



**RAJASTHAN STATE MINES & MINERALS LIMITED**

(A Government of Rajasthan Enterprise)

**SBU & PC - LIGNITE**

**Khanij Bhawan, Tilak Marg, C-Scheme, Jaipur-302005**

Phone: 0141-2227938, 2227947 Fax: 0141-2227360, 2227761

E-mail: rsmmljpr@bsnl.in, jaipur.rsmml@rajasthan.gov.in, Web: www.rsmm.com

Registered Office : C-89-90, Jan Path, Lal Kothi Scheme, Jaipur

CIN No. U14109RJ1949SGC000505, GSTIN: 08AAACR7857H1Z0

***e-TENDER DOCUMENT***

***FOR***

***Supply of 33/11 KV, 3.15 MVA 3 Phase, outdoor type power Transformer with parallel installation and commissioning at Kasnau-Matasukh Lignite Project, District Nagaur (Rajasthan) in buy-back of old Transformer***

**e-Tender No. F.9(1)23/2017/65**

**Dated: 03.02.2021**

**Issued by**

**Dy.Manager (Mech.-Contract),**

**RSMML Ltd., Khanij Bhawan, Tilak Marg, C-Scheme, Jaipur-302005 (Raj.)**

Cost of e-Tender Document including GST (Non-Transferable & Non-Refundable)	Rs.1180/-
Processing Fee	Rs.500/-
Bid Security / E.M.D.	Bid Security declaration on Judicial stamp paper of valuing Rs.50/- as per Annexure-IX
Period of online availability of Tender Document.	From 03.02.2021 to 24.02.2021 upto 3:00 P.M.
Last date and time of uploading the documents and submission of bid online.	24.02.2021 upto 3:30 P.M.
Last date of physical deposition of EMD, Cost of Tender Document, Processing fees and requisite original Documents/Affidavits etc. with duly filled Tender Document.	25.02.2021 upto 3:00 P.M.
Online opening of Part-I - Techno-Commercial Bid	On 26.02.2021 at 11:30 A.M.

**Registered Office:**

C-89-90, Jan Path, Lal Kothi Scheme,  
Jaipur -302 015 (Rajasthan)  
Phone : 0141-2743734  
Fax : 0141-2743735

**Corporate Office:**

4, Meera Marg, Udaipur-313001 (Rajasthan)  
Phone: (0294) 2527211, 2428763-67  
Fax : (0294) 2428770, 2428739  
(CIN No. U14109RJ1949SGC000505)

**SBU & PC - Lignite,**

Khanij Bhawan, Tilak Marg, C-Scheme,  
Jaipur-302005 (Rajasthan)  
Phone: 0141 - 2227949, 2227627  
FAX: 0141 - 2227761



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Ref: F.9(1)23/2017/65

Dated: 03.02.2021

### NOTICE INVITING TENDER

e-Tenders in two parts (Part-A: Techno-Commercial Bid and Part-B: Price Bid) are invited from manufacturers / their authorized dealers for the following :-

Brief Description / Specification	EMD/Security Money (in Rs.)
33/11 KV, 3.15 MVA 3 Phase, outdoor type power Transformer copper wound oil filled Vector Group DYN-11, 50 Hz, ONAN, bushings at both LV & HV side of appropriate ratings, off load tap changer with complete protection and measuring accessories and other parameters as per relevant IS codes with latest amendments with parallel installation and commissioning at Kasnau-Matasukh Lignite Project, Tehsil-Jayal, District Nagaur (Rajasthan) in buy-back of old Transformer.	Bid Security declaration on Judicial stamp paper of valuing Rs.50/- as per Annexure-IX
The cost of e-tender is Rs. 1180/- (including of GST) payable by D.D./Banker's Cheque in favour of "RSMM Ltd, Jaipur".	
E-Tender processing charges	D.D./Banker's Cheque of Rs.500/- in favour of M.D., R.I.S.L. payable at Jaipur.
Period of online availability of Tender Document.	From 03.02.2021 to 24.02.2021 upto 3:00 P.M.
Last date and time of uploading the documents and submission of bid online.	24.02.2021 upto 3:30 P.M.
Last date of physical deposition of EMD, Cost of Tender Document, Processing fees and requisite original Documents/Affidavits etc. with duly filled Tender Document.	25.02.2021 upto 3:00 P.M.
Online opening of Bid (Part-I).	On 26.02.2021 at 11:30 A.M.

For more details, visit us on website [www.rsmm.com](http://www.rsmm.com), [eproc.rajasthan.gov.in](http://eproc.rajasthan.gov.in) and [sppp.rajasthan.gov.in](http://sppp.rajasthan.gov.in).

The tenderer can download the tender from our website [www.rsmm.com](http://www.rsmm.com) and [eproc.rajasthan.gov.in](http://eproc.rajasthan.gov.in) and [sppp.rajasthan.gov.in](http://sppp.rajasthan.gov.in).

The price bid of only those bidders shall be opened who qualify in technical bid as per the above criteria & only qualified bidders will be informed about price bid opening.

The tenderer who have been suspended/banned by the company shall not be eligible to participate in this tender during the currency of suspension/banned period.

The company reserves the right to accept or reject any or all offers without assigning any reason. Also the company does not bind itself to accept the lowest price bid. The Company shall not be responsible for any postal delay or loss of offer. Offers sent by Fax/Telex/E-Mail shall not be accepted.

**Dy.Manager (Mech.-Contract)**

Note: The tenderers are advised to keep visiting our website till due / extended due date of tender for corrigendum/ addendum, if any, to the tender.

## SECTION - I

### INSTRUCTION FOR PREPARATION & SUBMISSION OF e-TENDER AND GENERAL TERMS & CONDITIONS

#### 1. INSTRUCTIONS TO THE TENDERER & GENERAL CONDITIONS

- i. Tender is to be submitted online at <https://eproc.rajasthan.gov.in> in electronic form as prescribed in the tender form.
- ii. No physical / offline tender / bid shall be accepted.
- iii. The Bidder should go through the website <https://eproc.rajasthan.gov.in> and the link "help for contractors", "information about DSC', FAQs' and bidders manual kit" to know the process for submitting the electronic bids at website. The complete bid document has been published on the website <https://eproc.rajasthan.gov.in> for the purpose of downloading. The uploaded bid document shall be considered valid for participation in the bid process subject to submission of required cost of bid document and e-Tendering processing fee.
- iv. All communications/correspondences/documents including the bid document should be physically signed, stamped on each page before uploading and also signed digitally by the designated authorized representative of the bidder.
- v. A scanned copy of EMD, e-Tendering processing fee and cost of tender document must be enclosed along with the Technical Bid proposal failing which the bid will be summarily rejected.
- vi. The DD towards the cost of tender document fees, Earnest Money deposit and processing fees along with original affidavits as per format of tender document should be kept in a sealed envelope addressed to Group General Manager, SBU & PC-Lignite, RSMML, Khanij Bhawan, Tilak Marg, C-Scheme, Jaipur-302005 (Rajasthan). This envelope should be marked with NIT number & work, name and address of contractor, telephone number etc is to be written on the top for clarity. This envelope should be submitted in the office of the Dy.Manager (Mech.-Contract), RSMML, Khanij Bhawan, Tilak Marg, Jaipur on or before the date and time as mentioned in the Notice Inviting Tender. The Company shall not be responsible for any postal delay. In case of non-receipt of same prior to the time of scheduled submission of tender, the offer of the tenderer shall be rejected.
- vii. The tenderer in quoting his rate, shall for all purpose, whatsoever, be deemed to have himself independently obtained all relevant and necessary information for the purpose of preparing his tender. The correctness or completeness of the details, given in the tender documents is not guaranteed. The tenderer is required to satisfy him in all respect, before the submission of offer.
- viii. The tenderer shall be deemed to have examined the tender document, to have obtained his own information in all matters whatsoever that might affect the carrying out of the works at the schedules rates and to have satisfied himself to the sufficiency of his tender. Any error in description or quantity or omission in the Contract Document shall not vitiate the contract or release the Contractor from executing the work comprised in the contract according to specifications at the scheduled rates. The tenderer is deemed to know the scope, nature and magnitude of the works and requirement of materials, equipment, tools and labour involved, wage structures, conditions of service of Company's staff/workmen doing similar and same type of work etc and as to what all works he has to complete in accordance with the contract documents irrespective of any defect, omissions or errors that may be found in the contract documents. The Contractor shall be deemed to have visited site and surroundings, to have satisfied himself to the working conditions at the site, availability of water, electric power, labour etc, transportation

facilities, probable sites for labour accommodation and store go-downs etc and all other factors involved in the execution of works.

- ix. All the provisions of Rajasthan Transparency in Public Procurement Act, 2012 and Rules, 2013 made there under and modification to be issued by the competent authority from time to time will automatically be ipso-facto applicable.

In compliance to the Rajasthan Transparency in Public Procurement Act, 2012 and Rajasthan Transparency in Public Procurement Rule, 2013, following annexures are enclosed :

- i) **Annexure-A-** Compliance with the Code of Integrity and No Conflict of Interest.
  - ii) **Annexure-B-** Declaration by the Bidder regarding Qualifications.
  - iii) **Annexure-C-** Grievance Redressal during Procurement Process and Form No. 1.
  - iv) **Annexure-D-** Additional Conditions of Contract.
- x. Contact details of Government of Rajasthan e-procurement Cell, Department of IT&C are :- 24X7 Help Desk Telephone No. 0120-4200462, 0120-4001002, 8826246593. Email-support-e proc @ nic.in. Local Help Desk Number 0141-4022688. 9.30 AM to 6.00 PM on all working days. email: eproc@rajasthan.gov.in,. Address: e-Procurement Cell, RISL, Yojana Bhawan, Tilak Marg, C-Scheme, Jaipur (Raj.).

## 2. GENERAL INSTRUCTIONS FOR FILLING THE e-TENDER

- i. e-Tender portal <https://eproc.rajasthan.gov.in> shall be used for all procedure related to the bidding.
- ii. The prospective Bidders should register themselves in the e-Tender Portal and submit the Bids electronically through the e-Tender portal.
- iii. The Bidders are requested to download the e-Tender help manual and user manuals from the Portal for reference.
- iv. It is mandatory for the Bidders to possess a valid Digital Signature Certificate to complete the e- Tender Bid process as per the provisions of Government of India IT Act.
- v. The Technical Bid form and Price Bid form will be available in prescribed format for downloading. The registered Bidders can log into the e-Tender system and download the Bid Forms.
- vi. The Bid forms should be filled and submitted using the Digital Signature Certificates. The supporting documents as required in support of tender should be scanned and uploaded in the e-Tender system.
- vii. The Bid Form should not be changed or altered or tampered by the bidder. If the Bid form found tampered, the Bids will be summarily rejected.
- viii. All uploaded document shall be digitally signed by the tenderer or by a person holding power of attorney authorising him/her to sign on behalf of tenderer before submission of the tender.
- ix. Tender in which any of the particulars and prescribed information is missing or incomplete in any respect and/or prescribed conditions are not fulfilled may be liable for rejection.
- x. Canvassing in connection with tenders is strictly prohibited for tenderers submitted by the tenderers, who resort to canvassing, will be liable for rejection.
- xi. Tenderers, in their own interest are advised to read the tender document completely and carefully, to avoid submission of incomplete bid. Tender in which any of the particulars and prescribed information is missing or incomplete in any respect and/or prescribed conditions are not fulfilled are liable for rejection, at the sole discretion of the Company.

- xii. The Company takes no responsibility for delay, loss or non-receipt of required document sent through post/courier service. Offers through any other mode other than prescribed shall not be accepted.
- xiii. Tenderer must upload the documents duly attested by Gazetted Officer/Notary Public/Magistrate in support of above required details and any declaration given by the tenderer without requisite supportive documents will not be considered. It may be noted that the bid shall be examined on the basis of documents uploaded, as per above required details, furnished along with it. A tenderer shall be fully responsible for consequences including rejection of his tender or cancellation of the Contract if the required attested documents/attested copies of documents are not submitted / uploaded along with the techno-commercial bid or any information / document is found to be false / fabricated / misleading. The authorised signatory of the tenderer should put his signature along with its stamp on each page of the Techno-commercial bid and should also record the date.

### 3. **BID SECURITY, e-TENDER DOCUMENT FEES AND PROCESSING CHARGES**

- a) The bidder submit a non-refundable processing charge of Rs. 500/- should be paid by way of Demand Draft or Banker's Cheque drawn in favour of "MD, RISL" payable at JAIPUR. The payment by way of Demand Draft or Banker's Cheque should be deposited physically at office of Dy.Manager (Mech.-Contract), RSMML, Khanij Bhawan, Tilak Marg, C-Scheme, Jaipur-302005 (Rajasthan) on or before the date and time of submission of the Tender.
- b) The Tender Document fee and Bid Security as mentioned in the NIT shall be paid by way of D.D./Banker's Pay Order in favour of RSMML payable at Jaipur.
- c) The payment particulars should be entered in the e-Tender Portal by the bidder while bidding.
- d) If any of the information committed in the e-Tender Bid does not match with physically submitted payment, RSMML reserves the right to reject the bid summarily.
- e) Even though the payment particulars are entered in the e-Tender portal, if the Bidder fails to submit the physical instrument prior to the scheduled date of submission of tender, their bid is liable for rejection.

### 4. **EARNEST MONEY**

In lieu of Bid Security, a bid security declaration will be furnished by the bidder (as per attached Annexure-IX) in favour of RSMML. Offers not accompanied with the requisite Bid Security declaration will not be considered. While opening of the tender, the envelope containing Bid security declaration will be opened first and in case the same is found as per tender requirement, then only offer will be opened.

### 5. **SECURITY DEPOSIT CUM PERFORMANCE GUARANTEE**

- i. Towards the due, proper and faithful fulfillment of the obligations under the contract, supplier will furnish to RSMML, Security Deposit cum Performance Guarantee @ 2.5% of the total value of order by way of Demand Draft or in the form of Bank Guarantee in the prescribed Performa (enclosed) from any Nationalised / Scheduled Bank having its branch at Jaipur within 30 days from the date of issue of LOA/Order. The Bank Guarantee should be valid for a period matching with the warranty/ guarantee period with claim period of 3/6 months (as the case may be) in excess of the contractual period.
- ii. The BG shall liable to be invoked/ amount of Security Deposit (S.D.) is liable to be forfeited wholly or partly at the sole discretion of the Company, should the supplier

either fails to execute the work within the stipulated period or fails to fulfill the agreed obligations or fails to settle in full its dues to the Company.

- iii. The Company is empowered to recover from the S.D. any sum due and /or any other sum that may be fixed by the Company as being the amount or loss or losses or damages suffered by it due to un-satisfactorily performance or non fulfillment of any of the conditions of the tender/contract.
- iv. The Bank Guarantee/ S.D. shall remain in force and binding, notwithstanding, if any variation, alternation, modification are made to the contract or any extension of the contract period are granted by RSMML.
- v. RSMML shall not pay any interest on the Security Deposit. The Security Deposit shall be released on application by the Supplier after the expiry of guarantees and after discharge of all the supplier's obligations under the contract.
- vi. The said Security shall not in any way be construed as a limitation of the supplier's responsibility or liability pertaining to its obligations and guarantees under the contract and shall be without prejudice to any other remedies available to RSMML in terms of the contract and or as per the laws of the land.
- vii. Incase SD is being furnished in the form of Bank Guarantee, the BG should be furnished on the non-judicial stamp paper of the value equal to 0.25% (Zero Point Twenty Five Percent) of total Security Deposit amount or as applicable at the time of submission of B.G.
- viii. Bank Guarantee/S.D. should be send to the office of Dy.Manager (Mech.-Contract), RSMML Ltd., SBU & PC-Lignite, Khanij Bhawan, Tilak Marg, C-Scheme, Jaipur-302005 (Rajasthan).

**6. RELAXATION IN TENDER DOCUMENT FEES, BID SECURITY & SECURITY DEPOSIT CUM PERFORMANCE GUARANTEE TO MSME, GOR**

Tenderers offering in capacity of micro, small and medium enterprises of the State of Rajasthan, having acknowledgement of Entrepreneurs Memorandum-II/Udyog Aadhaar Memorandum as mentioned in Micro, Small and Medium Enterprises Development Act, 2006, issued by the competent authority facilitated, on furnishing of a self-attested copy of acknowledgement of Entrepreneurs Memorandum-II/Udyog Aadhaar Memorandum, following relaxations will be provided :-

- i) Tender document fees will be taken @ 50% of the prescribed total value of Tender document fees.
- ii) Bid Security will be taken @25% of the total value of Bid Security. In case of offering the quantity lesser than the tendered quantity, then they can submit proportionate amount of bid security in proportion to the quantity being offered with respect to the bid security amount for tender quantity.
- iii) Security Deposit will be taken @1% of the total value of order/contract.

Except above as mentioned in above clauses, no exemption in respect of Tender Document Fee, Bid Security & Security Deposit (Performance Security) will be given to any party on any grounds (except considered by management on the merit of the case ) and their offer will be liable for rejection.

Note- Tenderer has to make request for exemption separately for each item alongwith documentary proof without which no exemption will be given.

**7. ONE BID PER TENDERER**

Each Tenderer shall submit only one Tender, either individually or as a partnership firm or a private/public limited company or a co-operative society.

**8. COST OF BIDDING**

The Tenderer shall bear all costs associated with the preparation and submission of his offer, and the company will in no case be responsible or liable for those costs, under any conditions.

