be taken for consideration for technical qualification/eligibility criteria.
11. Please refer annexure-H in the tender form as instruction to bidder for online bid submission.
12. Any amendment issued shall be part of the tender document and shall be published on web site only.
13. EE, Division-01, CSIDC, Raipur will open online envelope containing Envelope-A&B received online, and Envelope D received physically in the presence of the tenderer(s) / representatives who choose to attend at the time, date and place specified in the Notice inviting tender.
14. (a) The authorized committee will prepare minutes of the pre qualification opening and Shortlist/
approve the qualified tenderers.
(b) Financial Bids of only qualified Bidders will be opened.
15. The power to accept/reject the all or any tender is reserved with Managing Director, CSIDC, Ltd., Raipur.

16. SPECIAL CONDITION:-

- 1- Contractors are advised to go through the Notice Inviting tenders & the tender/~~P.Q. document~~ thoroughly. Certificates, annexure, enclosures as mentioned in the document will have to be submitted by the tenderers strictly in the prescribed format, at the time of submission of Technical/Financial Bid, failing which the contractor shall disqualify for the work & his financial offer shall not be opened and no representation, appeal or objection, what so ever in this regard shall be entertained, by the department.
- 2- Cess @ 1% (one percent) shall be deducted at source from every bill of the contractor under Building and other construction for workers welfare, cess act 1996.
- 3- Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders, 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 at their own cost obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect the execution of work and shall incorporate the cost of such effects while quoting the tender, A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed, The tenderer shall be responsible for arranging and maintaining at his own cost all materials tools & plants, water, electricity, access facilities for workers and on all other services required for executing the work unless otherwise specifically provided in the contract documents. Submission of tender by a tenderer 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 local conditions and other factors having a bearing on the execution of the work.
- 4- It is mandatory for the contractor(S) to get himself/themselves registered with "C.G. Building & Other Construction welfare Board" as soon as the work order is issued to him / them for the work amounting to Rs. 10.00 (ten) lacs and above and submit a copy of the same to the concern Executive Engineer. Otherwise no payment will be made under the contract.
- 5- The bidder must have experience of successfully completing works of similar nature (Sub-Station (11 KV /0.433 KV or 33 KV /0.433 KVA capacity not less than 500 KVA) during the last five years in Government/ Semi-Government/Public Sector/Government Undertakings. Experience certificate issued by the competent authority (not less below the rank of executive engineer) for such work shall be mandatorily submitted along with the tender.

- 6- **Necessary approval (if required), from Electrical Safety Inspector or any concern department will be furnished by the contractor.** Contractor will also be responsible for substation Liasioning work, getting HT connections from CSPDCL & will prepare necessary drawings for approval to complete work in all respect.
- 7- All Materials to be supplied and used in the work shall be of approved make and shall strictly Comply with the approved item list/specifications of CSPDCL
- 8- For technical specifications of works and approved make refer annexure II
- 9- The contractor shall also be responsible for performance of work carried out by him for a **period of 60 (Sixty) month** beyond the completion of work for which performance Guarantee has to be furnished by him @ 5%(five percent)of amount of contract.
- 10- 5% security deposit shall be deducted from running bills and shall be refunded on successful completion of the work.
- 11- It is mandatory for contractor to submit an affidavit in prescribed format attached in annexure 1 of P.Q. document.
- 12- *The offer shall be valid for 120 days from the date of opening of tenders.*
- 13- **GST will be applicable & should be paid by Contractor.**
- 14- **Tenders are advised to visit site before quoting the rates.**
- 15- **All the document to be submitted on line shall be duly clean readable otherwise Price Bid will not be opened.**
- 16- ~~For probable amount of contract upto Rs. five crore, Contractor shall submit the certificate of availability with him (owned or leased or higher or by procurement against mobilization advances) regarding computerized hot mix plant. Sensor Paver/mechanical paver, Vibratory roller, (for 50mm or more thickness of B.M./D.B.M. (with M.S.S./S.D.B.C. & B.C.) and other plants and machineries duly certified by Executive Engineer or Equivalent Officer (Certificate shall not be older than 24 months) along with the EMD envelope, otherwise tender will be disqualified while opening.~~
- 17- कार्यालय आयुक्त, राज्य कर छत्तीसगढ़, वाणिज्यिक कर विभाग-जीएसटी भवन, कैपिटल काम्पलेक्स, नार्थ ब्लॉक, सेक्टर 19 नवा रायपुर अटल नगर का महत्वपूर्ण निर्देश क्र. 95/2020 पत्र क्र. आ.वाक./ तक/2020/7754 नवा रायपुर, अटल नगर दिनांक 02.12.2020 के आदेशानुसार:-
 - I. ठेकेदार/सप्लायर्स के द्वारा अंतिम भुगतान से पूर्व जीएसटी विभाग से बकाया न होने संबंधी प्रमाण पत्र (Tax Clearance Certificate) अथवा पूर्व देय कर जमा किए जाने का प्रमाण पत्र प्रस्तुत किया जाना होगा।
 - II. चूंकि वर्तमान में क्रियाशील सप्लायर्स आर्डर/वर्क कॉन्ट्रैक्ट की निविदा में उपरोक्त शर्त नहीं थी, इसलिए One Time सत्यापन किया जाना उचित होगा कि जिस जी0 एस0 टी0 पंजीयन पर TDS कट रहा है वो जीवित है अथवा नहीं। यह सत्यापन निकटस्थ जी0 एस0 टी0 वृत्त कार्यालय से कराया जा सकता है। साथ ही अंतिम भुगतान या धरोहर राशि की विमुक्ति के पूर्व, देय कर का शासकीय कोष में जमा कराए जाने का सत्यापन कराया जाना भी उचित होगा।
- 18- ~~कार्यालय कलेक्टर (खनिज शाखा) छ.ग. द्वारा जारी आदेश क्र. 2336/खनिज/रायल्टी/20 दिनांक 04.03.2020 के तहत शासन के निर्देशानुसार बिना रायल्टी चुकता प्रमाण पत्र के किसी भी ठेकेदार का अंतिम देयक का भुगतान न किया जावे जिससे शासन को राजस्व की हानि न हो, तदनुसार बिना रायल्टी चुकता प्रमाण पत्र के अंतिम भुगतान नहीं किया जावेगा।~~

~~For probable amount of contract more than Rs. Five crore, the conditions of pre-qualification document shall be followed.~~

~~These special conditions will supersede anything contrary to it in the tender document.~~

14. The Dates for opening of Envelope A, online & Envelope D (Received by Post)

1. **Opening of Envelope A online & Envelope D (Received by Speed Post/ registered A.D.)**

On 06/07/2026 at 17:00 pm.

2. **Price bid shall be opened after Technical Evaluation.**

All the contractors are required to submit Envelope D physically containing the following Documents:

1. Instrument of Earnest Money Deposit (E.M.D.) in favour of M.D. CSIDC, Raipur.
2. Cost of tender document in the form of DD in favour of M.D. CSIDC, Raipur.
3. Affidavit in Original.
4. Integrity Pact in Original on Rs. 100/- Non Judicial Stamp Paper duly Notarized

Any additional documents which are not submitted online but submitted physically will not be accepted.

Envelope D should be submitted only through Registered Post/Speed Post so as to reach in the Office of the Executive Engineer, Division-01 CSIDC, Udyog Bhawan, Ring Road, No.-1 Telibandha, Raipur (C.G.) pin-492006 upto the date and time mentioned above. For any postal delay the department shall not be responsible.

Executive Engineer

Division-01

CSIDC, Raipur (C.G.)

