Office of the Chief Executive Officer
Shri Mata Vaishno Devi Shrine Board, Katra

No.CO/Pur/Elect/269-XI/995 **Dated: 22.06.2026**

Request for Inviting Quotations (RFIQ)

For and on behalf of Shri Mata Vaishno Devi Shrine Board; through Chief Executive Officer (herein after referred as SMVDSB), offers are hereby invited from reputed manufacturers or their authorized distributors / dealers only for furnishing the rates for **Supply of Distribution Transformer 250 KVA 11 KV** as per the Specifications mentioned in **Annexure-"B".**

Terms and conditions:

1. **Document to be submitted:**
   - i) GST Certificate.
   - ii) Registration Certificate of firm or authorized distributor / dealer certificate must be submitted along with the quotation.
   - iii) Relevant BIS Certificate
   - iv) RFIQ document, duly signed & stamped, as a token of acceptance of terms & conditions of RFIQ.

3. **Earnest Money Deposit (EMD):**

i. Earnest Money Deposit in the shape of **CDR /FDR / TDR** amounting to **Rs. 13,000/-** (**Rupees Thirteen Thousand only)** of any Nationalized / Scheduled Bank duly pledged to the FA & CAO, SMVDSB must be enclosed with the quotation.

ii. Alternatively, the bidders may also transfer the required amount on account of EMD in online mode (**IMPS / NEFT / RTGS**) in the following account of the Shrine Board:

Account No.:	0097010100000706
Type of Account:	SB
Banker:	Jammu and Kashmir Bank Ltd.
Branch:	Main Branch Katra
IFSC Code:	JAKA0KATTRA
Title of Account:	Shri Mata Vaishno Devi Shrine Board

In case of online transfer, the print-copies of screenshots of transaction must be enclosed with the quotation**. In addition, the full details of the Bank Account from which the transaction has been made shall have to written on the body of the Transaction Screenshot**. The transaction to the account specified above shall only be accepted. **The transaction made to any other account of Shrine Board shall be treated as failure to deposit the prescribed EMD**.

iii. Furnishing of EMD for an amount less that the stipulated amount mentioned in the RFIQ quoting the exemption as Small Scale Industries or any other reason shall not be entertained and the quotation / offer submitted by the firm shall be rejected out-rightly. The quotation will be considered of only those firms who had submitted requisite EMD.

iv. The EMDs of all un-successful bidders shall be returned after the issuance of Purchase Order.

v. The EMD of the successful bidder shall be released after the receipt of material in all respect, subject to satisfactory report by Incharge, Engg. Store, Banganga. The same can be withheld / forfeited, in full, or in part, in case the purchase order is not executed satisfactorily, within the stipulated time period.

2. **Validity:**
   The validity of quotation should be 20 days from the last date prescribed for submission.
4. **The last date for submission of sealed quotations is 29.06.2025 upto 3:00 PM**
5. Quantity mentioned in RFIQ is indicative and can be increased or decreased as per requirement.
6. **Rates**:
   i) The rates should be NET inclusive of GST, loading, unloading, labour charges, toll tax, freight and other taxes / charges / F.O.R. Engineering Store, Banganga Katra
   ii) Rates excluding GST and Ex-Shop shall not be considered even after opening of the quotation.
7. **The selection of the L-1 firm shall be made on lowest offered rate.**
8. **THIRD PARTY INSPECTION:**
   The material to be supplied shall be checked / inspected at manufacturer's site by third party inspection agency viz. **M/s Certification Engineering International Ltd., CEIL** (A wholly owned subsidiary of Engineers India Ltd., a Govt. of India Undertaking) at manufacturer's cost. The firm shall submit testing / inspection report of the Distribution Transformer prior to the delivery at Engineering Store, Banganga, Katra.
9. **Delivery :**
   The successful firm shall have to deliver the material within **25 days** from the date of issuance of Purchase Order. The material shall be supplied immediately from the ready stock from the date of placement of purchase order.
10. The conditional, illegible, ambiguous quotation (s) and quotation (s) received after the stipulated date and time shall be out rightly rejected.
11. The material to be supplied shall strictly be of specifications mentioned in the RFIQ. No change in the specifications shall be accepted. Any change in the specifications shall outrightly be rejected.
12. **INSPECTION / LIFTING BACK OF REJECTED SUPPLIES:**
    a. On receipt, the material shall be inspected / checked by our Inspection Committee and if found of inferior quality/defective, the same will be rejected and the Board shall be at liberty to have the same procured from open market at the risk & cost of the supplier whereby the original supplier shall be liable to pay the extra cost, if any, involved in the process. The Competent Authority, however, may accept the replaced material within the delivery period if it conforms to the approved specifications.
    b. The rejected material shall have to be lifted by the supplier at his own risk and cost within a week's time, failing which storage charges @ 2% per day shall be imposed against the supplier for a period of one week. The penalty amount shall get doubled for each subsequent week and the rejected material in the stores shall be at the risk of the firm. Beyond one month the material shall be auctioned and storage charges shall be recovered from the supplier @2% per day. The amount acquired on account of auctioning shall be deposited to SMVDSB Account.
13. **Warranty / Defect Liability Period**:
    Warranty / Defect Liability Period (on site) of the material shall be of **24 months** to be reckoned from the date of receipt of material. Any defect occurring in the supplied material during defect liability period shall be rectified / replaced by the firm at its own cost including cost of spares and visiting charges of Engineer / Technician. In case of failure to do so within specified time frame, SMVDSB shall be at liberty to take up the rectification work at the risk and cost of the successful firm and recover the same from any due amount.
14. **Terms of payment**:-

