

The Tata Power Company Ltd		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: CC25NP003</i>		<i>Document Date: 09th May' 2024</i>

CORRIGENDUM-1

09th May'2024

Corrigendum to the Notice Inviting Tender dated 07th May' 2024.

Package Details:

The Tata Power Company Limited Invites Tenders through E-Tender Two-Part Bidding Process from interested bidders for the following Works.

Supply, Unloading, Installation, Testing and Commissioning of 02 nos. 110KV/23.1 KV 40MVA Power Transformers at Trombay Station-A in Mumbai

Vide this corrigendum, following changes to be noted;

“Please note that Payment Terms, LD and CPBG details mentioned in the Tender Document are our standard Terms.

In case you have challenges with respect to the above terms you may quote with Suitable Deviations.

We may consider some of these deviations based on Tender Response and Merit of Deviation Requests”.

Also, Last day for Participation in this tender by paying tender fees is extended **till 1500 hrs of 21st May'2024.**

Interested bidders having executed similar work can participate by paying the tender fees and submission of authorization letter on or before **1500 hrs of Tuesday, 21st May 2024.**

Please note that, the bidders who have already participated in the Tender shall be retained as “participant” & they shall not be required to participate again by submitting the Tender Fee of INR 2,000 /-.

Tender documents with above change is produced below from page 2 onwards of this document.

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FOR

**Supply, Unloading, Installation, Testing and Commissioning
of 02 nos. 110KV/23.1 KV 40MVA Power Transformers at
Trombay Station-A in Mumbai.**

**Tender Enquiry No: CC25NP003
(Please note this reference number must be quoted in all
submission pertaining to this tender)**

**The Tata Power Company Limited (Tata Power)
Corporate Contracts,**

**Smart Center of Procurement Excellence,
2nd Floor, Sahar Receiving Station, Near Hotel Leela,
Sahar Airport Road, Andheri (E), Mumbai 400 059**

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Procedure for Participating in Tender

Tender Enquiry No.	Work Description	EMD (Rs.)	Tender Participation Fee	Last date and time for Payment of Tender Participation Fee*	Last date and time for bid submission
CC25NP003	Supply, Unloading, Installation, Testing and Commissioning of 02 nos. 110KV/23.1 KV 40MVA Power Transformers at Trombay Station-A in Mumbai	9,00,000/-	Rs. 2000/-	21st May'2024 1500 Hrs	Shall be informed separately through ARIBA portal to authorized personnel of bidder participating in tender.

***Interested bidders are strongly advised not to wait by above time and purchase the tender immediately to get the link for bid submission. This will enable them to communicate/raise queries against the subject tender in time.**

Procedure for Participating in Tender. Following steps to be done before last date for purchase of tender,

1. Interested Vendors to refer to the Section C of the tender (Prequalification criteria).
2. Eligible and Interested Bidders to submit duly signed and stamped letter on Bidder's letterhead indicating.
 - a. Tender Enquiry number
 - b. Name of authorized person
 - c. Contact number
 - d. e-mail id
 - e. Details of submission of Tender Participation Fee
3. Non-Refundable Tender Participation 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

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Account No – 00600110000763

Account type – CC

IFSC Code – HDFC0000060

E-mail with necessary attachment of 1 and 2 above to be send to naman.patel@tatapower.com with copy to vivek.mittal@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). User manual to guide the bidders to submit the bid through e-Tender system (Ariba) is also enclosed.

No e-mail or verbal correspondence will be responded. All communication will be done strictly with the bidder who have done the above steps (Payment of tender fee and submission of letter with requisite details) 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 acknowledged.