- Note: -1.** All eligible/interested contractors are mandated to get enrolled on the e Procurement portal (<https://eproc.cgstate.gov.in>) in order to download the tender documents and participate in the subsequent bidding process.
2. For any other queries regarding online registration on the above mentioned website please get in touch with e-Procurement system integrator, M/s. Mjunction Services Limited, Raipur – 492 001 on Toll free 1800 419 9140 or email helpdesk.eproc@cgswan.gov.in
 3. All Documents related to Tender are to be submitted by Tenderers online only. In Addition EMD and Affidavit should be submitted in original through speed post/ registered only, failing which the tenderer cannot participate in the bidding.
 4. निविदाकार द्वारा अर्हता शर्तों की पूर्ति/साक्ष्य हेतु आवश्यक दस्तावेज (अनैक्पर में दी गई जानकारी के समर्थन में) वैद्य वाणिज्यिकर चुकता प्रमाण पत्र, वैद्य बैंक साल्वेंषी आदि ऑन लाईन के माध्यम से प्रस्तुत करना अनिवार्य है। व्यक्तिगत रूप से कोई दस्तावेज ग्राह्य नहीं किया जावेगा।
 5. निविदा की टेक्निकल बिड खोलने की निर्धारित तिथि एवं समय पर संबंधित निविदाकारों की उपस्थिति अपेक्षित है, ताकि वे अनर्ह होते हैं, तो उसी दिन उन्हें सूचना दी जा सके, और वे अनर्हता के संबंध में अपना पक्ष उसी दिन रख सकें यदि वे उक्त समय पर उपस्थित नहीं होते हैं, तो भविष्य में उनके द्वारा ली गई किसी आपत्ति या उनके द्वारा प्रस्तुत कोई अभ्यावेदन मान्य नहीं होगा।

Affidavit

I.....S/o.....Aged.....
 ...years.....resident.....of.....
(address.....)
 (For and on behalf of.....), do here by and
 herewith solemnly affirm / state on oath that : -

1. **All documents and Information's furnished are correct in all respects to the best of my knowledge and belief .**
2. **I/We read carefully & understood the entire Tender document including Addendum if any along with important instructions to the tenderers submitting the tender online. In case at any stage whatsoever at a later date it is found that we have given false documents/information, we clearly understand that our work shall be liable to be cancelled and Earnest Money/Performance Guarantee/Security deposit etc. all are liable to be forfeited by CSIDC and in such an eventuality I/We shall have no right or claim for any damages/compensation from CSIDC on this account. Further in such case I/We may also be debarred by CSIDC for further participation in the concerned work of CSIDC.**
3. **I have not suppressed or omitted any information as is required.**
4. **I am/we are/ none of our partner of director is neither black listed nor debarred by Govt. of India/Other State Govt. Departments/Chhattisgarh State Govt. Departments / Semi Govt. Departments. (C.G. & Other Govt.)**
5. **I or any of the partner of the firm or any of the director of the company are neither partner of any such firm or director of any such company which has been debarred/black listed by Government of India/other state Govt. Department/ C.G. State Govt. Departments/ Semi Govt. Departments. (C.G. & Other Govt.)**
6. **I hereby authorize the CSIDC Officials to get all the documents verified from appropriate source(s).**

Deponent
 (.....)
 Authorized signatory /
 for and on behalf of

 (affix seal)

Verification

I.....S/o..... do here by affirm that the contents stated in Para 1 to 5 above are true to the best of my knowledge and believe and are based on my / our record.

Verified that this..... date of200....at (Place).....

Seal of attestation by a Public Deponent

Notary with date (.....)

Authorized signature /
for and on behalf of.....
(affix seal)

**TECHNICAL SPECIFICATION FOR OUTDOOR NON SEALED TYPE THREE PHASE
11 KV/0.433KV DISTRIBUTION TRANSFORMERS OF 500 KVA, AND SCOPE OF
WORK FOR ANNUAL MAINTENANCE CONTRACT (AMC)**

SCOPE:

This specification covers the design, engineering, manufacture, shop testing, supply & delivery of oil immersed, naturally cooled, three-phase, 50 Hz, double-wound, outdoor type Distribution transformers of 500 KVA, capacity. **Distribution Transformers for outdoor use along with metallic enclosure housing LV bushing with sealing facility.**

It is not the intent to specify completely herein all the details of the design and construction of equipment. However the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation upto the Bidder's guarantee, in manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance there with. The offered equipment shall be complete with all components necessary for their effective and trouble free operation. Such, components be deemed to be within the scope of Bidder's supply interceptive of whether those are specifically brought out in this specification and / or the commercial order or not. Transformers will be plinth mounted.

2.0 STANDARDS:

Unless otherwise modified in this specification the transformer/materials shall conform in all respect to the relevant Indian/International Standard Specification, with latest amendments thereof some of them are listed below:

| Title | India standard | International & Internationally recognized standard |
|---|-----------------------|--|
| Specification for power Transformer | IS-2026:1977-81 | IEC-76 |
| O/D type oil immersed Distribution transformer upto & including 2500 KVA, 33 KV specification | IS-1180(part-1):2014 | |
| Insulating Oil for transformer & Switchgear | IS-335/1983 | BS-148 |
| Fittings & Accessories for Power Transformer | IS-3639:1968 | ASTM D-1275 |
| High Voltage Porcelain Bushings | IS-2099:1986 | IEC 296-1969 |
| Low Voltage Porcelain Bushings | IS-7421-1988 | |
| Dimensions for Outdoor Bushings | IS-3347 | DIN 42531 to 33 |
| Specification for Copper wire rods | IS-1244 | ASTM B-49 |
| Specification for colors for ready mixed paints | IS-5/1964 | IEC-76 |

| | | |
|--|--------------------------|--------------|
| Guide for loading of oil immersed Transformers | IS-6600/1972 | BS-148 |
| Manual on Transformer | CBI&P Publication No.275 | ASTM D-1275 |
| Specification for Power Transformer | IS-2026:1977-81 | IEC 296-1969 |
| Insulating Oil for transformer & Switchgear | IS-335/1983 | |

The bidder shall use ISS, however, wherever this standard is not available, corresponding IEC may be followed. Material conforming to ISS or the internationally accepted standards, which ensure equal or higher quality than the standards mentioned above, would also be acceptable. In case the Bidders who wish to offer material conforming to the standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. Four copies of such standards with authentic English translations shall be furnished along with the other.

3.0 SERVICE CONDITIONS:-

The Distribution Transformers & other equipment/material to be supplied against this specification shall be suitable for satisfactory operation under the following climatic Conditions as per IS-2026 (Part-I) latest revision.

| Sr No. | Location | At Various locations in the state of Chhattisgarh |
|--------|--|---|
| 1 | Maximum ambient temperature (°C) | 60 |
| 2 | Minimum ambient air temperature (°C)-5 | |
| 3 | Maximum average daily ambient temperature | 40 |
| 4 | Maximum yearly weighed average ambient temperature | 32 |
| 5 | Maximum altitude above mean sea level (m) | 1000 |
| 6 | Minimum Relative Humidity (%) | 26 |
| 7 | Maximum Relative Humidity (%) | 95 |
| 8 | Average no of Rainy days/ year | 120 |
| 9 | Average annual rainfall | 900mm |
| 10 | Maximum wind pressure | 195 kg/m sq. |

The equipment shall be for safe operation in moderately hot and humid tropical climate, conducive to rust and fungus growth.

4.0 PRINCIPAL PARAMETERS OF THE TRANSFORMER

The transformer shall be suitable for outdoor service as step down transformer. The electrical parameters of the transformer shall be as follows:

| Sr. No. | Particulars | |
|---------|--|-----------------------|
| 1 | Rated HV Voltage | 11 KV |
| 2 | Rated LV Voltage | 433-250 KV |
| 3 | Connection (HV) | Delta |
| 4 | Connection(LV) | Star |
| 5 | Vector Group | Dyn-11 |
| 6 | Material of winding | Copper Double Wound |
| 7 | Type of cooling | ONAN |
| 8 | Max. Current Density in HV & LV winding for copper wound T/F | 2.8 A/mm ² |
| 9 | Method of system earthing Neutral Solidly earthed system | |

5.0 NO-LOAD VOLTAGE RATIO

The no-load voltage ratio shall be 11000/433 V.

TEMPERATURE RISE

The transformer shall be capable of operating continuously at its normal rating without exceeding the temperature rise limit. The temperature rise shall not exceed the limits of 45 °C (measured by resistance) for transformer windings and 40°C (measured by thermometer) in top oil above the ambient temperature when tested in accordance with IS. The Transformer with higher temperature rise shall not be acceptable. Hot spot temperature shall not exceed 95°C when calculated on an annual weighted average temperature of 45°C as per IS: 1180

The limits of temperature rise mentioned above will have to be satisfied by the Manufacture by carrying the Heat run test at the lowest negative tap by feeding losses corresponding to the rated current of the tap.

7.0 LOSSES

The maximum allowable losses for 11/0.433 KV shall not exceed the values given in the following table

| KVA Rating of T/F | Max Losses at 50 % loading (K. Watts) | Max losses at 100% loading at 75 Deg C. (K. Watts) |
|-------------------|---------------------------------------|--|
| 500 KVA | 1.430 | 4.100 |

These losses are maximum allowable and there would not be any positive tolerance. However, the manufacture can offer losses less than above.