a) 90% payment shall be released after the successful delivery of material at Engg. Store, Banganga.
b) Balance 10% shall be kept as Security Deposit and shall be released after completion of Defect Liability Period of **24 months**, subject to satisfactory report received from the AEE (Elect), SMVDSB through Engineer Incharge, SMVDSB.

15. **Penalty:** In case the supply is not completed within the stipulated timeframe (as mentioned in the Purchase Order), the supplier is liable to penalty for the delay, unless exempted by the competent authority for valid reasons to be brought on record.
    a) upto 6 days @ 0.5%
    b) From 7^{th} day to 9^{th} day @ 1%
    c) From 10^{th} day to 12^{th} day @ 1.5% and
    d) From 13^{th} day to 15^{th} day @ 2% shall be imposed as per the approved rate/quantity mention in the purchase order of the value of the pending supplies.
    e) After 15 days of delay, the purchase order shall be deemed to have been cancelled and the material shall be procured from alternative sources at risk and cost of vendor.

    Note: Despite cancellation of Purchase Order as stated above; for any valid reason to be brought on record, the Competent Authority may grant extension in the stipulated delivery period; with or without penalty. (Amount to be decided by the Competent Authority).
16. **Debarring**
    If the successful firm fails to comply with the terms and conditions of the RFIQ after successful culmination of the RFIQ and placing of purchase order, the firm shall be debarred from further dealing with SMVDSB for a period of 03 years and the EMD/Security Deposit, if any, of the firm shall be forfeited without any communication.
17. **Force Majeure:**
    Any failure or omission to carry out the provisions of the order shall not give rise to any claim by one party against the other, if such failure or omission arises from an "Act of God" which shall include all acts of Natural Calamities such as fire, flood, earthquakes, hurricanes, pandemics or any pestilences or from civil strikes, compliances with any statute or regulations of the Government lock outs and strikes, riots, embargoes or from any other reasons beyond the control of the parties.
18. All disputes arising hereto are subject to jurisdiction of the Courts of Law at Katra / Reasi. The Arbitration proceedings shall be conducted as per “The Arbitration and Conciliation Act, 1996”.
19. **Rights reserved by SMVDSB:**
    The Competent authority of SMVDB reserves the right:
    i. To cancel/ terminate the RFIQ / Purchase Order during the period of its validity without assigning any reason thereof.
    ii. To forfeit the CDR/FDR of defaulter firm.
    iii. To debar any defaulter firm from any further dealing with Shrine Board for a period of three years.
    iv. To grant of extension with or without imposing penalty, as deemed fit.
    v. To establish reasonability of rates, to negotiate with the L-1 bidder.
    vi. To visit the premises of the bidder to verify the quality of products.
20. This is just a RFIQ and not a Purchase Order.
21. The broad terms and conditions have been included. However, other standard terms and conditions of supply shall be incorporated in the Purchase Order to be issued in due course.

22. **Procedure for submission of Bid:**
Bidders are required to submit their bids under 2 bid system with Cover-I (Technical Bid) and Cover-II (Price Bid).

A. Cover-I (Technical Bid) This cover shall contain: -

(i) EMD.
(ii) Copy of Manufacturing License or its authorized Distributor / Dealer Certificate
(iii) Copy of GST certificate
(iv) RFIQ Document containing **Instructions and Terms & Conditions, duly signed / stamped** on each leaf by the bidder.

