**TENDER DOCUMENT**

**Ref: JDS:ENG:2019:/NO………/JABALPUR/Dt…………**

**TENDER DOCUMENT FOR DESIGN, SUPPLY AND LABOUR JOBFORSUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF NEW 33/500 KvaTRANSFORMER AT MAIN DAIRY PLANT OF JABALPUR SAHAKARI DUGDHA SANGH MARYADIT, JABALPUR, MADHYA.**

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**OWNER:JABALPUR SAHAKARI DUGDH SANGH**

**MARYADIT, JABALPUR**

**TECHINICAL CONSULTANT:**

****

**MARIGO CONSULTANTS**

**Engineers, Architect & Project Management Consultants**

**Flat No- G-II NilgiriAppartmentAnoop Nagar `` opposite CHL Hospital A.B. Road Indore (M.P)**

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**Contact No.- 9827065342**

**JABALPUR SAHAKARI DUGDH SANGH MARYADIT**

DAIRY PLANT . KARONDANALA, IMALIYA, JABALPUR

**Phone no……………….E-mai -[jdssanchipurchase@gmail.com](mailto:jdssanchipurchase@gmail.com)**

GST : 23AAAAJ0485D1Z6 Pan : AAAAJ0485D

(AN ISO 9001:2008 And 22000:2005 CERTIFIED ORGANISATION)

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**Tender Ref No: ……/Project JSDSM/ 2019/Jabalpur Date.**

**NOTICE FOR INVITING E-TENDER**

**Jabalpur SahakariDughdhSanghMaryadit Jabalpur invites on-line tenders from Manufacturers /Suppliers / contractors having adequate experience in DESIGN, SUPPLY AND LABOUR JOB FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF NEW 33/500 KVA transformer at main dairy plant of JABALPUR SAHAKARI DUGDHA SANGH MARYADIT, JABALPUR, MADHYA PRADESH. Tender document is available & can be downloaded from the website** [**www.mpeproc.gov.in**](http://www.mpeproc.gov.in) up to 4:00 PM Dated 13/09/2019 **.The tender document is also available on the web UNDER JABALPUR SAHAKARI DUGDHA SANGH MARYADIT, JABALPUR, MADHYA PRADES site** [**www.mpcdf.gov.in**](http://www.mpcdf.gov.in) **of M.P. State Co-Operative Dairy Federation to read the terms & conditions, scope of works etc. as a reference only. The C.E.O., J.S.D.S. reserves the right to accept or reject any or all the tenders without assigning any reasons.**

**CHIEF EXECUTIVE OFFICER**

**Jabalpur SahakariDugdhSanghMaryadit**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.No.** | **Particulars OF JOB** | **Qty.** | **EMD** | **Cost of Tender doc** | **Last date and time for puchase of tender Form** |
| **1.** | **DESIGN, SUPPLY AND LABOUR JOB FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF NEW 33/500 Kvatrensformer at main dairy plant of JABALPUR SAHAKARI DUGDHA SANGH MARYADIT, JABALPUR, MADHYA** | **1 unit** | **Rs /-20,000** | **Rs. 1000/-+ GST** | **12/09/2019 up to 12.00 pm** |

**CHIEF EXECUTIVE OFFICER**

**Jabalpur SahakariDugdhSanghMaryadit**

**GENERAL INFORMATIONS**

|  |  |
| --- | --- |
| **1. NAME OF WORK:** | **DESIGN, SUPPLY AND LABOUR JOB FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF NEW 33/500 KVA transformer at main dairy plant of JABALPUR SAHAKARI DUGDHA SANGH MARYADIT, JABALPUR, MADHYA**. |
| **2. PERIOD (Supply, installation, commissioning and successful trial)** | **60 DAYS(SIXTY DAYS) FROM THE DATE OF WORK ORDER.** |
| **3. CONTACT PERSON** | Mr................................GM(PO), JDS  Cell no..................................  Mr.................................AGM(PO), JDS  Cell no.................................. |
| **4. Last date & time for Tender Document purchase online** | **12/09/2019 up to 12 pm** |
| **5. Last date and time for on-line submission of Bid .** | **13/09/2019 up to 12.00 pm** |
| **10.Date and time of opening of on line price bid.** | **13/09/2019 up to 04.00 pm** |
| **12.Cost of Tender Document** | **Rs. 1000/-+GST** |
| **13. Earnest Money Deposit (E.M.D.)** | **Rs.20,000/-** |
| **14.Address forCommunicaation** | **JABALPUR SAHAKARI DUGDH SANGH MARYADIT**  DAIRY PLANT . KARONDANALA, IMALIYA, JABALPUR |
| **15.Name of the Employer/owner** | **JABALPUR SAHAKARI DUGDH SANGH MARYADIT** DAIRY PLANT . KARONDANALA, IMALIYA, JABALPUR |

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**SECTION –I**

**EARNEST MONEY DEPOSIT**

1. Tenderer should pay the amount specified as below towards Earnest Money Deposit.

Earnest Money Deposit :Rs.20000/- (Rupees twenty thousand only)

2. The Earnest Money Deposit specified above should be in the form of DEMAND DRAFT/ PAY ORDER/ BANKER’S CHEQUE for the above amount, from any of the Nationalised Banks with Branches in India payable to **JABALPUR SAHAKARI DUGDH SANGH MARYADIT**and payable at **JABALPUR**.

1. The EMD will not carry any interest.
2. The Earnest Money Deposit will be refunded to the unsuccessful tenderers after intimation of the rejection/non-acceptance of their tender is sent to them.
3. CHEQUE/Bank guarantee will not be accepted towards EMD and the tenders shall be rejected if EMD is not paid in the prescribed manner.

5. The following should be enclosed along with the tender offer inside the **outer cover or Envelope**

**‘A’.**

Demand Draft/Banker’s cheque of EMD

* 1. If, on opening the outer cover **or** Envelope ‘A’, it is found that the above have not been enclosed along with the tender, then their offer will be SUMMARILY REJECTED without opening the Envelope-B.

6. The Earnest Money Deposit made by the tenderer will be forfeited if:-

* 1. he withdraws his tender or backs out after acceptance.
  2. he withdraws his tender before the expiry of validity period stipulated in the specification or fails to remit the security deposit.
  3. He violates any of the provisions of these regulations contained herein.
  4. He revises any of the terms quoted during the validity period.

7. In the event of the documents furnished with the offer being found to be bogus or if the documents containing false particulars, the Earnest Money Deposit paid by the tenderers will be forfeited in addition to black listing them for future tenders/contracts.

**SECTION – II**

**BID QUALIFICATION REQUIREMENT (B.Q.R.)**

The bidders shall become eligible to bid on satisfying the following BQR only. The bidders shall procure required documentary evidence in support of fulfillment of BQR along with the tender.

1. The tendered should have an electrical engineering company/Firm.
2. Should be possesA grade electrical engineering contractor certificate and “C” certificate.
3. Should have an electrical engineer in the firm as a Director/Partner.
4. Possess atleast 5 years Experience in the relevant field and should have executed such similar works in government departmnets/companies/PSU.
5. Should have minimum Rs.50 lakhs turn over in each year.

**THE OFFER OF BIDDERS NOT SATISFYING THE ABOVE “BID QUALIFICATION REQUIREMENTS” WILL BE SUMMARILY REJECTED**

**SECTION – III**

**REJECTION OF TENDERS:**

1. Tenders will be **summarily** rejected if
   1. The EMD requirements are not complied with (vide Section-I)
   2. Not satisfying any of the Bid Qualification Requirements (BQR) vide Section-II.
2. Tender is **liable** to be rejected, if it is:
   1. not covering the supply of equipments/materials with all accessories.
   2. with validity period less than that stipulated in this specification.
   3. not in conformity with Tender’s Commercial terms and technical specifications (Section – V & VI)
   4. not signed by the tenderer in all pages.
   5. received from a tenderer who is directly or indirectly connected with Government service or Board Service or Services of local authority.
   6. from those who have not purchased the copy of the tender document.
   7. from any black listed Firm or Contractor.
   8. Bid received by Telex/Telegram/E-mail
   9. from a tenderer whose past performance/vendor rating is not satisfactory.

III. NA

IV. The offer received after due date and time shall be rejected.

**SECTION – IV – INSTRUCTIONS TO TENDERERS**

1. Sealed tenders in Two Part System
   1. Technical Bid with commercial terms but **without** Price Bid and
   2. Price Bid will be received for and on behalf of **JABALPUR SAHAKARI DUGDH SANGH MARYADIT**hereinafter referred as JDS so as to reach on or before the due date prescribed. All the tenders shall be prepared and submitted strictly in accordance with the instructions set forth herein. THE TENDERERS WHO DO NOT FULFILL THE “BID QUALIFICATION REQUIREMENTS” AS PER SECTION – II NEEDNOT PARTICIPATE IN THE TENDER. OFFER NOT SATISFYING THIS “BID QUALIFICATION REQUIREMENT” WILL NOT BE CONSIDERED AND WILL BE **SUMMARILY REJECTED.**
2. NA
3. **SCOPE OF SUPPLY:**

The scope of supply of the material (described in Schedule-A) includes design, manufacture, inspection, testing, packing, forwarding and delivery of the materials detailed herein, at JDS site at DAIRY PLANT . KARONDANALA, IMALIYA, JABALPURincluding commissioning.

1. **SUBMISSION OF TENDER OFFER:**
2. The tenderer is expected to examine all instructions and schedules detailed in the specification and submit the schedule of prices and other required particulars in the schedules called for in the specification only as per the formats prescribed herein.
3. **TWO PARTS TENDER:**
4. The tenders shall be in Two Parts as detailed below each in a separate sealed Envelope marked.

**“ENVELOPE – A” AND “ENVELOPE – B”**

1. The first envelope, called “Envelope – A” shall contain Technical Bid as below:
   1. Unpriced bid as per schedule B, C1, C2, D, E, F and G (ie. Technical Bid with commercial terms except price) along with tender terms and conditions duly signed in each page.
   2. Any other information called for in the specification other than price.

**THIS ENVELOPE – “A” SHOULD NOT CONTAIN ANY PRICE BID.**

1. The second envelope called Envelope-B shall contain the PRICE BID only as per Schedule-A and as below:
2. The tender in two parts shall be prepared and put in a separate sealed superscribed envelope (Envelope-A and Envelope-B) as instructed above. Each envelop should contain the name & address of the tenderer.
3. A The Earnest Money Deposit or Proof of Exemption shall be placed in the outer sealed cover or in “A” cover but not in “B” cover.
4. B Envelope-A and Envelope-B shall be enclosed in an overall envelope and the Earnest Money Deposit or proof of exemption from payment of EMD shall be enclosed either in “A” cover or inside the outer cover i.e.

OUTER COVER (overall envelope) SHALL CONSIST OF,

* 1. EMD IN APPROVED FORM (OR) PROOF FOR EXEMPTION FROM PAYMENT OF E.M.D. ALONG WITH UNDERTAKING IN LIEU OF E.M.D.
  2. ENVELOPE - A
  3. ENVELOPE - B

4.5. Envelope-A and Envelope-B and the overall envelope should be individually sealed, superscribed with the specification number, materials offered and due date of submission and addressed to**CEO**,**JABALPUR SAHAKARI DUGDH SANGH MARYADIT**DAIRY PLANT . KARONDANALA, IMALIYA, JABALPUR,MP

4.6.The tender offers in complete shape in one envelope containing Envelope-A and Envelope-B, as required in Clause 4.4 (A&B) shall be sent so as to reach **CEO**,**JABALPUR SAHAKARI DUGDH SANGH MARYADIT**DAIRY PLANT . KARONDANALA, IMALIYA, JABALPUR,MP. On or before the due date for submission of offers.

4.7. The tender documents shall be addressed and submitted to **CEO**,**JABALPUR SAHAKARI DUGDH SANGH MARYADIT**DAIRY PLANT . KARONDANALA, IMALIYA, JABALPUR, MP.