The supplier shall quote No-Load loss in KW at the rated voltage and frequency. The load loss in KW at rated voltage, frequency & output, for the temperature of 75 degree centigrade shall also be quoted. The supplier shall guarantee these loss figures.

Note:-Losses are taken as per Energy Efficiency Level 3 of IS 1180.

8.0 IMPEDANCE:

The recommended percentage impedance at 75 °C is 4.5% for with a tolerance as per IS 1180

WINDIG

The primary (HV) windings shall be connected in Delta and the secondary (LV) winding in Star (Vector system DYn11) so as to produce a positive displacement of 30 degree from the primary to secondary vectors of the same phase. The neutral of Secondary windings shall be brought out to a separate earth pit and the transformer body is to be connected to station grounding system. HV windings shall consist of single coil or cross over coil design. The copper wires for coil formation shall be of sufficient cross-sectional area to impart desired mechanical strength. All delta leads from HT coils as well as HT leads should be taken out through TPC. The current density in these leads should not exceed 0.8A/sq.mm.

The winding shall be so designed as to produce minimum out of balance forces in the transformers. Transformers shall be copper wound. The current density for copper wound transformer shall be limited to 2.6 A/mm.² upto 1 MVA and 2.8 A/mm.² for transformer more than 1 MVA

The winding design shall ensure that all the coil assemblies are of identical voltage ratio and shall be interchangeable and repairing of the winding could be made easily without special equipment.

The conductor used in the coil shall be best suitable to the equipment and all the permanent current carrying joints in the winding and leads shall be properly sleeved and brazed instead of jointing with solder or welding. All LV Coil ends shall be provided with brazed lugs and HV coil ends by brazing only.

For transformers HT winding (Crossover Type) shall have enamel conductor with double paper covering (DPC) for transformers upto 1.0 MVA & Triple paper covering (TPC) for transformer more than 1 MVA and LT winding (Spiral Type) shall have enamel copper insulation with Double paper covering. Electrical Grade insulation Kraft paper in layers uniform density and free from and foreign particles and shall conform to IS:698/56 and latest amendments thereof. The end turn of each layer shall be properly and fully covered to avoid interlayer flashover. Corrugated Cylinder made from pre-compressed insulation board should preferably be used between LV and HV winding. The insulation of coils shall be vacuum impregnated in oil to develop full electrical strength in the winding. All material used in the insulation and assembly of the winding shall be insoluble non catalytic and chemically inactive in the hot transformer oil and shall not soften or otherwise be adversely effected under operating conditions. The core and coil assembly shall be fully dried out in „Air Drying Oven“ till the coils are shrunken to the designed level and are completely dried. Only then they will be impregnated in the transformer oil.

The minimum insulation resistance values in Mega Ohms between winding and earth when the transformer is filled with oil should be:

Insulation resistance between winding and earth

| | 20°C | 30°C | 40°C | 50°C | 60°C |
|-------------------|------|------|------|------|------|
| HV winding | 800 | 400 | 200 | 100 | 50 |
| LV winding | 400 | 200 | 100 | 50 | 25 |

The insulation resistance values (HV windings) should be measured with a 2500 V Megger.

The overloading capacity transformer shall be as per IS-6600.

The value of unbalance current indicated by the ammeter shall not be more than 2% of the full load current.

CORE CONSTRUCTION

MATERIAL – CRGO METAL

The core shall be stack / wound type of grade M3 of better & generally of high grade rolled grain annealed steel lamination having low and good grain properties, coated with complete design of core must ensure permanency of the core losses with continuous working of the transformers. The value of the maximum flux density allowed in the design and grade of lamination used be clearly stated in the offer. The bidder should offer the core for inspection and approval by the purchaser during manufacturing stage. Bidder,s shall give notice for inspection with the following documents as applicable as a proof towards use of prime core material.

Invoice of the supplier
Mils Test Certificate
Packing List
Bill of Loading
Bill of entry certificate to customs

10.2.0 Core clamping for CRGO Stacked core.

Core channel on LV side to be reinforced at equidistance, if holes/cutting is done for LT lead in order to avoid bending of channel. MS channel shall be painted with varnish of oil resistant paint. Clamping & Tie-rods shall be made of HT steel and shall be parkarised.

10.3 Core clamping for CRGO wound core

10.3.1 Core clamping shall be with top and bottom U-shaped core clamps made of sheet steel clamped HT steel tie rods for efficient clamping

10.3.2. MS core clamps shall be painted with varnish or oil-resistant paint.

10.3.3 MS rods shall be used as tie rods

Suitable provision shall be made in the bottom core clamp/ bottom plate of the transformer to arrest movement or the active part.

The transformers core shall be suitable for over fluxing (due to combined effect of voltage and frequency) upto 12.5% without injurious heating at full load conditions and shall not get saturated. The Bidder shall furnish necessary design data in support of this situation.

No load current shall not exceed 2% of full load current and will be measured by energizing the transformer at 433 volts, 50c/s on the secondary, Increase of voltage of 433 volts by 12.5% shall not increase the no load current disproportionately high. Test for magnetic balance by connecting the LV phase by phase to rated phase voltage and measurement of an, bn, cn voltage will be carried out.

10.6 The core material should be imported directly from the required manufacture. Core material shall be processed by slitting only. Core cutting/slitting be done in front of inspecting officers deputed by department”.

10.7. Temperature rise

The temperature rise over ambient shall not exceed the limits described below:

- 1) Top oil temperature rise measured by thermometer: 40 deg. c
- 2) Winding temperature rise measure by resistance: 45 deg. c

Bids not meeting the above limits of temperature rise will be treated as nonresponsive.

AMORPHOUS METAL.

The core shall be high quality amorphous ribbons having very low loss formed into wound cores of rectangular shape, bolted together to the frames firmly to prevent vibration of noise. The complete design of core must ensure permanency of the core loss with continuous working of the transformers. The value of the flux density allowed in the design shall be clearly stated in the offer. Curve showing the properties of the metal shall be attached with the offer.

Core clamping for Amorphous metal Transformers.

Core clamping shall be with top and bottom U-shaped core clamps made of sheet steel clamped HT steel tie rods for efficient clamping.

MS core clamps shall be painted with varnish or oil-resistant paint.

Suitable provision shall be made in the bottom core clamp/bottom plate of the transformer to arrest movement of the active part.

The transformer core shall be suitable for over fluxing (due to combined effect of voltage and frequency) upto 12.5% without injurious heating at full load conditions and shall not get saturated. The Bidder shall furnish necessary design data in support of this situation.

No load current shall not exceed 2% of full load current and will be measured by energizing the transformer at 433 volts, 50c/s on the Secondary. Increase of voltage of 433 volts by 12.5% shall not increase the no load current disproportionately high. Test for measurement of an, bn, cn voltage will be carried out.

NOTE:

- i) "Equal weightage shall be given to the transformers with Amorphous Metal Core and CRGO.

TANK CONSTRUCTION

The tank shall be of robust construction in accordance with the best engineering practice. The main tank of the transformer shall be fabricated from tested quality of mild steel of adequate thickness i.e. minimum 4.00 mm. (for side walls) and 6.00 mm. (for top & bottom plates). The tank shall be valid (V shape welding fillet) inside of tank two outside welding of tank to bear more pressure to avoid bursting.

To provide rigidity and to meet the pressure inside the tank, due to short circuit current, the tank shall be suitably stiffened. The stiffeners wherever applicable are provided on all the four side walls of the tank, designed not to retain water.

The tank cover shall be slightly sloping towards HV bushing and shall provide facilities for draining of water.

The transformer tank shall be complete with all accessories, lifting lugs and shall be designed as to allow the complete transformer tank, filled with oil to be lifted by crane or other means without risk of any damage and transported by Rail/Road without straining any joint and without causing leakage of oil.

Bolted inspection covers shall be provided on top cover to inspect core, winding and have access to the bottom of bushing.

The tank shall be capable of with standing the pressure of $\pm 1 \text{ kg/cm}^2$ without deformation.

The transformer body should be welded from inside of the main tank body so that the joint is stronger due to V-shape welding fillet besides the outside welding be additional.

