

<b>The Tata Power Company Ltd</b>		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

**The Tata Power Company Limited Invites Tender** through E-Tender Two-Part Bidding Process from interested bidders for the following package: -

**A. Summary of the tendered package:**

Sr. No.	Description	Tender Reference no.	Bid Guarantee Fee / EMD (Rs.)	Tender Fee (Rs.)	Last Date and Time for payment of Tender Participation fee
For the following package please send mail to Mr. Vinayak Shinde ( <a href="mailto:vinayak.shinde@tatapower.com">vinayak.shinde@tatapower.com</a> ) with copy to Mr. Rameshkumar P N ( <a href="mailto:pnramesh@tatapower.com">pnramesh@tatapower.com</a> )					
1.	Out Line Agreement for procurement of Pad mounted unitised substations for Mumbai Distribution.	CC24VJS063	2,00,000/-	2,000 /-	29 <sup>th</sup> Jan 2024

**B. Procedure to Participate in Tender.**

**Following steps to be done before** “Last date and time for Payment of Tender Participation Fee” as mentioned above

1. Non-Refundable Tender Fee, as indicated in table above, to be submitted in the form of Direct deposit in the following bank account and submit the receipt along with a covering letter clearly indicating the Tender Reference number –

Beneficiary Name – The Tata Power Co. Ltd.

Bank Name – HDFC Bank Ltd.

Branch Name – Fort Branch, Mumbai

Address – Maneckji Wadia Building, Nanik Motwani Marg, Fort, Mumbai 400023.

Branch Code – 60

Bank & Branch Code – 400240015

Account No – 00600110000763

Account type – CC

IFSC Code – HDFC0000060

2. Eligible and Interested Bidders to submit duly signed and stamped letter on Bidder's letterhead indicating

Tender Enquiry number

Name of authorized person

Contact number

e-mail id

Details of submission of Tender Participation Fee

<b>The Tata Power Company Ltd</b>	 <b>TATA</b> <b>TATA POWER</b>	<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

E-mail with necessary attachment of 1 and 2 above to be send to [vinayak.shinde@tatapower.com](mailto:vinayak.shinde@tatapower.com) with copy to [pnramesh@tatapower.com](mailto:pnramesh@tatapower.com) before “Last date and time for Payment of Tender Participation Fee”

Interested bidders to submit Tender Participation Fee and Authorization Letter before Last date and time as indicated above after which link from Tata Power E-Tender system (Ariba) will be shared for further communication and bid submission.

Please note all future correspondence regarding the tender, bid submission, bid submission date extension, Pre-bid query etc. will happen only through Tata Power E-Tender system (Ariba).

No e-mail or verbal correspondence will be responded. All communication will be done strictly with the bidder who have done the above step to participate in the Tender.

Also it may be strictly noted that once date of “Last date and time for Payment of Tender Participation Fee” is lapsed no Bidder will be sent link from Tata Power E-Tender System (Ariba). Without this link vendor will not be able to participate in the tender. Any last moment request to participate in tender will not be entertained.

Any payment of Tender Participation Fee by Bidder who have not done the pre-requisite will not be refunded.

Also all future corrigendum's to the said tender will be informed on Tender section on website <https://www.tatapower.com> only.

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<b>The Tata Power Company Ltd</b>		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

## **OPEN TENDER NOTIFICATION**

**FOR**

**Out Line Agreement for procurement of Pad mounted  
unitised substations for Mumbai Distribution.**

**The Tata Power Company Limited (Tata Power)  
Smart Center of Procurement Excellence, 2nd Floor,  
Sahar Receiving Station, Near Hotel Leela,  
Sahar Airport Road, Andheri East, Mumbai-400059**

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: CC24VJS063		Document Date: 20 <sup>th</sup> Jan 2024

## Section A : Tender Notice including Instruction to Bidders

### 1. Tender Details

#### 1.1 Key Tender Specific Details

Reference Number	CC24VJS063
Description	Out Line Agreement for procurement of Pad mounted unitised substations for Mumbai Distribution.
Type of Tender	Out Line Agreement
Estimated Period	One Year
Tender Fee	Rs 2000/-
Earnest Money Deposit (EMD)	Rs 2,00,000/- Rs. Two Lakhs Only <b>PLEASE NOT THAT IT IS MANDATORY TO SUBMIT EMD IN BANK GUARANTEE FORMAT ONLY</b>
Price Basis	On Price Variation Basis
Executive Handling this Tender*	Name: Mr. Vinayak Shinde E-Mail ID: <a href="mailto:vinayak.shinde@tatapower.com">vinayak.shinde@tatapower.com</a>
Technical Query *	Name: Mr. Ajay Potdar E-Mail ID: <a href="mailto:avpotdar@tatapower.com">avpotdar@tatapower.com</a>

\*You may contact the above personnel from Monday to Friday during office hours only.

<b>The Tata Power Company Ltd</b>		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

### 1.2 Calendar of Events

(a)	Payment of Tender Fee and Submission of letter nominating authorized person by Interested Bidder indicating their intent to Buy Tender	Till 29 <sup>th</sup> January 2024
(b)	Access to Tender Documents through E-Tender system to authorized person of Interested Bidder	29 <sup>th</sup> January 2024
(c)	Last Date of receipt of pre-bid queries, if any.	By 5 <sup>th</sup> February 2024
(d)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	10 <sup>th</sup> February 2024
(e)	Last date and time of receipt of Bids	19 <sup>th</sup> February 2024

**Note:-** \* These date and time are as planned and tentative. In case of change the same shall be intimated to Authorized Person of Interested Bidder through E-Tender System.

Please note post submission of Bids relevant communication will be done with Authorized Person of Interested Bidder through E-Tender System

### 1.3 Mandatory documents required along with the Bid

- 1.3.1 Bid Guarantee Fee (EMD) of requisite value and validity. PLEASE NOTE THAT BID GUARANTEE ONLY IN FORM OF BANK GUARANTEE WILL BE ACCEPTED.
- 1.3.2 Requisite Documents to ascertain fulfilling of Technical and Commercial Pre-Qualification Requirement as detailed in Tender Enquiry.
- 1.3.3 Technical Submission including Drawings, Type Test details etc as detailed in Technical Specification.
- 1.3.4 Required Commercial Submission as detailed in Tender Document
- 1.3.5 Technical and Commercial Clarification and Deviations as per the format attached in the Tender Enquiry
- 1.3.6 Proper authorization letter to sign the tender and participate in Tata Power E-Tender system on the behalf of bidder.
- 1.3.7 **For vendor not registered with Tata Power, Duly filled Vendor Registration form with all supporting documents is mandatory to participate in the Tender.**

***Please note that in absence of any of the above documents, the bid submitted by a bidder shall be liable for rejection.***

***Also please note that whenever editable format are shared it is requested that data be filled in relevant cells. No formatting or addition / deletion of rows / columns to be done. Wherever editable Excel submission are requested the file should be free from references, macros etc.***

<b>The Tata Power Company Ltd</b>		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

**Checklist of Document Submission**

<b>Stage of Tendering</b>	<b>Document</b>	<b>Type of Format</b>	<b>Mode of submission</b>
Before last date of Pre-Bid Query	Query / Clarification / Deviation (QCD) Format. (F1) Technical and Commercial	Editable Excel Format	Through message in E-tender system
<b>Bid Submission Envelope 1 (First Part)</b>	<b>Earnest Money Deposit</b>	<b>Original Bank Guarantee</b>	<b>In Sealed Envelope</b>
<b>Bid Submission Envelope 2 (Second Part)</b>	<b>Documents to be uploaded in Ariba only.</b> In case of multiple files, a zipped folder can be attached for the same (size limit of 100MB per zipped file)		
To be submitted Under Tab 2.1 in Ariba	Duly filled PQR and supporting documents		
	Duly filled PQR format	Editable Excel Format	E-Tender System
	Backup documents for Technical and Commercial PQR	Signed and Scanned documents	E-Tender System
To be submitted under Tab 2.2 in Ariba	Technical Submission and Supporting Documents		
	Duly filled Unpriced Bid Format. Signed copy of Technical Specifications indicating your acceptance of the same	Signed and scanned copy of document	E-Tender System
To be submitted under Tab 2.3 in Ariba	Commercial Submission and supporting document		

<b>The Tata Power Company Ltd</b>		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

	Letter of Undertaking (FOR VENDORS NOT REGISTERED WITH TATA POWER)	Scanned Copy of letter of undertaking duly filled, stamped and signed	E-Tender System
	E-auction Undertaking form	Scanned Copy of letter of undertaking duly filled, stamped and signed	E-Tender System
Bid Submission Envelope 3 (Third Part)	<b>Duly filled Priced Bid Format</b>	Hard copy in original duly signed and stamped	<b>Sealed Envelope</b>
	Duly filled Priced Bid Format	To be entered in E-Tender System	E-Tender System

#### **1.4 Deviation from Tender**

Normally, the deviations to tender terms are not admissible and the bids with deviation are liable for rejection. Hence, the bidders are advised to refrain from taking any deviations on this Tender. Still in case of any deviations, all such deviations shall be set out by the Bidders, clause by clause in the Query / Clarification / Deviation (QCD) Format. Deviations have to be mandatorily submitted in editable Excel sheet.

Technical or Commercial Deviation should be mentioned in Deviation Format only. Deviation in any other document or Format will not be considered.

#### **1.5 Right of Acceptance/Rejection**

1.5.1 Bids are liable for rejection in absence of following:-

1.5.2 Mandatory Documents as listed in 1.3 above

1.5.3 Price Bid as per the Price Schedule mentioned in Tender Document

1.5.4 Receipt of Bid and Response to queries within the due date and time

Tata Power reserves the right to accept/reject any or all the bids without assigning any reason thereof.

<b>The Tata Power Company Ltd</b>		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

### 1.6 Qualification Criteria

S.No.	Description	Qualifying Criteria	Evaluation Documents Required
1	Infrastructure	<p>Bidder must be an OEM of Equipment with manufacturing facility / assembly in India.</p> <p>The bidder must have in-house routine and acceptance testing facilities for acceptance as per relevant IS/IEC</p>	<p>Self-undertaking to be submitted in this regard.</p> <p>TATA Power reserves the right to inspect the said manufacturing facility as a proof of compliance to this parameter.</p>
2	Supply and Experience	<p>The bidder must have supplied for same or higher size and voltage</p> <ul style="list-style-type: none"> <li>a) A minimum of 7 nos during last 3 years or</li> <li>b) A single order of 4 nos or</li> <li>c) Two orders of 2 nos last 3 years.</li> </ul> <p>Indian Subsidiaries of global companies having plant in India are also eligible to bid if the qualification requirements stated above are met independently or in combination with the parent company. Declaration from parent company needs to be submitted.</p>	<p>Purchase Order Copies and Completion Certificates.</p> <p>Self-undertaking to be submitted in this regard. TATA Power reserves the right to inspect the said manufacturing facility as a proof of compliance to this parameter.</p>



The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: CC24VJS063		Document Date: 20 <sup>th</sup> Jan 2024

S.No.	Description	Qualifying Criteria	Evaluation Documents Required
3	Type Test	<p>The bidder shall submit Type test reports obtained from CPRI/ERDA/ International Accredited Lab for the equipment / material offered. The type tests should have been conducted on the equipment / material of the same design.</p> <p>The type tests should have been conducted within 5 years prior to the date of bid opening. Time period for type test can be extended by another 5 years as a special case, if there is no change in design / material of construction (MOC).</p> <p>In case the type test reports furnished are not for the quoted equipment / material but for the equipment / material with higher voltage class and/or different capacity, then type test shall be carried out for the offered equipment / material from CPRI/ERDA / International Accredited Lab without any cost implication to the owner and the Type Test reports shall be submitted before dispatch of the equipment / material.</p>	<p>Type Test Report.</p> <p>Undertaking that there is no change in design / material of construction (MOC) if Type Test Report older than 5 years.</p> <p>Undertaking that type test shall be carried out for the offered equipment / material from CPRI/ERDA/ International Accredited Lab without any cost implication to the owner and the Type Test reports shall be submitted before dispatch of the equipment / material, in case type test reports furnished are not for the quoted equipment / material but for the equipment / material with higher voltage class and/or different capacity, (if applicable)</p>
4	Commercial Capability	Average Annual turnover of the bidder for last three years shall not be less than Rs 6 Crs	Copies of audited Balance Sheet and P&L Statements along with UDIN number to be submitted in this regard.
5	Performance	The bidder should have performance certificates for 2 year satisfactory performance from at least 2 reputed Distribution Utilities for equipments of similar or higher rating. The work against these issued certificates should be completed in last seven years from the date of bid submission. In case the bidder has a previous association with any of Tata Power Groups for similar products and services, the performance feedback for that bidder by Tata Power User Group shall only be considered irrespective of performance certificates issued by any third organization.	Supply List & Performance Certificates from the utilities

The Tata Power Company Ltd	 <b>TATA</b> <b>TATA POWER</b>	<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

### 1.7 Pre-Bid Queries

Technical or Commercial Pre-Bid Queries if any has to be sent through message in E-Tender System. Pre-Bid Query has to be sent only in the Query / Clarification / Deviation (QCD) Format. Pre-Bid Queries sent in any other format or send through any other communication channel will not be accepted and answered. Pre-Bid Query have to be sent in the stipulated timeline as defined in the Tender Document. No Pre-Bid Query will be accepted after the due time and date as specified as "Last Date of receipt of pre-bid queries, if any"

### 1.8 Marketing Integrity

We have a fair and competitive marketplace. The rules for bidders are outlined in the General Condition of Contracts and other parts of Tender Documents. Bidders must agree to these rules prior to participating. In addition to other remedies available, Tata Power reserves the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the General Condition of Contracts or other part of the Tender Documents. A bidder who violates the market place rules or engages in behavior that disrupts the fair execution of the marketplace, may result in restriction of a bidder from further participation in the marketplace for a length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honor prices submitted to the marketplace
- Breach of terms as published in TENDER
- Submit irrelevant documents or frequently cases of missing documents as part of compliance to Qualifying, Technical or Commercial Requirements causing unnecessary delay in Tender Evaluation

### 1.9 Supplier Confidentiality

All information contained in this tender is confidential and shall not be disclosed, published or advertised in any manner without written authorization from Tata Power. This includes all bidding information submitted to Tata Power. All tender documents remain the property of Tata Power and all suppliers are required to return these documents to Tata Power upon request. Suppliers who do not honor these confidentiality provisions will be excluded from participating in future bidding events.

### 1.10 Payment Terms

100% payment shall be made within **60 days** from the receipt and acceptance of the material at the Consignee Stores/Site/Location as per the Contractual Terms and Conditions.

## 2. Evaluation Criteria

- The bids will be evaluated technically on the compliance to tender terms and conditions.
- The bids will be evaluated commercially on the overall all-inclusive lowest cost for the complete tender BOQ / each line item as calculated in Schedule of Items. Tata Power however, reserves right to split the order line item wise and/or quantity wise among more than one

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: CC24VJS063		Document Date: 20 <sup>th</sup> Jan 2024

Bidder. Hence all bidders are advised to quote their most competitive rates against each line item.

- Bidder has to mandatorily quote against each item of Schedule of Items. Failing to do so, Tata Power may reject the bids.

**NOTE:** In case of a new bidder not registered with Tata Power, factory inspection and evaluation shall be carried out to ascertain bidder's manufacturing capability and quality procedures. However Tata Power reserves the right to carry out factory inspection and evaluation for any bidder prior to technical qualification. In case a bidder is found as Disqualified in the factory evaluation, their bid shall not be evaluated any further and shall be summarily rejected. The decision of Tata Power shall be final and binding on the bidder in this regard.

### 2.1 Price Variation Clause and Cap:

The prices shall be subject to IEEMA Price Variation Clause with following conditions:

IEEMA formulae and factors governing the price variation shall be as follows:

$$P = Po \left( 7 + 35 C + 30 ES + 7 IS + 8 IM + 7 ER + 6 W \right) / 100$$

CO
ESO
ISO
IMO
ERO
WO

P Price payable as adjusted in accordance with the formula  
PO Price quoted / confirmed (Each)

C Price of Copper - Applicable in the Month of ordering.  
CO Price of Copper - as per base month of tender.

ES Price of CRGO - Applicable in the Month of ordering.  
ESO Price of CRGO - as per base month of tender.

IS Price of HR Coil of 3.15mm - Applicable in the Month of ordering.  
ISO Price of HR Coil of 3.15mm - as per base month of tender.

IM Price of Insulating Materials - Applicable in the Month of ordering.  
IMO Price of Insulating Materials - as per base month of tender.

ER Price of Epoxy resin - Applicable in the Month of ordering.  
ERO Price of Epoxy resin - as per base month of tender.