B. Cover II (Price Bid):

(i) The bidder(s) shall have to quote rates on their letter head(s) only **as per Annexure-B.**
(ii) The price bid should be absolute and unconditional.
(iii) Conditional bids shall be rejected.
(iv) The price bids of only such bidders shall be opened, who qualify in the technical stage.

C. Both the sealed covers (Technical Bid & Price Bid) shall further be put in a 3rd Envelope duly sealed & super-scribed "Quotation for Supply of Distribution Transformer 250KVA 11KV" against RFIQ No. CO/Pur/Elect/269-XI/ 995 dated 22.06.2026.

23. All such offers must be submitted in person or may be sent by Registered Post /Speed Post/ Courier at following address so as to reach **by or before 3:00 PM (1500 hrs) on 29.06.2026.** The offer(s) received after the due date and time shall not be considered under any circumstance:

Asstt. Chief Executive Officer (VB)
Shri Mata Vaishno Devi Shrine Board,
Central Office, Jammu Road, Katra (J&K) - 182301

24. The quotations shall be opened by the Committee, at Central Office, SMVDSB, Katra in the presence of the bidders who may choose to remain present.
25. The Shrine Board shall not be responsible for any postal delay. Any conditional offer OR offers which are not appropriately sealed as per the format, as explained above, OR offers received after the stipulated date and time, shall not be entertained. Any cutting or overwriting in the Documents will also make the bid liable for rejection

Sd/-
(Vipan Bhagat) JKAS
Asstt. Chief Executive Officer

Seal and Sign. of the firm

(Please read all the contents of the RFIQ before the submission of the quotation)

Office of the Chief Executive Officer
Shri Mata Vaishno Devi Shrine Board, Katra

Annexure "A"

PRICE BID
(on the Letter Head of the Firm)

To,

The Asstt. Chief Executive Officer (VB),
Shrine Mata Vaishno Devi Shrine Board,
Katra.

Subject: Quotation for Supply of Distribution Transformer 250 KVA 11 KV.

Ref. CO/Pur/Elect/269-XI/995 dated 22.06.2026

I, _____ representative / proprietor of M/s_____ hereby submit my following rates as per specification / UOM / requirement of Shrine Board, Net inclusive of GST, freight, loading and other taxes / charges F.O.R. Engineering Store, Banganga, Katra & commissioning at site (Adhkuwari) :

S.No	Description of Item	NET Rate inclusive of GST & FOR ES Banganga (in ₹)
1.	Supply of Distribution Transformer 250 KVA 11 KV as per specifications at Annexure "**B**"	

Notwithstanding anything mentioned in our price bid, we hereby accept all the terms & conditions mentioned in the RFIQ which are being signed in token of my acceptance. We hereby undertake and confirm that I / we have understood the specifications properly and shall supply the material as per the required / higher specifications to SMVDSB.

I further affirm that in case, I fail to abide-by the conditions or upto the entire satisfaction of the Shrine Board; I shall be liable to the penalties under rules. I further hereby declare that my firm is not blacklisted.

Seal & Signature _____

M/s _____

Contact Person: _____

Contact Number:_____

E-mail ID: _____

- **Kindly read all the contents of the RFIQ before the submission of the quotation.**

Annexure-'B'

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Annexure - B

TECHNICAL SPECIFICATIONS OF OUTDOOR TYPE THREE PHASE OIL IMMERSED 11KV/433-250V, 50 HZ, DISTRIBUTION TRANSFORMERS OF ENERGY EFFICIENCY LEVEL-2 AS PER IS: 1180(PART-1):2014 OF RATING 63KVA, 100KVA & 250KVA ALONG WITH EXTERNALLY FITTED MCCB WITH CABLE BOX AND 4x4 MTRS SUITABLE CABLE

1. SCOPE:

i) This specification covers design, engineering, manufacture, assembly, stage testing, inspection and testing before supply and delivery at site of oil immersed, naturally cooled 3-phase 11KV/433-250V, 50 Hz, Distribution Transformers of Energy Efficiency Level-2 as per IS: 1180(Part-1):2014 of rating 63KVA (Al Wound), 100KVA (Al Wound) & 250 KVA (Cu Wound) fitted with externally fitted MCCB having overload cut-off as per relevant IS amended upto date along with cable box and 4x4 Mtrs suitable cable.

ii) The equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered equipment shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of bidder's supply irrespective of whether those are specifically brought out in this specification and / or the commercial order or not.

iii) The transformer and accessories shall be designed to facilitate operation, inspection, maintenance and repairs. The design shall incorporate every precaution and provision for the safety of equipment as well as staff engaged in operation and maintenance of equipment.

iv) All outdoor apparatus, including bushing insulators with their mountings, shall be designed so as to avoid any accumulation of water.