INSULATION MATERIAL:-

Material:-Electrical grade insulation Kraft papers and press Boards of standard should be used. For the use standard material the names of following firms have been approved.

| Sr. No. | Name of Insulating Material | Name of the firms |
|---------|-----------------------------|--|
| 1 | Press Board | a. Senapathy whitely b. Raman Board |
| 2 | Craft Paper | a. Ballarpur b. Padamjee c. Triveni d. M/S Skytouch tapes Ltd Mumbai e. M/s Vijaya Mercantile f. M/s Badri Enterprise, New Delhi. |
| 3 | Press pahn paper | Senapathy Whitely |
| 4 | Gasket | a. New Cork b. talbros c. M/S Skytouch tapes Ltd Mumbai d. M/s Vijaya Mercantile e. M/s Badri Enterprise, New Delhi |

Spacers, axial wedge / runners used in windings shall be made of pre-compressed pressboard-solid, conforming to type B 3.1 of IEC 641-3-2. In case of cross –over coil winding of HV all spacers shall be properly sheared and dovetail punched to ensure proper locking. All axial wedges / runners shall be properly milled to dovetail shape so that they pass through the designed spacers freely. Insulation shearing, cutting, milling and punching operations shall be carried out in such out in such a way, that there should not be any burr and dimensional variations.

SURFACE PREPARATION AND PAINTING

All paints shall be applied in accordance with the paint manufacturer's recommendations. Particular attention shall be paid to the following:

- Proper storage to avoid exposure as well as extremes of temperature and shelf life for storage
- Surface preparation prior to painting.
- Mixing and thinning.
- Application of paints and the recommended limit on time intervals between coats/

All paints, when applied in normal full coat, shall be free from runs, sags, Wrinkles, patchiness or other defects.

All primers shall be well marked into the surface, particularly in areas where painting is evident, and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray is not possible, conventional spray be used with prior approval of purchaser.

The supplier shall, prior to painting, protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.

Cleaning and surface preparation:

All machining, forming, welding and other manufacturing activities shall be

completed before surface preparation. All steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination by sand/shot blast cleaning or chemical cleaning by seven tank process including Phos-phating to the appropriate quality in accordance with IS 6005.

The Pressure and Volume of the compressed air supply for the blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination.

All rough surfaces shall be filled with approved two pack filler and then rubbed down to a smooth finish.

Protective Coating

As soon as all items have been cleaned and phosphate within four hours of the subsequent drying, they shall be given suitable anticorrosion protection of Zinc chromate primer.

Paint Material

Followings are the type of paints that may be suitably used for the transformer to be painted at shop and supply of matching paint to site:

- i) Heat resistant paint (Hot oil proof) for inside surface.
- ii) For external surfaces one coat of Thermo Setting Paint or 2 coats of Zinc chromate followed by 2 coats of polyurethane paint. The color of the finishing coats shall be light admiral grey conforming to no. 697 of IS:5:1961.

Painting Procedure

All paints in anyone particular system, whether shop or site applied, shall originate from one paint manufacturer.

The paint shall only be applied in the manner detailed by the manufacturer e.g. conventional or airless spray and shall be applied under the manufacturer's recommended conditions.

Where the quality of film is impaired by excess film thickness (wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coatings and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25%. In all instances, where two or more coats of the same paints are applied, such coatings should be of slightly contrasting colors.

Paints applied to items that are not being painted, shall be removed at supplier's expense, leaving the surface clean, un-stained and undamaged.

Damaged Paint work

Any damage occurring to any part of the painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.

Any damaged paint work shall be made good as follows:

The damaged area, together with an area extending 25 mm around its boundary, shall be cleaned down to bare metal.

- a) A priming coat shall immediately applied, followed by a full paint finish equal to that originally applied and extending 50 mm around the perimeter of the originally damaged.
- b) The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before & after priming.

Dry Film Thickness

To the maximum extent practicable, the coats shall be applied as a continuous film of uniform thickness and free of pores. Over-spray, Skips, runs, sags and drips should be avoided.

Each coat of paint shall be allowed to harden before the next is applied as per manufacturer's recommendations.

Particular attention must be paid to full film thickness at edges.

The requirement for the dry film thickness (DFT) of paint and the material is to be used shall be as given below:-

| Sr. No. | Paint Type | Area to be painted | No. of coats | Total Dry Film thickness (Min) |
|---------|---|--------------------|--------------|--------------------------------|
| 1 | Powder Paint a) Thermo setting powder. | Inside Outside | 01 01 | 20 Micron 60 Micron |
| 2. | Liquid paint a) Zinc Chromate | Out side | 02 | 45 microns |

13.0 CLEARANCES IN CABLE BOX

The external electrical clearance between phase to phase and phase to earth in air filled cable termination box shall be in accordance with Clause 11.1 of IS:1180 shall not be less than the values given below:-

| Voltage | Medium | Clearance Phase to Phase (mm) | Clearance phase to Earth (mm) |
|---------|--------|-------------------------------|-------------------------------|
| 11 KV | Air | 255 | 140 |
| 433 V | Air | 25 | 20 |

-

The aforesaid clearances are minimum, and no negative tolerance on these clearances shall be allowed. The minimum creepage distance of 11 KV bushings should be 900 mm.

BUSHINGS

Terminal arrangement: The transformer shall be fitted with three high voltages and four low voltages outdoor types porcelain bushing of appropriate voltage and current rating and LT bushing shall be provided on the side of the tank. Each terminal including the neutral shall be distinctly marked and colored for phase voltage on both HV and LV sides. The system of marking shall be in accordance with the latest amendment of relevant IS.

The electrical characteristics of high voltage bushing shall conform to latest version of IS:2099 and IS 3347. The low voltage bushing shall conform to latest version of IS: 7421. All porcelain bushing shall be homogeneous, free from flaws effecting its

mechanical strength or dielectric quality. They should be well vitrified, uniformly glazed, tough and impervious to moisture. The creepage distance of all the bushing shall be 25mm per KV of highest system voltage suitable for heavily polluted atmosphere and the protected creepage distance not less than 50% of total.

HT/LT CABLE BOXES FOR INDOOR TYPE TRANSFORMER:

H.T. & L.T. terminal for cable connection shall be brought out through sidewall mounted bushing to a cable end box. Cable end box shall be weatherproof, air filled type with sufficient space inside for termination and connection of cables.

Cable end box shall be furnished complete with removable gland plate, double compression brass glands.

In general, the arrangement shall be such as to permit of core & coil assembly without dismantling the cable installation.

Suitable arrangement for HV side box and LV side box shall be provided. The LV cable box shall be suitable for terminating the cable, which will approach the boxes vertically from the bottom. The cable box shall be suitable for being detached from the main body with suitable mounting arrangement.

The H.T. and L.T. cable box shall be fixed on the opposite sides.

In the case of indoor transformers, the enclosure shall be fitted with cable boxes on HV/LV sides:

HV Side cable box :

The HV side cable box shall be provided with glands suitable for termination of 11 KV XLPE armored aluminum cables of sizes up to 3C X 400 sq mm. The cable holding clamp shall be provided. Necessary drawing has to be provided in this regard for approval before supply.

LV Side cable box :

The LV side cable box with gland shall be provided, suitable for termination of one or more runs of 1 c or 3.5/4C XLPE armoured cables of sizes upto 3.5/4CX400 mm². The cable holding clamp is to be provided. Necessary drawings is to be furnished in this regard for approval before supply

FITTINGS AND ACCESSORIES

The transformer shall be fitted with the following fittings & accessories

- a) Two earthing terminals;
- b) Oil level Indicator;
- c) Lifting lugs and platform lugs
- d) Rating, diagram and terminal marking plate(s)
- e) Silica gel breather of approved design containing min. 0.25kg dehydrated silica gel.
- f) Drain-cum-sampling valve (steel) welded to the tank.
- g) Thermometer pocket with dial type thermometer on tank cover.
- h) Air Release Plug.
- i) GOR for alarm & trip
- j) Explosion Vent with Diaphragm.
- k) Pressure relief device as standard fitment to operate at a pressure of 0.3 to 0.5 kg/cm²
- l) Filling hole having p 1-1/4 thread (with cover) on the conservator. (k) Filter valve-2 nos. on top and bottom ends of tank at opposite sides.