W All India average Consumer price index - Applicable in the Month of ordering.  
WO All India average Consumer price index average - as per base month of tender.

- Base circular shall be Dec. 2023 circular issued in Jan. 2024. Base month for Bid Price shall remain same throughout the negotiation process till Outline Agreement / Rate Contract is finalized. Base month circular has to be attached in the Price Bid.

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: CC24VJS063		Document Date: 20 <sup>th</sup> Jan 2024

- Whenever Firm Order has to be placed against Outline Agreement / Rate Contract Tata Power shall seek PVC corrected price based on index published and available during the said month from the bidder. Purchase Order against Outline Agreement / Rate Contract will be placed at PVC corrected price. The said price shall then remain firm till completion of delivery and bill payment.
- There will be no cap on both positive and negative side.

Note : If due date of bid submission is extended due to any reason, the base date will remain unchanged for the calculation of PV clause

### 3. Submission of Bid Documents

#### 3.1 Bid Submission

Bidders are requested to submit their offer in line with this Tender document. Bids shall be submitted in 3 (three) parts:

**FIRST PART: “EMD – BANK GUARANTEE”** of Value detailed in 1.1 valid for 180 days from the due date of bid submission in the form of Bank Guarantee favoring ‘The Tata Power Company Limited’. The EMD has to be strictly in the format as mentioned in Tender Document, failing which it shall not be accepted by Tata Power and the bid as submitted shall be liable for rejection.

Note : BG of 180 days and further claim period of 180 days is needed. In case the same cannot be issued by your bank then BG valid for 365 days can be provided.

Tata Power Bank details for EMD BG / NEFT:

Beneficiary Name – The Tata Power Co. Ltd.

Bank Name – HDFC Bank Ltd.

Branch Name – Fort Branch, Mumbai

Address – Maneckji Wadia Building, Nanik Motwani Marg, Fort, Mumbai 400023.

Branch Code – 60

Bank & Branch Code – 400240015

Account No – 00600110000763

Account type – CC

IFSC Code – HDFC0000060

The hard copy of EMD in a sealed envelope should be sent on address mentioned in Tender document. Pls mail the UTR details in case of NEFT for verification.

**First Part has to be submitted in Sealed Envelope.**

**SECOND PART: “TECHNICAL / UN-PRICED COMMERCIAL BID”** shall contain the following documents:

- a) Documentary evidence in support of Technical, Commercial qualifying criteria

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: CC24VJS063		Document Date: 20 <sup>th</sup> Jan 2024

- b) Technical literature/GTP/Type test report/Details of Qualified Manpower Available/ Testing Facility available etc. *(complete in all respect as desired and detailed in Technical Specification and Technical Requirement Section)*
- c) Duly filled Technical and Commercial Deviation Sheets
- d) Duly filled formats like Authorization affidavit form
- e) *Unpriced Commercial Bid*

**The technical / un-priced commercial bid shall be properly indexed and is to be submitted in Soft Copy through E-Tender system of Tata Power. Hard Copy of Technical Bids need not be submitted.**

**Second Part has to be submitted through E-Tender System Only**

**THIRD PART: “PRICE BID”** shall contain only the price details and strictly in Price Bid format along with explicit break up of basic prices and applicable GST. Basic price should include packaging forwarding, freight, transit insurance and any other cost envisaged by the bidder.

**Third part has to be submitted through E-Tender System (ARIBA) only.**

**FOR BIDS INVITED THROUGH E-TENDER SYSTEM (TECHNICAL AND UN-PRICED COMMERCIAL BID) :**

In response to advertisement Bidder has to provide details of person authorized to Bid on behalf of the Bidder. An e-mail will be generated by E-Tender System and the authorized person can download the Tender Documents from the system.

SECOND and THIRD PART of the Bid have to be submitted in E-Tender System.

**Bidders have to mandatorily submit SECOND PART (Technical and Un-priced commercial Bid) only through E-Tender system of Tata Power. Bids submitted through any other form/ route shall not be admissible.**

EMD BG to be sent in a sealed envelope which shall be clearly marked as below to the below address.

**EMD**

**“Please mention Tender Reference No”**

The Tata Power Company Limited, Smart Center of Procurement Excellence, 2nd Floor, Sahar Receiving Station, Near Hotel Leela, Sahar Airport Road, Andheri East, Mumbai-400059

Bids submitted by Email/Telex/Telegram /Fax will be rejected. No request from any Bidder to Tata Power to collect the proposals from Courier/Airlines/Cargo Agents etc. shall be entertained.

**SIGNING OF BID DOCUMENTS:**

The bid must contain the name, residence and place of business of the person or persons making the bid and must be signed and sealed by the Bidder with his usual signature. The names of all persons signing should also be typed or printed below the signature.

The Bid being submitted must be signed by a person holding a Power of Attorney authorizing him to do so, certified copies of which shall be enclosed.

The Bid submitted on behalf of companies registered with the Indian Companies Act, for the time being in force, shall be signed by persons duly authorized to submit the Bid on behalf of the Company and shall be accompanied by certified true copies of the resolutions, extracts of Articles of Association, special or general Power of Attorney etc. to show clearly the title, authority and designation of persons

<b>The Tata Power Company Ltd</b>	 <b>TATA</b> <b>TATA POWER</b>	<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

signing the Bid on behalf of the Company. Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the bid.

A bid by a person who affixes to his signature the word ‘President’, ‘Managing Director’, ‘Secretary’, ‘Agent’ or other designation without disclosing his principal will be rejected.

The Bidder’s name stated on the Proposal shall be the exact legal name of the firm.

### **3.2 Contact Information**

**Communication Details: Detailed in 1.1**

### **3.3 Bid Prices**

Bidders shall quote for the entire Scope of Supply/ work with a break up of prices for individual items and Taxes & duties. The bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total price with taxes, duties & freight up to destination at various sites of Tata Power. The all-inclusive prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during the execution of the supply work, breakup of price constituents.

The quantity break up shown else-where other than Price Schedule is tentative. The bidder shall ascertain himself regarding material required for completeness of the entire work. Any items not indicated in the price schedule but which are required to complete the job as per the Technical Specifications/ Scope of Work/ SLA mentioned in the tender, shall be deemed to be included in prices quoted.

### **3.4 Bid Currencies**

Prices shall be quoted in Indian Rupees Only. It also may be noted that the denomination of Purchase Order / Outline Agreement / Rate Contract and associated Payment to Successful Bidder shall also be in Indian Rupees Only. In case Bidder intends to import any equipment, part etc and supply to Tata Power then all liability and costs related to import will rest with the Bidder. All statutory compliances, payments, expenditure etc related to importing of equipment will be responsibility of the bidder.

### **3.5 Period of Validity of Bids**

Bids shall remain valid for 180 days from the due date of submission of the bid.

Notwithstanding clause above, Tata Power may solicit the Bidder’s consent to an extension of the Period of Bid Validity. The request and responses thereto shall be made in writing.

### **3.6 Alternative Bids**

Bidders shall submit Bids, which comply with the Bidding documents. Alternative bids will not be considered. The attention of Bidders is drawn to the provisions regarding the rejection of Bids in the terms and conditions, which are not substantially responsive to the requirements of the bidding documents.

### **3.7 Modifications and Withdrawal of Bids**

The bidder is not allowed to modify or withdraw its bid after the Bid’s submission. The EMD as submitted along with the bid shall be liable for forfeiture in such event.

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: CC24VJS063		Document Date: 20 <sup>th</sup> Jan 2024

### 3.8 Earnest Money Deposit (EMD)

The bidder shall furnish, as part of its bid, an EMD amounting as specified in the tender. The EMD is required to protect the Tata Power against the risk of bidder's conduct which would warrant forfeiture.

The EMD shall be in following form:

- Bank Guarantee valid for 180 days after due date of submission.

**The EMD shall be forfeited in case of:**

- a) The bidder withdraws its bid during the period of specified bid validity.

Or

- b) In case of a successful bidder, if the Bidder, within 15 days, does not
- i) accept the purchase order, or
  - ii) furnish the required Contract Performance Bank Guarantee (CPBG)

**Original Bank Guarantee submitted as EMD shall be returned only after completion of award process for unsuccessful bidders and issue of Contract Performance Bank Guarantee (CPBG) for successful bidder.**

## 4. Bid Opening & Evaluation process

### 4.1 Process to be confidential

Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence Tata Powers processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

### 4.2 Technical Bid Opening

Bids will be opened at Corporate Office of Tata Power as per our standard Process. The bids shall be opened internally by Tata Power. Technical bid must not contain any cost information whatsoever.

First the envelope marked "EMD" will be opened. Bids without EMD of required amount/ validity in prescribed format, shall be rejected.

Next, the technical bid of the bidders who have furnished the requisite EMD will be opened in E-Tender system.

### 4.3 Preliminary Examination of Bids/Responsiveness

Tata Power will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order. Tata Power may ask for submission of original documents in order to verify the documents submitted in support of qualification criteria.

Prior to the detailed evaluation, Tata Power will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the Goods offered.

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: CC24VJS063		Document Date: 20 <sup>th</sup> Jan 2024

A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

Bid determined as not substantially responsive will be rejected by the Tata Power and/or the Tata Power and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

#### 4.4 Techno Commercial Clarifications

Bidders need to ensure that the bids submitted by them are complete in all respects. To assist in the examination, evaluation and comparison of Bids, Tata Power may, at its discretion, ask the Bidder for a clarification on its Bid for any deviations with respect to the Tata Power specifications and attempt will be made to bring all bids on a common footing. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted owing to any clarifications sought by Tata Power.

#### 4.5 Price Bid Opening

The EMD of the bidder withdrawing or substantially altering his offer at any stage after the technical bid opening will be forfeited at the sole discretion of Tata Power without any further correspondence in this regard.

Arithmetical errors will be rectified on the following basis: If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the Total Amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.

#### 4.6 Reverse Auction and Price Matching Option

Tata Power reserves the right to go for Reverse Auction (RA) for price negotiation and discover the most competitive price on ARIBA portal, Tata Power's official e-tendering platform. This will be decided after techno-commercial evaluation of the bids. Bidders need to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case Tata Power decides to go for RA.

**Only those bidders who are techno-commercially qualified shall be eligible to participate further in RA process. However, the original H1 bidder (whose price bid is the highest post techno-commercial evaluation) shall not be allowed to participate in further RA process provided minimum three techno-commercially qualified bids are available.**

For case where more than one bidders have to be awarded (including Rate Contract / Outline Agreement) Price Matching Option will be exercised. Volume of job allocated to original competitive bidder will be more than bidder who is chosen through Price Matching Option. Tata Power decision regarding work sharing shall be final and no explanation OR clarification shall be given regarding the same.



<b>The Tata Power Company Ltd</b>	 <b>TATA</b> <b>TATA POWER</b>	<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

## 5.0 Award Decision

Tata Power will award the contract to the successful bidder whose bid has been determined to be the lowest-evaluated responsive bid as per the Evaluation Criterion mentioned at Clause 2.0. The Cost for the said calculation shall be taken as the all-inclusive cost quoted by bidder in Priced Bid Format subject to any corrections required in line with Clause 4.3 above. The decision to place purchase order/Outline Agreement/ Rate Contract solely depends on Tata Power on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that Tata Power may deem relevant.

Tata Power reserves all the rights to award the contract to one or more bidders so as to meet the delivery requirement or nullify the award decision without assigning any reason thereof.

In case any supplier is found unsatisfactory during the delivery process, the award will be cancelled and Tata Power reserves the right to award other suppliers who are found fit.

### 5.1 Rate Contract / Outline Agreement

Rate Contract / Outline Agreement does not guarantee any assured business volume in Rupees or Quantity. Quantities are only indicative and specified for the purpose of readiness as per the request from Purchaser. Supplies shall be only against Firm Purchase Orders placed as per the agreed terms and conditions of Rate Contract / Outline Agreement. Purchaser shall be entitled at its discretion to place firm order for such supplies on "As and When Required Basis" without minimum take-off guarantee.

Rate Contract / Outline Agreement will have list of Items with Unit Rate and applicable Taxes and Duties. There will be a cap on value for which order which can be placed against the Rate Contract / Outline Agreement. Actual quantity ordered for each line item may differ significantly from the tentative quantity indicated in the Tender Document. One / few / all items of Rate Contract / Outline Agreement can be ordered till the Cap Value is reached.

## 6.0 Order of Preference/Contradiction:

In case of contradiction in any part of various documents in tender, following shall prevail in order of preference:

1. Outline Agreement/Purchase Order (with Commercial conditions)
2. Special Terms and conditions (if applicable)
3. General Terms and conditions
4. Technical Specifications

In case there is a discrepancy in the BOQ mentioned in tender (to the extent modified through subsequent Corrigendum, if any) and the bid submitted by any bidder, the description as mentioned in the tender (to the extent modified through subsequent Corrigendum, if any) shall prevail.

## 7.0 Ethics

Tata Power is an ethical organization and as a policy Tata Power lays emphasis on ethical practices across its entire domain. Bidder should ensure that they should abide by all the ethical norms and in no form either directly or indirectly be involved in unethical practice.

<b>The Tata Power Company Ltd</b>	 <b>TATA</b> <b>TATA POWER</b>	<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

Tata Power work practices are governed by the Tata Code of Conduct. Bidder is request to refer Tata Code of Conduct Clause in General Terms and Conditions.

**8.0 General Condition of Contract and Special Condition of Contracts**

Any condition not mentioned above shall be applicable as per General Terms and Conditions and Special Condition of Contracts attached along with this tender.

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<b>The Tata Power Company Ltd</b>		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC24VJS063</i>		<i>Document Date: 20<sup>th</sup> Jan 2024</i>

**Annexure 1**  
**Schedule Of Items**

Sr. no.	Material / Service Short Text (as per SAP)	Quantity	UoM	Unit Rate (Basic)	Total
1	TRANSFORMER,PAD USS,1000KVA, 11/0.415KV,	2	nos.		-
2	TRANSFORMER,PAD USS,1000KVA, 22/0.415KV,	2	nos.		-
3	TRANSFORMER,PAD USS,1250KVA, 11/0.415KV	3	nos.		-
	<b>Sub Total</b>				-
	<b>GST @18%</b>				-
	<b>Total with taxes</b>				-

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# TECHNICAL SPECIFICATION

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**Natural Ester oil Filled 1000 KVA & 1250 KVA**

**Pad Mounted Unitised Substation**

**The Tata Power Company Ltd.  
Engineering Services (ENSE),  
Distribution Division,  
Senapati Bapat Marg,  
Lower Parel,  
Mumbai – 400013  
Maharashtra**

The Tata Power Company Limited



**SPECIFICATION FOR 1000 KVA & 1250 KVA Pad mounted Unitised Substation**

**ENSE-DS-2003-R00**

**Date of Issue:  
30/09/2023**

**TECHNICAL SPECIFICATION COVER SHEET**

**Document No:** ENSE-DS-2003-R00

**Document Title:** Technical specifications for 1000 KVA & 1250 KVA Natural Ester oil Pad mounted Unitised Substation

00	For tender purpose (ENSE-DS-2003-R00)	30/09/23	YM		AVP		RMB	
Rev No.	Remarks	Date	Initials	Sign	Initials	Sign	Initials	Sign
			Prepared By		Checked By		Approved and Issued By	



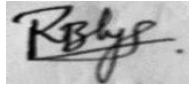
The Tata Power Company Ltd.  
Engineering Services (ENSE),  
Distribution Division,  
Senapati Bapat Marg,  
Lower Parel,  
Mumbai – 400013  
Maharashtra

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	30/09/2023	30/09/2023	30/09/2023



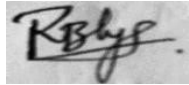
**CONTENTS**

1. Scope
2. Applicable Standards
3. Climatic Conditions of the installation
4. General Technical Requirements
5. General Constructions
6. Name Plate and Marking
7. Tests - Routine Test & Acceptance Test
8. Type Test Certificates
9. Pre-Dispatch Inspection
10. Inspection After Receipt at Stores
11. Guarantee
12. Packing and Transport
13. Tender Sample
14. Quality Control
15. Testing Facilities
16. Spares & Accessories
17. Drawing, Documents
18. Guaranteed Technical Particulars
19. Schedule of Deviations