**9. SUBMISSION OF e-TENDERS**

The tenders shall be submitted online as prescribed above in the tender document. The "Techno - commercial Bid" (Part-I) should contain the following:

- i) Power of Attorney in favour of the authorised representative signing the tender, as required.
- ii) Attested Certificate of Incorporation/Memorandum & Article of Association /Partnership deed duly certified by the Company Secretary/ Gazette Officer/Notary Public/Magistrate as the case may be. In case the tenderer /contractor make any change in the constitution of the firm after submission of the offer; they shall have to inform the company at the earliest.
- iii) Copy of PAN card & G.S.T. Registration Number.
- iv) Attested copy of the audited/CA certified Balance Sheet for the Financial Years prescribed in the tender conditions in support of the turnover.
- v) Undertaking that no condition is mentioned in Part II 'Price Bid' BOQ (Annexure-VIII) and conformation to the effect that the price quoted in part II 'Price Bid' of the tender will be firm. Even if any condition/s, other than like discounts, are mentioned those would be ignored, at the risk & cost of the tenderer.
- vi) Undertaking/affidavit as per Annexure-V & VI given in tender document and Annexure 'A' to 'D' of RTPP Act.

**10. CLARIFICATIONS OF CONTENTS OF e-TENDER DOCUMENT**

- (i) In case an intending tenderer require any clarification in connection with, or any point covered in the tender documents, they are advised to send their queries/clarifications addressed to the Dy.Manager (Mech.-Contracts), RSMML, Khanij Bhawan, Tilak Marg, C-Scheme, Jaipur (Raj.) Fax No. 0141-2227761, so as to reach him at least seven (7) days before the scheduled date of submission of bid. A copy of this communication should also be endorsed to the tender issuing authority.
- (ii) The Company will not be bound by any verbal/ oral clarification or interpretation of the tender document or of any matter(s) connected with works to be executed in accordance with the tender documents, which may be made by any of its employee, representatives or agent.
- (iii) Any neglect or failure on the part of the tenderer in obtaining necessary and reliable information upon the foregoing or any other affecting the contract shall not relieve him from any risks or liabilities or the responsibility from completion of the works at the scheduled rate/s & time and in strict accordance with the contract document/s.

**11. EXCEPTIONS & DEVIATION**

Tenderers are advised to submit their offer based on terms & conditions and specifications contained in the tender document and not to stipulate any deviations. Offer containing stipulations of deviations to the terms & conditions are liable to be

ignored. In case it is absolutely unavoidable to deviate from tender conditions & if the tenderer desires to propose any addition/deviation /alterations to any of the terms and conditions contained in the tender document, the same must be expressed clearly in Annexure - IV and furnished alongwith Part-I of the offer, without making any correction on the body of the tender documents. In the absence of it, it will be deemed as unqualified acceptance by the Tenderer to all terms and conditions contained herein. Tenderers should mention the deviations at their risk of rejection only. Deviations mentioned anywhere else in the offer shall be ignored without any consequences to the company.

Tenders containing corrections and alterations are liable to be rejected unless all such corrections and alterations are signed & stamped by the tenderer.

**12. AUTHORITY TO SIGN e-TENDER**

The tender should be signed by the person who is legally authorised to enter into commitments on behalf of the Tenderer.

**13. PART-II Price Bid (BOQ)**

- (a) The 'Price Bid' shall be submitted online in the prescribed BOQ format only (Annexure-VIII). It is suggested to the tenderer to read carefully the instructions mentioned in the Performa at BOQ for quoting the price offer. The price bid not submitted online in the prescribed format shall be summarily rejected.
- (b) The tenderer is also requested to quote the buy-back rate.
- (c) The rates are to be quoted in Rupees as per the price format.
- (d) While quoting the price under this part, the tenderer shall specifically confirm that the prices quoted are for the scope of work detailed in technical specification (Section-II) of the tender document.
- (e) Rates to be quoted for in BOQ i.e. for Supply of 33/11 KV 3.15 MVA 3 Phase Outdoor Type Power Transformer with parallel installation and commissioning at company's Kasnau-Matasukh Lignite Project, District Nagaur (Rajasthan) in buy-back of old Transformer with warranty period.
- (f) The old Transformer is lying at the Workshop of M/s Balaji Transformers, F-12, RIICO Industrial Area, Gegal, Distt. Ajmer (Rajasthan) which shall be lifted by the successful tenderer at his own risk and cost; and no additional payment shall be quoted in the BOQ.

**14. OPENING OF e-TENDER**

e-Tenders will be opened on the fixed date and time in the presence of Tenderer or their authorised representative who may wish to be present on the opening of the tender at the place, time and date as specified in the schedule.

**15. EVALUATION OF TECHNO-COMMERCIAL BID**

- (i) The techno-commercial bids of substantially responsive tenderers will be evaluated from all aspects. The RSMML reserves the right to assess the capability and competency of the tenderer based upon the information provided by the tenderer in the techno-commercial bid and the information that may otherwise be available to and/or gathered by the RSMML. The decision of the RSMML as to which tenderer is capable & competent to carry out the work shall be final. The tenderer should, therefore, see that he has required level of technical, financial & managerial competence & experience before submitting the tender.
- (ii) If a Bid is not substantially responsive, the Company at its sole discretion may reject it.
- (iii) The tenderer shall be prepared to furnish clarification / information and attend meetings / discussion as required by the company from time to time.
- (iv) Price Bid (Part II) of techno-commercially acceptable tenders shall only be opened.



**16. DETERMINATION OF LOWEST TENDERER**

The lowest tenderer shall be determined on the basis of total price of Supply of 33/11 KV 3.15 MVA 3 Phase Outdoor Type Power Transformer with parallel installation and commissioning at company's Kasnau-Matasukh Lignite Project, District Nagaur (Rajasthan) which includes basic price, all taxes & duties, transportation charges and any other delivery charges etc. till completion of the work excluding G.S.T.

- (a) The lowest tenderer shall be determined on the basis of total amount of price quoted for complete work, less buy-back price of old items.
- (b) For determination of lowest bidder, rates without GST shall only be considered. Bidders should quote rates without GST only. However bidders are required to quote GST amount in BOQ also and also provide the details of applicable GST rate, HSN/SAC code and GST amount charged separately in their offer.
- (c) The price offer should include basic price, transportation/delivery charges, installation and commissioning in presence of their technical expert representative charges, labour cost, Warranty charges, any other levies/duties/fees etc. for complete work but without GST.
- (d) The lowest tenderer shall be determined on the basis of total landed cost of each item at our Kasnau-Matasukh Lignite Project, District Nagaur (Rajasthan).
- (e) The old Transformer is lying at the Workshop of M/s Balaji Transformers, F-12, RIICO Industrial Area, Gegal, Distt. Ajmer (Rajasthan) which shall be lifted by the successful tenderer at his own risk and cost; and no additional payment shall be quoted in the BOQ.

**17. NEGOTIATIONS**

- (i) Negotiations will be conducted with the lowest tenderer only. In case of non-satisfactory achievement of rates from lowest tenderer, RSMML may choose to make a written counter offer to the lowest tenderer and if this is not accepted, RSMML may decide to reject and re-invite fresh tenders or to make the same counter-offer first to the second lowest tenderer, then to the third lowest tenderer and so on in the order of initial bidding, and work order be awarded to the tenderer who accepts the counter offer.
- (ii) In the case, when the quotations given by the tenderer during negotiations is higher than the original quotation of the tenderer then the tenderer will be bound by the lower rate originally quoted by the tenderer.
- (iii) In case of negotiations, representative of the tenderer attending negotiations must possess written authority from the tenderer to the effect that he is competent to modify/amend the submitted tender deviations and rates offered by them.

**18. TAXES / G.S.T.**

The tenderer shall quote the rates as follows:-

- i) The rate quoted by the bidder will be exclusive of Goods & Service Tax (GST). Goods and Service Tax will be paid extra as per specified rates in the Act/Rules. However, the rates will be inclusive of any other Levies and duties, as applicable on this contract (up to last date of submission of bid).
- ii) The rates quoted shall be on firm price basis during the pendency of the contract period and the contractor shall not be eligible for any escalation (except as mentioned in the tender document) in rates on whatsoever ground.
- iii) Timely deposition of GST and filing of requisite tax returns of relevant tax period would be the sole responsibility of the contractor. The contractor will also ensure that necessary credit on this account is available to RSMML in the next month. In case of any discrepancy, where credit is not available to RSMML, then company is

- free to deduct/recover/retain such amount from the bills of contractor or any other amount due to him/or from Security deposit, as the case may be.
- iv) In case of reversal of Input Tax Credit (ITC), imposition of penalty on account of payment of GST and default in filing of returns towards the payment for the work, contractor is liable to pay all such dues to the company, failing which RSMML is free to deduct/recover/retain such amount from the bills of contractor or any other amount due to him/or from Security deposit, as the case may be.
  - v) Further, the contractor shall submit an undertaking with monthly bills bearing GSTIN and HSN/SAC code that "total GST has been deposited and returns have been filed for relevant tax period."
  - vi) In addition, a general undertaking shall also be furnished by the bidder at the time of submission of bid that "as on date, no default has been made by us towards payment of GST and all returns up to the last date of submission of bid have been filed by us."

**19. RATES & TAX DEDUCTION AT SOURCE**

All taxes/duties/levies as are applicable exclusive of G.S.T. should be taken into consideration while making the offer. Ignorance in it shall not qualify for any additional payment. RSMML will reimburse/recover at actual any tax/duties which are imposed/increased/withdrawn/decreased after the date of submission of offer & are directly applicable to this contract and payable by the contractor/recoverable by RSMML, and determined on the basis of bills raised by him upon the company, if applicable, subject to the furnishing of documentary proof.

The company shall be fully entitled to deduct Income Tax and/or any other taxes levied at source as per the rules and instructions as may be applicable for this purpose from time to time.

**20. PROCESS TO BE CONFIDENTIAL**

- (i) Information, relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to the Bidders or any other person not officially concerned with such process. Any effort by a Bidder to influence the Company's processing of Bids or award decision may result in rejection of his bid.
- (ii) The tenderer may note that indulgence in submitting unsolicited offers or submitting unsolicited correspondence after submission of bid is liable reject his offer and also to debar him from participating in RSMML tenders.

**21. VALIDITY**

The tenderer shall keep the offer open for acceptance by RSMML for a minimum period of 120 days from the date of opening of tender within which period the tenderer shall have no right to withdrawn, amend or modify his offer. In case of withdrawal/amendment/modification the earnest money deposited by the Tenderer, as per Clause No. 4(B) hereof shall stand forfeited. This validity period may be extended further if required by mutual consent from time to time.

In case, tenderer, after issuance of communication of acceptance of offer by RSMML, fails to execute the contract as per the conditions of the contract, such an event will be considered as the tenderer calculated willful breach of the contract, the cost & consequence of which shall be on the sole account of the tenderer. Moreover, RSMML have full right to claim damages thereof in addition to the forfeiture of EMD/SD.

22. **COMPENSATION FOR DELAYED COMPLETION**

In the event of the supplier fail to deliver the stores in full/part within the delivery date or the stores are rejected, the Company shall be entitled at its option either:

- a) to recover from the supplier as agreed compensation @ ½ % of the value of the undelivered stores, for each week or part thereof subject to a maximum of 5% of value of undelivered store.
- b) to purchase from elsewhere, without notice to supplier at his risk and cost for full or undelivered part, as the case may be.

OR

- c) to cancel the contract

In case of (b & c) Company will be empowered to purchase the stores which are readily available to meet his requirements, irrespective of the fact whether these are similar or not.

23. **NO COMPENSATION FOR ALTERATION OF DELIVERY SCHEDULE OR SUSPENSION OF SUPPLIES**

If at any time before the commencement of the supply if the Company, for any reason, whatsoever do not require the whole supply or part thereof as specified in the LOA/Order, shall give notice in writing of the same to the supplier and the supplier shall not be entitled for any compensation and/or damage of any kind whatsoever on account for loss or profit etc. nor the contractor be entitled to any claim for compensation for re-scheduling of delivery period.

24. **RSMML RIGHTS:** RSMML reserves the right -

- i. not to accept any offer or reject any or all the offers without assigning any reason thereof. The decision of the Company in this regard shall be final and binding on the Tenderer.
- ii. to cancel the tender, postpone it for another date, change the venue of the receipt/opening of the tender.
- iii. to increase/decrease the quantity at any time during the contract.
- iv. if the Stores of make other than the specified make, found Techno-commercially acceptable, a trial order may be placed by RSMML at its sole discretion to begin with.

The decision of the company in above regards shall be final and binding on the tenderer. As a result of such change the company will not entertain any claim whatsoever.

25. **TERMINATION**

- i. In case of failure to perform the job as required under this contract or observe breach of any of the terms and conditions by the supplier, the company shall give a notice to rectify the default or breach within 10 days. Failure to rectify such default/ breach may result in termination of the contract and forfeiture of security deposit without any prejudice to the company's rights to claim damages/costs/loss etc. caused by such default/breach. Such termination shall not absolve the supplier of the liabilities accruing till the date of such termination.
- ii. The contract may also be terminated in the event the supplier is being adjudged insolvent or going into Liquidation or Winding up of their business, or making arrangement with their creditors.
- iii. Notwithstanding anything contained herein above, the company in its absolute discretion may at any time terminate the order without assigning any reason thereof by giving Fifteen day's notice to the supplier at their last notified address. In such an event the supplier shall not be entitled to raise any claim or demand for compensation, loss of profit and/or damages and / or losses or costs by reason of such earlier termination on any ground whatsoever.

26. **FORCE MAJEURE**

At any time, during the continuance of the contract, the performance in whole or in part by either party (sub-vendors excluded) and/ or obligations under this contract shall be prevented or delayed by reason of any war, Hostility acts of public enemy, civil commotion, sabotage, fires, floods, explosion, epidemics, quarantine restrictions, non-performance due to Acts of God or Acts of Government /statutory bodies (herein after referred as "Event") then provided a notice of the happening of any such event is given within seven days from the date of occurrence thereof neither party shall by reason of such event be entitled to terminate this contract nor shall either party have any claim for damage against the other in respect of such non-performance or delay in performance and the deliveries and/or performance of the work under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist and decision of Company as to whether the deliveries and/or performance of the work have been so resumed or not shall be final and conclusive. Provided further that if the performance in whole or in part is delayed by reasons of any such events for a period exceeding thirty days either party may at its option terminate the contract.

27. **DISPUTE & JURISDICTION**

In case of any dispute, it shall be the endeavour of both the parties to resolve it through mutual discussions. No courts other than the courts located at Jaipur-Rajasthan shall have jurisdiction over any matter concerning any aspect of the work under this tender. The contractor shall not stop or abandon the work due to and during the pendency of such disputes or differences.

For RAJASTHAN STATE MINES & MINERALS LIMITED,

Dy.Manager (Mech.-Contract)

We / I have carefully read and understood the Instructions, Terms and Conditions, Scope of Supply and Annexure of the tender document. One set of tender documents (intact) duly signed with office seal is submitted as token of its acceptance.

Signature of Tenderer with official stamp

Place:

Date:

## SECTION -II

### SPECIAL CONDITIONS OF CONTRACT

- 2.1 SPECIFICATION:** Detailed technical specification is as under and as per Annexure-1

S. No.	Description/Specification	Qty.
1.	33/11 KV, 3.15 MVA 3 Phase, outdoor type power Transformer copper wound oil filled Vector Group DYN-11, 50 Hz, ONAN, bushings at both LV & HV side of appropriate ratings, off load tap changer with complete protection and measuring accessories and other parameters as per relevant IER/IS/CEAR codes with latest amendments with parallel installation and commissioning.	One (01)

**2.2 SCOPE OF SUPPLY:**

- i. The scope of supply shall be the delivery of stores by the tenderer in accordance with agreed Specifications, Terms and Conditions.
- ii. The tenderer shall be deemed to have carefully examined and to have knowledge of the general and other conditions, schedules, specifications and all other documents forming part of the contract, and also to have satisfied himself as to the nature and character of the stores to be delivered under the contract.
- iii. The tenderer shall be entirely responsible for the performance of the contract in all respects according to the intent and meaning of the specification data.

**2.3 QUANTITY:**

As per Clause-2.1 above. However, RSMML reserves the right to increase / decrease the quantity mentioned thereon.

**2.4 QUALIFICATION OF BIDDER :**

- i. Pre-qualifying criteria:
  - a. The tenderer may be a manufacturer/authorised dealer/distributor or any independent supplier of 33/11 KV Power Transformer;
  - b. The tender should be empanelled or supplied minimum 5 transformers to state/center electricity companies in last three years of same (3.15 MVA) or above ratings;
  - c. The bid shall be accompanied by user's certificate from any Distribution Utility/Reputed Private Organization/State Govt./Central Govt. or their undertaking(s) in support of satisfactory performance of their above materials supplied earlier to them; &
  - d. The tenderer who fails to furnish the prescribed EMD/ Bid Security declaration on judicial stamp paper of valuing Rs.50/- as per Annexure-IX shall not be eligible for online price bid opening.
- ii. The techno-commercial suitability of the offers will be ascertained on the basis of pre-qualifying criteria, past track record of the suppliers to supply of similar technical specifications, the quantum and performance of such supplies on the basis of documents submitted along with the e-Tender (Part-I of the offer).

Bidder shall submit self attested copies of P.O.'s executed successfully for the relevant years and abstract thereof to prove the quantity as supplied.

- iii. The decision of the Company with regard to short-listed bidders shall be final and binding to tenderers.
- iv. Price Bid (BOQ) of the offer of only short-listed tenderers will be opened and only such short-listed tenderers will be informed about the date and time of opening of the price bid. The company will generally not entertain any correspondence on this subject.

## **2.5 DELIVERY PERIOD & TERMS:**

- a. The delivery of the stores is required Ex-stock and should be dispatched as soon as the orders are placed. **The tenderer should clearly indicate the delivery period of the material.**
- b. Should the supplier fail to deliver the stores in full or part within the delivery period of the contract, Company will be entitled to cancel the contract in full or for undelivered portion and to purchase at the risk and cost of the tenderer.

## **2.6 CONSIGNEE:**

The consignee is Deputy General Manager (Mining), CEU-Lignite, RSMML Ltd., Kasnau-Matasukh Lignite Project, District Nagaur (Rajasthan) or his authorized representative.

## **2.7 INSURANCE:**

The tenderer shall insure the stores against all transit risk from warehouse to warehouse basis at his own cost.