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

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

CONTENTS OF THE ENQUIRY

Following Documents Form Part of Tender Enquiry:	No. of Pages
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C. Pre-qualification Requirement and Submission Format*	
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D. Technical Set of Documents / Format	
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***To be submitted in editable excel format**

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Section A: Tender Notice including Instruction to Bidders

1. Tender Details

1.1 Key Tender Specific Details

Reference Number	CC25NP003
Description	Supply, Unloading, Installation, Testing and Commissioning of 02 nos. 110KV/23.1 KV 40MVA Power Transformers at Trombay Station-A in Mumbai
Type of Tender	Firm Order
Period	Till the completion of Contract
Tender Fee	Rs 2,000/-
Earnest Money Deposit (EMD)	Rs 9,00,000 /- Rs Nine lakhs Only PLEASE NOTE THAT IT IS MANDATORY TO SUBMIT EMD IN THE FORM OF ONLINE TRANSFER OR BANK GURANTEE OR DEMAND DRAFT
Price Basis	Price Variation Basis as per IEEMA PV clause.
Executive Handling this Tender*	Name: Mr. Naman Patel Contact No.: 9029001594 E-Mail ID: naman.patel@tatapower.com

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

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1.2 Calendar of Events

(a)	Access to Tender Documents through Tata Power website	07 th May' 2024 onwards
(b)	Last date and time for Payment of Tender Participation Fee to get e-tender link for bid submission*	Till 21 st May' 2024 1500 Hrs.
(c)	Date & Time of Site visit/Pre-Bid Meeting.	Shall be informed separately through ARIBA portal to authorized personnel of bidder participating in tender.
(d)	Last Date of receipt of pre-bid queries, if any.	Shall be informed separately through ARIBA portal to authorized personnel of bidder participating in tender.
(e)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	Shall be informed separately through ARIBA portal to authorized personnel of bidder participating in tender.
(f)	Last date and time of receipt of Bids	Shall be informed separately through ARIBA portal to authorized personnel of bidder participating in tender.

Note: - * Interested bidders are strongly advised not to wait by above time and purchase the tender immediately to get the link for bid submission. This will enable them to communicate/raise queries against the subject tender in time.

These date and time in above calendar of events 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.

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.

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Checklist of Document Submission

Stage of Tendering	Document	Type of Format	Mode of submission
Before last date of Pre-Bid Query	Query / Clarification / Deviation (QCD) Format. (F1) Separate Excel sheet to be used for Technical and Commercial Pre-Bid Query	Editable Excel Format	Through message in E-tender system
Bid Submission Envelope 1 (First Part)	Earnest Money Deposit	Original Bank Guarantee	In Sealed Envelope
Bid Submission Envelope 2 (Second Part)	Documents to be uploaded in Ariba only. In case of multiple files, a zipped folder can be attached for the same (size limit of 100 MB per zipped file)		
To be submitted Under Tab 2 in Ariba	Duly filled PQR and supporting documents		
	Duly filled PQR format	Editable Excel Format	E-Tender System
	Backup documents for Technical PQR	Signed and Scanned documents	E-Tender System
To be submitted in Ariba	Duly Filled Vendor Registration Form (for unregistered vendor) and supporting documents. Registered vendor to submit letter indicating Vendor Code in Tata Power and factory/supply address to be used.		
	Duly filled Vendor Registration Form (if vendor is not registered with Tata Power)	Signed and Scanned documents	E-Tender System
	Backup document for Vendor Registration Form (if vendor is not registered with Tata Power)	Signed and Scanned documents	E-Tender System

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To be submitted in Ariba	Technical Submission and Supporting Documents		
	Duly filled Technical Submission Format	Editable Excel Format	E-Tender System
	Technical Submission as required for Technical Specifications	Signed and Scanned documents	E-Tender System
	Duly filled Technical Submission- Type test verification sheet Format	Editable Excel Format	E-Tender System
	Backup documents for Type Test verification	Signed and Scanned documents/ reports	E-Tender System
	Query / Clarification / Deviation (QCD) Format for Deviation if any	Editable Excel Format	E-Tender System
	Duly filled Unpriced Bid Format	Signed and scanned copy of document	E-Tender System
To be submitted in Ariba	Commercial Submission and supporting document		
	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)	Duly filled Priced Bid Format	Duly signed and stamped scanned copy of document. To be entered in E-Tender System	E-Tender System

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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 and Commercial deviation have to be submitted separately.

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.

1.6 Qualification Criteria

Qualification Requirement expectation and document are detailed in documents in Section C

1.7 Pre-Bid Queries

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. Technical Pre-Bid Query and Commercial Pre-Bid Query have to be submitted in Separate Editable Excel File in Prescribed 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 marketplace 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

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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.