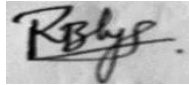
**Annexure-1**

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

<b>1.0</b>	<b>SCOPE</b>	<p>This specification covers technical requirement of design, engineering, manufacture, testing at manufacturing work, painting, packing, forwarding, supply and performance of Pad Mounted Unitised substation comprising of high voltage switchgear, transformer, low voltage switch gear mounted on a common base channel. The transformer shall be of hermetically sealed Natural Ester oil filled, the HV compartment shall comprise of RMU and the LV compartment shall include LT ACB along with outgoing MCCBs mounted on a common base channel as a unitised substation.</p> <p>The unitized substation shall be complete with all components and accessories, which are necessary or usual for their efficient performance and trouble free operation under the various operating and atmospheric conditions specified in clause no. 3</p> <p>It is not the intent to specify completely herein all the details of tech design and construction of material. However, the material shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in manner acceptable to Tata Power, 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 material 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.</p>																												
<b>2.0</b>	<b>APPLICABLE STANDARDS</b>	<p>The equipment (and the materials used) covered by this specification shall unless otherwise stated, be designed, manufactured, and tested in accordance with the latest editions of the following Indian, IEC / International standards, with latest amendment from time to time, thereof, some of which are listed below:</p> <table border="1"> <thead> <tr> <th style="text-align: center;">Indian Standards ( IS )</th> <th style="text-align: center;">Title</th> </tr> </thead> <tbody> <tr> <td>IS 5 : 2007</td> <td>Specification for Colors for ready mixed paints and enamels</td> </tr> <tr> <td>IS 104 : 1979</td> <td>Specification for ready mixed paint, brushing, zinc chrome, priming</td> </tr> <tr> <td>IS 191 : 2007</td> <td>Copper</td> </tr> <tr> <td>IS 16659:2017</td> <td>Fluids for electro technical applications – Unused Natural Ester for Transformers and similar Electrical Equipment</td> </tr> <tr> <td>IS 649: 1997</td> <td>Testing for steel sheets and strips and magnetic circuits.</td> </tr> <tr> <td>IS 1180 : 2014</td> <td>Outdoor Type Oil Immersed Distribution Transformers Upto and Including 2500 KVA, 33 kV-Specification</td> </tr> <tr> <td>IS 1576: 1992</td> <td>Solid Pressboard for Electrical Purposes -Specification</td> </tr> <tr> <td>IS 1897: 2008</td> <td>Copper strip for electrical purposes</td> </tr> <tr> <td>IS 2026 : 2011</td> <td>Specification for Power Transformers</td> </tr> <tr> <td>IS 2099:1986</td> <td>Specification for bushings for alternating voltages above 1000 volts</td> </tr> <tr> <td>IS 2362:1993</td> <td>Determination of water content in oil by Karl in oil Fischer Method – Test Method.</td> </tr> <tr> <td>IS 3024 : 2006</td> <td>Grain oriented electrical steel sheets and strips</td> </tr> <tr> <td>IS3347 (Part I):</td> <td>Dimensions for Porcelain Transformer Bushings for Use in</td> </tr> </tbody> </table>	Indian Standards ( IS )	Title	IS 5 : 2007	Specification for Colors for ready mixed paints and enamels	IS 104 : 1979	Specification for ready mixed paint, brushing, zinc chrome, priming	IS 191 : 2007	Copper	IS 16659:2017	Fluids for electro technical applications – Unused Natural Ester for Transformers and similar Electrical Equipment	IS 649: 1997	Testing for steel sheets and strips and magnetic circuits.	IS 1180 : 2014	Outdoor Type Oil Immersed Distribution Transformers Upto and Including 2500 KVA, 33 kV-Specification	IS 1576: 1992	Solid Pressboard for Electrical Purposes -Specification	IS 1897: 2008	Copper strip for electrical purposes	IS 2026 : 2011	Specification for Power Transformers	IS 2099:1986	Specification for bushings for alternating voltages above 1000 volts	IS 2362:1993	Determination of water content in oil by Karl in oil Fischer Method – Test Method.	IS 3024 : 2006	Grain oriented electrical steel sheets and strips	IS3347 (Part I):	Dimensions for Porcelain Transformer Bushings for Use in
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	30/09/2023	30/09/2023	30/09/2023

	1979	Normal and Lightly Polluted Atmospheres - Part 1 : Up to and including 1 kV	
	IS 4253: Part II: 1980	Specification for cork composition sheets- Part II : Cork and Rubber	
	IS 4257(Part I): 1981	Dimensions for Clamping Arrangements for Porcelain transformer Bushings - Part I: For 12 kV to 36 kV Bushings	
	IS 5082:1998	Wrought Aluminum and Aluminum Alloy bars, Rods , Tubes, Sections, Plates and Sheets for Electrical Applications	
	IS 5561 : 1970	Specification for Electric Power Connectors	
	IS 6792:1992	Method for Determination of Electric Strength of Insulating Oil	
	IS 7404 (Part-1): 1991	Paper Covered conductors: Round Conductors	
	IS 7421:1988	Specification for porcelain bushings for alternating voltages up to and including 1000kv	
	IS 8603 (Part-1) : 1977	Dimensions for Porcelain Transformer Bushings for Use in Heavily Polluted Atmospheres - Part I:12 kV and 17.5 kV Bushings	
	IS 9335:1979	Specification for Cellulosic Papers for Electrical Purposes	
	IS 11149:1984	Specification for rubber gaskets	
	IS 12444: 1988	Specification for continuously cast and rolled electrolytic copper wire rods for electrical conductors	
	IS 13964: 1994	Methods of measurement of transformer and reactor sound levels	
	IS9920: Part 1	High Voltage Switches, Part 1: Switches for Rated Voltages Above 1kV and Less Than 52 Kv	
		<b>IEC Standard</b>	<b>Title</b>
	IEC 60156: 1995	Method of determination of electric strength of insulating oils.	
	IEC 60529: 2001	Degrees of protection provided by enclosures (IP Code)	
	IEC 60076	Specification for power transformer.	
	IEC 60265-1	High voltage switches – Part 1: Switches for rated voltages above 1 kV and less than 52 kV	
	IEC 62271-200	HV switchgear and control gear-AC Metal Enclosed switchgear and control gear for voltages above 1kV and up to and including 52Kv.	
	IEC 62271-102	HV switchgear and control gear-Alternating current disconnectors and earthing switches	
	IEC 62770	Fluids for electro technical applications – Unused natural esters for transformers and similar electrical equipment	
	However in case of conflict between standard and this specification, the latest standards shall govern.		
<b>3.0</b>	<b>CLIMATIC CONDITIONS OF THE INSTALLATION</b>		
	1	Maximum ambient temperature	43 deg.C
	2	Max. Daily average ambient temp	35 deg.C



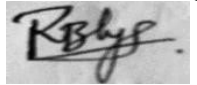
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	30/09/2023	30/09/2023	30/09/2023





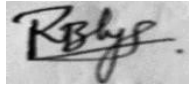
3	Min Ambient Temperature	07 deg.C
4	Maximum Relative Humidity	100%
5	Minimum Relative Humidity	40%
6	Average No. of thunderstorm per annum	50
7	Average Annual Rainfall	2380mm
8	Average No. of rainy days per annum	115
9	Rainy months	June to Oct.
10	Altitude above MSL not exceeding	300 meters
11	Average Air Pressure	29.6-inch Hg

Atmosphere is generally laden with mild acid and dust suspended during dry months and subjected to fog in cold months. The design of the equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1g.

		Description	Requirement
		4.0 GENERAL TECHNICAL REQUIREMENTS	Application
Rated voltage	12kV or 24 KV (as per tender document)		
Service Voltage	11kV or 22 KV (as per tender document)		
System Frequency	50 Hz		
Rated maximum power of substation	1000 KVA or 1250 KVA (as per tender document)		
Degree of Protection	IP 54		
Internal arc test	21kA 1 sec		
<b>HV Insulation Level</b>			
Rated Impulse withstand voltage	75kVP/125KVP		
Power Frequency Withstand voltage	28kV rms/50 KV rms		
<b>HV Network and Bus Bar</b>			
RMU	3 way, Non-extensible, Manual operation (2nos isolator with side cable entry+ 1no. Breaker) outdoor type		
Coupling between RMU CB HT bushing & transformer HT bushing	<ul style="list-style-type: none"> <li>a. HT Terminal to be coupled with RMU HT bushing through one coupling box with flexible tinned copper links (flats). To achieve this the HT bushing of transformer &amp; RMU CB outgoing bushing should be at same height &amp; with same dimension of coupling box.</li> <li>b. Vermin proofing &amp; waterproofing to be ensured in coupling box.</li> <li>c. This coupling unit should be such that if required RMU &amp; Transformer can be separated for any replaced or repair etc.</li> </ul>		
Rated current of incomer Load break Switch	630 A		
Rated Current Of Circuit –Breaker	630 A		

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	30/09/2023	30/09/2023	30/09/2023

		Rated Short Time Current Withstand	21kA for 3 sec (11KV rating) 25kA for 1 sec (22KV rating)
		Rated Short Circuit Making Current	50 kA
		<b>Transformer</b>	
		Rated voltage	11KV/415V or 22KV/415V
		Rated Capacity	1000 KVA or 1250 KVA
		Type	Hermitically sealed KNAN
		Losses	Level 1
		<b>LV Network</b>	
		Rated LT voltage	415V
		LV Incomer ACB	1no,3 pole 1600A or 2000A
		LV Outgoing MCCBs	4 nos., 630A (3+1 No. direct from Transformer secondary for fire supply)
		HT & LT terminals of transformer configuration	The HT & LT Terminals of transformer shall be on same side so that RMU & LT panel can be accessed from one side only.
		<b>5.1 Substation Construction:</b>	
		<p><b>5.1.1</b> The base of the substation shall ensure rigidity for easy transport and installation. The Structure of the substation should be provided with additional supporting beams capable of supporting the gross weight of all the equipments.</p> <p>The HV compartment shall comprise of one no. 3 way, non-extensible, 11kV RMU / 22KV RMU with 2 nos. incomer and one no. circuit breaker as outgoing. Termination bolts and boots for RMU shall be supplied by bidder as per Tata Power Approved Make. The RMU shall be of outdoor type</p> <p>The Transformer shall be Natural Esterl oil Filled as per tender rating KNAN, hermetically sealed construction. The LV compartment shall comprise of one no. 1600 A or 2000 A ACB with 4 nos. (3+1 for fire supply) 630A each MCCBs with interconnection required for complete operation of substation.</p> <p>Degree of protection for overall substation shall be IP 54 including all equipments in accordance with IEC recommendation. This would also ensure that the unit is well protected from outside nuisance owing to its being located in crowded and outdoor areas.</p> <p>HV and LV compartment shall be accessible through double doors equipment with key lock and nitrile rubber seal. The doors shall be pad locked and/or lock protected to ensure theft prone locking arrangement. Heavy duty hinges shall be provided for each door such that they are not visible from outside and hence not removable. The outgoing of the distribution transformer shall be connected directly to incomer of LV distribution through Aluminium busbars.</p> <p>Suitable arrangement for lifting unitised substation should be provided.</p>	
<b>5.0</b>	<b>GENERAL CONSTRUCTION</b>		

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

Vertical lifting members for LT panel side & HT panel side alongwith suitable support members to be provided. Separate lifting lug arrangement for Transformer to be provided.

**5.1.2 EARTHING:**

All metallic components of substation shall be earthed to a common earth conductor of size 50 x 6 mm Al busbar. 2 nos Earthing points each on RMU, LT panel & Transformer to be provided for connecting external earth. The connecting point shall be marked with protective earth symbol as per IEC.

**5.1.3 PAINT:**



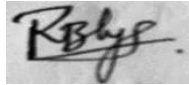
All paint shall be applied on clean, dry surfaces under suitable atmosphere condition by seven tank process and powder coating. The paint shall not be scale off or crinkle or be removed by abrasion during normal handling. The entire substation shall be painted with shade RAL 6037 Green. Natural Ester filled Distribution Transformer also to be painted with RAL 6037 Green colour to resemble environmentally friendly.

**5.2 HV COMPARTMENT:****11kV or 22KV RING MAIN UNIT**

The switch gears and busbar shall be contained in a stainless steel (SS304) tank filled with SF6 Gas and the outer body shall be made of GI sheet steel, minimum 2mm thick with 3mm thick gland plates. The tank should meet the sealed pressure system criterion in accordance with the IEC 62271-200. This is the system for which no handling /refilling of gas shall be required throughout the expected operating life, i.e. 30 years. Sealed pressure system are completely assembled, filled and tested in the factory. The maximum leakage rate of SF6 gas shall be lower 0.1% of total initial mass of SF6 gas per annum. The filling pressure for the switchgear should be just above the atmospheric pressure so as to reduce the tendency to leak. SF6 gas used for the filling of RMU shall be in accordance with IEC 376.

The RMU shall have IP54 degree of protection suitable for outdoor installation with provision for 11kV 3C X 300 sq.mm or 22KV 3C X 240 sq mm HT cabling through gland plate in the base and trench below. The RMU shall be designed so that position of different devices is visible to the operator on the front of RMU and operations are visible as well. The RMU shall be identified by an appropriate sized label which clearly indicates the functional units and their electrical characteristics. The RMU shall be designed to be tamper proof to prevent access to all live parts during operation without the use of tools.

The RMU shall be complete with all connection and copper bus bar with continuous current carrying capacity of 630A. The bus bar shall be fully

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	30/09/2023	30/09/2023	30/09/2023

encapsulated by SF6 gas inside the steel tank. There shall be continuity between the metallic parts of RMU and cables so that there is no electric field pattern in the surrounding air, thereby ensuring the safety of people. The earth bus bar should be preferably enclosed in an enclosure to prevent theft/ tampering and further connected to the common earth conductor provided for the entire substation.

All parts of main circuit to which access is required or provided shall be capable of being earthed prior to becoming accessible. This does not apply to removable parts which become accessible after being separated from the switchgear and control gear. The cables shall be earthed by an earth switch with short circuit making capacity in compliance with IEC 62271-102. The earth switch can only be operated when the main load breaker switch/circuit breaker is open. The earth switch shall be fitted with its own operating mechanism and manual closing shall be visible in the closed position through transparent covers. Mechanical interlocking system shall prevent access to the operating shaft to avoid all operator errors such as closing the earth switch when the load break switch is closed or when cable is charged.

2 Nos. spare relay tripping NO, NC contacts to be provided. Flag Indications on RMU when tripped should be on shunt trip. A flag is required for series and shunt coil actuation.



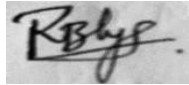
#### 5.2.1 INCOMER LOAD BREAK SWITCHES (LBS):

Load break switches shall be maintenance free. The position of the power contacts and earthing contacts shall be clearly visible on the front of RMU. The position indicator shall provide positive contact indication in accordance with IEC 60265-1. In addition, manufacturer shall prove reliability of indication in accordance with standard. The switches shall be of the increased operating frequency in accordance with IEC 60265-1. They shall be at least 3 positions, open- disconnected, closed, and earthed, and will be constructed in such a way that natural interlocking prevents unauthorized operations. Earth of the cable shall be either through a three position switch of a separate snap action type or earth switch having fault making capacity. The mechanism shall be constructed in such a way that natural interlocking prevents unauthorized operation.

The load break switches shall be motorised. The motor shall be fixed in factory. The switches shall be fully mounted and inspected in the factory. Manual opening and closing will be driven by a fast-acting mechanism, independent of operator action. Earth switch can be fitted with electrical operating mechanisms and without de-energizing the RMU. The switch and earthing switch operating mechanism shall have mechanical endurance of at least 5000 operations.

#### 5.2.2 CIRCUIT BREAKER FOR TRANSFORMER CONTROL:

The circuit breaker shall be non-motorised. The circuit breakers shall be of

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R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

maintenance free. The position of power and earthing contacts shall be clearly visible on the front of the RMU. The circuit breakers shall have at least 2 position Open-disconnected and closed and shall be constructed in such way that natural interlocks prevent all unauthorized operation. They shall be fully mounted and inspected in factory.

An operating mechanism can be used to manually close the circuit breaker and charge the mechanism in a single movement. It shall be fitted with a local system for manual tripping by an integrated push button. There will be no automatic reclosing. The circuit breaker shall be associated with self powered Electronic relay without any auxiliary power supply and shall include three current transformers which can be mounted on cables.

The protection system shall ensure circuit breaker tripping as of minimum operating current which is in rated current of the underground network to be protected. The settings shall be adjustable between 0 to 75 AMP. The circuit breaker shall be provided with phase protection of definite time/IDMT element having standard characteristics of standard inverse, very inverse, extremely inverse as per IEC 255-3 standard. The "time multiplier" with minimum set point of 0.05 TMS should be available. The earth fault protection shall be provided of definite time/IDMT element having standard characteristics of standard inverse, very inverse, extremely inverse as per IEC 255-3 standard. The "Time multiplier" with minimum set point of 0.05 TMS should be available. The breaker shall have the provision of flag relay for indication of trip on fault. The relay shall be as per Tata Power approved make.