2 STANDARD RATINGS:

The standard ratings shall be 63 KVA (Al Wound) & 100 KVA (Al wound) & 250 KVA (Cu Wound) for 11 KV distribution transformers.

3 STANDARDS:

3.1 The major materials used in the transformer shall conform in all respects to the relevant/specified Indian Standards and International Standards with latest amendments thereof as on bid opening date, unless otherwise specified herein. Some of the applicable Indian Standards are listed hereunder:

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Indian Standard	Title	International and Internationally Recognized standards
IS -2026	Specification for Power Transformers	IEC 76
IS – 1180 (Part-1): 2014	Outdoor Type Oil Immersed Distribution Transformer	
IS 12444	Specification for Copper wire rod	ASTM B-49
IS-335	Specification for Transformer Oil	IEC Pub 296
IS - 5	Specification for colors for ready mixed paints	
IS - 104	Ready mixed paint, brushing zinc chromate, priming	
IS – 2099	Specification for high voltage porcelain bushing	
IS – 649	Testing for steel sheets and strips and magnetic circuits	
IS-3024	Cold rolled grain oriented electrical sheets and strips	
IS - 4257	Dimensions for clamping arrangements for bushings	
IS - 7421	Specification for Low Voltage bushings	
IS - 3347	Specification for Outdoor Bushings	DIN 42531 to 33
IS - 5484	Specification for Al Wire rods	ASTM B – 233
IS - 9335	Specification for Insulating Kraft Paper	IEC 554
IS - 1576	Specification for Insulating Press Board	IEC 641
IS - 6600	Guide for loading of oil Immersed Transformers	IEC 76
IS - 2362	Determination of water content in oil for porcelain bushing of transformer	
IS - 6162	Paper covered aluminium conductor	
IS - 6160	Rectangular Electrical conductor for electrical Machines	
IS - 5561	Electrical power connector	
IS - 6103	Testing of specific resistance of electrical insulating liquids	
IS - 6262	Method of test for power factor and dielectric constant of electrical insulating liquids	
IS - 6792	Determination of electrical strength of insulating oil	
IS - 10028	Installation and maintenance of transformers.	
IS – 13947-2/1993	Low Voltage switchgear and control gear - Part:2 Circuit Breakers	IEC 60947-2

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4 **SERVICE CONDITIONS:** The service conditions shall be as defined in the Standard Bidding Document (SBD).

5 **PRINCIPAL PARAMETERS:**

5.1 The transformers shall be suitable for outdoor installation with three phase, 50 Hz, 11 kV or 33 kV system in which the neutral is effectively earthed and they should be suitable for service with fluctuations in supply voltage upto +12.5% to -12.5%.

(i) The transformers shall conform to the following specific parameters :

S.No.	Item	11 KV Distribution Transformers	33KV Distribution Transformers
1	System voltage (max.)	12 kV	36KV
2	Rated voltage HV	11 kV	33KV
3.	Rated voltage LV	433-250 V	433-250V
4.	Frequency	50 Hz +/- 5%	50 Hz +/- 5%
5	No. of Phases	Three	Three
6	Connection HV	Delta	Delta
7	Connection LV	Star (Neutral brought out)	Star (Neutral brought out)
8.	Vector group	Dyn-11	Dyn-11
9.	Type of cooling	ONAN	ONAN

Audible sound levels (decibels) at rated voltage and frequency for liquid immersed distribution transformers shall be as below (NEMA Standards):

KVA rating	Audible sound levels (decibels)
51-100	51
101-300	55
301-500	56

6. **TECHNICAL REQUIREMENTS:**

6.1.1 **CORE MATERIAL**

6.1.1.1 The core shall be stack / wound type of high grade Cold Rolled Grain Oriented or Amorphous Core annealed steel lamination having low loss and good grain properties, coated with hot oil proof insulation, bolted together and to the frames firmly to prevent vibration or noise. The core shall be stress relieved by annealing under inert atmosphere if required. The complete design of core must ensure permanency of the core loss with continuous working of the transformers. The value of the

maximum flux density allowed in the design and grade of lamination used shall be clearly stated in the offer.

6.1.1.2 The bidder should offer the core for inspection and approval by the purchaser during manufacturing stage. CRGO steel for core shall be purchased only from the approved vendors, list of which is available at http://apps.powergridindia.com/ims/ComponentList/Power-former%20upto%20420%20kV-CM%20List.pdf

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

6.1.2.4 No-load current up to 200kVA shall not exceed 3% of full load current and will be measured by energizing the transformer at rated voltage and frequency. Increase of 12.5% of rated voltage shall not increase the no-load current by 6% of full load current. No-load current above 200kVA and upto 2500kVA shall not exceed 2% of full load current and will be measured by energizing the transformer at rated voltage and frequency. Increase of 12.5% of rated voltage shall not increase the no-load current by 5% of full load current.