4.8. At the time of opening the tenders, any offer which does not satisfy the EMD conditions will not be read out. If any of the bidders indicate price in Envelope – A, the Bid will not be read out and will be rejected.

4.9.The price bid will be opened after satisfying the pre-requisite condition under two part system.

If the tenderer finds any ambiguity in any of the terms and conditions stipulated in this specification, he shall get it clarified from the **CEO**,**JABALPUR SAHAKARI DUGDH SANGH**

**MARYADIT**DAIRY PLANT . KARONDANALA, IMALIYA, JABALPUR

4.10 The clarification to the tender documents ifany asked for by any tenderer before 48 hours of the opening of the tender will be replied to and copies of such clarification will be communicated to all the tenderers. If this is not done and subsequent to the opening of the tenders, it is found that the doubt, about the meaning or, ambiguity in the interpretation, if any of the terms and conditions stipulated in the specification are raised by the tenderer either in this tender or by a separate letter, the interpretation or clarification issued by the **CEO**,**JABALPUR SAHAKARI DUGDH SANGH MARYADIT**DAIRY PLANT . KARONDANALA, IMALIYA, JABALPURon such of those terms and conditions of thetender document as may be raised by the tenderer shall be final and binding on the tenderer.

4.11 All tender offers shall be prepared by typing or printing in the formats enclosed with the specifications.

4.12 All information in the tender offer shall be in ENGLISH only. It shall not contain interlineations, erasures or over writings except as necessary to correct errors made by the tenderer. Such erasures or other changes in the tender document shall be attested by the person signing the tender offer.

1. The tender offer shall contain full information asked for in the accompanying schedules and elsewhere in the specification.
2. The tenderer has the option of sending the offer by Registered Post or submitting the same in person so as to reach by the date and time indicated.
3. In case of postal delivery, tenderers are advised to send them well in advance so that they are delivered at the Office of The, **CEO**, **JABALPUR SAHAKARI DUGDH SANGH MARYADIT** DAIRY PLANT . KARONDANALA, IMALIYA, JABALPUR before the prescribed date and time.JDS will not be responsible for any postal or other transit loss or delay in receipt of the tender offer.
4. Telex/Fax/E-mail or telegraphic offers will not be entertained and will be rejected.
5. Any offer received by the purchaser after the due date and time specified for submission of tender will be declared late, rejected and returned unopened to the tenderer.
6. No tender offer shall be allowed to be modified subsequent to the deadline for submission of tender offers.
7. Tenderer shall bear all costs associated with the preparation and delivery of his offers and the PURCHASER will in no way be responsible or liable for these costs.
8. No offer shall be withdrawn by the tenderer in the interval between the deadline for submission and the expiry of the period of validity specified/extended validity of the tender offer.
9. **ONLY MANUFACTURERS OR THEIR AUTHORISED DEALERS WITH AUTHORISATION MUST QUOTE.**
10. The tenderers are requested to furnish the exact location of their factories with detailed postal address, Pin Code, Telephone and Fax Nos., e-mail, etc. in their tender so as to arrange inspection by JDS if considered necessary.
11. **TENDER OPENING:**

The tender will be opened on the date notified at the office of The **CEO**,**JABALPUR SAHAKARI DUGDH SANGH MARYADIT**DAIRY PLANT . KARONDANALA, IMALIYA, JABALPURin the presence of tenderer’s authorised representatives who may wish to be present on the date of opening.

5.1. If the last date set for submission of tender offers and opening date happens to be a holiday, the tenders will be received and opened on the succeeding working day, without any changes in the timings indicated.

1. The duly authorised representatives of the tenderers who are present shall sign the tender opening register.
2. The tenderer’s name, prices, all discounts offered and such other details will be announced and recorded at the time of tender opening.
3. **INFORMATION REQUIRED AND CLARIFICATIONS:**
4. To assist in the examination, evaluation and comparison of tender offers, JDS may, at its discretion, ask the tenderer for a clarification of his offers. All responses to requests for clarification shall be in writing and to the point only. No change in the price or substance of the offer shall be permitted.
5. JDS will examine the tender offers to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed and whether the offers are generally in order.
6. Prior to the detailed evaluation, JDS will determine the substantial responsiveness of each offer to the Bidding Documents.
7. A substantially responsive offer is one which conforms to all the terms and conditions of the specification without any deviation.
8. The tender offers shall be deemed to be under consideration immediately after they are opened and until such time official intimation of award/rejection is made by the JDS to the tenderers. **While the offers areunder consideration, tenderers, and/or their representatives or other interested parties are advised to retrain from contacting by any means, the JDS and/or employees of JDS/ representative on matters related to the offers under consideration.**
9. Mere submission of any tender offer connected with these documents and specification shall not constitute any agreement. The tenderer shall have no cause of action or claim, against JDS for rejection of his offer. JDS shall always be at liberty to reject or accept any offer or offers as its sole discretion and any such action will not be called into question and the tenderer shall have to claim in that regard against JDS.
10. An attempt by any tenderer to bring to bear extraneous pressures on the tender accepting authority shall be sufficient reason to disqualify the tenderer.
11. **EVALUATION AND COMPARISON OF TENDER OFFERS:**
12. The tender offers received and accepted will be examined to determine whether, they are in complete shape, all data required have been furnished, the tender offer is properly signed and the offers are generally in order and the tender other conforms to all the terms and conditions of the tender document without any deviation.
13. For the purpose of evaluation of the tender offers, the following factors will be taken into account for arriving at the evaluated price.
14. The offers will be evaluated on FOR dairy plant, JDS all inclusive including GST/CST/ any othere taxes quoted by the firms.Where all the offers received are from outside State of MP offers may be evaluated FOR (D) all inclusive including GST/ taxes quoted by the firms.

Where all the offers received are within the State of MP ,offers may be evaluated

FOR (D) all inclusive of taxes quoted by the firms.

1. The amount of GST/ taxes and percentage of it shall be indicated in the offer.
2. NA.

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1. **VALIDITY**
2. The tender offer shall be kept valid for acceptance for a period of 180 days from the date of opening of offers. The offers with lower validity period are liable for rejection.
3. Further, the tenderer shall agree to extend the validity of the bids without altering the substance and prices of their bid for further periods, if any required by JDS.
4. **RIGHTS OFJDS:**

Notwithstanding anything contained in this specification, JDS reserves the right to

* 1. Accept the lowest tender
  2. Revise the quantities at the time of placing orders
  3. Reject any or all the tenders or cancel without assigning any reasons therefore.
  4. To split the tender quantity and place orders on one or more than one firm to meet the delivery requirements.
  5. Relax or waive or amend any of the conditions stipulated in the tender specification wherever deemed necessary in the best interest of JDS.
  6. Recover losses if any sustained by JDS, from the supplier who pleads inability to supply and backs out of his obligation after award of contract. The Security Deposit paid shall be forfeited.
  7. To cancel the orders for not keeping up the delivery schedule.

1. **DEVIATIONS:**
2. The tenderer shall furnish, if there are any deviations in the commercial and technical terms in the Schedule C1 & C2 Annexed. Deviations mentioned elsewhere will not be considered. If no deviations are furnished, it will be construed that the tenderer is accepting all terms specified in the specification. Similarly if any deviations are furnished in the said scheduled C1 & C2 it will be construed that these are the only deviations and the tenderer is accepting all other terms of the specification and the offer will be taken for evaluation accordingly.
3. THE OFFERS OF THE TENDERERS WITH DEVIATIONS IN COMMERCIAL TERMS OF THE TENDER DOCUMENT WHICH COULD NOT BE ACCEPTED WILL BE REJECTED.
4. NO ALTERNATE OFFER WILL BE ACCEPTED.

11. ARBITRATION

In case of any dispute ,if arises between the parties relating to any terms and   
conditions of the Tender / Agreement and or regarding the agreement /tender   
before or after the filling of tender and /or execution of the agreement, any party   
may refer the dispute to a sole arbitrator who will be the Chairman of Jabalpur   
SahakariDugdh Sangha Maryadit ,Jabalpur or a person nominated by him whose   
decision and award shall be final and binding to both the parties. The arbitration   
proceedings shall be under and accordance with provision of Arbitration and   
Conciliation Act 1996. Supplies under the Contract shall be continued by the supplier during the arbitration proceedings, unless otherwise, directed in writing by thePurchaser or unless the matter is such that the work can not possibly be continued until the decision of the arbitrators or of the Umpire, as the case may be, is issued.

12. JURISDICTION

Any dispute or difference, arising under, out of, or in connection with this tender/   
contract order shall be subject to exclusive jurisdiction of competent court at   
Jabalpur only.

**SECTION : V – COMMERCIAL**

1. **PRICE:**
2. The tenderers are requested to quote FIRM price and in the FORMAT given in Schedule A only.
3. The tenderers shall quote the price, FOR JDS dairy plant inclusive of all taxes(GST/CST/Excise duty/ any others) with packing and forwarding charges, freight and insurance charges and for delivery to Dairy plant ,JDS : A format for price is given in Schedule ‘A’.
4. It is the responsibility of the tenderer to make sure about the correct rates of duty/tax leviable on the materials at the time of tendering. If the rates assumed by the tenderers are less than the current rates prevailing at the time of tendering, JDS will not be responsible for the mistake
5. NA.

2.0 **INSURANCE:**

Contracting firms shall arrange insurance for the equipment and all its accessories being supplied by them at their cost, through any of the Nationalised Insurance Companies. The equipment shall be insured to cover transport (from warehouse) and 60 days storage risk at site. The damages, if any, during transit will be reported within 30 days of receipt of materials. It will be the responsibility of the supplier to replace the defective/damaged materials and make good the shortages and other losses in transit, free of cost, lodge and recover claim from insurance, under-writers/carriers.

1. **PACKING AND FORWARDING:**

The equipment and all its accessories shall be securely packed and despatched, freight paid duly insured at supplier’s risk and cost. The packing may be in accordance with the manufacturer’s standard practice. The supplier is responsible for ascertaining the facilities that exist for road transport to site. Each package shall be clearly marked and contain detailed packing list, such as gross weight, net weight, etc. The supplier is solely responsible for any loss or damage during transport. The despatch of materials shall be made only after the approval of test certificates by TNSC. **The equipment/materials shall be unloaded atdestination stores/sites by the supplier free of cost**

1. **PAYMENT:**
2. After completion of entire work/supply as per specification. Payments for the supplies will be made by cheque/rtgs on any one of the Nationalised Banks/Scheduled Banks approved by Reserve Bank of India in Madhya Pradesh. The bank charges involved in making the payment will be to the account of the tenderer.
3. Payments will not be made for equipment’s/materials damaged during transit erection. All defective materials shall be replaced by the supplier free of charge.
4. **OPTION – 1 : When the tenderer opts to furnish Performance Bank**

**Guarantee**

1. **For the equipment/materials delivered within the contractual delivery period:**

90% of the all inclusive price of the equipment/materials and cost of installation including GSTwillbe paid within a reasonable time on receipt of materials in good condition at site and on completion of installation and testing. The balance10% will be made within 3 months on completion of entire supply and installation successfully and on submission of performanceguarantee as per the clause.

6.4The bills for payment will be passed only after the approval/acceptance of the following:

* 1. Security Deposit for 5% value of order.
  2. Performance Guarantee for two years period.
  3. Sales Tax, Clearance Certificate
  4. Test Certificate from the competent authority .Supply of drawings, instruction manuals, etc. as per Section-VI Technical of this specification.
  5. Type test certificate for the equipment to be supplied (bought out components)
  6. Undertaking towards jurisdiction for legal proceeding.

6.5 The supplier should despatch only after getting despatch instruction. If the supplier despatches the materials without the prior approval of the purchaser, then the purchaser shall not be responsible for any demurrage or damage or both and only the supplier should bear any expenditure arising out of such unapproved despatches.