## **2.8 TERMS OF PAYMENT & PAYING AUTHORITY:**

- i) The company's desirable terms of payment are 100% within 30 days after receipt and acceptance of stores by consignee.
- ii) **Billing & Paying Authority:** The bill in triplicate along-with the supporting documents duly verified by the consignee will be released by payment disbursing authority - **Group General Manager (Lignite), RSMML, Khanij Bhawan, Jaipur.**
- iii) Payment will be made through crossed A/C payee cheque/e-payment. All bank charges/commission shall be borne by the contractor.

## **2.9 PRICE VARIATION**

The quoted price should remain firm and fixed till the completion of supplies. Only variation on account of changes in G.S.T. by the Government will be considered. No escalation/variation on any other grounds whatsoever shall be considered or be admissible.

The base date of price will be 01.11.2017 as per IEEMA latest circular irrespective of date of tender opening.

Save and except as aforesaid, the contractor shall not be entitled to raise any claim and/or demand and/or any dispute on account of escalation or raise or increase in the prices of any other item or element whether in respect of electrical charges, high speed diesel, oil, lubricants, tyres, tubes, spares, wages or Minimum Wages of workmen either statutory or contractual under any settlement or award or otherwise or on any other ground/or reason whatsoever.

## **2.10 PRICE FALL CLAUSE**

In the event of supplier accepting lower prices for supplies covered under the contract to any other companies during the pendency of the contract, the lower price and charges will also be applicable to this contract. The supplier must intimate RSMML as soon as they accept lower prices from any other company including PSU and Government Organization.

## **2.11 INDIAN/ BSS STANDARD**

All specification mentioned in the tender documents are based on Indian Standards or equivalent and where no Indian standards exists the supplies conform to B.S.S. All electric installations, equipments etc shall have to conform to Indian Electricity Rules 1967 and as amended from time to time.

## **2.12 TECHNICAL DATA**

Store shall confirm the technical specification as per Annexure-I.

## **2.13 MANUFACTURER**

In case the tenderer is Dealers/ Distributors/ sole agent, the name of the manufacturer for the store will be indicated. The tenderer has to furnish authorisation/accreditation certificate of the manufacturer in his favour to participate against this tender on their behalf.

## **2.14 SUPPORTING DOCUMENTS**

The Tenderer should furnish the following supporting documents along with offer:

- i. Envelope containing tender fee if downloaded from website as per N.I.T.
- ii. Envelope containing Demand Draft of Earnest Money Deposit in the manner specified in tender as per Clause-4.
- iii. One complete tender document as issued duly filled and sealed & signed on each page by the tenderer as token of acceptance of specification, terms & conditions of tender.
- iv. Details of capacity of manufacturing facility etc.
- v. In case of authorized dealers, furnish valid authorization/accreditation certificate from the manufacturer for participating in the tender.
- vi. The technical specification, make, name of manufacturer of the offered product.
- vii. Details in respect of satisfactorily supplying of similar type of Stores in the past. Please enclose the copy of purchase order & performance certificate or any other authentic supporting documents if any as per format of Annexure -II.
- viii. G.S.T. Registration Number.
- ix. PAN Number issued by the Income Tax Department.

- x. Declaration that the tenderer/bidder has not earlier been Suspended or banned by the company.
- xi. Manufacturer's standard Guarantee/Warranty of the product offered may be furnished against this tender. However our standard guarantee/warranty period is for a period of 36 months from the date of acceptance.
- xii. Duly filled and signed Annexure-I, I (A), II, III, IV, V & VI.
- xiii. Copy of registration certificate under the Micro, Small & Medium Enterprises Development Act 2006, as per Annexure-V.

Note: Each & every document including copy of tender document & Annexure furnished along-with Part I should be sealed & signed by the authorized person of the tenderer.

For RAJASTHAN STATE MINES & MINERALS LIMITED,

Dy.Manager (Mech.-Contract)

We / I have carefully read and understood the Instructions, Terms and Conditions, Scope of Supply and Annexure of the tender document. One set of tender documents (intact) duly signed with office seal is submitted as token of its acceptance.

Signature with Office Seal of the tenderer.

Place:

Date:



**Detailed Specification of e-Tender No. F.9(1)23/2017/65 dated 03.02.2021**  
**PART-I (Technical Specifications)**  
**Technical Specification for 33/11 KV ONAN Outdoor Power Transformer**

**1. SCOPE**

- 1.1 This Specification provides for design, manufacture, assembly, stage inspection, final inspection and testing before dispatch, packing and delivery at destination Sub-station by road transport, transit insurance, unloading, installation and commissioning at site of 3.15 MVA 33/11 KV Power Transformers, complete with all fittings, accessories, associated equipment, Spares, 10% extra Transformer Oil, required for its satisfactory operation.

The material offered shall be procured from short listed vendor at E-23 and shall have been successfully Type Tested during last five years on the date of bid opening. The Type Test reports shall be submitted alongwith the bid.

The Transformer shall be of outdoor type with tap changers as detailed below:

3.15 MVA      -      OFF Load Tap Changer

- 1.2 **The core shall be constructed from high grade, non-aging Cold Rolled Grain Oriented (CRGO) Silicon Steel laminations confirming to HIB grade with lamination thickness not more than 0.23mm to 0.27mm or better quoted grade Core. The maximum flux density in any part of the core and yoke at normal voltage and frequency shall not be more than 1.5 Tesla. The Bidder shall provide saturation curve of the core material, proposed to be used. Laminations of different grade(s) and different thickness (s) are not allowed to be used in any manner or under any circumstances.**
- 1.3 The Power Transformer shall conform in all respects to highest standards of engineering, design, workmanship based on this specification and the latest revisions of relevant standards at the time of offer. RSMML shall have the power to reject any work or material, which, in his judgment, is not in full accordance therewith. The Transformer(s) offered, shall be complete with all components, necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of supply, irrespective of whether those are specifically brought out in this specification and / or in the commercial order or not.

RSMML reserves the right to reject the transformer(s) -

- i) if on testing the No-load and load - losses exceed the stipulated values as per this Technical Specification
- ii) if the temperature rise in oil and / or winding exceeds the value as per this Technical Specification
- iii) if impedance value differs from the guaranteed value including tolerance as per this specification
- iv) on inspection and testing, if any of the technical data does not comply to this specification, bid offer and approved drawings etc.

1.4 The offered rating transformer should have been tested for 'Short Circuit withstand capability test' and 'Impulse test' in an NABL accredited Government Laboratory as per relevant IER/IS/CEAR and the Type Test certificates in complete shape shall be accompanied with the bid offer.

1.5 **CLIMATIC CONDITIONS :**

Max. ambient air temperature.	50 degree C.
Max. daily average ambient temp.	45 degree C.
Max. yearly weighted ambient temp.	35 degree C.
Min. ambient air temp.	(-) 5 degree C.
Max. humidity.	100%
Average number of thunder storm days per annum.	40
Average annual rain fall.	15 cm to 100 cm.
No. of months during which tropical monsoon conditions prevail.	4 months (June to Sept.)
Maximum wind pressure	195 Kg./Sq.M
Altitude above MSL	Varies from 61 meters to 815 meters
Average number of rainy days per annum.	120 days.

2. **TECHNICAL REQUIREMENTS OF POWER TRANSFORMER**

S.No.	Specific Technical Requirements									
1.	Rated MVA (ONAN rating)	3.15 MVA								
2.	No. of phases	3								
3.	Type of installation	Outdoor								
4.	Frequency	50 Hz ( ± 5%)								
5.	Cooling medium	Insulating Oil (ONAN)								
6.	Type of mounting	On Wheels, Mounted on rails.								
7.	Rated voltage :									
	a. High voltage winding	33 KV								
	b. Low voltage winding	11 KV								
8.	Highest continuous system voltage :									
	a. Maximum system voltage ratio (HV / LV)	36 KV / 12 KV								
	b. Rated voltage ratio (HV / LV)	33 KV / 11 KV								
9.	No. of windings	Two winding Transformers.								
10.	Type of cooling	ONAN (Oil natural / Air natural)								
11.	MVA Rating corresponding to ONAN cooling system.	100%								
12.	Method of connection :									
	HV :	Delta								
	LV :	Star								
13.	Connection symbol	Dyn 11								
14.	System earthing	Neutral of LV side to be solidly earthed.								
15.	Percentage impedance voltage on normal tap and MVA base at 750 C corresponding to HV/LV rating and applicable tolerance :	<table border="0"> <tr> <td><b>% Impedance</b></td> <td><b>Tolerance</b></td> </tr> <tr> <td>%</td> <td></td> </tr> <tr> <td>6.25</td> <td>+ 10</td> </tr> <tr> <td colspan="2"><b>(No negative tolerance will be allowed)</b></td> </tr> </table>	<b>% Impedance</b>	<b>Tolerance</b>	%		6.25	+ 10	<b>(No negative tolerance will be allowed)</b>	
<b>% Impedance</b>	<b>Tolerance</b>									
%										
6.25	+ 10									
<b>(No negative tolerance will be allowed)</b>										

16.	Intended regular cyclic overloading of windings.	As per IEC - 76-1, Clause 4.2	
17.	a. Anticipated unbalanced loading.	Around 10%	
	b. Anticipated continuous loading of windings (HV / LV).	110% of rated current.	
18.	a. Type of tap changer	Off-load tap changer.	
	b. Range of taping	<b>+5% to -15% in 9 equal steps of 2.5% each on HV winding.</b>	
	c. Rated Current of OLTC	300A (min)	
	d. Rated Short Current of OLTC	3 KA	
19.	Neutral terminal to be brought out	On LV side only	
20.	Over Voltage operating capability and duration.	112.5% of rated voltage (continuous)	
21.	Maximum Flux Density in any part of the core and yoke at rated MVA, rated voltage i.e. 33 KV / 11 KV and system frequency of 50 Hz.	1.5 Tesla	
22.	Insulation levels for windings :-	<u>33 KV</u>	<u>11 KV</u>
	a. 1.2/50 microsecond wave shape Impulse withstand (KVp)	170	95
	b. Power frequency voltage withstand (KVrms)	70	28
23.	Type of winding insulation		
	a. HV winding	Uniform	
	b. LV winding	Uniform	
24.	Withstand time for three phase short circuit.	2 Seconds (as per IS)	
25.	Noise level at rated voltage and frequency	As per NEMA Publication No. TR-1.	
26.	Permissible Temperature Rise over ambient temperature of 50° C		
	a. Of top oil measured by thermometer.	35° C	
	b. Of winding measured by resistance.	40° C	
	c. Hot Spot Temperature rise.	54° C	
27.	Minimum clearances in air (mm) :-	<u>Phase to Phase</u>	<u>Phase to ground</u>
	a. HV	400	320
	b. LV	280	140
28.	Terminals		
	a. HV winding line end	36 KV oil filled communicating type porcelain bushings (Antifog type).	
	b. LV winding	12 KV porcelain type of bushing (Antifog type).	
29.	Insulation level of bushing :	<u>HV</u>	<u>LV</u>
	a. Lightning Impulse withstand (KVP)	170	95
	b. 1 Minute Power Frequency withstand voltage (KV -rms).	70	28
	c. Creepage distance (mm) (minimum)	900	320
30.	Material of HV & LV Conductor.	Electrolytic Copper.	
31.	Maximum current density for HV and LV winding for rated current.	2.4 A/ mm <sup>2</sup>	

32.	Polarisation index i.e. ratio of megger values at 600 sec. to 60 sec. for H.V. to earth, L.V. to earth and HV to LV.	Shall be greater than or equal to 1.5, but less than or equal to '5'.
33.	<b>Core Assembly</b>	<b>Boltless type</b>
34.	Temperature Indicator	
	a. Oil	One number
	b. Winding	One number
35.	Maximum permissible no load loss at rated voltage and rated frequency.	3.0 KW
36.	Maximum permissible load loss at rated current and at 75° C	17 KW
37.	Accommodation on tank for outdoor neutral CT.	Yes
38.	Paper Covering thickness of HV Winding Conductor.	0.6 mm (minimum)
39.	Paper Covering thickness of LV Winding Conductor.	0.5 mm (minimum)
40.	Clearance :-	
	a. Gap between HV Coil to the inside of the tank on the longer side.	65 mm (minimum)
	b. Gap between HV Coil to the inside of the tank on the width side (LV Side).	65 mm (minimum)
	c. Gap between HV Coil to the inside of the tank on the width side (HV Side to accommodate delta and tapping leads).	115 mm (minimum)
	d. Gap between Core yoke to tank bottom.	55 mm (minimum)
	e. Yoke insulation at top and bottom.	130 mm (minimum)
	f. Phase to Phase clearance between HV Limbs.	20 mm (minimum)
	g. Radial Clearance between LV and HV Coil.	20 mm (minimum)
	h. Radial Clearance between Core to LV Coil.	12.5 mm (minimum)
41.	The difference of Ampere Turns at each location shall not be more than 5% at all percentages of tappings.	
42.	Winding to winding clearance should have minimum 20% of sum of pressboard Cylinder/Barrier.	
43.	Tap changing gear :-	
	(i) Type	In Tank, High Speed Resistor Type.
	(ii) Provided on	HV Side, off-load tap changer (OLTC)
	(iii) Tap range	-15% to +5%
	(iv) Tap Step	2.5% of 33 KV (8 equal steps).
	(v) Minimum Rated current	For 3.15 MVA - 100A
	(vi) Minimum Rated short circuit current	3 KA
	(vii) Automatic control required	Yes
	(viii) Remote Control Panel required	Yes
	(ix) Marshalling kiosk required	Yes
44.	Minimum Air core reactance of HV	20%

	winding	
45.	Type of oil preservation	Air-cell type

- (A) Arcing horns as per relevant IER/IS/CEAR.
- (B) Whole work shall be carried out in accordance with the latest edition/amendments of the Indian Electricity Act and Rules formed there and as amended from time to time.

**2.1 MARSHALLING BOX**

A metal enclosed, weather, vermin and dust proof marshalling box fitted with required glands, locks, glass door, terminal board, heater with switch, illumination lamp with switch etc. shall be provided with transformer to accommodate temperature indicators, terminal blocks etc. It shall have degree of protection of IP 55 or better as per IS: 2147.

**2.2 PERFORMANCE**

- a. Transformer shall be capable of withstanding for two seconds without damage to any external short circuit.
- b. The maximum flux density in any part of the core and yoke at rated MVA, Voltage and frequency, shall be 1.5 Tesla (maximum).
- c. Transformer shall under exceptional circumstances due to sudden disconnection of the load, be capable of operating at the voltage approximately 25% above normal rated voltage for a period of not exceeding one minute and 40% above normal for a period of 5 seconds.
- d. The transformer may be operated continuously without danger on any particular tapping at the rated MVA  $\pm$  12.5% of the voltage corresponding to the tapping.
- e. The thermal ability to withstand short circuit shall be demonstrated by calculation.
- f. Transformer shall be capable of withstanding thermal and mechanical stress caused by any symmetrical and asymmetrical faults on any winding. The Bidder shall submit the necessary Short Circuit Force Calculation with the offer.
- g. Performance guarantee of transformer shall be for the period of **36 (Thirty Six)** months from the date of receipt in stores of purchaser of such transformer complete in all respect. The period during which transformer remained defective/ failed will not be accounted in this performance guarantee period. The period of defective will be reckoned from the date of first intimation to date of delivery after repair.

**2.3 DRAWINGS/DOCUMENTS INCORPORATING THE FOLLOWING PARTICULARS SHALL BE SUBMITTED WITH THE BID**

- a) General outline drawing showing shipping dimensions and overall dimensions, net weights and shipping weights, quality of insulating oil, spacing of wheels in either direction of motion, location of coolers, marshalling box and tap changers etc.
- b) Assembly drawings of core, windings etc. and weights of main components / parts.

- c) Height of center line on HV and LV connectors of transformers from the rail top level.
- d) Dimensions of the largest part to be transported.
- e) GA drawings / details of various types of bushing.
- f) Tap changing and Name Plate diagram.
- g) Type test certificates of the quoted rating transformer.
- h) Illustrative & descriptive literature of the Transformer.
- i) The drawings and Type Test Certificates of Tap Changer.
- j) Maintenance and Operating Instruction.
- k) The Type Test Certificates in complete shape for "Lightning Impulse" and 'Short Circuit' Test and Temperature Rise Test.

#### 2.4 MISCELLANEOUS

- i) Padlocks alongwith duplicate keys as asked for various valves, marshalling box etc. shall be supplied by the contractor, wherever locking arrangement is provided.
- ii) Foundation bolts for wheel locking devices of Transformer shall be supplied by the Contractor.

#### 2.5 NAME PLATE

Transformer rating plate shall contain the information as given in Clause 15 of IS-2026 (Part-I). The details on rating plate shall be finalized during the detailed engineering. Further, each transformer shall have inscription of owner's name which will be intimated by RSMML to the firm before hand.

The name plate shall also include :

- (i) The short circuit rating.
- (ii) Measured no load current and no load losses at rated voltage and rated frequency.
- (iii) Measured load losses at 75° C (Normal Tap only).
- (iv) D.C. resistance of each winding at 75° C.

#### 3.0 SYSTEM CONDITIONS

The equipment shall be suitable for installation in supply systems of the following characteristics :

		33 kV	11 kV
1.	Frequency	50 Hz ± 5%	50 Hz ± 5%
2.	Nominal system voltages	33 kV	11 kV
3.	Maximum system voltages	36.3 kV	12 kV
4.	Nominal short circuit level	As per IS: 2026	
5.	Insulation levels (1.2/50 μ sec. impulse withstand voltage).	170 kV (peak)	95 kV (peak)
6.	Power frequency with one minute withstand (wet & dry) voltage.	70 kV (rms)	28 kV (rms)
7.	Neutral earthing arrangements.	-	Solidly earthed

#### 4.0 CODES & STANDARDS

4.1 The design, material, fabrication, manufacture, inspection, testing before dispatch and performance of power transformers at site shall comply with all currently applicable statutory regulations and safety codes in the locality where the equipment will be installed. The equipment shall also conform to the latest applicable standards and codes of practice. Nothing in this specification shall be construed to relieve the Contractor of this responsibility.

