MAHAVITARAN
Maharashtra State Electricity Distribution Co. Ltd.

MATERIAL MANAGEMENT CELL
MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD.
Tender No. MMC/T-HTM-01/0219
Date:

BID NOTICE

The Chief Engineer, Material Management Cell (MMC), on behalf of Maharashtra State Electricity Distribution Company Limited (the Purchaser), hereby invites sealed bids from eligible bidders for procurement of 11KV, 22 KV/0.433 KV, 16 KVA Three Phase Distribution Transformers with Energy Efficiency Level II as per IS 1180:2014 under HVDS. Entire bidding document is available online on http://www.works.mahadiscom.in/eTender/etender as per date indicated below. Any changes in the Bid Schedule, corrigendum etc. shall also be notified via MSEDCL's website. Prospective bidders are therefore requested to regularly check the website for any updates.

Tender No. MMC/T-HTM-01/0219

Estimated Tender Cost: Rs. 165.15 Crores

Tender Fee: Rs. 25,000.00 + 18% GST

The bidder should submit non-refundable Bid Fee of Rs. 25,000.00 + 18% GST paid through online payment only, prior to the dead line for submission of bids as per the procedure led by the MSEDCL.

Earnest Money Deposit: The bid must be accompanied with EMD @ 0.5% of estimated tender cost for an amount equal to Indian Rs. 82.58 Lakhs (Rs. Eighty Two Lakhs Fifty Eight Thousand only). The EMD shall be denominated in Indian Rupees only. The EMD can be paid online or should be submitted in original in the form of a Demand Draft or an Unconditional Bank Guarantee from any Nationalized / Scheduled Bank in favour of the Maharashtra State Electricity Distribution Co. Ltd., payable at Mumbai as mentioned in details in Tender Document (Section-I).

The scanned copy of the online payment receipt / Demand Drafts / BG should be uploaded (in e-tendering) and the Demand Drafts should be submitted to this office on or before submission date and time.

Calendar of Events Event	Date and Time
Begin Sale of Bid Document	12.02.2019
Date and time of submission of Bids	28.02.2019 at 15:00 hrs.
Date and time of Bid Opening	28.02.2019 at 15:30 hrs.
Date and time of Pre bid meeting	20.02.2019 at 15:00 hrs.

THE CHIEF ENGINEER
Maharashtra State Electricity Distribution Co. Ltd.
Material Management Cell,
Plot No. G-9, "Prakashgad" First floor, Prof. A.K. Marg,
Bandra (E), Mumbai – 400 051.
E-mail- cemmcmsedcl@mahadiscom.in

MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD.

TENDER FOR

Procurement of 11 & 22 kV/0.433 KV, 16 kVA three phase Distribution Transformers with energy efficiency Level-II as per IS: 1180/2014 under HVDS.

Tender No: **MMC/T-HTM-01/0219**

OFFICE OF THE CHIEF ENGINEER,
Maharashtra State Electricity Distribution Co. Ltd.
Material Management Cell,
Plot No. G-9, "Prakashgad" First floor, Prof. A.K. Marg,
Bandra (E), Mumbai – 400 051.
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SECTION-I

INVITATION TO TENDER AND INSTRUCTION TO BIDDERS

TENDER FORM (NOT TRANSFERABLE)

(TO BE SUBMITTED ONLINE DULY FILLED IN AND DIGITALLY SIGNED)

To be submitted online not later than the date mentioned in the tender details. For participating in tender opening, the bidder can login at the specified time and date of opening of the tender, if he desires so.

The bidder is requested to quote his lowest rates F.O.R. destination for the supply of materials. The material is required at various places in the State of Maharashtra. The tender documents duly filled-in and digitally signed, are to be submitted online before due time & date of the submission of tender in prescribed form.

The modifications made to the terms & conditions shall applicable to this tender only.

FOR CHIEF ENGINEER (M.M.CELL)

INSTRUCTIONS TO THE BIDDERS

I SCOPE OF WORK:

The scope of work under this tender is for design, engineering (wherever applicable), manufacture, inspection & testing before dispatch, packing and supply of 11KV, 22 KV/0.433 KV, 16 KVA Three Phase Distribution Transformers with Energy Efficiency Level II as per IS: 1180/2014 under HVDS Scheme as specified in Annexure-D / Technical Specifications, at various destination sites / stores Centers of the Purchaser in Maharashtra. The quantity for procurement is as below.

11KV/0.433 KV, 16 KVA – 31,200 Nos.

22KV/0.433 KV, 16 KVA – 1,640 Nos.

The Actual Quantity of the transformers that will be procured may vary depending upon the site requirement. The Quantity mentioned as above against various capacities can undergo change. However, the Minimum Assured Quantity for procurement shall be 50% of the total tendered quantity as mentioned above.

The list of various destination sites / stores Centers of the Purchaser is enclosed as Annexure K.

II Qualifying Requirements:

1. The bidder shall be an Original Equipment Manufacturer (OEM) of distribution transformer and possess valid BIS license as per clause no XIV.
2. The bidder should have experience in Design, Manufacture and Testing at work and supply of minimum 10,000 nos. of distribution transformers during last 3 years. The supplied distribution transformers can be of equal voltage class & capacity or higher voltage class & capacity in any Electricity Distribution Utility, Electricity Distribution Franchisee or public sector undertaking. The distribution transformers supplied by bidder should be in the successful operation as on the date of submission of the bid.
3. Average Annual Turnover – Average annual turnover of the bidder for supply of transformers shall be Rs. 15.00 Crores during three financial years, either FY 2014-15, 2015-16 & 2016-17 or FY 2015-16, 2016-17 & 2017-18.
4. The bidder should have in-house testing facilities for conducting acceptance tests in accordance with the procedures laid down in IS: 2026/1977 amended up to date.
5. Following Documents should be submitted by the bidder along with the bid.
   - BIS License and BEE certification as per clause no XIV.
   - The quantity offered for the supply of transformer in the prescribed format as per schedule 'C'.
   - Documentary evidence showing annual turnover of last 3 years, certified by Chartered Accountant for FY 2014-15, 2015-16 & 2016-17 OR FY 2015-16, 2016-17 & 2017-18.
   - Copies of orders executed by the bidder, and the Certificate from the purchaser with regards to successful execution of the order. The said documents shall be for the last three years, i.e. FY 2015-16, 2016-17 & 2017-18.
   - List of orders in hand.
   - Documentary evidence (for e.g. SSI/NSIC Certificate) for manufacturing capacity to cover the quantity offered by the bidder and considering orders in hand.
   - List of in house manufacturing and testing facilities as well as quality control set up.
   - Certificate from Charted Accountant for not having controlling stake in more than one entity as per clause no VII.

III PRICES:

Prices are acceptable only on F.O.R. destination basis inclusive of Goods and Service Tax (GST for brevity) i.e. Integrated GST (IGST) for outside State / Central GST+ State GST (CGST+SGST) for within State, risk in transit, freight showing the break-up as desired in the Annexure 'B'. It shall be noted that quotations not conforming to F.O.R. destination basis inclusive of IGST/(CGST+SGST) etc. and to the unit as specified in Annexure 'B', shall be rejected even though the bidder's offer may be lowest. Therefore, the prices shall be quoted only in the form of Annexure 'B' of the tender documents. The bidder shall quote Ex-Works Price and element of freight and insurance along with applicable rate of IGST/(CGST+SGST). The F.O.R. destination price

i.e. up to site or the Store Centre of the purchaser as the case may be inclusive of IGST/(CGST+SGST), risk in transit and freight will be programmatically calculated. While raising the invoices, however, IGST/(CGST+SGST) should be shown separately in the invoice raised.

The prices to be quoted by the bidder should take into account the credit available on input under the 'Input Tax Credit' scheme available under GST Law including such credit allowed on the stock available as on the appointed day of GST as per Transitional Provisions.

The bidder should give a declaration that any input tax credit in respect of duties on inputs as admissible under GST Law is being totally and unconditionally passed on to the purchaser in the price quoted by him.

The bidder should declare that in quoting the above price, bidder has taken into account the entire credit on inputs available under the 'Input Tax Credit' scheme available under GST Law.

The bidder should further agree to pass on such additional duties/taxes as input tax credit as may become available in future in respect of all the inputs used in the manufacture of the final product on the date of the supply under the 'Input Tax Credit' scheme available under GST Law by way of reduction of prices and advise the purchaser accordingly.

IV TAXES:

(i) The Purchaser shall be registered under Goods and Service Tax Act and should comply with all the statutory compliance requirements of GST Law diligently.

(ii) The F.O.R. destination rate shall be quoted inclusive of IGST/ (CGST+SGST). While raising the invoices, however, IGST/ (CGST+SGST) should be shown separately in the invoice raised. The same shall be indicated against respective clauses of Annexure 'B' without any ambiguity.

(iii) It is imperative for the bidder to indicate the amount of IGST/(CGST+SGST) included in their price while giving the break-up of F.O.R. destination price in Annexure 'B', failing which, the offer will be treated as ambiguous and will be rejected as per the provisions of clause X of tender form.

(iv) After awarding the contract, the supplier shall not charge any additional amount towards GST; during the currency of contract except statutory variation by Central / State Government in normal (full) rate of integrated GST. In case the GST is decreased than the rate indicated in the price bid, the benefits of the reduction in the GST shall be passed on to the purchaser. The increase in the GST rate due to increase in turnover during the contractual delivery period shall not be charged to the purchaser.

(v) Necessary documentary evidence for the GST claimed shall be submitted along with the bills.

V BASIS OF PRICES:

The bidder shall quote the prices on variable price basis, as has been specifically brought out in the Tender Details. For any deviation in this regard, the offer shall be summarily rejected.

VI PRICE VARIATION:

The price variation shall be admissible as per the price variation formula specified in Annexure - 'G' of this tender. No deviation shall be acceptable in the price variation formula. For any deviation, the offer shall be summarily rejected.

In case supplies are effected within the delivery period of lot / Part of lot, the "date of delivery" for PV purpose is the date on which the transformer is notified as being ready for inspection.

In case, supplies are effected after delivery period of lot, but within contractual period (09 months), the date of delivery for PV purpose would be the date on which the transformer are ready for inspection or delivery date of lot / Part of lot, or actual date of supply on which the PV is less.

For quantity supplied beyond contractual delivery period (09 months), negative price variation and statutory variations shall be applicable. However, the positive price variation and statutory variations for quantity supplied beyond contractual delivery period (09 months) shall not be allowed except where such delay in delivery is attributed to MSEDCL.

VII DELIVERY:

(i) Bidder is requested to quote delivery F.O.R. DESTINATION only. The bids only with firm delivery schedule in the format specified in Techno-Commercial Bid shall be accepted. It is mandatory on the part of the bidder to quote the delivery on monthly basis.

(ii) Size mix for the purpose of delivery, when delivery is quoted in assorted items, shall be determined by the Purchaser while issuing the A/T or dispatch instructions and will be binding on the bidder. The Purchaser will also have the liberty of modifying the size mix for the purpose of delivery, even after the A/T is issued.

(iii) Offer shall be rejected if the commencement period and rate of delivery per month is not indicated.

(iv) The delivery schedule offered shall indicate the quantity of first lot and the rate per month at which the supply shall be effected.

(v) Commencement of the delivery period (CM) of 2 months is allowed form the date of LOA only. The commencement quantity shall be minimum 5% of the offered quantity. The commencement of the delivery period (CM) shall include the period for submission of drawings / type test reports and approval of the same and the time required for routine inspection & approval of test certificates.

(vi) The deliveries of subsequent quantity i.e. completion period (CP) shall be effected at the agreed monthly rate from the date of LOA.

(vii) The scheduled delivery period is 9 months from the letter of award.

(viii) MSEDCL may issue dispatch instructions as per requirement. The quantity demanded per consignee could be less than or equal to monthly lot specified in contract. Wherever as per demands, the quantity to be supplied to a consignee in a

particular month is less than monthly lot quantity; the said quantity will be treated as lot quantity for the purpose of delivery and payment.

(ix) MSEDCL may instruct the supplier to withhold entire or part of monthly supply of transformers for a specified period by giving two months advance instruction.

(x) In the last demand made, if the deliveries cannot be effected within the contract period after counting the delivery period in above manner, the contract period shall stand automatically extended till the expiry of the delivery period in the above manner, unless instructed by MSEDCL not to dispatch the transformers after expiry of contract period.

Time being the essence of contract, the supplier shall strictly maintain monthly delivery schedule.

VIII OFFERING THE MATERIAL:

The person / entity should not have controlling stake in more than one entity applied for the tender / bid. **Necessary certificate duly certified by Chartered Accountant to this effect shall be submitted along with the tender documents**.

Factory address, from which the bidder intends to supply the material against the tender, shall be as indicated in the latest approved on line vendor registration form on e-tendering through which the vendor is submitting the offer.

The bidder shall offer the rates, taxes as applicable for the factory location indicated in his latest approved on line vendor registration form on e-tendering through which he is submitting his offer.

Bidders shall quote the delivery only in the unit of the item specified in Annexure 'B' i.e. if the quantity is in sets or in tones or in numbers or in kilometers or in coils, the rate of delivery shall only be in the same unit. Similarly, if the bidder quotes combined delivery in assorted sizes for all the items, he would be required to supply all the items ordered on him in fair proportion or particular item / items as may be required by the Purchaser at his option.

IX CONFLICT OF INTEREST

A bidder may be considered to have a conflict of interest with one or more parties in a bidding process if they:

(a) Have controlling shareholders in common; or

(b) Receive or have received any direct or indirect subsidy from any of them; or

(c) Have the same legal representative for purposes of a bid; or

(d) Have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on a bid of another bidder, or influence the decisions of the purchaser regarding the bidding process.

Bidders found to be in conflict of interest, shall be disqualified.

X QUOTATION:

(i) Bidder shall quote his rate per unit specified in Annexure 'B' / Price Bid in figures.

(ii) Bidder's printed terms and conditions will not be considered as forming part of the tender.

(iii) For each of the items quoted, bidder shall specify offered quantity. However, the offered quantity shall not be less than 5% of the advertised quantity (Advertised quantity means the quantity required as indicated in Annexure 'B' / Price Bid) so as to deliver the said quantity within the delivery requirement of the Purchaser as indicated in the tender documents.

XI AMBIGUITY IN QUOTATION:

The bidder is requested to please make a note that in case of ambiguous terms in respect of offered quantity in Annexure- B and schedule 'C', F.O.R. condition, GST, basis of price (i.e. firm / variable) or if the blanks are left out in the offer, the item / tender shall be rejected.

XII FILLING IN OF ANNEXURE:

The bidder is requested to ensure that the comments against each and every item / clause of Annexure shall be clearly filled in and answered. Any item/clause shall not be left blank or unanswered. If any item /clause is not applicable, the "Not Applicable (N.A.)" checkbox shall be selected.

XIII ADDITIONS/ALTERATIONS PROHIBITED:

The bidder shall not make any additions, alterations or changes in the Tender Form and the Conditions of Tender & Supply (Annexure 'A') including the description of material mentioned in Annexure 'B'. They should quote rate for the material described or click the checkbox 'Not quoted' against each of the item in Annexure 'B' / Price Bid.

XIV B.I.S. LICENCE AND BEE CERTIFICATE :

A scanned copy of valid BIS License (full Copy) & BEE certifications for offered ratings duly sealed & signed must be uploaded and submitted along with offer, failing which, the offer shall be rejected.

In case the validity of the BIS license is expiring before date of submission of tender, necessary documentary proof of having applied for renewal of validity of the BIS license must be uploaded while submitting the bid. The renewed copy of the BIS License shall be submitted before commencement of supply.

However, valid BIS license scan copy of sealed / non sealed type distribution transformers of offered rating with respective voltage class must be submitted by the qualifying bidders before commencement of supply, failing which their order will be cancelled with financial liability on supplier.

In case, the bidder does not possess a valid BEE certificate but qualified in other tender conditions, their offer will be considered for evaluation purpose. However, the bidder has to submit BEE certification complete in all respect in line with tender items before commencement of supply, failing which the order will be cancelled with financial liability on supplier.

XV MANDATORY REQUIREMENT OF SUBMISSION OF OFFER:

The offer shall be submitted online duly filled in; attaching all the required documents, completed in all respects and should be digitally signed.

XVI SUBMISSION OF DRAWING & BILL OF MATERIAL:

The standard drawings of MSEDCL and bill of material are enclosed with the tender documents. The bidder may confirm the same by agreeing to the standard GTP attached with the tender documents to supply the material as per these standard drawings at the time of submission of bid. Such bidders need not submit separate GTP & drawings. However, the bidder has to take prior approval of type test reports as per standard MSEDCL drawings & GTP before commencement of supply.

The bidder not confirming to the standard drawings & GTP, shall submit their drawings and bill of material conforming to the tender specification wherever applicable. The offer without the drawings and bill of material shall not be evaluated and considered. The drawings and bill of material of the successful bidder shall be scrutinized when the Purchaser decides to accept such bid. It may, however, be noted that Purchaser's action of evaluation of the tendered bid would not mean approval of the drawings and bill of material submitted along with the tender bid.

The bidder shall depute his authorized representative for discussion on the drawings, immediately after receipt of Letter of Award. The formalities like submission of drawings, bill of material, etc. and getting the same approved by the Purchaser shall be completed by the successful bidder within TEN DAYS from the date of Letter of Award of the contract. The approval to drawings complete in all respects will be accorded within SEVEN working days thereafter. Any delay in this regard shall lead to cancellation of the Letter of Award at the risk and cost of the bidder. The supplies against the contract shall conform to the approved detailed drawings / bill of material and the detailed technical specifications. The bidder has to take prior approval of type test reports as per GTP before commencement of supply.

XVII NAME OF AUTHORIZED REPRESENTATIVE:

The digital certificate shall be in the name of person authorized by the firm. In case, the digital certificate is compromised or the person holding the digital certificate is no longer authorized to digitally sign the tender, it is the responsibility of the bidder to revoke this certificate and obtain the fresh certificate. While submitting the bids online only valid digital certificate shall be used. The vendors are requested to check the validity of digital signature and prior to the expiry date & they are requested to get their Digital signature key validated before expiry of the same. MSEDCL shall not be responsible for Non-submission of any of the Bids (Techno Commercial Bid, Deviation Bid, Price Bid, Annexure - C-1) by vendors due to expired/Invalid Digital signature.

The bidder is responsible for all the contractual liabilities and responsibilities thereof.

In case the bidder authorizes the representative to deal on behalf of the bidder, the name and address of such person should be informed to the purchaser. The bidder shall submit the power of Attorney in favour of representative duly executed before the Notary. In the absence of the Power of Attorney, the purchaser shall not deal with the representative.

XVIII -(A) OFFER OF MICRO & SMALL ENTERPRISES AND OTHER UNITS:

The bidder registered with Directorate of Industries of Government of Maharashtra for manufacturing the items tendered / offered and those who have attached valid certificate at the time of vendor registration shall be considered for concessions applicable and procurement of reserved items as per GoM G.R. dtd. 30-10-2015

amended up to date. These benefits shall be available only to those items approved during the registration process and subsequent updates in registration up to the submission of this tender.

Based on concession of Central Government's Micro & Small Enterprises office order dtd. 23-03-2012, 241 items are being kept reserved. As per above reservation of items 100% reserved items to be purchased from Micro & Small Enterprises out of which 20% reserved items to be purchased from S.C./S.T. enterprises. Reservation is applicable for a limited period unless & until re- examined. If Micro & Small Enterprises participated in the tender and the tendered item is not reserved, then 20 % order with L-1 rate to be given to Micro & Small Enterprises and out of this 20%, 4% to be given to S.C./S.T. enterprises.

If there are any specific Government Directives such as reservation of items for units in Maharashtra, non-eligibility of preference to SSI units etc. for particular items, price and purchase preference etc. the same would be applicable irrespective of the fact that it has not been specifically incorporated in the tender notice and/or tender documents.

(B) PREFERENCE TO INDUSTRIAL UNITS LOCATED IN MAHARASHTRA AND OFFERS BY MATCHING RATES WITH LOWEST ACCEPTABLE BIDDER

The lowest acceptable rate will be the unit rate worked out without considering IGST/(CGST+SGST) as applicable and the same rate will be considered as applicable to the respective bidder who has agreed to accept order at lowest acceptable rate.

1) If the lowest acceptable rate received against the tender is from a bidder outside Maharashtra, then they shall be considered for order up to 50% of Purchaser's requirement and if industrial units located in Maharashtra are agreeable to accept order at such lowest acceptable rate, such industrial unit in Maharashtra shall be considered for order up to 50% of Purchaser's requirement by matching their rates with lowest acceptable unit rates exclusive of IGST/(CGST+SGST).

   However, if industrial units located in Maharashtra are not agree to accept order at such lowest acceptable rate, then full supply order shall be placed on bidders outside Maharashtra. The Purchaser reserves the right to distribute the quantity among Bidders after matching their rates with the rate of lowest acceptable bidder.

   Further, it is to note if the bidder registered outside Maharashtra submitted offer and given address of Maharashtra will be considered as bidder from Maharashtra only if offered the rate with (CGST+SGST).

2) The bidders who are not eligible under the above clauses can also give their confirmation to accept order at the lowest acceptable rate received against the tender. They could be considered for this entitlement only after allocating quantities of Maharashtra State Industrial units as per the provisions stated at (1) above, in the order of merit as per price ranking for the balance quantity remained to be procured. The Maharashtra State Industrial units who are not eligible for the purchase preference as above could also be considered for this preference under this clause in the order of merit of their prices. Other bidders shall be considered for the order by matching their rates with the rate of lowest acceptable bidder

after allocating reasonable quantities first to the industrial units of Maharashtra eligible under Clause 1(a) and 1(b) of Annexure 'C-1'.

The lowest acceptable rate is known only on the date of decision by the Competent Authority, hence the lowest acceptable rates of the tender cannot be declared in advance, however lowest acceptable rate of the tender would be equal to or more than the lowest rate received in the tender.

The confirmation for acceptance of the order at the lowest acceptable rate indicated as above shall be given in the format as per Annexure 'C-l' of the tender documents. The same should be submitted online on or before the due time and date of submission of Annexure 'C-1'. The confirmation shall be opened online on due time and date of opening of Annexure 'C-1'. Schedule for submission and opening of Annexure 'C-1' shall be communicated separately by e-mail and on the website. Though confirmation in Annexure `C-1' as above is called from all the qualified bidders, the bidders, who quoted rates within the range of 10% in comparison with the lowest acceptable rates, shall only be considered and their Annexure `C-1' will be opened on the date and time intimated subsequently in the presence of bidders who chose to be present. Provided, however, that the Annexure `C-1' of the bidders, who have quoted above the range of 10% in comparison with the lowest acceptable rates, shall also be considered in case the aforesaid bidders within the range of 10% are unable to fulfil the quantity requirement. In that case also, the date of opening of Annexure `C-1' will be intimated to the bidders

In the above confirmation, if the bidder indicates any rate, then the confirmation given by the bidder will not be considered as valid.

Above confirmation for the quantity less than as indicated in Clause X (iii) of Instructions to the bidder shall not be acceptable.

The prices indicated in the original offer shall not be considered as valid once offer for acceptance of order by matching rates is given. In the event of withdrawal of offer by matching rates within the validity period, the entire offer against the tender shall become invalid and shall be summarily rejected and the earnest money paid by the bidder shall be forfeited.

The lowest acceptable tenderer would be considered for awarding order up to 75% of requirement or any reasonable quantity subject to his capacity and capability at the sole discretion of MSEDCL.

Balance quantity will be allocated amongst the bidders whose quoted price(s) are within 10% and have matched with Lowest Acceptable Tenderer, subject to their capacities.

In case the requirement of transformers is not fulfilled after allocating the quantity as above, the bidders who have quoted rates above 10% and matched with L-1 will be considered for allocation of remaining quantity.

If matching rate offer is not available, 100% quantity will be allotted to L-1 bidder subject to capacity & capability to supply total quantity.

However, MSEDCL reserves the right to decide allocation of the quantity of transformers to the successful bidders.

XIX EARNEST MONEY DEPOSIT (EMD):

The bidder should pay the Earnest Money **@ 0.5% (Half Percent)** of the Estimated Value of Tender **in the form of BG as per the Annexure – M enclosed with tender documents having validity of 120 days from opening of tender.** Reference to the tender no. should be given in case the EMD is paid by demand draft before the due date of the tender and the relevant deposit amount mentioned in the tender. Interest shall not be allowed on EMD. Earnest money deposit shall be forfeited (i) in case the bidder withdraws the tender / offer during the validity period (ii) in case the bidder fails to pay the performance deposit if the contract is awarded.

However, bidders from the following categories are exempted from payment of earnest money deposit.

1) All Government and semi Government institutions under Govt. of Maharashtra and Zilla Parishad in Maharashtra and fully owned undertaking of any State Govt. and Govt. of India only for the items manufactured by such institutions.
2) Micro and Small Enterprises registered under Micro, Small and Medium Enterprises Development Act-2006 only for the items mentioned in their permanent registration certificate at the time of vendor registration.
3) The bidder registered with N.S.I.C. and those who have attached valid N.S.I.C. Registration Certificate **for the items mentioned in their permanent registration certificate** at the time of vendor registration.

The benefits mentioned in (1) to (3) above shall be available only to those items approved during the registration process and subsequent updates in registration up to the date of submission of this tender.

Exempted bidders should upload a latest valid certificate issued by any approved body of 'Ministry of Small & Medium Enterprises' (MSME) such as 'National Small Industries Corporation' (NSIC) or 'District Industries Centre' (DIC) for EMD exemption.

XX SIGNING OF THE TENDER DOCUMENTS:

Offer shall be submitted along with the tender documents and duly filled in with all Sections / Annexures / Appendixes / Schedules etc. The offer shall be signed with valid digital signature.

XXI SUBMISSION / SUPERSCRIBING OF THE TENDER DOCUMENTS:

The offer is to be submitted as follows.

(a) **Online Submission:**

(i) Techno-Commercial Bid (Part-I): This part shall contain all technical and commercial aspects of the bid and documents supporting the same except the Price Bid.

The bidder is requested to please make a note that in case of the Price Bid (Part-II) is submitted instead of Techno-Commercial Bid in Part-I or submitted Price Bid (Part-II) along with Techno-Commercial Bid in Part-I, the offer shall be rejected.

(ii) Price Bid (Part-II)

This part shall contain only the Price Bid strictly in the prescribed format, i.e. Annexure 'B'.

(b) Offline Submission:

Physical submission of documents (Part-III)

Envelope for this part shall contain documents like Type Test Reports, Drawings, Bill of Material, Catalogues etc. wherever applicable as per technical specification and they shall be scanned and these scanned documents to be taken into PDF format on CD media (2 sets) and are to be submitted to EE (HTM) in the office of Chief Engineer, Material Management Cell in sealed envelope on or before due date & time of submission.

METHOD OF SUBMISSION OF PART-III AND THEIR OPENING:

This envelope shall be individually sealed and shall be super scribed with the name and address of bidders and the following information before posting or delivering the same:

i. Tender No.

ii. Due date and time of submission.

iii. Due date and time of opening.

Envelope as above shall be submitted on or before the prescribed due date and time of submission and shall be opened on due date and time of opening as prescribed.

In case of bidders whose techno-commercial bid is acceptable, their Price Bids will be opened at a later date. This date shall be intimated to such bidders separately.

XXII TIMELY SUBMISSION OF OFFER:

(a) The bid is to be submitted online on or before due date and time of submission to the Purchaser at website.

(b) It is advisable to submit the digitally signed offer sufficiently in advance of due date and time so as to avoid last minute congestion of network / server.

(c) Offer received after the due date and time of submission shall not be accepted.

(d) In case, the due date of opening of tender happens to be holiday, the offer shall be opened on the next working day at the same time.

XXIII (a) The Purchaser reserves the right to reject any offer without assigning any reason whatsoever.

(b)The manufacturer who have been awarded A/T in previous tenders of HVDS transformers but failed to execute supply as per DI till date of opening of subject tender and those bidders who have already been allotted quantity as per there manufacturing capacity, may not be considered for placement of order against the subject tender.

XXIV DISREGARD OF TENDER CONDITIONS:

Tender containing any deviations / additions / alterations /changes in the conditions of the tender and supply as stated in Annexure 'A', 'B', 'C-I', 'D', 'E', 'G' and schedule 'C' shall not be acceptable.

The bidder having digitally signed all the tender documents indicates any deviations / additions / alterations / changes in the covering letter, unrelated annexures and schedules of the offer or elsewhere, the same shall be ignored and the offer shall be treated as meeting with all specified tender conditions.

XXV PROHIBITION FOR POST TENDER CORRESPONDENCE:

The Bidder should note that no correspondence shall be entertained or considered after the due date and time of submission of tender unless otherwise sought by the Purchaser.

XXVI RIGHT TO ORDER OUT QUANTITY IN VARIANCE TO OFFERED QUANTITY:

The Purchaser reserves the right to order out / procure any quantity in excess of the offered quantity with mutual consent. The quantity specified may be for dispatch to one destination or several places.

XXVII ACCEPTANCE OF TENDER:

The Purchaser does not bind itself to accept the lowest or any tender; neither will any reasons be assigned for the rejection of any tender or part of tender. It is also not binding on the Purchaser to disclose any analysis report on tender/samples. The bidder on his part binds himself to supply any item or items selected from his offer in part or whole at the option of the Purchaser.

XXVIII NOTIFICATION OF AWARD:

Notification of Award of contract will be made by a letter of Award, to be sent by registered post or given by hand, to the successful bidder by the Purchaser. It could also be made by e-mail or by Fax to be confirmed in writing by registered post to the successful bidder by the Purchaser.

Acceptance of the same to be conveyed within 3 working days by the supplier.

XXIX EARNEST MONEY OF UNSUCCESSFUL BIDDER:

Earnest money deposit shall be returned to the unsuccessful bidder by RTGS within 7 (seven) working days after the tender has been decided and on submission of receipt of E.M.D. payment to the G.M. (F&A-SB), MSEDCL, Prakashgad, Prof. A.K. Marg, Bandra (East), Mumbai - 400051. Earnest money deposit in the form of BG will be returned to the unsuccessful bidder within 7 (seven) working days by Chief Engineer, Material management Cell after the tender has been decided.

XXX VALIDITY OF OFFERS:

The bidder shall keep the offer valid for acceptance up to and including last date of calendar month, covering the date of completion of 120 days (one hundred and Twenty days) from the date of opening of the tender and shall also agree to extend the period of validity required by the Purchaser. The bidder shall not be allowed to modify or change the conditions of the tender while extending the period of validity.

XXXI DECARATION FROM BIDDER:

The Policy & Procedure for Debarring of Agency from Business Dealings with MSEDCL is as per Annexure-L in order to ensure participation of reliable and honest bidders / contractors / vendors, etc. and forms the parts of tender document. The bidder shall submit the declaration along with the bid in Annexure-I.

XXXII CORRUPT OR FRAUDULENT PRACTICES:

The Maharashtra State Electricity Distribution Company Ltd. and the State require that bidders / suppliers / contractors observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, MSEDCL:

(a) defines for the purposes of this provision, the terms set forth below as follows:

(i) "corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

(ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition.

(b) will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

(c) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded an MSEDCL contract if at any time it determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, an MSEDCL contract.

XXXIII INFLUENCE:

Any efforts by the bidders to influence the owner during evaluation process before order placement will be rejected. Similarly deviation in the term of payments, penalty, performance deposit, delivery period will be treated as non-responsive quotation / offer and will not be considered for evaluation /order placement.

Bidder shall submit the undertaking certifying that they have not approached any one for undue influence.

XXXIV TENDER FEES EXEMPTION:

Tender fee to be paid at the time of uploading / online submission of the tender. Bidders from the following categories are exempted from payment of Tender fees:

1) All Government and semi Government institutions under Govt. of Maharashtra and Zilla Parishad in Maharashtra and fully owned undertaking of any State Govt. and Govt. of India only for the items manufactured by such institutions.

2) Micro and Small Enterprises registered under Micro, Small and Medium Enterprises Development Act-2006 only for the items mentioned in their permanent registration certificate at the time of vendor registration.

3) The bidder registered with N.S.I.C. and those who have attached valid N.S.I.C. Registration Certificate at the time of vendor registration.

The benefits mentioned in (1) to (3) above shall be available only to those items approved during the registration process and subsequent updates in registration up to the date of submission of this tender.

The tender fee paid against the particular tender shall not be refunded / transferred /adjusted at all.

XXXV PRE-BID MEETING:

1) The bidder or its official representative is invited to attend pre-bid meeting(s) which will take place at the place, date and time designated in the Bidding Data.

2) The purpose of the pre-bid meeting(s) will be to present the salient features of the bidding documents to the bidders, including the bid submittal requirements, the Conditions of Contract (including payment terms and conditions), the technical features of the project, and to clarify issues and to answer questions on any matter that may be raised by the bidders.

3) The bidder is advised to visit the Site and study the bid document thoroughly, and is requested to submit any questions in writing or by fax, to reach the Employer not later than one week before the pre-bid meeting.

4) Minutes of the meetings, including the text of the questions raised and the responses given will be transmitted without delay to all the prospective bidders through the website http://www.works.mahadiscom.in/eTender/etender. Any modification of the bidding documents listed which may become necessary as a result of the pre-bid meetings shall be made by the Purchaser exclusively through the issue of an Addendum pursuant to Clause and not through the minutes of the pre-bid meetings.

5) Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder. Nevertheless, senior representatives of the bidders are strongly encouraged to participate in the pre-bid meeting to help ensure that they fully understand the key concerns of the Employer and the Employer's requirements.

XXXVI CLARIFICATION ON DEVIATIONS:

The purchaser, if necessary, shall obtain clarifications on deviations within 2 working days by requesting for such information from any or all the bidders in writing, as may be necessary.

The same should be submitted online on or before the due time and date of submission of Deviation Bid. The clarification shall be opened online on due time and date of opening of Deviation Bid.

The Schedule for submission and opening of Deviation Bid shall be communicated by auto generated e-mail of the e-tender website.

CERTIFICATE:

I/We agree to supply the materials at the rates herein tendered by me / us subject to the conditions of tender and supply in Annexure 'A' of this tender which I/We have carefully read and which I/we have thoroughly understood and to which I/we agree. I/we hereby agree to keep this offer open up to the date mentioned in tender details and shall be bound by communication of acceptance dispatched within the validity period.

Seal & Signature of bidder

(SECTION II)

ANNEXURE 'A'

CONDITIONS OF TENDER AND SUPPLY

1) EFFECT OF CONTRACT:

The contract shall be considered as having come in to force and shall be in operation for a period of 9 months from the date of Notification of Award. The bidder whose offer is accepted is hereinafter called "the supplier".

2) QUALITY OF SUPPLIES:

All materials supplied shall be strictly as per MSEDCL standard GTP & drawings along with the type test reports or in accordance with the approved Guaranteed Technical Particulars (GTP), drawings and type test reports.

3) MATERIAL AND COMPONENTS:

The material and components not specifically stated in this specification but which are necessary for satisfactory operation of the equipment / items specified, shall be deemed to be included unless specifically excluded and shall be supplied without any extra cost.

4) ACCEPTANCE OF SUPPLIES / INSPECTION:

i) The supplier shall normally offer at a time, the *entire* quantity required to be delivered every month as per the delivery schedule indicated at Annexure 'B' of A/T for the purpose of inspection by the Purchaser.