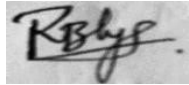
The cable compartment must be without any holes or gaps and properly vermin proofed before inspection. Termination boots as approved by Tata Power should have a proper opening to facilitate the testing. The opening should be covered by means of removable protection cap.

All panel covers shall be provided with antivandal screw bolts so that opening of panel covers is only possible with special tools, to be lockable and should be Tamper and arc proof. There should be provision of hinged doors in the RMU. The circuit breaker and earth switch shall be lockable in the open or closed position by 1 to 3 padlocks.

### 5.2.3 BUSHING AND CABLE TERMINATION:

Each cable compartment shall be provided with three bushing of adequate sizes to terminate the incoming and outgoing cables. The bushing should be conveniently located for proper bend so as to allow easy working and termination of cable. The cable termination shall be done with heat shrinkable /push ON termination method so that adequate clearances are maintained between phases and phase to body as per CBIP guidelines. Cables shall be held HDPE cleat.

The cables of 11kV, 3C X 300 sq. mm size or 22KV 3C X 240 sq mm are used for terminations in the isolators compartment. The RMU CB & Transformer HT bushings to be coupled through coupling unit with tinned

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

copper flexible flats with silicone rubber sleeve covering having window on top for fixing & removal of RMU at site if required. This coupling compartment shall have rain shade or canopy to avoid water ingress & breather provision if resin cast busing provided.

#### 5.2.4 VOLTAGE INDICATOR LAMP AND PHASE COMPARATORS:

Each function shall be equipped with a fixed type voltage indicator box on the device to indicate whether or not there is a voltage in the cables. The capacitive dividers will supply low voltage power to the lamps. Three inlets can be used to check the synchronization of phases. These devices shall be in compliance with IEC 61958 standard.

#### 5.2.5 OPERATING LEVER :

Anti – reflex mechanism on the operating lever shall prevent any attempts to reopen immediately after closing the switch or earth switch. All manual operations shall be carried out on the front of the RMU.

#### 5.2.6 FRONT PLATE :

The front plate includes a clear mimic diagram that indicates the different functions. The position indicators shall give true reflection of the position of the main contacts. They shall be clearly visible to the operator. The lever operating direction shall be indicated in the mimic diagram. The manufacture's plate shall include the RMUs main electrical characteristics. Earth mimic should be in green colour.



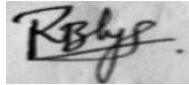
#### 5.2.7 FAULT PASSAGE INDICATORS:

Fault passage indicators shall be installed on the ring main unit. These devices shall be electronic devices with their own energy source and connected to each phase split core CTs. They shall be provided with bright LEDs /flags indicators, which shall be clearly visible in the daytime. They shall have the following resetting facilities:

- Manual reset,
- Resetting after a set time duration and
- Resetting on restoring of LV

The Unit shall have short circuit and earth fault adjustable to different setting with separate current transformer. They shall be fully field – programmable and shall have at least 16 settings for phase –phase. It shall be possible to Test these indicators at site through “Test” push button. The fault passage indicators should also be provided with SCADA output contact. They should confirm to the following standard:

IEC 68-2-6, IEC 68-2-9: Environmental testing - for vibration, Solar

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

radiations.

IEC 950: Information technology equipment – safety

IEC 1000-2: Electromagnetic compatibility for low frequency conducted disturbances and signalling in public low power supply system.

IEC 1000-4: EMC – testing & management

IEC 1000-6: EMC immunity for residential, commercial and light industrial environment.

### **5.3 DISTRIBUTION TRANSFORMER:**

#### **General Construction:**



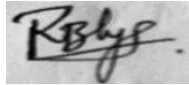
The transformer shall be double-wound, copper coil, Natural Ester Oil filled, naturally cooled (KNAN) and sealed type with plain rectangular tank. The transformer and accessories shall be designed to facilitate operation, inspection, maintenance and repairs. The design shall incorporate every precaution and provision for the safety of equipment as well as staff engaged in operation and maintenance of equipment. All outdoor apparatus, including bushing insulators with their mountings, shall be designed so as to avoid any accumulation of water.

#### **5.3.1 CORE:**

The core shall be stack type of high grade cold rolled, non-ageing, grain oriented, annealed silicon steel lamination (CRGO), having low loss & good grain properties, coated with hot oil proof insulation, bolted together to the frames firmly to prevent vibration or noise. Scrap CRGO material shall not be used for transformers. The core thickness should be 0.23mm or less and grade should be M3 or better. The core shall be stress relieved by annealing under inert atmosphere if required. All core clamping bolts (If any) shall be effectively insulated. Only one grade and one thickness of core shall be accepted and no mixing of different grades shall be allowed. The complete design of the core must ensure permanency of the core losses with continuous working of the transformers. Normal Flux Density at rated voltage and frequency shall be 1.6 T The value of the maximum flux density (1.9 T) allowed in the design & grade of laminations used shall be clearly stated in the offer. The successful bidder is required to submit the following documents with regard to the procurement of core material

- Invoice of supplier
- Test certificate
- Packing list
- Bill of landing
- Bill of entry certificate by custom
- Description of material, electrical analysis, physical inspection certificate for surface defects, thickness and width of the material.

The bidder shall offer the core for inspection and obtain approval of the Purchaser during manufacturing stage. Tata Power shall impose heavy

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

penalty or blacklist the bidders using seconds/defective CRGO sheets. The transformer shall be suitable for continuous service without damage under conditions of over fluxing (due to combined effect of voltage and frequency) where the ratio of voltage over frequency exceeds the corresponding ratio at rated voltage and rated frequency up to 12.5% and the core shall not get saturated.

The bidder shall furnish necessary design data in support of this situation. No load current shall not exceed 2% of full load current and shall be measured by energising the transformer at rated voltage & frequency on the secondary. For increase in rated voltage by 12.5%, the no load current shall not increase beyond 5 % of the full load current. Antitrust paint on the edges of lamination is required.



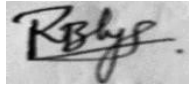
### 5.3.2 LOSSES:

The fixed (iron) and running (copper) losses shall be as low as is consistent with reliability and economical use of materials. The bidder shall guarantee individually the no-load and load loss without any positive tolerance. The bidder shall also guarantee the total losses at 50% and 100% load condition (at rated voltage and frequency and at 75 deg C) **level 1 of IS 1180** with latest amendment. & no positive tolerance shall be allowed on the maximum total losses declared by the Bidder for both 50% and 100% loading values. Losses offered by the bidder to be as per permissible limits mentioned in BIS specifications. No positive tolerance shall be allowed on the guaranteed losses and the bids with higher losses than those specified by the Purchaser would be treated as non-responsive.

Any changes in the figures assigned for the transformer losses shall not be permitted after opening the bids and bid evaluation shall be carried out on the basis of information made available at the time of bid opening. The successful bidder shall guarantee the quoted losses for at-least five years. Penalty shall be imposed as per above if losses increase during this period. Bidder shall be liable to pay a fine of Rs 250 per watt to the amount by which losses at 50% loading and 100% loading increase the values given in specifications.

### 5.3.3 PENALTY FOR NON PERFORMANCE:

- During testing at bidder'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 shall have the right to reject the complete lot.
- The Purchaser shall reject the entire lot during test at bidder's works, if the temperature rise exceeds the specified values.
- The Purchaser shall reject any transformer during the test at bidder's works, if the impedance values differ from the guaranteed values including tolerance.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023



**5.3.4 WINDINGS:**

Primary and secondary windings shall be constructed from high-conductivity, Double Paper Covered (DPC) copper conductor. The winding shall be designed for better voltage regulation and mechanical strength. LV winding shall be such that neutral formation will be at top. The coil shall be circular in shape and their construction shall be such that there is no possibility of any distortion under likely conditions of service.

Inter layer insulation both for HV and LV windings shall be Epoxy dotted Kraft/Kraft paper and pressboard of standard make or any other superior material subject to approval of Purchaser shall be used. All spacers, axial wedges/runners used in windings shall be made of pre-compressed solid press board. 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.



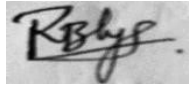
Operations shall be carried out in such a way, that there should not be any burr and dimensional variations. Proper bonding of inter layer insulation with the conductor shall be ensured. Test for bonding strength shall be conducted as per standards. The dimensional tolerances for windings shall be within limits and as specified in the GTP. All turns of windings shall be adequately supported to prevent movement. The core/coil assembly shall be securely held in position to avoid any movement under short circuit conditions. The joints in the winding shall be avoided but if it is necessary then, these shall be properly brazed and the resistance of the joints shall be less than that of parent conductor.

The current density for HV and LV winding should not be more than 2.5 Ampere per sq.mm. The insulation between core and bolts and core and clamps shall withstand 2.5kV for one minute. The bidder shall submit characteristics of insulation paper with the offer.

**5.3.5 TRANSFORMER TANK:**

The transformer tank shall be of corrugated type of robust construction, rectangular in shape and shall be built up of electrically tested welded mild steel plates of thickness 6 mm (minimum) for bottom and top and not less than 5 mm (minimum) for the sides. Tolerances as per IS 1852 shall be applicable.

The tank shall be fabricated by welding at corners. No horizontal or vertical joints in tank side walls and its bottom or top cover shall be allowed. In addition, the cover of the main tank shall be provided with an air release plug. The tank plates shall be of such strength that the complete transformer when filled with natural ester oil may be lifted bodily by means of the lifting lugs provided. The top cover shall have no cut at point of lifting

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

lug.



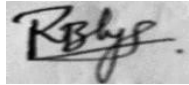
Under operating conditions, the pressure generated inside the tank should not exceed 0.4 Kg/sq.cm positive or negative. The tank shall be reinforced by welded flats on all the outside walls on the edge of the tank. The permanent deflection when the tank without oil is subjected to a vacuum of 525mm of mercury for rectangular tank shall not be more than 5mm up to 750mm horizontal length of flat plate and 6.5mm up to 1250mm horizontal length of flat plate. Pressure test shall be performed carefully at the time of 1st stage inspection only to confirm the adequacy of reinforcement angle & gauge of the tank. The tank shall be further capable of withstanding a pressure of 0.8 Kg/sq.cm (g) and a vacuum of 0.7 Kg/sq.cm (g) without any deformation.

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 shall occur during service. Inside of tank shall be painted with hot oil resistant paint. The top cover of the tank shall be slightly sloping to drain rainwater approximately 5° to 10° towards HV bushing. The tank plate and the lifting lugs shall be of such strength that the complete transformer filled with Natural Ester oil may be lifted by means of lifting shackle. Bidder shall carry out all welding operations as per relevant ASME standards and submit a copy of the welding procedure and welder performance qualification certificates to the Purchaser.

All matching faces of joints to be made oil tight with a smooth surface finish ensuring that the gasket material shall make a satisfactory joint. Bolts shall be spaced at sufficiently close intervals to avoid buckling of either flange or covers and provide reasonably uniform compression of the gasket. The transformer shall be provided with a minimum of two welded heavy duty closed lifting lugs of MS plate of 8mm thickness suitably reinforced by vertical supporting flat welded edgewise below the lug on the side walls up to reinforcing angle. They shall be so extended that cutting bend plate is not required. The lifting lugs shall be capable of withstanding the total weight of the transformer, fully filled with oil. The transformer shall be provided with four pulling lugs of MS plate of 8mm thick to pull the transformer horizontally.

### 5.3.6 TRANSFORMER TOP COVER GASKET AND BOLT:

Gaskets provided with the transformers shall be suitable for making oil tight joints, and there shall be no deleterious effects on either gaskets or oil when the gaskets are continuously in contact with Natural Ester oil. The gasket provided in between top cover plate and tank shall be neoprene rubberized oil resistant cork sheets conforming to type C as per IS: 4253, Part III to maintain the seal at extremes of operating temperature. Exterior gaskets shall be weatherproof and shall not be affected by strong sunlight.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

**5.3.7 SURFACE PREPARATION AND PAINTING:**



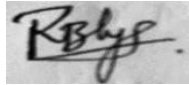
All paints, when applied in a normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects. All primers shall be well marked into the surface, particularly in areas where painting is evident and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray. However, wherever airless spray is not possible, conventional spray be used with prior approval of purchaser.

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. Steel surfaces shall be prepared by shot blast cleaning (IS: 9954) to grade Sq.2.5 of ISO 8501-1 or chemical cleaning including phosphating of the appropriate quality (IS: 3618). 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 explain such areas in the technical offer.

After cleaning and subsequently drying for four hours, they shall be given suitable anti-corrosion protection. Heat resistant (Hot oil proof) paint shall be used for the inside surface if possible whereas for external surface one coat of thermosetting powder paint or one coat of epoxy primer (zinc chromate) followed by two coats of synthetic enamel/polyurethane base paint. The two coats shall be of oil and weather-resistant nature with final coat as glossy and non-fading shade RAL 6037 as per IS 5. (These paints can be either air drying or stoving).

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

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. Any damaged part shall be cleaned to bare metal with an area extending 25 mm around its boundary. A priming coat shall be immediately applied followed by full paint finish equal to that originally applied and extending 50 mm around the perimeter of the original damage. The repainted surface shall present a smooth surface which shall be obtained by carefully chamfering the paint edges before and after priming. The coats shall be applied as a continuous film of uniform thickness and free of pores. Overspray, skips, runs, sags and drips shall be avoided. Each coat of paint shall be allowed to harden before the next is applied. The thickness of the film shall not be lesser at the edges.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

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

Sr. No.	Paint Type	Area to be Painted	No. Of Coats	Total Dry film thickness (min.) (Microns)
1	Thermosetting powder paint	Inside Outside	01 01	30 60
2	Liquid Paint			
	a) Epoxy (Primer)	Outside	01	30
	b) P.U Paint (Finish coat)	Outside Inside	02 01	25 Each 35
	c) Hot oil paint Resistant			

The painted surface shall be tested for paint thickness. 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 relevant ASTM standards. The supplier shall provide the painting performance requirement for a period of not less than 5 years.

#### 5.3.8 BUSHINGS:



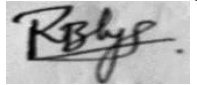
The Transformer HT bushings to be coupled with RMU through coupling unit with tinned copper flexible flats with silicone rubber sleeve covering having window on top for fixing & removal of RMU at site if required. This coupling compartment shall have rain shade or canopy to avoid water ingress & breather provision if resin cast busing provided. The coupling compartment shall be without oil. There shall be support channel arrangement for coupling box.

To achieve this the HT bushing of transformer & RMU CB outgoing bushing should be at same height & with same dimension of coupling box. Vermin proofing & waterproofing to be ensured in coupling box. This coupling unit should such that if required RMU & transformer can be separated for any replaced or repair etc.

For LV, 1.1kV bushings shall be of epoxy material. The bushing rods shall be made of tinned Copper material. The LV bushings shall be on the sideways along with cable box.

#### 5.3.9 EARTHING CONNECTION:

The provision for earthing connection shall be provided for 50x6 mm GI strip. The thickness of GI coating of neutral earthing strip shall be 80

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

microns (minimum). The bolts shall be located on the lower side of the transformer and be of M12 size for Body earthing. Separate LV neutral bushing to be provided for neutral earthing. Transformer top cover shall be connected at two diagonal places with the tank by tinned copper strip. 2 Nos. dedicated neutral earthing & 2 Nos. body earthing should be provided & to be extended outside the enclosure to enable connection with external earthing. 2 Nos. of bolts provision to be made on external earthing joints.

**5.3.10 TAPS:**

Tapping shall be provided on the HV winding for variation of HV within Range of +10% to -10% in steps of 2.5 %. Tap changing shall be carried out by means of an externally operated self position switch and when the transformer is in de-energized condition. Switch position no. 1 shall correspond to the maximum plus tapping. Each tap change shall result in variation of 2.5% in the voltage. Provision shall be made for locking the tapping switch handle in position. Suitable plate shall be fixed for tap changing switch to know the position number of tap. Tap Knob should be of better quality to ensure durability. Suitable Tap position numbers to be embossed.

**5.3.11 Natural Ester OIL:**

All transformers shall be filled to the required level with new, unused, clean, Natural Ester in compliance with IEC 62770. The use of recycled natural ester is not acceptable. The specific resistance of the natural ester shall not be less than  $2.5 \times 10^{12}$  ohm-cm at 27°C when tested as per IS 6103. Ester shall be filtered and tested for break down Voltage (BDV) and moisture content before filling. Ester shall be filled under vacuum. 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 ester. The Dielectric strength and water content shall meet with given below requirement.