4.2 The equipment and materials covered by this specification shall conform to the latest applicable provision of the following standards :

1.	IS: 5	Colour for ready mixed paints & Enamels
2.	IS: 325	Three Phase Induction Motors
3.	IS: 335	New insulating oil for transformers, switch gears
4.	IS: 1271	Classification of insulating materials for electrical machinery and apparatus in relation to their stability in services
5.	IS: 2026 (Part I to IV)	Power Transformer
6.	IS: 2026 (Part V)	Ability to withstand short circuit
7.	IS: 1866	Code of Practice for maintenance & supervision of insulating oil in service.
8.	IS: 9335	Specification for insulating craft paper.
9.	IS: 1576	Specification for solid insulating press boards for electrical purpose.
10.	IS: 104	Ready mixed paint, brushing zinc chromate, painting.
11.	IS: 649	Testing of steel sheet and strips for magnetic circuits.
12.	IS: 2362	Determination of water content in oil for porcelain bushing transformer.
13.	IS: 4257	Dimensions for clamping arrangements for bushing
14.	IS: 6160	Rectangular Conductor for electrical machine.
15.	IS: 3401	Silica Gel
16.	IS: 2070	Method of Impulse Voltage Testing
17.	IS: 2071	Method of high voltage testing
18.	IS: 2099	High voltage porcelain bushings
19.	IS: 2147	Degree of protection
20.	IS: 2705	Current Transformers
21.	IS: 3202	Code of practice for climate proofing of electrical equipment
22.	IS: 3347	Dimensions for porcelain Transformer Bushings
23.	IS: 3637	Gas & Oil operated relays
24.	IS: 3639	Fittings and accessories for power Transformers
25.	IS: 5561	Electric Power Connectors
26.	IS: 6600/BS:CP'10:0	Guide for loading of oil immersed Transformers
27.	IS: 10028	Code of practice for selection, installation and maintenance of transformers, Part I, II and III
28.	IS: 1002/1981 (Part - III)	Maintenance of Transformer
29.	C.B.I.P. Publication	Manual on Transformers

*\* If the standard is not quoted for any item, it shall be presumed that the latest version of Indian Standard shall be applicable to that item.*

The equipment complying other internationally accepted standards, may also be considered if they ensure performance superior to the Indian Standards.

#### 4.3 ELECTRICITY RULES

All work shall be carried out in accordance with the latest edition of the Indian Electricity Act-1910, Electricity supply Act-1948, Electricity Act-2003, Electricity rules-2005 and rules formed there under and as amended from time to time.

#### 4.4 DRAWINGS

a) The contractor shall furnish, within fifteen days after issuing of Letter of Award. Six copies each of the following drawings/documents incorporating the transformer rating for approval.

i) Detailed overall general arrangement drawing showing front and side elevations and plan of the transformer and all accessories including radiators and external features with details of dimensions, spacing of wheels in either direction of motion, net weights and shipping weights, crane lift for un-tanking, size of lugs and eyes, bushing lifting dimensions, clearances between HV and LV terminals and ground, quantity of insulating oil etc.

ii) Assembly drawings of core and winding and weights of main components/parts. In the Core-Coil assembly drawing, the following dimensions should be clearly mentioned:-

**Core:-** Window Height, Leg Centre, Core diameter, Grade & thickness of Core material, gross & net Core Cross-Sectional area, Watt loss per kg. at the quoted flux density, VA per kg. at the quoted flux density.

**HV & LV Windings:-** Conductor Size (both bare and insulated), Inside and Outside diameters, axial heights, type of windings, No. of spacers with sizes, No. of discs, No. of turns/disc, gap between discs, clearance from top and bottom yoke, gap between windings, Size of the conductor for delta connection etc.

iii) Foundation plan showing loading on each wheel land jacking points with respect to Centre line of transformer.

iv) GA drawings details of bushing and terminal connectors.

v) Name plate drawing with terminal marking and connection diagrams.

vi) Wheel locking arrangement drawing.

vii) Transportation dimensions drawings.

viii) Magnetization characteristic curves of PS class neutral and phase side current transformers, if applicable.

ix) Interconnection diagrams.

x) Over fluxing withstand time characteristic of transformer.

xi) GA drawing of marshalling box.

xii) Control scheme/wiring diagram of marshalling box.

xiii) Technical leaflets of major components and fittings.

xiv) As built drawings of schematics, wiring diagram etc.

xv) Setting of oil temperature indicator, winding temperature indicator.



- xvi) Completed technical data sheets.
  - xvii) Detail Drawings, Type Test Certificates including write-up of On-Load tap changing gear and its required accessories/equipments, wiring diagrams etc. as per this specification.
  - xviii) HV conductor bushing.
  - xix) Bushing Assembly.
  - xx) Bi-mettalic connector suitable for connection to 100 Sq. mm upto 232 Sq.mm AAAC Conductor.
  - xxi) Radiator type assembly.
  - xxii) Specific loss (watt/Kg. vs. Flux density), VA/Kg. vs. Flux density & B-H Graph for the offered HIB or better core material, to be used for the offered transformer.
- b) All drawings, documents, technical data sheets and test certificates, results and calculations shall be furnished.
  - c) Ampere - Turns Calculation at various locations and tapping positions of both LV and HV windings.
- 4.5 Any approval given to the detailed drawings by the RSMML shall not relieve the contractor of the responsibility for correctness of the drawing and in the manufacture of the equipment. The approval given by the RSMML shall be general with overall responsibility with contractor.

## **5.0 GENERAL CONSTRUCTIONAL FEATURES**

- 5.1 All material used shall be of best quality and of the class most suitable for working under the conditions specified and shall withstand the variations of temperature and atmospheric conditions without distortion or deterioration or the setting up of undue stresses which may impair suitability of the various parts for the work which they have to perform.
- 5.2 Similar parts particularly removable ones shall be interchangeable.
- 5.3 Pipes and pipe fittings, screws, studs, nuts and bolts used for external connections shall be as per the relevant standards, Steel bolts and nuts exposed to atmosphere shall be galvanized.
- 5.4 Nuts, bolts and pins used inside the transformers and tap changer compartments shall be provided with lock washer or locknuts.
- 5.5 Exposed parts shall not have pockets where water can collect.
- 5.6 Internal design of transformer shall ensure that air is not trapped in any location.
- 5.7 Material in contact with oil shall be such as not to contribute to the formation of acid in oil. Surface in contact with oil shall not be galvanized or cadmium plated.
- 5.8 Labels, indelibly market, shall be provided for all identifiable accessories like Relays, switches current transformers etc. All label plates shall be of in corrodible material.

- 5.9 All internal connections and fastenings shall be capable of operating under overloads and over-excitation, allowed as per specified stands without injury.
- 5.10 Transformer and accessories shall be designed to facilitate proper operation, inspection, maintenance and repairs.
- 5.11 No patching, plugging, shimming or other such means of overcoming defects, discrepancies or errors will be accepted.
- 5.12 Schematic Drawing of the wiring, including external cables shall be put under the prospane sheet on the inside door of the transformer marshalling box.
- 5.13 **Painting**
- 5.13.1 **Particular attention shall be paid to the following:**
- a) Proper storage to avoid exposure as well as extremes of temperature.
  - b) Surface preparation prior to painting.
  - c) Mixing and thinning.
  - d) Application of paints and the recommended limit on time intervals between coats.
  - e) Shelf life for storage.
- 5.13.1.1 All paints, when applied in normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.
- 5.13.1.2 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 according to the manufacturer's recommendations. However, wherever airless spray is not possible, conventional spray be used with prior approval of RSMML.
- 5.13.1.3 The supplier shall, prior to painting protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.
- 5.13.2 **Cleaning and Surface Preparation**
- 5.13.2.1 After all machining, forming and welding has been completed, all steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination prior to any painting.
- 5.13.2.2 Steel surfaces shall be prepared by Stand/Shot blast cleaning and Chemical cleaning by Seven tank process including Phosphating to the appropriate quality. The surface shall be treated by phosphating and dried in accordance with IS 6005 (Code of practices for phosphating of Iron and Steel). Immediately after Phosphating, surface shall be given two coats of high quality Zinc Chromate Primer.
- 5.13.2.3 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 prior to any painting.
- 5.13.2.4 Chipping, scraping and steel wire brushing using manual or power driven tools cannot remove firmly adherent mill-scale and shall only be used where blast cleaning is impractical.

### 5.13.3 **Protective Coating**

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

### 5.13.4 **Paint Material**

Followings are the type of paints that may be suitably used for the items 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. The color of the finishing coats shall be dark admiral grey conforming to No. 632 or IS 5:1961.

### 5.13.5 **Painting Procedure**

5.13.5.1 All painting shall be carried out in conformity with both specifications and with the paint manufacturer's recommendations. All paints in any one particular system. Whether shop or site applied, shall originate from one paint manufacturer.

5.13.5.2 Particular attention shall be paid to the manufacturer's instructions on storage, mixing, thinning and pot life. The paint shall only be applied in the manner detailed by the manufacturer i.g. brush, roller, conventional or airless spray and shall be applied under the manufacturer's recommended conditions. Minimum and maximum time intervals between coats shall be closely followed.

5.13.5.3 All prepared steel surfaces should be primed before visible re-rusting occurs or within 4 hours whichever is sooner. Chemical treated steel surfaces shall be primed as soon as the surface is dry and while the surface is warm.

5.13.5.4 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 specified, such coatings may or may not be of contrasting colours.

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

### 5.13.6 **Damages to Paints Work**

5.13.6.1 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.

5.13.6.2 Any damaged paint work shall be made as follows:

- a) The damaged area, together with an area extending 25mm around its boundary, shall be cleaned down to bare metal.
- b) A priming coat shall immediately applied, followed by a full paint finish equal to that originally applied and extending 50mm around the perimeter of the originally damaged.

5.13.6.3 The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before & after priming.

### 5.13.7 Dry Film Thickness

5.13.7.1 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. The different coats may or may not be same colour.

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

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

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

S.No.	Paint Type	Area to be painted	No. of Coats	Total Dry film thickness (Min.)
1.	Liquid Paint			
	a) Zinc Chromate (Primer).	Outside	02	45 micron
	b) POLYURETHANE (Finish Coat)	Outside	02	35 micron
	c) Hot Oil	Inside	01	35 micron

## 6.0 DETAILED DESCRIPTION

### 6.1 Tank

6.1.1 The Transformer tank and cover shall be fabricated from high grade low carbon plate steel of tested quality. The tank shall be of welded construction. The transformer Tank shall be of rectangular Shape design (No elliptical shape design is allowed).

6.1.2 Tank shall be designed to permit lifting by crane or jacks of the complete transformer assembly filled with oil. Suitable lugs and bossed shall be provided for this purpose.

6.1.3 All beams, flanges, lifting lugs, braces and permanent parts attached to the tank shall be welded and where practicable, they shall be double welded.

6.1.4 The main tank body of the transformer, excluding tap changing compartments and radiators shall be capable of withstanding pressure of 760mm of Hg. **The side Tank wall shall be of 6mm thickness (minimum) for 3.15 MVA. The bottom and Top Plate of the Tank shall be of 8mm thickness (minimum) for 3.15 MVA.**

6.1.5 Inspection hole(s) with welded flange(s) and bolted cover(s) shall be provided on the tank cover. The inspection hole(s) shall be of sufficient size to afford easy access to the lower ends of the bushings, terminals etc.

6.1.6 Gaskets of nitrile rubber of equivalent shall be used to ensure perfect oil tightness. All gaskets shall be closed design (without open ends) and shall be of one piece only. Rubber gaskets used for flange type connections of the various oil compartments, shall be laid in grooves or in groove-equivalent sections on bolt sides of the gasket, throughout their total length. Care shall be taken to secure uniformly distributed mechanical strength over the gaskets and retains throughout the total length. Gaskets of neoprene and / or any kind of impregnated / bonded core or cork only which can easily be damaged by over-pressing are not acceptable. Use of hemp as gasket material is also not acceptable.

- 6.1.7 Suitable guides shall be provided for positioning the various parts during assemble or dismantling. Adequate space shall be provided between the cores and windings and the bottom of the tank for collection of any sediment.

## **6.2 Tank Cover**

The transformer top shall be provided with a detachable tank cover with bolted flanged gasket joint. Lifting lugs shall be provided for removing the cover. The surface of the cover shall be suitable sloped so that it does not retain rain water.

## **6.3 UNDER CARRIAGE**

- 6.3.1 The transformer tank shall be supported on steel structure with detachable plain rollers completely filled with oil. Suitable channels for movement of roller with transformer shall be space accordingly, rollers wheels shall be provided with suitable rollers bearing, which will resist rust and corrosion and shall be equipped with fittings for lubrication. It shall be possible to swivel the wheels in two directions, at right angle to or parallel to the main axis of the transformers.

## **6.4 CORE**

- 6.4.1 Stage inspection for core construction shall be carried out by the Owner through a 3<sup>rd</sup> party agency as well as RSMML/DISCOM.
- 6.4.2 Each lamination shall be insulated such that it will not deteriorate due to mechanical pressure and the action of hot transformer oil.
- 6.4.3 The core shall be constructed from high grade, non-aging Cold Rolled Grain Oriented (CRGO) silicon steel laminations conforming to HIB grade or better grade with lamination thickness not more than 0.23mm. to 0.27mm. The maximum flux density in any part of the cores and yoke at normal voltage and frequency shall not be more than 1.5 Tesla. The Bidder shall provide saturation curve of the core material, proposed to be used. Laminations of different grade(s) and different thickness(s) are not allowed to be used in any manner or under any circumstances.
- 6.4.4 (A) The bidder should offer the core for inspection starting from the destination port to enable RSMML for deputing inspecting officers for detail verification as given below and approval by RSMML during the manufacturing stage. Bidder's call notice for the purpose should be accompanied with the following documents as applicable as a proof towards use of prime core material:

The core coils, if found suitable, are to be sealed with proper seals which shall be opened in presence of the inspecting officers during core-cutting at the manufacturer's or its sub-vendor's premises as per approved design drawing.

- i. Contract Order No. and Date.
- ii. Invoice of the supplier.
- iii. Mills test certificate.
- iv. Packing list.
- v. Bill of lading.
- vi. Bill of entry certificate to custom.

Core material shall be directly procured either from the manufacturer or through their accredited marketing organization of repute, but not through any agent.

6.4.4 (B) For Transformer Manufacturer (TM), who has in-house core-cutting facility, the packed core coils shall be verified at their works as per followings alongwith witnessing of core-cutting:

- a) Purchase Order No. and Date.
- b) No. of packed coils with Package Nos.
- c) Gross Weight.
- d) Net Weight.
- e) Port of loading.
- f) Port of Discharge.
- g) Name of the Ocean Vessel.
- h) Grade & Thickness of Core Material.
- i) Any other information as mentioned on the body of packed coils.

6.4.4 (C) For those bidders, who have no in-house core-cutting facility, they should mention the names of atleast three sub-vendors to whom they intend to assign their core-cutting. Such sub-vendors should have been approved by other Electricity Board / Electrical Utilities and accredited by some internationally recognized certification body like ISO-9000 etc. to ensure that a minimum quality parameters & tolerance are maintained. The experience, the details of core-cutting facilities finishing & testing facilities etc. as available which such sub-vendors should be clearly outlined in the bid.

6.4.4 (D) On award of Contract, the TM is to assign the core-cutting to such sub-vendors for which approval is to be given by the RSMML.

6.4.5 The laminations shall be free of all burrs and sharp projections. Each sheet shall have an insulting coating resistant to the action of hot oil.

6.4.6 The insulation structure for the core to bolts and core to clamp plates, shall be such as to withstand 2000 V DC voltage for one minute.

6.4.7 The completed core and coil shall be so assembled that the axis and the plane of the outer surface of the core assemble shall not deviate from the vertical plane by more than 25mm.

6.4.8 All steel sections used for supporting the core shall be thoroughly shot or sand blasted, after cutting, drilling and welding.

6.4.9 The finally assembled core with all the clamping structures shall be free from deformation and shall not vibrate during operation.

6.4.10 The core clamping structure shall be designed to minimize eddy current losses.

6.4.11 The framework and clamping arrangements shall be securely earthed.

6.4.12 The core shall be carefully assembled and rigidly clamped to ensure adequate mechanical strength.

6.4.13 Oil ducts shall be provided, where necessary, to ensure adequate cooling inside the core. The welding structure and major insulation shall not obstruct the free flow of oil through such ducts.

- 6.4.14 The design of magnetic circuit shall be such as to avoid static discharges, development of short circuit paths within itself or to the earth clamping structure and production of flux component at right angle to the plane of the lamination, which may cause local heating. The supporting framework of the cores shall be so designed as to avoid the presence of pockets, which would prevent complete emptying of the tank through the drain valve or cause trapping of air during filling.
- 6.4.15 The construction is to be of boltless core type. The core shall be provided with lugs suitable for lifting the complete core and coil assembly. The core and coil assembly shall be so fixed in the tank that shifting will not occur during transport or short circuits.
- 6.4.16 The temperature gradient between core & surrounding oil shall be maintained less than 20 deg. Centigrade. The manufacturer shall demonstrate this either through test (procedure to be mutually agreed) or by calculation.

## **6.5 INTERNAL EARTHING**

- 6.5.1 All internal metal parts of the transformer, with the exception of individual laminations and their individual clamping plates shall be earthed.
- 6.5.2 The top clamping structure shall be connected to the tank by a copper strap. The bottom clamping structure shall be earthed by one or more the following methods:
- a) By connection through vertical tie-rods to the top structure.
  - b) By direct metal to metal contact with the tank base.
  - c) By a connection to the structure on the same side of the core as the main earth connection to the tank.
- 6.5.3 The magnetic circuit shall be connected to the clamping structure at one point only and this shall be brought out of the top cover of the transformer tank through a suitably rated insulator. A disconnecting link shall be provided on transformer tank to facilitate disconnections from ground for IR measurement purpose.
- 6.5.4 Coil clamping rings of metal at earth potential shall be connected to the adjacent core clamping structure on the same side as the main earth.