However, MSEDCL may permit the bidders from Maharashtra to offer the material in part quantity for inspection against the monthly committed lot. Daily visit of all Maharashtra manufacturers shall be carried out by the Executive Engineer (O&M) Dn. / Executive Engineer, Testing Division / Executive Engineer (Adm.) of O&M Circle office for the manufacturers in their jurisdiction & inform the same to this office on email eehohvds@gmail.com to confirm the readiness of material for inspection. The successful bidders shall grant free access to purchasers representative at a reasonable time when the work is in progress. It is also the responsibility of the supplier to inform the daily progress of manufacture / material made ready on eehohvds@gmail.com. After receipt of confirmation as well as the intimation from the supplier in the prescribed proforma on eehohvds@gmail.com indicating quantity ready for inspection, the material may be inspected immediately by the Executive Engineer or the representative authorized by the Purchaser before dispatch as per the inspection procedure mentioned in technical specifications.

The supplier outside Maharashtra may offer 50% of the monthly lot quantity for inspection.

The payment of part quantity inspected & supplied shall be made irrespective of the monthly lot.

If in any month supplier could not supply 100% quantity committed for the month, he must supply minimum 50% of the committed quantity in the particular month & balance 50% quantity in the next immediate month along with 100% quantity committed in the next month. This facility shall not exceed two times in the entire contractual delivery period.

Time being the essence of contract; the supplier shall strictly maintain the monthly delivery schedule.

ii) Inspection calls sent on any other e-mail id than specified above, shall not be entertained and the supplier shall be responsible for delay in delivery on account of inspection.

The materials shall be dispatched ~~only~~ after inspection and approval of same by the Inspector. The inspection approval letter shall be valid for a period of 30 days from the date of issue of letter to enable the supplier pack the material and arrange transportation thereof so that material should be reached at the respective consignee within 30 days from the date of inspection approval letter.

After this period of 30 days, the validity of this inspection approval letter will lapse. If the material is not reached within 30 days to respective consignees, the approval of purchaser is to be sought by the supplier for revalidation of inspection approval letter at the sole discretion of MSEDCL.

For quantity supplied beyond contractual delivery period, negative price variation and statutory variations shall be applicable. However, the positive price variation and statutory variations for quantity supplied beyond contractual delivery period shall not be allowed unless the delayed delivery is attributed to MSEDCL.

iii) The supplier shall notify the names of the consignees as per DI, to whom the inspected lot would be dispatched. The supplier shall get the copies of inspection approval letter together with witness certificate duly signed by the concerned Inspecting Officer IN BLUE INK only and also mention reference or inspection approval letter on the challan / invoice, failing which any delay occurred in getting the S.R. Notes from the consignees would be solely to supplier's account. The inspection report shall be filled in online on the same day by the Inspector from the site on MSEDCL web portal after the inspection.

iv) Factory address, from which the bidder has to supply the material, shall be as indicated in the latest approved on line vendor registration form on e-tendering through which the bidder has submitted the offer.

v) The supplier shall offer inspection call as specified above in cl. (i). In the event, during the inspection by the Purchaser's Inspecting Officer, if it is observed that the quantity actually offered for inspection is less than the quantity indicated for inspection in the inspection call, the Purchaser shall be entitled to recover from the supplier, the actual expenses incurred for arranging the inspection, and the supplier shall not dispute the amount to be recovered.

vi) All the necessary help shall be extended by the supplier to the authorized representative of the Purchaser to carry out testing of equipment / materials.

vii) MSEDCL may issue the dispatch instructions (DI) to deliver the ordered quantity to the bidders in Maharashtra within same districts of factory location of the supplier. However, it will not be binding on the MSEDCL; supplier has to deliver the distribution transformers in other districts as per MSEDCL requirement. Further outside Maharashtra bidders have to deliver the distribution transformers as per MSEDCL requirement to the designated consignee.

viii) MSEDCL on its sole discretion may get distribution transformers inspected and tested by third party NABL lab.

ix) During the inspection of the transformers at the factory of the manufacturer, in addition to the specified tests carried out as per relevant IS, the Inspector of MSEDCL shall also test all the transformers (100%) for the loss levels. All the transformers where the losses are within specified limits, shall be accepted for dispatch if the failure is less than 5% of that particular lot / part of lot.

5) RIGHT TO CARRY OUT INSPECTION DURING MANUFACTURING:

The Purchaser at its option, will inspect the material ordered during its process of manufacturing including the inspection of raw materials and will request the supplier to carry out such tests as may be necessary to ensure proper quality of the material. The samples of components of the material shall be subject to quality check by the inspecting officer during manufacturing.

6) RIGHT TO REVISE DESPATCH INSTRUCTIONS, DELIVERY SCHEDULE AND TO DEFER SUPPLIES:

i) The Purchaser reserves its right to revise the dispatch instructions issued along with the order, at the time of giving final clearance for dispatch after inspection of the material. If such change in destination is not intimated at the time of inspection approval or waiver of inspection, the supplier shall dispatch the material as per the dispatch instruction in accordance with A/T indicated by him in the inspection call letter.

ii) The Purchaser reserves its right to change the delivery schedule of the contract either by reducing the monthly lot up to 60% of the agreed lot or by increasing the same up to 120% of the agreed lot with prior two months' notice and the Purchaser shall not be liable to pay any compensation/damages on account of such change in delivery schedule.

iii) The Purchaser reserves its right to defer the balance supply to be received against the order by giving two months' notice for a maximum period of 6 months. In such an event, the delivery period for the deferred material shall be deemed to be extended proportionate to the period of deferment and the Purchaser shall not be liable to pay any compensation/ damages on account of such deferment of deliveries.

7) WAGON LOADS / TRUCK LOADS:

Quantity to be dispatched to consignee should be minimum two full truck loads and may be part load as per the Purchaser's requirements.

8) ROAD TRANSPORT:

In case the supplier prefers to dispatch the materials by road transport at his risk and cost and without any extra cost to the Purchaser, the materials shall be accepted only during office hours on working days. The supplier should ensure that the goods reach the stores in first half so as to arrange their unloading during office hours, failing which, the Purchaser shall not be liable for delay in unloading and for inconvenience caused to the transport contractor in the form of detention etc. Unloading at stores shall be arranged by the consignee.

9) DESPATCH INTIMATION:

The supplier shall inform by e-mail to the consignee details of dispatch along with e-way bill receipt in hard & soft format giving RR/ LR No., Wagon / Truck No., Type of wagon, craneable consignment or otherwise, total value of consignment, etc. to facilitate the consignee to arrange for clearance of goods. The copy of the intimation should also be given on **eehohvds@mahadiscom.in**.

10) BILL OF MATERIALS:

The supplier shall furnish bill of materials for each type of equipment / material offered which should be consistent with the drawing, specification and guaranteed technical particulars. The copies of the bill of materials should always be enclosed along with the bill submitted by the supplier for payment wherein he should specifically mention the materials / components dispatched out of the bill of materials, if the equipment is not sent in totality. Where the equipment / material to be supplied consist of more than one component, the supplier claiming payment for equipment / materials shall certify that all components of the equipment / material have been supplied in full for the quantity indicated in the invoice. Part payment shall not be allowed.

11) PACKING LIST:

Each package shall contain, in waterproof cover, the detailed list indicating the order reference, date, list of content and reference to the approved bill of materials. Each item contained in the package shall be described sufficiently to enable identification of the quantity, weight etc. There should not be any alteration in the packing list incorporated in the order, soft copy of the packing list should be sent to all the consignees, nodal officer EE HVDS in the office of Chief Engineer (MM Cell) on specified e-mail id eehohvds@mahadiscom.in and hard copy to G.M. (F&A-SB) should be enclosed with the bills along with other documents.

12) REPLACEMENT OF GOODS LOST, BROKEN OR DAMAGED:

Notwithstanding anything herein contained, the supplier undertakes to be responsible for the safe arrival of the materials in good condition and without any loss or damage at the final destination and until the same be actually delivered to and received by the Purchaser at its stores or other place of final destination and for this purpose, materials carried by railways or other carrier shall be deemed to be so carried at the risk of the supplier. In case of transit damage / shortages, the payment shall be made only for the quantity received in good and working condition and the consignee shall lodge claims with carriers and transfer the same to the supplier with all necessary documents for settlement of the same with carriers at the supplier's end. The transit damages / shortages / losses reported by the consignee shall be repaired / replaced by the supplier duly inspected, free of cost, within one month from the date of such intimation of breakages / shortages / losses without waiting for settlement of the claims from carrier or insurance co. etc.

However, rectification of minor defects at store locations are allowed for following minor defects only.

i. Leakages.
ii. Bushing replacement
iii. LA replacement
iv. Nut bolt tightening
v. Gasket replacement, etc.

13) REPLACEMENT OF REJECTED MATERIALS:

If, on inspection at the final destination, the Purchaser discovers any loss in the materials supplied or that they are received in damaged condition or that in the opinion of the

Purchaser, they are not of the contracted quality or specification, the Purchaser shall be entitled (notwithstanding that the property in the materials shall have passed on to the Purchaser) to refuse to accept or reject the materials altogether and claim damages or cancel the contract and buy its requirements from any of its suppliers stipulating earliest possible delivery and in accordance with its tender system against the supplier and recover the damages if any, from the supplier from any outstanding sums that may be due to the supplier from the Purchaser against this contract or against any of the contract entered into with the supplier, without prejudice to other rights and remedies available to it in law and reserving always to itself the right to forfeit the performance deposit placed by the supplier for the due fulfillment of the contract.

In case the stores / materials are found not in accordance with the prescribed specifications and / or the approved sample, the same will be rejected and the supplier shall replace the rejected stores / materials free of cost within one month from the date of intimation. The replacement of goods shall also have to be got inspected as per inspection clause. Further if the stores / equipment supplied becomes incomplete on account of either rejection or short supply of its components, the complete cost of the stores / equipment shall be recovered from supplier's bills without notice.

14) MATERIAL DESPATCHED AND PROGRAMME:

A statement as under indicating dispatches effected during every month shall be furnished to this office along with the programme of manufacturing / dispatches during the following two months on e-mail id eehohvds@mahadiscom.in. In the event of no dispatch, the statement shall contain nil information.

MONTHLY STATEMENT:

I. Name of Supplier:

II. Reporting Month:

Sr. No.	A/T No.	Material	Item No. as Per A/T	Consignee	RR/LR Delivery Challan No. With date	Date of Actual Receipt of Material	Qty. Dispatched Between 26th of Preceding month and 25th of the Reporting month	Programme of supply during the next 2 months
1	2	3	4	5	6	7	8	9

Consolidated details of the above information shall be furnished to office of the Chief Engineer (M.M.Cell) after completing the supplies of a particular order. The copy of this consolidated information shall invariably be forwarded to the respective consignees, failing which; security deposit paid against the contract shall not be released.

15) MATERIAL RECEIPT & SUBMISSION OF BILLS AT CONSIGNEE:

On receipt of material at destination of consignee as per DI, Additional Executive Engineer (MM CELL) of respective store should ensure the receipt of material in good & healthy condition. While receiving the material, store in charge should ensure the receipt of material as per

Dispatch Instructions issued by MM Cell. Further, the store in charge should ensure the receipt of original & scan copies of following documents:

a) Tax invoice.

b) Detailed packing list.

c) Bill of Material.

d) Delivery challan.

e) E-way bill receipt.

f) Dispatch document (RR/LR).

g) Inspection report if applicable

Where required by the Purchaser, the successful bidder must send the operation and maintenance manuals, test certificates, drawings etc. for the material ordered. These should be sent immediately after dispatch of material and a statement to that effect should be made in the invoice.

After receipt of material at concern stores, on confirmation & validity of above documents, store in charge will generate Final SR Note through ERP system immediately for receipt of material at stores thereof.

16) PAYMENT OF BILLS:

Following documents will have to be forwarded by the supplier to the G.M. (F&A-SB), Maharashtra State Electricity Distribution Co. Ltd., Prakashgad, Station Road, Bandra (East), Mumbai - 400 051 to facilitate payment.

(i) Original Tax invoice in triplicate along with PV claim,

(ii) Scan copy of Guarantee Certificate of equipment.

(iii) Scan copy of Dispatch document (RR/LR).

(iv) Scan copy of E-way bill in soft & hard format.

(v) Scan copy of Delivery challan

(vi) Inspection approval letter signed by the Inspecting Officer in Blue ink (for whole lot) if applicable

The bill should indicate GST registration number & date held by him under GST law. No payment shall be made for the supply of equipment / item in part components.

100% payment of the Contract price will be paid by online RTGS within 30 days from the date of receipt of documents specified above to GM (F&A) SB Section, HO Mumbai. In case of delay in payment beyond 45 days from the receipt of above specified documents, MSEDCL shall pay an interest at prevailing MCLR rate of SBI calculated on daily basis

The whole of the first lot as well as monthly lot when delivered in installments, the date of delivery and due date of payment will be counted for the received quantity irrespective of the entire lot along with documents as above. MSEDCL shall make payment for supply of part quantity against the committed lot size.

Any amount more than Rs. One Lakh will be transferred to the Bank Account of the supplier electronically. For this RTGS (Real Time Gross Settlement) provision, following information is to be furnished by the bidder in the required documents of the online offer.

1. Name of the Company
2. Name of the Bank & Branch with address where the amount is to be transferred.
3. Current Account Number (15 digits)
4. RTGS No. / (IFSC Code) (Indian Financial Security Code)
5. MICR Code of the Bank
6. Company's email ID
7. Contact Name & Telephone No.

17) TAXES:

(A) Notwithstanding the fact that contract price is inclusive of GST:

(i) GST shall be paid at actuals on the basis of due date of delivery or actual date of supply whichever is lower against documentary evidence.

(ii) Variation in GST on bought out items shall not be entertained.

(B) Structural changes in and due to 'Input Tax Credit' Scheme: -

(i) In the event of any structural change occurred in the Input Tax Credit Scheme after the date of submission of the tender till the currency of the contract, the benefit out of such change shall be passed on to the purchaser.

(ii) In the event of 'Input Tax Credit' being extended by the GST Law which were otherwise ineligible for claiming Input tax credit thereof, the seller should advise the purchaser about the additional benefits accrued or any variation thereof, through a letter containing such details and computation within such time as may be agreed between both the parties i.e. Supplier & MSEDCL.

18) DEDUCTION:

Any amount or amounts which become payable by the supplier to the purchaser under a particular contract, shall be deducted by the purchaser from any amount/amounts due or becoming due to the supplier under the same or any other contract and shall be adjusted against dues to the Purchaser.

19) GUARANTEE:

Transformers offered shall be guaranteed for a period 24 months from the date of receipt of material at concern stores / consignee. In case of failure of Distribution Transformer within the above guarantee period, tenderer shall make available other new conditioned / repaired Distribution transformer, free of cost at stores for replacement within 45 days from the date of intimation from stores and lift the failed Dist. Transformer for repair after replacement. For this purpose, bidder shall maintain spare stock in adequate quantity of ordered ratings of Dist. Transformer. If the defective Dist. Transformer is not replaced / repaired within the specified period as above, the Maharashtra State Electricity Distribution Company Ltd. shall retained an equivalent end cost of transformer from any of the bills of the supplier or encashing available performance bank guarantee submitted against guarantee period or through any available sources, till the return of the equipment.

No interest will be paid on the amount so retained / recovered. In case of material / item not returned duly repaired within 45 days, penalty shall be imposed @ 0.5% per week or part thereof maximum up to 10% of the cost of undelivered material / equipment beyond specified time limit. In case of material / item not returned duly repaired within 5 months, total cost of the material / item along with penalty will be adjusted / recovered from the pending bills of the supplier or encashing available performance bank guarantee submitted against guarantee period or through any available sources with MSEDCL.

The clause itself shall be the notice to the supplier about enchashment of PBG to adhere to the timelines.

The outage period, i.e. the period from the date of failure till unit is repaired / replaced shall not be counted for arriving at the guarantee period.

20) LIFTING OF REJECTED/DAMAGED MATERIALS FROM STORES:

a) If the supplier fails to lift the failed material within specified period, the material will remain with the Purchaser at the cost and risk of the supplier. The Purchaser will be also free to dispose of such material, after the period of 5 months from the date of intimation of failure, by Public auction / Tender notice / Destruction as may be deemed fit.

b) Process for lifting of rejected / damaged / failed materials from stores:

i. The communication / correspondence shall only be made by specified e-mail id eehohvds@mahadiscom.in by MSEDCL field offices / the supplier.

ii. As soon as the transformer is failed within guarantee period, the concerned Executive Engineer of O&M Division / Stores-in-charge shall inform the intimation of such failure immediately to Supplier.

iii. If supplier fails to return repaired transformer at concern O&M Division / Store within 45 days from the date of intimation, concerned Executive Engineer of O&M Division / Stores-in-charge shall inform the intimation of such failure immediately to EE (HTM), MM Cell on specified e-mail id in Format A.

iv. The EE (HTM) shall forward the format A to GM (F & A – SB Section) to withhold the payment equivalent to the cost of transformer from any of the bills of the supplier with penalty to be imposed @ 0.5% per week or part thereof maximum up to 10%.

v. The EE O&M Division / Store-in-charge shall immediately inform the EE (HTM) regarding the receipt of transformers against replacement or repairs at stores on specified e-mail id as above.

vi. On successful commissioning of the replace / repaired transformer, the EE O&M Division / Store-in-charge shall issue Format C to EE (HTM) through specified e-mail id.

vii. EE (HTM) shall issue the Format C to the supplier.

viii. The supplier shall extend the guarantee period for the delayed period taken for replacement / repairing.

ix. EE (HTM) shall inform the GM (F&A- SB Section) to release the payment withheld against that transformer.

x. From the date of intimation, if supplier fails to return repaired transformer at O&M Division / concern store within 5 months, concerned Executive Engineer of O & M

Division / Stores-in-charge shall inform the intimation of such failure immediately to EE (HTM) on specified e-mail id.

xi. The EE (HTM) shall forward the same to GM (F & A – SB Section) to recover the payment equivalent to the cost of transformer from any of the bills of the supplier with penalty to be imposed @ 0.5% per week or part thereof maximum up to 10% for final recovery as per clause 19.

21) LIQUIDATED DAMAGES FOR LATE DELIVERY:

In case the materials are not delivered within the period stipulated in the order, the supplier shall be liable to pay at the discretion of the competent authority of the Purchaser, the liquidated damages to the Purchaser @ one per cent per week or part of week on the value of delayed material / unexecuted quantity plus taxes as applicable, if any on the price subject to a maximum of cumulative ceiling of 10% reckoned on the contract value of such complete portion or section of the plant, equipment or material delayed and also the portion supplied which could not be brought into commission due to any part thereof not having been delivered in time. In addition to above if bidder fails to supply the material within contractual delivery period continuously for 3 lots, then the order shall be liable for cancellation.

Due consideration may be given in the levy of liquidated damages for reasons absolutely beyond the control of the supplier, for which documentary evidence shall be produced to the satisfaction of the competent authority of the Purchaser. The Purchaser shall be entitled to deduct/recover the amount of liquidated damages from the current bill payable to the supplier or any other amount due or payable to him against this or any other contract. For computing the liquidated damages for delayed supplies, the date of railway receipt or the date of receipt of materials at stores in case of road transport, shall be the date of delivery.

In case the Purchaser does not arrange for inspection of material within 10 days from the date of (readiness of material mentioned in the inspection call) receipt of inspection call in its office, the period of more than 10 days will not be considered for levy of liquidated damages. For computing the period taken for inspection in such cases, the relevant date mentioned in the inspection certificate issued by the inspecting officer would be considered.

22) ORDER PLACED ON TIME PREFERENCE BASIS (WHEREVER APPLICABLE):

In case of order on time preference basis (i.e. orders given at higher rate on delivery period considerations only) if order is given at higher rate of L-2 (or L-3 etc.), then the payment at higher rates will be made provided the firm makes supplies within the stipulated time period. In case of delay in supplies, the payment will be made at the rates offered by L-1. In addition, Clause No. 21 above for Liquidated Damages for late delivery will also be applicable. However, the quantity allocation for order under this clause shall be at the sole discretion of MSEDCL & the specified quantity allocation for this tender will not be applicable in this case.

23) FORCE MAJEURE CLAUSE:

If, at any time, during the continuance of this contract the performance in whole or in part by either party of any obligation under this contract shall be prevented of delayed by reason of any war, hostility, acts of the public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restriction, strikes, lock-outs or acts of God (hereinafter referred to as "events"), provided notice of happening of any such eventuality is given by either party to the other within 21 days from the date of occurrence thereof, neither party shall by reason of such event, be entitled to terminate this contract nor shall either party have any claim for

damages against the other in respect of such non-performance or delay in performance; and deliveries under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, and the decision of the purchasing officer as to whether the deliveries have been so resumed or not, shall be final and conclusive, provided further that if the performance in whole or part of any obligation under this contract is prevented or delayed by reason of any such event for a period exceeding 60 days, either party may at its option terminate the contract PROVIDED ALSO that it the contract is terminated under this clause, the purchaser shall be at liberty take over from the contract at a price to be fixed by the purchasing Officer which shall be final all unused, undamaged and acceptable materials, bought out components and stores in course of manufacture in the possession of the contractor at the time of such termination or such portion thereof as the purchaser may deem fit accepting such material, bought out components and stores as the contractor may with the concurrence of the purchaser elect to retain.

24) PERFORMANCE OF CONTRACT:

The Purchaser will not be in any way liable for non-performance either in whole or in part of any contract or for any delay in performance thereof in consequence of strikes, shortage, non-availability of raw materials, combination of labour or workmen or lockout, breakdown or accident to machinery or accidents of whatever nature, failure on the part of the railways to supply sufficient wagons to carry essential raw materials etc. and finished products from the stores, subject to the provision and stipulation made in condition No. 21 as stated above i.e. Liquidated damages for late delivery.

25) CONTRACT PERFORMANCE DEPOSIT:

25.1 The supplier will have to furnish contract performance deposit as per Annexure - N in the form of unconditional & irrevocable BG within 15 days from the date of issue of LoA, as mentioned in Clause 25.2.

25.2 The contract performance deposit shall be an amount equal to 5% of the contract value and shall be valid for a period of 90 days beyond guarantee period of the last lot of the transformers.

25.3 The contract performance deposit shall be an amount equal to 5% of the contract value in two installments. First performance deposit shall be equal to 2.5% of the contract value in the form of unconditional & irrevocable BG within 15 days from the date of issue of LoA & second performance deposit shall be equal to 2.5% of the contract value in the form of unconditional & irrevocable BG within 15 days after 6 months from the date of issue of LoA. In case contract period is less than or 6 months, the supplier will have to furnish 1st installment equal to 2.5% of the contract value in the form of unconditional & irrevocable BG within 15 days from the date of issue of LoA & second performance deposit shall be equal to 2.5% of the contract value in the form of unconditional & irrevocable BG before 2 months from the expiry of contract period.

25.4 The contract performance deposit of both instalments shall be refunded within 90 days from the date of expiry of the guarantee period of the equipment supplied. The purchaser shall not be liable to pay any interest or compensation to the contractor for retaining the deposit after the end of the said period.

25.5 The contract performance deposit is intended to secure the performance of the contract for guarantee period of the equipment supplied. However, it is not to be construed as limiting the damages stipulated in other clauses of the contract.

26) POWER OF ATTORNEY:

It will be obligatory on the supplier to communicate the revocation of Power of Attorney, if any, after submission of offer till the execution of contract failing which the act/s & action done by the agent/representative shall be deemed to be the valid act/s & action of the bidder/ supplier.

27) JURISDICTION:

Permanent Dispute Resolution Committee (PDRC) comprises of Chief Engineer (MM Cell), respective zonal Chief Engineer and representative of supplier will resolve the dispute arise if any.

Any disputes or difference arising under, out of or in connection with this tender or contract if concluded, shall be subject to the exclusive jurisdiction of the "Courts" in Mumbai.

28) TERMINATION OF CONTRACT

1) The decision of the Purchaser shall be final as regards the acceptability of the stores supplied by the supplier and the Purchaser shall not be required to give any reason in writing or otherwise at any time for the rejection of the stores/materials.

2) In case the contractor/supplier fails to deliver the stores/material or any consignment thereof within the contracted period of delivery or in case the stores/materials are found not in accordance with the prescribed specification and the performance of the supplied material is not found satisfactory, the Purchaser shall exercise in discretionary power either,

   a) to purchase from elsewhere, after giving 15 days due notice to the contractor, at the risk of contractor, such stores/material not so delivered or other of similar description, without cancelling the contract in respect of consignment not yet due for delivery, OR

   b) to cancel the contract reserving Purchaser's right to recover damages Plus GST as may be applicable.

   c) notwithstanding that the powers under (a) and (b) referred above are in addition to the rights and remedy available to the Purchaser under the General Law of India relating to contract.

   d) Purchaser reserves right to recover damages against risk purchase or 10% value of non-supplied material plus applicable taxes, if any whichever is higher.

   In the event of risk purchase of stores of similar description, the option of the Purchaser shall be final. In the event of action taken under (a) or (b) above, the supplier shall be liable for any loss which the Purchaser may sustain on that account but the supplier shall not be entitled to any saving on such purchases made against default.

3) Further contract can be terminated in case of sub-standard /poor quality material.

29) DEBAR OF MANUFACTURER FROM PARTICIPATION IN TENDERS OF MSEDCL:

As per MSEDCL debar policy enclosed as Annexure-L.

30) TAX DEDUCTED AT SOURCE:

The purchaser shall deduct tax at source in accordance with the provisions of the laws as and when the same is notified.

ANNEXURE - "B"

QUANTITY, PRICE AND DELIVERY PERIOD

ANNEXURE - "B" to be submitted online against commercial bid; attached separately

ANNEXURE 'C-I'

[To be submitted later on as per as per Clause XVIII(B) of Instructions]

CONFIRMATION FOR ACCEPTING ORDER BY MATCHING RATES WITH LOWEST ACCEPTABLE BIDDER

APPLICABLE FOR INDUSTRIAL UNITS FROM MAHARASHTRA ONLY Marketing Assistance and Purchase Preference to the units from Maharashtra (refer Clause XVIII of Instructions to Bidders):-

1. (a) In case your unit is located in Maharashtra and the lowest acceptable rate received against the tender is from the unit outside Maharashtra, please confirm whether you are agreeable to accept order at that lowest acceptable rate limited to 50% (fifty percent) of our requirement. .....

APPLICABLE FOR ALL BIDDERS INCLUDING THOSE ELIGIBLE UNDER THE ABOVE CLAUSES:

1. (b) Please confirm whether you are agreeable to accept order at the lowest acceptable rate received against the tender. .....

[Industrial units from Maharashtra can give option under 1(b) above for balance quantity]

Note:-

1. If the bidder gives the above confirmation for the quantity less than as indicated in Clause X(iii) of the Instructions to the Bidders, then the above confirmation shall not be acceptable.
2. Bidders may confirm matching for one or more items originally tendered.
3. Any withdrawal of confirmation for order by matching rate within validity of offer will render the entire offer invalid and shall be summarily rejected and Earnest Money Deposit shall stand forfeited.
4. A bidder will not be entitled to the benefit of offers by matching rates and will not be considered for orders if his original offer is rejected on the ground of ambiguity or because of not accepting/noncompliance of the terms & conditions of the tender.
5. In the above confirmation, if the bidder indicates any rate, then the above confirmation given by the bidder will not be considered as valid.

ANNEXURE- 'D'

TECHNICAL SPECIFICATION FOR

TECHNICAL SPECIFICATION OF 16 KVA AND 25 KVA, 11/0.433 KV & 22/ 0.433 KV LEVEL-2 THREE PHASE, SEALED / NON SEALED TYPE DISTRIBUTION TRANSFORMERS OUTDOOR TYPE OIL IMMERSED WITHOUT CSP FEATURE

Maharashtra State Electricity Distribution Company Limited

MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

OF

16 kVA AND 25kVA, 11/0.433 kV & 22/ 0.433 kV LEVEL-2 THREE PHASE, SEALED/NON SEALED TYPE DISTRIBUTION TRANSFORMERS OUTDOOR TYPE OIL IMMERSED WITHOUT CSP FEATURE

TECHNICAL SPECIFICATION NO.

CE/MMC/MSC-I/3Phase (16-25kVA)/DT/T/2018/02,

Date: 09.04.2018 (Revised on dtd. 07.02.2019).

(Amended as per guidelines by Ministry of Power)

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1.0 Scope

This specification covers design, manufacturing, testing and delivery of 16 and 25 kVA, 11/0.433 kV & 22/ 0.433 kV level-2 three phase, sealed/non sealed type distribution transformers outdoor type oil immersed without CSP feature, Oil natural Air Natural (ONAN) suitable for 11 kV& 22 kV , 50 Hz, Distribution system.

The equipment offered shall be complete with all parts necessary for their effective and trouble-free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.

It is not the intent to specify herein complete details of design and construction. The equipment offered shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements.

The design and constructional aspects of materials shall not withstanding any anomalies, discrepancies, omissions, in-completeness, etc. in these specifications and will be subject to good engineering practice in conformity with the required quality of the product, and to such tolerances, allowances and requirements for clearances etc. as are necessary by virtue of various stipulations in that respect in the relevant Indian Standards, IEC standards, I.E. Rules, I.E. Act and other statutory provisions.

The Bidder/supplier shall bind himself to abide by these considerations to the entire satisfaction of the purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.

Tolerances:

The tolerance of guaranteed performance figures shall be as specified in the (Part-I) table 1 of latest issue of IS 2026 except losses or relevant International Standard except wherever specified otherwise in this specification.

2.0 System Particulars:

The transformers shall be suitable for outdoor installation with following system particulars and they should be suitable for service under fluctuations in supply voltage as permissible under Indian Electricity Rules.

Nominal System Voltage: 11 kV or 22 kV

Corresponding Highest System Voltage: 12kV or 24 kV

Rated Basic Insulation Level: 75 KVp or 125 KVp

Neutral earthing: Solidly earthed

Frequency: 50 Hz with ±3 % tolerance

Number of Phases: 3

3.0 **Service Conditions**

3.1 Equipment supplied against the specification shall be suitable for satisfactory operation under the following tropical conditions:-

i	Max. ambient air temperature	:	50 Deg. C
ii	Max. relative humidity	:	100 %
iii	Max. annual rainfall	:	1450 mm
iv	Max. wind pressure	:	150 kg/sq.m.
v	Max. altitude above mean sea level	:	1000 mtrs.
vi	Isoceraunic level	:	50
vii	Seismic level (Horizontal acceleration)	:	0.3 g.
viii			Climatic Condition Moderately hot and humid tropical climate conducive to rust and fungus growth.
ix	Reference Ambient Temperature for Temperature rise		50 Deg C

3.2 The climatic conditions are prone to wide variations in ambient conditions andhence the Distribution Transformer shall be of suitable design to work satisfactorilyunder these conditions.

3.3 The Distribution Transformer shall be for use in moderately hot and humidtropicalclimate conducive to rust and fungus growth.

3.4 The Distribution Transformer shall be mark with standard mark governed by BIS as per clause 13.4 of IS 1180(Part 1):2014]

3.5 The Distribution Transformer shall bear star 1 or 2 rating label approved by BEE(Bureau of Energy Efficiency).

3.6 The Distribution Transformer shall bearlevel2 (star 1of BEE)ratings label approved by BIS (Bureau of Indian Standard) as per IS 1180 (Part1):2014 (Amendment-1 August 2016).

3.7 The Bidder/ Manufacturer shall possess the BIS license for offered product.

3.8 The Bidder/ Manufacturer shall possess the BEE certification for offered product.

4.0 **APPLICABLE STANDARDS:-**

4.1 The design, manufacture and performance of the Distribution Transformer shall comply with all currently applicable statutes, regulations and safety codes. Nothing in this specification shall be construed to relieve the bidder off his responsibilities.

4.2 The Distribution Transformers shall conform to IS: 1180 (Part 1): 2014 amended up to date or other International Standards for equal or better performance.

4.3 The applicable standards are as follows:

Sr.No.	IS number	IS name
	IS:1180(Part-1) : 2014 with (Amendment-1 August 2016)	Outdoor type oil immersed distribution transformers up to and including 2500 kVA, 33kV
	IS:2026(Part I to IV)	Specification for power transformer
	IS:335/1993	New insulating oil- Specification(fourth revision)
	IS:2099/1986, IS: 7421-1988, IS:3347 (Part-I/Sec-2)-1979, IS:3347 (Part-I /Sec-1)-1982 amended up to date	Bushing
	IS 5	Colours for ready mixed paints andEnamels.
	IS 13730 (Part-27)1996	Specification for particular types of winding wires.
	IS: 3073/1974, IS: 3070(Part-II)	Specifications for L.A's
	CEA Guidelines August -2008	Manual on transformers
	Gazette notification by Ministry of Power dated 16.12.2016	Revised losses of distribution transformers

4.4 In case of conflict arising out due to variations between the applicable standard and the standards specified herein the provisions of this specification should prevail.

5.0 **Specific Technical requirement:**

5.1Standard kVA Ratings:-

The standard ratings for three phase transformer shall be 16 & 25kVA as per IS 1180 (Part-I):2014

5.2 Nominal voltage ratings

iPrimary voltage: 11 kV/ 22 kV

ii Secondary voltage: 0.433 kV

5.2.1 Winding connections:-

i. H.V. Winding: Delta (Δ)

ii. L.V. Winding: Star (Y)

so as to produce a positive phase displacement of 30 degrees from the primary to the secondary vectors of the same phase. The neutral of the L.V. winding shall be brought out to a separate insulated terminal. The voltage group shall be Dyn-11 (IS 2026 Part I).

5.3 Temperature Rise:

i The temperature rise for top oil over an ambient temperature of 50° C should be 35°C maximum [measured by thermometer in accordance with IS 1180 (Part 1) & IS 2026 (Part 2)]

ii Temperature rise for winding over an ambient temperature of 50° C should be 40° C maximum [measured by resistance method in accordance with IS 1180 (Part 1) IS 2026 (Part 2)]

5.4 No load voltage ratio:-

The no load voltage ratio shall be 11000/433 Volts & 22000/433 Volts.

6.0 **Design & construction**

a. The spring washers must be used for fixing core with tie rod.

b. Core base & bottom Yoke shall be supported with 75 mm X 40 mm X6 mm MS Channel with proper bolting. The core assembly shall be fixed by four locking bolts.

c. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 % combined voltage and frequency variation with rated voltage and frequency does not exceed 1.9 Tesla. Flux density should not be more than 1.69 Tesla at rated voltage and frequency.

d. Limit of no load current shall be 3% of full load current of respective winding at rated voltage.

6.1 Core

i The core shall be stacked/ wound type.

a) For Stack core :- The core shall be ofhigh grade cold rolled grainoriented (C.R.G.O) annealed steel lamination having low loss and good grain properties,

coated with hot oil proof insulation, bolted together to the frames firmly to prevent vibration or noise. All core clamping bolts shall be effectively insulated. The complete design of core must ensure permanency of the core losses with continuous working of the transformers.

b) For Wound core :-

The core shall be 'C' type construction of core high grade cold rolled grain oriented (C.R.G.O.) annealed steel lamination having low loss and good grain properties, coated hot oil proof insulation. The complete design of core must ensure permanency of the core losses with continuous working of the transformers. The core material shall not be brittle in case of CRGO material.

Core clamping for C.R.G.O. Wound core type transformers shall be as follows:

a. Core clamping shall be with top and bottom U- shaped core clamps made of sheet steel clamped.

b. M.S. core clamps shall be painted with oil-resistant paint.

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

1. Core shall be clamped by minimum 12 mm diameter MS Tie rods.

2. Compliance of CRGO Electrical steel as per IS 3024 [as mentioned in Cl.No.9.1 (a) of IS 1180(Part1):2014] shall be ensured through test certificate of the supplier.

ii The grade of core laminations shall be M4 or better (CRGO).

iii The successful bidder shall be required to submit the manufacturer's test report showing the Watt Loss per kg and the thickness of the core lamination, to ascertain the quality of Core materials.