- m) Conservator with filling hole and drain plug.
- n) Porcelain bushings with arcing horns and terminal connectors on HV side.
- o) Porcelain bushing on LV side and HV side conforming to IS-3347, part-I and III of the latest version thereof with brass studs fitted with single gap arcing horns.
- p) Offload tap changer with tapping range of +5% to -7.5% in steps of 2.5% each with a locking device.
- q) Bimetallic terminal connector for HV/LV Bushing connecting to XLPE cable.
- r) PSR Radiators (Detachable) duly tested for leakage and pressure.
- s) Uni-directional flat rollers (4 nos.) suitable for use on 1000 mm gauge track with clamping device or base mounting arrangement as required.

Note: (I)

The fitting listed above are indicative and any other fittings which are generally required for satisfactory operation of the transformer are deemed to be included in the quoted price of the transformer.

16.0 CONSERVATORS

Conservators along with Silica gel breathers are to be provided in the transformers. The conservator shall be liberally dimensioned such that with the lowest ambient temperature and no load on the transformer, the oil level shall not recede too low and with the highest ambient temperature and permissible overload on the transformer, the oil will not spill into the breather pipe or to the exterior to waste. The conservator shall be provided with oil level indicator with minimum, Normal & Maximum temperature Markings. The inside diameter of the pipe connecting the conservator to the main tank shall be < 25 to 50 mm and it should be projected into the conservator in such a way that its end is approximately 20 mm above the bottom of the conservator. Conservators shall not be provided with drain plug. Filling hole with cover shall be provided as usual. The conservator pipe hole fitted to the tank cover should be provided with a suitable slanted plate, if required so that while pouring oil into the transformer through the conservator, oil does not fall directly on the winding. Care should be taken so that free oil flow is not impeded. Explosion vents for transformers shall also be welded on the cover. Air release plug should be provided in the explosion vent, and in tank cover to release any entrapped air. One suitable inspection hole with cover of adequate size should be provided on the tank top cover so that bushing ends and tap changer assembly may be easily accessible through that hole. The inspection cover should be placed on turret and should be provided with lifting handle and air release plug. All the fitting on the top cover should be placed on the turret. An air release plug should also be provided at the topmost point of the H.V. Bushing turrets so that any accumulated air bubble there in may be released through Air release Plug. Conservator tank shall be provided with plain oil gauge with maximum and normal marking visible from the G.L. conservator tank shall be provided with dehydrating breathers. Drain valve shall be provided on conservator.

The Buchholz relay shall have two contacts for alarm and for tripping. The relay shall also comprise drain cock, air vent, and facility of testing with air injection/mechanical testing facility.

OTI pocket is to be provided.

Marshalling box is to be provided for housing OTI. OTI shall be DIAL Type Thermometer with mercury contacts

17.0 SEALING GASKETS

All sealing washers and gaskets shall be made of oil and heat resistant Nitrile / Neoprene rubber / synthetic. rubber-bonded cork type RC-70C gaskets. The oil level in the transformer shall be made up to the required level while the transformer filled with oil is maintained at a temperature of 55 Deg.

C. All steel screws, nuts and fasteners exposed to atmosphere shall be either galvanized or cadmium plated.

18.0 TRANSFORMER OIL

The transformer oil used shall comply with the requirements of the specification as per the provision in the IS:335-1993 (Latest). Oil sample will also be taken out from fresh stock of T/F oil to be tested as per latest IS:335-1993.

19.0 BASE MOUNTING ARRANGEMENT

As per IS: 1180, to make them suitable for mounting on platform or plinth.

20.0 RATING AND TERMINAL MARKING PLATE(S)

Each transformer shall be provided with non-detachable rating diagram and terminal marking plate(s) of weather proof material, fitted in a visible position and showing the complete information as given under clause 17 of IS: 1180 (part-I)-1981. Further each transformer shall have inscription of Owner name-Purchase order and date.

TESTES:

Routine Tests:-All transformers shall be subjected to routine tests at the manufacturer's works in accordance with IS:2026 and IS:1180(part-I).

Acceptance tests:

The following shall tests acceptance tests are to be carried out in presence of purchaser's representative in accordance with procedure mentioned in the General specifications:

- (a) Measurement of winding resistance
- (b) Measurement of voltage ratio and check of voltage vector relationship
- (c) Measurement of impedance voltage/short circuit impedance and load-loss
- (d) Measurement of no-load loss and current at full voltage.
- (e) Measurement of insulation resistance.
- (f) Induced over-voltage withstand test.
- (g) Separate-source voltage withstand test.
- (h) Dielectric tests.
- (i) Oil sample test for BDV and moisture content
- (j) Visual examination & Measurement of Dimensions.
- (k) SFRA Test.

Type Tests:

The proposed transformer design must have type tested from any NABL accredited laboratory .In addition to the Tests mentioned in para 21 following Tests shall be conducted.

21.3.1. Temperature rise test for determining the maximum temperature rise after continuous full load run. The ambient temperature and time of test should be stated in the test certificate.

Impulse voltage test: As per Clause No. 13 (With chopped wave) of IS-2026 part-III latest version. BIL for 11 KV shall be 75 KV peak.

Air Pressure Test: As per CI.-22.5 of IS-1180/part-I/1989.

Short Circuit withstand test: Thermal and dynamic ability.

Magnetic Balance Test.

The type test report (s) submitted by the bidder/ supplier from any NABL accredited laboratory shall be acceptable for participation of the bidder in the procurement.

Type test certificates for the tests carried out on prototype of same specifications shall be submitted along with the bid.

The supplier shall furnish calculations in accordance with IS: 2026 to demonstrate the thermolability of the transformers to withstand short-circuit.

22.0 TEST VOLTAGES

Transformers shall be capable of withstanding the power frequency and impulse test voltage prescribed below:

| Nominal system voltage | Highest voltage | Impulse test voltage | Power frequency voltage |
|-------------------------------|------------------------|-----------------------------|--------------------------------|
| 433 V (rms) 11 KV (rms) | - 12 KV (rms) | - 75KV (peak) | 3 KV 28 KV (rms) |

23.0 Deleted

24.0 GUARENTEED TECHNICAL PARTICULARS

The guaranteed technical particulars of the transformer shall be given by the tenderalong with the tender. Tenders without GTPS shall be out rightly rejected

| GENERAL TECHNICAL REQUIREMENTS | | | |
|-------------------------------------|--|--------------------------------------|--|
| 11/0.4 KV, Distribution Transformer | | | |
| Sr. No. | Particulars | Requirement | |
| 1 | GENERAL SPECIFICATIONS | | |
| 1.1 | Rated KVA | 500 | |
| 1.2 | Service & Duty | Continuous, Distribution Transformer | |
| 1.3 | Type/Location | Core / Outdoor | |
| 1.4 | Wound | Copper Double wound | |
| 2 | SYSTEM PARTICULARS | Copper Double wound | |
| 2.1 | Nominal voltage | 11000 V | |
| 2.2 | Highest System Voltage | 12000 V | |
| 2.3 | No. of Phases | 3 | |
| 2.4 | Frequency | 50 Hz | |
| 2.5 | Voltage Variation | ± 10% | |
| 2.6 | Frequency Variation | ± 3% | |
| 2.7 | Combined Voltage Frequency variation & | ± 10% | |
| 3 | RATING | | |
| 3.1 | Rated Voltage of H.V (Volts) | 11000 | |
| 3.2 | Rated Voltage of L.V(Volts) | 433 | |
| 3.3 | Max. Temperature rise in oil by thermometer above 50 deg. C ambient Temp. | 40 Deg C | |
| 3.4 | Max. Temperature rise above 50 deg C ambient Temperature of winding by resistance method | 45 deg C | |
| 3.5 | Overload Capacity | As per IS: 6600 | |
| 4 | WINDING CONNECTION DETAILS | | |
| 4.1 | Connections | | |
| 4.2 | 1. H.V. Winding | Delta | |
| 4.3 | 2. L.V. Winding | Star | |
| 4.4 | 3. Neutral brought out for earthing | Yes | |
| 4.5 | Tapings | | |
| 4.6 | 1. No. of Tap positions | 5 Positions (4 Steps) | |
| 4.7 | 2. Range | +5% to -7.5% in steps of 2.5% | |
| 4.8 | Vector Symbol | Dyn 11 | |
| 5 | LOSSES/EFFICIENCY | | |
| 5.1 | Max losses at 50% loading (Watts) | 1430 | |
| 5.2 | Max losses at 100 % loading (Watts) | 4100 | |
| 5.3 | Percentage Impedance at 75 deg C at Normal Tap | 4.5% | |