Break Down Voltage (kV min.)	Water content mg/kg, (max.)
60	200



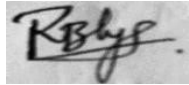
**5.3.12 OVERLOAD CAPACITY:**

The transformer shall be suitable for loading as per IS 6600

**5.3.13 RADIO INTERFERENCE:**

When operated at voltages up to 12.5% in excess of the normal system rating, transformers shall be substantially free from partial discharges (i.e. corona discharges in either internal or external insulation) which are likely to cause interference with radio or telephone communication

**5.3.14 PRESSURE RELIEF VALVE:**

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

Pressure Relief valve shall be provided on top cover with contacts for suitable local as well as remote annunciation.

**5.3.15 DRAIN VALVE:**

The drain valve shall be of mild steel (M.S.) with gate type of valve. The drain valve and filter valve shall be provided with embossed name plate stating drain valve and filter valve. The valves shall be covered with a MS box by welding on tank. Locking rod shall be provided to stop movement of hand wheel.

**5.3.16 FILTER VALVE:**

The filter valve shall be provided at the top of the tank. The filter valve shall be of same type as that of drain valve.

**5.3.17 OIL TEMPERATURE INDICATOR:**

Suitable Dial Type temperature indicator shall be provided on HV compartment with contacts from transformer for local and remote annunciation. The OTI shall preferably work on the principle of thermal expansion of gas instead of mercury.



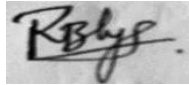
**5.3.18 TERMINAL CONNECTOR:**

Suitable palm terminal connectors shall be provided, suitable for specified cable sizes. Terminal connectors shall be tested as per IS 5561. The outgoing of the distribution transformer shall be directly connected to the incomer of the LV distribution through busbar. The LT bus bar shall be electrolytic grade Aluminium duly sleeved with heat shrinkable colour sleeves and maximum current density of 1.0A/Sq mm.

**5.3.19 FASTENERS:**

All bolts, studs, screw threads, pipe threads, bolt heads and nut bolts shall comply within the appropriate Indian standards for metric threads. Bolts or studs shall not be less than 6mm in diameter except when used for small wiring terminals. All nuts and pins shall be adequately locked. 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. 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 have electrolytic action between dissimilar metals. Each bolt shall project at least one thread but more than three threads through the nut. If bolts and nuts are placed so that they are inaccessible by means of ordinary spanners, special spanners shall be provided.

The length of the screwed portion of the bolts shall be such that no screw

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

thread may form part of a shear plane between members. Taper washers shall be provided where necessary. Protective washers of suitable material shall be provided on front and back of the securing screws.

#### 5.4 LV COMPARTMENT:

The complete arrangement of ACB & MCCBs shall be provided on framework of channel with adequate strength to support the weight of ACB & MCCBs. The framework shall be covered from the front with GI sheet of thickness not less than 2mm. such that no live part is accessible at any time during the operation or testing period. All mechanism shall be made of such material as to prevent corrosion due to sticking of dust. Cast iron shall be used for any part of equipment which may be subjected to mechanical stresses. All connections and contacts shall be of ample section and surfaces for carrying continuously the specified current without undue heating and shall be secured rigidly & locked in position. Separate Gland plate should be provided for each Incoming & Outgoing section. Each section should be separated from top to bottom as a compartment. Each compartment shall have separate doors with insulated handles.



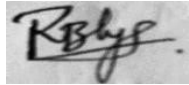
As per protection philosophy adopted by TATA Power, REF Protection shall be incorporated with provision of CDG-11 relay on neutral CT secondary. The relay type shall be Normal inverse with 3 sec. Neutral CT ratio 1600/5 A (1000 KVA rating) or 2000/5 A (1250 KVA rating) 5P20 15 VA.

All apparatus shall be so designed and constructed as to obviate the risks or short circuit of the live parts by lizards/rodents. Corresponding parts of similar apparatus shall be mutually interchangeable. All apparatus to minimize risks of fire and any damage which might cause in the event of fire.



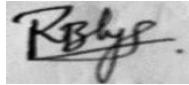
#### 5.3.1 ACB & MCCBs WITH BUSBAR:

The bus bar shall be of electrolytic grade aluminium, duly sleeved with shrinkable colored sleeves and maximum current density of 1.0A/sq mm. The bus bar from transformer secondary shall enter the LV compartment and suitably terminated at incoming of the 3-pole fixed type 1600 A or 2000 A LT ACB with CT operated thermal overload & magnetic short ckt. Release. Metering CTs of ratio 1600/5 A or 2000/5 A, 15 VA, 0.5 CI shall be provided on each phase for connected to energy meter. The CT & Voltage wiring shall be wired upto TTB & loose wires from TTB onwards for wiring Energy meter. Energy meter is not in scope of bidder. The ACB shall be mounted at a height to accommodate mounting of 4 nos. MCCBs (630A each) directly below the ACB with sufficient space for cable termination. Phase barriers shall be provided suitably at the terminals. LOTO lock/Padlock provision should be provided.

The outgoing from the ACB should be connected to bus bar which in turn

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

		<p>is connected to the incoming bus bar of MCCBs. All LV bus bar shall be supported on the LV compartment frame with suitable bus support insulators of 1.1 kV class. The minimum clearance between phase to phase shall be 25 mm and between phase to earth 20 mm or as per CBIP norms. The neutral bus bar shall be same size as phase bus bar. The neutral bus bar shall be insulated from the frame using 1.1kV class support insulators. The transformer neutral shall be terminated on the neutral bus bar in the LV compartment. The entire mechanism of breakers along with framework shall be suitably earthed 50 x 6 sq mm Aluminium earth conductor at two distinct points and further connected to the common earth conductor provided for the entire sub-station. Out of 4 outgoing MCCBs, one outgoing MCCBs shall take supply from transformer secondary and shall be used for fire supply. The busbar shall be insulated &amp; MCCB should be with phase barriers. There should be sufficient space below the MCCB (around 500mm) to terminate the LT cables. Each MCCB should have ON &amp; OFF indication lamp. LOTO lock arrangement to be done for LT ACB ON &amp; OFF push button switch &amp; Spring charging Handle.</p> <p>Note: The LT ACB should have self- powered release for O/C &amp; E/F protection. LT ACB should have additional 230V AC Shunt Tripping coil for tripping of LT ACB. Additional compensating CT be installed on Neutral bus Bar to avoid tripping of LT ACB during unbalanced load.</p>
6.0	NAME PLATE AND MARKING	<p>All the components and operating devices of the RMU shall be provided durable and legible nameplates containing all technical parameters. Name plates shall be suitably embossed with "PO no. with date" "PROPERTY OF TATA POWER" &amp; "CODE NUMBER" along with the following information. A Danger plate of appropriate size shall also be provided on the enclosure.</p> <p><b>RMU: (Approved makes)</b></p> <ol style="list-style-type: none"> <li>1. Manufacture's Name</li> <li>2. Type Designation or serial no.</li> <li>3. Year of manufacture</li> <li>4. Application Rated values</li> <li>5. Mass of unit</li> <li>6. SF6 gas filling pressure</li> </ol> <p><b>TRANSFORMER: (Approved makes)</b></p> <p>A stainless steel rating plate, of at least 1 mm thickness, shall be fitted to each transformer in a visible position and shall carry all the information as specified in the standards. The letters on the rating plate shall be engraved black on the white/silver back ground. Fixing screws for outdoor use shall be of stainless steel or any other corrosion resistant metals. Danger notice shall have red lettering on a white background or they may be pictorial as approved by the Purchaser. The name plate shall contain following information:</p>

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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	30/09/2023	30/09/2023	30/09/2023





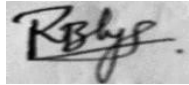
1. Type of transformer
2. Relevant standard.
3. Manufacturer's Name
4. Manufacturer's Serial No.
5. Year of Manufacture
6. No. of phases
7. Rated kVA
8. Rated frequency
9. Rated Voltage
10. Rated current
11. Connection symbol
12. Percentage impedance voltage at rated current
13. Type of cooling (KNAN)
14. Total mass
15. Mass and volume of oil
16. BIL of oil

In addition to the above information the rating plate shall also contain the following:

1. Guaranteed values of no load losses and full load losses at 50% & 100 % load
2. Temperature rise
3. Table giving the tapping voltage, tapping current and tapping power of each tap.
4. Indication of winding which is fitted with tapping's.
5. Value of short circuit impedance on extreme tapping and on principal tapping and Indication of winding to which impedance is related.
6. Actual losses of transformer
7. % Impedance
8. Overall dimensions

#### LV ACB AND MCCBDs: (Approved makes)

1. Manufacturer name
2. Type Designation or serial no.
3. No of the relevant standard
4. Utilization category
5. Rated voltage
6. Rated Current
7. Rated Frequency
8. Rated service Short breaking capacity (Ics)
9. Rated Ultimate short circuit breaking capacity (Icu)
10. Line and load terminals
11. Neutral pole terminal
12. Protective earth terminal
13. Indication of open and closed position
14. Terminal marking

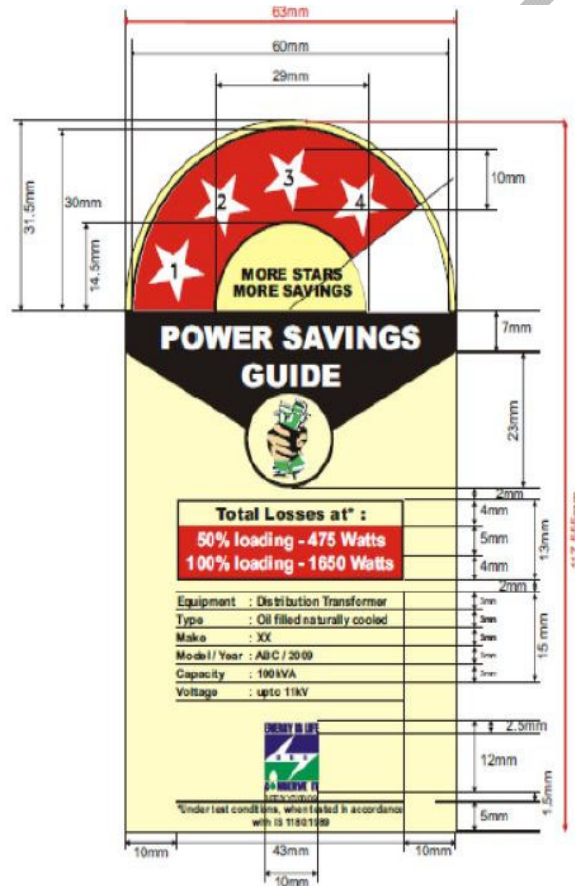
Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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	30/09/2023	30/09/2023	30/09/2023

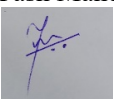

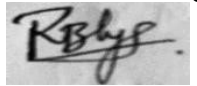
15. Fire Outlet front cover shall be in Red colour.

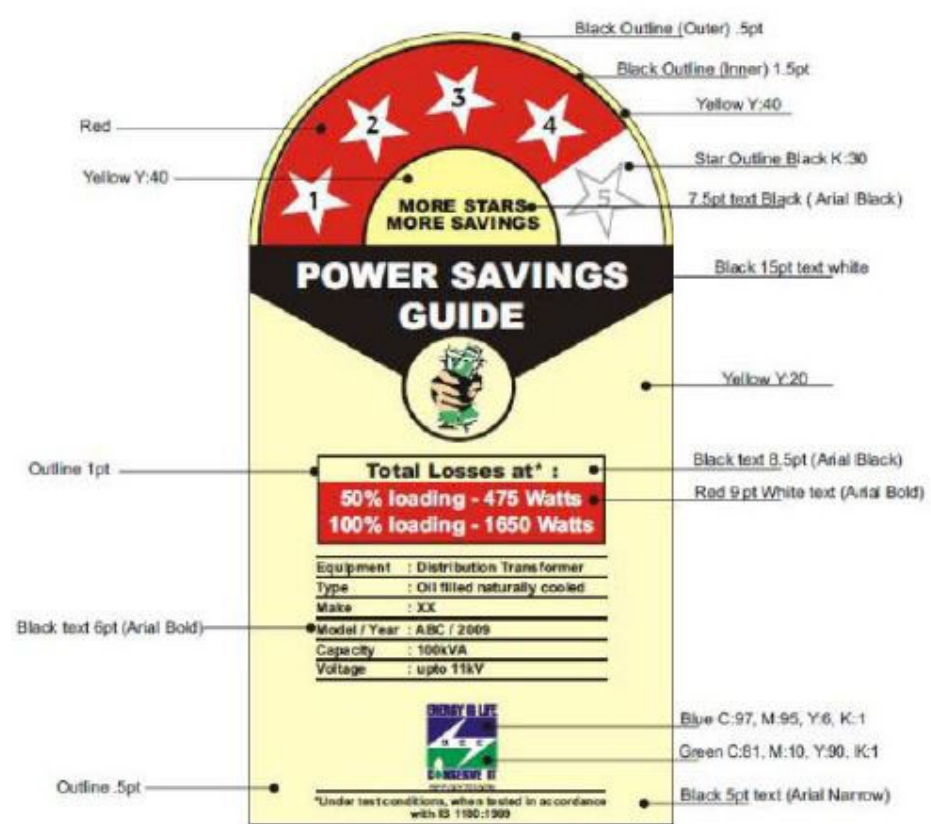
**BEE Certification Label:** Level 1 Rating as per IS 1180 part (1) shall be specified. BEE Label for Power Savings shall be marked on the transformer. The format for the BEE label

shall be as follows:

- 1) Detailed label Specification (Size, Color scheme, Font size, security Features, if any) shall be specified as below.
- 2) The label shall be applied near the nameplate details of the transformer and shall be clearly visible on the equipment.



Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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	30/09/2023	30/09/2023	30/09/2023



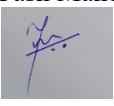


**POWER SAVINGS GUIDE**



**Total Losses at\* :**



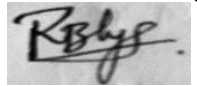
50% loading - 475 Watts
100% loading - 1650 Watts

Equipment : Distribution Transformer  
 Type : Oil filled naturally cooled  
 Make : XX  
 Model / Year : ABC / 2009  
 Capacity : 100kVA  
 Voltage : upto 11kV



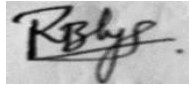
**Tata power Branding Name plate -**  
 Separate metallic name plate with Tata Power Logo of Dimension 12\*12 Inches in clear font as shown below.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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	30/09/2023	30/09/2023	30/09/2023



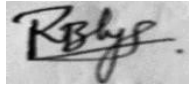
		<p><b>Relationship between the two marks- size</b></p> <p>The Tata and Tata Power Marks are always used in conjunction with each other, never appearing in isolation on Tata Power communication.</p> <p>The height of the letter T of Tata (T-height) is the basic measure for all sizes and proportions.</p> <p>The rounded measure 2T in height, is separated from the Tata lettering by a distance of 1/2T.</p> <p>The T height of both, the Tata and the Tata Power Marks is to be the same, except in exceptional cases on approval from the Corporate Communications team.</p>	
		<p><b>Relationship between the two marks- positioning</b></p> <p>The two marks can appear stacked, which is the preferred placement, or linear, by the side of one another.</p>	<p>Centre aligned - Stacked (Preferred)</p> 
7.0	TESTS	<p>Routine &amp; acceptance Tests shall be conducted on the Ring Main Units in accordance with the latest versions of IS/IEC. All the tests shall be witnessed by the purchaser/his authorized representative. All the components within the RMU enclosure shall have been tested for routine/acceptance and type tests as per the relevant standards. All type tests are as per latest IS/IEC shall have been carried out on the RMU as per relevant IS/IEC.</p> <p>For Transformer All routine, acceptance &amp; type tests shall be carried out in accordance with the IS 2026 and IS 1180.</p>	
7.1	TYPE TEST	<p>Following Type test to be conducted on equipment as below:</p> <p>A) Ring Main Unit:</p> <ol style="list-style-type: none"> <li>Lightning Impulse test</li> <li>Power Frequency Voltage Test</li> <li>Temperature Rise Test</li> <li>Measurement of Circuit Resistance</li> <li>Rated Short Time and Peak Current Withstand test for main and Earth Circuit.</li> <li>Breaking and Making Capacity Test for Breaker &amp; Isolating Switches.</li> <li>Operational &amp; Interlock Performance Test</li> <li>Internal Arc Withstand Test.</li> <li>Degree of Protection (IP Code verification tests)</li> <li>Mechanical Endurance Tests for Isolator and Breaker.</li> </ol>	