1. **SECURITY DEPOSIT:**
2. The successful tenderer will have to furnish 5% of order value as Security Deposit in the form of Demand Draft/Banker’s Cheque/irrevocable Bank Guarantee. If the value of the Purchase Order is less than Rs.10 lakhs, Security Deposit shall be furnished in the form of Demand Draft/Banker’s Cheques only.
3. The Security Deposit will be refunded to the supplier only if the contract is completed to the satisfaction of the purchaser. If the purchaser incurs any loss or damages on account of breach of any of the clauses or any other amount arising out of the contract becomes payable by the supplier to the purchaser, then the purchaser will in addition to such other dues that he shall have under the law, appropriate the whole or part of the security deposit and such amount that is appropriated will not be refunded to the supplier.
4. The successful tenderer will have to furnish the Security Deposit within 15 days from the date of receipt of P.O. The security deposit will not carry any interest. JDS also reserves the right to accept the belated payment of Security Deposit by levying penal interest at the rate of 22% p.a. from the date of expiry of 15 days time limit till the date of actual payment of Security Deposit. The same will be recovered from suppliers first bill.
5. Failure to comply with the terms regarding Security Deposit set out in the purchase order within the stipulated time of the successful tenderer will entail cancellation of the purchase order without any further reference to the supplier.
6. **JDS reserves the right to cancel the purchase order on failure to furnish the Security Deposit within the prescribed time and right to levy penal interest for delayed payment or Security Deposit and delayed submission of Bank Guarantee towards Security Deposit.**
7. **DELIVERY:**

The delivery indicated in the Schedule-B shall have to be adhered to. If any other delivery period is indicated the tender is liable for rejection. The delivery period will be reckoned from the date of receipt of purchase order and not from the date of approval of drawings.

The date of receipt of materials at Stores/Site in good condition will be treated as date of delivery for all purposes.

1. **LOSS OR DAMAGE:**
2. External damages and/or shortages that is prima facie, the results of rough handling in transit or due to defective packing will be intimated within one month from the date of receipt of the materials at site. Internal defects, damages or shortages of integral parts which cannot ordinarily be detected on a superficial visual examination, though due to bad handling in transit or defective packing, would be intimated within 2 months from the date of receipt of materials. In either case, the defective materials shall be replaced/rectified by the supplier, free of cost as per Clause 14.1.
3. If during the period of supply, it is found that goods already supplied are defective in material or workmanship or do not conform to specification or are unsuitable for the purpose for which they are purchased, then it will be open to the purchaser either to reject the goods or repudiate the entire contract and claim such loss that the purchaser may suffer on that account or require the supplier to replace the defective goods, free of cost.
4. Similarly, if during the guarantee period any of the goods found to be defective in materials or workmanship or do not conform to specification, it will be open to the purchaser either to repudiate the entire contract and claim damages or accept such parts of the goods that are satisfactory and require the supplier to replace the balance or to claim compensation for the entire loss sustained by the purchaser on that account.
5. In the event of supplies being received damaged or any shortages at the destination stations, the cost of such materials, Excise duty and Sales Tax (if payable) and other charges payable thereof will be paid only proportionate to the value of materials received in good condition, unless the damaged goods or short supplies are made good free of cost by the suppliers.
6. For all legal purposes, the materials shall be deemed to pass into JDS’s ownership at the destination stores, where they are to be delivered and accepted.
7. **LIQUIDATED DAMAGES AND PENALTY.**
8. The delivery as specified should be guaranteed by the supplier under the liquidated damages clause given below: If the supplier fails to deliver the equipments/materials within the time specified in the contract or any extension thereof, the purchaser shall recover from the supplier as liquidated damages, a sum of **HALF PERCENT (0.5%)** of the contract price of the undelivered equipments/materials for each completed week of delay. The total liquidated damages shall not exceed **TEN PERCENT (10%)** of the contract price of the equipments/materials so delayed. **Only the date ofactual receipt of materials at stores/completion of work will be reckoned as date of delivery for this purpose.**

It should be noted that if a contract is placed on the higher tenderer in preference to the lowest acceptable tender in consideration of the offer of earlier delivery, the said contractor will be liable to pay TNSC the difference between the contract rate and that of the lowest acceptable tender in case of failure to complete the supplies in terms of such contract within the delivery period specified in the tender and incorporated in the contract. Thus is without prejudice to other rights under the terms of contract.

1. Equipment will be deemed to have been delivered only when all its component parts and its accessories are also delivered work completed. It certain components and accessories are not delivered in time, the whole equipment will be considered as delayed unless, the missing parts are delivered. **The liquidated damages will also be levied for the quantity notsupplied as is done for the delayed supplies. If supplies effected in part which could not be beneficially used by JDS (due to such incomplete supply), liquidated damages will be worked out on the basis of contract price of such whole units which could not be beneficially used and not on the value of delayed portion only.**
2. If supplies to be rendered are made by the supplier beyond the period of delivery and they are accepted by JDS, such acceptance is without prejudice to TNSC’s right to levy liquidated damages for the delay in supply.
3. If the ordered materials are not delivered, the purchaser shall recover from the supplier, as liquidated damages a sum equal to TEN PERCENT (10%) of the contract price of the equipments/materials undelivered besides forfeiture of security deposit.
4. The suppliers are liable to pay the amount of loss sustained by JDS in the event of non-execution of orders, if any placed on them either in full or part to the satisfaction of JDS under the terms and conditions of contract and in the event of placing orders for such quantities on some others at a higher price.
5. Tenderers not giving clear and specific acceptance to the above clauses are liable for rejection.
6. If there is any downward trend in prices on account of belated supplies, the tenderers have to accept the same with the levy of liquidated damages, for belated supplies.
7. **FORCE MAJEURE:**
8. If at any time, during the continuance of the contract, the performance in whole or in part, in any obligation under this contract, shall be prevented or delayed by reasons of any war, hostility, acts of public enemy, acts of civil commotion, strikes, lockouts, sabotages, fires, floods, explosions, epidemics, quarantine restrictions or other acts of God (hereinafter referred to a eventualities) then, provided notice of the happening of many such eventuality is given by the tenderer to JDS within 15 days from the date of occurrence thereof, neither party shall, by reasons of such eventuality, be entitled to terminate this contract nor shall have any claim for damages against the other in respect of such non-performance or delay in performance and deliveries under this contract, shall be resumed as soon as practicable after such eventuality has come to an end or ceased to exist.
9. Provided that if the performance in whole or part by the supplier on any obligation under this contract is prevented or delayed by reasons of any eventuality for a period exceeding 60 days, JDS may at its option terminate the contract by a notice in writing.
10. **GUARANTEE:**
11. The entire equipments should be guaranteed for satisfactory operation and good workmanship at least for a period of 36 (thirty six) months from the date of receipt of last consignment of materials at site in good condition.
12. Any defects noticed during this period shall be rectified free of cost to JDS within 2 (two) months from the date of intimation of defect/failure. Irrespective of number of failures and repairs, the suppliers are responsible for free replacement of the defective materials till the same serves a continuous period of 12 (twelve) months from the date of commissioning after the last repairs or 36 (thirty six) months from the date of receipt of last consignment of materials at site in good conditions whichever is LATER.
13. The incidental expenses, transport and freight charges for the replacement of defective materials within the guarantee period shall be borne by the supplier till such time it serves a continuous period of 12 (twelve) months as said above.
14. The tenderers shall guarantee among other things, the following:
    1. Quality and strength of materials used.
    2. Safe electrical and mechanical stresses on all parts of the equipments under all specified conditions
    3. Performance figures given by the tenderers in the schedule of guaranteed technical particulars.
15. **PERFORMANCE-GUARANTEE: OPTION – I**

The successful tenderer should furnish a performance guarantee in the form of irrevocable bank guarantee for 5% of the total accepted value of the contract and shall be valid for a period of 36 months from the anticipated date of receipt of last consignment of goods/materials at site in good condition. In case of delay in supply, the Performance Bank Guarantee should be extended suitably.

The Performance Bank Guarantee will be released on expiry of guarantee period after ensuring that defects/damages during the guarantee periods are rectified/replaced.

**OPTION – 2**

The successful tenderer need not furnish any Bank Guarantee towards performance guarantee. Instead they should agree to retain 5% value of the material supplied against each invoice till the completion of guarantee period.

1. **REPLACEMENT OF DEFECTIVE/DAMAGED MATERIALS:**
2. Notwithstanding anything contained in the above liquidated damages clause when the whole or part of the materials supplied by the supplier are found to be defective/damaged or are not in conformity with the specification or sample, such defects or damages in the materials supplied shall be rectified within two months from the date of intimation of defect/damage either at the point of destination or at these supplier’s works, at the of supplier, against proper security and acknowledgement. In the alternative, the defective or damaged materials shall be replaced free of cost within three months from the date of receipt of the intimation from the purchaser of such defects or damages. If the defects or damages are not rectified or replaced within this period, the supplier shall pay a sum towards liquidated damages as per liquidated damages clause given above for the delay in rectification/replacement of the defects or damages.
3. If even after such rectification or replacement of the damaged or defective part, if the equipment ordered is not giving the satisfactory performance as per the contract, then it will be open to the purchaser to reject the goods and recover the entire cost of such goods and also claim such other loss sustained by JDS.
4. **FAILURE TO EXECUTE THE CONTRACT:**

Suppliers failing to execute the order placed on them to the satisfaction of the JDS under terms and conditions set forth therein, will be liable to make good the loss sustained by JDS, consequent to the placing of fresh orders elsewhere at higher rate, i.e. the difference between the price accepted in the contract already entered into and the price at which fresh orders have been placed. This is without prejudice to the imposition of liquidated damages and forfeiture of security deposit.

1. **NON-ASSIGNMENT:**

The supplier shall not assign or transfer the contract or any part thereof without the prior approval of the purchaser.

1. **EFFECTIVE OR RECOVERIES:**

Any loss, arising due to non-fulfillment of this contract or any other contract, will be recovered from the Security Deposit held and or any other amount due to the supplier from TNSC from the contract as well as from other contracts.

1. **INCOME TAX:**

The tenderers should furnish their Permanent Account Number for Income Tax in their offer.

1. **SALES TAX CLEARANCE CERTIFICATE:**

The tenderer should enclose with the tender, a copy of certificate of Sales Tax clearance for the previous year from the appropriate Sales Tax authorities.

**NOTE** **:** The successful tenderer should submit the copies of latest STCC after

receiving the order.

1. **PATENT RIGHTS ETC.:**

The supplier shall indemnity the purchaser against all claims, actions, suits and proceedings for the infringement or alleged infringement of any patent, design or copy right protected either in the country of origin or in India by the use of any equipment supplied by the supplier other than for the purpose indicated by or reasonably to be inferred from the specification.

1. **ARBITRATION:**

TNSC will not accept any arbitration in case of disputes arising in any respect under this contract. Any dispute arising out of this contract shall not be subject to arbitration under the provisions of Arbitration and conciliation Act 1996 in the event of any dispute between the parties.

1. **DEVIATIONS FROM SPECIFICATION:**

Deviations from Commercial and Technical terms of tender documents is not acceptable.

1. **TEST CERTIFICATES:**

The test certificates in triplicate for the materials furnishing the results of the tests as per latest issue of IS shall be forwarded and got approved before the materials are despatched. In addition to the tests called for in the specification, the purchaser reserves the right of having such tests as the desires carried out at his own expenses to satisfy himself that the materials conform to the requirement of this specification. The materials may be rejected if the test results are not satisfactory.

1. **RESPONSIBILITY:**

The tenderer is responsible for safe delivery of the materials at the destination stores. The tenderer should include and provide for packing and secured protection of the materials so as to avoid damages or loss in transit.