6.1.1.5 Please refer to **"Check-list for Inspection of Prime quality CRGO for Transformers"** attached at Annexure-A. It is mandatory to follow the procedure given in this Annexure.

7 WINDINGS:

(i) Material:

7.1.1 HV and LV windings shall be wound from Super Enamel covered /Double Paper covered Aluminum / Electrolytic Copper conductor.

7.1.2 LV winding shall be such that neutral formation will be at top.

7.1.3 The winding construction of single HV coil wound over LV coil is preferable.

7.1.4 Inter layer insulation shall be Nomex /Epoxy dotted Kraft Paper.

7.1.5 Proper bonding of inter layer insulation with the conductor shall be ensured. Test for bonding strength shall be conducted.

7.1.6 Dimensions of winding coils are very critical. Dimensional tolerances for winding coils shall be within limits as specified in Guaranteed Technical Particulars (GTP Schedule I).

7.1.7. The core/coil assembly shall be securely held in position to avoid any movement under short circuit conditions.

7.1.8 Joints in the winding shall be avoided. However, if jointing is necessary the joints shall be properly brazed and the resistance of the joints shall be less than that of parent conductor. In case of foil windings, welding of leads to foil can be done within the winding.

8 TAPPING RANGES AND METHODS:

8.1.1 No tapping shall be provided for distribution transformers up to 100 kVA rating.

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8.1.2 The tapping shall be as per provisions of IS: 1180 Part-I (2014).

8.1.3 Tap changing shall be carried out by means of an externally operated self-position switch and when the transformer is in de-energised condition. Switch position No.1 shall correspond to the maximum plus tapping. Each tap change shall result in variation of 2.5% in voltage. Arrangement for pad locking shall be provided. Suitable aluminum anodized plate shall be fixed for tap changing switch to know the position number of tap.

9 OIL:

9.1 The insulating oil shall comply with the requirements of IS 335. Use of recycled oil is not acceptable. The specific resistance of the oil shall be as per relevant IS.

9.2 Oil shall be filtered and tested for break down voltage (BDV) and moisture content before filling.

9.3 The oil shall be filled under vacuum.

9.4 The design and all materials and processes used in the manufacture of the transformer, shall be such as to reduce to a minimum the risk of the development of acidity in the oil.

10 INSULATION LEVELS:

S.No	Rated Voltage (kV)	Impulse Voltage (kV peak)	Power Frequency voltage (kV)
1	0.433	-	3
2	11	75	28
3	33	170	70

11 LOSSES:

11.1 The transformer of HV voltage up to 11kV,the total losses(no-load + load losses at 75 ^{0}C) at 50% of rated load and total losses at 100% of rated load shall not exceed the maximum total loss values given in Table-3 upto 200kVA & Table-6 for ratings above 200kVA of IS 1180(Part-1):2014.

11.2 The maximum allowable losses at rated voltage and rated frequency permitted at 75 ^{0}C for 11/0.433 kV transformers can be chosen by the utility as per **Table-3 upto 200kVA** and **Table-6 for ratings above 200kVA** as per **Energy Efficiency Level-2 specified in IS 1180 (Part 1): 2014** for all KVA ratings of distribution transformers.

11.3 The above losses are maximum allowable and there would not be any positive tolerance. Bids with higher losses than the above specified values would be treated as non-responsive. However, the manufacturer can offer losses less than above stated values. The utility can evaluate offers with losses lower than the maximum allowable losses on total owning cost basis in accordance with methodology given in Annex-I.

12 TOLERANCES:

12.1 No positive tolerance shall be allowed on the maximum losses displayed on the label for both 50% and 100% loading values.

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13 **PERCENTAGE IMPEDANCE:**

The percentage impedance of transformers at 75 ^{0}C for different ratings upto 200 kVA shall be as per Table 3 and for ratings beyond 200 kVA shall be as per Table 6 of IS 1180(Part-1):2014.

14 **TEMPERATURE RISE:** The temperature rise over ambient shall not exceed the limits given below:

14.1 The permissible temperature rise shall be as per IS: 1180 (Part-I):2014.

14.2 The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. Bidder shall submit the calculation sheet in this regard.

15 **PENALTY FOR NON PERFORMANCE:**

15.1 During testing at supplier's works if it is found that the actual measured losses are more than the values quoted by the bidder, the purchaser shall reject the transformer and he shall also have the right to reject the complete lot.