The purchaser reserves the right to get sample of the core material tested at any Government recognized laboratory.

iv The transformer core shall not be saturated for any value of V/f ratio to the extent of 112.5% of the rated value of V/f ratio (i.e. 11000/50 or 22000/50) (due to combined effect of voltage and frequency) up to 12.5% without injurious heating at full load conditions and will not get saturated. The bidder shall furnish necessary design data in support of this situation.

v Flux density:-

The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 % combined voltage and frequency variation with rated voltage and frequency does not exceed 1.9 Tesla. Flux density at rated voltage and frequency should not be more than 1.69 Teslafor CRGO core.

vi The No load current at rated voltage shall not exceed the percentage as given below.

The no load current of 16kVA& 25 kVA transformers shall not exceed 3%the full load current and will be measured by energizing the transformer at rated voltage and frequency. Increase of 12.5 percent of rated voltage shall not increase the no load current by 6% of full load current. (As per IS 1180 (Part1):2014).

Number of steps of CRGO stackedcore shall be minimum of

Sr. No.	Rating (kVA)	Number of steps
1	16	Min. 5 standard steps
2	25	Min. 5 standard steps

vii The CRGOcore material shall be used for 16KVA &25KVA transformer.

6.2 Winding:-

The material for winding shall be Aluminum for both 11kV & 22kV class.

i. Super enameled of thermal grade of 220 degree C or Double paper covered Aluminum conductor shall be used for HV/LV winding for 16KVA,25KVA Distribution Transformersfor both 11 kV& 22 kV.

ii. Current Density:- Current density for HV and LV winding should not be more than 1.3 A/sq. mm (including tolerance) for Aluminum.

iii. L.V. Neutral formation shall be at top.

iv. No of HV coil per phase shall be as below

a) CRGO stack core – Minimum 2 coils per phase.

b) CRGO wound core- Single coil per phase.

6.3 Losses:

The total losses (no-load + load losses at 75 deg. Centigrade) at 50% of rated load & total losses at 100% of rated load shall not exceed the maximum total loss values indicated as below:-

for 11kV class transformers. *The indicated losses in the tablefor CRGO as per IS: 1180 (Part-I) 2015.*

Rating (KVA)	Impedance (Percentage)	Max. total losses in watts up to 11 kV Class, Level-2 (Star-1)	
		At 50% Load	At100% Load

16	4.5	135	440
25	4.5	190	635

Note:-

1) For Transformer having voltage class above 11 kV and up to and including22 kV, the permissible total loss values shall not exceed by 5 percent of the maximum total loss values mentioned in above table.(Ref Clause 6.8.1.2 of IS 1180: Part- I/2014)

Tolerances:

No positive tolerance shall be allowed on the maximum total losses given in the above table for both 50% & 100% loading values. In case the actual loss values exceed the above guaranteed values, the transformers shall be rejected at the risk, costand responsibility of the supplier. The bidder should guarantee individual No load losses.

The values guaranteed in G.T.P. for flux density, no load current at rated voltage, no load current at 100 % & 112.5% of rated voltage and no load loss at rated voltage shall be individually met.

The tolerance on electrical performance excluding total losses at 50% of rated load & total losses at 100% of rated load shall be as given in IS 2026(Part 1).

6.4 Insulation material & clearances:

i Materials –

Makes of Electrical grade insulating Kraft paper, Press Board, Perma wood/ Haldi wood insulation shall be declared in GTP by the bidder. The test reports for all properties as per relevant IS amended up to date shall be submitted during inspection .Compliance to Kraft paper IS 9335 [Cl.No.9.1(d) of IS 1180 (Part 1):2014] and for press board IS 1576 [Cl.No.9.1(e) of IS 1180 (Part 1):2014] and gasket shall be ensured through test certificate of the supplier.

ii The electrical clearance between the winding and body of the tank (between inside surface of the tank and outside edge of the windings) should not be less than 30 mm and 40 mm for 11 kV and 22 kV class respectively.

iii Radial clearances of LV coil (bare conductor) to core shall be minimum 3.5 mm

iv Radial clearance between HV & LV winding shall be minimum 11mm for 11kV & 14mm for 22kV.

v Phase to Phase clearance between HV conductor shall be minimum 10mm for 11kV & 15mm for 22kV

vi Minimum End insulation to Earth shall be

11kV - 25 mm, 22KV – 40mm

vii Minimum external clearances between bushing terminals

Voltage level	Details	11 kV	22 kV
HV	Ph to Ph	255 mm	330 mm
	Ph to E	140 mm	230 mm
LV	Ph-to-Ph	75 mm.	75 mm
	Ph to E	40 mm.	40 mm

6.5 Impedance Value –

The percentage impedance at 75 º C. for different ratings shall be as per clause no 6.3 table above.

6.6 Tank

6.6.1 The transformer tank shall be made up of prime quality M.S. sheets of rectangular shape. No other shape will be accepted. The transformer tank shall be of robust construction. All joints of tank and fittings should be oil tight and no bulging shall occur during service. The tank design shall be such that the core and windings can be lifted freely. The tank plates shall be of such strength that the complete transformer when filled with oil may be lifted bodily by means of the lifting lugs provided. Tank inside shall be painted by varnish or oil resistant paint. Top cover plate shall be slightly sloping; approximately 5 to 10 deg. Opposite to LV bushing and edges of cover plate should be bent downwards so as to avoid entry of water through the cover plate gasket. The width of bend plate shall be 25 mm min. The top cover shall have no cut at point of lifting lug. The rectangular tank shall be fabricated by welding at corners.

6.6.2 The transformer tank of corrugation is also acceptable, however shape of tank shall be rectangular only. The corrugation sheets thickness shall be of minimum 1.6mm. Corrugation panel shall be used for cooling. The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. Bidder shall submit the detailed calculation sheet alongwith offer. The safe guard angle frame 25X25X5 mm shall be welded for corrugated side to the tank.

6.6.3 In rectangular shape tanks, horizontal or vertical joints in tank side walls and its bottom or top cover will be not allowed.

Side wall thickness: 3.15 mm. (min.)

Top and bottom plate thickness: 5 mm. (min)

a) The permanent deflection of flat plates after pressure / vacuum has been released shall not exceed the values given below.(All figures in mm)

Horizontal length of flat Plate	Permanent deflection
Up to and including 750 mm	5.0 mm
751 to 1250 mm	6.5 mm

6.6.4 Reinforced by welded angle 25X25X5 MM on all the outside walls on the edge of tank to form two equal compartments.

6.6.5 When transformer tank without oil is subject to air pressure of 80 KPa above atmospheric pressure for 30 min as per IS 1180 (Part 1):2014. Pressure test shall be performed carefully as per IS 1180 (Part 1):2014 Clause no.21.5.1 at the time of 1st stage inspection only to confirm the adequacy of reinforcement angle and gauge of the tank and certified by E.E. (IW).

6.6.6 All welding operations to be carried out by MIG process.(Metal Inert Gas Welding)

6.6.7 Lifting lugs: 2 nos. welded heavy duty lifting lugs of MS plate of 8 mm (minimum) thickness suitably reinforced by vertical supporting flat of same thickness as of lug welded edgewise below the top cover on the side wall. They shall be so extended that cutting of bend plate is not required. 2 nos. of welded heavy duty lifting lugs of MS plate of 8 mm thickness should be on the top plate of transformers.

6.6.8 Pulling lugs: 2 nos. of welded heavy duty pulling lugs of MS plate of 8mm thickness shall be provided to pull the transformer horizontally.

6.6.9 All bolts / nuts / washers exposed to atmosphere shall be as follows:[Clause no.15.3 of IS 1180 (Part 1):2014]

a) Size 12mm or below—stainless steel.

b) Above 12mm--- steel with suitable finish like electro galvanized with passivation or hot dip galvanized.

6.6.10 Top cover fixing bolts: GI nut bolts of 1/2" diameter (min) with one plain washer shall be used for top cover fixing, spaced at 4" apart. 6 mm neoprene bonded corkoil resistance gaskets conforming to type B/C IS 4253 Part-II amended up to date will be placed between tank and cover plate.

6.6.11 Vertical clearance: - The height of the tank shall be such that minimum vertical clearance up to the top cover plate of 120 mm is achieved from top yoke.

6.6.12 The transformer tank shall be of adequate mechanical strength to withstand positive and negative pressures built up inside the tank while the transformer is in operation.

6.6.13 The tank design shall be such that the core and windings can be lifted freely.

6.6.14 Plain tank shall be capable of withstanding a pressure of 80kPa for 30 minutes and a vacuum of 250 mm of mercury for 30 minutes (Type Test). The permanent deflection

of flat plates shall not exceed the values given in IS 1180(Part 1): 2014 clause no. 21.5.1.1.

6.6.15 Thermometer pocket must be located at centre of top cover or high side of tank height for true valve of max top oil temperature

The construction of the tank should be sealed/ non sealed.The space on the top of the oil shall be filled with dry air or nitrogen for sealed transformers. The dry air or nitrogen plus oil volume inside the tank shall be such that even under extreme operating conditions, the pressure generated inside the tank does not exceed 0.4kg/sq.cm positive or negative. The nitrogen shall conform to commercial grade of the relevant standard. Oil level indicator with only minimum position corresponding to the operating temperature of 30°C (for sealed type transformers) shall fixed on side wall of the tank.

6.6.17 QR code laminated P touch labels shall be fixed on transformer tank body below the name plate depicting various technical details such as Name of manufacturer, rating, Serial no, date of manufacturing, A/T No. etc.

6.7 Off Load Taps:

6.7.1 No taps are required to be provided up to 100 kVA rating.

7.0 **Efficiency:**

The efficiency is the ratio of output in KW to the input in KW.

$$\text{Efficiency} = \frac{(\text{Input in KW} - \text{Total Losses in KW})}{\text{Input in KW}}$$

8.0 **Heat Dissipation:**

a) Heat Dissipation by tank walls excluding top and bottom plates should be 500 Watts/Sq. meter.

b) Heat dissipation calculation should be based on maximum measured total loss i.e. (No load loss at rated excitation + load loss at 100% Loading converted to 75 deg' C reference temperature) shall be supplied during temperature rise test.

c) The heat dissipation by tank wall should be increased to appropriate value considering the climatic temperature rise.

9.0 **Total Minimum Oil Volume:**

The firm should maintain the minimum oil volume in all supplied transformers as mentioned below or oil up to mark indicator level whichever is more.

Sr.No.	KVA rating	Oil in liters	(exclusive of oil
		absorbed in core & coil assembly)	

		Voltage rating11/0.433 kV	Voltage rating22/0.433 kV
1	16	50	70
2	25	70	100

Note:

Transformer shall be supplied complete with first filling of oil up to minimum position corresponding to the operating temperature of 30°C (for sealed type transformers) on oil indicator fixed on side wall of the tank& Transformer shall be supplied complete with first filling of oil up to the mark indicator level of conservator(for non-sealed type transformer). Detailed calculation of absorption should be submitted.

10.0 **Conservator:**

a. The total volume of conservator shall be such as to contain 10% of total quantity of oil. Normally 3% quantity of the total oil will be contained in the conservator. Dimension of the conservator shall be indicated on the General Arrangement Drawing. The capacity of the conservator tank shall be designed keeping in view the total quantity of oil and its contraction and expansion due to the temperature variations.

b. Oil level indicator shall be provided on the side which will be with fully covered detachable flange with single gasket and tightened with MS nut-bolt. Level indication by color shall not be accepted.

c. The inside diameter of the pipe connecting the conservator to the main tank should be 25 to 50 mm and it should be project into the conservator in such way that its end is approximately 20 mm above the bottom of the conservator so as to create a sump for collection of impurities. The minimum oil level (corresponding to (-) 5 deg.) should be above the sump level. [Refer Cl.no.16.3 of IS 1180 (Part1):2014]

d. There shall be minimum -5deg, normal 30deg and maximum 98deg marking on the oil gauge indicator of the conservator.

11.0 **Breather:**

a. The material used for breather shall be only of Poly propylene.

b. The dehydrating agent shall be silica gel. The volume of breather shall be suitable for 250 gm to 16 & 25 kVA silica gel conforming to IS 3401. Makes of the breather shall be subject to purchaser's approval. The make and design of breather shall be subject to approval of MMC.

12.0 **Terminals:**

a. The Palm type terminal connector of adequate capacity shall be connected to L.V side suitable to connect it to the Bus extension.

b. On H.V. side the bimetallic connector to be provided with bimetallic lug of suitable rating.

c. The rating of brass rod for H.V. & L.V. shall be as per relevant IS for different capacity of Transformer. [Following (d) and (e) are indicative and shall be conformed with relevant IS)]

d. Brass rods of 12 mm. diameter for HT with necessary nuts, check-nuts and plain thick tinned washer.

e. Brass Rod of 12 mm diameter with LT extension with suitable cable lugs, necessary nuts, check-nuts and plain thick tinned washer.

13.0 **Bushings & Connections:**

13.1 The transformers shall be fitted on high voltage and low voltage sides with outdoor type bushings of appropriate voltage and current ratings. The high voltage bushings (3nos.) shall be provided with R-Y-B colour coding marking & shall conform to IS 2099. The low voltage bushings (4 nos.) shall conform to IS 7421. Alternatively, the low voltage side may be made suitable for adoption of PVC/XLPE cables of suitable size. The dimensions shall conform to IS 1180(Part 1): 2014 clause no. 10.1.5.

13.2 The bushing shall be made in two parts. The outer bushing shall be of porcelain. The dimensions of the outer bushing shall confirm to the relevant Part/Section of IS 3347 depending on the voltage class. The internal bushing shall be of either porcelain or tough insulating material, like epoxy and shall have embedded stem. Metal portion of the internal HV and LV bushing inside the tank shall remain dipped in oil in all operating conditions. [Refer Cl.no.10.1.3 of IS 1180 (Part1):2014]

13.3 Gaskets shall be made of synthetic rubber or synthetic rubberized cork resistant to hot transformer oil or Nitrile Rubber. [Refer Cl.no.10.1.4 of IS 1180 (Part1):2014]

13.4 The dimensions of the bushings of voltage classes shall confirm to Cl. no 10.1.5 of IS 1180 (Part1):2014.

13.5 For 11 kV class 12 kV bushing & for 22 kV class 24 kV bushing shall be used and for 433 volts 1.0 kV bushing shall be used. Bushings of the same voltage class shall be interchangeable. Bushings with plain shed shall be as per relevant IS:3347 amended up to date. HV bushings shall be mounted on the top of the transformer tank & LV bushings shall be mounted on side of the transformer tank.

13.6 HV bushings shall be mounted on curvature shaped embossed plate and not on welded M.S ring. Supporting clamps for LT cable should be provided to avoid the weight of cable on the Bushing.

13.7 The minimum creepage distance for both HV & LV Bushings shall not be less than 25 mm per kV.

13.8 Compliance of bushing as per IS 2099 / IS 7421 and relevant part of IS 3347 shall be ensured through test certificate from the supplier of transformer manufacturer firm getting the same tested from BIS recognized / group 2 category of laboratory.

13.9 Supporting clamp for cable should be provided to avoid weight of cable on the bushing/bushing rod.

14.0 **Internal connections:**

14.1 H.V. Winding:

(i) In case of H.V. winding all jumpers from winding to bushing shall have cross section larger than winding conductor.

(ii) Inter coil connection shall be by crimping and brazing.

(iii) In case of Aluminum Winding Delta joints shall be with crimping and brazing only.

(iv) Lead from delta joint shall be connected to bushing rod by brazing only.

14.2 L.V. Winding:

(i) For Aluminum windings inter coil connections crimping & silverbrazing shall be used.

(ii) L.T. Star point shall be formed of Aluminum flat of sufficient length. Lead from winding shall be connected to the flat by crimping and brazing.

(iii) Firm connections of L.T. winding to bushing shall be made of adequate size of `L' shaped flat. Connection of L.T. Coil lead to `L' shape flat shall be by crimping and brazing. Alternatively `L' shape lug of adequate capacity effectively crimped shall be acceptable.

(iv)`L' shape flat/lug shall be clamped to L.V. Bushing metal part by using nut, lock-nut and washers.

15.0 **Tank base channel / Mounting Arrangement:**

The under-base of the transformer shall be provided as per clause 14.1 of IS 1180(Part1):2014

16.0 **Terminal Marking Plates and Rating Plates :**

(a) All Transformer HV terminals shall be provided terminal marking plated to Tank. Each terminal, including with neutral, shall be distinctly marked on both primary & secondary in accordance with the connection diagram fixed upon the transformer which shall conformed to latest 1S-2026 (part- IV).

(b) Each Transformer shall be provided with Ratingplate having marking as per IS 1180 (part-l):2014 clause no 13 clearly indicating max. total losses at 50% rated load in watts and maximum total losses at 100% rated load in watts.

(c) Rating & terminal marking plates shall be combined into one plate and shall be mark with standard mark Govern by the provisions of the BIS act 1986.

(d) Terminals shall be provided with terminal marking plates. The transformer shall be provided with riveted rating plate of minimum 18 SWG aluminum anodizedmaterial

sheet in a visible position. The entries of the rating plate shall be in indelibly marked (i.e. by etching, engraving or stamping).

(e) Marking as `M.S.E.D.C.L'S and `Sr. No.' of transformer shall be engraved on transformer main tank below L.T. bushings.

(f) The name of the company, order No., capacity, month and year of manufacturing shall be engraved on separate plate which shall be firmly welded to main tank and shall form integral part of the tank.

(g) The distribution transformer shall be marked with the Standard Mark. The use of Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules Regulations made thereunder.

(h) In addition to the BIS certification mark license No. (a seven digit number) represented as CM/L xxxxxxx shall be clearly & indelibly marked on the rating plate as per the norms of BIS. The width to height ratio of ISI symbol shall be 4:3.

(i) The copy of valid ISI license shall be submitted in support with the bidding document.

(j) Each transformer shall be provided with rating plate having marking as per Cl.no.13 of IS 1180(Part 1): 2014 clearly indicating maximum total losses at 50% rated load in watts and maximum total losses at 100% rated load in watts.

(k) Following details shall also be given on the rating plate as per Fig.1 of Cl.no.13.1 of IS 1180(Part 1): 2014 and terminal marking plate with diagram shall be in accordance with Cl.no.13.2 of IS 1180(Part 1): 2014.

(i) ISI Mark.

(ii) Energy Efficiency level as approved by BIS

(iii) Order No. – Month & year.

(iv) Sr.No. of transformer.

(v) Date of manufacturing – Month & year.

(vi) Date of expiry of guarantee period – month & year.

(vii) Maximum guaranteed 50% load loss & 100 % load loss figures.

(viii) Name and full address of the manufacturer.

(ix) Capacity.

(x) Rating.

(All details on the rating and diagram plate shall be indeligibly marked i.e. by engraving or stamping or etching).

17.0 **Fittings:**

The following standard fittings shall be provided.

1	Rating and terminal marking plate	1 no.
2	Earthing terminals with lugs.	2 nos.
3	Lifting lugs	4 nos. (2 nos. for tank and 2 nos. fortop plate of the transformer)
4	Pulling lugs	2 nos
5	Drain valve - 32mm for all T/Fs (It shallbe covered with metallic box spot weldedto tank) IS554	1 No.
6	Silica gel breather 250gms	1No.
7	Oil filling hole with cap (On Conservator)	1No.
8	Conservator with drain plug	1No.
9	The pipe connecting the conservator to the main tank	1No.
10	Thermometer pocket with cap	1No.
11	Oil filling hole with cap on top cover	1No.
12	Pressure release device	1No.
13	On transformer side tank wall Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; or on conservator with 3 position Minimum (-) 5 deg.C. Normal 30 deg.C, Maximum 98 deg.C.	1No.
14	HT & LT bushing and terminalconnectors	3 nos. of HT bushing and 4 nos. ofLT bushing shall be provided with brass terminal rods with 3 nos. of brass nuts and 2 plain brass washers.

15	Lightening Arrestors for HT bushings	3 Nos.
16	2 year guarantee plate	1 No.
17	Anti-theft stainless steel fasteners with breakaway nut at top cover	4 Nos.

Any other fitting necessary for satisfactory performance. The fittings shall be provided in accordance with Cl no. 20.1 (a to v) &Cl no. 20.2 Optional fittings of IS 1180 (Part1):2014 (if required).

17.1Fasteners.

1. All bolts, studs, screw threads, pipe threads, bolt heads and nuts shall comply with the appropriate Indian standards for metric threads or the technical equivalent.
2. Bolts or studs shall not be less than 6 mm in diameter except when used for small wiring terminals.
3. All nuts and pins shall be adequately locked.
4. Wherever possible bolts shall be fitted in such a manner that in the event of failure of locking resulting in the nuts working loose and falling off, the bolt will remain in position.
5. All ferrous bolts, nuts and washers placed in outdoor positions shall be treated to prevent corrosion by hot dip galvanizing except high tensile steel bolts and spring washers, which shall be Electro, galvanized. Appropriate precautions shall be taken to prevent electrolytic action between dissimilar materials.
6. Each bolt or stud shall project at least one thread but not more than three threads through the nut, except when otherwise approved for terminal board studs or relay stems. If bolts are provided at inaccessible places for ordinary spanners, special spanners shall be provided.
7. The length of screwed portion of the bolts shall be such that no screw thread may form part of a sheer plane between members.
8. Taper washers may be provided where necessary. Protective washers of suitable material shall be provided front and back of the securing screws.
9. LT side should be of Pad type terminal.

18.0 **Lightening Arrestors:**

The Lightening Arrestors (Disconnector type) of high surge capacity of 9 kV (Vrms), 5 kA (8/20 micro wave shape) for 11 kV class transformers and 18 kV (Vrms), 5 kA (8/20 micro wave shape) for 22 kV class transformers & 30 kV, 10 kA (8/20 micro wave shape) for 33 kV, conforming to IS: 3070/1993 shall be mounted on the HV bushings of transformer, clamped securely to the tank, to protect the transformer and associated line equipment

from the occasional high voltage surges resulting from lighting or switching operations. The earthing terminal of the lightening arresters shall be grounded separately.

Random sample of LA shall be destructively tested by breaking the LA to confirm availability of inside component only.

19.0 **Transformer Oil**

The unused mineral insulating oil (type II) for transformers as per IS 335/2018 (fifth revision)amended upto date to be used in all Distribution transformers.The Type test certificates of oil being used shall be produced to inspecting officer at the time of Final inspection at factory premises.

20.0 **Test and Inspection:-**

All routine, type and special tests as described in Clause 21.2 to 21.4 of IS 1180 (Part 1):2014 shall be performed as per relevant parts of IS 2026. Pressure and oil leakage test shall be conducted as per Clause 21.5 of IS 1180 (Part1):2014.

20.1 Routine Tests:

The following shall constitute theRoutine tests:

a) Measurement of winding resistance [IS 2026 (Part 1)].

b) Measurement of voltage ratio and check of phase displacement [IS 2026(Part1)].

c) Measurement of short circuit impedance and load loss at 50 percent and 100 percent load [IS 2026 (Part 1)].

d) Measurement of no load loss and current [IS 2026 (Part 1)].

e) Measurement of insulation resistance [IS 2026 (Part 1)].

f) Induced over-voltage withstand test [IS 2026 (Part 3)].

g) Separate-source voltage withstand test [IS 2026 (Part 3)].

h) Pressure test

i) Oil leakage test

20.2 Type Tests (to be conducted on one unit):-

The following shall constitute the type tests:

a) Lightening impulse test [IS 2026 (Part 3)].

b) Temperature-rise test [IS 2026 (Part 2)].

Note – Minimum total loss (No load + load loss at 75 deg' C referencetemperature) at 100 %loading shall be supplied during temperature rise test.

c) Short-circuit withstand test [IS 2026 (Part 5)].

d) Pressure test.

In addition to that the successful bidder shall submit the type test report of transformer Oil & HV/LV bushings as per relevant IS with offer.

20.3 The Type Tests as per Clause 20.2 above shall be successfully carried out at laboratories accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL) in accordance with IS 1180(Part 1):2014 as amended from time to time and technical specifications, within the last 5 (five) years prior to the date of offer.

20.4 The type test reports should be submitted and got approved from the Chief Engineer (MMC) before commencement of supply.

20.5 Special Tests (to be conducted on one unit):-

The following shall constitute the special tests.

a) Determination of sound levels [IS 2026 (Part 10)].

b) No load current 112.5 percent voltage [refer clause 7.9.2 of IS 1180(Part 1): 2014].

c) Paint adhesion tests: The test is performed as per ASTM D 3359 (Standard Test Methods for measuring adhesion by Tape Test).

d) BDV and moisture content of oil in the transformer (IS 335). Note:Tests at (c) and (d) may be carried out on more than one unit.

20.6 Pressure and Oil leakage Test

20.6.1 **Pressure Test (Type Test)**

The transformer tanksubjected to air pressure of 80 kPa for 30 min and vacuum of 250 mm of mercuryfor 30 min. The permanent deflection of flat plate, after pressure/vacuum hasbeenreleased, shall not exceed the values given below.

Length of Plate	Deflection
Up to 750 mm	5.0 mm
751 mm to 1250 mm	6.5 mm

20.6.2 **Pressure Test (Routine Test) :**

a) Plain tanks:

The transformer tank with welded / bolted cover shall be tested ata pressure of 35 kPa above atmospheric pressure maintained inside the tank for 10 min. There should be no leakage at any point.

b) Corrugated tanks:

The corrugated transformer tank shall be tested for airpressure of 15 kPa above atmospheric pressure maintained inside the tank for 10 min. There should be no leakage at any point.

20.6.3 **Oil leakage Test (routine Test):**

The assembled transformer for sealed/ non-sealed type withall fittings including bushing in position shall be tested at a pressure equivalent to twice the normal head measured at the base of the tank for 8 h. There should be no leakage at any point. Tank with corrugations shall be tested for oil leakage test a pressure of 15 kPa measured at the top of the tank for 6 h. There should be no leakage at any point.

21.0 **Challenge Testing:**

The manufacturer can also request challenge testing for any test based on specification and losses. The challenger would request for testing with testing fees. The challenge test fees are proposed at least three times the cost of testing. This is likely to deter unnecessary challenges. The challenger would have the opportunity to select the sample from the store and any such challenge should be made within the guarantee period. The party challenged, challenger and the utility could witness the challenge testing.

The challenge testing would cover following tests:

1. Measurement of magnetizing current.
2. No load losses test.
3. Load losses test (at 50 % loading or as per routine test).
4. Temperature rise test.

The challenge test could be conducted at NABL Laboratory, like ERDA and CPRI. If the values are within the limits the products gets confirmed else not conformed. No positive tolerances in losses are permitted. If the product is not conformed the manufacturer would pay the challenge fee and challenger would get the fee refunded. However as a redressal system the challenger would be allow to ask for fresh testing of two or more samples from the store and the same be tested in NABL Laboratory in presence of party challenge, challenger and the utility.

If any one of the above sample does not conform the test, then the product is said to have failed the test. In such cases the manufacturer will be declared as unsuccessful manufacturer for the said product with wide publicity and would not be allowed to compete in tenders of the MSEDCL for the period of three years and heavy penalty would be imposed.

22.0 **Offer Qualification for Type Test:-**

22.1 In case of any of the following, the offer may be considered for evaluation only.

i) If above tests are carried out beyond 5 years

ii) Impulse Voltage Withstand test,Dynamic Short Circuit test, Temperature rise Test & Pressure Test carried out not from NABL approved Laboratory.

iii) If there is any change in the design/ type of old type tested transformers to be offered against this specification.

Note: *However, In that case successful bidders have to carry out the type tests at thelaboratories accredited by NABL before commencement of supply at their own expense on the sample drawn by the purchaser from the lot offered for first Stage Inspection*.

22.2 In respect of the successful bidder, the purchaser reserves the right to demand repetition of some or all the type tests in presence of the purchaser's representative.

In case the unit fails in the type tests, the complete supply shall be rejected. The bidders are therefore requested to quote unit rates for carrying out each type test, which however, will not be considered for evaluation of the offer.

23.0 **Drawings & Calculation sheet:-**

23.1 Following as per attached standard drawings with these technical specifications shall be sealed and signed by the bidder and upload along with the offer if bidder agrees to MSEDCL specific requirement as given standard GTP attached with this specification:

i. Rating & Diagram Plate Drawing.(As per Cl.no.13.1 Fig.1 of IS 1180(Part1):2014

ii. General Dimensional Drawing.

iii. Internal Construction Drawing

iv. Core Assembly drawing

v. HV& LV Bushings Assembly drawing

vi. Creepage distances distance drawing of HV& LV Bushing

vii. Silica gel breather drawings

viii. viii. BEE certification

ix. Calculation sheet for flux density and total losses at 50% and 100% loading

x. Heat dissipation calculations

xi. Oil absorption calculations

23.2 The drawings shall be of A-3 (420 x 297 mm) size only. The bidder should also supply along with his offer the pamphlets/literatures etc. for fittings / accessories.

23.3 The bidder should not change design once offered as per A/T, approved drawings and Type Test Reports.

23.4 The successful Bidders shall submit complete a set of legible and clear drawings (as listed in Cl.No.23.1) of the transformer toMMC for record before offering first factory inspection of the transformers.

24.0 **Rejection :-**

24.1 Apart from rejection due to failure of the transformer to meet the specified test requirements the transformer shall be liable for rejection on any one of the following reasons.

i. Maximum total losses at 50 % load & 100% Load lossexceeds the specifiedvalues mentioned in Cl. No.6.3 above.

ii. Impedance voltage value exceeds the guaranteed value plus tolerances as mentioned at Cl.No.6.5 above.

iii. Type test are not carried out as per clause no. 20.2 & 20.3 of the specification.

iv. Drawings are not submitted as per clause no. 23.0 of the specification.

v. GTP not submitted as per clause no. 26.0 of the specification.

vi. Heat dissipation calculation sheet are not submitted as per clause no.8.0 of the specification.

25.0 **Cleaning and Painting.**

i. The external surface of transformers shall be painted with one coat of Epoxy primer (30 micron)and two coats of Polyurethane (finish coat) Liquid paint (each 25 micron) and inside surface of the tank hot oil resistant paint/ varnish with one coat with dry film thickness as mentioned in Table 12 , Cl.no.15.5 of IS 1180(Part 1):2014 .

ii. The test of measurement of paint thickness shall be carried out cross hatch test, chemical test and other as per IS 13871:1993

iii. The surface of the tank shall be properly pre-treated / phosphated in a seven tank process and shall be applied with a powder coating of 40 micron thickness. The powder coating shall be of **Aircraft Blue** colour (shade No. 108) for transformers. Powder coating shall be suitable for outdoor use. The seven tank process facility shall be enhance to ensure proper quality for outdoor application.

iv. The month and year of supply shall be painted in red bold **Marathi** lettering at two places one at conservator and other at sum conspicuous place on the transformer which shall be clearly visible from the ground.

26.0 **Standard Guaranteed & Technical Particulars:**

The specific requirement of MSEDCL is given in GTP attached with this specification, the bidderif agreed to all technical parameters given as listed in GTP the statement such as “as per MSEDCL’s requirement” shall be considered and if he is wants offer deviations to specific requirement they can offer their technical parameters in column given in GTP. The GTP should be filled otherwise offer shall liable for rejection.

27.0 **Testing facility:**

The bidder should have adequate testing facility for all routine and acceptance tests and also arrangement for measurement of losses, resistance, etc. details of which will be enumerated in the tender.

28.0 **Submission Routine Test Certificate:**

a. The successful bidder shall submit the routine test certificate along with documentary evidence for having paid the Excise Duty for the following raw

materials viz. Oil, Aluminum, copper for conductors, insulating materials, core materials, bushings at the time of routine testing of the fully assembled transformer

b. Instruction and operation Manual: The successful bidder shall be required to submit 5 copies of instruction and Operation manual for each lot of 100 Transformers (or part thereof) supplied. This instruction manual should give complete details about the pre-commissioning tests/checks and the details of preventive maintenance etc.

29.0 **Stage Inspection :- Deleted**

30.0 **Inspection at Factory Premises**

The manufacturer will give inspection call for a lot / part of lot for inspection in prescribed Proforma along with the serial numbers of distribution transformers.

On receipt of intimation for inspection for the lot / part of lot offered as per cl. no. 4 (i) of Section II (Annexure A) of tender documents on email-id eehohvds@mahadiscom.in, the inspection will be carried out as below.

(i) The Executive Director (Infra) will depute one Inspecting Officer for inspection of offered lot / part of lot.

(ii) 10% samples to be tested at factory will be decided by ED Infra office for that particular lot / part of lot.

(iii) The ED (Infra) will select at random 10% DTs along with its serial number and communicate to the Inspecting Officer.

(iv) The Inspecting Officer shall tests these transformers for 50% & 100% losses.

(v) If the transformers pass in 50% & 100% losses tests, the inspector shall select one transformer from these 10% offered lot / part of lot for RST.

(vi) This selected transformer will be tested for routine tests mentioned in cl. no. 20.1 above.

(vii) If the transformer passes in routine tests, the transformer will be opened and all design technical parameters shall be checked as per GTP, approved drawings and technical specifications.

(viii) If any transformer fails to meet the requirement, then that particular lot / part of lot will be rejected and supplier has to reoffer the lot / part of lot.

(ix) If the transformer passes in inspection, then clearance will be given by the inspector for dispatch to consignee stores as per delivery instructions issued by MM Cell.

(x) The inspection report shall be fed online through ERP by the Inspector at factory premises only.

(xi) Inspection and acceptance of any equipment under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications.

(xii) However, MSEDCL will decide to carry out the inspection as above or at random or otherwise. If it is decided by MSEDCL that a particular lot is not to be inspected, the same will be informed to the supplier and supplier will have to supply the transformers to consignee stores as per DI issued.

31.0 **Testing of all Distribution Transformers for losses at 50% load and 100% load:**

Merged in cl. no. 30.0 above

32.0 **Random Sample Testing (RST):-**

Merged in cl. no. 30.0 above

33.0 **Inspection & Testing of Transformer Oil:**

The tenderer shall make arrangements for testing of transformer oil as per IS 335/2018 to be used in the transformers and testing will be done in presence of purchaser's representative.

To ascertain the quality of transformer oil, original manufacturer's test report should be furnished to EE (Testing) at the time of factory inspection for acceptance of the lot.

34.0 **Quality Assurance**

34.1 The bidder shall invariably furnish following information along with the offer failing to which the offer will be rejected.

34.2 Certificates of following materials shall be submitted as per relevant standards indicated in Clause No.9.1 of IS 1180(Part1):2014.

i. Copper / Aluminum conductor

ii. Transformer oil

iii. C.R.G.O.Core.

iv. Insulating / Kraft paper.

v. Porcelain Bushings

vi. Steel Plate used for Tank, press board.

34.3 Names of the supplier for the raw material, list of standard accordingly to which the raw materials are tested, list of test normally carried out on raw materials in presence of bidder’s representatives, copies of type test certificates to be furnished.

34.4 Information and copies of test certificate as in (33.3) above respect of bought out accessories including terminal connectors.

34.5 List of manufacturing facilities available, in this list the bidder shall specifically mention whether lapping machine, vacuum drying plant, air conditioned dust free room with positive air pressure for provision of insulation and winding etc are available with him.

34.6 Level of automation achieved and list of areas where manual processing still exists.

34.7 List of areas in manufacturing process where stage inspection are normally carried out for quality control and details of such tests and inspections.

34.8 Special features provided in the equipments to make it maintenance free

34.9 List of testing equipment available with the bidder for final testing of transformers and test plant limitation, if any, vis-à-vis the type, special acceptance and routine tests specified in the relevant standards and the present specification. These limitations shall be very clearly brought out in schedule of deviations from specified test requirements.

34.10 The successful bidder shall submit the Routine Test Certificate along with documentary evidence having paid for the excise duty for the following raw materials viz Oil, Copper for conductors, insulating materials, Core materials, Bushing at the time of routine Testing of the fully assembled transformer.