1. **MAXIMUM WEIGHTS AND DIMENSIONS OF PACKINGS:**
2. The supplier is responsible to make sure about the facilities that exist for Road and Rail transport to site, the maximum packages which can be conveyed by the railways and crane lift available at the destination railway station. The supplier is also responsible for any loss or damage during transport and storage for 60 days.
3. Each case or package should be clearly marked and should contain detailed packing list.
4. **INSPECTION:**
5. The authorised representatives of the purchaser shall have access to the supplier’s or sub-vendor’s works at any time during working hours, for the purpose of inspecting the manufacture of the materials and for testing the selected samples from the materials covered by this specification. The supplier of the sub-vendor shall provide facilities for the above.
6. Tenderers are requested to furnish in their tenders the exact location of their factory with detailed address to enable inspection by JDS if considered necessary.
7. Not less than 15 (fifteen) days advance intimation shall be given about the quantity of materials that will be ready for inspection by the JDS’s Officers/Third Agency authorised by JDS. The arrangement for inspection shall be made by suppliers in such a way that the delivery schedule is kept up. The materials shall not be despatched without instruction from TNSC.
8. **MATERIALS AND WORKMANSHIP:**
9. All materials, equipment and spare parts thereof shall be new, unused and originally coming from manufacturer’s plant to the destination stores. Those including used rebuilt or overhauled materials/equipment will not be accepted.
10. All the materials shall be of best class and capable of satisfactory operation in the tropics with humid atmosphere condition. Unless otherwise specified they shall conform to the requirement of appropriate Indian Standards. Where these are not available, IEC and American/British Standards shall be followed.
11. The equipment should be designed to facilitate inspection and repair and to ensure satisfactory operation under atmospheric conditions prevailing at site and under sudden variations of load and voltages as may be met with under working conditions in the system including those due to faulty synchronizing and short circuits within the rating of the apparatus.
12. The design shall incorporate every reasonable precautions and provisions for the safety of all those concerned in the operation and maintenance of equipment.
13. All the equipment should operate without undue vibration and with the least practicable amount of noise.
14. **RECOVERIES OF DUES:**

JDS is empowered.

* 1. To recover any dues against this contract in any bills/Security Deposit/Earnest Money Deposit due to the suppliers either in this contract or any other contracts with JDS.
  2. To recover any dues against any other contract of the suppliers with JDS, with the available amount due to the suppliers against this contract.

1. **PAST PERFORMANCE**
2. The intending tenderers shall furnish the details of various supply orders/work contracts executed by them for the past three years as on the date of tendering in the proforma enclosed to the tender specification and also proof for their satisfactory performance. The details furnished by the tenderers shall be in complete shape and if it is found that any information is found omitted, suppressed, incomplete or incorrect, the same will be taken note of while dealing with the tenderers in future. Tenders furnished by the tenderers without these accompanying details of their past performance are liable for rejection.
3. The bidders shall furnish copies of Balance Sheet, Profit and Loss Account for the preceding 3 years certified by the Auditor..
4. The bidders shall furnish documentary evidence for the constitution of the firm such as Memorandum and Articles of Association, attested copy of Registered Partnership Deed with details of Name, Address, Telephone, Electricity Board Service Connection, No. of the manufacturing plants.
5. **TYPE TESTS:**

Tenderers are requested to furnish along with tender copy of type test certificates for the Equipment/bought out components in **full shape** as conforming to relevant IS/IEC standards of latest issue obtained from a Government/Government Recognised Laboratory wherever applicable. The above test certificates should accompany the drawings of the material/equipment, duly signed under seal by the institutions who have issued the type test certificate.

Otherwise the above type test certificates shall be furnished before the offer of inspection for the first lot of materials/equipment at **no extracost to JDS and no relaxation to JDS’s Delivery clause will be given on this account.**

The above type test should have been conducted not earlier than five years (5 years) as on the date of tender opening. Non submission of above type test certificates within the stipulated time will entail cancellation of Purchase Order without any further reference to supplier.

The original type test certificates shall be furnished for verification on request. The details of type test if already conducted should be furnished in the Schedule-G.

1. **RAW MATERIALS:**

It is the responsibility of the tenderer to make his own arrangement to procure the necessary raw materials required for the manufacture.

1. **JURISDICTION FOR LEGAL PROCEEDINGS (AFTER AWARD OF CONTRACT)**

Jabalpur only.

**SCHEDULE – “B”**

**SCHEDULE OF MATERIALS AND DELIVERY PERIOD**

**(TO BE FILLED IN BY THE TENDERER)**

|  |  |  |  |
| --- | --- | --- | --- |
| Sl. | Description | Quantity |  |
| No. |  | (In Nos.) |  |
|  |  |  |  |

Company Seal Signature :

Designation :

Company :

Date :

**SCHEDULE – C1**

**DEVIATION FROM TECHNICAL SPECIFICATION**

|  |  |  |  |
| --- | --- | --- | --- |
| All technical deviations from the specification shall be filled in | | | by the |
| tenderer, clause by clause in the schedule | |  |  |
|  |  |  |  |
| Section No. | Clause No. | Deviation |  |
|  |  |  |  |

The tenderer hereby certifies that the above mentioned are the only deviations from the Technical Specification and the tender conforms to the specification in all other respects.

Company Seal Signature :

Designation :

Company :

Date :

**SCHEDULE – C2**

**DEVIATION FROM COMMERCIAL TERMS**

All technical deviations from the specification shall be filled in by the tenderer, clause by clause in the schedule

|  |  |  |
| --- | --- | --- |
| Section No. | Clause No. | Deviation |
|  |  |  |

The tenderer hereby certifies that there is **no deviation** to any of the commercial terms of this specification.

Company Seal Signature :

Designation :

Company :

Date :

**SCHEDULE – D**

**STATEMENT OF SUPPLY ORDERS EXECUTED/UNDER EXECUTION DURING THE PAST THREE YEARS AS ON THE DATE OF TENDER OPENING.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sl. | Name & | Name of | P.O. No. | Quantity | Value of | Scheduled | Actual |
| No. | Address of the | the | & Date |  | order Rs. | date of | date of |
|  | organisation | material |  |  | in lakhs | completion | completion |
|  |  |  |  |  |  | of order | of order |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
|  |  |  |  |  |  |  |  |

Company Seal Signature : Designation : Company : Date :

**TENDER NO.1**

**SCHEDULE – E**

**DECLARATION FORM**

To

**Chief Executive Officer,**

**Jabalpur shakaridugdhasanghmaryaditjabalpur**

Dear Sir,

Having examined the above specification together with the accompanying schedules, etc. we hereby offer to manufacture and supply the equipments/materials covered in this specification at the rates entered in the attached schedule of prices.

1. We hereby guarantee the particulars entered in the schedules attached to the specification.
2. In accordance with security deposit clause, Section-V of the specification, we agree to furnish security to the extent of 5% of the total value of the contract.
3. In accordance with performance guarantee clause Section0V of the specification, we agree to furnish performance guarantee to the extent of 5% of the total value of the contract.
4. Our company is not a potentially sick Industrial Company or a sick industrial company in terms of Section – 23 or Section – 15 of the sock industrial companies (Special Provisions) Act, 1985.
5. We hereby confirm that we are agreeable to TNSC’s Commercial Terms and we have not taken any deviation to the Commercial Terms of Specification.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Yours faithfully, | |
| Place | : | Signature | : |
| Date | : | Designation | : |
| Company Seal | : | Company | : |

**SECTION VI**

**TECHNICAL SPECIFICATIONS**

Purpose:

This specification covers the general requirements for the design, manufacture and testing of oil cooled type Distribution Transformer.

This specification shall be used in conjunction with all specifications and data sheets attached.

The scope of vendor covers the design, fabrication, procurement, manufacture, assembly, testing, and delivery at site including supervision of unloading of Transformer as plant site. Assisting in testing and commissioning of Transformers and putting into successful and satisfactory operation as per attached BOQ.

Scope of Service:-

Supply of the Transformers 500KVA as per specification and Data sheets**.**

**Transportation of Transformers to the Employer’s store at site should be the part of the scope.**

**Supervision of unloading of the Transformers is also to be considered in the scope. (Optional cost to be offered)**

**The items of work to be performed on all equipment and materials shall include but not limited to the following:**

**Supply, loading and transportation at site.(To Employer or Contractor’s stores).**

**Arranging to repair and/or re-order all damaged and short supply items.**

**Packing of the Equipments suitable for (all) weather conditions for proper protection.**

**Final check-up, testing and commissioning in presence of Employer’s representative**

**Trial run for thirty (30) days, rectification of defects, if any and adjustments as necessary.**

**Obtaining Employer’s written acceptance of satisfactory performance**

Exclusion:-

Civil foundation of above equipments.

# Information Required From Vendor:-

4.1 Following information shall be furnished by the supplier:-

4.1.1 Along with the offer

1. Technical particulars of various equipments as format (Annexure) enclosed with this specification.
2. G.A. drawing of Transformers.

4.2 After award of work (For approval)

1. Foundation drawings of all equipment, GA drawings Transformer and all other equipment in Auto cad format (within one week of the award of contract).
2. Bill of Materials
3. Test certificates of equipment.
4. Four copies of final drawings with one auto cad CD, operation, installation and maintenance manual shall be supplied well in advance before inspection.

# Completeness:-

* 1. It is not the intent to specify completely herein all details of the equipment. Nevertheless, the equipment shall be complete and operative in all aspects.
  2. Any material or accessories which may not have been specifically mentioned but which is necessary usual for satisfactory and trouble free operation and maintenance of the equipment, shall be furnished by the contractor without any extra charge to the Employer.

# Notes to Bidder:-

It is necessary to follow the following points while submitting the offer :

* 1. All equipment shall meet the requirement of this specification. Deviations (if any) with respect to this specifications shall clearly be indicated in the offer in Annexure under “Deviations” with page no. & clause no. of specification.
  2. Quantities of equipment indicated herein are subject to change.
  3. All technical particulars and other details as asked for shall be furnished in the specification only. Additional information, if desired by the bidder, can also be furnished separately.

# Design Criteria & Electrical System:

# Design Criteria:-

The Transformers specified here in or not, shall be designed, manufactured and tested with the latest revisions of relevant Indian or International Standards.

The design, material, construction, manufacture inspection, testing and commissioning of Transformers shall comply with all currently applicable states, regulations and safety codes in the locality where the equipment will be installed and in particular shall comply with IS or IEC Standard. The equipment shall also confirm to the latest applicable standards and code of practice. Nothing in this specification shall be construed to relieve the supplier of this responsibility.

Wherever IEC Standards are not available, the Transformers shall conform to relevant local Standard.

* All electrical components shall also conform to the latest Electricity rules as regards safety and other essential provisions.
* All electrical installation work shall comply with the requirements of the following Act/Rules/Codes as amended up to date:

1. Indian Electricity Act.
2. Indian Electricity Rules.
3. National Electric Code of Indian.
4. All relevant IEC codes of practice.
5. Regulations published by Tariff Advisory Committee.

* Nominal system supply available shall be as follows:

a) Incoming : Provided by the client.

b) Utilization : 415V, 3 Ph., 4 wires, 50 Hz.

* Transformers are intended to provide primary voltage level 33 KV, 3 Ph. 3 wire, 50 Hz to various loads of the plant and secondary voltage level 0.433 KV 3 ph. 4 Wire 50 Hz.

# Electrical System:-

The electrical arrangement of the Transformers and switchgears, control, interlocking, inter-tripping, auxiliary power supply etc. shall be as mentioned in relevant Specification and data sheet.

All components of the Transformer and switchboard shall be rated for the electrical system indicated in relevant document speciation and data sheet.

The Transformer shall be suitable for operation with system voltage and frequency variations:

a) Voltage variation : ± 10%

b) Frequency variation : ± 3%

Two extremes of voltage and frequency variations are not to be considered to coincide.

HV Side : 33 KV 3 Phase 3 Wire system 50 C/Sec.