## **6.6 COOLING :**

- 6.6.1 Each transformer shall be provided with ONAN type cooling as specified under the schedule of requirements.
- 6.6.2 The ONAN cooling of the transformers shall be by natural circulation of air while the circulation of oil shall be effected by natural convection, the maximum oil flow being assured by a method whereby the return flow of cooled oil is made to enter the tank at a level coinciding with the bottom of the hot columns of oil thus avoiding centre heads of cold oil at the bottom of the tank. Out flow shall be arranged to coincide as nearly as possible with the hot oil level at the top of the tank so that the total available difference will be fully employed in circulating the oil round the shortest possible paths.
- 6.6.3 The windings of the transformers shall be designed to deliver continuously rated MVA corresponding to ONAN cooling.

Radiators shall be provided for cooling purpose. These shall be directly mounted on the tank on both sides in a balanced manner & not on one side only.

6.6.4 The Radiator to be used should be of PSR type for all three type of rating.

For heat dissipation calculation for tank surface at 45 Degree, 500 watt per Sq. meter will be considered and for Radiator, heat dissipation will be worked out as per manufacturing chart provided by manufacturer, firm will enclose the chart.

The cooling arrangement shall consist of detachable radiators which may be directly mounted on the transformers. Connections between the radiators and tank shall be made with flanges provided with gaskets and an indicating sheet valve provided at both connection ends, which can be fastened in either open or closed position.

The radiators shall be so arranged that these can be detached from the tank or bank without disturbing the oil in transformer. These shall be designed to withstand the vacuum and pressure specified for the tank.

Radiators shall be so designed as to be for cleaning & painting to prevent accumulation of water on the outer surface to completely drain oil from the tank or bank and to ensure against formation of gas pockets when the tank is being filled. All connections between the radiators and tank or bank and between the bank & tank shall be provided with flanges when the particular item is detached. Each radiator shall have a lifting eye, an oil drain and vent at top.

The height of the radiator should not be above the transformer tank & All the Radiator shall be so arranged that they can be directly be connected to tank without any bend.

The indication regarding state of opening/ closing of radiator valve should be clearly identified through paint-marking.

## 6.7 WINDING

6.7.1 Winding shall be subjected to a shrinking and seasoning process, so that no further shrinkage occurs during service. Adjustable devices shall be provided for taking up possible shrinkage in service.

6.7.2 All low voltage windings for use in the circular coil concentric winding shall be wound on a performed insulating cylinder for mechanical protection of the winding in handling and placing around the core.

6.7.3 Winding shall not contain sharp bends which might damage the insulation or produce high dielectric stresses. No strip conductor wound on edge shall have width exceeding six times the thickness.

6.7.4 Materials used in the insulation and assembly of the windings shall be insoluble, non catalytic and chemically inactive in the hot transformer oil and shall not soften or the otherwise affected under the operating conditions.

6.7.5 Varnish application on coil windings may be given only for mechanical protection and not for improvement in dielectric properties. In no case varnish or other adhesive be used which will seal the coil and prevent evacuation of air and moisture and impregnation by oil.



- 6.7.6 Winding and connections shall be braced to withstand shocks during transport or short circuit.
- 6.7.7 Permanent current carrying joints in the windings and leads shall be welded or brazed. Clamping bolts for current carrying parts inside oil shall be made of oil resistant material which shall not be affected by acidity in the oil steel bolts, if used, shall be suitably treated.
- 6.7.8 Terminals of all windings shall be brought out of the tank through bushings for external connections.
- 6.7.8.1 The completed core and coil assemble shall be dried in vacuum at not more than 0.5mm of mercury absolute pressure and shall be immediately impregnated with oil after the drying process to ensure the elimination of air and moisture within the insulation. Vacuum may be applied in either vacuum over or in the transformer tank.
- 6.7.8.2 The winding shall be so designed that all coil assemblies of identical voltage ratings shall be interchangeable and field repairs to the winding can be made readily without special equipment. The coils shall have high dielectric strength.
- 6.7.8.3 Coils shall be made of continuous smooth high grade electrolytic copper conductor, shaped and braced to provide for expansion and contraction due to temperature changes.
- 6.7.8.4 Adequate barriers shall be provided between coils and core and between high and low voltage coil. End turn shall have additional protection against abnormal line disturbances.
- 6.7.8.5 The insulation of winding shall be designed to withstand voltage stress arising from surge in transmission lines due to atmospheric or transient conditions caused by switching etc.
- 6.7.8.6 Tapping shall not be brought out from inside the coil or from intermediate turns and shall be so arranged as to preserve as far as possible magnetic balance of transformer at all voltage ratios.
- 6.7.8.7 Magnitude of impulse surges transferred from HV to LV windings by electro magnetic induction and capacitance coupling shall be limited to BIL of LV winding.
- 6.7.8.8 The current density adopted in all winding shall not exceed 2.4 A/mm<sup>2</sup>. The total net conductor area should be arrived after deducting the area lost due to rounding off the sharp edges of the conductor, which is given below:-

0.21 mm <sup>2</sup> upto a depth of 1.6 mm
0.36 mm <sup>2</sup> upto a depth of 2.24 mm
0.55 mm <sup>2</sup> upto a depth of 3.25 mm
0.86 mm <sup>2</sup> above 3.25 mm

- 6.7.8.9 The finally compressed shrunk height of both HV and LV windings should be equal.

## 6.8 INSULATING OIL

- 6.8.1 The insulating oil for the transformer shall be of EHV grade, generally conforming to IS: 335. No inhibitors shall be used in the oil.

- 6.8.2 The quantity of oil required for the first filling of the transformer and its full specification shall be stated in the bid. The bidder shall quote the price of transformer complete with all fittings, accessories and new transformer oil required for first filling plus 10% extra oil. The extra quantity of oil shall be supplied in non-returnable drums along with the oil required for the radiator banks.
- 6.8.3 The design and materials used in the construction of the transformer shall be such as to reduce the risk of the development of acidity in the oil.
- 6.8.4 Transformer Oil – The contractor shall ensure that the Transformer oil furnished conforms to IS: 335 including amendment, if any.

## 6.9 VALVES

- i) Valves shall be of forged carbon steel upto 50mm size and of gun metal or of cast iron bodies with gun metal fittings for sizes above 50mm. They shall be of full way type with screwed ends and shall be opened by turning counter clockwise when facing the hand wheel. There shall be no oil leakage when the valves are in closed position.
- ii) Each valve shall be provided with an indicator to show the open and closed positions and shall be provided with facility for padlocking in either open or closed position. All screwed valves shall be furnished with pipe plugs for protection. Padlocks with duplicate keys shall be supplied along with the valves.
- iii) All valves except screwed valves shall be provided with flanges having machined faced drilled to suit the applicable requirements. Oil tight blanking plates shall be provided for each connection for use when any radiator is detached and for all valves opening to atmosphere. If any special radiator valve tools are required, the contractor shall supply the same.
- iv) Each transformer shall be provided with following valves on the tank:
  - a) Drain valve so located as to completely drain the tank and to be provided with locking arrangement.
  - b) Two filter valves on diagonally opposite corners of 50mm size and to be provided with locking arrangement.
  - c) Oil sampling valves not less than 8mm at top and bottom of main tank and to be provided with locking arrangement.
  - d) One 15mm air release plug.
  - e) Valves between radiators and tank.

Drain and filter valves shall be suitable for applying vacuum as specified in this specification.

## 6.9.1 ACCESSORIES

### 6.10.1 Bushing

- i) All porcelain used in bushings shall be homogeneous, non-porous, uniformly glazed to brown colour and free from blisters, burns and other defects.
- ii) Stress due to expansion and contraction in any part of the bushing shall not lead to deterioration.
- iii) Bushing shall be designed and tested to comply with the applicable standards.
- iv) Bushing rated for 400A and above shall have non-ferrous flanges and hardware.
- v) Fittings made of steel or malleable iron shall be galvanized.
- vi) Bushing shall be so located on the transformers that full flashover strength will be utilized. Minimum clearances as required for the BIL shall be realized between live parts and live parts to earthed structures.
- vii) All applicable routine and type tests certificates of the bushings shall be furnished for approval.
- viii) Bushing shall be supplied with bi-metallic terminal connector/ clamp/ washers suitable for fixing to bush terminal and the RSMML's specified conductors. The connector/clamp shall be rated to carry the bushing rated current without exceeding a temperature rise of 50° C over an ambient of 50° C. The connector/clamp shall be designed to be corona free at the maximum rated line to ground voltage.
- ix) Bushing of identical voltage rating shall be interchangeable.
- x) The insulation class of high voltage neutral bushing shall be properly coordinated with the insulation class of the neutral of the low voltage winding.
- xi) Each bushing shall be so coordinated with the transformer insulation that all flashover will occur outside the tank.

### 6.10.2 Protection & Measuring Devices

#### i) Oil Conservator Tank

- a) A conservator complete with drain valve shall be provided in such a position, so as not to obstruct the electrical connections to the Transformer. The capacity of the conservator between highest and lowest visible levels shall be minimum of 7.5% of the total cold oil volume in the Transformer.
- b) The conservator tank shall be bolted on its support of mounting to allow for its removal for cleaning / repairing purposes.
- c) The conservator shall be fitted with magnetic oil level gauge with low level electrically insulated alarm contact.

- d) The silica get breather shall have minimum quantity of silica gel as 1 kg. for every 3500 Ltrs. Of oil in the Tank. The container for the dehydrating agent shall be of transparent plastic of best quality, to be approved by RSMML.

ii) **Pressure Relief Device**

The pressure relief device provided shall be of sufficient size for rapid release of any pressure that may be generated in the tank and which may result in damage of the equipment. The device shall operate at a static pressure of less than the hydraulic test pressure of transformer tank. It shall be mounted direct on the tank. A pair of electrically insulated contract shall be provided for alarm and tripping.

iii) **Buchholz Relay**

A double float type Buchholz relay shall be provided. Any gas evolved in the transformer shall collect in this relay. The relay shall be provided with a test cock suitable for a flexible pipe connection for checking its operation. A copper tube shall be connected from the gas collector to a valve located about 1200 mm above ground level to facilitate sampling with the transformer in service. The device shall be provided with two electrically independent potential free contracts, one for alarm on gas accumulation and the other for tripping on sudden rise of pressure.

iv) **Temperature Indicator**

a) **Oil Temperature Indicator (OTI)**

The transformers shall be provided with a mercury contact type thermometer with 150 mm dial for top oil temperature indication. The thermometer shall have adjustable, electrically independent potential free alarm and trip contacts. Maximum reading pointer and resetting device shall be mounted in the local control panel. A temperature sensing element suitably located in pocket on top oil shall be furnished. This shall be connected to the OTI by means of capillary tubing. Accuracy class of OTI shall be  $\pm 1\%$  or better. One No electrical contact capable of operating at 5 A ac at 230 volt supply.

b) **Winding Temperature indicator (WTI)**

A device for measuring the hot spot temperature of the winding shall be provided. It shall comprise the following:

- i) Temperature sensing element.
  - ii) Image Coil
  - iii) Mercury contacts.
  - iv) Auxiliary CTS, If required to match the image coil, shall be furnished and mounted in the local control panel.
  - v) 150mm dial local indicating instrument with maximum reading pointer mounted in local panel and with adjustable electrically independent ungrounded contacts, besides that required for control of cooling equipment, one for high winding temperature alarm and on for trip.
  - vi) Calibration device.
  - vii) Two number electrical contact each capable of operating at 5A ac at 230 Volt supply
- 7.9.3 Oil Preservation Equipment.

### 6.10.3.-

The oil preservation shall be diaphragm type oil sealing conservator to prevent oxidation and contamination of oil due to contact with atmospheric moisture.

The conservator shall be fitted with a dehydrating filter breather, It shall be so designed that.

Passage of air is through a dust filter & Silica gel.

Silica gel is isolated from atmosphere by an oil seal.

Moisture absorption indicated by a change in colour of the crystals of the silica gel can be easily observed from a distance.

Breather is mounted not more than 1400 mm above rail top level.

### 6.11 MARSHALLING BOX:-

i) Sheet steel, weather, vermin and dust proof marshalling box fitted with required glands, locks, glass door, terminal Board, heater with switch, illumination lamp with switch, watertight hinged and padlocked door of a suitable construction shall be provided with each transformer to accommodate temperature indicators, terminal blocks etc. The box shall have slopping roof and the interior and exterior painting shall be in accordance with the specification. Padlock along with duplicate keys shall be supplied for marshalling box. The degree of protection shall be IP-55 or better.

ii) The schematic diagram of the circuitry inside the marshalling box be prepared and fixed inside the door under a suitable sheet.

iii) The marshalling box shall accommodate the following equipment:

a) Temperature indicators.

b) Space for accommodating Control & Protection equipment in future for the cooling fan (for ONAF type cooling, may be provided in future).

c) Terminal blocks and glands plates for incoming and outgoing cables.

All the above equipments except c) shall be mounted on panels and back of panel wiring shall be used for inter-connection. The temperature indicators shall be so mounted that the dials are not more than 1600 mm from the ground level and the door (s) of the compartment (s) shall be provided with glazed window of adequate size. The transformer shall be erected on a plinth which shall be 2.5 feet above ground level.

iv) To prevent internal condensation, a metal clad heater with thermostat shall be provided. The heater shall be controlled by a MCB of suitable rating mounted in the box. The ventilation louvers, suitably padded with felt, shall also be provided. The louvers shall be provided with suitable felt pads to prevent ingress of dust.

v) All incoming cables shall enter the kiosk from the bottom and the gland plate shall not be less than 450 mm from the base of the box. The gland plate and associated compartment shall be sealed in suitable manner to prevent the ingress of moisture from the cable trench.

vi) The control connection, wiring etc. shall be as per latest IER/IS/CEAR.

6.12 OFF LOAD TAP CHANGER (For 3.15 MVA transformer):

- i. The transformers shall be provided with Off-load Taps.
- ii. The Transformer with off-load tap changing gear shall have taps ranging from +5% to -15% in 8 equal steps of 2.5% each on HV winding for voltage variation.
- iii. The tap changing switch shall be located in a convenient position so that it can be operated from ground level. The switch handle shall be provided with locking arrangement along with tap position indication, thus enabling the switch to be locked in position.

6.13 FITTING AND ACCESSORIES:-

The following fittings and accessories shall be provided on the transformers:-

- i) Conservator with isolating valves, oil filling hole with cap and drain valve. The conservator vessel shall be filled with constant oil pressure diaphragm oil sealing system.
- ii) Magnetic type oil level gauge (150 mm dia) with low oil level alarm contacts.
- iii) Prismatic/toughened glass oil level gauge.
- iv) Silica gel breather with oil seal and connecting pipe complete with first fill of activated silica gel or Alumina mounted at a level of 1300 mm above ground level.
- v) A double float type Buchholz relay with isolating valve, Bleeding pipe and a testing cock, the test cock shall be suitable for a flexible (pipe connection for checking its operation). A 5 mm dia. Copper pipe shall be connected from the relay test cock to a valve located at a suitable height above ground level to facilitate sampling of gas with the transformer in service. Interconnection between gas collection box and relay shall also be provided. The device shall be provided with two electrically independent ungrounded contacts, one for alarm on gas accumulation and the other for tripping on sudden oil surge. These contacts shall be wired upto transformer marshalling box. The relay shall be provided with shut off valve on the conservator side as well as on the tank side.
- vi) Pressure relief devices (including pressure relief valve) and necessary air equalizer connection between this and the conservator with necessary alarm and trip contacts.
- vii) Air release plugs in the top cover.
- viii) Inspection cover, access holes with bolted covers for access to inner ends of bushing etc.
- ix) Winding temperature (hot spot) indicating device for local mounting complete in all respects. Winding temperature indicator shall have three set of contacts to operate at different settings.
  - a) To provide winding temperature high alarm.
  - b) To provide temperature too high trip.
- x) Dial thermometer with pocket for oil temperature indicator with one set of alarm and one stop trip contacts and maximum reading pointer.
- xi) Lifting eyes or lugs for the top cover, core and coils and for the complete transformer.
- xii) Jacking pads.
- xiii) Haulage lugs.

- xiv) Protected type mercury/ alcohol in glass thermometer and a pocket to house the same.
- xv) Top and bottom filter valves in diagonally opposite ends with pad locking arrangement on both valves.
- xvi) Top and bottom sampling valves.
- xvii) Drain valve with pad locking arrangement.
- xviii) Rating and connection diagram plate.
- xix) Two numbers tank earthing terminals with associated nuts and bolts for connections to Owner's grounding strip
- xx) Bi-directional flagged rollers with locking and bolting device.
- xxi) Marshalling Box (MB)
- xxii) Shut off valve on both sides of flexible pipe connections between radiator bank and transformer tank.
- xxiii) Cooling Accessories:
  - a) Requisite number of radiators provided with :-
    - o One shut off valve on top
    - o One shut off valve at bottom
    - o Air release device on top
    - o Drain and sampling device at bottom
    - o Lifting lugs
  - b) Air release device and oil drain plug on oil pipe connectors:
- xxiv) Terminal marking plates for Current Transformer and Main Transformer
- xxv) Oil Preservation Equipment
- xxvi) Oil temperature indicator

Note: (i) The fittings 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.

(ii) The contacts of various devices required for alarm and trip shall be potential free and shall be adequately rated for continuous, making and breaking current duties as specified.

#### 6.14 CONTROL CONNECTIONS AND INSTRUMENT AND WIRING TERMINAL BOARD AND FUSES:-

- i) Normally no fuses shall be used anywhere instead of fuses MCB's (both in AC & DC circuits) shall be used. Only in cases where a MCB cannot replace a fuse due to system requirements, a HRC fuse can be accepted.
- ii) All wiring connections, terminal boards, fuses MCB's and links shall be suitable for tropical atmosphere. Any wiring liable to be in contact with oil shall have oil resisting insulating and the bare ends of stranded wire shall be sweated together to prevent seepage of oil along the wire.
- iii) Panel connections shall be neatly and squarely fixed to the panel. All instruments and panel wiring shall be run in PVC or non-rusting metal cleats of the compression type. All wiring to be panel shall be taken from suitable terminal boards.
- iv) Where conduits are used, the runs shall be laid with suitable falls, and the lowest parts of the run shall be external to the boxes. All conduit runs shall be adequately drained and ventilated. Conduits shall not be run at or below ground level.