35.0 **Qualifying Requirement: As per Tender**

36.0 **Performance Guarantee:**

All transformers supplied against this specification shall be guaranteed for a period of 24 months from the date of receipt of material at concern stores / consignee. However, any engineering error, omission, wrong provisions, etc. which do not have any effect on the time period, shall be attended to as and when observed/ pointed out without any price implication.

37.0 **COST DATA SHEET:-**

The bidders shall submit the cost data sheets indicating the break up prices and quantity of each raw material and components along with the unit rates required for manufacture the offered transformers along with the offer. The cost data sheet format is enclosed herewith.. If the rates quoted are not justified with the cost data sheets, the offer shall not be considered for evaluation and placement of the order.

The cost data sheets shall be scrutinized by MM Cell section.

KVA				
Particulars	UNIT	Rate	Qty.	AMT(Rs.)
CRGO CORE (M4 or better)/Amorphous	KG			
ALUMINIUM/COPPERWITHSUPER ENAMELED OF THERMAL GRADE OF 220 DEGREE C FOR HV WINDING	KG			
ALUMINIUM/COPPERWITHDPC FOR LV WINDING	KG			
INSULATION PAPER	Meter			

OIL	LITRE			
TANK	NO.			
CHANNELS	KG			
INSULATORS/BUSHINGS	NO.			
OTHERS	LUMPSUM			
WASTAGE @ %				

38.0 **Schedules**

38.1 The bidder shall fill in the following schedules which form part of the tender specification and offer. If the schedules are not submitted duly filled in with the offer, the offer shall be rejected.

Schedule `A' -Guaranteed Technical Particulars

Schedule `B' -Schedule of Tenderer's Experience.

38.2 The discrepancies between the specification and the catalogs, Literatures and indicative drawings which are subject to change, submitted as part of the offer, shall not be considered and representation in this regard will not be entertained.

38.3 The Bidder shall submit the list of orders for similar type of equipments, executed or under execution during the last three years, with full details in the schedule of Tenderer's experience (Schedule `B') to enable the purchaser to evaluate the tender.

Schedule `A'

STANDARD GUARANTEED TECHNICAL PARTICULARS

SCHEDULE – 'B'

SCHEDULE OF TENDERER'S EXPERIENCE

Tenderer shall furnish here a list of similar orders executed/under execution by him to whom a reference may be made by Purchaser in case he considers such a reference necessary.

Sr. No.	Name of client& Description	ValueOf Order(along with cap. of T/F)	Period of supply & commissioning	Name & Address to whom reference

NAME OF FIRM _____

NAME & SIGNATURE OF TENDERER_____

DESIGNATION_____

DATE_____

Annexure I

Air Pressure Test

Name of Supplier:

Order No.:

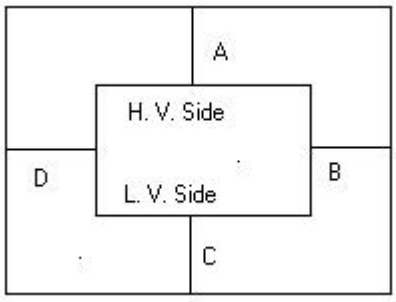
Capacity & Voltage Ratio of Distribution Transformer : _____ kVA, ___/0.433 kV Vector Group Dyn11

Sr. No. of equipment Tested:

Date of Testing:

Reference Standard

All the opening of the transformer tank were closed with suitable gasket, bushing, valves and plugs. The compressor pipe connected at oil filling hole on conservator and a pressure guage was fitted at air vent plug. The parallel string were places around the tank, the distance between string and tank as shown in following diagram were recorded before applying the pressure and after releasing pressure.



Tank Thickness: Side _____ mm.			Top & Bottom _____ mm	
Test Pressure : _____ kg/cm2 applied for 30 Minutes				
	Test Point	Distance before Test In mm	Distance after release of Pressure in mm	Deflection In mm
	A			
	B			
	C			
	D			

Permanent Deflection : _____ mm

Permissible Limit of Permanent Deflection as per Specification : ____ mm

Test witnessed by Tested by

Annexure II

Temperature Rise Test

Name of Supplier:
Order No.:
Capacity & Voltage Ratio of Distribution Transformer : _____ kVA, ____/0.433 kV
Vector Group Dyn11
Sr. No. of equipment Tested:
Date of Testing:
Reference Standard

	H. V. Winding	L. V. Winding
Rated Line Current in Amp		

Guaranteed No Load Losses _____ watt
Load Losses _____ watt
Total Losses _____ watt

P. T. Ratio : _____/____ =
C. T. Ratio : _____/____ =
Wattmeter Constant =
Total Multiplying Factor (MF) =

TIME	Ambient Temp.				Top Oil Temp. °C	Rise in Top Oil Temp. °C	Line Voltage in Volts	Line Current in Amps	W1 watts	W2 watts	W3 watts	W1+W2+W3 watt	Multiplying Factor (MF)	Total Watt
	T1 °C	T2 °C	T3 °C	Average °C										
Reduced to Rated Current _____ amps														

Calculation of Temperature Rise in Winding

LV Winding : Since the resistance of LV winding is less than 0.005 ohm, Temperature Rise in LV Winding is taken as temperature rise of oil as per clause no. 4.3 of IS:2026 (Part II)/1977

Temperature Rise in LV Winding = _____ °C

HV Winding Resistance across 1U1V at _____°C = _____ ohm

Measurement of Hot Resistance of HV Winding after Shut Down.

Time	Resistance

Hot winding Resistance at Ambient Temperature _____ °C (from graph) = _____ Ohm

Temperature Rise in H. V. Winding is

$$\frac{\text{Hot Resistance x(235+Cold Ambient Temperature)}}{\text{Cold Resistance}} - (235+\text{Hot Ambient Temperature})$$

Results :

1) Temperature Rise in Oil = _____ °C

2) Temperature Rise in LV Winding = _____ °C

3) Temperature Rise in HV Winding = _____ °C

4) Oil leakage test:

The oil leakage test shall be conducted on one unit selected from the offered lot of each rating. Transformer complete in all respects shall be subjected to the pressure of 0.4 kg/cm2 and maintained for 8 hours. No leakage should occur.

Test witnessed by Tested by

Standard GTP - 25 KVA, 22/0.433 KV Distribution Transformers (Level-2) – Sealed/Non Sealed Type

Sr.No	Guaranteed Technical Particular	Specific Requirement of MSEDCL	Specific Requirement of MSEDCL whether agree with it yes or not	If not , please specify value
1	Name of Manufacturer			
2	Reference Standard	IS 1180 Part -1, Energy Effiency Level - 2		
3	Whether transformer is Oil Natural Air Natural cooled type (Yes/ No)	Yes		
4	Whether transformer is suitable for Indoor /Outdoor installation	Outdoor Installation		
5	Rating of transformer in KVA	25		
6	Primary Voltage in kV	22		
7	Secondary Voltage in kV	0.433		
8	Whether neutral is solidly earthed (Yes/ No)	Yes		
9	Colour of transformer	Aircraft Blue, Shade no 108 of IS : 5		
10	Vector Group	Dyn-11		
11	Approximate overall length of transformer in mm	975		
12	Approximate overall breadth of transformer in mm	705		
13	Approximate overall height of transformer in mm	1275		
14	Approximate length of transformer tank in mm	775		
15	Approximate breadth of transformer tank in mm	305		
16	Approximate height of transformer tank in mm	720		
17	Thickness of the side of transformer Tank plate in mm	3.15		
18	Thickness of the bottom of transformer tank plate in mm	5		
19	Thickness of the top of transformer tank plate in mm	5		
20	Weight of Tank & fittings in kgs	105		
21	Total Weight of Transformer in kgs	357		
22	Type of Tank (corrugated/conventional)	Conventional		

23	Degree of slope to the top plate of Transformer.	5 degree to 10 degree towards HV Side		
24	In case of Corrugated tank, Thickness of corrugated sheet (in mm)	N.A.		
25	Name plate details are as per the requirement specified in tender. (Yes/ No)	Yes		
26	Total radiating surface of transformer tank in Sq. mtrs.	1.555		
27	Core material used & its grade	CRGO, M4		
28	Type of core	Stacked Core		
29	Weight of Core in kgs	90.53kg		
30	No. of steps of core for CRGO core	9		
31	Diameter of core in mm	86mm		
32	Effective core area.(sq.cm)	52.2248		
33	Flux density in Tesla	1.69 Tesla max		
34	Thickness of core lamination in mm	0.27		
35	The temperature shall in no case reach a value that will damage the core itself, other parts or adjacent materials (Yes/No)	Yes		
36	Type of connection for H.V. Winding (Delta) (Yes/ No)	Yes ,Delta		
37	Type of connection for L.V. Winding (Star) (Yes/ No)	Yes,Star		
38	Material of H.V. winding	Aluminum		
39	Material of L.V.Winding	Aluminum		
40	Insulation provided to H.V winding.	Super Enamelled with thermal grade 220 degree centigrade		
41	Insulation provided to L.V. winding.	Double Paper covering		
42	Current density of H.V. winding (in Ampere/ sq.mm)	1.3 Max		
43	No of LV winding turns	140		
44	No of HV winding turns	12320		
45	Resistance of LV winding per phase at 20 deg C in ohms	0.0563ohms		
46	Resistance of HV winding per phase at 20 deg C in ohms	391.514 ohms		
47	Current density of L.V. winding (in Ampere/sq. mm.)	1.3 Max		
48	Clearance between Core & L.V. winding in mm	3.5mm		
49	Clearances between L.V. & H.V. winding in mm	14mm		

50	Clearances between HV Phase to Phase in mm	15mm (min)		
51	Clearances between end insulation to Earth in mm	40 mm		
52	Clearances between winding to tank in mm (min 40 mm)Yes/No	Yes		
53	Weight of Aluminum/Copper in kgs	40.37Kg		
54	Inter layer insulation provided in H.V winding to design for Top & bottom layer	Electrical Grade Insulating Kraft paper -Thick-2mill		
55	Inter layer insulation provided in L.V winding to design for Top & bottom layer	Electrical Grade Insulating Kraft paper -Thick-2mill		
56	Inter layer insulation provided in between all layer in H.V winding	Electrical Grade Insulating Kraft paper -Thick-2mill		
57	Inter layer insulation provided in between all layer in L.V winding	Electrical Grade Insulating Kraft paper -Thick-2mill		
58	Details of end insulation	Press board block and sheet		
59	Whether wedges are Provided at 50% turns of the Coil (Yes/ No)	No		
60	Insulation materials provided for core	Hot oil proof insulation Carlite		
61	Length of coil used for HV winding in meter.	7098.6608		
62	Cross section area of the coil used for HV winding (sq.mm)	0.515sq.mm.		
63	Length of coil used for LV winding in meter.	45.9382 mtrs.		
64	Size of strip used for LV winding in mm	10 x 2.4 mm		
65	No. of conductors in parallel for LV winding	1		
66	Total cross section area of LV conductor in sq. mm	23.45		
67	No. of H.V coils /phase	4		
68	Thickness of locking spacers between H.V. coils (in mm)	7		
69	Weight of Oil in kgs	89 kg		
70	Volume of Oil in Ltrs	110 Ltrs		
71	Quantity of total oil absorption (in liters) in first filling	4.430 Ltrs.		
72	Total oil Volume including Total Oil absorption in liters	114.430 Ltrs.		
73	Grade of Oil used.	Mineral Oil As per IS 335 amendedupto date		
74	Name of Oil manufacturers to be supplied.			

75	Breakdown Values of Oil at the time of first filling (kV/mm) considering 2.5 mm gap	30 KV for Unfiltered Oil & 60 KV for Filtered Oil		
76	Oil level indicator (showing three levels) on tank (Yes/ No)	Yes		
77	Drain Valve (32 mm) provided to the transformer tank (Yes/No)	Yes (32mm)		
78	Earthing terminals with lugs is provided (Yes/No)	Yes		
79	Lifting lugs provided (Yes/No)	Yes		
80	Thermometer pocket is provided (Yes/No)	Yes		
81	Material of HV and LV Bushings and makes thereof			
82	Reference standard of Bushings	As per IS 3347		
83	Rating of L.V. Bushing	1kV/250Amp		
84	Minimum Creepage Distance of HV Bushing in mm (min.25 mm per kV)	605		
85	Minimum Creepage Distance of LV Bushing in mm (min.25 mm per kV)	65		
86	Rating of H.V. Bushings (in kV)	24KV/250A		
87	Rating of L.V. Bushing (in kV, kA)	1kV,/250Amp		
88	Min. External clearances of H.V. bushing terminals between ph. to ph (330 mm)	330		
89	Min. External clearances of H.V. bushing terminals between ph. to earth (230 mm)	230		
90	Min. External clearances of L.V. bushing terminals between ph. to ph (75 mm)	75		
91	Min. External clearances of L.V. bushing terminals between ph. to earth (40 mm)	40		
92	Rating of Lightening Arrestors and Make thereof	18kv rms, 5kA (8/20 micro wave shape)		
93	Reference Standard of Lightening Arrestors.	IS: 3070/1974		
94	Maximum winding temperature rise in °C over an Ambient temp. of 50°C by Resistance Method	40		
95	Maximum temperature rise of Oil in °C over an Ambient temp. of 50°C by thermometer.	35		
96	Magnetizing current (No load) in Amps and its % of full load current at rated voltage referred to L.V. side.	0.99 Amps, 3% of Full Load Current in LT Winding		

97	Magnetizing current (No load) in Amps and its % of full load current at maximum voltage (112.5% of rated voltage) referred to L.V. side.	1.99 Amps, 6% of Full Load Current in LT Winding		
98	Max. core (No load) losses at rated voltage and rated frequency (Watts) .	85		
99	Max. Total losses (No Load + Load Losses at 75 °C) at 50% loading in Watts	199		
100	Max. Total losses (No Load + Load Losses at 75 °C) at 100% loading in Watts	666		
101	Efficiency at 75 °C at unity P.F. at 125% load	98.55		
102	Efficiency at 75 °C at unity P.F. at 100% load	98.76		
103	Efficiency at 75 °C at unity P.F. at 75 % load	98.92		
104	Efficiency at 75 °C at unity P.F. at 50% load	99.02		
105	Efficiency at 75 °C at unity P.F. at 25% load	98.89		
106	Efficiency at 75 °C at 0.8 P.F. lag at 125% load	98.22		
107	Efficiency at 75 °C at 0.8 P.F. lag at 100 % load	98.44		
108	Efficiency at 75 °C at 0.8 P.F. lag at 75 % load	98.67		
109	Efficiency at 75 °C at 0.8 P.F. lag at 50 % load	98.65		
110	Efficiency at 75 °C at 0.8 P.F .lag at 25% load	98.43		
111	Efficiency at 75 °C at 0.8 P.F. leading at 125% load	98.24		
112	Efficiency at 75 °C at 0.8 P.F. leading at 100% load	98.48		
113	Efficiency at 75 °C at 0.8 P.F. leading at 75% load	98.66		
114	Efficiency at 75 °C at 0.8 P.F. leading at 50%load	98.68		
115	Efficiency at 75°C at 0.8 P.F. leading at 25 % load	98.42		
116	Regulation at Unity P.F (in %)	1.066		
117	Regulation at 0.8 P.F. lag. (in %)	3.42		
118	Regulation at 0.8 P.F. leading. (in %)	3.42		
119	% Impedance value at 75°C	4.5% (±10%)		
120	Separate source power frequency withstand test for HV for 1 minute in kv(min)	50 kV applied for HV for 1 minute		

121	Separate source power frequency withstand test for LV for 1 minute in kv(min)	3 kV applied for LV for 1 minute		
122	Induced over voltage withstand test for 1 min. specify voltage frequency, time for test.	866 kV applied for LV side for 1 minute @ 100Hz.		
123	Impulse test value (in kVp) .	125 kVp,1.2/50 micro second		
124	The test certificates of Aluminium/copper conductor, core , insulating paper, porcelainbushings, steel plate used for enclosure of offer transformer is enclosed along with the offer in soft copy.(Yes/ No)	Yes		
125	All type test report of type tests carried out on transformer at NABL laboratory shall be submitted along with the offer as per cl. XXII (c) of Section (I) i.e. Instructions to tenderers.(Yes/ No)	Yes		
126	Air pressure test and temperature rise test shall be conducted as per format enclosed with thetechnical specification along with the offer (Yes/ No)	Yes		
127	All drawings shall be furnished for each offered item separately along with this offer (Yes/No)	Yes		
128	Oil absorption calculation sheet shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
129	Heat dissipation calculation shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
130	Flux density calculation sheet with no. of Primary & Secondary turns shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
131	Calculation sheet for 112.5% of Rated V/f ratio (over fluxing calculation sheet) shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
132	Required documents, plant and machinery, list of order executed/under execution shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		

133	The information required under Quality Assurance shall be submitted with the offer in physical format & soft copy(Yes/ No)	Yes		
134	The cost data in the prescribed format shall be submitted with offer in physical format & soft copy (Yes/ No)	Yes		
135	The performance Guarantee of the transformers in years	2 Years from date of receipt of material		
136	Power frequency withstand voltage dry & wet in kV(rms) for H.V Bushing	50 KV rms		
137	Dry lightning Impulse withstand voltage test in kV (peak) Stating the wave form adopted for H.V. bushing	125 kVP with wave form 1.2/50 micro second as per Technical Specification		

Standard GTP - 16 KVA, 22/0.433 KV Distribution Transformers (Level-2) - Sealed /Non Sealed Type

GTP Srr.No	Guaranteed Technical Particular	Specific Requirement of MSEDCL	Specific Requirement of MSEDCL whether agree with it yes or not	If not , please specify value
1	Name of Manufacturer.			
2	Reference Standard	IS 1180 Part -1, Energy Effiency Level - 2		
3	Whether transformer is Oil Natural Air Natural cooled type (Yes/ No)	Yes		
4	Whether transformer is suitable for Indoor /Outdoor installation	Outdoor Installation		
5	Rating of transformer in KVA	16		
6	Primary Voltage in kV	22		
7	Secondary Voltage in kV	0.433		
8	Whether neutral is solidly earthed (Yes/ No)	Yes		
9	Colour of transformer	Aircraft Blue, Shade no 108 of IS : 5		
10	Vector Group	Dyn-11		
11	Approximate overall length of transformer in mm	945		
12	Approximate overall breadth of transformer in mm	695		
13	Approximate overall height of transformer in mm	1270		
14	Approximate length of transformer tank in mm	745		
15	Approximate breadth of transformer tank in mm	295		
16	Approximate height of transformer tank in mm	715		
17	Thickness of the side of transformer Tank plate in mm	3.15		
18	Thickness of the bottom of transformer tank plate in mm	5		
19	Thickness of the top of transformer tank plate in mm	5		
20	Weight of Tank & fittings in kgs	103		
21	Total Weight of Transformer in kgs	330		

22	Type of Tank (corrugated/conventional)	Conventional		
23	Degree of slope to the top plate of Transformer.	5 degree to 10 degree towards HV Side		
24	In case of Corrugated tank, Thickness of corrugated sheet (in mm)	N.A.		
25	Name plate details are as per the requirement specified in tender. (Yes/ No)	Yes		
26	Total radiating surface of transformer tank in Sq. mtrs.	1.487		
27	Core material used & its grade	CRGO, M3		
28	Type of core	Stacked Core		
29	Weight of Core in kgs	68.96 kg		
30	No. of steps of core for CRGO core	7		
31	Diameter of core in mm	76mm		
32	Effective core area.(sq.cm)	39.993		
33	Flux density in Tesla	1.69 Tesla max		
34	Thickness of core lamination in mm	0.27		
35	The temperature shall in no case reach a value that will damage the core itself, other parts or adjacent materials (Yes/No)	Yes		
36	Type of connection for H.V. Winding (Delta) (Yes/ No)	Yes ,Delta		
37	Type of connection for L.V. Winding (Star) (Yes/ No)	Yes,Star		
38	Material of H.V. winding	Aluminium		
39	Material of L.V.Winding	Aluminium		
40	Insulation provided to H.V winding.	Super Enamelled with thermal grade 220 degree centegrate		
41	Insulation provided to L.V. winding.	Double Paper covering		
42	Current density of H.V. winding (in Ampere/ sq.mm)	1.3 Max		
43	No of LV winding turns	184		
44	No of HV winding turns	16192		
45	Resistance of LV winding per phase at 20 deg C in ohms	0.0818		
46	Resistance of HV winding per phase at 20 deg C in ohms	611.82		
47	Current density of L.V. winding (in Ampere/sq. mm.)	1.3 Max		

48	Clearance between Core & L.V. winding in mm	3.5 mm		
49	Clearances between L.V. & H.V. winding in mm	14.0mm		
50	Clearances between HV Phase to Phase in mm	15 mm		
51	Clearances between end insulation to Earth in mm	40 mm		
52	Clearances between winding to tank in mm (min 40 mm)Yes/No	Yes-40mm		
53	Weight of Aluminum/Copper in kgs	38.44		
54	Inter layer insulation provided in H.V winding to design for Top & bottom layer	Electrical Grade Insulating Kraft paper 2 mill thick		
55	Inter layer insulation provided in L.V winding to design for Top & bottom layer	Electrical Grade Insulating Kraft paper 2 mill thick		
56	Inter layer insulation provided in between all layer in H.V winding	Electrical Grade Insulating Kraft paper 2 mill thick		
57	Inter layer insulation provided in between all layer in L.V winding	Electrical Grade Insulating Kraft paper 2 mill thick		
58	Details of end insulation	Press board block and sheet		
59	Whether wedges are Provided at 50% turns of the Coil (Yes/ No)	No		
60	Insulation materials provided for core	Hot oil proof insulation carlite		
61	Length of coil used for HV winding in meter.	8821.24		
62	Cross section area of the coil used for HV winding (sq.mm)	0.396 Sq.mm.		
63	Length of coil used for LV winding in meter.	54.598		
64	Size of strip used for LV winding in mm	7.9 X 2.4 mm		
65	No. of conductors in parallel for LV winding	1		
66	Total cross section area of LV conductor in sq. mm	18.41		
67	No. of H.V coils /phase	4		
68	Thickness of locking spacers between H.V. coils (in mm)	7		
69	Weight of Oil in kgs	62		
70	Volume of Oil in Ltrs	76		

71	Quantity of total oil absorption (in liters) in first filling	3.2		
72	Total oil Volume including Total Oil absorption in liters	80		
73	Grade of Oil used.	Minaral Oil As per IS 335 ammended up to date.		
74	Name of Oil manufacturers to be supplied.			
75	Breakdown Values of Oil at the time of first filling (kV/mm) considering 2.5 mm gap	30 KV for unfiltered oil & 60 kV for Filtered Oil		
76	Oil level indicator (showing three levels) on tank (Yes/ No)	Yes		
77	Drain Valve (32 mm) provided to the transformer tank (Yes/No)	Yes (32mm)		
78	Earthing terminals with lugs is provided (Yes/No)	Yes		
79	Lifting lugs provided (Yes/No)	Yes		
80	Thermometer pocket is provided (Yes/No)	Yes		
81	Material of HV and LV Bushings and makes thereof			
82	Reference standard of Bushings	IS 3347		
83	Rating of L.V. Bushing	1kV/250Amp		
84	Minimum Creepage Distance of HV Bushing in mm (min.25 mm per kV)	605		
85	Minimum Creepage Distance of LV Bushing in mm (min.25 mm per kV)	65		
86	Rating of H.V. Bushings (in kV)	24/250Amp		
87	Rating of L.V. Bushing (in kV, kA)	1kV/250Amp		
88	Min. External clearances of H.V. bushing terminals between ph. to ph (255 mm)	330		
89	Min. External clearances of H.V. bushing terminals between ph. to earth (140 mm)	230		
90	Min. External clearances of L.V. bushing terminals between ph. to ph (75 mm)	75		
91	Min. External clearances of L.V. bushing terminals between ph. to earth (40 mm)	40		

92	Rating of Lightening Arrestors and Make thereof	18kv rms, 5kA (8/20 micro wave shape)		
93	Reference Standard of Lightening Arrestors.	IS: 3070/1974		
94	Maximum winding temperature rise in °C over an Ambient temp. of 50°C by Resistance Method	40		
95	Maximum temperature rise of Oil in °C over an Ambient temp. of 50°C by thermometer.	35		
96	Magnetizing current (No load) in Amps and its % of full load current at rated voltage referred to L.V. side.	0.64Amps, 3% of Full Load Current in LT Winding		
97	Magnetizing current (No load) in Amps and its % of full load current at maximum voltage (112.5% of rated voltage) referred to L.V. side.	1.28 Amps, 6% of Full Load Current in LT Winding		
98	Max. core (No load) losses at rated voltage and rated frequency (Watts) .	72		
99	Max. Total losses (No Load + Load Losses at 75 °C) at 50% loading in Watts	141		
100	Max. Total losses (No Load + Load Losses at 75 °C) at 100% loading in Watts	462		
101	Efficiency at 75 °C at unity P.F. at 125% load	98.65		
102	Efficiency at 75 °C at unity P.F. at 100% load	98.77		
103	Efficiency at 75 °C at unity P.F. at 75 % load	98.59		
104	Efficiency at 75 °C at unity P.F. at 50% load	98.55		
105	Efficiency at 75 °C at unity P.F. at 25% load	98.78		
106	Efficiency at 75 °C at 0.8 P.F. lag at 125% load	98.22		
107	Efficiency at 75 °C at 0.8 P.F. lag at 100 % load	98.74		
108	Efficiency at 75 °C at 0.8 P.F. lag at 75 % load	98.96		
109	Efficiency at 75 °C at 0.8 P.F. lag at 50 % load	98.64		
110	Efficiency at 75 °C at 0.8 P.F .lag at 25% load	98.49		
111	Efficiency at 75 °C at 0.8 P.F. leading at 125% load	98.36		

112	Efficiency at 75 °C at 0.8 P.F. leading at 100% load	98.62		
113	Efficiency at 75 °C at 0.8 P.F. leading at 75% load	98.6		
114	Efficiency at 75 °C at 0.8 P.F. leading at 50%load	98.61		
115	Efficiency at 75°C at 0.8 P.F. leading at 25 % load	98.49		
116	Regulation at Unity P.F (in %)	1.067		
117	Regulation at 0.8 P.F. lag. (in %)	3.42		
118	Regulation at 0.8 P.F. leading. (in %)	3.42		
119	% Impedance value at 75°C	4.5% (±10%)		
120	Separate source power frequency withstand test for HV for 1 minute in kv(min)	50 kV applied for HV for 1 minute		
121	Separate source power frequency withstand test for LV for 1 minute in kv(min)	3kV applied for LV for 1 minute		
122	Induced over voltage withstand test for 1 min. specify voltage frequency, time for test.	866 kV applied for LV side for 1 minute @1 100Hz		
123	Impulse test value (in kVp) .	125 kVp,1.2/50 micro second		
124	The test certificates of Aluminium/copper conductor, core , insulating paper, porcelainbushings, steel plate used for enclosure of offer transformer is enclosed along with the offer in soft copy.(Yes/ No)	No		
125	All type test report of type tests carried out on transformer at NABL laboratory shall be submitted along with the offer as per cl. XXII (c) of Section (I) i.e. Instructions to tenderers.(Yes/ No)	Yes		
126	Air pressure test and temperature rise test shall be conducted as per format enclosed with thetechnical specification along with the offer (Yes/ No)	Yes		
127	All drawings shall be furnished for each offered	Yes		

	item separately along with this offer (Yes/No)			
128	Oil absorption calculation sheet shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
129	Heat dissipation calculation shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
130	Flux density calculation sheet with no. of Primary & Secondary turns shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
131	Calculation sheet for 112.5% of Rated V/f ratio (over fluxing calculation sheet) shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
132	Required documents, plant and machinery, list of order executed/under execution shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
133	The information required under Quality Assurance shall be submitted with the offer in physical format & soft copy(Yes/ No)	Yes		
134	The cost data in the prescribed format shall be submitted with offer in physical format & soft copy (Yes/ No)	Yes		
135	The performance Guarantee of the transformers in years	24 months from date of receipt of material		
136	Power frequency withstand voltage dry & wet in kV(rms) for H.V Bushing	50 kV rms		
137	Dry lightning Impulse withstand voltage test in kV (peak) Stating the wave form adopted for H.V. bushing	125 kVP with wave form 1.2/50 micro second as per Technical Specification		

Standard GTP - 16 KVA, 11/0.433 KV Distribution Transformers (Level-2) Sealed /Non sealed Type

Sr.No.	Guaranteed Technical Particular	Specific Requirement of MSEDCL	Specific Requirement of MSEDCL whether agree with it yes or not	If not , please specify value
1	Name of Manufacturer.			
2	Reference Standard	IS 1180 (part-i)2014		
3	Whether transformer is Oil Natural Air Natural cooled type (Yes/ No)	Yes		
4	Whether transformer is suitable for Indoor /Outdoor installation	Outdoor		
5	Rating of transformer in KVA	16		
6	Primary Voltage in kV	11		
7	Secondary Voltage in kV	0.433		
8	Whether neutral is solidly earthed (Yes/ No)	Yes		
9	Colour of transformer	Aircraft Blue (Shade no 108)		
10	Vector Group	Dyn-11		
11	Approximate overall length of transformer in mm	915		
12	Approximate overall breadth of transformer in mm	585		
13	Approximate overall height of transformer in mm	1070		
14	Approximate length of transformer tank in mm	715		
15	Approximate breadth of transformer tank in mm	275		
16	Approximate height of transformer tank in mm	690 (Avg)		
17	Thickness of the side of transformer Tank plate in mm	3.15		
18	Thickness of the bottom of transformer tank plate in mm	5		
19	Thickness of the top of transformer tank plate in mm	5		
20	Weight of Tank & fittings in kgs	78		
21	Total Weight of Transformer in kgs	290		

22	Type of Tank (corrugated/conventional)	conventional		
23	Degree of slope to the top plate of Transformer.	5 °To 10 ° towards HV side		
24	In case of Corrugated tank, Thickness of corrugated sheet (in mm)	N.A.		
25	Name plate details are as per the requirement specified in tender. (Yes/ No)	Yes		
26	Total radiating surface of transformer tank in Sq. mtrs.	1.3662 Sq.mm		
27	Core material used & its grade	CRGO,M4		
28	Type of core	Stacked		
29	Weight of Core in kgs	64		
30	No. of steps of core for CRGO core	6		
31	Diameter of core in mm	75		
32	Effective core area.(sq.cm)	39		
33	Flux density in Tesla	1.69 Tesla max		
34	Thickness of core lamination in mm	0.27		
35	The temperature shall in no case reach a value that will damage the core itself, other parts or adjacent materials (Yes/No)	Yes		
36	Type of connection for H.V. Winding (Delta) (Yes/ No)	Yes ,Delta		
37	Type of connection for L.V. Winding (Star) (Yes/ No)	Yes,Star		
38	Material of H.V. winding	Aluminium		
39	Material of L.V.Winding	Aluminium		
40	Insulation provided to H.V winding.	DPC		
41	Insulation provided to L.V. winding.	DPC		
42	Current density of H.V. winding (in Ampere/ sq.mm)	1.3 A/sq.mm Max		
43	No of LV winding turns	188		
44	No of HV winding turns	8272		
45	Resistance of LV winding per phase at 20 deg C in ohms	0.0703		
46	Resistance of HV winding per phase at 20 deg C in ohms	204.25		
47	Current density of L.V. winding (in Ampere/sq. mm.)	1.3 A/sq.mm Max		
48	Clearance between Core & L.V. winding in mm	3.5		
49	Clearances between L.V. & H.V. winding in mm	11		
50	Clearances between HV Phase to Phase in mm	10		

51	Clearances between end insulation to Earth in mm	25		
52	Clearances between winding to tank in mm (min 30 mm)Yes/No	Yes		
53	Weight of Aluminum/Copper in kgs	36		
54	Inter layer insulation provided in H.V winding to design for Top & bottom layer	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
55	Inter layer insulation provided in L.V winding to design for Top & bottom layer	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
56	Inter layer insulation provided in between all layer in H.V winding	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
57	Inter layer insulation provided in between all layer in L.V winding	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
58	Details of end insulation	Press Board, Blocks & Sheet		
59	Whether wedges are Provided at 50% turns of the Coil (Yes/ No)	No		
60	Insulation materials provided for core	Hot oil proof insulation Varnish		
61	Length of coil used for HV winding in meter.	4406.62		
62	Cross section area of the coil used for HV winding (sq.mm)	0.59		
63	Length of coil used for LV winding in meter.	57.46		
64	Size of strip used for LV winding in mm	6.8mm × 3.4 mm		
65	No. of conductors in parallel for LV winding	1		
66	Total cross section area of LV conductor in sq. mm	22.26		
67	No. of H.V coils /phase	4		
68	Thickness of locking spacers between H.V. coils (in mm)	6		
69	Weight of Oil in kgs	68		
70	Volume of Oil in Ltrs	85		
71	Quantity of total oil absorption (in liters) in first filling	2.6		
72	Total oil Volume including Total Oil absorption in liters	88		
73	Grade of Oil used.	Mineral Oil confirming to IS - 335 amended upto date		
74	Name of Oil manufacturers to be supplied.			