LV Side : 0.433 KV 3 Phase 4 Wire system 50 C/Sec Neutral solidly earthed

# Basic Condition:

1. The selection of equipment shall be governed by fitness for purpose, safety, reliability, maintainability of spares and service, compatibility with specified future expansion, design margins, suitability for environment, economic considerations, and past service history.
2. The SI system of units shall be used.
3. English language shall be used for all drawings, texts and communications.

# Service Condition:

* 1. Transformers shall, in all respects, be suitable for operation outdoor site environmental and service conditions stated in Design criteria.
  2. The Maximum Ambient Temperature is 45°C, the Transformer shall be capable of continuous operation indoor at +45°C, if Temperature exceed above 45°C then Transformer shall be rated accordingly.
  3. Transformers shall in all respects be suitable for operation in typical tropical area.
  4. The atmosphere is to be considered sulphurous and dusty. The possibility of condensation, as experienced during large temperature variations in a humid environment in the tropic.

# General Information:

The Transformer shall be designed, fabrication and equipped with accessories in accordance with this specification and the applicable codes, standards indicated in sr. No 9. Materials and components not specifically stated in this specification but which are necessary for satisfactory and trouble free operation and maintenance of the equipments shall be supplied.

The design and workmanship shall be in accordance with the good electrical engineering practices to ensure satisfactory performance and service life as specified herein.

The transformers also require approval of the client or his representative at Various Stage of their manufacture such as design, selection, construction, testing, shipping etc.

# Codes and Standard:

The Transformer and components specified here in or not, shall be designed, manufactured and tested with the latest revisions of relevant Indian or equivalent British or International Standards.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IEC STANDARDS** | | | **SPECIFICATIONS** | |
| IEC 60071 | | | Co-ordination of insulation. | |
| IEC 60296 | | | Specification for unused mineral insulating oils for transformers and switchgear. | |
| IEC 60076 | | | Power Transformers. | |
| IEC 60529 | | | Degrees of protection provided by enclosures (IP Code). | |
| IEC 60038 | | | Standard Voltages | |
| IEC 60044 | | | Instrument Transformers | |
| IEC 60050 | | | International Electro technical Vocabulary | |
| IEC 60085 | | | Electrical Insulation Thermal Classification | |
| IEC 60445 | | | Identification of equipment terminals and of terminations of certain designated conductors, including general rules for an alphanumeric system | |
| IEC 60947 | | | Low-voltage Switchgear and Control gear. | |
| IS:1180, Part 1 | Distribution transformer | |
| IS:1180, Part 1 | Distribution Transformer-General & Distribution Transformer Temperature rise | |
| IS:3639 | Fittings and Accessories for Distribution Transformers. | |
| IS:335 | Insulating oil for transformers and switchgear | |
| IS:6600 | Guides for loading of oil immersed transformers. | |
| IS: 3637 | Specification for gas operated relays. | |
| IS:2026 | Distribution Transformer Insulation level | |
| IS:1271 | Classification of Insulation Materials. | |
| IS:2026 (Part-III) | Dielectric tests. | |
| IS:2099 | High Voltage Porcelain bushing screen | |
| IS:2705  (Part I & Part-III) | Current Transformers | |
| IS:3202 | Core of practice for climate proofing | |
| IS:4257 | Porcelain bushings for transformers | |
| IS: 2707 (Part 1-4) | Current Transformers | |
| IS:10028 | Installation and Maintenance of Transformers, Code of Practice | |
| IS 8478 | Application guide for tap-changers | |
| IS 10028 | Code of practice for selection, installation and maintenance of transformers. | |
| IS:648 | Non-oriented electrical steel sheets for magnetic circuits | |
| IS:1866 | Code of practice for maintenance of insulating oil | |
| IS: 694 | PVC insulated wire for voltage up to 1100 with copper conductors. | |
| IS: 3618 | Phosphate treatment of iron and steel for protection against corrosion. | |
| IS: 6005 | Code of practice of phosphate­ing of iron and steel. | |
| IS: 5 | Painting. | |
| IS: 2544 | Specifications for HV post (insulators). | |

All other relevant standards

Wherever Indian Standards are not available, the Transformer shall conform to relevant International Standard.

# Technical Specification of Transformers:

## 10.1 Scope:-

The following Specification covers the design, manufacture, inspection and testing at manufacturer’s works, packing and forwarding, delivery at site to fulfill requirements for the proposed Project.

Vender may be required to depute an Erection, Testing and Commissioning Engineer at site for erection, supervision and commissioning on man day basis.

## 10.2 General Information:-

1. Transformer shall be designed, manufactured and equipped with accessories in accordance with this Specification and the applicable Standards indicated.
2. The design and workmanship shall be in accordance with the best engineering practices, high standards of engineering design and workmanship and shall be capable of performing in continuous operation.
3. The equipment offered shall be complete in all respects. Any material and component not specifically stated in this specification and which is necessary for trouble free operation of the equipment and accessories specified in this specification shall be deemed to be included unless specifically excluded. All such component / accessories shall be supplied without any extra cost.
4. The equipment shall be designed taking into consideration the design ambient temperature as specified in specific requirements of Transformer.
5. The design and workmanship shall be in accordance with the best engineering practices to ensure satisfactory performance and service lift.
6. Transformers shall be suitable for the following ambient conditions :-

Design ambient temperature : - 45oC

Maximum humidity : - Not less than 50%

## 10.3 General Design Features:-

1. The transformer shall be outdoor, Oil cooled type, Copper wound, natural air cooled and continuous duty confirming to IP 55.
2. The Transformers shall be oil immersed conservator type and designed for natural Cooling (ONAN).
3. The Transformer shall be suitable for operation at full rated Power on all tapping without exceeding temperature rise.
4. Overloads shall be allowed within the conditions defined in the loading guide of the applicable Standard. Under these conditions, no limitations by terminal bushings, on load tap changers or other auxiliary equipment shall apply
5. It shall be possible to operate the transformer satisfactorily, up to overloads of 150% of the rated value in confirmation with the loading guide specified in IS 6600. There shall be no limitations imposed by bushing, tap changer, auxiliary equipment to meet this requirement.
6. The Transformer impedance shall be as specified to limit the fault level on the LV side as per IS 1180 (Part I). The neutral of the low voltage winding will be solidly grounded.
7. The Transformers with all accessories shall be capable of withstanding the thermal and mechanical effects of short-circuits at the terminals of any winding without adverse effect. The successful bidder shall justify their design with necessary supporting calculation. The maximum short circuit current shall be determined by computing the through fault current using the formula
8. Account shall be taken of the different forms of system fault that can arise in service, such as line to earth faults and line faults associated with the relevant system and transformer earthing conditions. The short-circuit levels will be as specified in the Data Sheet.
9. The Transformer shall be designed to suppress harmonic content, especially the third and fifth, so as to eliminate distortion in the waveform and consequent additional Insulation stress, noise on communication system and undesirable circulating currents between the neutrals at different transformer at station.
10. Transformer shall be designed for minimum no-load and Load losses within the economic limit.
11. The magnetic circuit shall be so designed that the Eddy-current and Hysteresis losses in the core are minimized. Bidders shall indicate the loss figures (Copper & Iron losses) which should comply with the loss-figures specified in Annexure.
12. The transformer design shall take into consideration the electromagnetic compatibility as per relevant standards.
13. Continuity of power supply shall be the given foremost importance and the transformer design shall be such as to provide facilities to simplify inspection, testing, maintenance, and cleaning and general repair at site. Design shall include all reasonable precautions and provisions for the safety of operating and maintenance personnel.
14. The design of Transformers shall be such as to reduce noise and vibration to the level obtained in good modern practice. The noise ratios, impedance, load losses and no-load losses subject to the Supplier's guarantees shall be within the tolerance given in NEMA Standards.
15. All mechanisms shall be of stainless steel, brass or other suitable material to prevent sticking due to rust or corrosion.
16. Steel bolts and nuts exposed to the atmosphere shall be either galvanized or zinc-  
    passivated and not leave pockets where water can collect.
17. Nuts, bolts and pins used inside the transformers and tap changer compartments shall be provided with lock washers or locknuts and 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 zinc-passivated.
18. The Transformers shall be capable of continuous operation at its rated output without exceeding the temperature rise limits above ambient temperature as below:

* In top oil by Thermometer 40oC (As per IS 1180 (Part1):2014)
* In winding by resistance 45oC (As per IS 1180 (Part1):2014)

1. Overloads shall be allowed within the conditions defined in the loading guide of the applicable Standard. Under these conditions, no limitations by terminal bushings, on load tap changers or other auxiliary equipment shall apply.
2. The Transformers shall be capable of continuous normal operation at its rated output under the following conditions:-

* Voltage variation by ± 10%
* Frequency variation by ± 3%

1. The Transformer shall be designed and constructed so as not to cause any undesirable interference in radio communication circuits.
2. Transformer shall be fitted with all standard accessories like low voltage bushing, rating plate, disconnecting cable box on the Primary and Secondary side, supporting insulators and any other accessories required for smooth operation of the transformer.
3. If any temporary fitting is fixed to protective housing of the transformer for transporting / handling purposes these shall be identified as well as instructions and illustrated drawings shall be furnished to facilitate their removal at site after erection.
4. Transformer design shall take care of protection against surge voltage.
5. Internal design of Transformer shall ensure that air is not trapped in any location.
6. The neutral terminal windings shall be designed for the highest over current that can flow through this winding.
7. The design of Transformer shall be such as to reduce noise and vibration to the level obtained in good modern practice. The noise ratios, impedance, load losses and no-load losses subject to the Supplier's guarantees shall be within the tolerance given in applicable Standards.
8. All electrical connections and contact shall be of ample cross section for carrying the rated current without excessive heating.

## 10.4 Transformer Tank:-

1. The tank shall be of manufactured from high grade steel plates of adequate thickness suitably reinforced by providing stiffeners of structural steel and electrically welded construction and fabricated . Tanks shall be hydraulically tested to ensure that they are leak-proof and subjected to vacuum test.
2. Tanks shall be of strength to prevent distortion occurring when the transformers are lifted, jacked or transported. All joint seams and fittings shall be strong and protected to prevent leakage of oil. Tanks shall be of strength to withstand, without deformation, the maximum internal pressures caused by the expansion of the oil and air/gas under service and maximum through-fault conditions. Tank covers shall be of a construction that will prevent accumulation of moisture.
   * All welded joints to be stress relieved.
   * Also the tank shall have adequate strength to withstand without any deformation during oil filling by vacuum.
3. The tank shall also be provided with two numbers grounding pads for earthing.
4. The transformer tank shall be provided with sets of bi-directional flat wheels for rolling the transformer parallel to either center lines.
5. The tank shall be provided with, jacking pads lifting lugs and pulling lug to facilitate lifting and movement of transformer filled with oil, lifting lug shall be located that safe clearance is obtained between sling attached to the lifting lug and transformer fitting without use of spreader. All heavy removable parts shall be provided with eye bolt for ease of handling.
6. The transformer top shall be provided with a detachable tank cover the cover shall be gasket using neoprene or a superior material (cork shall not be used) and bolted All gasket joints shall be below the cold oil level.
7. Lifting lugs shall be provided for removing the cover. If necessary, the surface of the cover shall be suitably sloped so that it does not retain rain water.
8. Adequate space shall be provided at the bottom of the tank for collection of sediments.
9. The Transformer base shall be designed to permit skidding of the complete Transformer unit in any direction. Pulling eyes shall be provided for moving the Transformer in either direction.
10. The material used for gaskets shall be high quality neoprene or superior material Gasket joints for the tank and manhole covers bushings and other bolted attachments shall be oil-tight and so designed that the gasket will not be exposed to the weather. If necessary suitable stops shall be provided to prevent crushing of the gaskets due to over tightening.
11. Tank shall be provided with a pressure release devices which shall operate at a pressure below the test pressure for the tank and radiators. The device shall be rain-proof after blowing and shall be provided with a device visible from ground to indicate operation. An equalizer pipe connecting the pressure relief device to the conservator shall be supplied.
12. Materials 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.
13. Inspection covers of manholes of sufficient size shall be provided for access to leads, windings, bottom terminals of bushings and taps.
14. Oil sampling taps shall be provided with flanged end valve at bottom to collect sample of oil from the tank for testing.
15. To facilitate the oil filtration by streamline filter, suitable inlet and outlet taps with flanged end valves at the bottom and at the top of the tank on diagonally opposite corners shall be provided. The valve at the bottom may be used as drain valve and shall be flanged connection at bottom most location of the tank to ensure complete drainage of transformer oil.
16. Thermometer pocket at top for oil temperature measurement by liquid thermometer shall be provided.
17. Marshalling kiosk boxes, etc. shall be weatherproof having a degree of protection to IP 55.
18. Radiators or ribs shall permit every part to be cleaned by hand and shall be suitably braced to protect them from mechanical shock. Each radiator bank shall be detachable type and provided with oil isolating valves at either sides. Bends in tubes shall be smooth and any clearance gaps where they join the tank shall be filled effectively filled.
19. The Transformer tank shall be fitted with a double diaphragm type of explosion relief vent at the top with equalizer pipe connection to oil conservator.
20. Explosion relief vent should be located on the top cover and directed in such a way that on bursting of diaphragm; the oil forced out will not fall in any of the auxiliary equipment of the transformer and the other electrical equipment in the vicinity.