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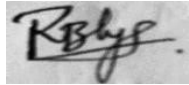
		<p>B) Distribution Transformer:</p> <ol style="list-style-type: none"> <li>Temperature Rise Test</li> <li>Short Circuit Test</li> <li>Lightning Impulse Test</li> <li>Pressure Test</li> <li>Determination of sound levels [IS 2026 (part 10)].</li> <li>No load current at 112.5% voltage</li> <li>BDV and moisture content of oil in transformer (IS 335).</li> <li>Magnetic balance test.</li> <li>Measurement of Zero-phase sequence impedance.</li> <li>Measurement of Harmonics of no-load current.</li> </ol> <p><b>Note:</b> - Out of the above-mentioned type test, the tests under sl. No. a, b, c, d shall be conducted at CPRI or ERDA labs. Balance shall be acceptable as in- house tests.</p> <p>C) For ACB &amp; MCCB: As per relevant IS type test documents to be submitted.</p>
7.2	ROUTINE TEST	<p>Routine Test for Transformers:</p> <ol style="list-style-type: none"> <li>Measurement of Winding Resistance at each tap [As per IS 2026 (Part 1)].</li> <li>Measurement of voltage ratio &amp; check of phase displacement [As per IS 2026 (Part 1)].</li> <li>Measurement of short circuit impedance (principal tapping, when applicable) and load loss at 50% and 100% load [As per IS 2026 (Part 1)].</li> <li>Measurement of no load losses and magnetizing current at rated frequency and 90%, 100% and 112.5% of rated voltage. [As per IS 2026 (Part 1)].</li> <li>Measurement of insulation resistance [As per IS 2026 (Part 1)].</li> <li>Induced over voltage withstand test [As per IS 2026 (Part 3)].</li> <li>Separate Source voltage withstand test [As per IS 2026 (Part 3)].</li> <li>Pressure test [As per IS 1180: Part 3].</li> <li>Oil leakage test [As per IS 1180: Part 3].</li> <li>Oil sample Test (as per IS 335).</li> </ol> <p>Routine Test for RMU:</p> <ol style="list-style-type: none"> <li>Power Frequency Withstand Test.</li> <li>Dimensional &amp; Visual Checks</li> <li>Operational &amp; Interlock Tests of breaker &amp; isolator switches</li> <li>Measurement of Circuit Resistance</li> <li>SF-6 chamber pressure withstands/leakage test.</li> <li>HV withstand test across isolator distance.</li> <li>HV withstand test of control and auxiliary circuits.</li> <li>Voltage Indication Tests.</li> </ol>

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		<p>9. Breaker Contact Resistance Test</p> <p>10. Total Trip Time Check Test through Current Injection in primary.</p> <p>11. IR Value.</p>
7.3	<b>ACCEPTANCE TEST</b>	<p>For Transformer:</p> <ol style="list-style-type: none"> <li>Temperature Rise Test (on one unit of every lot offered for inspection for each rating).</li> <li>Oil leakage test for acceptance shall be conducted at pressure of 0.35kg/sq.cm for one hour.</li> <li>The painted surface shall pass the Cross Adhesion Test, Impact Test and Hardness Test.</li> <li>Checking of weight, dimensions, fitting and accessories, tank sheet thickness, oil quantity, material finish and workmanship, physical verification of core coil assembly and measurement of flux density on one unit with reference to the GTP and drawings.</li> <li>At least 10% transformer of the offered lot (minimum of one) shall be subjected to all the tests mentioned under the section 'ROUTINE in presence of Tata Power representative at the place of manufacture before dispatch without any extra charges. The testing shall be carried out in accordance with IS: 1180 and IS: 2026.</li> </ol> <p>For RMU:</p> <p>All the tests specified under Routine Test Clause above shall be carried out as acceptance test on random samples as per sampling plan under IEC/IS for each lot or OEM test reports shall be verified at discretion of Tata Power. Bidder should have all the requisite testing equipment's to carry out routine and acceptance test mentioned above including:</p> <ol style="list-style-type: none"> <li>Facility for primary current injection up to 1000amp.</li> <li>Facility to check total trip timing of breaker along with breaker main contacts through primary current injection</li> </ol> <p>For ACB &amp; MCCB:</p> <p>As per IS, OEM test reports verification.</p> <p>Following tests shall be necessarily conducted on the equipment and its components in addition to others specified in the IS/IEC. QAP needs to be submitted prior to inspection and get approved by Purchaser before inspection.</p> <p>Visual Inspection of material &amp; bought-out material verification as per GTP :</p> <ul style="list-style-type: none"> <li>Verification of BOM &amp; Layout</li> <li>Fixing of Gasket</li> <li>Paint shade Verification</li> </ul>

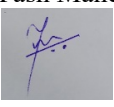

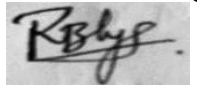
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		<ul style="list-style-type: none"> <li>• Verification of loose material as per order.</li> <li>• Verification of electrical wiring &amp; Relay logic.</li> <li>• Dimensions and clearances.</li> <li>• Door Alignment &amp; operations.</li> <li>• Earthing Verification.</li> </ul>
8.0	<b>TYPE TEST CERTIFICATE</b>	<p>For Transformer:</p> <p>The Bidder shall furnish the type test certificates of the Transformer &amp; MCCB for the tests as mentioned above &amp; as per the corresponding IS standards. All the tests shall be conducted at CPRI / ERDA as per the relevant standards. Type tests should have been conducted in certified Test laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to Tata Power.</p> <p>For RMU:</p> <p>The Bidder shall furnish the type test certificates of the 11KV RMU of same design as offered in bid for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA or reputed International Laboratory like PHELA, KEMA IPH, etc. as per the relevant standards of IS and IEC. Type tests shall have been conducted in certified Test laboratories during the period not exceeding 10 years from the date of opening the bid. In case if type test conducted beyond 10 years then bidder to certify on letter head of parent OEM that no design change &amp; no manufacturing plant change occurred from type tested product.</p> <p>For ACB: As per relevant IS type test documents to be submitted.</p> <p>In the event of any discrepancy in the test reports, i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TATA POWER.</p> <p>Bids without all type test report shall stand disqualified.</p>
9.0	<b>PRE-DISPATCH INSPECTION</b>	<p>Equipment shall be subject to inspection by a duly authorized representative of the Tata power. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material is liable to rejection. Supplier shall grant free access to the paces of manufacture to Tata Power representatives at all times when the work is in progress. Inspection by the Tata Power or its authorized representatives shall not relieve the supplier of this obligation of furnishing equipments in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by Tata Power. Following documents shall be sent along with material:</p> <ol style="list-style-type: none"> <li>1. Test reports</li> <li>2. MDCC issued by Tata Power</li> <li>3. Invoice in duplicate</li> </ol>

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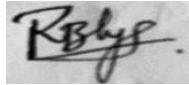
The Tata Power Company Limited		<b>SPECIFICATION FOR 1000 KVA &amp; 1250 KVA Pad mounted Unitised Substation</b>
ENSE-DS-2003-R00		<b>Date of Issue:</b> 30/09/2023

		4. Packing list 5. Drawings & catalogue 6. Guarantee / Warrantee card 7. Delivery Challan 8. Other Documents (as applicable)
10.0	<b>INSPECTION AFTER RECEIPT AT STORE</b>	Material received at Tata Power store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to consumer engineering department.
11.0	<b>GUARANTEE</b>	Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect found by the purchaser up to a period of at least 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract whichever is later, bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the purchaser, failing which the purchaser will be at liberty to get it replace / rectify at bidder's risk and costs and recover all such expenses plus the purchaser's own charges from the bidder or from the security cum performance deposit as the case may be. Bidder shall further be responsible for free replacement for another period of Three years from the end of the guarantee period for any Latent Defects if noticed and reported by the purchaser.
12.0	<b>PACKING AND TRANSPORT</b>	1) Bidder shall ensure that all equipment covered by this specification shall be prepared for rail/road transport and be packed in such a manner as to protect it from damage in transit. 2) Bidders should prefer to use recyclable & environmentally friendly materials for packing. 3) No single use plastic to be used in packaging. The packaging material shall be environmentally friendly & recyclable.
13.0	<b>TENDER SAMPLE</b>	All drawing & details of offered USS to be provided in tender hence tender sample not applicable.
14.0	<b>QUALITY CONTROL</b>	The bidder shall submit with the offer, assurance plan indicating the various stages of inspection, the tests and checks which will be carried out in the material of construction, components during manufacture and after finishing, bought out items and fully assembled component and equipment including drives. As a part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The purchaser's or its nominated representative engineer shall have free access to the manufacture / sub supplier's works to carry out inspections.
15.0	<b>MINIMUM TESTING FACILITIES</b>	Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant IS/IEC.
16.0	<b>SPARES, ACCESSORIES &amp; SPECIAL TOOLS/GAUGES</b>	Bidder shall provide a list of recommended spares with quantity and unit price for 5 year of operation after commissioning. The purchaser may order all of any of the spare parts listed at the time of contract award and the spare parts so ordered shall be supplied as part of the definite works. The purchaser may order additional spares at any time during the contract period at the rate stated in the contract document. A list of complete set special tools and gauges required for erection & maintenance and

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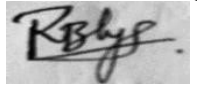
		<p>installation procedure shall be submitted.</p> <p>Bidder shall give an assurance that spare parts and consumable items will continue to be available through the life of the equipment which shall be 25 year minimum. However the purchaser shall give a minimum of 12 month notice in the event that the bidder or any sub vendor plans to discontinue manufacture of any component use in this equipment.</p> <p>Any spare apparatuses, parts or tools shall be subjected to the same specification, tests, and conditions as similar material supplied under the contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identifications.</p>																																																																						
17.0	<b>DRAWING AND DOCUMENTS</b>	<p>Following drawings and documents shall based on Tata Power specification and statutory requirements and shall be submitted with the bid:</p> <ol style="list-style-type: none"> <li>1. Complete filled in Gaurenteed Technical Particulars</li> <li>2. General description of the equipment and all components including brochures</li> <li>3. General arrangement for Unitised substation</li> <li>4. Single line diagram</li> <li>5. Foundation plan</li> <li>6. Bill of material</li> <li>7. Experience List</li> <li>8. Type test certificates</li> </ol> <p>Drawings/ Documents to be submitted after the award of contract are as under. All the documents &amp; drawings shall be in English language.</p> <table border="1"> <thead> <tr> <th>Sr. No</th> <th>Descriptions</th> <th>For Approval</th> <th>For Review/ Information</th> <th>Final submission</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Technical particulars</td> <td>√</td> <td></td> <td>√</td> </tr> <tr> <td>2</td> <td>General Arrangement drawings</td> <td>√</td> <td></td> <td>√</td> </tr> <tr> <td>3</td> <td>Single Diagram</td> <td>√</td> <td></td> <td>√</td> </tr> <tr> <td>4</td> <td>HV and LV compartment layout</td> <td>√</td> <td></td> <td>√</td> </tr> <tr> <td>5</td> <td>Schematic Diagram</td> <td>√</td> <td></td> <td>√</td> </tr> <tr> <td>6</td> <td>Earthing Plan</td> <td>√</td> <td></td> <td>√</td> </tr> <tr> <td>7</td> <td>Bill of Materials</td> <td>√</td> <td></td> <td>√</td> </tr> <tr> <td>8</td> <td>Foundation Plan &amp; loading Details</td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>9</td> <td>Installation instructions</td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>10</td> <td>Instruction for Use &amp; maintenance</td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>11</td> <td>Transport/Shipping Dimension Drawing</td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>12</td> <td>QA &amp; QC Plan</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>13</td> <td>Test Certificates</td> <td>√</td> <td>√</td> <td>√</td> </tr> </tbody> </table>	Sr. No	Descriptions	For Approval	For Review/ Information	Final submission	1	Technical particulars	√		√	2	General Arrangement drawings	√		√	3	Single Diagram	√		√	4	HV and LV compartment layout	√		√	5	Schematic Diagram	√		√	6	Earthing Plan	√		√	7	Bill of Materials	√		√	8	Foundation Plan & loading Details		√	√	9	Installation instructions		√	√	10	Instruction for Use & maintenance		√	√	11	Transport/Shipping Dimension Drawing		√	√	12	QA & QC Plan	√	√	√	13	Test Certificates	√	√	√
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6	Earthing Plan	√		√																																																																				
7	Bill of Materials	√		√																																																																				
8	Foundation Plan & loading Details		√	√																																																																				
9	Installation instructions		√	√																																																																				
10	Instruction for Use & maintenance		√	√																																																																				
11	Transport/Shipping Dimension Drawing		√	√																																																																				
12	QA & QC Plan	√	√	√																																																																				
13	Test Certificates	√	√	√																																																																				

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023



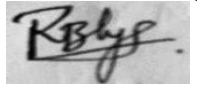
		A. ENTIRE UNIT			
Sr. No	Descriptions	Unit	As Specified By Tata Power	As Furnished By Bidder	
1	Application		Outdoor		
2	Rated voltage	KV	12 or 24 (as per tender document)		
3	Service Voltage	KV	11 or 22 (as per tender document)		
4	System Frequency	Hz	50		
5	Rated impulse withstand voltage	KVP	75 or 125		
6	Rated power frequency withstand voltage	KV rms	28 or 50		
7	Rated LT voltage	V	415		
8	Dimension of Unit (LxWxH)	mm x mm x mm	To be provided by bidder		
9	Control wiring		To be provided by bidder		
	a) Type of insulation		PVC		
	b) Voltage grade	KV (Max)	1.1		
	c) Conductor Material		Copper		
	d) Conductor Size & insulation wiring	Sq. mm	1.5 & 2.5		
	e) CT wiring	Sq. mm	2.5		
	f) Wiring identification mark & Accessories as per specification		To be provided by bidder		
10	Locking arrangement		The doors shall be padlocked As well as protected.		
11	Earthing to be provided --RMU -Trf body and neutral -LV ACB & MCCB -Body earthing for USS		To be provided by bidder		
12	Paint		RAL 6037 GREEN		
13	Common base frame		To be provided by bidder		
14	Guarantee-from date of taking over by Tata Power		48 Months from the date of commissioning or 60 months from the date of last supplies made under the contract whichever is later		
15	Availability of spares		Assurance by bidder for 25 years		

18.0



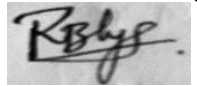
GUARANTEED  
TECHNICAL  
PARTICULARS

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023



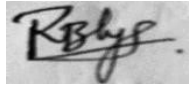
16	Total weight	Kg	To be provided by bidder	
17	Lifting Lug arrangement for integrated unit		The main lifting lugs shall have yellow color paint marking and label.	
18	Lifting arrangement details		To be provided by bidder	
<b>B. 11kV RMU</b>				
<b>S.N.</b>	<b>Description</b>	<b>As specified by TATA Power</b>		<b>As furnished by Bidder</b>
1.0	RMU Category	3Way - 1CB & 2 LBS LBS with side cable entry- CB shall be at center and cable entry on sides		
2.0	RMU application	Outdoor		
3.0	Offered Model nos. and OEM type	3Way (O/D)		
4.0	Dielectric medium	SF6		
5.0	Interrupting medium	Vacuum- for CB SF6 for LBS and earth switch		
6.0	System Frequency	50 Hz		
7.0	Rated Voltage	12 KV or 24 KV		
8.0	Service Voltage	11 KV or 22 KV		
9.0	Rated current -Line Switches	630 A		
10.0	Rated Current-CB and LBS	630 A for all type		
11.0	Rated Short time current withstand	21 KA/3s for 11 KV 25 KA/1s for 22 KV		
12.0	Rated Short time Making capacity	50 KA		
13.0	Rated cable charging interrupting current of incomer load break switch	10 A		
14.0	Rated load interrupting line current	630 A		
15.0	Rated cable charging breaking current of breaker	25 A		
16.0	No. of operations at rated short circuit current on line switches, earthing switches should be E2	LBS- 5 close ES- 5 close The ES in line with CB		
17.0	Opening time of breaker (max.) Without relay time	3 cycle		
18.0	Closing time of breaker (max.)	3 cycle		
19.0	Breaker Duty Cycle	O – 3min - CO - 3min - CO		
20.0	i. Mechanical endurance for Isolator & Earth Switch	Min 1000 Operations		