| | | |
|------|--|--|
| 5.4 | No load Current | 2% of full load current |
| 5.5 | Regulation at full load at 75 Deg C U.P.F | 1.17% |
| 5.6 | Efficiency at Unity Power Factor (75 Deg C) | |
| 5.7 | 100% full load | 99.10% |
| 5.8 | 75% full load | 99.20% |
| 5.9 | 50% full load | 99.35% |
| 5.10 | Efficiency at 0.8 Power Factor (75 Deg C) | |
| 5.11 | 100% full load | 99.00% |
| 5.12 | 75% full load | 99.10% |
| 5.13 | 50% full load | 99.20% |
| 5.14 | Maximum Efficiency (%) | 99.00% |
| 6 | CONSTRUCTIONAL DETAILS | |
| 6.1 | Type of Construction | Core Type |
| 6.2 | Core Grade | M3 or better |
| 6.3 | Insulation class | A |
| 6.4 | H.V. Winding | Crossover |
| 6.5 | L.V. Winding | Spiral |
| 7 | Insulation of Conductors | |
| 7.1 | H.V. winding turn Insulation for transformer upto 1 MVA | DPC |
| 7.2 | H.V. winding turn Insulation for transformer above 1 MVA | TPC |
| 7.2 | L.V. Winding turn Insulation | DPC |
| 7.3 | 3. Between H.V. & L.V. winding | Oil Duct + Solid Insulation + Oil Duct |
| 7.4 | 4. Between L.V. winding & core | Solid Insulation |
| 7.5 | Joints in Winding | Brazed only |
| 8 | Bushing Clearances | |
| 8.1 | Phase to Phase (H.V) Air Medium | 255 mm |
| 8.2 | Phase to Phase (L.V) Air Medium | 25 mm |
| 8.3 | Phase to Earth (H.V) Air Medium | 140 mm |
| 8.4 | Phase to Earth (L.V) Air Medium | 20 mm |
| 9F | II wave lightning impulse withstand Voltage | |
| 9.1 | H.V. Winding (KV Peak) | 75 |
| 9.2 | L.V. Winding (KV Peak) | NA |
| 9.3 | Power Frequency Voltage (H.V Winding) | 28 KV (rms) |
| 9.4 | Power Frequency Voltage (L.V Winding) | 3 KV (rms) |
| 10D | TAILS OF TANK AND MATERIALS M.S | |
| 10.1 | Thickness of side plates (mm) | 4 |

| | | |
|------|---|-----------------------|
| 10.2 | Thickness of Bottom plates (mm) | 6 |
| 10.3 | Thickness of Cover plates (mm) | 6 |
| 10.4 | Thickness of radiator (pipes or sheets) | 1.2 mm |
| 11 | Flux Density | 1.9 T |
| 12 | Maximum Current Density (Copper) | |
| 12.1 | Upto 1 MVA | 2.6 A/mm ² |
| 12.2 | Above 1 MVA | 2.8 A/mm ² |

GURANTEED OTHER PARTICULARS FOR DISTRIBUTION TRANSFORMERS

(To be furnished by the Manufacturer)

| S.No. | Description | Particular Offered |
|--------------|---|---------------------------|
| | | 500 KVA |
| 1 | Manufacturer's Name & Address | |
| 2 | Service | |
| 3 | Rated Voltage : | |
| (a) | HV Winding | |
| (b) | LV Winding | |
| 4 | Rated frequency | |
| 5 | Number of phase | |
| 6 | Connections: | |
| (a) | HV Winding | |
| (b) | LV Winding | |
| 7 | Connection symbol | |
| 8 | Type of cooling | |
| 9 | Rating available at different cooling (if any) in% | |
| 10 | Tap changing equipment | |
| (a) | Manufacturer | |
| (b) | Type | |
| (c) | No. of steps | |
| 11 | Guaranteed positive sequence impedance at 75 °C with 100% rating at | |
| (a) | Principal tap | |
| (b) | Maximum tap | |
| (c) | Minimum tap | |
| 12 | Temperature rise over an ambient of 50°C | |
| (a) | Top oil (if applicable) °C | |
| (b) | Windings (by resistance measurement method) °C | |

| | | |
|-------|---|--|
| 13 | Guaranteed losses at rated voltage on principal tap at rated frequency | |
| (a) | No load loss or iron loss | |
| (b) | Copper loss at full load at 75°C | |
| (c) | Maximum Weighted average loss | |
| 14 | Withstand time for three phase short circuit at terminals (secs.) | |
| 15 | No load current at rated Voltage and rated frequency | |
| 16 | Insulation level | |
| (a) | Separate source power frequency voltage withstand | |
| (i) | HV Winding | |
| (ii) | LV Winding | |
| (b) | Induced over voltage withstanding | |
| (i) | HV Winding | |
| (ii) | LV Winding | |
| (c) | Full wave lightning impulse withstanding | |
| (i) | HV Winding | |
| (ii) | LV Winding | |
| 17 | Regulation at full load at 75°C | |
| (a) | At unity power factor | |
| (b) | At 0.8 power factor | |
| 18 | Terminal arrangement | |
| (a) | High voltage | |
| (b) | Low voltage | |
| (c) | LV Neutral | |
| 19 | Bushings | |
| (a) | High Voltage | |
| (i) | Manufacturer | |
| (ii) | Type | |
| (iii) | Minimum Creepage distance | |
| (b) | Low Voltage | |
| (i) | Manufacturer | |
| (ii) | Type | |
| (iii) | Minimum Creepage distance | |
| (c) | LV Neutral | |
| (i) | Manufacturer | |
| (ii) | Type | |
| (iii) | Minimum Creepage distance | |
| 20 | Total quantity of oil (liters) required for first filling (wherever applicable) | |
| 21 | Is vacuum filling required if so, stated | |
| | Absolute pressure | |
| 22 | Efficiency at 75°C at unit power factor. | |
| (a) | At full load | |
| (b) | At ¾ full load | |

| | | |
|-------|---|--|
| (c) | At ½ full load | |
| 23 | Approximate dimensions | |
| (a) | Tank enclosure LxBxH | |
| (b) | Overall LxBxH | |
| 24 | Untanking height | |
| 25 | Approximate Weight | |
| (a) | Core and winding | |
| (b) | Tank fittings | |
| (c) | Oil (if applicable) | |
| (d) | Total Weight | |
| 26 | Dispatch details | |
| (a) | Approximate mass of heaviest package | |
| (b) | Approximate dimensions of largest package | |
| (i) | Length | |
| (ii) | Breadth | |
| (iii) | Height | |
| 27 | Reference Standards | |

ADDITIONAL DETAILS

Sl. No. Description

1. Core Grade
2. Core diameter (mm)
3. Gross Core area (cm)
4. Net Core area (cm)
5. Flux density (Tesla)
6. Wt. of Core (kg.)
7. Loss per kg. of Core at the Specified Flux density (Watts)
8. Core window height
9. Center to center distance of the core (mm)
10. No. of L.V. Turns
11. No. of H.V. Turns
12. Size of LV Conductor bare/ covered (mm)
13. Size of HV Conductor bare/ covered (mm)
14. No. of parallels
15. Current density of LV winding amps/sq.mm.
16. Current density of HV winding amps/sq.mm.
17. Wt. of the LV winding for Transformer kg.
18. Wt. of the HV winding for Transformer kg.
19. No. of LV Coils/phase
20. No. of HV Coils/phase
21. Height of LV Winding mm
22. Height of HV Winding mm
23. ID/OD of LV Winding mm
24. ID/OD of HV Winding mm
25. Size of the duct in LV winding mm
26. Size of the duct in HV winding mm
27. Size of the duct between HV & LV mm

28. HV winding to LV winding clearance mm
29. HV winding to tank clearance mm
30. Calculated impedance %
31. HV to earth creepage distance mm
32. LV to earth creepage distance mm