## 10.5 Core and Coil:-

1. The core shall be built of high quality, low loss, non-ageing high permeability grain-oriented, electrical grade silicon steel sheets with both side coated. The assembly shall be accurately cut and stacked. Joint shall have the least possible air gaps and shall be rigidly clamped to produce an assembly with minimum core losses and noise generation.
2. The silicon sheets lamination with very low magnetization losses and annealed to relieve stresses and develop excellent magnetic properties.
3. The core shall be braced to withstand a bolted fault on the secondary without mechanical damage. Core bracing shall also prevent any transformer damage that might take place during transportation and positioning.
4. The core clamping frame shall be provided with lifting eyes for the purpose of taking and inspecting the core with windings mounted thereon and shall have ample strength to take the full weight of the core and winding assembly. The core assembly shall be electrically connected to the transformer tank for effective core earthing.
5. Transformers shall be factory filled with insulating liquid prior to shipment unless the size and consequential weight of the unit precludes transportation whilst fully assembled. In this case, an inert gas filling shall ensure the integrity of the insulation during transportation and the insulating liquid shipped separately. Insulating liquids shall be certified not to contain PCBs.
6. Transformer construction shall be such that the value of the internal pressure in service will not exceed approximately 0.35 kg/cm² for a range of top oil temperature from -5° to +90° C.
7. Degree of enclosure protection shall be IP55 minimum.
8. All insulating materials shall be of proven design. Coils shall be so insulated that voltage stresses are minimum.
9. The windings shall be from electrolytic copper conductor of high conductivity of insulation. The material used for winding insulation shall not shrink, disintegrate, carbonize or become brittle under the action of hot oil. The windings shall be duly sectionalized, similar coils shall be connected by accessible joints braced or welded and finished smooth. Care shall be taken while paper covering of the copper conductors to avoid damage to paper layers due to sharp edge etc. completed winding shall be subjected to shrinkage treatment before assembly on the core.
10. The windings shall be suitable for withstanding the short circuit current, in the event of fault, without damage. Adequate insulation shall be provided between the windings and cores/tanks wherever the specified minimum clearance in oil is difficult to obtain.
11. Coil assembly shall be securely positioned with spacers, pressed board cylinders, barriers and shall be so arranged as to allow free circulation of the oil.
12. The joints carrying current shall be riveted, soldered and brazed. No joints shall be made in the disc of winding.
13. All leads from the windings shall be suitably supported to prevent damage from vibration or short-circuit stresses.
14. The core and coil assembly shall be rigidly braced and fixed on to the tank so that no shifting or deformation occurs during transport and installation or during short circuits.
15. The finally assembled core with all clamping structure shall be free from deformation and shall not vibrate during operation.
16. The core clamping structure shall be designed to minimize eddy current loss.
17. The end turns on the high voltage windings shall have reinforced insulation to withstand any of the voltage surges likely to occur during switching or any other abnormal system condition.
18. The tapping shall be provided at such locations on the winding so as to preserve, as far as possible, the electromagnetic balance of the transformer at all voltage ratings.

## 10.6 Internal Earthing:-

1. All internal metal parts of the transformer, with the exception of individual laminations, core bolts and their individual clamping plates shall be earthed.
2. The top clamping structure shall be connected to the tank by a copper strap. The bottom clamping structure shall be also earthed.
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 bushing. A disconnecting link shall be provided on transformer tank to facilitate disconnections from the ground for IR measurement purpose.
4. Additional Neutral shall be brought out of LV box for solidly earthing

## 10.7 Tappings:-

1. Off Load Tap Changer shall be provided on the high voltage winding.
2. The Transformer shall be capable of delivering its rated output at any tap position.
3. The winding including the tapping arrangement shall be designed to preserve the electromagnetic balance between HV and LV winding at all voltage ratios.

## 10.8 Insulating Oil:-

1. The insulating oil shall conform to the latest revision of IS: 335 properly inhibited for prevention of sliding.
2. The necessary first filling (after filtration) of oil, shall be supplied for the transformer. 10% excess oil shall also be provided (to take care of wastes) in non-returnable containers suitable for outdoor storing.

## 10.9 Transformer Bushing:-

1. The transformer bushing shall be of epoxy or oil filled porcelain type. The bushing shall have continuous metal stud or tube from one end to other end making intimate contact with either solid or liquid dielectric at all point throughout the length. Transformer bushings shall conform to the requirement of the latest revisions of IS: 2099 and IS: 3347.
2. All porcelain used in bushings shall be of best electric quality , sound free from defects and thoroughly vitrified so that glaze is not depended upon for insulation and in addition shall be homogenous, nonporous glazed and shall be smooth and of uniform brown shade and completely covered the exposed parts of insulation and free from blisters, burns and other defects.
3. Stresses due to expansion and contraction in any part of the bushing, shall not lead to deterioration.
4. Fittings made of steel or malleable Iron, shall be galvanized. Each bushing shall be so coordinated with the transformer insulation that all flash over will occur outside the tank.
5. The bushings shall be located so as to provide adequate electrical clearances between the bushings and also between bushing and ground.

## 10.10 Terminal Arrangement:-

1. The transformer shall be provided with air insulated cable box or chamber suitable for cable termination as specified on HV and LV side. The HV terminals shall be brought to an air-insulated disconnecting (HV Cable Box) chamber suitable for terminating 1R x 3C x 300 Sq.mm XLPE, 33 KV and LV terminals shall be LV Cable Box chamber and shall be capable of termination of 3R x 3.5C x 300 Sq.mm XLPE Cable.
2. The cable box shall be weatherproof in construction, with provision of suitable gaskets on the joints and covers, suitable canopy shall be provided on the boxes to prevent entry of rain water through the joints.
3. Cable boxes shall have both front cover and gland plate removable and arranged to allow adequate access to the top of the gland plate.
4. Cable termination accessories (other than the cable lugs) including stress relieving devices and cable glands, shall be provided by the **Purchaser** unless specified otherwise on the data sheet. Terminals shall be marked in accordance with the connection diagram on the rating plate. The characters indicating the terminals shall be engraved or etched on stainless steel plate, securely fixed to the cable box, tank or tank cover.
5. The necessary inspection cover shall be provided on the cable boxes and disconnecting chambers so as to facilitate access to the bushing connection.
6. The cable boxes shall have all standard facilities suitable for termination if more than one termination are specified and accommodate all cable joint fittings. Links shall be provided of suitable length for easy termination of XLPE/PVC cables/Copper / Aluminum conductor as mentioned in the data sheet
7. In case of a three phases and neutral arrangement, all four terminals shall be provided in a single compartment. The star point earth terminal shall be an external bushing.
8. Cable box shall have a drain plug to enable the filling medium removal quickly and earthing pads shall be provided on cable box.
9. The disconnecting chamber shall be air-insulated. Bushings, drain breather, removable covers, shall be provided for the disconnecting chamber, Plates through which high current carrying conductors pass, shall be non-magnetic.
10. Phase to phase and phase to ground clearances within the camber shall be as per relevant – IS.

## 10.11 Neutral Terminal:-

1. The size of the neutral bushing shall be as that of phase bushings. On the LT side, two bushings shall be provided for neutral, one through top side wall bushings and other connection to earthing and Neutral bushing only applicable for 3 phases 4 wire system only.
2. Earth portion of the Cable End Box shall be provided with 2 Nos. grounding pads suitable for Purchaser's 100 x 10 mm Copper flat.

## 10.12 Accessories:-

The following accessories shall be provided with transformer.

1. **Radiators :-**

Radiators shall be plate type. Each radiator shall be provided with air releasing plug, top & bottom isolating valve, lifting lugs, oil drain valve or plug the radiator shall withstand the pressure tests specified for the tanks to which these are fitted. Each radiator bank shall be provided with earthing plug

Radiators or ribs shall facilitate cleaning and painting. Bends in tubes shall be smooth and any clearance gaps where they join the tank shall be effectively filled.

1. **Conservator Tank :-**

The conservator tank shall be connected with the main tank by a pipe through Buchholz relay (having separate sets of contacts for alarm and tripping) with Isolating valves at both ends.

The conservator shall be filling hole at top and drain plug at bottom and also shall be provided with vent

The conservator tank shall be provided with dial type (magnetic) level indicator which is visible from ground level and fitted with low oil level alarm contact on one face and plain prismatic oil level gauge on the other face which shall be clearly visible from ground level.

A weather proof dehydrating breather with silica gel shall be fitted to conservator The Breather shall be designed to ensure that external atmosphere is not in contact with the dehydrating agent The Transformer will supply with first filling dehydrating agent.

1. **Marshalling Box :-**

On transformers rated above 1.0 MVA a free-standing locally mounted marshalling box shall be provided. On transformers rated 1.0 MVA and below the marshalling box shall be mounted on the transformer tank.

A dust and weather proof marshaling box of sheet steel construction, suitable for outdoor use shall be provided to accommodating all control, protection and indicating equipments and terminal box.

Wiring from alarm and control equipments shall be carried out in conduits and terminated in the cabinets all wiring shall be carried out by using 2.5 Sq.mm stranded copper conductors.

The marshalling box shall be provided with a Blank detachable plate for mounting the control cable glands. The control cable glands are not within the scope of this specification.

The marshalling box shall have glass front for reading the temperature indicators from outside. Degree of Protection IP 55.

The marshalling box shall include the following:

* All required timers and relays
* Marshalling terminals for transformer mounted instrument, gauges, etc.
* Oil temperature and winding temperature indicators
* Anti-condensation heater, complete with ON/OFF switch and thermostat.
* Compact fluorescent light with door switch
* All the terminal blocks in the control cabinets shall be of stud type and adequate number of spare terminals shall be provided in the box.

Terminals for each service shall be separated by segregation plates.

1. **Gas and Oil Actuated relay (Buchholz Relay) :-**

* A double float type Buchholz relay as per specified standards shall be provided if specified in data sheet. All gases evolved in the transformer shall collect in this relay. Buchholz relay shall be provided for detecting internal faults in the transformer prior to and in the event major breakdown
* The relay shall be provided with a test cock suitable for a flexible pipe connection for checking its operation. A 5 mm copper pipe shall be connected from the relay test cock to a valve located about 1.25 M above ground level to facilitate sampling with the transformer in service.
* The relay shall be provided with two electrically independent ungrounded contacts, one for alarm element operative on gas accumulation (collection) and the other for tripping element operative on the surge in the oil in the event of heavy faults inside the transformer tank or on sudden rise of pressure. These contacts shall be wired up to the transformer marshalling box.
* The relay shall be provided with shut-off valves on the conservator side as well as the tank side.