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023



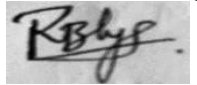
		ii. Mechanical endurance for Circuit Breaker	Min 2000 Operations	
21.0		Electrical operations of at rated current a. LBS/Disconnecter b. Earth Switch	To be provided by bidder	
22.0		Temp rise above ambient of 50 deg.	50 Deg C. (Type Tested as per IEC and complying to requirements)	
23.0		Min Gas pressure in bar	To be provided by bidder based on type tested design	
24.0		SF6 Gas pressure manometer with indicating bars/scale to measure the actual gas pressure (indirect method RFS etc. not accepted )	1. Dial type Manometer to be provided for gas pressure indication 2. Contacts to be provided and wires up on the TB for SCADA communication of gas status.	
25.0		Enclosure	The RMU metal parts shall be greater than 2mm thickness high tensile steel/CRCA. The overall paint thickness shall be not less than 70 microns.	
26.0		Guaranteed SF6 leakage per annum	Less than 0.1% from main tank	
27.0		Degree of protection	a. IP 67 for the tank and b. IP2X for the front cover / mimic board and c. IP 54 (Main door closed) for Outdoor RMUs. d. IP 54 for cable compartment	
28.0		Internal Arc rating	IAC AFL or better	
29.0		Internal Arc test	20kA for 1 Sec.	
30.0		Lightning Impulse withstand Voltage	75 kVp or 125 KVp	
31.0		Power Frequency withstand voltage	28 kVrms.or 50 KVrms	
32.0		SF6 Tank design	Hermetically/robotically sealed unpainted stainless-steel enclosure with SF6 Gas. Sealed pressure system by Laser welding so that no refilling of gas is required for 30 years. No gas work at site. Complete body shall be	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023



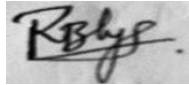
			tamperproof to prevent access to live parts. No gaskets shall be used. No bolts shall be provided.	
32.1	Tank material and grade of SS and welding		Should be of SS (304) and non-corrosive, offered grade of SS to be mentioned. The welding shall be such that there shall be no corrosion of welding for useful life of equipment.	
33.0	Earth bus bars		In enclosure to prevent tampering.	
34.0	Material & size of earth bus bar		Copper & 105 sq mm	
35.0	Earthing of main CCT Cables shall be earthed with earth switch with S/C making capacity as per IEC 129.		To be provided by bidder	
36.0	Incomer Load Break switch: Shall be SF6 insulated with least maintenance. Shall have at least 3 positions, Open, Close & earth with natural interlocks. Fitting of motor at site shall be possible & shall have mechanical interlock.		To be provided by bidder	
37.0	Circuit Breakers: a. With VCB interrupter and SF6 insulated bus with minimum maintenance and shall have at least 2 positions i.e. Open & Close, Manual operation. b. In view of safety each VCB shall be assisted with disconnecter having 3 positions, open-disconnected, closed, and earth (having fault making capacity) and shall be constructed in such a way that natural interlocking prevents unauthorized operations.		To be provided by bidder as per specs.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023



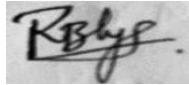
		38.0	Protection Relay-Without auxiliary power & shall include electronic relay, low energy release & fast on test receptacle for protection testing.	To be provided by bidder.	
		39.0	Make of self-powered Relay & offered model	Ashida: Basic model ADR241S.	
		40.0	Flag indication for CB Trip on fault in relay/ mechanical	To be provided by bidder	
		41.0	Protection against theft	Design of RMU shall be tamper & arc proof. Anti vandal screws shall be provided. Cable covers shall be pad lockable. All live parts and internal parts etc. shall be covered with antitheft covers.	
		42.0	Doors	Hinged Main doors shall be provided for outdoor type RMU. The hinges for the doors need to be riveted and shall not have any access from outside. Bolted shall not be acceptable.	
		43.0	Voltage indicator box shall be fixed type-This device shall be in compliance with IEC 62271-206:2011 standard only	Capacitive dividers type which will supply low voltage to power the lamps & 3 inlets can be used to check phase sequence or presence of voltage in cable	
		44.0	Cable cleats (full circle)	HDPE/Nylon (Fire Retardant)	
		45.0	Cable termination and bushing suitability	Heat/ Cold shrink terminations	
		46.0	Cable compartment suitability shall be	Suitable for cable sizes In the isolators compartment 11kV, 3C X 300 sq. mm or 22KV 3C X 240 sq mm	
		47.0	The cable compartment	All cable compartments shall be bottom entry and on either side of CB.	
		48.0	Size of bimetallic washer in all compartments	Must be suitable for M12 bolt and bushing sizes with min. 2mm thick.	
		49.0	Height of bushing terminal from base plate	Minimum 800mm for proper termination space.	
		50.0	Fault passage indicator	One per RMU in Incomer left LBS as a part of each RMU with specified default setting.	
		51.0	Operating handle	To be provided by bidder as a	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

			part of RMU with each RMU and to be placed on front or on door	
52.0	Non removable MIMIC Diagram on Front of panel		To be provided by bidder with detailed descriptions as mentioned in specs. And earth switch marking background shall be green.	
53.0	Main Bus bar Material		Copper	
53.1	Bus bar Cross Section		To be specified by bidder as per current density	
54.0	Opening & Closing times with relay		125 ms maximum	
55.0	Current Transformer for CB compartment		Shall be epoxy resin casted and mounted on cables. The CTs around the cables shall be supported on the sheet steel bracket and should be fixed with bolts. The mounting frame should be moveable up and down or to and fro but shall be fixed at co-axial position with base plate holes and bushing terminal bolts. CT ratio 100/1, 5P10	
56.0	Future motorization and SCADA Compatibility		To be provided	
57.0	Guarantee		As per specification	
58.0	Dimension (LxWxH) (mm x mm x mm)		To be provided by bidder	
59.0	Total weight		To be provided by bidder	
60.0	Paint		Green shade RAL 6037	
61.0	Type test of product		To be provided by bidder as per specification	
62.0	Availability of spares		Assurance by bidder for 25 years, list of spares as mentioned in specification to be provide along with RMU lot.	
63.0	VPIS auxiliary contact		The VPIS shall have auxiliary contact wired up in TB.	
63.1	VPIS		In all compartments	
64.0	Breaker operation counter		To be provided by bidder	
65.0	LBS operation counter		To be provided by bidder	
66.0	Moisture absorption material in SF6 tank		Bidder should provide the detail of the moisture absorption material.	



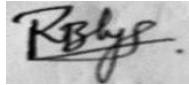
Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

67.0	Making of earthing operations	All earth operation to be marked with green back ground and permanent in nature.	
68.0	Auxiliary contacts (total numbers and spare numbers)	LBS Earth Switch CB CB Disconnecter - CB earth switch-	
69.0	Control cable entry provision	To be provided	
70.0	Shunt trip coil 230V AC	230V AC shunt trip coil to be provided. Trip coils to be wired up on TB.	
71.0	MCB for LT AC incomer and TB connection of all CT, Aux switches and relay wiring	To be provided	
72.0	SF6 Tank material	Stainless steel SS304	
73.0	RMU Cable Boot/ terminal protector		
a	Terminal protector	Insulating Boots	
b	System voltage	12 kV or 24 KV	
c	AC High voltage	28kV or 50 KV For 1 min	
d	Impulse withstand voltage	75kV or 125 KV	
e	Bushing Diameter	To be provided by bidder	
f	Bushing Types	To be mentioned by bidder	
g	Cable cross section suitability	Bidder to provide complying to specs.	
h	Dimensions of cable protector	Suitable for cables & bushing in specs. (Offered size to be provided by bidder)	
i	Material of the component	To be specified by bidder	
74	Coupling between RMU CB HT bushing & transformer HT bushing	The RMU CB & Transformer HT bushings to be coupled through coupling unit with tinned copper flexible flats with silicone rubber sleeve covering having window on top for fixing & removal of RMU at site if required. This coupling compartment shall have rain shade or canopy to avoid water ingress & breather provision if resin cast busing provided.	
<b>C. DISTRIBUTION TRANSFORMER</b>			



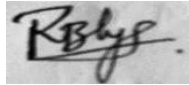
Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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	30/09/2023	30/09/2023	30/09/2023





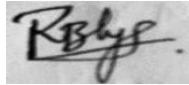
Sr. No	Descriptions	Unit	As Specified By Tata Power	As Furnished By Bidder
1	Name of the manufacture		To be provided by bidder	
2	Type of Transformer		Natural Ester Oil Filled	
2.1	Type of Construction		Hermitically sealed	
3	Reference standards		IS 1180 part 1 (2014)	
4	Installation		Indoor	
5	Duty		Continuous	
6	Application		Distribution	
7	Altitude	M	Less than / equal to 1000m	
8	Continuous Rating	KVA	1000 or 1250 (as per tender document)	
9	Voltage ratio	KV	11/0.415 22/0.415	
10	HV current	A	To be provided by bidder	
11	LV current	A	To be provided by bidder	
12	Frequency	Hz	50+/-3%	
13	No. Of Phases		3	
14	HV connection		Delta	
15	LV connection		Star (Neutral brought out)	
16	Vector group		Dyn11	
17	Tap changer (off load)		+10% to -10% in steps of 2.5%	
18	Type of cooling		KNAN	
19	Class of Insulation		Class A	
20	Winding Material		DPC Copper	
21	Noise level at rated voltage and frequency	Db	56	
22	Permissible temperature rise over ambient			
a)	Temp rise of winding (measured by resistance)	Deg C	45 at an ambient of 50 deg C	
b)	Temp rise of top oil (measured by thermometer)	Deg C	40 at an ambient of 50 deg C	
c)	Hotspot	Deg C	73 at an ambient of 50 deg C	
23	No load losses at Rated voltage & frequency	W	To be provided by bidder	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

		(max)			
24	Load losses at 50% and 100% loading at 75%	W	To be provided by bidder		
25	Max. Total Losses at 50% loading (Watts) at 75 deg C Losses should be Star 2 as per IS 1180 Part 1	W	Star 1 Rating 1000 KVA 2790 Watts (11 KV) 2930 Watts (22 KV) 1250 KVA 3300 Watts (11 KV) 3465 Watts (22 KV)		
26	Max. Total Losses at 100% loading (Watts) at 75 deg C Losses should be Star 2 as per IS 1180	W	Star 1 Rating 1000 KVA 7700 Watts (11 KV) 8085 Watts (22 KV) 1250 KVA 9200 (11 KV) 9660 (22 KV)		
27	Impedance (with IS tolerance)	%	5% or 6.25% (as per tender document)		
a)	Reactance	%	To be provided by bidder		
b)	Resistance	%	To be provided by bidder		
28	Weight of core	Kg	To be provided by bidder		
29	Weight of winding	Kg	To be provided by bidder		
30	Quantity of oil	Ltr	To be provided by bidder		
31	Total weight (Approx)	Kg	To be provided by bidder		
32	Regulation at Full Load at 75 Deg. C				
a)	Regulation at UPF	%	To be provided by bidder		
b)	Regulation at .8 PF	%	To be provided by bidder		
33	Efficiencies at 75 Deg. C at Unity Power Factor (Reference Value)				
a)	Efficiency at 100 % Load & UPF	%	To be provided by bidder		
b)	Efficiency at 75 % Load & UPF	%	To be provided by bidder		
c)	Efficiency at 100 % Load & 0.8 PF	%	To be provided by bidder		
d)	Efficiency at 75 % Load	%	To be provided by		

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023



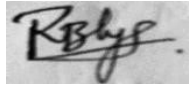
		& 0.8 PF		bidder	
34	Maximum flux density rated Voltage	Wb/ sq mm	1.6 to 1.9 (Max)		
35	Max current density	A/Sq mm	2.6		
36	Separate Source Power-Frequency Voltage withstand (HV/LV)	KV rms	28 or 50		
37	Full wave Lighting Impulse Withstand Voltage (HV/LV)	KV p	75 or 125		
38	Minimum HV clearance	mm	130 ph-ph and 90 Ph- earth (11 KV) 241 ph-p and 140 ph- earth (22 KV)		
39	Minimum LV clearance	mm	25 ph-ph and 20 Ph- earth		
40	Induced over voltage test at double frequency	KV rms	As per IS		
41	Grade of core		M3 or better		
42	Terminal on LV side		Bus bar with insulated sleeve		
43	Terminal on HV cable		a. HT Terminal to be coupled with RMU HT bushing through one coupling box with flexible tinned copper links (flats). To achieve this the HT bushing of transformer & RMU CB outgoing bushing should be at same height & with same dimension of coupling box. b. Vermin proofing & waterproofing to be ensured in coupling box. c. This coupling unit should be such that if required RMU & Transformer can be separated for any replaced or repair etc.		
<b>Additional details for Transformer</b>					

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023



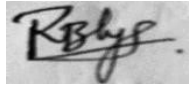
Sl. No.	Description	Unit	As furnished by bidder
1.	Core grade		
	Thickness of core	mm	
2.	Core diameter	mm	
3.	Gross core area	Sq.cm	
4.	Net core area	Sq.cm	
5.	Flux density (calculated)	Tesla	
6.	Mass of core	Kg	
7.	Loss per Kg of core at the above specified flux density	Watt	
8.	Core window height	mm	
9.	Center to center distance of the core	mm	
10.	No. of LV Turns		
11.	No. of HV Turns		
12.	Size of LV conductor bare/covered	mm	
13.	No. of parallels		
14.	Size of HV conductor bare/covered	mm	
15.	Current density of LV winding(calculated)	A/sq.mm	
16.	Current density of HV winding(calculated)	A/sq.mm	
17.	Wt. of the LV winding	Kg	
18.	Wt. of the HV winding	Kg	
19.	No. of LV coils/phase		
20.	No. of HV coils/phase		
21.	Height of LV winding	mm	
22.	Height of HV winding	mm	
23.	ID/OD of HV winding	mm	
24.	ID/OD of LV winding	mm	
25.	Thickness of the duct in LV winding	mm	
26.	Thickness of the duct in HV winding	mm	
27.	Thickness of the duct between HV and LV	mm	
28.	Calculated Impedance	%	
29.	HV to earth creep age distance in oil	mm	
30.	LV to earth creep age distance in oil	mm	

## D. LV Compartment



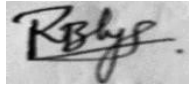
Sr. No	Descriptions	Unit	As Specified By Tata Power	As Furnished By Bidder
1	Thickness of sheet for the frame	mm	2mm (min) GI	
2	Max. Current Density of bus bar	A/sq mm	1.0	
3	Max, permissible		80 deg C at terminal	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

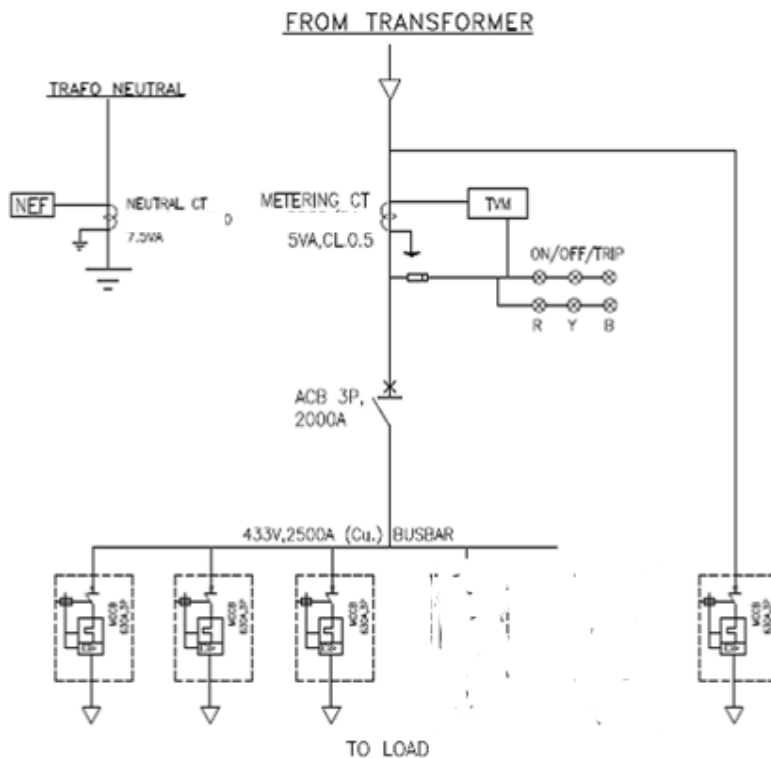
	temperature		with an amb. Temp not exceeding 40 deg C	
4	Min. clearance between phases	mm	25	
5	Min. clearance between phase to earth	mm	20	
6	<b>ACB</b>			
7	Application		Indoor	
8	Rated voltage	V	433	
9	Rated current	A	1600 A or 2000 A (As per tender)	
10	Type of release		CT operated thermal overload & magnetic short ckt. Release	
11	Rated insulation	V	690	
12	Rated impulse- Withstand voltage	kV	8	
13	No of poles		3	
14	Rated Ultimate short ckt breaking capacity ICU	kA (rms)	50	
15	Rated service short ckt breaking capacity Ics	kA (rms)	100% of ICU	
16	Rated short time withstand capacity Icw	KA p	50kA	
17	Rated Making capacity	KA p	105 KAp for 1 sec	
18	CT operated thermal overload relay with setting range	%	50-100%	
19	Typical operating time	m sec	< 40	
20	Typical closing time	m sec	To be provided by bidder	
21	Bus bar current capacity	A	2000 or 2500 A (As per tender)	
22	Bus bar material	Al	To be provided by bidder	
23	Earth fault relay will be Alstom make CDG11 self-powered with Normal Inverse type (for 3secs)		To be provided by bidder	
<b>MCCBs</b>				
1	Application		Indoor	
2	Rated voltage	V	433	
3	Rated current	A	630	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023