- v) When 400volt connections are taken through junction boxes or marshalling boxes, they shall be adequately screened and 400 volts Danger Notice must be affixed to the outside of the junction boxes or marshalling box. Proper color code for Red, Yellow, Blue wires shall be followed.
- vi) All box wiring shall be in accordance with relevant IER/IS/CEAR. All wiring shall be of stranded copper (48 strands) of 1100 Volt grade and size not less than 2.5 sq.mm.
- vii) All wires on panels and all multi-core cables shall have ferrules, for easy identifications, which bear the same number at both ends, as indicated in the relevant drawing.
- viii) At those points of inter connection between the wiring carried out by separate contractors, where a change of number cannot be avoided double ferrules shall be provided on each wire. The change of numbering shall be shown on the appropriate diagram of the equipment.
- ix) The same ferrule number shall not be used on wires in different circuits on the same panels.
- x) Ferrules shall be of white insulating material and shall be provided with glossy finish to prevent the adhesion of dirt. They shall be clearly and durably marked in black and shall not be affected by dampness or oil.
- xi) Stranded wires shall be terminated with finned Ross Courtney terminals, claw washers or crimped tubular lugs. Separate washers shall be suited to the size of the wire terminated. Wiring shall in general, be accommodated on the sides of the box and the wires for each circuit shall be separately grouped. Back of panel wiring shall be arranged so that access to the connecting items of relays and other apparatus is not impeded.
- xii) All circuits, in which the voltage exceeds 125 volts, shall be kept physically separated from the remaining wiring. The function of each circuit shall be marked on the associated terminal boards.
- xiii) Where apparatus is mounted on panels, all metal cases shall be separately earthed by means of stranded (48 No.) copper wire of strip having a cross section of not less than 2 Sq.mm. where strip is used, the joints shall be sweated. The copper wire shall have green color insulation for earth connections.
- xiv) All wiring diagram for control and relay panel shall preferably be drawn as viewed from the back and shall show the terminal boards arranged as in services.
- xv) Terminal block rows should be spaced adequately not less than 100 mm apart to permit convenient access to external cables and terminations.
- xvi) Terminal blocks shall be placed with respect to the cable gland( at a minimum distance of 200 mm) as to permit satisfactory arrangement of multi core cable tails.
- xvii) Terminal blocks shall have pairs of terminals for incoming and outgoing wires, Insulating barriers shall be provided between adjacent connections. The height of the barriers and the spacing between terminals shall be such as to give adequate protection while allowing easy access to terminals. The terminals shall be adequately protected with the insulating dust proof covers. No live metal shall be exposed at the back of the terminal boards. CT terminals shall have shorting facilities. The terminals for CTs should have provision to insert banana plugs and with isolating links.
- xviii) All interconnecting wires, as per the final approved scheme between accessories of transformer and marshalling box is included in the scope of this specification and shall be done by the Transformer supplier.
- xix) The schematic diagram shall be drawn and fixed under a transparent prospane sheet on the inner side of the marshalling box cover.



- xx) To avoid condensation in the Marshalling Box, a space heater shall be provided with an MCB and thermostat.
- xxi) Suitable MV, CFL light shall be provided in the Marshalling Box for lightning purpose.

#### 6.15 RADIO INTERFERENCE AND NOISE LEVEL:

Transformers shall be designed with particular care to suppress at least the third and fifth harmonic voltage so as to minimize interference with communication circuits. Transformer noise level when energised at normal voltage and frequency shall be as per NEMA stipulations.

#### 7.0 INSPECTION AND TESTING:

- (i) The contractor shall carry out a comprehensive inspection and testing program during manufacturing of the transformer and it is the contractor's responsibility to draw up and carry out such a program duly approved by the RSMML.
- (ii) The contractor shall carry out type tests and routine tests on the transformer as per relevant IER/IS/CEAR in CPRI presence of authorized Engineer(s) of RSMML. The charges for conducting each of type tests shall be included in the bid price and no separate type test charges shall be paid. Front page of the type test report of same voltage class, same ratio (33/11KV) & rating (3.15MVA or higher) duly signed by the bidder is required to be scanned & upload along with the bid. However, designed transformer as per tender specification parameters to be made by the contractor at his cost. Type test to be done design-wise not package-wise.
- (iii) The pre-shipment checks shall also be carried out by the contractor.
- (iv) The requirements on site tests are as listed in the specifications.
- (v) Certified test report and oscillograms shall be furnished to the RSMML for evaluation as per the schedule of distribution of documents. The Contractor shall also evaluate the test results and rectify the defects in the equipment based on his and the RSMML's evaluations of the tests without any extra charges to RSMML. Manufacturer's Test Certificates in respect of all associated auxiliary and ancillary equipment shall be furnished.
- (vi) The bidder shall state in his proposal the testing facilities available at his works. In case full testing facilities are not available, the bidder shall state the method proposed to be adopted so as to ascertain the transformer characteristics corresponding to full capacity.
- (vii) RSMML at its discretion may use its power analyser or the power analyser of authorised testing agency for determination of no load loss, no load current, load loss and % Impedance at the works of the manufacturer and the concerned stores / any other Government approved Laboratory.

## 8.0 INSPECTION

- i) Tank and Conservator:
  - a) Inspection of major weld.
  - b) Crack detection of major strength weld seams by dye penetration test.
  - c) Check correct dimensions between wheels, demonstrate turning of wheels, through 900 and further dimensional check.
  - d) Leakage test of the conservator.
  
- ii) Core:
  - a) Sample testing of core materials for checking specific, loss, properties, magnetization characteristics and thickness.
  - b) Check on the quality of varnish if used on the stampings.
  - c) Check on the amount of burrs.
  - d) Visual and dimensional check during assembly stage.
  - e) Check on complete core for measurement of iron loss, determination of maximum flux density. (Determination of gross and net cross sectional area of the core & no. of turns/phase.)
  - f) Visual and dimensional checks for straightness and roundness of core, thickness of limbs and suitability of clamps.
  - g) High voltage DC test (2 KV for one minute) between core and clamps.
  
- iii) Insulating Material:
  - a) Sample check for physical properties of materials.
  - b) Check for dielectric strength
  - c) Check for the reaction of hot oil on insulating materials.
  
- iv) Winding:
  - a) Samples check on winding conductor for mechanical and electrical conductivity.
  - b) Visual and dimensional checks on conductor for scratches, dent mark etc.
  - c) Samples check on insulating paper for PH value, electric strength.
  - d) Check for the bonding of the insulating paper with conductor.
  - e) Check and ensure that physical condition of all materials taken for windings is satisfactory and free of dust.
  - f) Check for absence of short circuit between parallel strands.
  
- v) Checks Before Drying Process:
  - a) Check condition of insulation on the conductor and between the windings.
  - b) Check insulation distance between high voltage connection, between high voltage connection cables and earth and other live parts.
  - c) Check insulating distances between low voltage connections and earth and other parts.
  - d) Insulating test for core earthing.
  
- vi) Check During Drying Process:
  - a) Measurement and recording of temperature and drying time during vacuum treatment.
  - b) Check for completeness of drying.

- vii) Assembled Transformer:
  - a) Check completed transformer against approved outline drawing, provision for all fittings, finish level etc.
  - b) Jacking test on the assembled transformer.
  
- viii) Oil :
 

All standard tests in accordance with IS:335 shall be carried out on Transformer oil sample before filling in the transformer.
  
- ix) Test Report for bought out items :
 

The contractor shall submit the test reports for all bought out/ sub contracted items for approval.

  - a) Buchholz relay
  - b) Sudden pressure rise relay on Main Tank
  - c) Winding temperature indicators ( for TX capacity 5 MVA)
  - d) Oil temperature indicators.
  - e) Bushings
  - f) Bushing current transformers in neutral (if provided)
  - g) Marshalling box
  - h) Tap changer
  - i) Any other item required to complete the works.
  - j) Porcelain, bushing, bushing current transformers, wherever provided winding coolers, control devices, insulating oil and other associated equipment shall be tested by the contractor in accordance with relevant IER/IS/CEAR. If, such requirement is purchased by the contractor on a sub-contract, he shall have them tested to comply with these requirements.

## 8.1 FACTORY TESTS

- i) All standards routine tests in accordance IS:2026 with dielectric tests corresponding as per latest amendments to IS:2026 shall be carried out.
- ii) All auxiliary equipment shall be tested as per the relevant IER/IS/CEAR. Test certificates shall be submitted for bought out items.
- iii) High voltage withstand test shall be performed on auxiliary equipment and wiring after complete assembly.
- iv) Following additional routine tests shall also be carried out on each transformer:
  - a) Magnetic Circuit Test  
Each Core shall be tested for 1minutes at 2000 Volt DC
  - b) Oil leakage test on transformer.

## 8.2 Type Tests:

The transformer shall be subjected to the following type tests particularly short circuit and Impulse withstand tests at RSMML. Before conducting the short circuit test and Impulse test, the firm will offer for both stage inspection and final inspection of the transformer by through a 3rd party agency as well as RSMML/DISCOM at the manufacturer's works. If the transformer complies to the specification and offered technical parameters, the transformer will be sealed by authorized engineer(s) of RSMML and thereafter the transformer can be transported to CPRI for required type

tests in presence of RSMML's authorized representative(s) who will verify the seal & allow for conducting the type tests.

The Type Tests shall include:-

- (1) Tan delta measurement and capacitance of each winding to earth (with all other windings earthed) & between all windings connected together to earth.
- (2) Measurement of Zero sequence impedance.
- (3) Temperature Rise Test
- (4) Short Circuit Test
- (5) Tank Vacuum test
- (6) Tank Pressure Test
- (7) Lightning impulse withstand test for line and neutral terminal
- (8) Measurement of acoustic noise level.

### 8.3 STAGE INSPECTION:

The supplier shall offer the core, windings and tank of each transformer for inspection by a 3rd party agency as well as RSMML representative(s). During stage inspection, all the measurements like diameter, window height, leg centre, stack width, stack thickness, thickness of laminations etc. for core assembly, conductor size, Insulation thickness, I.D., O.D. winding height, major and minor insulations for both H.V. and L.V. windings, length, breadth, height and thickness of plates of Transformer tank, the quality of fittings and accessories will be taken/determined. The supplier can offer for final inspection of the transformers subject to clearance of the stage inspection report by the RSMML. No. of turns is to be determined by wrapping known No. of turns across LV winding and determining the turns ratio by ratio meter.

### 8.4 Routine Tests:

Transformer routine tests shall include tests stated in latest issue of IS: 2026 (Part-1). These tests shall also include but shall not be limited to the following:

- (i) Measurement of winding DC resistance.
- (ii) Voltage ratio on each tapping and check of voltage vector relationship.
- (iii) Impedance voltage at all tapings.
- (iv) Magnetic circuit test as per relevant IER/IS/CEAR or CBIP manual or latest standard being followed.
- (v) Measurement of Load losses at normal tap and extreme taps.
- (vi) No load losses and no load current at rated voltage and rated frequency, also at 25% to 121% of rated voltage in steps.
- (vii) Absorption index i.e. insulation resistance for 15 seconds and 60 seconds (R 60/ R 15) and polarization index i.e. insulation Resistance for 10 minutes and one minute (R 10 mt / R 1 mt).
- (viii) Induced over voltage withstand test.
- (ix) Separate source voltage withstand test.
- (x) Tan delta measurement and capacitance of each winding to earth (with all other windings earthed) & between all windings connected together to earth.

- (xi) Measurement of zero sequence impedance.
- (xii) Auxiliary circuit tests.
- (xiii) Oil BDV tests.
- (xiv) Measurement of neutral unbalance current which shall not exceed 2% of the full rated current of the transformer.
- (xv) Magnetic balance test.
- (xvi) Leakage test.

Six (6) sets of certified test reports and obcillographs shall be submitted for evaluation prior to dispatch of the equipment. The contractor shall also evaluate the test results and shall correct any defect indicated by his and RSMML's evaluation of the tests without charge to the RSMML.

## 8.5 TANK TESTS

### a) Oil Leakage Test:

The tank and oil filled compartments shall be tested for oil tightness completely filled with air or oil of viscosity not greater than that of insulating oil conforming to IS:335 at the ambient temperature and applying a pressure equal to the normal pressure plus  $35 \text{ KN/m}^2$  measured at the base of the tank. The pressure shall be maintained for a period of not less than 12 hours of oil and one hour for air and during that time no leak shall occur.

### b) Pressure Test:

Where required by the RSMML, one transformer tank of each size together with its radiator, conservator vessel and other fittings shall be subjected to a pressure corresponding to twice the normal head of oil or to the normal pressure plus  $35 \text{ KN/m}^2$  whichever is lower, measured at the base of the tank and maintained for one hour.

### c) Vacuum Test:

One transformer tank of each size shall be subjected to the vacuum pressure of 60 mm of mercury. The tanks designed for full vacuum shall be tested at an internal pressure of  $3.33 \text{ KN/m}^2$  (25 mm of mercury) for one hour. The permanent deflection of flat plates after the vacuum has been released shall not exceed the value specified in C.B.I.P., Manual on Transformers (Revised 1999) without affecting the performance of the transformer.

## 8.6 PRE-SHIPMENT CHECK AT MANUFACTURER WORKS:

- i) Check for proper packing and preservation of accessories like radiator, bushing, explosions vent, dehydrating breather, rollers, buchholz relay, control cubicle connecting pipes and conservator etc.
- ii) Check for proper provision of bracing to arrest the movement of core and winding assembly inside the tank.
- iii) Gas tightness test to conform tightness.

## 8.7 INSPECTION AND TESTING AT SITE

The Engineer authorized from RSMML along with the contractor's site engineer shall carry out detailed inspection covering areas right from the receipt of material up to

commissioning stage. An indicative program of inspection as envisaged by the Engineer is given below:

8.7.1 Receipt and Storage Checks:

- i) Check and record conditions of each package visible parts of the transformers etc. for any damage.
- ii) Visual check of core and coils before filling up with oil and also check condition of core and winding in general.

8.7.2 Installation Checks:

- i) Inspection and performance testing of accessories like tap changers etc.
- ii) Check choking of the tubes of radiators.
- iii) Test on oil samples taken from main tank top and bottom and cooling system. Samples should be taken only after the oil has been allowed to settle for 24 hours.
- iv) Check the whole assembly for tightness, general appearance etc.
- v) Oil leakage tests.

8.7.3 Pre-Commissioning tests:

After the transformer is installed, the following pre-commissioning tests and checks shall be done before putting the transformer in service :-

- i) Dry out test.
- ii) Megger Test.
- iii) DC Resistance measurement of windings.
- iv) Ratio test on all taps.
- v) Phase relationship test (Vector Grouping test)
- vi) Buchholz relay alarm & surge operation test.
- vii) Low oil level (in conservator) alarm.
- viii) Temperature Indicators.
- ix) Marshalling kiosk.
- x) Protective relays.
- xi) Magnetising current.

8.7.4 The following additional checks shall be made :

- i) All oil valves are incorrect position closed or opened as required.
- ii) All air pockets are cleared.
- iii) Thermometer pockets are filled with oil.
- iv) Oil is at correct level in the bushing, conservator, diverter switch & tank etc.
- v) Earthing connections are made.
- vi) Colour of Silica gel is blue.

- vii) Bushing arcing horn is set correctly and gap distance is recorded.
- viii) C.T. polarity and ratio is correct.

## 9.0 PERFORMANCE

The performance of the transformer shall be measured as per the latest IER/IS/CEAR on the following aspects:-

- i) The transformer shall be capable of being operated without danger on any tapping at the rates KVA with voltage variations and  $\pm 10\%$  corresponding to the voltage of the tapping.
- ii) Radio interference and Noise Level.
- iii) The transformer shall be designed with particular attention to the suppression of third and fifth harmonics so as to minimize interference with communication circuits.

## 9.1 FAULT CONDITIONS:

- a) The transformer shall be capable of withstanding for two (2) seconds without damages any external short circuit to earth.
- b) Transformer shall be capable of withstanding thermal and mechanical stresses conveyed by symmetrical or asymmetrical faults on any winding. This shall be demonstrated through calculation as per IS:2026.
- c) Transformer shall accept, without injurious heating, combined voltage and frequency fluctuation which produce the 125% over fluxing condition for one minute and 140% for 5 seconds.

Certified test report and oscillograms shall be furnished to the RSMML for evaluation as per the scheme of distribution of documents. The Contractor shall also evaluate the test results and rectify the defects in the equipment based on his and the RSMML's evaluations of the tests without any extra charges to the RSMML. Manufacturer's Test Certificates in respect of all associated auxiliary and ancillary equipment shall be furnished.

The bidder shall state in his proposal the testing facilities available at his works. In case full testing facilities are not available, the bidder shall state the method proposed to be adopted so as to ascertain the transformer characteristics corresponding to full capacity testing.

## 10.0 LOSSES:

S.No.	Transformer Rating	Maximum No-Load loss in KW at rated voltage & frequency	Maximum Load Loss in KW at 75° C at normal tap position & rated frequency
1	33/11 KV, 3.15 MVA	3.0	17

N.B.- There shall be no positive tolerance to above losses. Capitalization of losses shall not be factored in the comparative statement for selection of vendors.

## 11.0 SPARE PARTS

In case the manufacturer goes out of production of spare parts, then he shall make available the drawings of spare parts and specification of materials at no extra cost to the RSMML to fabricate or procure spare parts from other sources.