15.2 Purchaser shall reject the entire lot during the test at supplier's works, if the temperature rise exceeds the specified values.

15.3 Purchaser shall reject any transformer during the test at supplier's works, if the impedance values differ from the guaranteed values including tolerance.

16 **INSULATION MATERIAL:**

16.1 Electrical grade insulation epoxy dotted Kraft Paper/Nomex and pressboard of standard make or any other superior material subject to approval of the purchaser shall be used.

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

17 **TANK:**

- Transformer tank construction shall conform in all respect to clause 15 of IS 1180(Part-1):2014.
- The internal clearance of tank shall be such, that it shall facilitate easy lifting of core with coils from the tank without dismantling LV bushings.
- All joints of tank and fittings shall be oil tight and no bulging should occur during service.
- Inside of tank shall be painted with varnish/hot oil resistant paint.
- The top cover of the tank shall be slightly sloping to drain rain water.
- The tank plate and the lifting lugs shall be of such strength that the complete transformer filled with oil may be lifted by means of lifting shackle/Hook Type.

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- Manufacturer should carry out all welding operations as per the relevant ASME standards and submit a copy of the welding procedure and welder performance qualification certificates to the customer.

17.1 PLAIN TANK:

17.1.1 The transformer tank shall be of robust construction rectangular/octagonal/round/elliptical in shape and shall be built up of electrically tested welded mild steel plates of thickness of 3.15 mm for the bottom and top and not less than 2.5 mm for the sides for distribution transformers upto and including 25 kVA, 5.0 mm and 3.15 mm respectively for transformers of more than 25 kVA and up to and including 100 kVA and 6 mm and 4 mm respectively above 100 kVA. Tolerances as per IS: 1852 shall be applicable.

17.1.2 In case of rectangular tanks above 100 kVA the corners shall be fully welded at the corners from inside and outside of the tank to withstand a pressure of 0.8 kg/cm^2 for 30 minutes. In case of transformers of 100 kVA and below, there shall be no joints at corners and there shall not be more than 2 joints in total.

17.1.3 Under operating conditions the pressure generated inside the tank should not exceed 0.4 kg/ sq. cm positive or negative. There must be sufficient space from the core to the top cover to take care of oil expansion. The space above oil level in the tank shall be filled with dry air or nitrogen conforming to commercial grade of IS 1747 for DT up to 63 KVA. For DT of 63 KVA and above rating, conservator shall be provided.

(i) The tank shall be reinforced by welded flats on all the outside walls on the edge of the tank.

(ii) Permanent deflection: The permanent deflection, when the tank without oil is subjected to a vacuum of 525 mm of mercury for rectangular tank and 760 mm of mercury for round tank, shall not be more than the values as given below:

(All figures are in mm)

Horizontal Length of flat plate	Permanent deflection
Up to and including 750	5.0
751 to 1250	6.5
1251 to 1750	8.0
1751 to 2000	9.0

17.1.4 The tank shall further be capable of withstanding a pressure of 0.8kg/sq.cm and a vacuum of 0.7 kg/sq.cm (g) without any deformation.

17.1.5 The radiators can be tube type or fin type or pressed steel type to achieve the desired cooling to limit the specified temperature rise.

17.2 CORRUGATED TANK:

17.2.1 The bidder may offer corrugated tanks for transformers of all ratings.

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17.2.2 The transformer tank shall be of robust construction corrugated in shape and shall be built up of tested sheets.

17.2.3 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 calculation sheet in this regard.

17.2.4 Tanks with corrugations shall be tested for leakage test at a pressure of 0.25kg/ sq cm measured at the top of the tank.

17.2.5 The transformers with corrugation should be provided with a pallet for transportation, the dimensions of which should be more than the length and width of the transformer tank with corrugations.

18 CONSERVATOR:

(i) Transformers of rating 63 kVA and above with plain tank construction, the provision of conservator is mandatory. For corrugated tank and sealed type transformers with or without inert gas cushion, conservator is not required.

(ii) When a conservator is provided, oil gauge and the plain or dehydrating breathing device shall be fitted to the conservator which shall also be provided with a drain plug and a filling hole [32 mm (1¼")] normal size thread with cover. In addition, the cover of the main tank shall be provided with an air release plug.

(iii) The dehydrating agent shall be silica gel. The moisture absorption shall be indicated by a change in the colour of the silica gel crystals which should be easily visible from a distance. Volume of breather shall be suitable for 500g of silica gel conforming to IS 3401 for transformers upto 200 KVA and 1 kg for transformers above 200 KVA .