75	Breakdown Values of Oil at the time of first filling (kV/mm) considering 2.5 mm gap	60 kV for Filtered & 30 kV Unfiltered Oil		
76	Oil level indicator (showing three levels) on tank (Yes/ No)	Yes (-5,30,98)		
77	Drain Valve (32 mm) provided to the transformer tank (Yes/No)	Yes(32mm)		
78	Earthing terminals with lugs is provided (Yes/No)	Yes		
79	Lifting lugs provided (Yes/No)	Yes		
80	Thermometer pocket is provided (Yes/No)	Yes		
81	Material of HV and LV Bushings and makes thereof	Porcelain		
82	Reference standard of Bushings	IS : 3347		
83	Rating of L.V. Bushing	1kV/250Amp		
84	Minimum Creepage Distance of HV Bushing in mm (min.25 mm per kV)	305		
85	Minimum Creepage Distance of LV Bushing in mm (min.25 mm per kV)	65		
86	Rating of H.V. Bushings (in kV)	12 kV/ 250 Amp.		
87	Rating of L.V. Bushing (in kV, kA)	1.0 kV/ 250 Amp.		
88	Min. External clearances of H.V. bushing terminals between ph. to ph (255 mm)	255mm		
89	Min. External clearances of H.V. bushing terminals between ph. to earth (140 mm)	140mm		
90	Min. External clearances of L.V. bushing terminals between ph. to ph (75 mm)	75mm		
91	Min. External clearances of L.V. bushing terminals between ph. to earth (40 mm)	40mm		
92	Rating of Lightening Arrestors and Make thereof	9kv rms/5kA (8/20 micro wave shape), Oblum/ Lamco		
93	Reference Standard of Lightening Arrestors.	IS: 3070/1974		
94	Maximum winding temperature rise in °C over an Ambient temp. of 50°C by Resistance Method	40		
95	Maximum temperature rise of Oil in °C over an Ambient temp. of 50°C by thermometer.	35		
96	Magnetizing current (No load) in Amps and its % of full load current at rated voltage referred to L.V. side.	0.64 Amps 3% of full load current		

97	Magnetizing current (No load) in Amps and its % of full load current at maximum voltage (112.5% of rated voltage) referred to L.V. side.	1.28 Amps 6% of full load current		
98	Max. core (No load) losses at rated voltage and rated frequency (Watts) .	60		
99	Max. Total losses (No Load + Load Losses at 75 °C) at 50% loading in Watts	135		
100	Max. Total losses (No Load + Load Losses at 75 °C) at 100% loading in Watts	440		
101	Efficiency at 75 °C at unity P.F. at 125% load	97.71		
102	Efficiency at 75 °C at unity P.F. at 100% load	97.25		
103	Efficiency at 75 °C at unity P.F. at 75 % load	97.75		
104	Efficiency at 75 °C at unity P.F. at 50% load	98.31		
105	Efficiency at 75 °C at unity P.F. at 25% load	98.12		
106	Efficiency at 75 °C at 0.8 P.F. lag at 125% load	95.88		
107	Efficiency at 75 °C at 0.8 P.F. lag at 100 % load	96.56		
108	Efficiency at 75 °C at 0.8 P.F. lag at 75 % load	97.19		
109	Efficiency at 75 °C at 0.8 P.F. lag at 50 % load	97.89		
110	Efficiency at 75 °C at 0.8 P.F .lag at 25% load	97.65		
111	Efficiency at 75 °C at 0.8 P.F. leading at 125% load	95.88		
112	Efficiency at 75 °C at 0.8 P.F. leading at 100% load	96.56		
113	Efficiency at 75 °C at 0.8 P.F. leading at 75% load	97.19		
114	Efficiency at 75 °C at 0.8 P.F. leading at 50%load	97.89		
115	Efficiency at 75°C at 0.8 P.F. leading at 25 % load	97.65		
116	Regulation at Unity P.F (in %)	0.4895		
117	Regulation at 0.8 P.F. lag. (in %)	3.0573		
118	Regulation at 0.8 P.F. leading. (in %)	3.0573		
119	% Impedance value at 75°C	4.5± 10%		

120	Separate source power frequency withstand test for HV for 1 minute in kv(min)	28kV rms		
121	Separate source power frequency withstand test for LV for 1 minute in kv(min)	3kV rms		
122	Induced over voltage withstand test for 1 min. specify voltage frequency, time for test.	866Volt,100Hz.for one minute		
123	Impulse test value (in kVp) .	75kVp,1.2/50 micro second		
124	The test certificates of Aluminium/copper conductor, core , insulating paper, porcelainbushings, steel plate used for enclosure of offer transformer is enclosed along with the offer in soft copy.(Yes/ No)	Yes		
125	All type test report of type tests carried out on transformer at NABL laboratory shall be submitted along with the offer as per cl. XXII (c) of Section (I) i.e. Instructions to tenderers.(Yes/ No)	Yes		
126	Air pressure test and temperature rise test shall be conducted as per format enclosed with thetechnical specification along with the offer (Yes/ No)	Yes		
127	All drawings shall be furnished for each offered item separately along with this offer (Yes/No)	Yes		
128	Oil absorption calculation sheet shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
129	Heat dissipation calculation shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
130	Flux density calculation sheet with no. of Primary & Secondary turns shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
131	Calculation sheet for 112.5% of Rated V/f ratio (over fluxing calculation sheet) shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		

132	Required documents, plant and machinery, list of order executed/under execution shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
133	The information required under Quality Assurance shall be submitted with the offer in physical format & soft copy(Yes/ No)	Yes		
134	The cost data in the prescribed format shall be submitted with offer in physical format & soft copy (Yes/ No)	Yes		
135	The performance Guarantee of the transformers in years	24 months from date of receipt of material		
136	Power frequency withstand voltage dry & wet in kV(rms) for H.V Bushing	28kV rms for one minute		
137	Dry lightning Impulse withstand voltage test in kV (peak) Stating the wave form adopted for H.V. bushing	75kVp,1.2/50 micro second		

Standard GTP - 25 KVA, 11/0.433 KV Distribution Transformers (Level-2) Sealed / Non - Sealed Type

Sr.No	Guaranteed Technical Particular	Specific Requirement of MSEDCL	Specific Requirement of MSEDCL whether agree with it yes or not	If not , please specify value
1	Name of Manufacturer.			
2	Reference Standard	IS 1180 (part-i)2014		
3	Whether transformer is Oil Natural Air Natural cooled type (Yes/ No)	Yes		
4	Whether transformer is suitable for Indoor /Outdoor installation	Outdoor		
5	Rating of transformer in KVA	25		
6	Primary Voltage in kV	11		
7	Secondary Voltage in kV	0.433		
8	Whether neutral is solidly earthed (Yes/ No)	Yes		
9	Colour of transformer	Aircraft Blue (Shade no 108)		
10	Vector Group	Dyn-11		
11	Approximate overall length of transformer in mm	960		
12	Approximate overall breadth of transformer in mm	665		
13	Approximate overall height of transformer in mm	1300		
14	Approximate length of transformer tank in mm	750		
15	Approximate breadth of transformer tank in mm	285		
16	Approximate height of transformer tank in mm	765 (Avg)		
17	Thickness of the side of transformer Tank plate in mm	3.15		
18	Thickness of the bottom of transformer tank plate in mm	5		
19	Thickness of the top of transformer tank plate in mm	5		
20	Weight of Tank & fittings in kgs	95		
21	Total Weight of Transformer in kgs	360		
22	Type of Tank	conventional		

	(corrugated/conventional)			
23	Degree of slope to the top plate of Transformer.	5 °To 10 ° towards HV side		
24	In case of Corrugated tank, Thickness of corrugated sheet (in mm)	N.A.		
25	Name plate details are as per the requirement specified in tender. (Yes/ No)	Yes		
26	Total radiating surface of transformer tank in Sq. mtrs.	1.583 Sq.mm		
27	Core material used & its grade	CRGO,M4		
28	Type of core	Stacked		
29	Weight of Core in kgs	84		
30	No. of steps of core for CRGO core	7		
31	Diameter of core in mm	81		
32	Effective core area.(sq.cm)	48.73		
33	Flux density in Tesla	1.69 Tesla max		
34	Thickness of core lamination in mm	0.27		
35	The temperature shall in no case reach a value that will damage the core itself, other parts or adjacent materials (Yes/No)	Yes		
36	Type of connection for H.V. Winding (Delta) (Yes/ No)	Yes		
37	Type of connection for L.V. Winding (Star) (Yes/ No)	Yes		
38	Material of H.V. winding	Aluminium		
39	Material of L.V.Winding	Aluminium		
40	Insulation provided to H.V winding.	DPC		
41	Insulation provided to L.V. winding.	DPC		
42	Current density of H.V. winding (in Ampere/ sq.mm)	1.3 A/sq.mm Max		
43	No of LV winding turns	164		
44	No of HV winding turns	7216		
45	Resistance of LV winding per phase at 20 deg C in ohms	0.0465		
46	Resistance of HV winding per phase at 20 deg C in ohms	111		
47	Current density of L.V. winding (in Ampere/sq. mm.)	1.3 A/sq.mm Max		
48	Clearance between Core & L.V. winding in mm	3.5		
49	Clearances between L.V. & H.V. winding in mm	11		

50	Clearances between HV Phase to Phase in mm	10		
51	Clearances between end insulation to Earth in mm	25		
52	Clearances between winding to tank in mm (min 30 mm)Yes/No	Yes		
53	Weight of Aluminum/Copper in kgs	53		
54	Inter layer insulation provided in H.V winding to design for Top & bottom layer	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
55	Inter layer insulation provided in L.V winding to design for Top & bottom layer	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
56	Inter layer insulation provided in between all layer in H.V winding	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
57	Inter layer insulation provided in between all layer in L.V winding	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
58	Details of end insulation	Press Board, Blocks & Sheet		
59	Whether wedges are Provided at 50% turns of the Coil (Yes/ No)	No		
60	Insulation materials provided for core	Hot oil proof insulation Varnish		
61	Length of coil used for HV winding in meter.	4104		
62	Cross section area of the coil used for HV winding (sq.mm)	1.09		
63	Length of coil used for LV winding in meter.	57.96		
64	Size of strip used for LV winding in mm	10mm × 3.5 mm		
65	No. of conductors in parallel for LV winding	1		
66	Total cross section area of LV conductor in sq. mm	34.45		
67	No. of H.V coils /phase	4		
68	Thickness of locking spacers between H.V. coils (in mm)	9		
69	Weight of Oil in kgs	95		
70	Volume of Oil in Ltrs	115		
71	Quantity of total oil absorption (in liters) in first filling	4		
72	Total oil Volume including Total Oil absorption in liters	119		
73	Grade of Oil used.	Mineral Oil confirming to IS - 335 amended		

		upto date		
74	Name of Oil manufacturers to be supplied.			
75	Breakdown Values of Oil at the time of first filling (kV/mm) considering 2.5 mm gap	60 kV for Filtered & 30 kV Unfiltered Oil		
76	Oil level indicator (showing three levels) on tank (Yes/ No)	Yes (-5,30,98)		
77	Conservator tank to the Transformer with oil level indicator	Yes		
78	Drain Valve (32 mm) provided to the transformer tank (Yes/No)	Yes(32mm)		
79	Earthing terminals with lugs is provided (Yes/No)	Yes		
80	Oil filling hole with cap (On conservator)	Yes		
81	Lifting lugs provided (Yes/No)	Yes		
82	Thermometer pocket is provided (Yes/No)	Yes		
83	Quantity of silica gel filled in breather	250gms		
84	Material of HV and LV Bushings and makes thereof	Porcelain		
85	Reference standard of Bushings	IS : 3347		
86	Rating of L.V. Bushing	1kV/250Amp		
87	Minimum Creepage Distance of HV Bushing in mm (min.25 mm per kV)	305		
88	Minimum Creepage Distance of LV Bushing in mm (min.25 mm per kV)	65		
89	Rating of H.V. Bushings (in kV)	12 kV/ 250 Amp.		
90	Rating of L.V. Bushing (in kV, kA)	1.0 kV/ 250 Amp.		
91	Min. External clearances of H.V. bushing terminals between ph. to ph (255 mm)	255mm		
92	Min. External clearances of H.V. bushing terminals between ph. to earth (140 mm)	140mm		
93	Min. External clearances of L.V. bushing terminals between ph. to ph (75 mm)	75mm		
94	Min. External clearances of L.V. bushing terminals between ph. to earth (40 mm)	40mm		
95	Rating of Lightening Arrestors and Make thereof	9kv rms/5kA (8/20 micro wave shape)		
96	Reference Standard of Lightening	IS: 3070/1974		

	Arrestors.			
97	Maximum winding temperature rise in °C over an Ambient temp. of 50°C by Resistance Method	40		
98	Maximum temperature rise of Oil in °C over an Ambient temp. of 50°C by thermometer.	35		
99	Magnetizing current (No load) in Amps and its % of full load current at rated voltage referred to L.V. side.	0.99 Amps 3% of full load current		
100	Magnetizing current (No load) in Amps and its % of full load current at maximum voltage (112.5% of rated voltage) referred to L.V. side.	1.98 Amps 6% of full load current		
101	Max. core (No load) losses at rated voltage and rated frequency (Watts) .	80		
102	Max. Total losses (No Load + Load Losses at 75 °C) at 50% loading in Watts	190		
103	Max. Total losses (No Load + Load Losses at 75 °C) at 100% loading in Watts	635		
104	Efficiency at 75 °C at unity P.F. at 125% load	97.06		
105	Efficiency at 75 °C at unity P.F. at 100% load	97.52		
106	Efficiency at 75 °C at unity P.F. at 75 % load	97.94		
107	Efficiency at 75 °C at unity P.F. at 50% load	98.5		
108	Efficiency at 75 °C at unity P.F. at 25% load	98.15		
109	Efficiency at 75 °C at 0.8 P.F. lag at 125% load	36.36		
110	Efficiency at 75 °C at 0.8 P.F. lag at 100 % load	96.92		
111	Efficiency at 75 °C at 0.8 P.F. lag at 75 % load	97.44		
112	Efficiency at 75 °C at 0.8 P.F. lag at 50 % load	98.14		
113	Efficiency at 75 °C at 0.8 P.F .lag at 25% load	97.7		
114	Efficiency at 75 °C at 0.8 P.F. leading at 125% load	96.36		
115	Efficiency at 75 °C at 0.8 P.F. leading at 100% load	96.92		
116	Efficiency at 75 °C at 0.8 P.F. leading at 75% load	97.44		

117	Efficiency at 75 °C at 0.8 P.F. leading at 50%load	98.14		
118	Efficiency at 75°C at 0.8 P.F. leading at 25 % load	97.7		
119	Regulation at Unity P.F (in %)	0.6517		
120	Regulation at 0.8 P.F. lag. (in %)	3.1737		
121	Regulation at 0.8 P.F. leading. (in %)	3.173		
122	% Impedance value at 75°C	4.5± 10%		
123	Separate source power frequency withstand test for HV for 1 minute in kv(min)	28kV rms		
124	Separate source power frequency withstand test for LV for 1 minute in kv(min)	3kV rms		
125	Induced over voltage withstand test for 1 min. specify voltage frequency, time for test.	866Volt,100Hz.for one minute		
126	Impulse test value (in kVp) .	75kVp,1.2/50 micro second		
127	The test certificates of Aluminium/copper conductor, core , insulating paper, porcelainbushings, steel plate used for enclosure of offer transformer is enclosed along with the offer in soft copy.(Yes/ No)	Yes		
128	All type test report of type tests carried out on transformer at NABL laboratory shall be submitted along with the offer as per cl. XXII (c) of Section (I) i.e. Instructions to tenderers.(Yes/ No)	Yes		
129	Air pressure test and temperature rise test shall be conducted as per format enclosed with thetechnical specification along with the offer (Yes/ No)	Yes		
130	All drawings shall be furnished for each offered item separately along with this offer (Yes/No)	Yes		
131	Oil absorption calculation sheet shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
132	Heat dissipation calculation shall be furnished for each offered item separately along with this	Yes		

	offer (Yes/ No)			
133	Flux density calculation sheet with no. of Primary & Secondary turns shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
134	Calculation sheet for 112.5% of Rated V/f ratio (over fluxing calculation sheet) shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
135	Required documents, plant and machinery, list of order executed/under execution shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
136	The information required under Quality Assurance shall be submitted with the offer in physical format & soft copy(Yes/ No)	Yes		
137	The cost data in the prescribed format shall be submitted with offer in physical format & soft copy (Yes/ No)	Yes		
138	The performance Guarantee of the transformers in years	24 months from date of receipt of material		
139	Power frequency withstand voltage dry & wet in kV(rms) for H.V Bushing	28kV rms for one minute		
140	Dry lightning Impulse withstand voltage test in kV (peak) Stating the wave form adopted for H.V. bushing	75kVp,1.2/50 micro second		

ANNEXURE-E & F

Not Applicable

Annexure-G

IEEMA/PVC/STAR_DIST-AL/2015(R-1) Effective from: 1st June 2015.

PRICE VARIATION CLAUSE FOR ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS

COMPLETE WITH ALL ACCESSORIES AND COMPONENTS

(BEE/Energy Efficiency levels as per IS-1180(Part-1):2014)

(For Single & Three phase of ratings up to 2,500 KVA and voltage up to 33 KV supplied against domestic contracts)

(Read with IEEMA circular No. 114/DIV/TRF_TLA&H/05 dt. 07th December 2017)

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of opening of tender and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100}\left\{10 + 19\frac{AL}{AL_0} + 30\frac{ES}{ES_0} + 13\frac{IS}{IS_0} + 4\frac{IM}{IM_0} + 11\frac{TO}{TO_0} + 13\frac{W}{W_0}\right\}$$

Wherein

P = Ex works price payable as adjusted in accordance with the above formula.

Po = Ex works price quoted/confirmed.

ALo = Average LME settlement price of EC Grade Aluminium rods (Properzi rods) (refer notes)

This price is as applicable on the 1st working day of the month, one month prior to the date of opening of tender.

ESo = Price of CRGO Electrical Steel Lamination (refer notes)

This price is as applicable on the 1st working day of the month, one month prior to the date of opening of tender.

ISo = Price of HR Coil of 3.15 mm thickness (refer notes).

This price is as applicable on the 1st working day of the month, one month prior to the date of opening of tender.

IMo = Price of Insulating materials (refer notes)

This price is as applicable on the 1st working day of the month, one month prior to the date of opening of tender.

TOo = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of the month, one month 'prior to the date of opening of tender.

Wo = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base 2001 = 100)

This index number is as applicable on the first working day of the month, Three months prior to the date of opening of tender.

For example, if date of opening of tender falls in Dec 2015, the applicable prices of Aluminium(ALo), Transformer Oil (TOo), CRGO Steel Sheets (Eso),HR Coil(ISo) and insulating material (IMo) should be as on 1st November 2015 and all India average consumer price index no. (Wo) should be for the month of September 2015.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/TRF(R-1)/ -/ - prevailing as on first working day of the month… i.e. one month prior to the date of opening of tender.

AL = Average LME settlement price of EC Grade Aluminium rods (Properzi rods) (refer notes)

This price is as applicable on the 1st working day for the month, one month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer note)

This price is as applicable on the 1st working day for the month, one month prior to the date of delivery.

FE = Price of HR Coil of 3.15 mm thickness (refer notes)

This price is as applicable on the 1st working day of the month, one month prior to the date of opening of tender.

IM = Price of Insulating Materials (refer notes)

This price is as applicable on the 1st working day of the month, one month prior to the date of delivery.

TO= Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of the month, one month prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base 2001 = 100).

This index number is as applicable on the first working day of the month, three months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2015, the applicable prices of Aluminium (AL) , Transformer Oil [TO] , CRGO Steel Sheets [ES], HR Coil(ISo) and Insulating material [IM] should be as on 1st November 2015 and all India average consumer price index [W] should be for the month of September 2015.

The "date of delivery" is the date on which the transformer is notified as being ready for inspection.

In case supplies are effected within the delivery period of lot, the "date of delivery" for PV purpose is the date on which the transformer is notified as being ready for inspection.

In case, supplies are effected after delivery period of lot , but within contractual period (5 months), the date of delivery for PV purpose would be the date on which the transformer are ready for inspection or delivery date of lot or actual date of supply on which the PV is less.

NOTES:

a) All prices of raw materials are exclusive of all taxes. Transformer manufacturers import major raw materials like CRGO Steel Sheets and Insulating Pressboards etc. The landed cost of these imported raw materials includes applicable custom duty but exclusive of GST.

b) All prices are as on first working day of the month.

c) The details of prices are as under.

(i) The price of Aluminium in Rs./MT is the average Ex –works price of EC Grade Aluminium rods quoted by the primary producers confirming to specifications IS:5484.

(ii) The price of CRGO Electrical Steel Lamination suitable for transformers of rating upto 10MVA and voltage up to 33KV (in Rs./MT) is the average price as quoted by processing centres of overseas mills and lamination suppliers.

This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.

(iii) Price of steel is the average retail price of HR Coil 3.15mm thickness as published by Joint Plant Committee (JPC) in Rs./MT as on 1st working day of the month.

(iv) The average price of Insulting materials (in Rs./Kg) of pre- compressed pressboards of size 3mm and 10 mm thick, 3200mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.

(v) The price of Transformer Oil (in Rs./K.Ltr) is the average price on ex-refinery basis as quoted by two manufacturers for supply in drums.

(vi) Some purchasers are purchasing oil immersed Transformers from manufacturer without first filling of oil. Oil for first filling is procured and filled by the purchasers. For such supplies PVC formula, excluding Oil will apply as under.

$$P = \frac{P_0}{89}\left\{10 + 19\frac{AL}{AL_0} + 30\frac{ES}{ES_0} + 13\frac{IS}{IS_0} + 4\frac{IM}{IM_0} + 13\frac{W}{W_0}\right\}$$

Where description of P, Po, AL, ES, IS, IM and W etc. remains same as mentioned earlier.

Acceptance of MSEDCL's GTP & Drawings

As per MSEDCL's attached GTP & Drawings if accepted / Non accepted fill up the following table.

KVA Rating	Annexure	Drawing	Accepted	Not accepted
16 KVA, 22/0.433 KV	Annexure – H-1	D-1		
16 KVA, 11/0.433 KV	Annexure – H-2	D-2		

Note: If accepted no need to fill up Annexure –H & submission of Drawing. If not accepted fill up Annexure-H & submit the Drawings.

Annexure- H-1

Standard GTP - 16 KVA, 22/0.433 KV Distribution Transformers (Level-2) - Sealed /Non Sealed Type

GTP Srr.No	Guaranteed Technical Particular	Specific Requirement of MSEDCL	Specific Requirement of MSEDCL whether agree with it yes or not	If not , please specify value
1	Name of Manufacturer.			
2	Reference Standard	IS 1180 Part -1, Energy Effiency Level - 2		
3	Whether transformer is Oil Natural Air Natural cooled type (Yes/ No)	Yes		
4	Whether transformer is suitable for Indoor /Outdoor installation	Outdoor Installation		
5	Rating of transformer in KVA	16		
6	Primary Voltage in kV	22		
7	Secondary Voltage in kV	0.433		
8	Whether neutral is solidly earthed (Yes/ No)	Yes		
9	Colour of transformer	Aircraft Blue, Shade no 108 of IS : 5		
10	Vector Group	Dyn-11		
11	Approximate overall length of transformer in mm	945		
12	Approximate overall breadth of transformer in mm	695		
13	Approximate overall height of transformer in mm	1270		
14	Approximate length of transformer tank in mm	745		
15	Approximate breadth of transformer tank in mm	295		
16	Approximate height of transformer tank in mm	715		
17	Thickness of the side of transformer Tank plate in mm	3.15		
18	Thickness of the bottom of transformer tank plate in mm	5		
19	Thickness of the top of transformer tank plate in mm	5		

20	Weight of Tank & fittings in kgs	103		
21	Total Weight of Transformer in kgs	330		
22	Type of Tank (corrugated/conventional)	Conventional		
23	Degree of slope to the top plate of Transformer.	5 degree to 10 degree towards HV Side		
24	In case of Corrugated tank, Thickness of corrugated sheet (in mm)	N.A.		
25	Name plate details are as per the requirement specified in tender. (Yes/ No)	Yes		
26	Total radiating surface of transformer tank in Sq. mtrs.	1.487		
27	Core material used & its grade	CRGO, M3		
28	Type of core	Stacked Core		
29	Weight of Core in kgs	68.96 kg		
30	No. of steps of core for CRGO core	7		
31	Diameter of core in mm	76mm		
32	Effective core area.(sq.cm)	39.993		
33	Flux density in Tesla	1.69 Tesla max		
34	Thickness of core lamination in mm	0.27		
35	The temperature shall in no case reach a value that will damage the core itself, other parts or adjacent materials (Yes/No)	Yes		
36	Type of connection for H.V. Winding (Delta) (Yes/ No)	Yes ,Delta		
37	Type of connection for L.V. Winding (Star) (Yes/ No)	Yes,Star		
38	Material of H.V. winding	Aluminium		
39	Material of L.V.Winding	Aluminium		
40	Insulation provided to H.V winding.	Super Enamelled with thermal grade 220 degree centegrate		
41	Insulation provided to L.V. winding.	Double Paper covering		
42	Current density of H.V. winding (in Ampere/ sq.mm)	1.3 Max		
43	No of LV winding turns	184		
44	No of HV winding turns	16192		
45	Resistance of LV winding per phase at 20 deg C in ohms	0.0818		

46	Resistance of HV winding per phase at 20 deg C in ohms	611.82		
47	Current density of L.V. winding (in Ampere/sq. mm.)	1.3 Max		
48	Clearance between Core & L.V. winding in mm	3.5 mm		
49	Clearances between L.V. & H.V. winding in mm	14.0mm		
50	Clearances between HV Phase to Phase in mm	15 mm		
51	Clearances between end insulation to Earth in mm	40 mm		
52	Clearances between winding to tank in mm (min 40 mm)Yes/No	Yes-40mm		
53	Weight of Aluminum/Copper in kgs	38.44		
54	Inter layer insulation provided in H.V winding to design for Top & bottom layer	Electrical Grade Insulating Kraft paper 2 mill thick		
55	Inter layer insulation provided in L.V winding to design for Top & bottom layer	Electrical Grade Insulating Kraft paper 2 mill thick		
56	Inter layer insulation provided in between all layer in H.V winding	Electrical Grade Insulating Kraft paper 2 mill thick		
57	Inter layer insulation provided in between all layer in L.V winding	Electrical Grade Insulating Kraft paper 2 mill thick		
58	Details of end insulation	Press board block and sheet		
59	Whether wedges are Provided at 50% turns of the Coil (Yes/ No)	No		
60	Insulation materials provided for core	Hot oil proof insulation carlite		
61	Length of coil used for HV winding in meter.	8821.24		
62	Cross section area of the coil used for HV winding (sq.mm)	0.396 Sq.mm.		
63	Length of coil used for LV winding in meter.	54.598		
64	Size of strip used for LV winding in mm	7.9 X 2.4 mm		
65	No. of conductors in parallel for LV winding	1		
66	Total cross section area of LV conductor in sq. mm	18.41		
67	No. of H.V coils /phase	4		

68	Thickness of locking spacers between H.V. coils (in mm)	7		
69	Weight of Oil in kgs	62		
70	Volume of Oil in Ltrs	76		
71	Quantity of total oil absorption (in liters) in first filling	3.2		
72	Total oil Volume including Total Oil absorption in liters	80		
73	Grade of Oil used.	Minaral Oil As per IS 335 ammended up to date.		
74	Name of Oil manufacturers to be supplied.			
75	Breakdown Values of Oil at the time of first filling (kV/mm) considering 2.5 mm gap	30 KV for unfiltered oil & 60 kV for Filtered Oil		
76	Oil level indicator (showing three levels) on tank (Yes/ No)	Yes		
77	Drain Valve (32 mm) provided to the transformer tank (Yes/No)	Yes (32mm)		
78	Earthing terminals with lugs is provided (Yes/No)	Yes		
79	Lifting lugs provided (Yes/No)	Yes		
80	Thermometer pocket is provided (Yes/No)	Yes		
81	Material of HV and LV Bushings and makes thereof			
82	Reference standard of Bushings	IS 3347		
83	Rating of L.V. Bushing	1kV/250Amp		
84	Minimum Creepage Distance of HV Bushing in mm (min.25 mm per kV)	605		
85	Minimum Creepage Distance of LV Bushing in mm (min.25 mm per kV)	65		
86	Rating of H.V. Bushings (in kV)	24/250Amp		
87	Rating of L.V. Bushing (in kV, kA)	1kV/250Amp		
88	Min. External clearances of H.V. bushing terminals between ph. to ph (255 mm)	330		
89	Min. External clearances of H.V. bushing terminals between ph. to earth (140 mm)	230		

90	Min. External clearances of L.V. bushing terminals between ph. to ph (75 mm)	75		
91	Min. External clearances of L.V. bushing terminals between ph. to earth (40 mm)	40		
92	Rating of Lightening Arrestors and Make thereof	18kv rms, 5kA (8/20 micro wave shape)		
93	Reference Standard of Lightening Arrestors.	IS: 3070/1974		
94	Maximum winding temperature rise in °C over an Ambient temp. of 50°C by Resistance Method	40		
95	Maximum temperature rise of Oil in °C over an Ambient temp. of 50°C by thermometer.	35		
96	Magnetizing current (No load) in Amps and its % of full load current at rated voltage referred to L.V. side.	0.64Amps, 3% of Full Load Current in LT Winding		
97	Magnetizing current (No load) in Amps and its % of full load current at maximum voltage (112.5% of rated voltage) referred to L.V. side.	1.28 Amps, 6% of Full Load Current in LT Winding		
98	Max. core (No load) losses at rated voltage and rated frequency (Watts) .	72		
99	Max. Total losses (No Load + Load Losses at 75 °C) at 50% loading in Watts	141		
100	Max. Total losses (No Load + Load Losses at 75 °C) at 100% loading in Watts	462		
101	Efficiency at 75 °C at unity P.F. at 125% load	98.65		
102	Efficiency at 75 °C at unity P.F. at 100% load	98.77		
103	Efficiency at 75 °C at unity P.F. at 75 % load	98.59		
104	Efficiency at 75 °C at unity P.F. at 50% load	98.55		
105	Efficiency at 75 °C at unity P.F. at 25% load	98.78		
106	Efficiency at 75 °C at 0.8 P.F. lag at 125% load	98.22		
107	Efficiency at 75 °C at 0.8 P.F. lag at 100 % load	98.74		
108	Efficiency at 75 °C at 0.8 P.F. lag at 75 % load	98.96		

109	Efficiency at 75 °C at 0.8 P.F. lag at 50 % load	98.64		
110	Efficiency at 75 °C at 0.8 P.F .lag at 25% load	98.49		
111	Efficiency at 75 °C at 0.8 P.F. leading at 125% load	98.36		
112	Efficiency at 75 °C at 0.8 P.F. leading at 100% load	98.62		
113	Efficiency at 75 °C at 0.8 P.F. leading at 75% load	98.6		
114	Efficiency at 75 °C at 0.8 P.F. leading at 50%load	98.61		
115	Efficiency at 75°C at 0.8 P.F. leading at 25 % load	98.49		
116	Regulation at Unity P.F (in %)	1.067		
117	Regulation at 0.8 P.F. lag. (in %)	3.42		
118	Regulation at 0.8 P.F. leading. (in %)	3.42		
119	% Impedance value at 75°C	4.5% (±10%)		
120	Separate source power frequency withstand test for HV for 1 minute in kv(min)	50 kV applied for HV for 1 minute		
121	Separate source power frequency withstand test for LV for 1 minute in kv(min)	3kV applied for LV for 1 minute		
122	Induced over voltage withstand test for 1 min. specify voltage frequency, time for test.	866 kV applied for LV side for 1 minute @1 100Hz		
123	Impulse test value (in kVp) .	125 kVp,1.2/50 micro second		
124	The test certificates of Aluminium/copper conductor, core , insulating paper, porcelainbushings, steel plate used for enclosure of offer transformer is enclosed along with the offer in soft copy.(Yes/ No)	No		
125	All type test report of type tests carried out on transformer at NABL laboratory shall be submitted along with the offer as per cl. XXII (c) of Section (I) i.e. Instructions to tenderers.(Yes/ No)	Yes		

126	Air pressure test and temperature rise test shall be conducted as per format enclosed with thetechnical specification along with the offer (Yes/ No)	Yes		
127	All drawings shall be furnished for each offered item separately along with this offer (Yes/No)	Yes		
128	Oil absorption calculation sheet shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
129	Heat dissipation calculation shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
130	Flux density calculation sheet with no. of Primary & Secondary turns shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
131	Calculation sheet for 112.5% of Rated V/f ratio (over fluxing calculation sheet) shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
132	Required documents, plant and machinery, list of order executed/under execution shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
133	The information required under Quality Assurance shall be submitted with the offer in physical format & soft copy(Yes/ No)	Yes		
134	The cost data in the prescribed format shall be submitted with offer in physical format & soft copy (Yes/ No)	Yes		
135	The performance Guarantee of the transformers in years	24 months from date of receipt of material		
136	Power frequency withstand voltage dry & wet in kV(rms) for H.V Bushing	50 kV rms		

137	Dry lightning Impulse withstand voltage test in kV (peak) Stating the wave form adopted for H.V. bushing	125 kVP with wave form 1.2/50 micro second as per Technical Specification		

Annexure- H-2

Standard GTP - 16 KVA, 11/0.433 KV Distribution Transformers (Level-2) Sealed /Non sealed Type

Sr.No.	Guaranteed Technical Particular	Specific Requirement of MSEDCL	Specific Requirement of MSEDCL whether agree with it yes or not	If not , please specify value
1	Name of Manufacturer.			
2	Reference Standard	IS 1180 (part-i)2014		
3	Whether transformer is Oil Natural Air Natural cooled type (Yes/ No)	Yes		
4	Whether transformer is suitable for Indoor /Outdoor installation	Outdoor		
5	Rating of transformer in KVA	16		
6	Primary Voltage in kV	11		
7	Secondary Voltage in kV	0.433		
8	Whether neutral is solidly earthed (Yes/ No)	Yes		
9	Colour of transformer	Aircraft Blue (Shade no 108)		
10	Vector Group	Dyn-11		
11	Approximate overall length of transformer in mm	915		
12	Approximate overall breadth of transformer in mm	585		
13	Approximate overall height of transformer in mm	1070		
14	Approximate length of transformer tank in mm	715		
15	Approximate breadth of transformer tank in mm	275		
16	Approximate height of transformer tank in mm	690 (Avg)		
17	Thickness of the side of transformer Tank plate in mm	3.15		
18	Thickness of the bottom of transformer tank plate in mm	5		
19	Thickness of the top of transformer tank plate in mm	5		
20	Weight of Tank & fittings in kgs	78		
21	Total Weight of Transformer in kgs	290		

22	Type of Tank (corrugated/conventional)	conventional		
23	Degree of slope to the top plate of Transformer.	5 °To 10 ° towards HV side		
24	In case of Corrugated tank, Thickness of corrugated sheet (in mm)	N.A.		
25	Name plate details are as per the requirement specified in tender. (Yes/ No)	Yes		
26	Total radiating surface of transformer tank in Sq. mtrs.	1.3662 Sq.mm		
27	Core material used & its grade	CRGO,M4		
28	Type of core	Stacked		
29	Weight of Core in kgs	64		
30	No. of steps of core for CRGO core	6		
31	Diameter of core in mm	75		
32	Effective core area.(sq.cm)	39		
33	Flux density in Tesla	1.69 Tesla max		
34	Thickness of core lamination in mm	0.27		
35	The temperature shall in no case reach a value that will damage the core itself, other parts or adjacent materials (Yes/No)	Yes		
36	Type of connection for H.V. Winding (Delta) (Yes/ No)	Yes ,Delta		
37	Type of connection for L.V. Winding (Star) (Yes/ No)	Yes,Star		
38	Material of H.V. winding	Aluminium		
39	Material of L.V.Winding	Aluminium		
40	Insulation provided to H.V winding.	DPC		
41	Insulation provided to L.V. winding.	DPC		
42	Current density of H.V. winding (in Ampere/ sq.mm)	1.3 A/sq.mm Max		
43	No of LV winding turns	188		
44	No of HV winding turns	8272		
45	Resistance of LV winding per phase at 20 deg C in ohms	0.0703		
46	Resistance of HV winding per phase at 20 deg C in ohms	204.25		
47	Current density of L.V. winding (in Ampere/sq. mm.)	1.3 A/sq.mm Max		
48	Clearance between Core & L.V. winding in mm	3.5		
49	Clearances between L.V. & H.V. winding in mm	11		
50	Clearances between HV Phase to Phase in mm	10		

51	Clearances between end insulation to Earth in mm	25		
52	Clearances between winding to tank in mm (min 30 mm)Yes/No	Yes		
53	Weight of Aluminum/Copper in kgs	36		
54	Inter layer insulation provided in H.V winding to design for Top & bottom layer	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
55	Inter layer insulation provided in L.V winding to design for Top & bottom layer	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
56	Inter layer insulation provided in between all layer in H.V winding	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
57	Inter layer insulation provided in between all layer in L.V winding	Electrical Grade insulating Paper Min. 2 milx.2 Thk		
58	Details of end insulation	Press Board, Blocks & Sheet		
59	Whether wedges are Provided at 50% turns of the Coil (Yes/ No)	No		
60	Insulation materials provided for core	Hot oil proof insulation Varnish		
61	Length of coil used for HV winding in meter.	4406.62		
62	Cross section area of the coil used for HV winding (sq.mm)	0.59		
63	Length of coil used for LV winding in meter.	57.46		
64	Size of strip used for LV winding in mm	6.8mm × 3.4 mm		
65	No. of conductors in parallel for LV winding	1		
66	Total cross section area of LV conductor in sq. mm	22.26		
67	No. of H.V coils /phase	4		
68	Thickness of locking spacers between H.V. coils (in mm)	6		
69	Weight of Oil in kgs	68		
70	Volume of Oil in Ltrs	85		
71	Quantity of total oil absorption (in liters) in first filling	2.6		
72	Total oil Volume including Total Oil absorption in liters	88		
73	Grade of Oil used.	Mineral Oil confirming to IS - 335 amended upto date		
74	Name of Oil manufacturers to be supplied.			