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 Bidder. Hence all bidders are advised to quote their most competitive rates against each line item.
- Bidder must 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 Contract prices shall be subject to IEEMA Price Variation Clause. IEEMA price variation shall be applicable on Transformer supply portion only.

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 must 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 validity 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.

Note: At times bidders have sought Tata Power bank details which is needed by them to make BG. Hence the same is reproduced below. These details are only provided to facilitate making of BG if needed

Tata Power's Bank Details for submitting EMD BG:
Bank Name & Address – ICICI Bank, 163 HT Marg,

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Backbay Reclamation, Churchgate, Mumbai 400 020.

A/c no. - 000451000293

IFSC Code – ICIC0000393

The hard copy of EMD in a sealed envelope should be sent on address mentioned in Tender document.

First Part must 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
- 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 must 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 must be submitted through E-Tender System 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.

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

FOR BIDS INVITED IN SEALED ENVELOPE PROCESS (FIRST PART):

First Part of the bid shall be sealed in envelope which shall be clearly marked as below:

**EMD BID –
“Please mention Tender Reference No”**

Please mention our Tender Reference No on the Tender and drop the same in our Tender Box located at The Tata Power Company Limited (Tata Power), Corporate Contracts, Smart Center of Procurement Excellence, 2nd Floor, Sahar Receiving Station, Near Hotel Leela, Sahar Airport Road, Andheri (E), Mumbai 400 059.

The bid shall be addressed to:

Head - Procurement

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The Tata Power Company Limited (Tata Power),
Smart Center of Procurement Excellence, 2nd Floor, Sahar Receiving Station,
Near Hotel Leela, Sahar Airport Road, Andheri (E), Mumbai 400 059.

The envelope shall also bear the Name and Address of the Bidder along with our Tender No. and subject.

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and Tata Power, shall be written in the English Language. Any printed literature furnished by the Bidder may be written in another Language, provided that this literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

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 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 breakup 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 breakup 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.

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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. Price submitted as part of E-auction / Negotiation shall remain valid for **90 days** from date of E-auction / Negotiation.

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.

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 with an additional claim period of 180 days from the date of expiry of BG.

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. 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

Price Bid of only Technically and / or Safety Qualified Bidders shall be considered and open internally by TPC. Bidders will get mail intimation from Tata Power E-Tender system (Ariba) when their Price Bids are opened.

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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 conduct the reverse auction AND / OR Manual Negotiations for the products/ services being asked for in the tender. Only Technical Qualified Bids will be allowed to participate in e-auction. Date and time of e-auction will be intimated through E-Tender system to Authorized Person of Interested Bidder.

For case where more than one bidder has 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.

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.

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.

Tata Power work practices are governed by the Tata Code of Conduct. Bidder is requested 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.

---XXX---

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OPEN TENDER NOTIFICATION

Tender Reference: CC25NP003

Document Date: 07th May' 2024

Section B: Format of Technical & Commercial Pre bid Queries

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OPEN TENDER NOTIFICATION

Tender Reference: CC25NP003

Document Date: 07th May' 2024

Section C.1: Pre-Qualification requirement

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C.1 Bidders Prequalifying Requirements for Mineral Oil (MO) Power Transformers