(iv) The capacity of a conservator tank shall be designed keeping in view the total quantity of oil and its contraction and expansion due to temperature variations. The total volume of conservator shall be such as to contain10% quantity of the oil. Normally 3% quantity the oil shall be contained in the conservator.

(v) The cover of main tank shall be provided with an air release plug to enable air trapped within to be released, unless the conservator is so located as to eliminate the possibility of air being trapped within the main tank.

(vi) The inside diameter of the pipe connecting the conservator to the main tank should be within 20 to 50 mm and it should be projected into the conservator so 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 ^{0}C) should be above the sump level.

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19. SURFACE PREPARATION AND PAINTING:

(i) GENERAL

19.1.1 All paints, when applied in a normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.

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

19.2 CLEANING AND SURFACE PREPARATION:

a) After all machining, forming and welding has been completed, all steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination prior to any painting.

b) Steel surfaces shall be prepared by shot blast cleaning (IS9954) to grade Sq. 2.5 of ISO 8501-1 or chemical cleaning including phosphating of the appropriate quality (IS 3618).

c) Chipping, scraping and steel wire brushing using manual or power driven tools cannot remove firmly adherent mill-scale. These methods shall only be used where blast cleaning is impractical. Manufacturer to clearly explain such areas in his technical offer.

19.3 PROTECTIVE COATING:

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

19.4 PAINT MATERIAL:

i) Following are the types of paint which may be suitably used for the items to be painted at shop and supply of matching paint to site: Heat resistant paint (Hot oil proof) for inside surface.

ii) For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of synthetic enamel/polyurethene base paint. These paints can be either air drying or stoving.

iii) For highly polluted areas, chemical atmosphere or for places very near to the sea coast, paint as above with one coat of high build Micaceous iron oxide (MIO) as an intermediate coat may be used.

19.5 PAINTING PROCEDURE:

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

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ii) Where the quality of film is impaired by excess film thickness (wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coating and apply another coating. As a general rule, dry film thickness should not exceed the specified minimum dry film thickens by more than 25%.

19.6 DAMAGED PAINTWORK:

(i) Any damage occurring to any part of a painting scheme shall be made good to the same standard of corrosion protection and appearance as that was originally applied.

(ii) Any damaged paint work shall be made good as follows:

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

19.6.2.2 A priming coat shall be immediately applied, followed by a full paint finish equal to that originally applied and extending 50 mm around the perimeter of the original damage.

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

19.6.2.4 The paint shade shall be as per Annexure-Paint which is attached herewith.

19.7 DRY FILM THICKNESS:

19.7.1 To the maximum extent practicable the coats shall be applied as a continuous film of uniform thickness and free of pores. Overspray, skips, runs, sags and drips should be avoided. The different coats may or may not be of the same colour.

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

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

19.7.4 The requirements for the dry film thickness (DFT) of paint and the materials to be used shall be as given below:

Sl. No.	Paint type	Area to be painted	No. of coats	Total dry film Thickness (min.) (microns)
1.	Thermo setting powder Paint	inside outside	01 01	30 60
2.	**Liquid paint** a) Epoxy (primer) b) P.U. Paint (Finish coat) c) Hot oil paint/ Varnish	 outside outside inside	 01 02 01	 30 25 each 35/10

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19.8 TESTS FOR PAINTED SURFACE:

19.8.1 The painted surface shall be tested for paint thickness.

19.8.2 The painted surface shall pass the cross hatch adhesion test and impact test as acceptance tests and Salt spray test and Hardness test as type test as per the relevant ASTM standards. Note: Supplier shall guarantee the painting performance requirement for a period of not less than 5 years.

20 BUSHINGS:

20.1 The transformer shall be fitted with three high voltage and four low voltage outdoor type porcelain bushings of appropriate voltage and current ratings as per relevant IS. Each terminal including the neutral shall be distinctly marked and coloured for phase voltage on both HV and LV sides. The system of marking shall be in accordance with the latest amendment of relevant IS.

20.2 For 33 kV-36 kV class bushings shall be used for transformers of ratings 500 kVA and above. And for transformers below 500 KVA, 33 kV class bushings, for 11 kV -12 kV class bushings and for 0.433 kV- 1 kV class bushings shall be used.

20.3 Bushing can be of porcelain/epoxy material. Polymer insulator bushings conforming with relevant IEC can also be used.