75	Breakdown Values of Oil at the time of first filling (kV/mm) considering 2.5 mm gap	60 kV for Filtered & 30 kV Unfiltered Oil		
76	Oil level indicator (showing three levels) on tank (Yes/ No)	Yes (-5,30,98)		
77	Drain Valve (32 mm) provided to the transformer tank (Yes/No)	Yes(32mm)		
78	Earthing terminals with lugs is provided (Yes/No)	Yes		
79	Lifting lugs provided (Yes/No)	Yes		
80	Thermometer pocket is provided (Yes/No)	Yes		
81	Material of HV and LV Bushings and makes thereof	Porcelain		
82	Reference standard of Bushings	IS : 3347		
83	Rating of L.V. Bushing	1kV/250Amp		
84	Minimum Creepage Distance of HV Bushing in mm (min.25 mm per kV)	305		
85	Minimum Creepage Distance of LV Bushing in mm (min.25 mm per kV)	65		
86	Rating of H.V. Bushings (in kV)	12 kV/ 250 Amp.		
87	Rating of L.V. Bushing (in kV, kA)	1.0 kV/ 250 Amp.		
88	Min. External clearances of H.V. bushing terminals between ph. to ph (255 mm)	255mm		
89	Min. External clearances of H.V. bushing terminals between ph. to earth (140 mm)	140mm		
90	Min. External clearances of L.V. bushing terminals between ph. to ph (75 mm)	75mm		
91	Min. External clearances of L.V. bushing terminals between ph. to earth (40 mm)	40mm		
92	Rating of Lightening Arrestors and Make thereof	9kv rms/5kA (8/20 micro wave shape), Oblum/ Lamco		
93	Reference Standard of Lightening Arrestors.	IS: 3070/1974		
94	Maximum winding temperature rise in °C over an Ambient temp. of 50°C by Resistance Method	40		
95	Maximum temperature rise of Oil in °C over an Ambient temp. of 50°C by thermometer.	35		
96	Magnetizing current (No load) in Amps and its % of full load current at rated voltage referred to L.V. side.	0.64 Amps 3% of full load current		

97	Magnetizing current (No load) in Amps and its % of full load current at maximum voltage (112.5% of rated voltage) referred to L.V. side.	1.28 Amps 6% of full load current		
98	Max. core (No load) losses at rated voltage and rated frequency (Watts) .	60		
99	Max. Total losses (No Load + Load Losses at 75 °C) at 50% loading in Watts	135		
100	Max. Total losses (No Load + Load Losses at 75 °C) at 100% loading in Watts	440		
101	Efficiency at 75 °C at unity P.F. at 125% load	97.71		
102	Efficiency at 75 °C at unity P.F. at 100% load	97.25		
103	Efficiency at 75 °C at unity P.F. at 75 % load	97.75		
104	Efficiency at 75 °C at unity P.F. at 50% load	98.31		
105	Efficiency at 75 °C at unity P.F. at 25% load	98.12		
106	Efficiency at 75 °C at 0.8 P.F. lag at 125% load	95.88		
107	Efficiency at 75 °C at 0.8 P.F. lag at 100 % load	96.56		
108	Efficiency at 75 °C at 0.8 P.F. lag at 75 % load	97.19		
109	Efficiency at 75 °C at 0.8 P.F. lag at 50 % load	97.89		
110	Efficiency at 75 °C at 0.8 P.F .lag at 25% load	97.65		
111	Efficiency at 75 °C at 0.8 P.F. leading at 125% load	95.88		
112	Efficiency at 75 °C at 0.8 P.F. leading at 100% load	96.56		
113	Efficiency at 75 °C at 0.8 P.F. leading at 75% load	97.19		
114	Efficiency at 75 °C at 0.8 P.F. leading at 50%load	97.89		
115	Efficiency at 75°C at 0.8 P.F. leading at 25 % load	97.65		
116	Regulation at Unity P.F (in %)	0.4895		
117	Regulation at 0.8 P.F. lag. (in %)	3.0573		
118	Regulation at 0.8 P.F. leading. (in %)	3.0573		
119	% Impedance value at 75°C	4.5± 10%		

120	Separate source power frequency withstand test for HV for 1 minute in kv(min)	28kV rms		
121	Separate source power frequency withstand test for LV for 1 minute in kv(min)	3kV rms		
122	Induced over voltage withstand test for 1 min. specify voltage frequency, time for test.	866Volt,100Hz.for one minute		
123	Impulse test value (in kVp) .	75kVp,1.2/50 micro second		
124	The test certificates of Aluminium/copper conductor, core , insulating paper, porcelainbushings, steel plate used for enclosure of offer transformer is enclosed along with the offer in soft copy.(Yes/ No)	Yes		
125	All type test report of type tests carried out on transformer at NABL laboratory shall be submitted along with the offer as per cl. XXII (c) of Section (I) i.e. Instructions to tenderers.(Yes/ No)	Yes		
126	Air pressure test and temperature rise test shall be conducted as per format enclosed with thetechnical specification along with the offer (Yes/ No)	Yes		
127	All drawings shall be furnished for each offered item separately along with this offer (Yes/No)	Yes		
128	Oil absorption calculation sheet shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
129	Heat dissipation calculation shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
130	Flux density calculation sheet with no. of Primary & Secondary turns shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
131	Calculation sheet for 112.5% of Rated V/f ratio (over fluxing calculation sheet) shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		

132	Required documents, plant and machinery, list of order executed/under execution shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes		
133	The information required under Quality Assurance shall be submitted with the offer in physical format & soft copy(Yes/ No)	Yes		
134	The cost data in the prescribed format shall be submitted with offer in physical format & soft copy (Yes/ No)	Yes		
135	The performance Guarantee of the transformers in years	24 months from date of receipt of material		
136	Power frequency withstand voltage dry & wet in kV(rms) for H.V Bushing	28kV rms for one minute		
137	Dry lightning Impulse withstand voltage test in kV (peak) Stating the wave form adopted for H.V. bushing	75kVp,1.2/50 micro second		

Annexure- I

(On supplier's Letter Head)

I, ... certify that,

a. The business dealings with our firm / agency M/s…….. have not been debarred by any Ministry of GoI / GoM / state owned electricity distribution utility and still in force.

b. The Directors, Proprietors, Partners, Employee(s) or owner of our firm / agency M/s…….. have not been either jointly or severally guilty of malpractices in relation to its business dealings with the Government or MSEDCL during the last five years.

I hereby certify that I am duly authorized representative of M/s.---------- whose name appears above my signature.

Bidders Name:

Authorized representative's signature:

Authorized representative's Name:

Seal of the company

Name and address of the Bidder

Date:

Annexure- J

(On MSEDCL Letter Head)

Dispatch Instructions

BY R. P. A. D. / ORD. POST /E-MAIL

(SAP CONTRACT No: ----------)

To,

M/s. ----------

Email: ----------

Sub: Supply of ---------- against A/T No. ---------- dt. ----------

Ref: Final Inspection Call letter No. ---------- dt. ----------.

(I.W. Regn. No. ------- dt. ----------)

……

Dear Sir,

With reference to the above, you are requested to dispatch …….. Transformers as given below:

Sr. No.	Consigned to	Meant for Circle	Meant for Zone	Qty. in Nos.

Further, you are requested to contact concerned S.E. (O&M) Circle / E.E. (O&M) Division / Addl. E.E. (MM Section) before dispatching / unloading the above material.

This is issued without prejudice to all other terms and conditions of the order.

Yours faithfully,

Chief Engineer (M M Cell)

Copy f.w.cs. to: The C.E., MSEDCL, ----------.

Copy to:

The S.E. (MSC) / S.E. (O & M Circle, MSEDCL, Mumbai.

This material is to be strictly booked under HVDS scheme.

The G.M. (F & A – SB), MSEDCL, Mumbai.

The E.E. (IW), MSEDCL, Mumbai.

The E.E. (O & M Division), MSEDCL, ----------

1. The Addl.E.E. (MM Section), MSEDCL, ----------

Annexure- K
List of Stores

Sr. No.	Name of Stores	Address
1	Common Stores Ahmednagar	Nagar-Pune Road, Opp. Arti Hotel, Kedgaon, Ahmednagar.
2	Common Stores Airoli	Power House, Thane-Belapur Road, Airoli, Navi Mumbai.
3	Common Stores Akola	Major Store Babhulgaon NH No 6 Akola.
4	Common Stores Amravati	Major Store MSEDCL Power House, Mulshi Road, Amravati.
5	Common Stores Aurangabad	MIDC Plot No. J-13, Opp. Garware Stadium, Naregaon Phata, Chikhalthana, Aurangabad.
6	Common Stores Beed	Near 132 kV Sub-station, Idgah Nagar, Nalvandi Naka, Beed.
7	Common Stores Chandrapur	Near Vidyut Bhavan, Bagala Chaowk, Babu Peth, Chandrapur.
8	Common Stores Jalgaon	Old MIDC Area, Behind Ajanta Lawns, Ajanta Road, Aurangabad Highway, Jalgaon.
9	Common Stores Kalyan (Netivali)	MIDC Phase 1, Near Tata Power House, Kalyan - Dombivali Road
10	Common Stores Kamptee	Maldhakka Godown, Behind Railway Station Kamatee, Nagpur.
11	Common Stores Khamgaon	Manav Dharm Bld. Near 132 kV Sub-Station, Shegaon Road, Khamgaon, Dist. Buldhana.
12	Common Stores Kolhapur	Kaneri Math Road, A/P Gokulshirgaon, Tal. Karveer, Dist. Kolhapur.
13	Common Stores Kudal	Malwan Road, MIDC Pinguli-Nerur, Kudal, Sidhudurg.
14	Common Stores Latur	MIDC Plot No. P-21/P, In Front of Kirti Gold Oil Mill, Latur.
15	Common Stores Mulshi	Phursungi-Saswad Road, Near Overhead Bridge, Mulshi/ Phursungi, Dist. Pune.
16	Common Stores Nanded	Taroda Naka Main Road, Nanded.
17	Common Stores Nashik	Aringale Plot, Hanuman Nagar, Jail Road, Juna Saykheda Road, Panchak, Nasik.
18	Common Stores Osmanabad	Near MSEDCL Rest House, Tuljapur Road, Osmanabad.
19	Common Stores Palghar	Near 33/11 kV Sub-Station, MSEB Coloney, Boisar Road, Palghar.
20	Common Stores Parabhani	Old Power House Jintur Road, Parbhani.
21	Common Stores Ratnagiri	MIDC Area Mirjole, Kuwarbav, Ratnagiri.
22	Common Stores Sangli	Near Walchand Engineering College, Vishram Baug, Sangli.
23	Common Stores Satara	A/P Satara, Tal. Koregaon, Dist. Satara.
24	Common Stores Solapur	Plot No P-4, MIDC Chincholi, Behind Post Office, Solapur
25	Common Stores Tumsar	Near Power House, Nakaq Dongari Road, Old Bus Stop, Tumser, Bhandara.
26	Common Stores Wardha	Borgaon road, Wardha.
27	Common Stores Yavatmal	MIDC Lohara, Yavatmal.

Annexure- L

Policy & Procedure for Debarring of Agency from Business Dealings with MSEDCL

(…In addition to Tender and other conditions and relevant Law)

****

1. **Scope:**

1.1 MSEDCL reserves its right to debar any Agency from any business dealings with it, if such Agency is found to have committed deception, fraud or misconduct or any other act which is not in the interest of MSEDCL in the execution of contracts awarded or any of its action(s) fall into any such categories as laid down in this policy.

1.2 The provisions of this policy will be effective on investigations conducted or misconduct/irregularities noticed on the part of any Agency in all contracts awarded on or after the date of implementation of this policy.

2. **Definitions:**

In this policy, unless the context otherwise requires:

2.1 **Agency** shall mean Contractor / Supplier / Purchaser / Bidder/ Vendor/ MSEDCL approved sub-contractor of a Contractor to whom work has been awarded. It shall include, but not limited to, a public limited company or a private limited company, a firm whether registered or not, a proprietorship, any individual, a cooperative society or an association or a group of persons engaged in any commerce, trade, industry, or constituents of an unincorporated Joint Venture Company, etc.

2.2 **Bid/ Tender** shall mean an offer, proposal or quote for goods, services or works in response to solicitation issued for such goods, services or work by MSEDCL.

2.3 **'Competent Authority' and 'Appellate Authority'** shall mean the following :-

For Purchase Order (LOA) value up to & below 10 Cr., the Director Project / Director Operation shall be the 'Competent Authority'. The Chairman & Managing Director (CMD) shall be 'Appellate Authority' in respect of such cases.

For Purchase Order (LOA) value above 10 Cr., the Chairman & Managing Director (CMD) shall be the 'Competent Authority'. The Board of Directors shall be the 'Appellate Authority' in respect of such cases.

2.4 **'Enquiring Committee'** (EC) shall mean the following;-

The Committee comprising Chief Engineer (MM Cell), Chief General Manager (I/A) and Chief Legal Advisor shall be the Enquiring Committee

2.5 **Debarring: -** Business dealings with an agency may be debarred if it is considered not desirable to continue the business with the agency. It means action taken by the Competent Authority / Appellate Authority pursuant to this policy prohibiting agency from directly or indirectly performing any work for or otherwise participating in MSEDCL bid / tender

including to prohibit agency from submitting a bid, having a bid considered, or entering into any work / contract during a specified period of time as set forth in debarment order.

2.6 '**Purchase Order Issuing Authority (LOA)' & 'Vender Approving Authority(VA)':** Shall mean the person(s) designated to act for and on behalf of MSEDCL for the discharge of his duties in execution of the Work / Project / Job / Role, and shall include but not limited to the Regional Director(s), Executive Director(s), Chief Engineer(s), Superintending Engineer(s), Executive Engineer(s), etc.

3. Grounds for Debarring:

3.1 Debarring from business dealings can be initiated against the Agency if involved or committed any of the following misconduct / irregularities:

a) The Directors, Proprietors, Partners, Employee(s) or owner of the agency have been either jointly or severally guilty of malpractices such as fraud including but not limited to submission of fake or forged documents / certificates / guarantees, substitution of tenders, etc. in relation to its business dealings with the Government or MSEDCL, during the last five years.

b) The business dealings with the agency have been debarred by any Ministry of GoI / GoM and still in force.

c) The agency is found to have been in default in paying any dues resulting in incurring financial loss to the MSEDCL by virtue of an order and/or direction of any Statutory Authority or Court or Arbitration, etc. for making such payment in respect of the agency concerned.

d) The agency is repeatedly found to be non performing in execution of 3 (three) or more contracts and / or in rectification of critical / major defects pointed out by MSEDCL or any person authorized by MSEDCL, in last 5 (five) years.

The grounds given above are only illustrative and not exhaustive. The Competent Authority may decide to debar an Agency according to the seriousness of the ground.

3.2 a) The Competent Authority shall decide depending upon the level of severity in defaults from the agency, the period of debarring. In case of major lapses and a criminal or fraudulent type of issues involved therein, the First Information Report (FIR) to Police Department shall be lodged.

b) If any one or more Partner / Directors of any debarred Agency firm promotes or forms a new contracting firm or a sister-concern firm of the said debarred Agency, then it shall also be considered as a debarred firm.

4. Competent Authority (CA) and Appellate Authority (AA) for Debarment:

Considering the above mentioned grounds for Debarring from business dealings can be initiated against the Agency, after due scrutiny by the Purchase Order issuing authority (LOA) or Vender Approving Authority (VA) and shall serve upon the 'Show Cause Notice' for Debarring of the Agency after termination of contract is effected. For the purpose of debarment, the powers delegated to the following designated officers of MSEDCL as Competent Authority (CA) and as Appellate Authority (AA) for debarring of business dealings with the accused Agency.

Sr. No.	Purchase Order Issuing Authority (LOA) & Vender Approving Authority (VA)	Enquiring Committee (EC)	Competent Authority for Debarring (CA)	Appellate Authority for Debarring (AA)
1	Orders from Corporate Office	For orders below Rs. 10 Cr.	Director(Project) / Director (Operation)	Chairman & Managing Director (CMD)
		For orders above 10 Cr.	Chairman & Managing Director (CMD)	BOARD OF DIRECTORS

5. Powers of Competent Authority and Appellate Authority:-

a) To investigate the matter in connection with the allegation of corrupt, fraudulent, coercive or collusive practices or illegal practice of agencies;

b) To ensure timely and expeditious disposal of proceedings of debarment;

c) Seek advice or opinion on specific issues.

6. Procedure:

The Purchase Order Issuing Authority (LOA) or Vendor Approving Authority (VA) of the concerned department on noticing any misconduct and / or irregularities as mentioned in clause 3.1 above, shall serve upon the 'Show Cause Notice for Debarring' after termination or closing of contract(s) stating therein the facts / reasons containing the allegation of misconduct or irregularities and the period of 14 days will be afforded to the agency to present their statement / submission in the form of reply in response to Show Cause Notice. In the event, non receipt of reply from the agency within the stipulated period, action as proposed will be proceeded with and no representation / submissions thereafter will be accepted. The copy of service return of notice will be kept and a confirmatory document through electronic mode is sine qua non.

a. The Purchase Order Issuing Authority (LOA) or Vendor Approving Authority (VA) shall submit the duly recommended detailed proposal of debarring of Agency to the Competent Authority (CA) along with Show cause notice and reply, if any and para-wise justification to the reply to the Show Cause Notice submitted by the Agency, if any for consideration and order.

b. The Competent Authority (CA) shall scrutinize the proposal and depending on merit of the case and after examining the material on record shall decide to proceed for enquiry or to close the case. In the event of exoneration of the Agency from debarring, the decision shall be conveyed to LOA or VA issuing authority and subsequently it shall be informed to Agency.

c. If the Competent Authority (CA) arrives at the decision to proceed in the matter, then the complete case shall be handed over to the Enquiring Committee (EC). The Enquiring Committee shall in detail examine the materials on record, conduct the hearing and decide

the case as per the principle of natural justice.

During the process of hearing, only the authorized representative of Agency will be permitted to represent the Agency and no Legal practitioner / Advocate shall be allowed to plead the case on its behalf.

d. The Enquiring Committee shall submit its Report along with detailed findings within 30 days to the Competent Authority (CA).

The Competent Authority (CA) shall pass an appropriate order after examining the material on record.

e. The decision of the Competent Authority (CA) shall be in the form of Reasoned Order, the period for which the debar would be operative shall be mentioned in the order and the same shall be communicated to the LOA or VA issuing authority.

f. The Purchase Order Issuing Authority (LOA) or Vendor Approving Authority (VA) shall then communicate the decision of debarring of business dealings along with the order of Competent Authority (CA) to the Agency.

g. The procedure for debarring shall be completed within a period of three months from initiation of case by concerned authority.

The Reasoned Order will be communicated to the agency at its recorded address available with MSEDCL within 15 days of order issued by Registered post. In addition to it, the copy shall preferably be sent on the registered Email address of the Agency.

7. <u>Period of Debarment:</u>

The period for which an agency is debarred shall be clearly mentioned in the order. Period of debarment of business dealings shall be decided by the Competent Authority in exercise of its power delegated and would depend upon the seriousness of the cause. Debarment shall be up to the maximum period of five (5) years.

Provided further that in case the information / documents submitted by the agency is found to be false / forged at any point of time, MSEDCL shall have a right to recover from the agency the cost incurred in carrying out physical assessment for establishing veracity of such information / document including a penalty decided by the Enquiring Committee. If the agency fails to reimburse such cost and penalty to MSEDCL, the debarment period of the agency may be extended by the Enquiring Committee which shall not in any case exceed more than two (2) years but in any cumulative period for debarring the Agency shall not exceed five (5) years, in exceptional cases such period shall be up to five (5) years and the cumulative period for debarring of agency in such cases shall not exceed ten (10) years.

8. <u>Consequences of Debarment:</u>

Upon issuance of the order of debarment of an agency from future business dealings with MSEDCL, the debarred agency along with its Joint Venture Partner Firm shall not be allowed to participate in any future tender/s, during the debarred period. Further, in case the agency has already participated in the tender process and the price bid is not opened prior to issuance of the order of debarment of business dealings, its Techno Commercial Bid shall be rejected and Price Bid shall not be opened.

In the event the Price Bid of the participating agencies has been opened and the agency against whom the order of debarment of business dealings has been issued, the bid of the debarred agency shall be rejected even if he is found to be successful bidder, considering the agency as disqualified.

Provided the order of debarment of business dealings issued against any agency shall not override the rights of the debarred agency already engaged in executing any other contract(s) till its completion.

9. Withholding:

The Competent Authority (CA) may, depending on the severity of the case, withhold the business dealing with the agency till the report given by the Enquiring Committee from the date of initiation of proposal of debarring.

10. Appeal against the Debarment Order:

a. The Agency, aggrieved by the order of debarment, may prefer an appeal before the Appellate Authority (AA), against the order of the Competent Authority (CA) specifying the grounds of appeal along with necessary documents.

b. Such appeal shall be filed within one month from the date of receipt of the order of debarment of business dealing. The agency shall represent their case through authorized representative of its agency, and no service of legal practitioner shall be adopted.

c. Purchase Order Issuing Authority (LOA) or Vendor Approving Authority (VA) shall submit all the original papers of the debar case to Appellate Authority (AA), along with the justification on points raised in appeal by debarred Agency.

d. Appellate Authority shall admit the appeal and decide the appeal within 45 days from the filing of appeal. The agency may file any additional document/evidence before the Appellate Authority, if Appellate Authority permits.

e. Appellate Authority shall pass appropriate Reasoned Order on appeal and communicate decision to the Purchase Order Issuing Authority (LOA) or Vendor Approving Authority (VA) through the Competent Authority (CA). LOA or VA Issuing Authority will then communicate appeal order to the Debarred Agency.

No appeal will lie to the Appellate Authority against the final order of the competent authority pursuant to the written consent of the agency.

Awaiting the decision of the competent authority, the debarring order passed by the competent authority shall remain effective till Appellate Authority takes a final decision in the matter.

The order of the Appellate Authority is final and binding.

11. Revocation of Debarment Order :

The order for debarment passed for certain specified period shall be deemed to have been automatically revoked on expiry of the specified period and it will not be necessary to issue a specific formal order of revocation.

An order of debarment for the reasons mentioned above may be revoked if accused has been wholly exonerated by Court of Law.

12. Interpretation :

The competent authority shall be responsible for the administration, interpretation, application and revision of this policy. The policy will be reviewed as and when needed.

13. Post Debarment Action:

The Competent Authority (CA) will ensure the following;

a) Hosting at MSEDCL Website: The name of the Agencies with whom Business Dealings have been debarred shall be hosted at MSEDCL website by HO-IT Department, after confirmation of Debarment of the Agency.

b) The Competent Authority shall ensure that the names of the debarred agency along with the names of Director, JV Partner, Owner of the debarred Agency is displayed on the MSEDCL website.

c) The cancellation is activated for Online Login for e-Tendering website of MSEDCL for the debarred Agency Firm during the period of debarment.

d) Copy of the order of debarring of the Agency shall be conveyed to all Utilities in India and Financial Institutions viz. REC, PFC, etc. and Ministry of Power of both GOM and GOI.

14. AMENDMENTS :

MSEDCL may introduce modification thereto through the amendment of its specific provision as the need arises and the amendment to this policy shall be applicable to the ongoing contract as well future contract.

ANNEXURE – M

BANK GUARANTEE FORMAT

EARNEST MONEY DEPOSIT BANK GUARANTEE AGAINST TENDER

B.G. No. & DATE:

The Bank of _____ (full address of Branch) hereby agree unequivocally and unconditionally to pay, at Mumbai within 48 hours, on demand in writing from the MAHARASHTRA STATE ELECTRICITY DISTRIBUTUION CO. LTD. (name of the company formerly known as M.S.E.B.) on behalf of M/s _____ (Address as per MSEDCL REGISTRATION) who have tendered and/or contracted or may tender or contract hereafter for supply of materials. Equipments or services to the MAHARASHTRA STATE ELECTRICITY DISTRIBUTUION CO. LTD. against Tender No. ---------- dated ---------- total value of Tender is Rs. ----------

This agreement shall be valid and binding on this Bank up to and including validity (date) and shall not be terminable by notice or any change in the constitution of the Bank or the firm of contractors or any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made given conceded or agreed with or without our knowledge or consent by or between parties to the said within written contract. The validity of this Bank Guarantee will be extended by us for the further period of six months, one month prior to its present validity period at the request of MAHARASHTRA STATE ELECTRICITY DISTRIBUTUION CO. LTD.(name of the company-formerly known as M.S.E.B.).

In case of any dispute arising out or it connection with the extension or encashment of Bank Guarantee, the Courts in Mumbai will have jurisdiction.

Our liability under this Guarantee is restricted to Rs.----------/- (Rupees---------- only). Our Guarantee shall remain in force until (date). Unless a suit or action to enforce a claim under the guarantee is filed against us within six months from the aforesaid date, all your rights under the said guarantee shall be forfeited and we shall be relieved and discharged from all liability there under.

Place:

Date: Sign----------

For----------

(Banker's Rubber Seal & Bank Code No. of signatory)

Please note that:

1. The value of non-judicial stamp paper for this Bank Guarantee is Rs.200/- should be purchased in the name of Guarantor Bank.
2. The Bank Guarantee should be furnished from any Scheduled Bank/Nationalized Bank.
3. Please state the full and complete postal address of the Bank undertaken the guarantee.
4. The Bank Guarantee may be valid as per terms and condition of A.T.
5. B.G. should be submitted along with covering letter of Bank.

ANNEXURE – N

BANK GUARANTEE FORMAT

FORM OF BANK GUARANTEE FOR THE PERFORMANCE OF THE EQUIPMENT

B.G. No. & Date:

This deed of Guarantee is made this ……..day of…… By……branch having at H.O. at…….. (here in after called "the Surety" which expression shall where the context so admits include its permitted assign) in favour of MAHARASHTRA STATE ELECTRICITY DISTRIBUTUION COMPANY LTD. (name of the company formerly known as M.S.E.B.) being a government company formed as per the provisions of the Maharashtra Electricity Reforms Transfer Scheme. 2005 having its registration no. U40109 MH 2005 SGC 153645 (here in after called the "Creditor" which expression shall include its permitted assigns). WHERE AS M/s. (Name of Party)…….. (Postal address as per A/T) have entered into a contract to supply (Name of Material) to the MAHARASHTRA STATE ELECTRICITY DISTRIBUTUION COMPANY LTD. (Name of the Company formerly known as M.S.E.B.) vide contract No. ……dtd……..on the terms and conditions in the said contract. (here in after for brevity sake called "the said contract").

In accordance with terms of the said contract, the creditor has agreed to pay to M/s…….. (|Name of Party)……. the said sum representing the 2.5% of the total contract price for the Rs……../- and WHEREAS M/s. …….. (Name of Party)…….is required under the terms of contract to furnish a Bank Guarantee for Rs……../- (Rupees:…….Only) the said sum representing the 2.5% …….price as given in the said contract.

The surety as he requests of M/s. ……(Name of Party)…. has agreed to give this guarantee.

NOW THEREFORE THIS DEED WITNESS AS FOLLOWS:

1. In consideration of the creditor agreeing to make to the debtor at Mumbai the payment of Rs…….. (Rupees……only) being the value of 2.5% of the total contract ……price as given in the said contract on supplying the complete material as per the contract by the debtor failing which the surety does undertake to pay to the creditor on demand such amount of amounts as the surety may be called upon to pay not exceeding in the aggregate sum of Rs. ……../- (Rupees…….only).
2. The surety hereby guarantee to the creditor the due performance and observance by the debtor of the terms and conditions of the contract.
3. The surety also agrees that it shall not during the currency of the guarantee herein given or during the period of its execution revoke the same even by giving notice to the creditor.
4. On account of the non-fulfillment of the contractual obligation by the debtor or in case the surety or contractor do not renew this guarantee bond as herein provided, the surety will on simple demand from the creditor, pay at Mumbai the creditor, the sum of Rs……..(Rupees …… .only) as indicated under clause -1 above, without demure and without the creditor to invoke any legal remedy that may be available to them to compel the surety to pay the same even if the debtor consider such demand of the creditor unjustified.
5. The surety agrees and declares that notwithstanding anything contained in Section 133 to 135 of the Indian Contract Act 1872 (IX of 1972) or any other rule of law or equity in the view

of any variance in the terms of the said contract shall not operate as a discharge of his obligations hereunder or shall any composition made by the creditor with debtor in respect of any breach of the terms and conditions of the said contract operate as a discharge of the surety's obligation and surety further expressly agrees and declares that though as between the creditor and surety, the surety shall be liable for sum payable or falling due hereunder equally with the debtor and the surety save as otherwise herein provided hereby waives all his rights which he might as guarantor be entitled to claim and enforce.

6. The decision of the creditor that any sum has become payable shall be final and binding on the surety.
7. The guarantee shall come into force on supply of material shall remain in force till the end of ……(date) ….The surety, at the request of the creditor shall extend the validity of the Bank Guarantee for a further period of 6 months, one month prior to its present validity period.
8. In case of any dispute arising out of or in connection with the extension or encashment of the Bank Guarantee, the courts in Mumbai will have the jurisdiction.
9. The guarantee herein contained shall not be effected, by the change in the constitution of the surety or the debtor.
10. Our liability under this guarantee is restricted to Rs. ……..(Rupees……only) and our guarantee shall remain in force until (Date….) unless a claim under this guarantee is lodged with us within six months from the date of expiry of guarantee i.e. on or before ..(date)…all your rights under this guarantee shall be forfeited and we shall be relieved and discharged from all our liabilities there under.

IN WITNESS WHERE OF THE surety has executed this deed in presence of

Place: Signature……..

Date: for……..

(Banker's Rubber Seal & Code No. of signatory)

Witnessed (2 witness is required from bank only)

1) Name & Address

   Signature

2) Name & Address

   Signature

Please Note:

1. The value of non-judicial stamp paper for this bank guarantee is Rs. 200/- should be purchased in the name of Guaranteed Bank.
2. The bank guarantee should be furnished from any Scheduled bank
3. Please state the full and complete postal address of the bank undertaking the guarantee.
4. B.G. may be valid as per terms of A/T including guarantee period of material.
5. B.G. should be submitted along with covering letter of Bank.

SCHEDULE C

Quantity Offered at Column No. 6 of Annexure-'B' (Price Schedule):

Sr. No.	Item Code	Material Description	Quantity Tendered in Nos	Quantity Offered at Column No. 6 of Annex-'B' (Price Schedule) in Nos
1	2	3	4	5
1	20113001653	11KV/0.433 KV, 16 KVA, Three Phase Distribution Transformers without CSP of energy efficiency level II as per IS:1180 (2014)	31,200	
2	20119983163	22KV/0.433 KV, 16 KVA, Three Phase Distribution Transformers without CSP of energy efficiency level II as per IS:1180 (2014)	1,640	

Seal & Signature of Supplier

Format for Inspection Call

Ref.No. **Date:**

To,
The CE (MMC),
Prakashgad, Bandra (E),
Mumbai - 400051.

Sub: Inspection of/material against A/T No. ---------- dated. ----------
for Supply of----------.

……..

1. Brief description of the material Offered for inspection:
2. Reference of drawing Approval :
3. a) Reference of approval of type test:
   b) Reference of approval of balance type test (If applicable):
4. Whether it is a joint inspection with
   Testing SE (TQA) etc. (if applicable):
5. a) Whether EMD has been paid against the order:
   b) if paid, please give details:
6. Sr. No. of the items as per A/T:
7. Total Quantity of the items Ordered:
8. Total quantity of the items inspected so far:
9. a) Quantity monthly committed in delivery schedule:
   b) Lot No. for which the Quantity is offered for inspection now:
   c) Due date of delivery as per A/T for offered quantity:
10. Date of readiness of Material:
11. Complete address of the factory
    where materials is to be inspected:
12. Name of the person to be contacted in connection
    with inspection & his Office/Factory/Residence Tel. No.:
13. Staggering holiday of Factory/Office at the place of inspection:
14. a) Whether Dispatch Instructions are available (Say Yes or No):
    b) Quote Letter No.:
    c) Brief destination & Qty. per consignee of this present lot offered:
15. Last visit of our Inspecting Officer:
16. a) Whether the entire material is dispatched against last inspection.
    (Our EE[IW] will ensure before inspection of this lot that the earlier inspected lot is already dispatched)
    b) Quantity dispatched
17. Further programme of production Quantity likely to be offered & by what date:

Authorized Signature
For (Name of the Firm).

Format A

(Intimation of failure of Transformer)

MAHAVITARAN
Maharashtra State Electricity Distribution Co. Ltd.

……

Ref. No. **Date:**

To,
Name & address of the firm

Sub: Failure of ------KVA, ------kV Dist. Transformer within Guarantee Period.

……..

Dear sir,

This is to inform that ------KVA, ------kV Dist. Transformer supplied by you is failed within Guarantee Period.

You are therefore requested to depute your service representative at ---------store to attend the repairing of the same at the earliest.

The detail of Transformer is as below:

Sr. No.	Material and stores	Purchase order reference	Unit rating with class	Sr. No. of unit make failure	Date of commissio n	Date of failure	Load details &probable cause of	Present location of faulty unit	Remarks

EXECUTIE ENGINEER
O&M Division

Copy s.w.r. to

Copy to :

Format C

(Intimation of replacement / repairs of transformer & successful commissioning)

MAHAVITARAN
Maharashtra State Electricity Distribution Co. Ltd.

……

Ref. No. **Date:**

To,
Name & address of the firm

Sub: Rectification/Repair of Dist. Transformers under Supplier Guarantee period.

Ref: This Office Format A Letter No.---------- dt. -------.

……..

Following transformer is repaired as per our satisfaction on dt.---------- by your representative or departmentally and cost of repairs is Rs. ----------Which is inclusive of normative charge Transformer Details are as below,

1. Sr. No.:
2. Make:
3. Capacity:
4. Date of Failure :
5. Date of repairing :
6. P.O. Reference No.:
7. Store Centre from where lifted:
8. Reasons for failure :
9. Details of rectification:

Submitted for your further needful please.

EXECUTIE ENGINEER
O&M Division

Copy s.w.r. to

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Drawing D-1

105

175

DISTRIBUTION TRANSFORMER

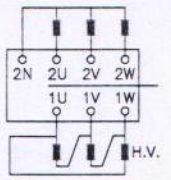
MFG.BY :-

3 PHASE TRANSFORMER (SEALED TYPE)

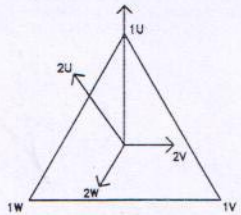
STANDARD	IS : 1180 (PART-I)	ENERGY EFFICIENCY LEVEL	II
KVA	16	MAX TOTAL LOSSES AT 50 % RATED LOAD W	141
VOLTS AT NO LOAD HV	22000	MAX TOTAL LOSSES AT 100 % RATED LOAD W	462
VOLTS AT NO LOAD LV	433		
BIL HV	125 KVP	TYPE OF COOLING	ONAN
BIL LV	--------		
AMPERES HV	0.42	TEMP. RISE OVER & AMB. 50°C OIL °C	35
AMPERES LV	21.33	TEMP. RISE OVER & AMB. 50°C WDG. °C	40
FREQUENCY Hz	50	MASS OF OIL Kg.	85
VECTOR GROUP	DYn-11	TOTAL MASS Kg.	320
IMPENDANCE % VOLT %	4.5	VOL OF OIL Ltr.	105
		MONTH & YEAR OF MFG.	
		Sr.NO.	

CUSTOMER MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LTD.

ORDER NO.