1. **Pressure Relief Valves :-**

A sudden pressure device shall be provided on units rated above 1 MVA for tripping the transformer on internal faults. On units rated 1 MVA and below a diaphragm type pressure relief device may be fitted as an alternative. In the case of conservator tank type transformers a two-element Buchholz unit providing gas accumulation and surge protection shall also be fitted.

1. **Termination and Wiring :-**

* When terminations for bus duct are specified on the data sheet, provision shall be made for the support and fastening of the ducting. The transformer terminals shall provide a sufficient pre-drilled contact area for accepting flexible connectors, and provision shall be made for access for convenient making off, or disconnection of, the connections while the duct remains in place.
* When air insulated cable terminal boxes are specified on the data sheet access covers shall be full height, bolted and gasketed. An earthing bus and removable bottom undrilled gland-plate shall be provided. Clearance between the termination and the gland-plate shall allow for the bending of cables and the use of stress relieving devices. Suitable pads shall be provided for supporting the terminal boxes, cable supports will be supplied by the purchaser.
* On transformers rated above 1.0 MVA all secondary wiring from current transformers, Buchholz relay, pressure relief device, and temperature indicators shall be brought out by means of armoured cable for site connection to a freestanding, locally mounted marshalling box. Sufficient length of this cable shall be provided which shall be coiled up for site installation. Cable glands shall be fitted at the transformer end. Transformers rated 2.0 MVA and below shall have all secondary wiring terminated in a suitable enclosure.
* For transformers rated above 1.0 MVA terminal compartments, auxiliaries enclosures, and boxes shall be mounted at a height of at least 1.0 meter above the foundation level. They shall be of weather-proof construction (IP-55) with canopy. For transformers rated 2.0 MVA and below a minimum distance of 0.575 meters between the base of any terminal compartment or auxiliary enclosures and the foundation level shall be observed.
* Cable entries shall be from below unless otherwise specified on the data sheet. Purchaser shall make provision for cable supports below the terminal boxes to support cables rising from ground level.
* Alarm/trip wiring, current transformer wiring, and all alarm wiring shall have copper conductors of the manufacturer’s standard sizing, (subject to client/consultant's approval) and shall be run in armored cable, to the terminal block inside the marshalling box.
* Wiring shall be crimped using self-insulated compression spade-type terminal blocks which shall be suitably identified. Conductors shall be fitted with sleeve ferrules bearing the same identification as the terminal to which they are connected. Minimum conductor size shall be 2.5 mm² (except for electronic signal wiring).Cable’s wires shall be identified at the terminations by numbered plastic ferrules.
* Not more than two wires shall be connected to one terminal.10% spare terminals shall be provided.
* Auxiliary supply to all indications, alarms and trip contacts provided shall be suitable for operation on a suitable A.C/D.C system.
* All devices and terminal blocks within the marshalling box shall be clearly identified by symbols corresponding to these used on applicable schematic or wiring diagram.

## 10.13 Name Plates and labels:-

* The manufacturers rating plate shall be of stainless steel and show all information in accordance with the standards specified.
* The impedance value stamped on the nameplate shall be the actual measured value obtained during testing.
* In addition to the standard nameplate referred to above, each transformer shall be identified with a transformer identification plate.
* For transformers rated above 1.0 MVA plates shall be machine engraved phenolic, with black figures on a white background. For transformers rated 1.0 MVA and below etched stainless steel labels shall be used and shall be securely attached with stainless steel self-tapping screws.
* Identification plate information shall be defined by the Client. All loose items such as conservators and cooling fins shall also be tagged with Client’s transformer tag number.
* Danger/Warning labels shall have white lettering on a red background and shall be in English and Hindi with all other labels shall have black lettering on a white background. All labels shall be fixed by screws or rivets.

# Metal Treatment and Painting:-

1. All steel surfaces shall be thoroughly cleaned by sand blasting or chemical agents as required to produce as smooth surface. Free of scale, rust and grease.
2. All paints shall be carefully selected to withstand tropical heat, rain, etc. The paint shall not scale-off or crinkle or be removed by abrasion due to normal handling.
3. Tanks recoated inside with oil and heat resistant paint. The external surfaces shall be given a coat of high quality Zinc chromate primer followed by two coats of high quality Epoxy paint as per IS: 5- 1961.
4. All steel work shall be phosphate in accordance with the following procedure and in accordance with relevant standards.
5. Oil, Grease, Dirt and Swarf shall be thoroughly removed by emulsion cleaning.
6. Rust and scales shall be removed by pickling with dilute acid followed by washing with running water, rinsing with slightly alkaline hot water and drying.
7. After phosphating, through finishing shall be carried out with clean water, followed by final rinsing with dilute dichromate solution and oven drying.
8. The phosphate coating shall be sealed by the application of two coats of ready mixed, stoving type zinc chromate primer. The first coat may be “flashing dried” while the second coat shall be stoved.
9. After application of the primer, two coats of finishing powder coating Light Grey Shade 631 as per IS 5. Paint shall be applied with each coat followed by stoving in the dust free atmosphere. The second finishing coat shall be free from imperfection like pinholes, orange pills etc. The sample sheet for the finishing paint shall be approved by Architects / Client.
10. Each coat of primer and finishing paint shall be of a slightly different shade to enable inspection of the painting.
11. The final finished thickness of paint film on steel shall not be less than 100 microns and shall not be more than 150 microns.
12. Finished painted appearance of equipment shall present am aesthetically pleasing appearance, free from dents and uneven surface.

# Tolerance on Performance Guarantees:-

1. The permissible tolerances on the performance guarantee are as per IS 2016 (Part-I)
2. Vendor shall guarantee for design, materials workmanship and performance for a period of 12 months from date of handing over the system.

# Rejection:-

Client/Consultant may reject any transformer if during tests or services any of the following conditions arise:

1. Voltage ratio at no load not within the limits of tolerance over the guaranteed value.
2. No load and load losses exceeds the guaranteed value by 10% or more.
3. Impedance voltage at principal tapping not within the limits of tolerance over the guaranteed value.
4. Transformer fails during any of the tests.
5. Transformer is proved to have been manufactured not in accordance with the agreed specification.
6. The fixed losses at normal ratio are not within the specified tolerance limits as specified in IS 2026 (Part-I) & as guaranteed by manufacture.
7. Commissioning of the project is likely to be delayed by rejection of a transformer the clients reserves the right to accept the rejected transformer and take it into service until the supplier replacement of transformer is made available. Transporting the rejected and replacement transformer as well as installation and commissioning of both the transformers shall be the venders cost.
8. Vendor shall repair or replace the transformer within a reasonable period to the client’s satisfaction at no extra cost to the Buyer.

# Dimensions:-

The overall dimensions of the transformer shall be indicated along with the offer.

# Tests:-

* 1. **Routine Test - As per IS.**

During manufacturer and on completion, transformers shall be subjected to the routine tests as laid down in IS: 2026-1977 as amended upto date. These includes:-

* Resistance measurement of all windings at the rated voltage connection on all taps.
* Ratio tests at the voltage connection on all taps.
* Voltage vector Relationship and Polarity( Vector Group Test)
* Impendence and load loss at rated current on the rated voltage and connection on all taps.
* No-load loss and current at 90, 110% of the rated voltage.
* Insulation resistance tests in windings, auxiliary devices, core and tank.
* Induced Over voltage test
* CT Polarity test , earth continuity test , and oil die electric test
* Temperature rise test if demanded
* All tap-changers, alarm/trip contacts, sudden pressure sensors, current transformers and all other accessories shall be electrically and functionally tested
* Extra charges if any for carrying out this test shall be separately indicated along with the offer In addition, the following tests shall be performed on each transformer:
* After fabrication, each tank fitted with all valves, covers, etc. shall be tested for leaks with normal head of liquid plus 0.352 kg/ Sq cm for a period of 12 hours. If any leak occurs, the test shall be conducted after all leaks have been repaired.
* The tank shall be subjected to vacuum as per CBIP specifications.
  1. **Type Tests**

Typical type test certificates shall be furnished for approval before dispatch of equipments.

The transformers shall be demonstrated as capable of performing satisfactorily the supplier guarantee. All test required by the specification including repeated test and inspection that may be necessary owing to the failure to meet any tests specified , shall be carried out.

If the transformer fails to pass the tests specified the engineer shall have the option to reject the unit. Additional tests shall be made to locate the failure and after rectification, all tests shall be repeated to prove that the rebuilt transformer meets the specification in all respects.

* 1. **Test Certificates**

Three (3) copies of test certificates for type / routine test for transformer including for bought-out items like relays, valves, etc. shall be furnished to the Buyer, along with complete identification of data including serial number of the transformer.

The Client / Consultant will depute his representative to inspect the equipment and witness any (or) all the tests.

# Transformer Fitting:-

ON Load tap changer by switching specified tapping in data sheet.

1. Conservator with drain plug, filling plug sump and drain valve with shut off valve on pipe connection between transformer tank and conservator to permit removal of conservator.
2. Explosion vent valve , Double diaphragm type with sight glass
3. Air relief valve
4. Double float Buchholz relay for the transformers with shut off valves on both side of relay with alarm and tripping contact for main transformer only.
5. Inspection cover on tank of the transformer
6. Filtering connection with required valves.
7. Oil sampling valve, oil drain valve, Filtering valve shall be provided with transformer with required quantity.
8. Grounding terminals, two for the transformer tank for connection of clients grounding grid.
9. Lifting lugs for the top cover of tanks, cores and coils and for complete transformer.
10. Pulling lugs for pulling the transformer parallel to and at right angles to the axis bushing.
11. Diagram and rating plate
12. Bidirectional rollers suitable to move the transformer in direction of both the axis perpendicular to each other.
13. Thermostat pockets with dial type thermostats for top oil temperature indicated Oil temp indicator ( 150 mm diameter dial ) fitted with ungrounded alarm contacts , maximum reading pointer and resetting devise, the thermostat shall be clearly visible from ground level as specified
14. Winding temperature indicators with trip & alarm contact ( 150 mm diameter dial )
15. Weather proof marshalling box.
16. Oil level indicator with minimum marking.
17. Weather proof dehydrating breather with activated alumina or silica gel as dehydrating agent
18. First Filling oil with 10% extra oil for top up & will be after filtration.
19. Base channel with towing holes/lugs.
20. Air release hole with plug on radiators.
21. Double gland type air insulated disconnecting chamber suitable for 1R x 3C x 300 sqmm XLPE 33 KV cable.
22. Double gland type air insulated disconnecting chamber suitable for LT Cables.
23. Marshalling box to house WTI/OTI with double compression glands duly wired up from accessories to the box.
24. Other items as per IS and the spares as in data sheet shall be quoted along with transformer offer.

# Packing

Packing should be of high quality to avoid any damage of the equipments during transit.

# Drawings/Details/Documents

A general outline drawing of each transformer showing dimension, net weights and shipping weights, quantity of insulating oil, etc shall be furnished with the offer.

Sectional view showing the general construction features of the transformer, cores, coils, tap changes, mounting and marshalling box etc.

After acceptance of the offer, the Vender shall furnish the following drawings for approval:-

* General arrangement drawing showing the plan, front elevation , side elevation, foundation plan, complete with details of bill of materials, detailed dimensions, net weights, details/drawings of HV/LV terminals, cable boxes, LT trunking arrangement clearances between HV/LV terminals and ground , quantity of insulating oil etc. Dimensions shall be marked in Metric units.
* Drawings of each bushing
* Name plate drawing with terminal marking and connection diagram.
* Control and wiring diagram showing polarity and vector group pf windings, current transformer and bushing potential devise polarities and connection , and also for marshalling boxes. With interconnection details of cable sizes & number of cores required between various equipment such as relays, marshalling box, etc.
* Drawing showing construction and mounting of control cubicles.
* Four copies of all final approved drawings shall be furnished by the seller before dispatch of the equipment.
* Any other relevant drawing and data necessary for operation and maintenance purpose shall be furnished.
* Three sets of instruction manual of transformer, its various fittings and gauges (the manual shall clearly indicate the installation methods, check-ups and tests to be carried out before commissioning of the equipments) shall be furnished to Buyers. One set of the above shall be submitted to Architects.