### **Mandatory Spare Parts**

The suppliers shall provide the following mandatory spare for each of Transformer supplied :

1. H.V. & L.V. Busing & Studs - Each 2 Nos.
2. Bimetallic connector for H.V. & L.V. Bushing - Each 2 sets.

#### 12.0 INSTRUCTION MANUAL

Eight sets of the instruction manuals shall be supplied at least four (4) weeks before the actual dispatch of equipment. The manuals shall be inbound volumes and shall contain all the drawings and information required for erection, operation and maintenance of the transformer. The manuals shall include amongst other, the following particular:

- a) Marked erection prints identifying the components, parts of the transformer as dispatched with assembly drawings.
- b) Detailed dimensions, assembly and description of all auxiliaries.
- c) Detailed views of the core and winding assembly, winding connections and tapings tap changer construction etc. These drawings are required for carrying out overhauling operation at site.
- d) Salient technical particulars of the transformer.
- e) Copies of all final approved drawings.
- f) Detailed O&M instructions with periodical check lists and Performa etc.

#### 13.0 COMPLETEENESS OF EQUIPMENT

All fittings and accessories, which may not be specifically mentioned in the specification but which are necessary for the satisfactory operation of the transformer, shall be deemed to be included in the specification and shall be furnished by the supplier without any extra charge. The equipment shall be complete in all details whether such details are mentioned in the specification or not, without any financial liability to the RSMML under any circumstances.

#### 13.1 TOOLS AN TACKLES

All the necessary tools and tackles required for normal operation & maintenance of the transformers shall be supplied by the Contractor.

#### 13.2 COMMISSIONING:

The equipments shall be commissioned as per CBIP manual, IS:10028 and manufacturer's recommendations. All the related drawings and manuals shall be pre-requisite for release of final payment.

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## ANNEXURE-I (A)

(Technical Data Schedule for 3.15 MVA, 33/11 KV Power Transformers)

S.No.	Description	Bidder's offer
1.	Name and address of the Manufacturer	
a)	Transformer	
b)	HV & LV Bushings	
c)	Bimetallic connectors	
d)	Transformer Oil	
e)	On load tap changer	
f)	Instruments	
g)	Neutral Bushing CTs	
2.	Service (Indoor / Outdoor)	
3.	Normal continuous rating in KVA under site conditions at all taps:	
a)	HV winding (KVA)	
b)	LV winding (KVA)	
4.	Rated Voltage	
	HV winding (KV)	
	LV winding (KV)	
5.	Rated frequency (Hz)	
6.	No. of phases	
7.	Type of transformer	
8.	Connections	
a)	HV winding	
b)	LV winding	
9.	Connections symbols	
	HV - LV	

S.No.	Description	Bidder's offer
10.	Tappings	
a)	Range	
b)	Number of steps	
c)	Position of tapping on HT winding for high voltage variation	
11.	Reference ambient temperatures	
a)	Maximum ambient air temperature ( $^{\circ}$ C)	
b)	Maximum daily average ambient temperature ( $^{\circ}$ C)	
c)	Minimum ambient air temperature ( $^{\circ}$ C)	
d)	Maximum yearly weighted average ambient temperature ( $^{\circ}$ C)	
12.	Maximum temperature rise over ambient temperature	
a)	Top oil by thermometer ( $^{\circ}$ C)	
b)	HV & LV windings by resistance measurement ( $^{\circ}$ C)	
c)	Hot Spot Temperature rise of windings ( $^{\circ}$ C)	
d)	Limit for hot spot temperature for which the transformer is designed ( $^{\circ}$ C)	
e)	Temperature gradient between windings and oil ( $^{\circ}$ C)	
f)	Type of maximum winding temperature indicator ( $^{\circ}$ C)	
13.	Voltage to earth for which the star point will be insulated	
14.	Cooling type	
15.	Losses	
a)	No-Load loss at rated voltage & rated frequency (KW)	

S.No.	Description	Bidder's offer
b)	Load loss at rated current at Normal Tap at 75° C (KW)	
16.	Max. Current density in winding at rated current for normal tap position	
a)	HV winding (Amps/ sq.mm.)	
b)	LV winding (Amps/ sq.mm.)	
17.	Impedance voltage at rated current rated frequency and at 75° C expressed as percentage of rated voltage at :	
a)	Principal (normal) tap (%)	
b)	Highest tap (%)	
c)	Lowest tap (%)	
18.	Reactance at rated current & frequency at percentage of rated voltage at :	
a)	Principal (normal) tap	
b)	Highest Tap	
c)	Lowest Tap	
19.	Resistance at 75° C	
a)	H.V. winding at normal tap position	
b)	L.V. winding	
c)	Resistance voltage drop at 75° C winding temperature expressed as percent of rated voltage (%)	
	i) Principal/ normal tap	
	ii) Highest tap	
	iii) lowest tap	
20.	Insulation level	
a)	Separate source power frequency voltage withstand	
	i) HV winding (KV rms)	

S.No.	Description	Bidder's offer
	ii) LV winding (KV rms)	
b)	Induced over voltage withstand	
	i) HV winding (KV rms)	
	ii) LV winding (KV rms)	
c)	Full wave lightning impulse withstand voltage	
	i) HV winding (K V peak)	
d)	Power frequency high voltage tests	
	i) Test voltage for one minute withstand test on high voltage windings (induced)	
	ii) Test voltage for one minute withstand test on low voltage windings	
	iii) Test voltage for one minute withstand test on neutral end of low voltage windings	
e)	Lightning impulse withstand tests	
	i) Impulse test on high voltage winding 1.2/50 $\mu$ sec full wave withstand (KV peak)	
	ii) Impulse test on low voltage winding 1.2/50 $\mu$ sec full wave withstand (KV peak)	
	iii) Wave form for impulse test	
21.	No load current, no load loss, no load power factor at normal ratio and frequency (AMP/ KW/P.F.)	
a)	10 percent of rated voltage	
b)	25 percent of rated voltage	
c)	50 percent of rated voltage	
d)	85 percent of rated voltage	
e)	100 percent of rated voltage	
f)	105 percent of rated voltage	
g)	110 percent of rated voltage	
h)	112.5 percent of rated voltage	

S.No.	Description	Bidder's offer
i)	115 percent of rated voltage	
j)	120 percent of rated voltage	
k)	121 percent of rated voltage	
22.	Efficiency at 75° C at unity power factor	
a)	Full load	
b)	75% load	
c)	50% load	
d)	25% load	
23.(a)	The minimum percentage of load at which the transformer will run at maximum efficiency (%)	
(b)	Maximum efficiency of the transformer	
24.	Regulation at full load at 75° C	
a)	At unity power factor (%)	
b)	At 0.8 power factor (lagging) (%)	
25.	Core data	
a)	Grade of core material used	
b)	Thickness of core plate lamination (mm)	
c)	Whether core laminations are of HIB cold rolled grain oriented	
d)	Details of oil ducts in core, if any	
	i) Whether in the plan & at right angle to the plane of winding	
	ii) Across the plane of lamination	
e)	i) Insulation of core lamination	
	ii) Insulation of core plates	
	iii) Type of core joints (Mitred or Mitred Step-lap)	
26.	Flux density	

S.No.	Description	Bidder's offer
a)	Designed maximum operating flux density which the transformer can withstand for one minute at normal tap (Tesla)	
b)	Designed maximum operating flux density which the transformer can withstand for five seconds at normal tap (Tesla)	
27.	Inter Tap insulation	
a)	Extent of extreme end turns reinforcement	
b)	Extent of end turns reinforcement	
c)	Extent of turn adjacent to tapping reinforced	
d)	Test voltage for 10 seconds 50 Hz inter turn insulation test on (a)	
e)	Test voltage for 10 seconds 50 Hz inter turn insulation test on (b)	
f)	Test voltage for 10 seconds 50 Hz inter turn insulation test on (c)	
28.	Windings:	
a)	Material	
b)	Type of windings:	
	i) HV windings	
	ii) LV windings	
c)	Insulation of HV windings	
d)	Insulation of LV windings	
e)	Insulation between HV & LV windings	
29.	Continuous rating under following conditions:	
a)	At 40° C ambient air temp. at site	
b)	At 30° C ambient air temp. at site	
c)	At 20° C ambient air temp. at site	

S.No.	Description	Bidder's offer
30.	Transformer Tank	
a)	Material	
b)	Thickness	
	- Top	
	- Sides	
	- Bottom	
c)	Details of painting	
	- Inner surface	
	- Outer surface	
31.	Dimensions of 3 phase transformers:	
a)	Max. Height to top of bushing (mm)	
b)	Over-all length (mm)	
c)	Over-all breadth (mm)	
32.	Weight data of transformer components: (Tolerance + 5%) (approximate values not allowed)	
a)	Core excluding clamping (Kg)	
b)	Core with clamping(Kg)	
c)	HV winding insulated conductor (Kg)	
d)	LV winding insulated conductor (Kg)	
e)	Coils with insulation (Kg)	
f)	Core and windings (Kg)	
g)	Weight of steel (Kg)	
h)	Fittings and accessories (Kg)	
i)	Oil required for first including 10% extra (ltrs / Kg)	
	1. Oil in main tank (Ltrs)	
	2. Oil in the conservator (Ltrs)	

S.No.	Description	Bidder's offer
	3. Oil in the radiators (Ltrs)	
	4. Oil in the OLTC (Ltrs)	
	5. Overall total quantity of oil with 10% extra oil for first filling (ltrs / Kg)	
j)	1. Transportation weight excluding accessories (Kg)	
	2. Shipping details	
	i) Weight of heaviest package (Kg)	
	ii) Dimension of largest package (Kg)	
k)	Untanking weight (Kg)	
l)	Total weight of transformer with oil and fittings (Kg)	
33.	Bushing data:	
a)	Type of bushing insulator	
	i) HV	
	ii) LV	
	iii) Neutral	
b)	Material of bushing (inner part/ outer part)	
c)	Weight of bushing insulator (Kg)	
d)	Quantity of oil in one bushing (Lt.)	
e)	Minimum dry withstand & flash over power frequency voltage of bushing (KV)	
f)	Minimum wet withstand & flash over power frequency voltage of bushing (KV)	
g)	Minimum withstand & flashover impulse level (KV)	
h)	Voltage rating (KV)	
i)	Current rating (Amps.)	
j)	Thermal Short Time current & Duration	
k)	Rated Dynamic current & its duration	



S.No.	Description	Bidder's offer
l)	Cantilever with stand loading	
m)	Clearance in oil	
	- Phase to phase ( mm)	
	- Phase to earth (mm)	
n)	Creepage distance in oil & air (mm)	
o)	Minimum level of immersing/ medium(oil) (mm)	
p)	Maximum pressure of immersing medium (oil) Kg/cm <sup>2</sup>	
q)	Free space required at top for removal of bushing (mm)	
r)	Angle of mounting	
34.	Details of CT to be provided in the neutral for REF protection.	
a)	Outdoor bushing type	
b)	No. of cores and their function	
c)	Location (Lime/ Neutral)	
d)	Current rating for various cores (Primary/ Secondary)	
e)	VA burden / Knee Point voltage (Core wise)	
f)	Magnetising current at half knee point voltage (mA)	
g)	Classification (PS class) core wise	
h)	Test voltage	
i)	Construction details	
35.	Conservator (Main Transformer and OLTC)	
a)	Total volume of the Conservator (Cub mtr / Ltr.)	
b)	Volume of the conservator between the highest and lowest level (Cubic mtr. / Ltrs)	

S.No.	Description	Bidder's offer
36.	Calculated time constants for natural cooling	
37.	Type of axial coil supports:	
a)	HV winding	
b)	LV winding	
38.	Details of On Load tap changer	
a)	Make	
b)	Type	
c)	Rating	
	i) Rated Voltage	
	ii) Rated current	
	iii) Step voltage	
	iv) Number of steps	
	v) Rated Short Circuit Current	
d)	Whether Diverter switch provided with gas vent and buchholz relay (Yes / No)	
e)	Whether a separate oil surge relay with trip contacts provided (Yes/ No)	
f)	Pressure relief valve	
g)	Details of motor device unit housed in kiosk / mounted on tap changer	
h)	Whether Remote control panel provided with Control scheme for simultaneous operation of Tap changer when transformers are running in parallel and independent control when in independent operation.	
i)	Details of equipment in the OLTC kiosk	
j)	Details of OLTC panels	
	i) automatic tap changer relay	
	ii) Literature of all the relays	
	iii) dimensions of OLTC Panel L x B x H	

S.No.	Description	Bidder's offer
	iv) thickness of sheet	
	v) degree of protection	
	vi) details of equipment supplied	
39.	Dispatch details:	
a)	Approx mass of heaviest Package (Kg)	
b)	Approx. dimensions of largest Package	
i)	Length (mm)	
ii)	Breadth (mm)	
iii)	Height (mm)	
40.	Un-tanking height (mm)	
41.	Bimetallic connectors HV / LV	
a)	Normal current rating (A)	
b)	Short time current rating (A)	
c)	Tensile strength(Kg)	
d)	Maximum temperature limit	
e)	Dimensional sketch enclosed indicating tolerances (Yes/No)	
f)	Minimum clearance (mm)	
	- Phase to phase	
	- Phase to Earth	
42.	CORE ASSEMBLY:-	
a)	Core diameter (mm)	
b)	Core window height (mm)	
c)	Core leg centre (mm)	
d)	Gross core cross - sectional area (m <sup>2</sup> )	
e)	Total height of core (mm)	
f)	Details of top end frame	
g)	Details of Bottom end frame	

S.No.	Description	Bidder's offer
h)	Details of clamp plate (material, thickness, insulation)	
i)	Total core weight (Kg)	
j)	Core loss, basing on core loss graph at operating flux density (rated voltage and rated frequency) (KW)	
k)	Core stacking factor	
l)	Net core area (Sq. m)	
m)	Margin towards corner joints, cross-fluxing, dielectric loss (KW)	
n)	Total core loss at rated voltage and rated frequency (KW)	
o)	Describe location / method of core grounding	
p)	Details of core belting	
	i) Material, grade and type	
	ii) Width	
	iii) Thickness	
	iv) Fixing method	
43.	DETAILS OF WINDING	
a)	Type of winding	
b)	Material of the winding conductor	
c)	Maximum current density of windings at rated current and conductor area	
d)	Whether windings are pre-shrunk?	
e)	Whether adjustable coil clamps are provided for HV and LV windings?	
f)	Whether steel rings are used for the windings? If so, whether these are split?	
g)	Whether electrostatic shields are provided to obtain uniform voltage distribution in the windings?	

S.No.	Description	Bidder's offer
h)	Windings Insulation (Type & Class)	
i)	Insulating material used for	
	i) HV winding	
	ii) LV winding	
	iii) Tapping connection	
j)	Insulating material used between	
	i) L. V. and H. V. winding	
	ii) Core & L. V. winding	
k)	K.V. to HV. winding between phases	
l)	Type of axial supports	
	i) HV winding	
	ii) LV winding	
m)	Type of radial support	
	i) HV winding	
	ii) LV winding	
n)	Maximum allowable torque on coil clamping bolts	
o)	Clamping ring details	
	i) Thickness of ring mm	
	ii) Diameter of ring mm	
	iii) No. & size of pressure screw	
p)	Bare of conductor size (mm)	
	i) HV	
	ii) LV	
q)	Insulated conductor size (m)	
	i) HV	
	ii) LV	
r)	No. of conductor in parallel (Nos)	

S.No.	Description	Bidder's offer
	i) HV	
	ii) LV	
s)	No. of turns / phase	
	i) HV	
	ii) LV	
t)	No. of discs / phase	
	i) HV	
	ii) LV	
u)	No. of turns / Disc	
	i) HV	
	ii) LV	
v)	Gap between discs (mm)	
	i) HV	
	ii) LV	
w)	Inside diameter (mm)	
	i) HV	
	ii) LV	
x)	Outside diameter (mm)	
	i) HV	
	ii) LV	
y)	Axial height after shrinkage (mm)	
	i) HV	
	ii) LV	
z)	D C Resistance	
i)	L V winding at 75° C (Ohms)	
ii)	H V winding at normal tap 75° C (Ohms)	
iii)	H V winding at highest tap at 75° C (Ohms)	

S.No.	Description	Bidder's offer
iv)	H V winding at lowest tap at 75° C (Ohms)	
v)	Total I2R losses at 75° C for normal tap (KW)	
vi)	Total I2R losses at 75° C for highest tap (KW)	
vii)	Total I2R losses at 75° C for lowest tap (KW)	
viii)	Stray losses including eddy current losses in winding at 75° C (KW)	
	a) Normal tap position	
	b) Highest tap position	
	c) Lowest tap position	
	d) Any special measures, taken to reduce eddy current losses and stray losses, Mention in details.	
ix)	Load losses at 75° C (I2R + Stray)	
	a) Normal tap position (KW)	
	b) Highest tap position (KW)	
	c) Lowest tap position (KW)	
x)	Details of special arrangement, provided to improve surge voltage distribution in the windings.	
44.	DETAILS OF TANK	
	a) Material of Transformer tank	
	b) Type of tank	
	c) Thickness of sheet (No approximate value to be mentioned)	
	i) Sides (mm)	
	ii) Bottom (mm)	
	iii) Cover (mm)	
	iv) Radiators (mm)	
	d) Inside dimensions of main tank (No approximation in dimensions to be used )	

S.No.	Description	Bidder's offer
	i) Length (mm)	
	ii) Breadth (mm)	
	iii) Height (mm)	
e)	Outside dimensions of main tank ( No approximation in dimensions to be used)	
	i) Length (mm)	
	ii) Breadth (mm)	
	iii) Height (mm)	
f)	Vacuum recommended for hot oil circulation (torr / mm of Hg)	
g)	Vacuum to be maintained during oil filling in transformer tank (torr / mm of Hg)	
h)	Vacuum to which the tank can be subjected without distortion (torr / mm of Hg)	
i)	No. of bi-directional wheels provided	
j)	Track gauge required for the wheels	
	i) Transverse axis	
	ii) Longitudinal axis	
k)	Type and make of pressure relief device and minimum pressure at which it operates (Kpa)	
45.	CONSERVATOR:-	
a)	Thickness of sheet (mm)	
b)	Size ( Dia x length)(m)	
c)	Total volume (Litres)	
d)	Volume between the highest and lowest visible oil levels (Liters)	



**DETAILS OF PAST EXPERIENCE****ORDERS EXECUTED**

Sl. No.	Purchaser Name & Address	Order no. & Date & volume of order	Quantity Supplied with value in Rs.
1.			
2.			
3.			
4.			
5.			