CONNECTION DIAGRAM



VECTOR DIAGRAM

MADE IN INDIA

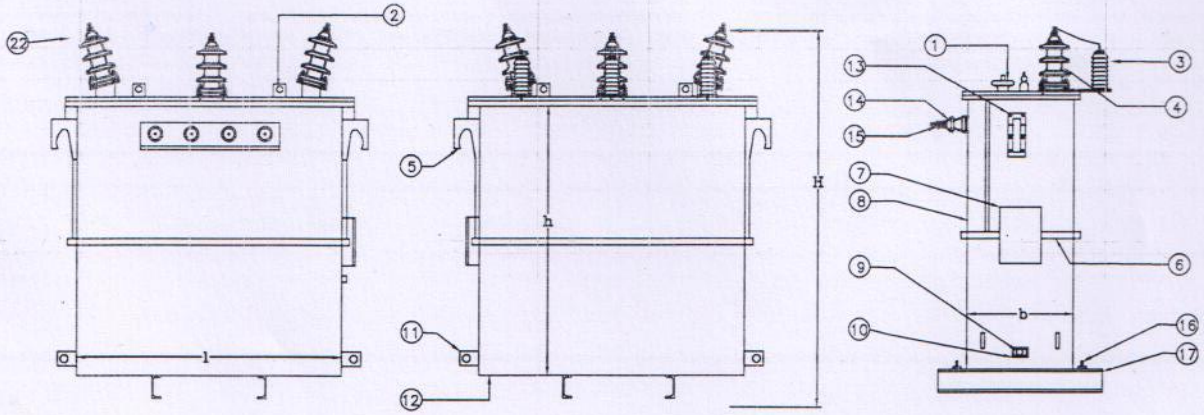
4HOLES ø6

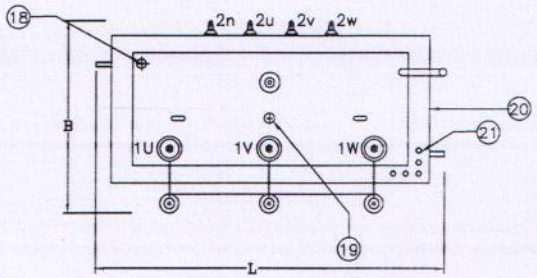
NOTES :-
1) MONTH & YEAR, SR. NO., % IMP.& ORDER NO. MARKED * WILL BE PUNCHED AT THE TIME OF DISPATCH.
2) MATERIAL ALUMINUM ANODIZED
3) THICKNESS – 18 SWG. MIN.
4) WEIGHT ARE SUBJECTED TO ±5% TOLERANCE
5) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED

SIGN OF AUTHORISED PERSON & STAMP OF THE FIRM

CUSTOMER : MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LTD.

CONSULTANT		RATING & DIAGRAM PLATE
DRG. NO.	16.22.LEVEL-II/04	
DIM.TOL.		16KVA,22/0.433KV, 3 PHASE DISTRIBUTION TRANSFORMER ENERGY EFFICIENCY LEVEL-II AS PER IS-1180 (PART-I) 2014(NON SEALED)
SCALE	NTS	





S.NO.	ACCESSORIES	QTY.	DETAILS
1	OIL FILLING HOLE WITH CAP(ø30mm)	1	M.S.(ø30mm)
2	LIFTING LUGS (FOR TOP COVER) 8mm THICK.	2	M.S. 8mmTHICK.-2NOS.
3	LIGHTNING ARRESTER	3	18KV/5KA
4	H.T. BUSHING 24KV, 250Amp	3	PROECLEIN (24KV)
5	LIFTING LUGS FOR BODY 8mm THICK.	2	M.S. 8mmTHICK.-2NOS.
6	REINFORCING ANGLE (40x40x5mm)	1	M.S.(40x40x5mm)
7	RATING & DIAGRAM PLATE (18 SWG.)	1	AL ANODISED
8	TANK BODY	1	M.S.
9	DRAIN VALVE -32ømm	1	M.S. T VALVE
10	SPOT WELDED METALLIC COVER FOR DRAIN VALVE	1	M.S.
11	PULLING LUGS 8mm THICK.	4	M.S. 8mmTHICK.-4NOS.
12	TANK BOTTOM PLATE 5 mm.	1	M.S.
13	OIL LEVEL GAUGE WITH 3 POSITION OF OIL	1	-5°,30°,98°C
14	L.V. BUSHING 1KV/250A	4	PROECELIN 1KV
15	L.V. BUSHING TERMINAL STUDS (M-12)	4	TINNED CU. ø12mm
16	EARTHING TERMINAL WITH LUGS 70 Sq.mm.	2	M.S. 2 NOS.
17	BASE CHANNEL-75mmx40mm WITH HOLE	2	M.S. 75x40mm
18	THERMOMETER POCKET	1	M.S.
19	AIR RELEASE PLUG	1	M.S.
20	TOP COVER	1	M.S.
21	TOP COVER FIXING BOLTS (M-10) QTY.	L.S.	M.S. (M-10)
22	H.T. BUSHING TERMINAL (M-12) DIA. WITH NUTS	3	BRASS

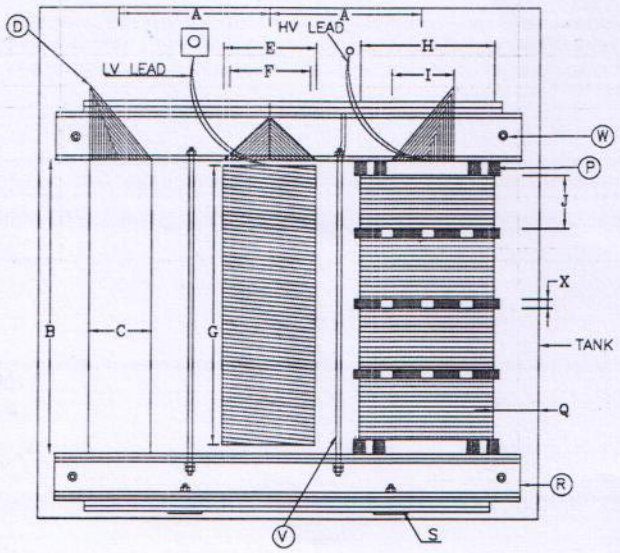
1	WEIGHTS IN KGS.		DIMENSIONS IN MM
	CORE	68.96	TRANSFORMER TANK
	WINDINGS (ALUMINIUM)	38.44	l = 745
	CORE & WINDINGS (ASS'LY WT.)	140	b = 295
	TANK & FITTINGS	95	h(avg.)= 715 (SLOPE 5'ON HV SIDE)
	OIL IN Kg/Ltr.	85/105	TRANSFORMER TANK OVER ALL
	TOTAL WEIGHT	320	L = 945
2	THICKNESS IN MM		B = 695
	TANK SIDE PLATES (MIN.)	3.15	H = 1185
	TOP & BOTTOM PLATES (MIN.)	5	BUSHING CLEARANCES (ELECT.)MIN
			HV TO HV = 330
			LV TO LV = 75
			HV TO ETH = 230
			LV TO ETH = 40

NOTES :-
1) WIDTH OF TOP COVER BEND PLATE MIN. 25mm
2) COLOR OF TRANSFORMER- AIRCRAFT BLUE SHADE NO. 108 OF IS-5
3) GASKET BETWEEN TOP COVER & TANK SHALL BE AS PER IS:4253
4) WEIGHTS ARE SUBJECT TO ±10% TOLERANCE
5) MAKE OF LIGHTENING ARRESTOR -
6) MAKE OF PRESS BOARD -
7) ALL WELDING OPERATION SHALL BE CARRIED OUT BY MIG PROCESS
8) SLOPE 5° TO 10° TOWARDS H.V. SIDE

SIGN OF AUTHORISED PERSON & STAMP OF THE FIRM

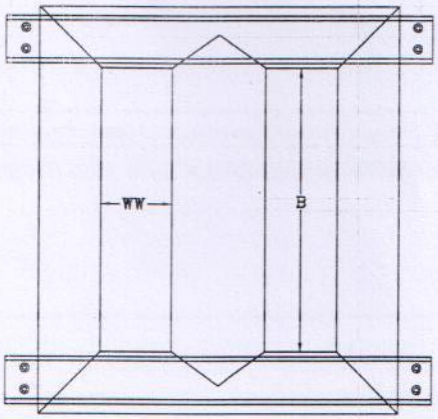
CUSTOMER : MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LTD.

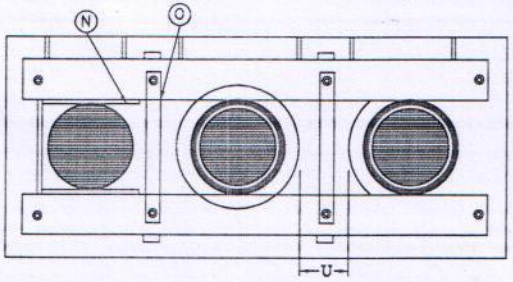
CONSULTANT		GENERAL ARRANGEMENT DRAWING
DRG. NO.	16.22.LEVEL-II/01	
DIM.TOL.		16KVA,22/0.433KV, 3 PHASE DISTRIBUTION TRANSFORMER ENERGY EFFICIENCY LEVEL-II AS PER IS-1180 (PART-I) 2014(NON SEALED)
SCALE	NTS	

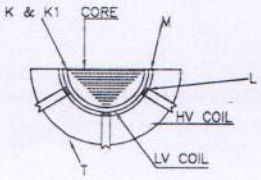


WINDING AND CONSTRUCTION DETAILS

FRONT VIEW







SIDE VIEW

CORE	DESCRIPTION	UNIT	DETAILS
A	LEG CENTRES	mm	225
B	WINDOW HEIGHT	mm	410
C	CORE DIAMETER	mm	76
D	NO OF STEPS	Nos.	7
	EFFECTIVE CORE AREA	cm^2	39.993
WW	WIDTH OF WINDOW	mm	155
ST	STACK THICKNESS	mm	69.3
LV COIL			
E	OUTER DIA	mm	107
F	INNER DIA	mm	82
G	AXIAL LENGTH	mm	394
	CONDUCTOR SIZE	mm	(7.9X2.4)
	CONDUCTOR CROSS SECTION AREA	sq.mm	18.41
	CONDUCTOR INSULATION		DPC
	CONDUCTOR MATERIAL		ALUMINIUM
	NO.OF TURNS	NO.	184
HV COIL	HV COILS PER PH	NO.	2
H	OUTER DIA	mm	211
I	INNER DIA	mm	136
J	AXIAL LENGTH	mm	77
	CONDUCTOR SIZE	mm	0.71
	CONDUCTOR CROSS SECTION AREA	sq.mm	0.396
	CONDUCTOR INSULATION		SE
	CONDUCTOR MATERIAL		ALUMINIUM
	NO.OF TURNS	NO.	16192
INSULATION			
K	WRAP ON CORE		0.5 mm
K1	CLEARANCE LV TO CORE	mm	3.5
L	WEDGES BETWEEN HV & LV COILS	No.	6
M	CLEARANCE BETWEEN HV & LV	mm	14
N	FRAME CHANNEL INSULATION	mm	2
O	PHASE BARRIER	mm	2 x 2
P	END INSULATION BLOCK	mm	40
Q	CLEARANCE TO TANK WALL	mm	40
R	CORE FIXING CHANNEL SIZE	mm	75 X 40
S	BASE CHANNEL SIZE	mm	75 x 40
T	SPACERS BETWEEN HV AXIAL COIL	mm	6 PER CIRCLE
U	INTER PHASE CLEARANCE (HV)	mm	15
V	TIE RODS SIZE & Nos.	mm	4 NoS.OF 12mm
W	KEY STUD SIZE & Nos.	mm	4 NoS.OF 12mm
X	THICKNESS OF SPACERS (HV COIL)	mm	8

RESISTANCE	LV	HV
RESISTANCE IN Ohm AT 20°C PER PHASE	0.0861	644.018

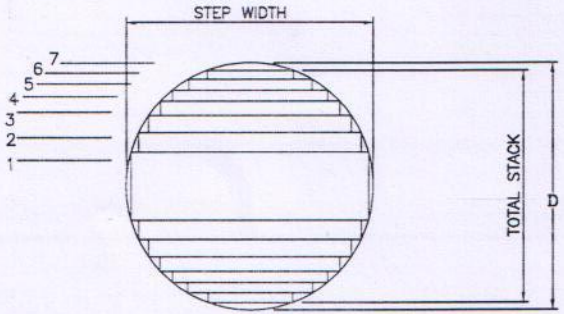
NOTES :-
1) CORE CHANNEL ARE PAINTED WITH OIL RESISTANCE PAINT / WARNISH
2) NAME OF PRESS BOARD -
3) ALL TOP & BOTTOM YOKE BOLT, NUTS, TIE RODS ARE PHOXPHATED
4) NO NEGATIVE TOLERANCE ON MINIMUM SPECIFIED PARAMETERS
5) DIMENSIONS ARE SUBJECT TO +5% TOLERANCE
6) STAR FORMATION & HV & LV WINDING LEAD CONNECTION TO BUSHING ROD SHALL BE MAKE THROUGH BRAZING & CRIMPING. (WHERE EVER IT IS APPLICABLE)

SIGN OF AUTHORISED PERSON & STAMP OF THE FIRM		CONSULTANT	
		DRG. NO.	16.22.LEVEL-II/02
	CUSTOMER : MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LTD.	DIM.TOL.	
		SCALE	NTS

INTERNAL CONSTRUCTION DRAWING

16KVA,22/0.433KV, 3 PHASE DISTRIBUTION TRANSFORMER ENERGY EFFICIENCY LEVEL-II AS PER IS-1180 (PART-I) 2014(NON SEALED)

Sr.No.	DESCRIPTION	DETAILS
1	PRIMARY VOLTAGE (KV)	22 KV
2	SECONDARY VOLTAGE (KV)	0.433 KV
3	RATING (KVA)	16
4	VECTOR GROUP	DYn 11
5	CONFIRMING TO I.S.S.	1180-2014 (PART-I)
6	PERMISSIBLE VOLTAGE FLUCTUATION %	12.5
7	TEMP. OF HOTTEST SPOT(MAX.)	95°C
8	TEMP. OF WINDING OVER & AMBIENT 50°C (MAX)	40°C
9	TEMP. OF OIL OVER & AMBIENT 50°C (MAX)	35°C
10	CORE DETAILS	
	a) CORE MATERIAL	CRGO ANNEALED STEEL
	b) PRINCIPAL SOURCE OF CORE MAT.	IMPORTED
	c) GRADE OF LAMINATION/THICKNESS	M3 / 0.23mm
	d) FLUX DENSITY W/M²	1.69 MAX.
	e) NO OF STEPS OF CORE (NOS.)	7
11	% IMPEDANCE AT	4.5 +/-10%
12	CORE DIMENSIONS (Cd x Wh x Lc) mm	76 X 410 X 225



Sr.No.	DESCRIPTION	DETAILS	
12	WINDING	HV	LV
	MATERIAL	Al.	Al.
	CONDUCTOR SIZE mm x mm	0.71 DIA	7.9 X 2.4
	INSULATION MATERIAL	SE	DPC
	CURRENT DENSITY A/mm2	1.3 MAX.	1.3 MAX.
	No. OF TURNS	16192	184
	OUTER DIA mm	211	107
	INSIDE DIA mm	136	82
	AXIAL LENGTH mm	77	394
	No. OF COILS PER PHASE No.	4	1
	RESISTANCE IN Ohm AT 20°C PER PHASE	644.018	0.0861
	CONDUCTOR CROSS SECTION AREA	0.396 sq.mm	18.41 sq.mm
13	BUSHING	DETAILS	
	MIN. CREEPAGE DISTANCE	25mm/Kv., HV-605mm, LV-55mm	
14	LOSSES		
	NO LOAD LOSSES	72 WATT	
	MAX. TOTAL LOSSES AT 50% FULL LOAD AT 75°C	141 WATT	
	MAX. TOTAL LOSSES AT 100% FULL LOAD AT 75°C	462 WATT	
15	TANK		
	SIDE WALL THICKNESS mm	3.15	
	TOP & BOTTOM PLATE THK. mm	5	
16	OIL USED		
	NAME OF MANUFACTURER		
	GRADE OF	MINERAL OIL AS PER IS: 335 AMENDED UP TO DATE	
	VOLUME (LITERS) TANK	105 Ltr.	
	TOTAL	105 Ltr.	

KVA	PHASES	FREQ.	COOLING	VOLTAGE		CURRENT	
				HV(v)	LV(v)	HV(A)	LV(A)
16	3	50	ONAN	22000	433	0.42	21.334

STEP NO.	1	2	3	4	5	6	7
L mm	70	65	60	55	50	40	30
W mm	29.4	9.7	7	5.9	4.9	7.3	5.1
CROSS SEC. MM²	2058	630.5	420	324.5	245	292	153

TOTAL CROSS SECTION AREA MM² = 4123 = 41.23 CM²
EFFECTIVE CORE AREA = 0.97 x 41.23 = 39.9931 CM²

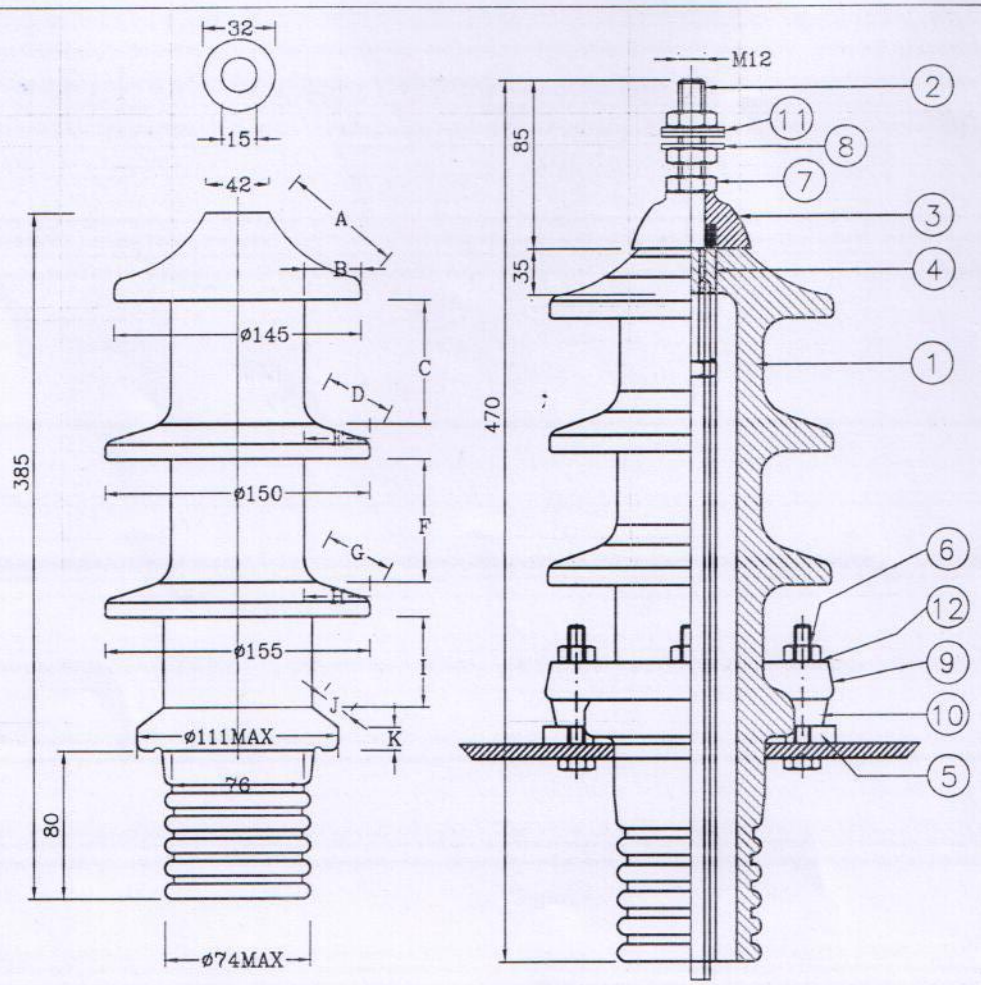
DESCRIPTION		mm
CORE WINDOW HEIGHT	H	410
CORE WINDOW CENTER TO CENTER	W	225
CORE STACK THK.	T	69.3
CORE DIA	D	76

NOTES :-
1) ALL DIMENSIONS ARE IN MM

SIGN OF AUTHORISED
PERSON & STAMP OF THE FIRM

CUSTOMER : MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LTD.

CONSULTANT		TECHNICAL DETAILS DRAWING
DRG. NO.	16.22.LEVEL-II/03	
DIM.TOL.		16KVA,22/0.433KV, 3 PHASE DISTRIBUTION TRANSFORMER ENERGY EFFICIENCY LEVEL-II AS PER IS-1180 (PART-I) 2014(NON SEALED)
SCALE	NTS	



RATED RATING	24kv /250A
STANDARD APPLICABLES IS	IS-8603/3347/2099
ONE MINUTE DRY P.F.VOLTAGE WITHSTAND	50 KV (RMS)
ONE MINUTE WET P.F.VOLTAGE WITHSTAND	50 KV (RMS)
1.2/50 MICRO SEC. IMPULSE VOLTAGE WITHSTAND	125 KVP
TOTAL CREAPAGE DISTANCE (AIR) 25mm/kv	605mm

SR. NO.	DESCRIPTION	QTY.	MATERIAL
01	INSULATOR 24KV, 250 AMP	01	PROCELAIN
02	STEM M12 DIA	01	BRASS
03	CAP 50MM DIA	01	BRASS
04	SEALING WASHER FOR STEM	01	NEOPRENE RUBBER
05	SEALING WASHER FOR GENERAL PURPOSE	01	CORK
06	HEX NUT M10	04	M.S.
07	HEX NUT M12	03	BRASS
08	PLAIN WASHER M12	02	BRASS
09	CLAMPING RING	01	M.S. Galy/Zinc Electro Plated
10	CLAMPING MEMBER	04	AL ALLOY
11	SPRING WASHER B12	01	M.S.
12	PLAIN WASHER B12	01	M.S.

CREEPAGE DISTANCE	
A	85 MM
B	40 MM
C	90 MM
D	45 MM
E	40 MM
F	95 MM
G	50 MM
H	40 MM
I	65 MM
J	25 MM
K	30 MM
TOTAL =	605 MM

TOTAL CREEPAGE 605MM

BUSHING ASSEMBLY IS AS PER IS:3347, IS:7421 (PART IV & IS : 2009)

NOTES:-
1) PERFORMANCE REQUIREMENTS OF THE BUSHING SHALL CONFORM TO IS : 2099-1995
2) CREEPAGE DISTANCE 605mm.
3) WEIGHT OF BUSHING ASSEMBLY APPROXIMATE 4 kg.
4) VISIBLE DISCHARGE TEST 18 kv

MAKE:-

NOTE:- ALL DIMENSIONS IN MM

SIGN OF AUTHORISED

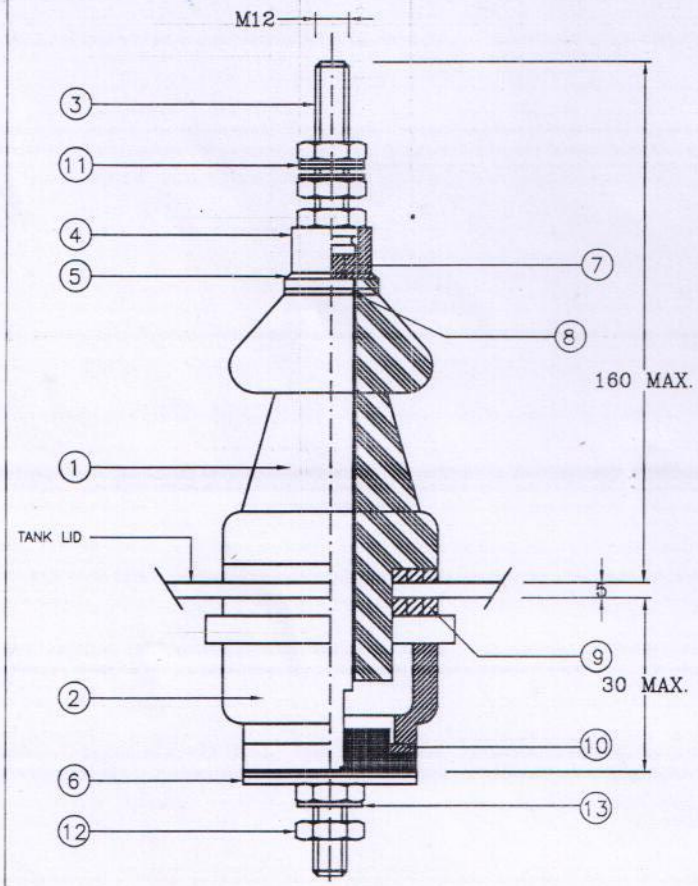
PERSON & STAMP OF THE FIRM

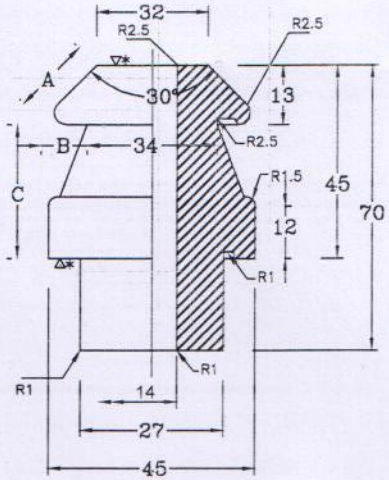
CUSTOMER : MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LTD.

CONSULTANT	
DRG. NO.	16.22.LEVEL-II/05
DIM.TOL.	
SCALE	NTS

HV BUSHING DRAWING

16KVA,22/0.433KV, 3 PHASE DISTRIBUTION TRANSFORMER ENERGY EFFICIENCY LEVEL-II AS PER IS-1180 (PART-I) 2014(NON SEALED)





CREEPAGE DISTANCE	
POINT A	12 MM
POINT B	7 MM
POINT C	36 MM
TOTAL =	55 MM

SR. NO.	DESCRIPTION	MATERIAL	QTY.	WT.	REMARKS
01	INSULATOR UPPER	PROCELAIN	01		
02	INSULATOR LOWER	PROCELAIN	01		
03	STEM M12 (E.TINNED)	COPPER	01		
04	TOP END WASHER (E.TINNED))	BRASS	01		
05	STEM WASHER (E.TINNED)	BRASS	01		
06	SEALING WASHER (STEM)	SYNTHRTIC RUBBER	01		
07	SEALING WASHER (TYPE-M)	NBRC	01		
08	SEALING WASHER (TYPE-N)	NBRC	01		
09	SEALING GASKET	NBRC	01		
10	SEALING GASKET	NBRC	01		
11	PLAIN WASHER M10 (E.TINNED)	BRASS	02		
12	HEX. NUT M12 (E.TINNED)	BRASS	05		
13	PLAIN WASHER M10	S.S.	02		

ELECTRICAL CHARACTERISTICS

1) RATED VOLTAGE :- 1.0KV
2) RATED CURRENT :- 250 Amps.
3) POWER FREQUENCY WITH STAND VOLTAGE :- 3KV,
4) CREEPAGE DISTANCE :-55mm (MIN.)
5) WEIGHT OF BUSHING ASSEMBLY 0.7 kg (APPROX.)

NOTES:-

PERFORMANCE REQUIREMENTS OF THE BUSHING SHALL CONFORM TO IS : 2099-1996
NRBC:- NITRILE RUBBER BONDED CORK

MAKE:-

BUSHING ASSEMBLY IS AS PER IS:3347, IS:7421 (PART IV & IS : 2009)

NOTE:- ALL DIMENSIONS IN MM

* UNGLAZED
▽ SURFACES GROUND PARALLEL TO EACH OTHER AND PERPENDICULAR TO AXIS

RATED RATING	1kv /250A
STANDARD APPLICABLES IS	IS-3347/2099
ONE MINUTE DRY P.F.VOLTAGE WITHSTAND	3 KV (RMS)
ONE MINUTE WET P.F.VOLTAGE WITHSTAND	3 KV (RMS)

SIGN OF AUTHORISED

PERSON & STAMP OF THE FIRM

CUSTOMER : MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LTD.

CONSULTANT	
DRG. NO.	16.22.LEVEL-II/06
DIM.TOL.	
SCALE	NTS

LV BUSHING DRAWING

16KVA,22/0.433KV, 3 PHASE DISTRIBUTION TRANSFORMER ENERGY EFFICIENCY LEVEL-II AS PER IS-1180 (PART-I) 2014(NON SEALED)

Drawing-D-2

Ø3.6mm

Ø3.6mm

MFD BY:-

IS 1180: Part 1: 2014

For Detail Of the BIS Certification Marks Scheme Refer : www.bis.org.in

3 PHASE AL WOUND DISTRIBUTION TRANSFORMER

STANDARD IS: 1180 (PART-1) 2014

KVA		16	ENERGY EFFICIENCY LEVEL		2
VOLTS AT NO LOAD	HV	11000	MAX. TOTAL LOSSES AT 50% RATED LOAD AT 75°C		135
	LV	433			
BIL (KVP)	HV	75	MAX. TOTAL LOSSES AT 100% RATED LOAD AT 75°C		440
	LV	-			
AMPERES	HV	0.84	TEMP. RISE OVER AMBIENT 50°C.	OIL	35°
	LV	21.33		WDG	40°
FREQUENCY Hz		50	MASS OF OIL (Kgs)		68
VECTOR GROUP		Dyn-11	TOTAL WEIGHT (Kgs)		290
IMPEDANCE VOLT.%		*	VOLUME OF OIL(Ltrs)		85
			TYPE OF COOLING		ONAN
			MONTH & YEAR OF MFG		*

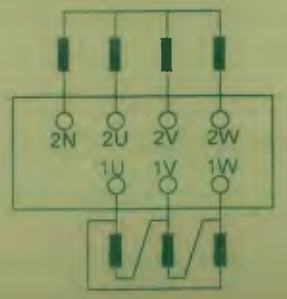
SERIAL NO. *

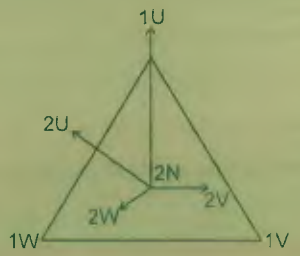
CUSTOMER MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD

ORDER NO.

MADE IN INDIA

TERMINAL MARKING & DIAGRAM





165 175

95

105

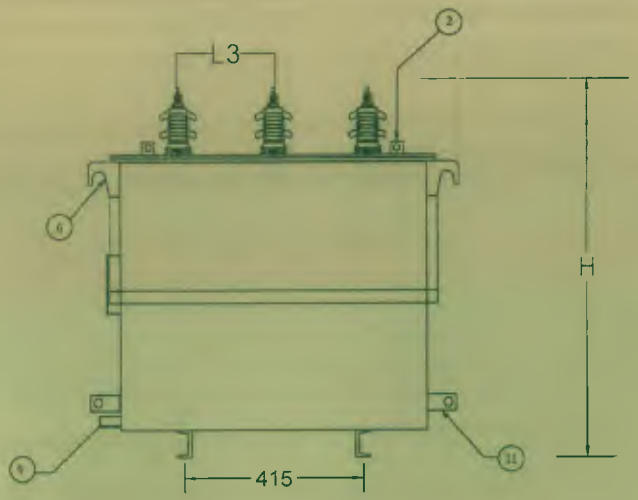
NOTE:-

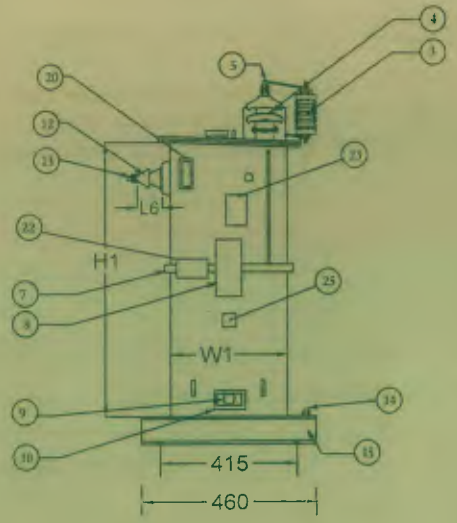
1) (*) MARKED VALUE WILL BE PUNCHED AT THE TIME OF DISPATCH.
2) MATERIAL ALUMINIUM ANODIZED.
3) THICKNESS -18 SWG.MIN.
4) ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.

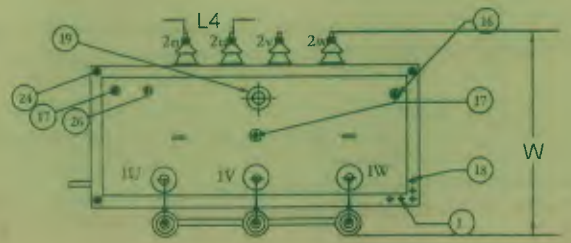
QUANTITY: NOS

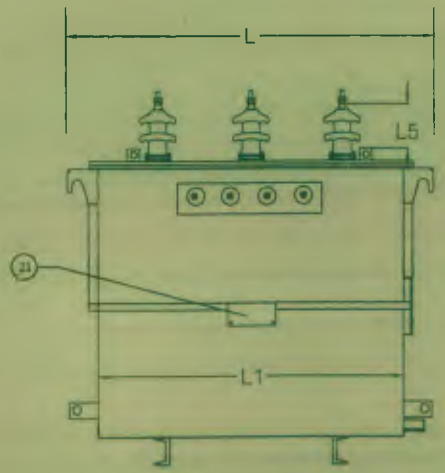
SIGNATURE OF AUTHORIZED PERSON & STAMP OF THE FIRM	

CUSTOMER		MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD
DRN BY		RATING & DIAGRAM DRAWING.
CHD BY		16 KVA, 11/0.433KV,3PHASE, ALU WOUND, CRGO CORE, DIST TRANSFORMER (ENERGY EFFICIENCY LEVEL- 2 , AS PER IS:1180 (PART-1):2014
SCALE		DRAWING NO:- MSEDCL/HVDS/16/11 3ϕ/EEL2/01.