20.4 Dimensions of the bushings of the voltage class shall conform to the Standards specified and dimension of clamping arrangement shall be as per IS 4257

20.5 Minimum external phase to phase and phase to earth clearances of bushing terminals shall be as follows:

Voltage	Clearance	
	Phase to phase	Phase to earth
33 kV	350mm	320mm
11 kV	255mm	140mm
LV	75mm	40mm

For DTs of 200 KVA and above, the clearances of cable box shall be as below:

Voltage	Clearance	
	Phase to phase	Phase to earth
33 kV	350mm	220mm
11 kV	130mm	80mm
LV	25mm	20mm

20.6 Arcing horns shall be provided on HV bushings.

20.7 Brazing of all inter connections, jumpers from winding to bushing shall have cross section larger than the winding conductor. All the Brazes shall be qualified as per ASME, section – IX.

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20.8 The bushings shall be of reputed make supplied by those manufacturers who are having manufacturing and testing facilities for insulators.

20.9 The terminal arrangement shall not require a separate oil chamber not connected to oil in the main tank.

21 TERMINAL CONNECTORS:

21.1 The LV and HV bushing stems shall be provided with suitable terminal connectors as per IS 5082 so as to connect the jumper without disturbing the bushing stem. Connectors shall be with eye bolts so as to receive conductor for HV. Terminal connectors shall be type tested as per IS 5561.

22 LIGHTNING ARRESTORS:

22.1 9 kV, 5 kA metal oxide lightning arrestors of reputed make conforming to IS 3070 Part-III, one number per phase shall be provided.(To be mounted on pole or to be fitted under the HV bushing with GI earth strip 25x4 mm connected to the body of the transformer with necessary clamping arrangement as per requirement of purchaser.) Lightening arrestors with polymer insulators in conformance with relevant IEC can also be used. 1 clamp for LA shall also be provided for each HT bushing. Supply of LA is not included in DT supplier's scope.

23 CABLE BOXES:

23.1 No cable box on HT side shall be provided in transformers of all ratings. (Refer S. No. 41 of GTP).

23.2 The transformer shall be fitted with suitable LV cable box. The bidder shall ensure the arrangement of Cable box so as to prevent the ingress of moisture into the box due to rain water directly falling on the box and having non-magnetic material gland plate with appropriate sized single compression brass glands on LV side to terminate 1.1 kV/single core XLPE armoured cable (Size as per requirement).

***Note: HT side without cable box and LT side with cable box for all ratings as per Chief Engineer, JPDCL, Jammu's Letter No: CE/P&P/JPDCL/TS/92-95 Dated: 19.05.2020**

24 TERMINAL MARKINGS:

High voltage phase windings shall be marked both in the terminal boards inside the tank and on the outside with capital letter 1U, 1V, 1W and low voltage winding for the same phase marked by corresponding small letter 2U, 2V, 2W. The neutral point terminal shall be indicated by the letter 2N. Neutral terminal is to be brought out and connected to local grounding terminal by an earthing strip.

25 FITTINGS:

25.1 The following standard fittings shall be provided:

i. Rating and terminal marking plates, non-detachable.

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ii. Earthing terminals with lugs - 2 Nos.

iii. Lifting lugs for main tank and top cover

iv. Terminal connectors on the HV/LV bushings (For bare terminations only).

v. Thermometer pocket with cap - 1 No.

vi. Air release device (for non-sealed transformer)

vii. HV bushings - 3 Nos.
viii. LV bushings - 4 Nos.

ix. Pulling lugs

x. Stiffener

xi. Radiators - No. and length may be mentioned (as per heat dissipation calculations)/ corrugations.

xii. Arcing horns on HT side - 3 No . Only clamps for lightning arrestor shall be provided.

xiii. Prismatic oil level gauge.

xiv. Drain cum sampling valve.

xv. One filter valve on upper side of the transformer (For transformers above 200 kVA)

xvi. Oil filling hole having p. 1- ¼ „" thread with plug and drain plug on the conservator.

xvii. Silica gel breather (for non-sealed type transformer)

xviii. Base channel 75x40 mm for up to 100 kVA and 100 mmx50 mm above 100 kVA, 460 mm long with holes to make them suitable for fixing on a platform or plinth.

xix. 4 No. rollers for transformers of 200 kVA and above.

xx. Pressure relief device or explosion vent (above 200 kVA)

xxi. Oil level gauge

A. -5 °C and 90°C marking for non-sealed type

xxii. Nitrogen / air filling device/ pipe with welded cover
Capable of reuse (for sealed type transformers)

xxiii. Inspection hole for transformers above 200 kVA

xxiv. Pressure gauge for sealed type transformers above 200 kVA.

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