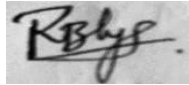
		4	No of SFUs		4 nos. 630A, (3 +1 For fire supply). 3 Poles with thermal magnetic release.							
		5	No of poles		3							
		6	Rated insulation voltage	V	690							
		7	Impulse-Withstand voltage	kV	8							
		8	Rated operation voltage	V	1100							
		9	Rated ultimate short circuit breaking capacity Icu	kA (rms)	Min 36 kA							
		10	Rated service short circuit breaking capacity Ics % of Icu	kA (rms)	100%							
		11	Overload release setting		50-100%							
		12	Typical opening time	m sec	As per IEC 60947/ IS 13947							
		13	Typical closing time	m sec	As per IEC 60947/ IS 13947							
		14	Electrical and mechanical life (No of operating cycles)		As per IEC 60947-2							
		15	Thermal shrouds		To be provided							
		16	Phase barriers		To be provided							
19.0	<b>SCHEDULE OF DEVIATION</b>	<p>The bidders shall set out all deviations from this specification, Clause by Clause in this schedule. Unless specifically mentioned in this schedule, the tender shall be deemed to confirm the purchaser's specifications.</p> <p style="text-align: center;"><b><u>(TO BE ENCLOSED WITH THE BID)</u></b></p> <p>All deviations from this specification shall be set out by the bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:</p> <table border="1"> <thead> <tr> <th>S.No.</th> <th>Clause No.</th> <th>Details of deviation with justifications</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>We confirm that there are no deviations apart from those detailed above.</p> <p>Seal of the Company _____ Signature : _____</p> <p style="text-align: right;">Designation : _____</p>					S.No.	Clause No.	Details of deviation with justifications			
S.No.	Clause No.	Details of deviation with justifications										

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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	30/09/2023	30/09/2023	30/09/2023

Reference SLD for fire pump to be provided as shown below:



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R00	Yash Mane 	Ajay V Potdar 	Ravindra M. Bhanage 
	30/09/2023	30/09/2023	30/09/2023

**ANNEXURE – I**  
**PROFORMA FOR STAGE INSPECTION OF DISTRIBUTION TRANSFORMER**

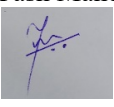

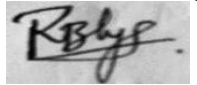
S No.	Particulars	Details
(A)	<b>GENERAL INFORMATION:</b>	
1	Name of firm	
2	Order No. and Date	
3	Details of offer	
a)	Rating	
b)	Quantity	
c)	Serial Numbers	
4	Details of last stage inspected lot:	
a)	Total quantity inspected	
b)	Serial Numbers	
c)	Date of stage inspection	
d)	Quantity offered for final inspection of (a) above with date	
(B)	<b>Position of manufacturing for the offered quantity:</b>	
a)	Complete tanked assembly	
b)	Core and coil assembly ready	
c)	Core assembled	
d)	Coils ready for assembly	
	i) HV coils	
	ii) LV coils	

Note: i) The stage inspection shall be carried out in case:-

- At least 50% quantity has been tanked and
- Core coil assembly of further at least 30% of the quantity offered has been completed.
- Rest of quantity shall be in form of core assembly & coils.



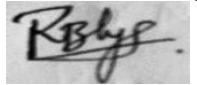
ii) Quantity offered for stage inspection should be offered for final inspection within 15 days from the date of issuance of clearance for stage inspection, otherwise stage inspection already cleared shall be liable for cancellation.

S No.	Particulars	As offered	As observed	Deviation and Remarks
(C)	<b><u>Inspection of Core :</u></b>			
	(I) Core Material			
	1) Manufacturer's characteristic certificate in respect of grade of lamination used. (Please furnish test certificate)			
	2) Thickness of core lamination			
	3) Remarks regarding Rusting and smoothness of core.			
	4) Whether laminations used for top and bottom yoke are in one piece.			
	(II) Core Construction :			
	(1) No. of steps			



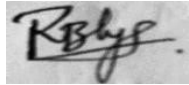
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	30/09/2023	30/09/2023	30/09/2023



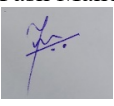

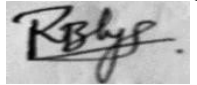
(2) Dimension of steps												
<b>As offered :</b>												
Step No	1	2	3	4	5	6	7	8	9	10	11	12
W mm												
T mm												
<b>As found :</b>												
Step No	1	2	3	4	5	6	7	8	9	10	11	12
W mm												
T mm												
(1)												
(2) Core Diameter (mm)												
(3) Total cross sectional area of core												
(4) Effective cross sectional area of core												
(5) Whether top yoke is cut for LV connection.												
(6) If yes, at 6 above, whether Reinforcement is done.												
(7) Core length (leg center to leg center)												
(8) Window height.												
(9) Core height												
(10) Core weight only												
<b>(D) INSPECTION OF WINDING</b>												
(I) Winding material												
(1) Material used for												
a) HV winding												
b) LV winding												
(2) Grade of material for												
a) HV winding												
b) LV winding												
(3) Test certificate of manufacturer (enclosed copy) for winding material of:												
a) HV												
b) LV												
(II) Construction Details												
1) Size of Cross sectional area of conductor for :												
a) HV winding												
a) LV winding												
2) Type of insulation for conductor of :												
a) HV winding												
b) LV winding												
3) Diameter of wire used for delta formation (mm)												
4) Diameter of coils in:												
a) LV winding												
a) Internal Diameter (mm)												
ii) Outer diameter (mm)												
b) HV winding												
a) Internal diameter (mm)												
ii) Outer diameter (mm)												

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	30/09/2023	30/09/2023	30/09/2023



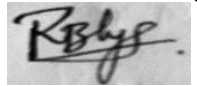
5)	Current density of winding material used for:			
	a) HV			
	b) LV			
6)	Whether neutral formation on top.			
7)	HV coils / Phase			
	a) Number			
	b) Turns/coil			
	c) Total turns			
8)	LV coils /Phase			
	a) Number			
	b) Turns / coil			
	c) Total turns			
9)	Total weight of coils of			
	a) LV winding (Kg)			
	b) HV winding (Kg)			
<b>(E)</b>	<b>INSULATION MATERIALS</b>			
	(I) Material			
	1) Craft paper			
	a) Make			
	b) Thickness (mm)			
	c) Test certificate of manufacturer (enclose copy)			
	2) Press Board			
	a) Make			
	a) Thickness (mm)			
	b) Test certificate of manufacturer (enclose copy)			
	3) Material used for top and bottom yoke and insulation			
	(II) Type and Thickness of material used : (mm)			
	a) Between core and LV			
	b) Spacers			
	c) Interlayer			
	d) Between HV and LV winding			
	e) Between phases			
<b>(F)</b>	<b>CLEARANCES: (mm)</b>			
	(I) Related to core and winding			
	1) LV to core (radial)			
	2) Between Hv and LV (Radial)			
	3) (i) Phase to phase between HV conductor			
	(ii) Whether two nos. press board each of minimum 1mm thick provided to cover the tie rods.			
	4) Thickness of duct between HV and LV coil mm			
	(II) Between core – coil assembly and tank:			
	1) Between winding and body			
	a) Tank length wise			
	b) Tank breadth wise			
<b>(G)</b>	<b>TANK :</b>			
	(I) Construction Details:			
	1) Rectangular shape			
	2) Thickness of side wall (mm)			

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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	30/09/2023	30/09/2023	30/09/2023

	3) Thickness of top and bottom plate (mm)			
	4) Provision of sloping top cover towards HV bushing.			
	5) Tank internal dimensions (mm)			
	a) Length			
	b) Breadth			
	c) Height			
	h) On HV side			
	ii) On LV side			
	<b>(II) General Details :</b>			
	1) Inside painted by oil corrosion resistant paint (please specify which type of coating done)			
	2) Gasket between top cover and tank			
	a) Material			
	i) Thickness (mm)			
	ii) Jointing over laps (mm)			
	3) Provision of lifting lugs:			
	a) Numbers			
	b) Either reinforced by welded plates edge wise below the lug up to re-enforcing angle of the tank done.			
	4) Pulling lug of MS plate			
	a) Nos.			
	b) Thickness (mm)			
	c) Whether provided on breadth side or length side			
	5) Provision of air release plug			
	6) Provision of hot dip galvanized GI Nuts Bolts with 1no. plain and 1no. spring washer.			
	7) Deformation of length wise side wall of tank when subject to:			
	a) Vacuum of (-) 0.7 Kg/sq.cm for 30 minutes.			
	b) Pressure of 0.8 Kg/sq.cm. for 30 minutes.			
	<b>(K) TERMINALS:</b>			
	1) Material whether of Brass Rods/Tinned Copper.			
	a) HV			
	b) LV			
	2) Size (dia. In mm )			
	a) HV			
	b) LV			
	3) Whether SRBP tube / insulated paper used for formation of Delta on HV.			
	<b>(L) BUSHINGS</b>			
	1) Whether HV bushings mounted on top cover/ side walls.			
	a) HV			
	b) LV			
	2) Whether arrangement for studs for fitting of HV Bushing are in diamond shape (so that arcing horns are placed vertically.)			
	3) Position of mounting of LV bushings			

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	30/09/2023	30/09/2023	30/09/2023

	4) Bushing Clearance: (mm)			
	a) LV to Earth			
	b) HV to Earth			
	c) Between LV bushings			
	d) Between HV bushings			
<b>(N)</b>	<b>OIL:</b>			
	1) Name of supplier			
	2) Breakdown voltage of oil: (kV)			
	a) Filled in tanked transformer			
	b) In storage tank (to be tested by Inspecting officer).			
	3) Supplier's test certificate (enclose copy)			
<b>(O)</b>	<b>ENGRAVING:</b>			
	1) Engraving of Sl. No. and name of firm.			
	a) On bottom of clamping channel of core-coil assembly.			
	b) On Top cover of tank			
<b>(P)</b>	<b>i) MS Plate of size 125× 125 mm welded on width side of stiffner.</b>			
	ii) Following details engraved (as per approved GTP):			
	a) Serial Number			
	b) Name of firm			
	c) Order No. and date			
	d) Rating			
	e) Date of dispatch			
<b>(Q)</b>	<b>NAME PLATE DETAILS:</b>			
	Whether Name Plate is as per approved drawing			
<b>(R)</b>	<b>COLOUR OF TRANSFORMER</b>			
	1) Tank body with			
	2) Conservator with			
<b>(S)</b>	<b>CHECKING OF TESTING FACILITIES:</b>			
	(Calibration certificate also to be checked for its validity)			
	TESTS:			
	1) No Load Current			
	2) No Load Loss			
	3) % Impedance			
	4) Load losses			
	5) Insulation Resistance test			
	6) Vector group Test (phase relationship)			
	7) Ratio and Polarity test relationship			
	8) Transformer oil Test (Break Down Voltage)			
	9) Magnetic Balance			
	10) Measurement of winding resistance (HV and LV both)			
	11) Induced over voltage withstand test (Double voltage and Double frequency)			
	12) Separate source power frequency withstand test at 28kV for HV and 3kV (One minute).			
	13) Air, pressure/oil leakage Test			
	14) Vacuum Test			

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	30/09/2023	30/09/2023	30/09/2023

The Tata Power Company Limited



**SPECIFICATION FOR 1000 KVA & 1250 KVA Pad mounted Unitised Substation**

**ENSE-DS-2003-R00**



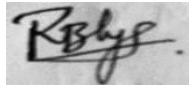
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30/09/2023**

	15) Unbalanced current test			
	16) Temperature rise (Heat run) test.			
(T)	<b>We have specifically checked the following and found the same as per G.T.P/ deviations observed as mentioned against each:</b>			
	(i) Rustlessness of CRGO laminations used			
	ii) Core steps			
	iii) Core area			
	iv) Core weight			
	v) Core lamination thickness			
	vi) Winding cross sectional area			
	a) LV			
	b) HV			
	vii) Weight of windings			
	viii) Clearance between winding and wall of tank (mm)			
	a) Length-wise			
	b) Breadth-wise			
	ix) Clearance between top yoke/ top most live part of tap changer to tank cover.			
	x) Details of Neutral formation			
	xi) Connections to Bushings:			
	a) LV			
	b) HV			
	xii) Slope of tank top			
	xiii) Position of mounting of bushings			

PURCHASER'S OFFICER

BIDDER'S REPRESENTATIVE

DATE OF INSPECTION



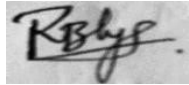
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	30/09/2023	30/09/2023	30/09/2023

**ANNEXURE-II****PERFORMA FOR PRE-DELIVERY INSPECTION OF DISTRIBUTION TRANSFORMERS**

1.	Name of the firm	
2.	Details of offer made	
	(i) Order No. and date	
	(ii) Rating	
	(iii) Quantity	
	(iv) Sl. No. of transformers	
3.	Date of stage inspection of the lot	
4.	Reference of stage inspection clearance	
5.	Quantity offered and inspected against the order prior to this lot	

**ACCEPTANCE TESTS TO BE CARRIED OUT**

S No.	PARTICULARS	OBSERVATIONS
1.	(a) Ratio Test	AB/an
		BC/bn
		CA/cn
	(b) Polarity Test	
2.	No load loss measurement	
		W1
		W2
		W3
	TOTAL	
	Multiplying factor	
	CT	
	Watt meter	
	Total × MF	
	NET LOSS	
3.	Load loss measurement	
		W1
		W2
		W3
	Total	
	Multiplying factors:-	
	CT	
	Watt meter	
	PT	

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	30/09/2023	30/09/2023	30/09/2023

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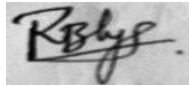


**SPECIFICATION FOR 1000 KVA & 1250 KVA Pad mounted Unitised Substation**

**ENSE-DS-2003-R00**

**Date of Issue:  
30/09/2023**

	Total × MF	
	Loss at ambient temperature (Watt)	
	Loss at 75 deg C (with calculation sheet ) (Watt)	
4.	Winding Resistance :	
	H.V. (in Ohms)	
	At ambient temperature of _____ deg.C	A-B
		B-C
		C-A
	Resistance at 75 deg.C	A-B
		B-C
		C-A
	L.V. (in Ohms)	
	At ambient temperature of _____ deg.C	a-b
		b-c
		c-a
	Per Phase resistance at 75 deg.C	a-b
		b-c
		c-a
5.	Insulation resistance (M ohm)	HV-LV
		HV-E
		LV-E
6.	Separate source Voltage withstand test voltage:	
	HV	28 kV for 60 secs.
	LV	3 kV for 60 secs.
7.	Induced over-voltage withstand test at double voltage and double frequency	100 Hz, 866 volts for 60 seconds.
8.	No load current at	
	90% volts	
	100%	
	112.5% volts	
9.	Unbalance current	
10.	Vector group test	Diagram and readings be shown in separate sheets
11.	Percentage Impedance at 75 deg.C ( Please furnish calculation sheet)	
12.	Transformer oil test (Break down voltage)	
13.	Oil leakage test	
14.	Heat run test	To be carried out against the every offered lot
15.	Bushing clearance (mm)	HV
	a) Phase to Phase	
	b) Phase to earth	

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	30/09/2023	30/09/2023	30/09/2023

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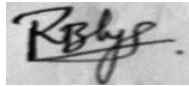
**SPECIFICATION FOR 1000 KVA & 1250 KVA Pad mounted Unitised Substation**

**ENSE-DS-2003-R00**

**Date of Issue:  
30/09/2023**

16	Comments on compliance by the firm on the modifications done as per stage inspection clearance letter issued.	
18.	Whether UV protected seamless acrylic tube silica gel breather is fitted on the transformers offered.	
19.	Whether engraving of Sl.no. and name of firm on core clamping channel, side wall and top cover of tank has been verified.	
20.	Whether MS Plate of size 125 × 125 mm welded on with side of stiffener.	
21.	Whether engraving of name of firm, S No., rating of transformer, Order No. and date and Date of Dispatch on MS Plate.	
22.	Copy of calibration certificates of metering equipment be enclosed.	

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	30/09/2023	30/09/2023	30/09/2023