**GUARANTEED CHARACTERISTICS OF NEW TRANSFORMER OIL IN
DRUMS/TANKERS AND IN TRANSFORMERS**

A. OIL IN DRUMS/TANKERS

| SR.NO. | Characteristics | Requirement |
|--------|--|--|
| 1. | Appearance | Oil shall be clear & transparent & free from suspended matter or sediments. |
| 2 | Density at 29.5 °C (Max.) | 0.89 g/cm ³ |
| 3. | Kinematics viscosity at 27°C (Min.) | 27 CST |
| 4. | Interfacial tension at 27°C (Min.) | 0.04 N/M |
| 5. | Flash point (Min.) | 140°C |
| 6. | Pour point (Max.) | -6°C |
| 7. | Neutralization value a) Total acidity (max.) b) In organic acidity | 0.03 mg KOH/gm Nil |
| 8. | Corrosive sulphur | Non-corrosive |
| 9. | Electric strength (Break down voltage) Min. a) New untreated oil: If the above value is not obtained the oil shall be treated. b) After treatment. | a) 30 KV (rms) b) 60 KV (rms) |
| 10. | Dielectric dissipation factor (Tan-delta) at 90°C | 0.002 (Max.) |
| 11. | Water content (Max.) | 50 ppm |
| 12. | Specific resistance (resistivity) a) At 90 °C (Min.) b) At 27°C (Min.) | a) 35X10 ¹² ohm-cm b) 900X10 ¹² ohm-cm |
| 13. | Oxidation stability a) Neutralization value after oxidation (max.) b) Total sludge after oxidation (max.) | 0.40 mg KOH/gm 0.10% by weight |
| 14. | Ageing characteristics after accelerated ageing (open breaker method with copper catalyst) a) Specific resistance (Resistivity) i) At 90 °C (Min.) ii) At 27 °C (Min.) b) Dielectric dissipation factor (Tan delta) at 90 °C c) Total acidity (Max.) d) Total sludge value percent by weight | 2.5X10 ¹² ohm-cm 0.2 X10 ¹² ohm-cm 0.2 Max. 0.05 Mg KOH/gm 0.05 Max. |
| 15. | Presence of oxidation inhibitor | Absent |

Scope of work for Annual Maintenance contract (AMC)

GENERAL REQUIREMENTS APPLICABLE FOR ANNUAL MAINTENANCE CONTRACT (AMC)

1. The scope of work covers Annual Maintenance contract of Sub-Station. The contractor shall arrange to attend the complaints relating to the repair & replacement of the Substation /Transformer components.
2. The maintenance scope includes preventive and breakdown maintenance of all the equipment installed related to substation. The contractor shall maintain preventive/breakdown maintenance of the work along with periodical safety test to examine all safety devices/components according to the standard maintenance manual for such equipment.
3. The Breakdown maintenance shall be attended to at the highest priority so that to make good the faulted system and put into operation. For breakdown maintenance the contractor shall coordinate / liason with Engineer In-Charge/Plant manager and the original equipment manufacturer for replacement of parts and Services as required.
4. Infrastructure, Manpower, tools and tackles and site support shall be provided by the contractor for such jobs with priority and without any delays
5. Any parts to be replaced for maintenance of work will be provided by the department. Contractor has to intimate the department in advance for the requirement of parts.
6. To ensure the availability of materials/parts required for regular maintenance work, it will be the responsibility of the contractor to inform/provide a list of materials/parts in advance to the department.
7. The parts determined to be defective as a result of normal uses, wear and tear shall be repaired or replaced by the AMC agency & No extra labour charges will be paid to the contractor.
8. The contractor shall be fully responsible for any damage and or for loss of life of his own employee or any outsider due to any accident, Fire, Hazards occurred during the maintenance work under AMC.
9. The contractor shall deploy technically qualified team for the performance, execution and implementation of the services.
10. To observe all the safety norms/standard during the maintenance shall be the responsibility of AMC contractor.

Preventive Maintenance Services schedule of Work:-

The 11 KV power is received from nearest substation located at Bilaspur through HT Line (Overhead), and set down to 0.433 KV through 500KVA, 11/0.433 KV Transformers, with allied equipment, and various sizes of HT/LT cables & control cables etc.

The maintenance of the various electrical equipment i.e, Transformers:- 500 KVA, DP Structure 11 KV, HT Breaker (11 KV) and LT panel be carried out as per the following routine:-

Monthly:

Transformers:-

- 1) Observe and record Load (amperes) and Voltage. Check against rated figure.
- 2) Visual check for overheating if any at terminal connections (Red hot) and observation
- 3) Measurement of IR values of transformer with suitable megger according to the rating of the transformer. Recording of the values specifying the temperature which measurements are taken
- 4) Changing the gaskets at all locations as and when leakage is found or the gasket is Damaged.
- 5) Checking of Transformer Oil.

- 6) Evidence of rusting, corrosion, and deterioration of the insulation, varnish or paint should be checked, and corrective measures taken. Auxiliary devices should be inspected and serviced during these inspections.
- 7) Check for loose connections, condition of tap changers, terminal boards and for the general condition of the transformer.
- 8) Check for signs of overheating and tracking or carbonization marks.
- 9) Checking of earth connections of structures .

HT Breakers:

- 1) Tightening of nuts and bolts.
- 2) Checking breaker Operation .
- 3) Complete servicing, oiling and greasing of all moving parts. Replacement of any defective part.
- 4) Clean the porcelain insulators and inspect for cracks and chip of.
- 5) check any burning of connection.
- 6) Open the disconnect and earthing switch and inspect the contacts. (Wipe the Contact surface with solvent).
- 7) Check for contact surface soundness.
- 8) After maintenance and inspection, smear contact surface lightly with contact lubricant.
- 9) Check for split pins in clevis if damaged replaces the same.
- 10) Lubricate all clevis pins.
- 11) Apply grease on the AB Switch contacts for smooth functioning.
- 12) Check that all the electrical components are firmly fixed and let the contactors operate freely.
- 13) Check all electrical connections for tightness.
- 14) Check for any tripping chattering in the electrical parts, abnormal noise, overheating
- 15) Tightening of all earthing connections.
- 16) clean all the breaker cubical & relay mounting box by blower.
- 17) check the tightness of lugs & both control & power cable
- 18) cleaning the track of breaker for its rack in & rack out position.
- 19) check the glanding of holes & sealed if any.
- 20) check & ensure proper dressing of cable.
- 21) check physical condition of ct.(no any hot spot or crack.)
- 22) check physical condition of pt.(no any hot spot or crack.)
- 23) open power contactor & clean its point if required.
- 24) check the healthiness of indication.
- 25) check the rubber lining of door for dust sealing.
- 26) take trial of the breaker rack in & rack out position.

LT panel

- 1) Check the rubber lining of door for dust sealing.
- 2)Check the tightness of lugs & both control & power cable
- 3)Check the glanding of holes & sealed if any
- 4)Check & ensure proper dressing of cable
- 5)Check any burning of connection
- 6)Open power contactor & clean its point by etc if required.
- 7)Check the overload setting of relay
- 8)Check the correct rating of fuses & mcb's.
- 9)Check the healthiness of indication & local remote selector switches.
- 10) Check the healthiness of meter mounted on feeder.

Earthing System

- 1 Clean the earth pit properly.
- 2 Clean the contact surface and nut bolts, if required replace the nut/bolts with new one.
- 3 Check the continuity of the earthing strip from earth pit to equipment which is earthed through respective pit.
- 4 Check the nomenclature board availability containing of resistance and identification details.
- 5 Check the physical condition of Earthing strip and replace if necessary.
- 6 Pour the water if necessary to improve the required earth resistance values
- 7 As per IE 1956 value 132kv & 220kv substation equal to or below 1.0 ohm & for 33 kv or below will be 2.0 ohms. If value comes above this value then pour the water to improve the required earth resistance (once in year).