# Deviation

Deviations from this specification are only acceptable where the Vender has listed in his quotation the requirements he cannot or does not wish to comply with and the Client has accepted, in writing, the deviations before the order is placed. If the vender is also to offer alternatives resulting in technical or price advantages he should submit a supplement to the main quotation.

In the absence of a list of deviations, it will be assumed by the client that the Vender complies fully with this specification.

# Data Sheet for Transformer

# 1.6 MVA Transformer

| **S N** | **DESCRIPTION** | **SPECIFICATION** |
| --- | --- | --- |
|  | Service | Distribution |
|  | Type | Oil Filled , Outdoor, Double wound, core type |
|  | Ratings | 500 KVA |
|  | Winding Material | Copper |
|  | Voltage Ratio (OFF Load) | 33/0.433 KV |
|  | Vector Group | Dyn11 |
|  | Connection (HV / LV) | Delta / Star |
|  | Reference Standard | As per IS 1180 (Energy Efficiency Level-2) |
|  | **Electrical System** | |
|  | HV Side | 33 KV , 3 Phase ,3 Wire ,50 Hz |
|  | Supply Neutral | Solidly Earthed |
|  | LV side | 415 V , 3Phase , 4 Wire, 50 Hz |
|  | Supply Neutral | Solidly Earthed |
|  | Insulation | Class A Uniform |
|  | Tapping on HV side | ­10% to + 10% Taps in Steps of 1.25 % (Typ) |
|  | Tapping Method | Off Load Tap changing |
|  | Parallel Operation | Yes |
|  | Impedance | As per IS 1180 |
|  | Terminal HV | 33 KV , 1R x 3C x 240 Sq.mm XLPE |
|  | Terminal LV | 3R x 3.5C x 300 Sq.mm XLPE |
|  | Neutral |  |
|  | Star Point | 100 x 10 mm Copper bar (x2) |
|  | Degree of Protection | IP 55 |
|  | Noise Level | 75 dB(A)-1 Meter(Maximum) |
|  | Type of Protection | WP |
|  | Area Classification | Non-Hazardous |
|  | Cooling method | ONAN |
|  | Mounting | Rollers on Floor |
|  | Conservator | Yes require |
|  | Buchholz Relay | Yes require |
|  | Dehydrating Breather | Yes require |
|  | Filter Valves | Yes require |
|  | Pressure Relief Valve | Yes require with 1 NO + 1 NC contacts |
|  | Cable chamber | HV yes  LV yes |
|  | Jacking Lugs | Yes require |
|  | Thermometer Pocket | Yes require |
|  | Oil temperature Indicator | Type :-Indication , Alarm & Trip with 2 NO |
|  | Winding temperature Indicator | Type :-Indication , Alarm & Trip with 2 NO |
|  | Tank/Conservator | Drain Valve & oil level gauge require |
|  |  |  |
|  | Winding Materials | Electrolytic Copper |
| 38. | Specification applicable | Covered in specification |
| 39. | Ambient Design Temp. | 45° C |
| 40. | Duty cycle | Continuous |
| 41. | **Terminal Arrangement:** |  |
| 41.1 | H.V. | Cable Chamber (outdoor) to receive 1R x 3C x 240 Sq.mm 33 KV, XLPE. |
| 41.2 | L.V. | Cable Chamber (outdoor) to receive 3R x 3.5C x 300 Sq.mm 1.1 KV, XLPE |
| 41.3 | Neutral | Bushing |

Technical Particulars to be furnished by Vendor for Transformers:

| **S N** | **DESCRIPTION** | **VENDOR DATA** | |
| --- | --- | --- | --- |
| 1. | Vender Type / cat No. |  | |
| 2. | Outline Drawing No. |  | |
| 3. | Serial No. |  | |
| 4. | Flux Density | Telsa | |
| 5. | Losses as per ECBC norms |  | |
| 5.1 | No Load |  | |
| 5.2 | Full Load |  | |
| 6. | Exact Turns Ratio ( Rated Volts ) |  | |
| 7. | Regulation | At Unity PF | At 0.8 PF |
|  | At 100% Load |  |  |
|  | At 75% Load |  |  |
|  | At 50% Load |  |  |
| 8. | No Load Current ( Magnetising ) | Amps | |
| 9. | Impedance Voltage | % | |
| 10. | Impedance Voltage Tolerance | ± % | |
| 11. | X/R Ratio |  | |
| 12. | Inrush Current | Amps for Secs | |
| 13. | Efficiency | At Unity PF | At 0.8 PF |
| 13.1 | At 100% Load |  |  |
| 13.2 | At 75% Load |  |  |
| 13.3 | At 50% Load |  |  |
| 14. | Noise Level |  | |
| 15. | Resistance per Phase (Cold) LV | Ohms | |
| 16. | Resistance per Phase (Cold) HV | Ohms | |
| 17. | Insulation level of windings HV/LV |  | |
|  | a) Impulse full wave. |  | |
|  | b) Separate source voltage test. |  | |
|  | c)Induced voltage over test |  | |
| 18. | Temperature rises of Oil/WDG by thermometer / Resistance method over specified ambient temp. of 45°C at principal tap. | 40/45°C | |
| 19. | Weights |  | |
|  | Weight of core & windings | Kg | |
|  | Tank & Fitting | Kg | |
|  | Coolant | Kg | |
|  | Total Weight | Kg | |
| 20. | Oil Quantities |  | |
|  | Tank | Litres | |
|  | Conservator | Litres | |
|  | Disconnecting chamber | Litres | |
| 21. | Dimension |  | |
|  | Length | mm | |
|  | Width | mm | |
|  | Height | mm | |
| 22. | Thickness |  | |
|  | Wall | mm | |
|  | Base | mm | |
|  | Cover | mm | |
| 23. | Paint Shade | Epoxy 631 of IS:5 | |

# Approved makes of Materials:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S N** | **DESCRIPTION** | **PREFERABLE MAKE** | | |
| 1. | ON LOAD TAP CHANGER | OLG | CTR | ESSANR |
| 2. | CTs & PTs (Resin Cast) | AE | KAPPA | KALPA |
| 3. | INDICATINGLAMPS/PUSH BUTTONS | SIEMENS | SCHNEIDER | TECKNIC |
| 4. | INDICATING METERS (ANALOG) | RISHAB | AE | IMP |
| 5. | MCBs | SIEMENS | SCHNEIDER | LEGRAND |
| 6. | MCCBs | SIEMENS | SCHNEIDER | L & T |
| 7. | CONTACTORS/OL RELAYS | SIEMENS | SCHNEIDER | L & T |
| 8. | SELECTOR SWITCHES | SIEMENS | SALZER | KAYCEE |

# Transformer - Bill of Quantities:

|  |  |  |  |
| --- | --- | --- | --- |
| **S N** | **DESCRIPTION** | **UNIT** | **Qty** |
| **A** | **TRANSFORMER :** |  |  | |
| 1.0 | SUPPLY & DELIVERY, OF 500 KVA 33 KV/ 0.433 KV OUTDOOR TYPE , IP 55 ,OIL NATURAL AIR NATURAL (ONAN) DITSRUBUTION TRANSFORMER (LEVEL-2) AS PER IS :1180 | Nos. | 1 | |

|  |  |
| --- | --- |
| **Important: -** | |
| 1. | Please Tick (¨) the make of material considered in tender. |
| 2. | Detail submittals in the form of catalogues specification sheets, and samples were called for, shall be submitted one week from the date of order and approvals shall be obtained on the type of accepted make before procurement are made. |
| 3. | Out of the approved makes of materials mentioned above, the make of materials to be used on the work shall be as decided by the Consultant/Client jointly. |
| 4. | In respect of materials for which approved makes are not specified above, these will be of makes to be decided by the consultant and as per sample approved before procurement. |
| 5. | Equipments approved and supplied shall have local servicing facilities available in the region. |

* **Preamble to Schedule of Quantities:**

1. All items of work mentioned in the Schedule of Quantities shall be read and executed strictly in accordance with the description of the item in the Schedule of Quantities, equipment schedule/ Data sheet ,drawing and standard specifications read in conjunction with the appropriate IS and conditions of contract.
2. The rate for each item of work included in the bill of quantities shall unless expressly stated otherwise include cost of:-

All materials, fixing materials, accessories, hardware, operations, tools, equipment, consumables, civil works wherever involved and incidentals required in preparations for in the full and entire execution and completion of the work called for the item and as per specifications and drawings completely.

* Wastage on materials and labour.
* All taxes, duties., including, sales tax, transit insurance, packing and forwarding charges, loading , transportation at site in supplier scope as per good manufacturing practice and recognized principles.
* Octroi if any, receiving, unloading handling, hoisting, to all levels. Setting and fixing in position, disposal of debris and all other labour necessary in accordance with client scope as per good practice and recognized principles.

+

* Liabilities, obligations and risks arising out of conditions of contract.

1. All requirements of system whether such of them are mentioned in the item or not the specifications and drawings are to be read as complimentary to and part of the schedule or quantities and any work called for in one shall be taken as required for all.
2. In the event of conflict between the bill of quantities and other documents, the most stringent shall apply and interpretations of the Architect shall be final and binding.
3. No change in unit rate shall be allowed for any change in quantity or for any other reason whatsoever.
4. Supply of materials shall mean supply of materials at site. The rate for supply shall include all taxes, insurance, packing and forwarding charges, transportation at site.
5. The supplier shall submit the Schematic diagrams, fabrication drawings with details of equipment wiring diagrams etc. to Client / Consultant for approval prior to supply / commencement of such works. The approval of these drawings will be general and will not absolve to supplier of the responsibility of the correctness of these drawings. At least four copies of the approved drawings supplied to Client/Consultant for their distribution to various agencies at site at no cost to client.
6. Any error in description if in quantity or omission of items from the supplier shall not vitiate this contract but shall be corrected and deemed to be a variation required by Client/consultants.
7. The tender shall take into account the expenses of pre-commissioning tests to be conducted as per specification of the complete installation with clients licensed agencies.

**(Supplier) (Employer)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **PRICE BID (For design and supply) (TO BE FILLED IN BY THE TENDERER) -01** | | | | |  |
| S.NO. | DESCRIPTION | QTY | RATE | AMOUNT | AMOUNT IN WORDS | REMARK |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |

Company seal Signature:

Designation:

Company:

Date:

**NOTE:**

1. Rates quoted shall be both in Words & Figures.
2. Rate are to be quoted inclusive of all taxes, packing, forwarding, insurance and transportation FOR dairy plant Jabalpur..
3. Price schedule should be placed inside ENVELOPE ‘B’ (Price Bid) only.
4. In case of discrepancy between prices quoted in words and in figures, lower of the two will be taken for evaluation.
5. Evaluation will be done all inclusive for supply, erection and civil works.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **PRICE BID (For INSTALLATION TESTING AND COMMISSIONING) (TO BE FILLED IN BY THE TENDERER) -02** | | | | |  |
| S.NO. | DESCRIPTION | QTY | RATE | AMOUNT | AMOUNT IN WORDS | REMARK |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Company seal Signature:

Designation:

Company:

Date:

**NOTE:**

1. Rates quoted shall be both in Words & Figures.
2. Rate are to be quoted inclusive of all taxes, packing, forwarding, insurance and transportation FOR dairy plant Jabalpur..
3. Price schedule should be placed inside ENVELOPE ‘B’ (Price Bid) only.
4. In case of discrepancy between prices quoted in words and in figures, lower of the two will be taken for evaluation.
5. Evaluation will be done all inclusive for supply, erection and civil works.