**ORDERS IN HAND**

Sl. No.	Purchaser Name & Address	Order no. & Date & volume of order	Quantity Supplied with value in Rs.
1.			
2.			
3.			
4.			
5.			

Signature of Tenderer with official stamps

Place :

Date :

**GENERAL INFORMATION ABOUT THE TENDERER**

1	Name & address of the tenderer with telephone No., Fax No., e-mail address etc.	a) Office b) Plant
2	Date of establishment.	
3	Whether Proprietor/Partnership/ Company	
4	Name of owner/partners Directors with full address.	
5	Details of infrastructure facilities to meet the requirement.	
6	Annual turnovers in rupees for last three years.	
7	Name & address of the banker	
8	Are you exempted from paying G.S.T.	
9	Any other important information related to the tender requirement.	
10	Registration under MSMED Act 2006.	
11	PAN NO.	
12	G.S.T. No.	

Signature of tenderer with official stamp

Date:

Place:

EXCEPTIONS AND DEVIATIONS

Name of Tenderer \_\_\_\_\_

Tenderer may stipulate here exceptions and deviations to the tender conditions, if considered unavoidable.

Sl.No.	Tender Clause no.	Requirement as per tender clause	Offered condition / deviation

Note: In case the tenderer does not mention any information to the deviations in the above format & furnish it blank then it will be presumed that the tenderer is not offering / putting any deviations to the tender terms & condition.

**We confirm that we have not put any other deviations to the tender terms & conditions except to the above.**

Signature of tenderer with official stamp

Date:

Place:

**AFFIDAVIT (Undertaking)**  
**(on non-judicial stamp paper worth Rs.50/- )**  
**(Part-I)**

Tender No.....

Name of Tenderer.....

I.....S/o Shri.....aged.....Years,  
resident of.....on behalf of the  
tenderer i.e. M/s.....hereby undertake  
oath and state as under:

- (1) I / We are not having or had any litigation with the RSMML/any other company in relation to the work. In case of litigation with RSMML or any other company, I/we hereby undertake that such litigation will not restrict me/us in smooth execution of tendered work.
- (2) I/We have not been banned /suspended / de-listed by RSMML.
- (3) I/We declare that I/We have not mentioned any exception /deviation of the tender conditions in our offer.
- (4) I/We declare that price bid is in prescribed proforma & no conditions are attached to it. Even if any conditions /s found, those would be ignored at the risk & cost of us &
- (5) That we are registered under MSMED Act & registration number of the firm is ..... (Copy enclosed) or that we are not registered under MSMED Act.
- (6) I/We do hereby declare that I/We have fully read and understood the purpose and contents of all the terms and conditions of this contract, nature, quantum, contract period and scope of work of the tender document and all terms & conditions of this tender and these are acceptable to we/us.
- (7) I/We do hereby declare that I/We have fully read and understood the provision of Rajasthan Transparency in Public Procurement Rules, 2013 and all terms & conditions mentioned therein are acceptable to we/us.
- (8) I hereby declare that as on date no default has been made by us towards payment of GST and all returns up to the last date of submission of bid have been filled by us.

Signature of Tenderer(s)

**AFFIDAVIT**  
(on non-judicial stamp paper worth Rs.50/- )  
(Part-I)

I .....S/o Shri .....  
aged.....Years, resident of  
.....on behalf of the tenderer i.e.  
M/s .....hereby undertake oath and  
state as under:

- 1) That I have submitted a tender for .....
- 2) That I/We have gone through the terms & conditions of the tender document.
- 3) That the provisions of Employees Provident Fund and Miscellaneous Provisions Act, 1952 including subsequent amendments & notifications in respect of the employees engaged for the work, are not applicable on me / us (i.e. tenderer / contractor).
- 4) That in case during the currency of the contract, I /We come under the purview of Employees Provident Fund and Miscellaneous Provisions Act, 1952 including subsequent amendments & notifications, then I/We will get myself / ourselves registered with the concerned PF Commissioner.

Deponent  
(Authorised Signatory)

**VERIFICATION**

I /We the above deponent make oath and state that my above statement is true and correct to my personal knowledge that no part of it is wrong and that nothing material has been concealed. So help me God.

Deponent  
(Authorised Signatory)

CHECK LIST

(While submitting the tender, each column should be filled by the tenderer. In case, any column does not relevant, it should be mentioned as 'not applicable' )

Sl No.	Particulars	Agreed / Provided	Deviation in case of not agreed
1	Tender document fee		
2	Earnest Money Deposit as per Clause no. 1.12		
3	One complete tender set duly signed & sealed as token of acceptance		
4	Validity 120 days		
5	Specifications as mentioned in the tender document (ANNEXURE-I)		
6	Make of product		
7	Details of mfg., Capacity, testing facilities, quality control etc.		
8	PO Copies of previous supplies for similar item		
9	Authorization Certificate in case of dealer		
10	GSTIN No.		
11	IT PAN No.		
12	Offered Guarantee / Warranty		
13	Undertaking that no condition is mentioned in the Price Bid		
14	Declaration that tenderer have not been banned/suspended.		
15	Acceptance to Security Deposit		
16	Acceptance to Payment Terms		
17	Compensation for delayed delivery		
18	Confirmation to suitability and conformity		
19	Acceptance to specification & scope of work		
20	Acceptance to termination clause		
21	Determination of lowest bidder.		
22	Acceptance to force majeure clause		

23	Acceptance to jurisdiction clause		
24	Delivery period		
25	Price: (No price indication should be here)		
	a) F.O.R. destination		
	b) Firm & Fix		
	c) Packing & forwarding		
	d) Freight & Insurance		
	e) Excise duty /Custom Duty & CESS on Duty		
	f) Sales tax		
	g) Any other taxes & duties		
26	Duly filled up Annexure I, II, III, IV, V, VI with Part-I and Annexure VII (Part-II) in separate sealed cover		
27	Any Other Information ( Give Details)		

Signature of Tenderer with official stamps

Place :

Date :

**PRICE BID FORM (BOQ)**

**(Part-II)**

**(To be submitted online in the prescribed format)**



## INDEX

Section - I	Instruction for Preparation & Submission of Tender and General Terms & Conditions
Section -II	Special Conditions of Contract
Annexure-I	Technical Specifications
Annexure -II	Details of past experience
Annexure - III	General Information about the tenderer
Annexure - IV	Exceptions & Deviation
Annexure - V	Declaration towards MSMED Act, 2006
Annexure - VI	Undertaking for Employees Provident Fund and Miscellaneous Provisions Act, 1952
Annexure - VII	Check list
Annexure - VIII	Price (Part - II of offer)



राजस्थान स्टेट माईन्स एण्ड मिनरल्स लिमिटेड  
(राजस्थान सरकार का उपक्रम)

### **Annexure A: Compliance with the Code of integrity and No Conflict of Interest**

Any person participating in a procurement process shall:

- (a) not offer any bribe, reward or gift or any material benefit either directly or indirectly in exchange for an unfair advantage in procurement process or to otherwise influence the procurement process.
- (b) not misrepresent or omit that misleads or attempts to mislead so as to obtain a financial or other benefit or avoid an obligation.
- (c) not indulge in any collusion, Bid rigging or anti competitive behavior to impair the transparency, fairness and progress of the procurement process;
- (d) not misuse any information shared between the procuring Entity and the Bidders with an intent to gain unfair advantage in the procurement process;
- (e) not indulge in any coercion including impairing or harming or threatening to do the same, directly or indirectly, to any party or to its property to influence the procurement process.
- (f) not obstruct any investigation or audit of a procurement process.
- (g) disclose conflict of interest, if any; and
- (h) disclose any previous transgressions with any Entity in India or any other country during the last three years or any debarment by any other procuring entity.

#### **Conflict of Interest:**

The Bidder participating in a bidding process must not have a Conflict of Interest.

A Conflict of Interest is considered to be a situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations.

- i. A Bidder may be considered to be in Conflict of Interest with one or more parties in a bidding process if, including but not limited to:
  - a. have controlling partners/shareholders in common; or
  - b. receive or have received any direct or indirect subsidy from any of them; or
  - c. have the same legal representative for purposes of the Bid; or
  - d. have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another bidder, or influence the decisions of the Procuring Entity regarding the bidding process; or
  - e. the Bidder participates in more than one Bid in a bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which the Bidder is involved. However, this does not limit the inclusion of the same subcontractor, not otherwise participating as a Bidder, in more than one Bid; or

- f. the Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the Goods, Works or Services that are the subject of the Bid; or
- g. Bidder or any of its affiliates has been hired (or is proposed to be hired) by the Procuring Entity as engineer-in-charge/consultant for the contract.

\* \* \* \* \*



राजस्थान स्टेट माईन्स एण्ड मिनरल्स लिमिटेड  
(राजस्थान सरकार का उपक्रम)

**Annexure B: Declaration by the Bidder regarding Qualifications**

**Declaration by the Bidder**

In relation to my/our Bid submitted to ..... For procurement of ..... in response to their Notice Inviting Bids No. .... Dated ..... I/We hereby declare under Section 7 of Rajasthan Transparency in Public Procurement Act, 2012, that:

1. I/we possess the necessary professional, technical, financial and managerial resources and competence required by the Bidding Document issued by the Procuring Entity.
2. I/we have fulfilled my/our obligation to pay such of the taxes payable to the Union and the State Government or any local authority as specified in the Bidding Document.
3. I/we are not insolvent, in receivership, bankrupt or being wound up, not have my/our affairs administered by a court or a judicial officer, not have my/our business activities suspended and not the subject of legal proceedings for any of the foregoing reasons.
4. I/we do not have, and our directors and officers not have, been convicted of any criminal offence related to my/our professional conduct or the making of false statements or misrepresentations as to my/our qualifications to enter into a procurement contract within a period of three years preceding of commencement of this procurement process, or not have been otherwise disqualified pursuant to debarment proceedings;
5. I/we do not have a conflict of interest as specified in the Act, Rules and the Bidding Document, which materially affects fair competition;

Date  
Place

Signature of bidder  
Name:  
Designation:  
Address:



राजस्थान स्टेट माईन्स एण्ड मिनरल्स लिमिटेड  
(राजस्थान सरकार का उपक्रम)

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**Annexure C: Grievance Redressal during Procurement Process.**

The designation and address of the First Appellate Authority is –

Managing Director,  
RSMM Limited,  
4-Meera Marg, Udaipur (Raj.)

The designation and address of the Second Appellate Authority is –

Mines Department,  
Government of Rajasthan,  
Jaipur (Raj.)

**(1) Filing an appeal**

If any Bidder or prospective bidder is aggrieved that any decision, action or omission of the Procuring Entity is in contravention to the provisions of the Act or the Rules or the Guidelines issued thereunder, he may file an appeal to First Appellate Authority, as specified in the Bidding Document within a period of ten days from the date of such decision or action, omission, as the case may be, clearly giving the specific ground or grounds on which he feels aggrieved:

Provided that after the declaration of a Bidder as successful the appeal may be filed only by a Bidder who has participated in procurement proceedings:

Provided further that in case a Procuring Entity evaluates the Technical Bids before the opening of the Financial Bids, an appeal related to the matter of Financial Bids may be filed only by a Bidder whose Technical Bid is found to be acceptable.

- (2) The officer to whom an appeal is filed under para (1) shall deal with the appeal as expeditiously as possible and shall endeavour to dispose it of within thirty days from the date of appeal.
- (3) If the officer designated under para (1) fails to dispose of the appeal filed within the period specified in para (2), or if the Bidder or prospective bidder or the Procuring Entity is aggrieved by the order passed by the First Appellate Authority, the Bidder or prospective bidder or the Procuring Entity, as the case may be, may file second appeal to Second Appellate Authority specified in the Bidding Document in this behalf within fifteen days from the expiry of the period specified in para (2) or of the date of receipt of the order passed by the First Appellate Authority, as the case may be.

**(4) Appeal not to lie in certain cases**

No appeal shall lie against any decision of the Procuring Entity relating to the following matters, namely:-

- (a) determination of need of procumbent;
- (b) provisions limiting participation of Bidders in the bid process;
- (c) the decision of whether or not to enter into negotiations;
- (d) cancellation of a procurement process;
- (e) applicability of the provisions of confidentiality.

**(5) Form of Appeal**

- (a) An appeal under para (1) or (3) above shall be in the annexed Form along with as many copies as there are respondents in the appeal.
- (b) Every appeal shall be accompanied by an order appealed against, if any, affidavit verifying the facts stated in the appeal and proof of payment of fee.
- (c) Every appeal may be presented to First Appellate Authority or Second Appellate Authority, as the case may be, in person or through registered post or authorized representative.

**(6) Fee for filing appeal**

- (a) Fee for first appeal shall be rupees two thousand five hundred and for second appeal shall be rupees ten thousand, which shall be non refundable.
- (b) The fee shall be paid in the form of bank demand draft or banker's cheque of Scheduled Bank in India payable in the name of Appellate Authority concerned.

**(7) Procedure for disposal of appeal**

- (a) The first Appellate Authority or Second Appellate Authority as the case may be, upon filing of appeal, shall issue notice accompanied by copy of appeal, affidavit and document, if any, to the respondents and fix date of hearing.
- (b) On the date fixed for hearing, the First Appellate Authority or Second Appellate Authority, as the case may be, shall:-
  - (i) hear all the parties to appeal present before him; and
  - (ii) peruse or inspect documents, relevant records or copies thereof relating to the matter.
- (c) After hearing the parties, perusal or inspection of documents and relevant records or copies thereof relating to the matter, the Appellate Authority concerned shall pass an order in writing and provide the copy of order to the parties to appeal free of cost.
- (d) The order passed under sub-clause(c) above shall also be placed on the State Public Procurement Portal.

\* \* \* \* \*

**Memorandum of Appeal under the Rajasthan Transparency in Public Procurement Act, 2012**

Appeal No. .... of .....  
Before the .....(first/second Appellate Authority)

1. Particular of appellant:
  - (i) Name of the appellant:
  - (ii) Official address, if any:
  - (iii) Residential address:
2. Name and address of the respondent(s):
  - (i)
  - (ii)
  - (iii)
3. Number and date of the order appealed against and name and designation of the officer/authority who passed the order (enclosed copy, or a statement of a decision, action or omission of the Procuring Entity in contravention to the provisions of the Act by which the appellant is aggrieved:
4. If the Appellant proposes to be represented by a representative, the name and postal address of the representative:
5. Number of affidavits and documents enclosed with the appeal:
6. Ground of appeal : .....  
.....  
.....(Supported by an affidavit)
7. Prayer: .....  
.....  
.....

Place .....  
Date .....  
Appellant's Signature



राजस्थान स्टेट माईन्स एण्ड मिनरल्स लिमिटेड  
(राजस्थान सरकार का उपक्रम)

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**Annexure D : Additional Conditions of Contract**

**1. Correction of arithmetical errors**

Provided that a Financial Bid is substantially responsive, the Procuring Entity will correct arithmetical errors during evaluation of Financial Bids on the following basis:

- i. if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Procuring Entity there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected.
- ii. if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- iii. if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (i) and (ii) above.

If the Bidder that submitted the lowest evaluated Bid does not accept the correction of errors, its Bid shall be disqualified and its Bid Security shall be forfeited or its Bid Securing Declaration shall be executed.

**2. Procuring Entity's Right to Vary Quantities**

- (i) If the Procuring Entity does not procure any subject matter of procurement or procures less than the quantity specified in the Bidding Document due to change in circumstances, the Bidder shall not be entitled for any claim or compensation except otherwise provided in the Conditions of Contract.
- (ii) In case of procurement of Goods or services, additional quantity may be procured by placing a repeat order on the rates and conditions of the original order. However, the additional quantity shall not be more than 50% of the value of Goods of the original contract and shall be within one month from the date of expiry of last supply. If the Supplier fails to do so, the Procuring Entity shall be free to arrange for the balance supply by limited Bidding or otherwise and the extra cost incurred shall be recovered from the supplier.

\* \* \* \* \*



**FORM OF BID-SECURING DECLARATION**  
**( to be typed on non judicial stamp paper of valuing Rs. 50/- )**

Date:  
Bid No.:  
Alternative No.:

To:

We, the undersigned, declare that:

We understand that, according to your conditions, bids must be supported by a Bid-Securing Declaration. We accept that we are required to pay the bid security amount specified in the Term and Condition of Bid, In the following cases, namely:-

- (a) when we withdraw or modify our bid after opening of bids;
- (b) when we do not execute the agreement, if any, after placement of supply/work order with in the Specified period;
- (c) when we fail to commence the supply of the goods or service or execute work as per supply/work Order within the time specified;
- (d) when we do not deposit the performance security within specified period after the supply/work Order is placed ;and
- (e) if we breach any provision of code of integrity prescribed for bidding specified in the Act and Chapter VI of these rules.

In addition to above, the State Government shall debar us from participating in any procurement process Undertaken for a period not exceeding three years in case where the entire bid security or any part thereof is required to be forfeited by procuring entity.

We understand this bid securing declaration shall expire if:-

- (i) we are not the successful bidder;
- (ii) the execution of agreement for procurement and performance security is furnished by us in case we are successful bidder;
- (iii) thirty days after the expiration of our bid.
- (iv) the cancellation of the procurement process ;or
- (v) the withdrawal of bid prior to the deadline for presenting bids, unless the bidding documents stipulate that no such withdrawal is permitted.

Signed.:-----

Name :-----

In the capacity of:-----

Duly authorized to sign the bid for and on behalf of:

Dated on day of

Corporate seal-----

[Note: In case of a Joint Venture, the bid securing declaration must be signed in name of all Partners of the joint venture that is submitting the bid,]