APPROVED MAKE LIST FOR ELECTRICAL WORKS

| Sr. No. | Item | Approved Make (As required) |
|----------------|---|---|
| 1. | Distribution Transformer/Oil type | EMCO/VIJAI/VOLTAMP/KIRLOSKAR/BARBRIK/CROMPTON/ APPROVED VENDOR OF CSPDCL |
| 2. | Dry type Transformer | Voltamp /Telewane/Kirloskar/ Toshiba / ABB Ltd/ AMES Impex Electrical Pvt Ltd. |
| 3. | HT PANEL/VCB /LBS | SCHNEIDER/L&T/SIEMENS/ABB/CG/STELMEC/ APPROVED VENDOR OF CSPDCL |
| 4. | POWER TRANSFORMER 33/11 KV | CROMPTON/BHEL/EMCO/Toshiba/VOLT AMP/BARBRIK/ APPROVED VENDOR OF CSPDCL |
| 5. | RING MAIN UNIT 11&33 KV | CROMPTON/SIEMENS/ABB/SCHNEIDER/LUCCY/Stelmec/ APPROVED VENDOR OF CSPDCL |
| 6. | LT Panel boards | CPRI certified panel manufacturer with components of approved makes. |
| 7. | ACB | Schneider, Lauritz Knudsen (formerly L&T), ABB, Siemens, Mitsubishi, Hager |
| 8. | MCCB | Schneider, Lauritz Knudsen (formerly L&T), ABB, Siemens, Legrand(Only for MCCB Distribution Boards), Mitsubishi, Hager |
| 9. | SDF/ SDFU | Lauritz Knudsen (formerly L&T), Simens, Schneider, ABB, Hager |
| 10 | Capacitor and block reactor (LT) | Lauritz Knudsen (formerly L&T) Sprague, Schneider, Epcos, ABB, Hager. |
| 11 | Starters, Timer & Contactors | Siemens, Lauritz Knudsen (formerly L&T) Schneider, C&S, ABB, BCH, Hager |
| 12 | Push Buttons | Schneider, Siemens, Lauritz Knudsen (formerly L&T), BCH, C&S, Teknic |
| 13 | Indicating lamps (LED type) | Teknic, Schneider, Siemens, Lauritz Knudsen (formerly L&T), BCH, C&S |
| 14 | Numerical Relays | Siemens Lauritz Knudsen (formerly L&T), ABB, GE, Schneider, Alstom |
| 15 | Synchronization relays | Deif, Woodward |
| 16 | APFC relay* | ABB, Beluk, Epcos, Lauritz Knudsen (formerly L&T) |
| 17 | Indicating meters (Analogue) | AE, MECO, Lauritz Knudsen (formerly L&T)Rishab, Schneider, C&S. |
| 18 | TOD meter | Lauritz Knudsen (formerly L&T)Schnieder, Secure |
| 19 | Digital meters | Lauritz Knudsen (formerly L&T), ABB, Siemens, Schneider, Socomec, Secure, Hager, C&S. |
| 20 | Current Transformer & Potential Transformer | AE, Kappa, Lauritz Knudsen (formerly L&T) Rishab, PGR Powertech, Pragati, Hager/OEM OF VCB |
| 21 | Selector switches | Tecnic, Kaycee, Lauritz Knudsen (formerly L&T), ABB,Hager/ Siemens / Schneider/C&S |
| 22 | Battery Charger | Waves, HBL, Amararaja, Dubas, Exide. |
| 23 | SMF/VRLA Batteries | Exide, Amara Raja, HBL |
| 24 | HT Cables | UNIVERSAL/GLOSTER/CCI/POLYCAB/RAVIN/RPG(KEC) / HAVELLS |
| 25 | Cable Joints | DENSON/RAYCHEM/3-M/CABSEAL |
| 26 | LT Cables | Polycab, Havells, Gloster, Finolex, RPG-KEC Cables, Ravin, CCI , Universal, RR Kabel & KEI |
| 27 | Wires | Finolex, RR Kabel, Lapp Kabel, Polycab, Havells, Gloster, Ravin, KEI, HPL |
| 28 | Cable glands, lugs, End termination kits | Lapp Kabel, Gripwel, HMI, Denson, Multipressings, Yamuna Gasses, Dowels, Comet |
| 29 | Anchor Fastener | Hilti, Fischer |
| 30 | GI Cable tray | Indiana/ Steelite / Rico Steel / ProfabEngg /OBO/Legrand/ fixotech, Hira (RR Ispat,). |
| 31 | Modular type switches, sockets, bell push, fan regulator etc-Medium range | Honeywell, Wipro-North West , Legrand , Kolors (krest),Crabtree, Anchor by Panasonic (Roma Plus), |
| 32 | Metal clad plug/socket/Decontactor | Legrand, Schneider, Lauritz Knudsen (formerly L&T) Hager |
| 33 | Change over Switch | L&T/C&S/ABB/HPL/Hager/Legrand |
| 34 | MCB, RCCB | Legrand, Siemens, Hager, Schnedier, Lauritz Knudsen (formerly |

| Sr. No. | Item | Approved Make (As required) |
|---------|---|---|
| | | L&T)ABB, C&S, Havells. |
| 35 | MCB Distribution Boards | Legrand, Siemens, Hager, Schneider, Lauritz Knudsen (formerly L&T), ABB, C&S, Havells. |
| 36 | Ceiling fans/Wall fans | Usha, Crompton, Orient, Bajaj, Havells. |
| 37 | Exhaust fans | Almonard, Crompton, Khaitan, Havells, Bajaj Orient, Usha |
| 38 | Ventilating fans | Greenheck, Ostberg, System Air, Kruger |
| 39 | PVC Conduit and accessories/ casing and capping | Precision , Clipsal, Lappkabel, Balco, Konseal, Polycab, Panasonic, Saraswati |
| 40 | Ceiling Rose | Anchor, GM |
| 41 | GI conduit/M S Conduit | Any ISI marked. |
| 42 | LED Light Fixtures (Indoor) | Philips, Wipro, Crompton Greaves, Osram, Bajaj, Havells Panosonic. |
| 43 | LED module/LED Chip | Osram/Nichia Japan/Cree, USA/ Bridgelux, USA/ Lumiled, USA/ Citizen Japan |
| 44 | LED Driver | Osram, Meanwell, Tridonics, BAG, LT, Helvar, Wipro, Philips, Crompton, Bajaj, Havells, Surya, Halonix |
| 45 | LED Street Light/Flood Light/Hi-Bay Light | Crompton/Philips/Wipro/Bajaj/Halonix/Havells/Surya/ Energy Green. |
| 46 | LED Solar Street Light | Crompton/Philips/Wipro/LT/Bajaj/Halonix/Havells/Surya/ Energy Green. |
| 47 | Octogonal Pole | Crompton, Bajaj, Valmont, RR Consoul, Transrail, Skipper. |
| 48 | High mast Pole | Crompton, Bajaj, valmont |
| 49 | Lightning Protection and accessories | OBO , Dehn, Furse, Erico |
| 50 | Surge Protective Devices | OBO, Dehn, Furse, Phoenix Contact, Erico, Mersen, Lauritz Knudsen (formerly L&T) |
| 51 | Synthetic Insulating Mats | CPRI certified for required voltage level as per IS 15652 |
| 52 | Chemical earthing | OBO, Dehn, ABB multipressing |
| 53 | DG Sets | Mahindra, Jacson, Kirlosker, Cotton Greaves, Cummins, Caterpillor, Ashok Layland, sterling |
| 54 | Electric Motor | Siemens/ABB/C.G./Bharat Bijee/Kirloskar/Alstom/KSB |
| 55 | Lift | Kone, Otis, Johnson, T.K.E. (Thysson krupp), Schindler. |
| 56 | Air Conditioners System | |
| | (i) VRF System/Air Conditioner Unit | Mitsubishi/Toshiba/O-General/Bluestar/Daikin/Trane/L.G. /Hitachi/Voltas/Carrier/Samsung. |
| | (ii)Grilles/Diffuser/Louvers/ Sand Trap Louvers/VCD | Systemair/Caryaire/Dyna Craft/Ruskintitus/Airmaster |
| 57 | ELV | |
| | (i) LAN Components and Structured cabling | Belden, Panduit, Commscope, Norder, D-Link. |
| | (ii) Racks | APW President, Valrack, Rittal, Netrack, Panduit Tata, D-Link. |
| | (iii) HDPE pipe | Sangir, Noble, Varun, Supreme. |
| | (iv) Switches and Transceivers | Cisco, Juniper, Extreme, Aruba, HP, D-Link, CP PLUS. |
| | (v) UTM | Juniper, Cisco, Checkpoint, Palo Alto, Fortinet, Sophos . |
| | (vi) IP-PBX | Cisco, NEC, Avaya, Unify, Matrix. |
| | (vii) CCTV and NVR | Bosch, Axis, Pelco, Honeywell, Tyco, CP PLUS. |
| | (viii) PC and Servers | Dell, HP, IBM, Lenovo. |
| | (ix) Displays | LG, Samsung, Sony, Panasonic. |
| | (x) Attendance Reader | Tyco, Lenel, HID, Honeywell, Schneider,Matrix. |

For the All items, the relevant IS Code and specification should be binding on the contractor. The contractor should take approval wrt the approved vendor list prior to any procurement from the Engineer in charge. Further , contractor shall procure “or equivalent as approved” after getting the approval of Engineer in Charge ,only if the approved makes mentioned in the” list of approved makes” is not avilable in the market.All makes mentioned below in various sections will be applicable for the entire work package.