SR. NO.	ACCESSORIES.	QTY	DETAIL
1.	SEALING BOLT	2	M.S.
2.	LIFTING LUGS (FOR TOP COVER) 8MM	2	M.S
3.	LIGHTNING ARRESTORS	3.	9KV / 5KA
4.	HV BUSHING 12 KV, 250 AMP.	3.	PORCELAIN
5.	HV TERMINAL WITH NECESSARY FASTNERS (M-12)	3	BRASS
6.	LIFTING LUGS FOR TANK (8MM)	2	M.S.
7.	REINFORCING ANGLE (25X25X5 MM)	1	M.S.
8.	RATING & DIAGRAM PLATE- RIVETED	1.	ANODIZED AL
9.	DRAIN VALVE 32MM	1	V. VALVE
10.	DRAIN VALVE METALLIC COVER SPOT WELDED (32)MM	1	M.S.
11.	PULLING LUGS (8MM)	4	M.S.
12.	LV BUSHINGS 1KV/250 AMP.	4	PORCELAIN
13.	LV TERMINAL WITH NECESSARY FASTNERS (M-12)	4	BRASS
14.	EARTHING TERMINAL (10MM)	2	M.S.
15.	BASE CHANNEL- 75MMx40MM WITH HOLES	2	M.S.
16.	THERMOMETER POCKET WITH CAP	1	M.S.
17.	AIR RELEASE PLUG- 1.25 " DIA.	1	M.S.
18.	TOP COVER FIXING BOLTS- 1/2 " DIA. WITH PLAIN WASHER	—	GI
19.	OIL FILLING HOLE WITH CAP /GAUGE FOR TEST	1	M.S.
20.	OIL LEVEL INDICATOR (-5 30 98)	1	M.S.
21.	CLAMP SUPPORT FOR LT CABLE CLAMP	1	M.S.
22.	2 YEARS GARRANTY PLATE	1	M.S.
23.	BEE LABLE	1	STICKER
24.	ANTI THEFT STAILNESS STEEL FASTNERS WITH BREAK AWAY AT TOP COVER	4	S.S
25.	QR CODE LABEL	1	STICKER
26.	PRESSURE RELEASE DEVICE	1	BRASS

RADIATING SURFACE AREA	TANK	1.2797 Sq. mtrs
	TOTAL	1.2797 Sq. mtrs

WEIGHT IN KGS		
1.	CORE	64
2.	WINDINGS	36
3.	CORE & ASSEMBLY WEIGHT	124
4.	TANK & FITTINGS	80
5	OIL in Kgs	68
6.	TOTAL WEIGHT (WITH ALL ACCESSORIES)	290

DIMENSIONS ARE IN mm			
OVERALL		TANK	
L	915	L1	715
W	585	W1	275
H	1070	H1	690

MIN. BUSHING CLEARENCE IN AIR	
L3 (H.V.)	255 PHASE TO PHASE
L4 (L.V.)	75 PHASE TO PHASE
L5 (H.V.)	140 PHASE TO EARTH
L6 (H.V)	40 PHASE TO EARTH

THICKNESS ARE IN mm	
TANK SIDE PLATES MIN.	3.15
TOP AND BOTTOM PLATES MIN.	5.0

QUANTITY: NOS

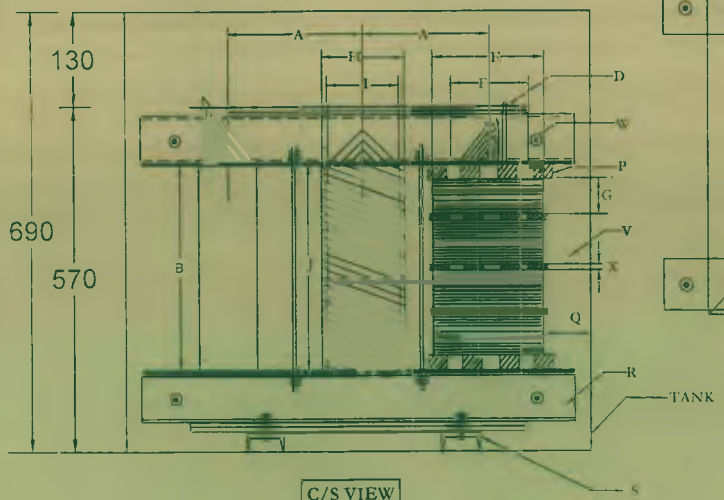
SIGNATURE OF AUTHORIZED PERSON & STAMP OF THE FIRM	

NOTE:

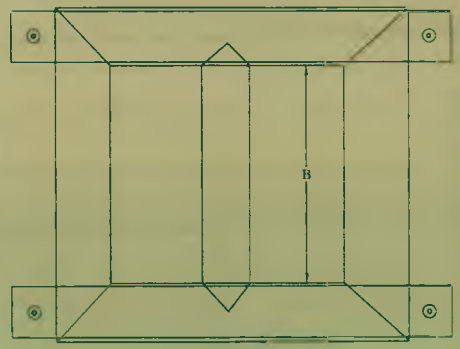
1. WIDTH OF TOP COVER BEND PLATE - MIN. 25 mm.
2. COLOR OF TRANSFORMER:- AIRCRAFT BLUE SHED NO.108 OF IS: 5
3. GASKET BETWEEN TOP COVER & TANK SHALL BE AS PER IS: 4253
4. LIGHTENING ARRESTOR (AS PER IS: 3070/1974)
   MAKE- LAMCO / OBLUM / ENGINEERING ENTERPRISE, JAIPUR / NEW AQUARIA / ORANGE.
5. MAKE OF PRESS BOARD- RAMAN/UMANG/SENAPATHY/ ITC / RAJ TECHNO / KUBERA INNOVATIVE.
6. ALL WELDING OPERATIONS SHALL BE CARRIED OUT BY MIG PROCESS.
7. TRANSFORMER TOP COVER SHALL BE SLOPING UPTO 5° TO 10° TOWARDS HV SIDE
8. WEIGHT ARE SUBJECT TO + 5% TOLERANCE.

CUSTOMER		MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD
DRN BY		GENERAL ARRANGEMENT DRAWING
CHD BY		16 KVA, 11/0.433KV, 3PHASE, ALU WOUND. CRGO CORE. DIST TRANSFORMER (ENERGY EFFICIENCY LEVEL- 2 , AS PER IS 1180 (PART-1):2014
SCALE		
		DRAWING NO:- MSEDCL/HVDS/16/11 3φ/EEL2/02.

WINDING & CONSTRUCTIONAL DETAILS

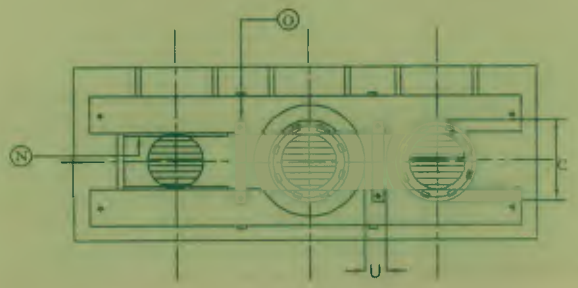


C/S VIEW

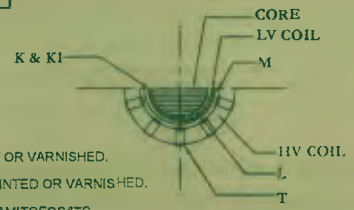


FRONT VIEW

SIDE VIEW



TOP VIEW



DESCRIPTION		UNIT	AS PER OFFER TECH. SPECIFICATONS
CORE			11
			16 KVA
A	LEG CENTRE	mm	225
B	WINDOW HEIGHT	mm	380
C	CORE CIRCLE	mm	75
D	NO OF STEPS	No.	6
	EFFECTIVE CORE AREA	cm^2	39.129

HV COIL			
	NO. OF HV COIL PER PHASE		4
I	OUTER DIAMETER	mm	215
I	INNER DIAMETER	mm	135
G	AXIAL LENGTH	mm	78
	CONDUCTOR CROSS SECTION/SIZE	mm	0.594 (DIA-0.87)
	CONDUCTOR INSULATION		DPC
	CONDUCTOR MATERIAL		AL
	RESISTANCE AT 20°C PER PHASE	OHMS	215

LV COIL.			
H	OUTER DIAMETER	mm	113
I	INNER DIAMETER	mm	82.5
J	AXIAL LENGTH	mm	361
	CONDUCTOR CROSS SECTION/SIZE	mm^2	22.57(6.8X3.4XIP)
	CONDUCTOR INSULATION		DPC
	CONDUCTOR MATERIAL		AL
	RESISTANCE AT 20° C PER PHASE	OHMS	0.074

INSULATION			
K	WRAP ON CORE	NOS.	COTTON TAPE
K1	CLEARENCE TO LV COIL	mm	3.5
L	WEDGES BETWEEN HV & LV COILS	mm	8
M	CLEARANCE BETWEEN HV & LV	mm	11
M1	CLEARANCE BETWEEN HV PHASE TO PHASE	mm	10
N	FRAME CHANNEL INSULATION	mm	2
O	PHASE BARRIER	mm	2 X 1
P	END INSULATION	mm	25
Q	CLEARANCE TO TANK WALL	mm	30
R	CORE FIXING CHANNEL SIZE	mm	75 X 40 X 5 MM
S	BASE CHANNEL SIZE	mm	75 X 40 X 5 MM
T	NO. OF SPACER BETWEEN HV AXIAL COIL		6 PER CIRCLE
U	INTER PHASE CLEARANCE		10
V	TIE ROD SIZE	mm	12mm X 4NOS.
W	CORE BOLT SIZE	mm	12mm X 4NOS.
X	INTER COIL INSULATION	mm	6

NOTE:

1. CORE CLAMPS ARE PAINTED WITH OIL RESISTANCE PAINT OR VARNISHED.
2. ALL TOP & BOTTOM YOKE BOLTS, NUTS, TIE RODS ARE PAINTED OR VARNISHED.
3. MAKE OF INSULATION CRAFT PAPER:- MUNKSJO/ RAMAN/ AMITOFOS/ITC.
4. MAKE OF PRESS BOARD :- RAMAN / SENAPATHY / UMANG RAJ TECHNO / KUBERA INNOVATIVE.
5. NO NEGETIVE TOLERANCE ON MINIMUM SPECIFIED PARAMETER.
6. ALL HV INTER COIL CONNECTION SHALL BE DONE BY SOLDERING / BRAZING & CRIMPING.
7. HV DELTA CONNECTION SHALL BE DONE BY SOLDERING / BRAZING.
8. DELTA LEAD FROM DELTA JOINT TO BUSHING STEM BY BRAZING
9. LV STAR POINT BY BRAZING & CRIMPING .
10. LV WINIDING TO LV BUSHING STEM BY "L" SHAPPED AL FLAT BRAZING
11. "L" SHAPED AL FLAT CLAMPED TO LV BUSHING METAL PART USING NUT. LOCK NUT. WASHERS.
12. L&T ALKAPEE AL BRAZING ROD WITH FLUX USED FOR BRAZING.

QUANTITY: NOS

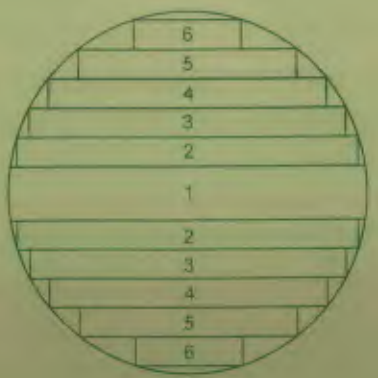
SIGNATURE OF AUTHORISED PERSON & STAMP OF THE FIRM	

CUSTOMER		MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD
DRN BY		CORE & COIL ASSEMBLY DRAWING.
CHD BY		16 KVA, 11/0.433KV, 3PHASE, ALU WOUND CRGO CORE, DIST TRANSFORMER (ENERGY EFFICIENCY LEVEL- 2 , AS PER IS:1180 (PART-1):2014
SCALE		
		DRAWING NO:- MSEDCL/HVDS/16/11 3φ/EEL2/03

SR. NO.	DESCRIPTION	TECHNICAL DETAILS
		AS PER OFFER
1.	PRIMARY VOLTAGE (KV)	11 KV
2.	SECONDARY VOLTAGE (KV)	0.433 KV
3.	RATING (KVA)	16 KVA
4	VECTOR GROUP	Dny. 11
5	CONFORMING TO I.S.S.	IS: 1180 & PART-1 2014
6	PERMISSIBLE VOLTAGE FLUCTUATION %	12.5%
7	TEMPERATURE RISE OF OIL OVER AMBIENT 50°C	35
8	TEMPERATURE RISE OF WINDING OVER AMBIENT 50°C	40
9	THICKNESS OF CORE LAMINATION	0.27 mm
	a) CORE MATERIAL	CRGO ANNEALED STEEL
	b) PRINCIPLE SOURCE OF CORE MATERIAL	IMPORTED
	c) GRADE OF LAMINATION	M4
	d) FLUX DENSITY W/m^2	1.69 Max.
	e) NO. OF STEPS OF CORE (NOS.)	6
10.	% IMPEDANCE	4.5% ±10%
11.	CORE DIMENSIONS (Lc X Wh X Cd)	225 X 380 X 75.5

STEP NO.	1.	2	3	4	5.	6
L mm.	70	65	60	50	40	30
W mm.	28.1	10	7.3	10.5	7.3	5.4
CROSS SECTION Cm^2	19.67	6.50	4.38	5.25	2.92	1.62

TOTAL CROSS SECTION AREA Cm^2 = 40.34
EFFECTIVE CORE AREA = 40.34X 0.97 = 39.129 Cm^2



SR. NO.	DESCRIPTION	AS PER OFFERED	
		H.V.	L.V.
1.	WINDING		
	a) MATERIAL	ALU	ALU
	b) SPECIFIC CONDUCTIVITY	-	-
	c) CONDUCTOR SIZE IN mm	0.87	6.8X3.4X1
	d) CONDUCTOR CROSS SECTION mm^2	0.590	22.26
	e) INSULATION MATERIAL	DPC	DPC
	f) CURRENT DENSITY A/mm^2 Max	1.3	1.3
	g) NO. OF TURNS	8272	188
	h) OUTER DIAMETER mm	210	113
	i) INSIDE DIAMETER mm	135	82.5
	j) AXIAL LENGHT mm	78 PER COIL	361 PER COIL
	k) NO. OF COIL PER PHASE NO.	4	1
	l) RESISTANCE PER PHASE Ohms at 75°C	215	0.074

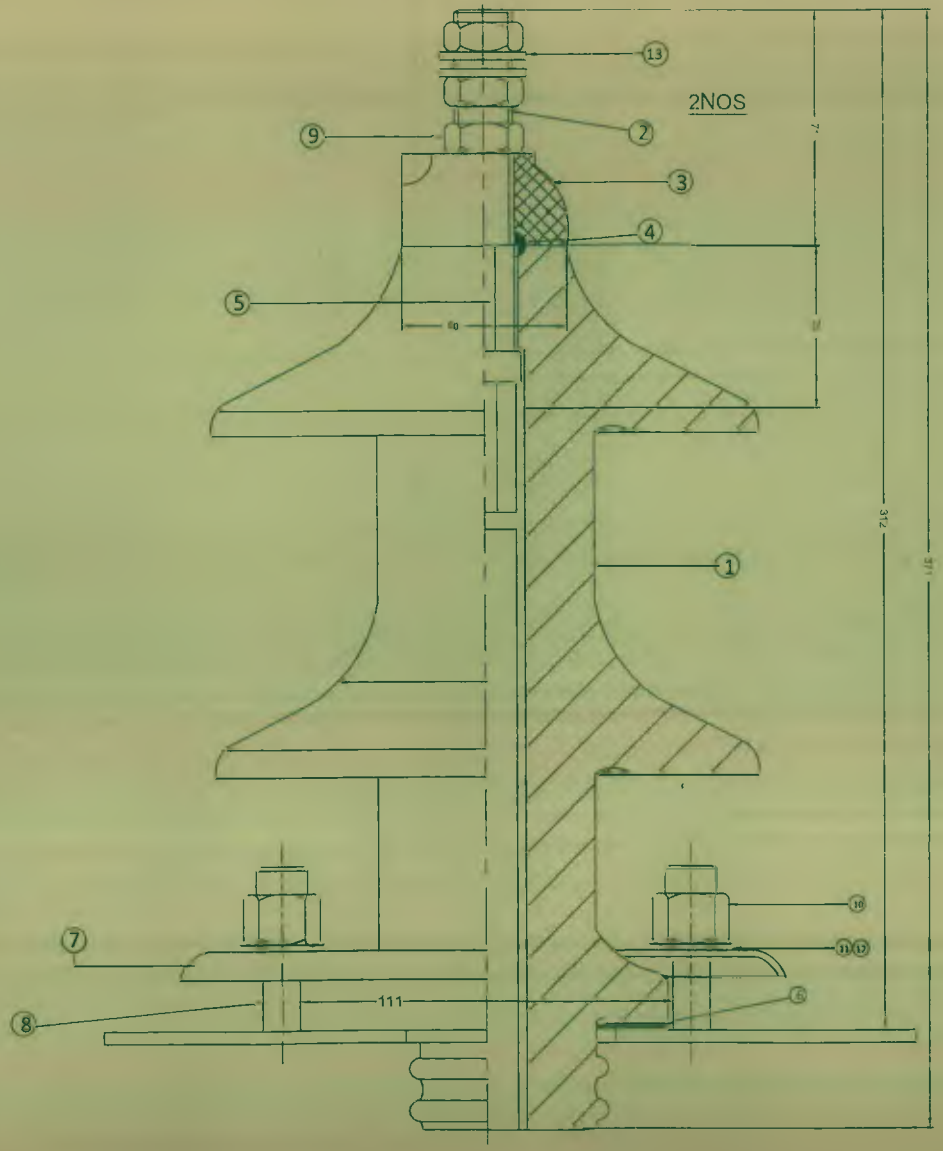
2	BUSHING	AS PER OFFERED	
	MINIMUM CREEPAGE DISTANCE IN MM	HV	LV
		305 mm	65 mm
3	LOSSES		
	NO LOAD LOSS	60 WATTS	
	TOTAL LOSSES AT 75°C AT 50% LOAD (Watts)	135 (MAX)	
	TOTAL LOSSES AT 75°C AT 100% LOAD (Watts)	440 (MAX)	
4	TANK		
	SIDE WALL THICKNESS mm.(MIN)	3.15	
	TOP & BOTTOM PLATE THICKNESS mm.(MIN)	5	
5	OIL USED		
	NAME OF MANUFACTURER	SAVITA/COLUMBIA/RAJ/APAR/ GP PETROLIUM	
	GRADE	MINERAL OIL CONFORMING TO IS.335 AMENDED UPTO DATED	
6	VOLUME (LITRE'S)	---	
	IN TANK	85	
	TOTAL	85	

QUANTITY: NOS

SIGNATURE OF AUTHORIZED PERSON & STAMP OF THE FIRM	

CUSTOMER		MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD
DRN BY		TECHNICAL SPECIFICATION DRAWING
CHD BY		16 KVA, 11/0.433KV, 3PHASE, ALU WOUND, CRGO CORE, DIST TRANSFORMER (ENERGY EFFICIENCY LEVEL- 2 , AS PER IS:1180 (PART-1):2014
SCALE		
		DRAWING NO:- MHEDCL/HVDS/16/11 3φ/EEL2/04

TRANSFORMER HV BUSHING ASSEMBLY DRAWING AS PER IS:3347



ALL DIMENSIONS ARE IN mm.

QUANTITY: NOS

ELECTRICAL CHARECTERISTICS:

1. RATED VOLTAGE : 12KV
2. RATED CURRENT: 250 Amp
3. POWER FREQUENCY WITHSTAND VOLTAGE: 28KV
4. IMPULSE WITHSTAND VOLTAGE 75 KVP
5. CREEPAGE DISTANCE: 305 mm.

NOTE:

PERFORMANCE REQUIREMENTS OF THE BUSHING SHALL CONFIRM TO IS: 2099-1986
NRBC= NITRILE RUBBER BONDED CORK.

MAKE: JAIPUR/ SAMPAT/ UDYOG CENTRE/TAYAL/CJI/BIKANER/ SAMRAKSHANA/RR/TEK MEK/SHINE/JS GROUP/ RR.

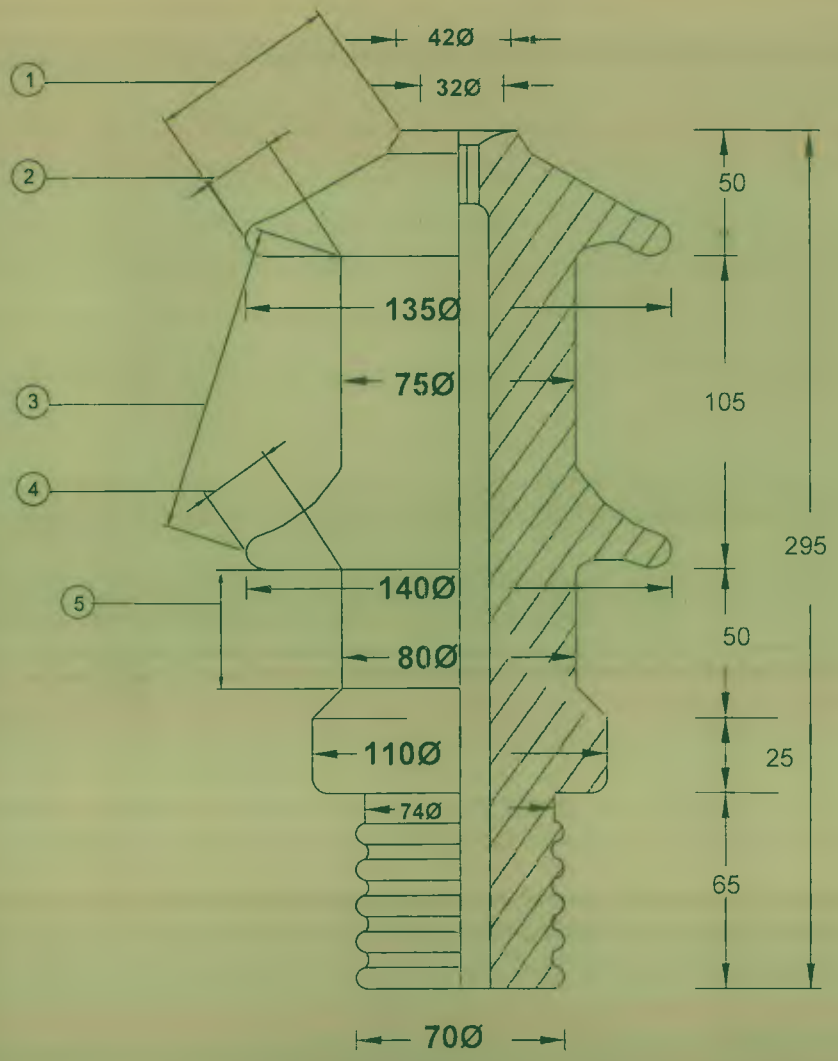
SR.NO.	DESCRIPTION	QUANTITY
1	INSULATOR 12KV, 250 AMP.	1
2	STEM- M12x1.75 (E.TINNING)	1
3	END CAP (E.TINNING)	1
4	SEALING WASHER (STEM)	1
5	SEPARATOR	1
6	SEALING WASHER FOR GEN. PURPOSE	1
7	CLAMPING RING	1
8	CLAMPING MEMBER	4
9	HEX. NUT FOR STEM-M12x1.75(E.TINNING)	3
10.	HEX. NUT- M10 (HDG)	4
11.	PLAIN WASHER- M10 (HDG)	4
12.	SPRING WASHER- M10 (HDG)	4
13.	PLAIN WASHER- M12 (E.TINNING)	2

SIGNATURE OF AUTHORIZED PERSON & STAMP OF THE FIRM	

CUSTOMER		MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD
DRN BY		HV BUSHING ASSEMBLY DRAWING
CHD BY		16 KVA, 11/0.433KV, 3PHASE, ALU WOUND, CRGO CORE, DIST TRANSFORMER
SCALE		(ENERGY EFFICIENCY LEVEL- 2 , AS PER IS:1180 (PART-1):2014
		DRAWING NO.- MHEDCL/HVDS/16/11 3ϕ/EEL2/05

NOTE:

1. DIMENSIONS ARE CONFORMING TO IS: 3347 (PART-III/SEC.1)- 1988.
2. COLOUR: DARKEN BROWN
3. CREEAPGE DISTANCE: 305mm. (MIN.)



ALL DIMENSIONS ARE IN mm.

RATED RATING	12 KV/250A
STANDARD APPLICABLES IS	IS- 3347 (PART-III)/2009
ONE MINUTE DRY P.F.VOLTAGE WITHSTAND	28 KV (RMS)
ONE MINUTE WET P.F.VOLTAGE WITHSTAND	28 KV (RMS)
1.2/50 MICRO. SEC. IMPULSE VOLTAGE WITHSTAND	75 KVP
WEIGHT OF ASSEMBLED BUSHING	3.54 Kg
TOTAL CREEPAGE DISTANCE (AIR) 25mm/kv	305 mm.

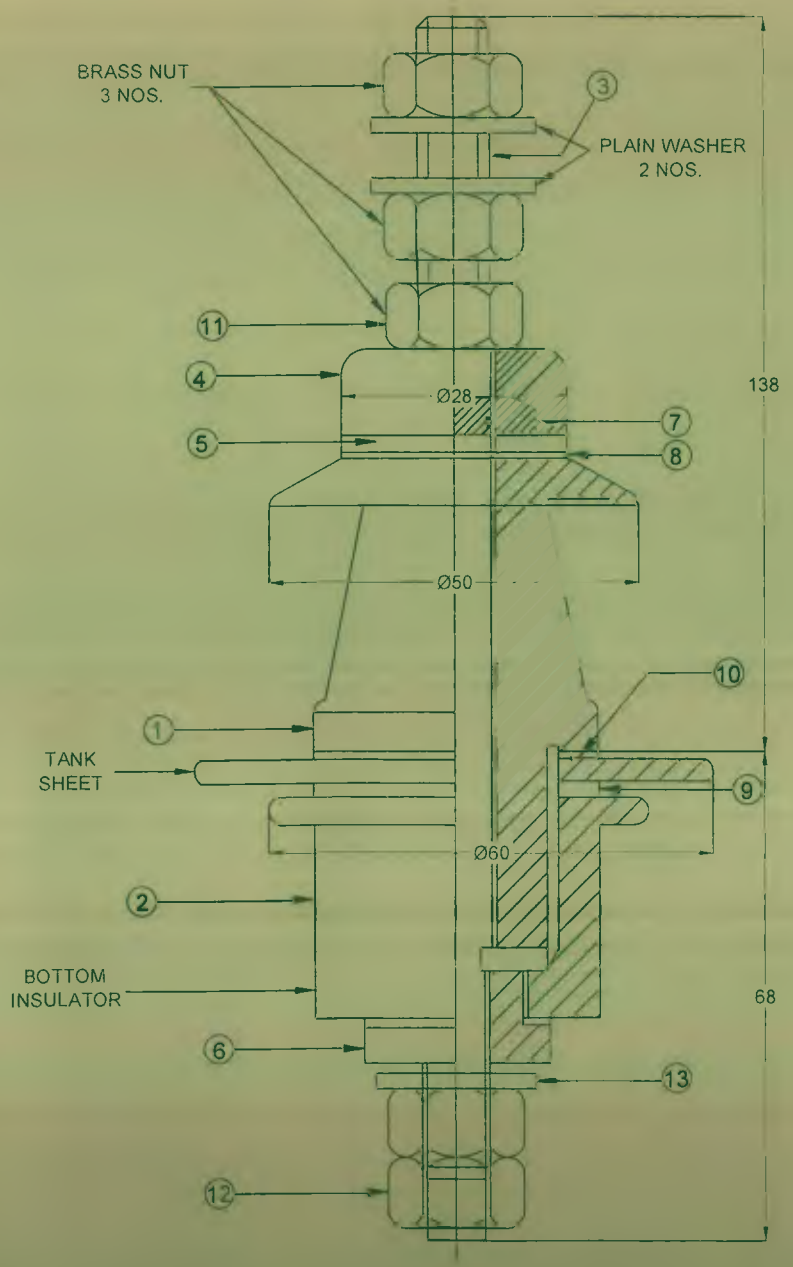
CREEPAGE DISTANCE	
POINT NO.	DIMENSIONS
1	79
2	30
3	80
4	43
5	30
6	43
TOTAL	305 mm

SIGNATURE OF AUTHORIZED PERSON & STAMP OF THE FIRM	

QUANTITY: NOS

CUSTOMER		MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO.LTD
DRN BY		**CREEPAGE DISTANCE DRAWING OF HV BUSHING 12KV/250 Amps**
CHD BY		16 KVA, 11/0.433KV, 3PHASE, ALU WOUND CRGO CORE, DIST TRANSFORMER (ENERGY EFFICIENCY LEVEL- 2 AS PER IS.1180 (PART-1):2014
SCALE		
		DRAWING NO:- MSEDCL/HVDS/16/11 3ϕ/EEL2/06.

TRANSFORMER LV BUSHING ASSEMBLY DRAWING AS PER IS: 3347



ELECTRICAL CHARECTERISTICS:

1. RATED VOLTAGE 1KV
2. RATED CURRENT: 250 Amp
3. POWER FREQUENCY WITHSTAND VOLTAGE: 3KV
4. CREEPAGE DISTANCE: 65 mm.

NOTE:

PERFORMANCE REQUIREMENTS OF THE BUSHING SHALL CONFIRM TO IS: 7421- 1988

MAKE: JAIPUR/TAYAL/BIKANER/TEK MEK/RR/SHINE/JS GROUP/RR.

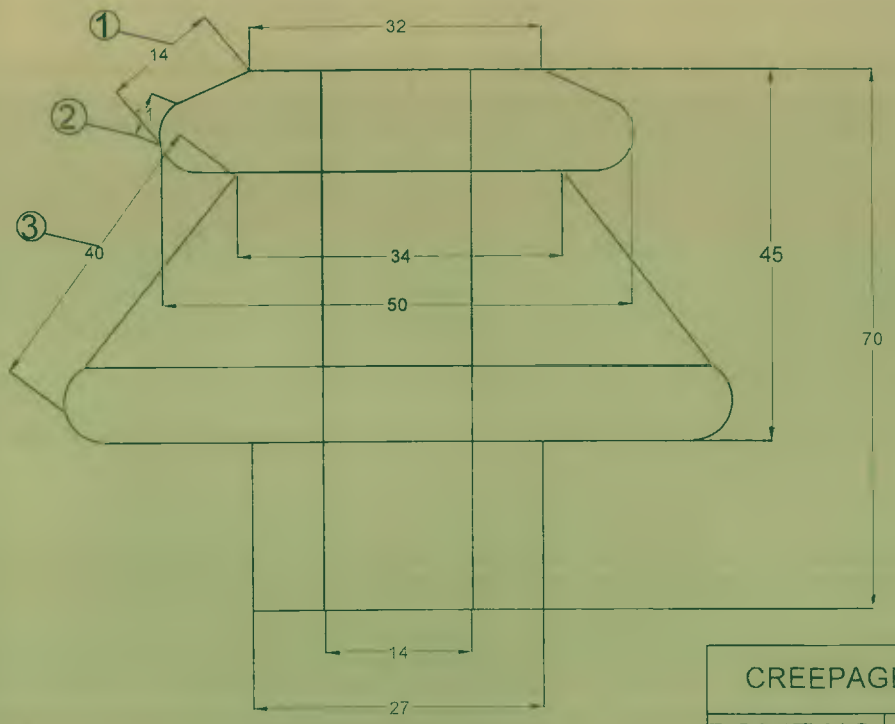
SR.NO.	DESCRIPTION	MATERIAL	QUANTITY
1.	UPPER INSULATOR	PORCELAIN	1
2.	LOWER INSULATOR	PORCELAIN	1
3.	STEM- (M12x1.75) (E. TINNING)	BRASS	1
4.	TOP END WASHER (E. TINNING)	BRASS	1
5.	STEM WASHER (E. TINNING)	BRASS	1
6.	BOTTOM NUT (E. TINNING)	BRASS	1
7.	SEALING WASHER (STEM)	SYNTHETIC RUBBER	1
8.	SEALING GASKET WASHER	NRBC	1
9.	SEALING GASKET WASHER	NRBC	1
10.	SEALING GASKET WASHER	NRBC	1
11.	HEXAGONAL NUT M-12	BRASS	3
12.	HEXAGONAL LOCKING NUT M-12	BRASS	2
13.	PLAIN WASHER (TYPE- N)	BRASS	3

QUANTITY: NOS

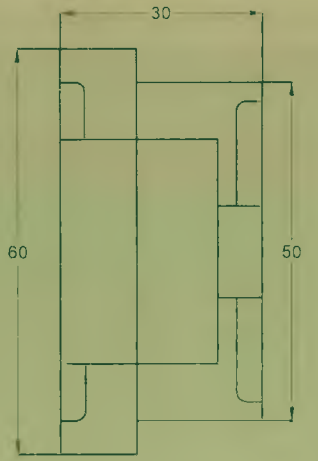
SIGNATURE OF AUTHORIZED PERSON & STAMP OF THE FIRM	

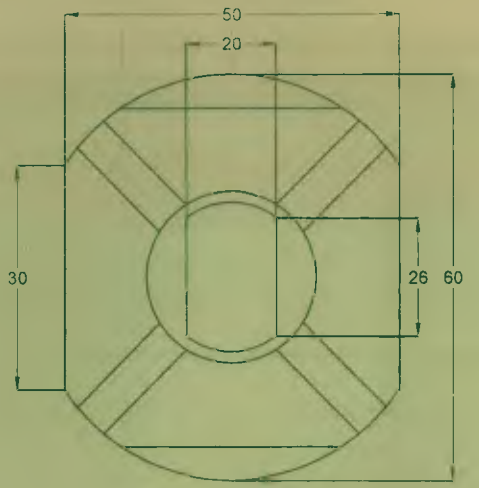
CUSTOMER		MAHARASHTRA STATE ELECTRICITYDISTRIBUTION CO.LTD
DRN BY		LV BUSHING ASSEMBLY DRAWING
CHD BY		16 KVA, 11/0.433KV, 3PHASE, ALU WOUND, CRGO CORE, DIST TRANSFORMER (ENERGY EFFICIENCY LEVEL- 2 , AS PER IS:1180 (PART-1):2014
SCALE		
		DRAWING NO:- MSEDCL/HVDS/16/11 3φ/EEL2/07

CREEPAGE DISTANCE DRAWING OF LV BUSHING 1.0KV/250 Amps.



UPPER INSULATOR





LOWER INSULATOR

CREEPAGE DISTANCE	
POINT NO.	DIMENSIONS
1	14
2	11
3	40
TOTAL	65 mm

QUANTITY: NOS

SIGNATURE OF AUTHORIZED PERSON & STAMP OF THE FIRM	

NOTE:

1. COLOR- BROWN GLAZED
2. CREEPAGE DISTANCE -25mm/KV(Min.)
3. AS PER IS:3347 (PART-I/SECI)
4. ALL DIMENSIONS IN mm.
5. RATED VOLTAGE- 1.0 KV
6. RATED CURRENT- 250 AMP.
7. WEIGHT OF BUSHING ASSEMBLY- 0.7Kg. (APPROX.)
8. PERFORMANCE REQUIRMENTS OF THE BUSHING SHALL CONFORM TO IS: 2099-1996
9. TOTAL CREEAPGE DISTANCE- 65mm.
10. ALL DIMENSIONS ARE IN mm.

CUSTOMER		MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO.LTD
DRN BY		CREEPAGE DISTANCE DRAWING OF LV BUSHING 1.0KV/250 Amps
CHD BY		16 KVA, 11/0.433KV, 3PHASE, ALU WOUND, CRGO CORE, DIST TRANSFORMER (ENERGY EFFICIENCY LEVEL 2 AS PER IS:1180 (PART-1):2014
SCALE		DRAWING NO:- MSEDCL/HVDS/16/11 3Φ/EEL2/08

Total Losses at * :
50% loading - 135 Watts 100% loading - 440 Watts

Equipment	:	Distribution Transformer
Type	:	Oil Filled naturally cooled
Make	:	
Model / year	:	
Capacity	:	16 KVA
Voltage	:	upto 11kv

ENERGY IS LIFE

CONSERVE IT

BEE/MEE/03/0751/17

*Under test conditions, when tested in accordance with IS 1180 : 1989

NOTE:

1) THE UNIQUE LABEL SERIES CODE PROVIDED IN THE LATTER HAS TO BE MENTIONED IN THE LABEL AFFIXED ON THE DISTRIBUTION TRANSFORMER

2) THE LABEL DESIGN SIZE, COLOR SCHEME , MATERIAL TO BE USED FOR THE LABEL CONTENT OF THE LABEL AND COLOR SCHEME OF THE BUREUS LOGO SHALL BE AS SCHEDULED TO THE BUREAU OF ENERGY EFFICIENCY (PARTICULARS AND MANNER OF THEIR DISPLAY ON LABEL OF DISTRIBUTION TRANSFORMER) REGULATION 2009

QUANTITY: NOS

SIGNATURE OF AUTHORIZED PERSON & STAMP OF THE FIRM	

CUSTOMER		MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO.LTD
DRN BY		BEE 1 STAR LABEL DRAWING
CHD BY		16 KVA, 11/0.433KV, 3PHASE, ALU WOUND, CRGO CORE, DIST TRANSFORMER (ENERGY EFFICIENCY LEVEL- 2 , AS PER IS:1180 (PART-1):2014
SCALE		
		DRAWING NO:- MSEDCL/HVDS/16/11 3ϕ/EEL2/09