S No	Parameter	Tata Power Requirement	Documents To be submitted by Vendor to ascertain meeting of Pre-qualification requirement
1	2	3	4
1	Infrastructure	Bidder shall be an OEM of Transformer of 110 kV and above with manufacturing facility / assembly in India. The bidder must have in-house NABL accredited routine and acceptance testing facilities for acceptance as per relevant IS/IEC.	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.
2	Supply and Experience	Bidder shall have supplied from India minimum 5 no. Mineral Oil (MO) Transformer of 110 / 23.1 kV, 40 MVA or higher capacity rating in last 10 years. Minimum 2 no. of MO Transformer of 110 / 23.1 kV, 40 MVA or higher capacity should have been in satisfactorily commercial operation for a minimum period of two years as on the date of bid opening.	Supply List & Performance Certificates from the utilities / clients 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.
3	Type Test	The bidder shall submit Type test reports obtained from NABL/ International Accredited Lab for the transformer offered. The type tests should have been conducted on the 110 / 23.1 kV, 40 MVA or higher rating MO Transformer of the same design. Bidder to provide Short circuit type test report on 110 / 23.1 kV, 40 MVA or higher rating Mineral oil Transformer of similar design as offered. 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).	Type Test Report. Undertaking that there is no change in design / material of construction (MOC) if Type Test Report older than 5 years but less than 10 years prior to date of bid opening has to be considered (if applicable) Undertaking that type test shall be carried out for the offered equipment / material from NABL / International Accredited Lab without any cost implication to the owner and the Type Test reports shall be submitted before despatch 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)
4	EPC Experience	In case the package involves installation & commissioning of the Transformer, then the bidder shall have installed and commissioned minimum 2 no. of MO Transformer of 40 MVA or higher capacity and should have been in satisfactorily commercial operation for a minimum period of two years as on the date of bid opening.	Performance Certificates / reference list from the utilities / clients
5	Commercial Capability	Average annual turnover of the Bidder for last three financial years shall not be less than Rs. 40 Crore	CA Audited P&L Statements and balance sheets for last 03 years.
Sr no.	Additional Project specific qualification criteria		Documents to be submitted by Bidder
1	Performance criteria	In case the bidder has a previous association with Tata Power for similar products and services, the performance feedback for that bidder by Tata Power shall only be considered irrespective of performance certificates issued by any third organization. Technical performance, engineering deliverables, delivery timelines, Erection Testing and Commissioning (ETC) service and support records of past executed projects in Tata Power will be considered for technical evaluation of bidder.	-

S No	Parameter	Tata Power Requirement	Documents To be submitted by Vendor to ascertain meeting of Pre-qualification requirement
1	2	3	4
2	Delivery Criteria	<p>Bidder shall confirm delivery of power transformers within 17 months from date of award and commissioning within 18 months from date of purchase order for both power transformers. Details of delivery schedule are as below;</p> <p>Supply:</p> <p>a) Drawing submission/approval shall be completed within 02 month from the date of award (Bidder shall submit the complete drawings within 04 weeks from date of award and Tata Power shall approve the drawing and provide manufacturing clearance within 04 weeks from date of receipt of complete drawing)</p> <p>b) Material shall be delivered at site within 15 months from date of manufacturing clearance.</p> <p>Service: Installation, testing and commissioning shall be completed within 01 month from date of supply.</p>	Confirmation / Undertaking from incharge of transformer manufacturing factory is required. Alternatively, same can be issued by authorised person.
3	Owner complies with the provisions issued by the statutory bodies with regards to the subject Project.	<p>Business Associate/Bidder participating in the present tender also need to comply with the same, as elaborated below,</p> <p>i)Business Associate/Bidder participating in the present tender, agrees and undertake to procure the products associated with the present order as per the provisions of Public Procurement orders issued by Ministry of Power vide orders No. 11/5/2018 - Coord. dated 28.07.2020 for transmission sector, as amended from time to time read with Department for Promotion of Industry and Internal Trade (DPIIT) orders in this regard.</p> <p>ii)Bidder also agrees and undertake to comply with Department of Expenditure, Ministry of Finance vide Order (Public Procurement No 1) bearing File No. 6/18/2019-PPD dated 23.07.2020, Order (Public Procurement No 2) bearing File No. 6/18/2019-PPD dated 23.07.2020 and Order (Public Procurement No. 3) bearing File No. 6/18/2019-PPD, dated 24.07.2020, as amended from time to time, regarding public procurement from a bidder of a country, which shares land border with India.</p>	Undertaking from authorised person to be submitted.

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OPEN TENDER NOTIFICATION

Tender Reference: CC25NP003

Document Date: 07th May' 2024

Section C.2: Safety Bid document

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The Tata Power Company Ltd	TPCØDL TPSØDL		TPNØDL TPWØDL	Contractor's Safety Code of Conduct
Document no TPSMS/GSP/ CSM/015/REV 07				Date of Issue: 01/08/2023

Appendix 6: CSM F6 - Safety Competency Assessment Form (Template)

Name of the Vendor/Bidder:
 Name of the Sub Vendor (If job is given to Sub Vendor):
 Description of the Job:
 Request for Quotation (RFQ) No.:

Vendor/Bidder to mandatorily provide the below safety competency related information:

1. Proposed Manpower Deployment Schedule :-

Type of manpower	Qualification	Experience	Month 1	Month 2	Month 3
<u>Project /AMC Manager(R7)</u>						
Site In Charge						
Safety Manager						
Safety Officer						
Supervisors						
Technicians						
High Skilled workmen						
Skilled workmen						
Semiskilled workmen						
Lineman						
Helpers						
Drivers						
Unskilled						
<u>Others(R7)</u>						

Instruction to Bidders:

- i. Indicate the overall site manpower deployment schedule as above
- ii. Indicate direct or subcontracted employees by using color code given below:
 - Direct Bidder Employee – Green**
 - Partly Direct / partly Subcontracted – Yellow**
 - 4.3.5 **Subcontracted – Red** *If subcontractor detail is not available at stage of Bid evaluation, then this can be agreed with Order manager or Engineer in charge before deployment Ensure that all sub-contractors follow the Tata Power Safety Procedure and agreed CSM F9 Site Safety Management Plan.R7*
- iii. Against each category, indicate minimum educational qualification and work experience

The Tata Power Company Ltd	TPC ODL TPS ODL	 TATA TATA POWER	TPN ODL TPW ODL	Contractor's Safety Code of Conduct
Document no TPSMS/GSP/ CSM/015/REV 07				Date of Issue: 01/08/2023

- iv. Add rows to include other specialized manpower, if any.
- v. Extend columns to cover the entire duration of the proposed contract.
- vi. If the operation is in shifts, then indicate shift in charge and / or safety officers required for each shift operation.

2. List of Tools, Tackles, Machines and Equipment: -

Bidder/ Vendor to provide the list of tools, tackles, equipment **to be used during the job / project execution**. Bidder/Vendor to ensure that all the lifting tools and tackles, pressure vessels are duly certified by the competent person authorised by the Chief Inspector of Factories of the respective state prior to start of the job

Sr. No	Description of Tools / Tackles	Capacity / Rating	Quantity	Make	Year of manufacture	Remarks
1						
2						
3						
4						
5						
.....						

3. Safety Records:

Bidder to provide the details of fatalities and lost workday cases (LWDC), occurred in last three years (data to be provided for the last completed FY and preceding 2 years).

Description	Safety Data for current and Last 3 Years			
	Current Year	Year 1 (Last FY)	Year 2	Year 3
		20__ - __	20__ - __	20__ - __
Fatalities (Nos.)				
Lost Workday Cases (Nos.)				

In case of no fatalities, LWDC during any year, the form may be filled stating NIL against the respective year. Bidders are encouraged to also submit the RCA / incident investigation reports and the learning's implemented out of the above reported incidents

4. Job Safety Plan/ Method Statement:

Bidder to provide / enclose a detailed Site/Job Safety Plan along with a Method statement detailing the execution philosophy (how the bidder intends to execute the Job/Project), identifying all key activities which are required to be performed by the contractor at Site.

The Tata Power Company Ltd	TPC ODL TPS ODL	 TATA TATA POWER	TPN ODL TPW ODL	Contractor's Safety Code of Conduct
Document no TPSMS/GSP/ CSM/015/REV 07				Date of Issue: 01/08/2023

Bidder to also list down all high-risk activities and provide the Hazard Identification and Risk Assessment (HIRA) for all such high-risk activities involved in the site work.

(Use Method Statement template attached as Appendix 9)

5. PPE Requirement -R7

Division/DISCOM Requirement	Bidders Response
The Bidder/Vendor shall ensure that all PPE of Approved standards as per CSM F8 – PPE Requirements shall be always available and shall be used by his employees with no exception whatsoever. Bidders to also ensure Standard PPE matrix of Tata Power to be followed for all activities.	
10% Buffer stock of PPEs to be provided by bidders at each circle to meet any contingency	
Bidder will ensure that sample PPEs to be submitted/approved by Safety Department along with EIC at the time of submission of Safety bids for evaluation In case bidder manpower found using substandard or any PPEs which are not approved by the Tata Power-Division /DISCOM representative, then Tata Power-Division /DISCOM will provide the same to manpower deployed at the cost of bidders.	

6. Vehicle Deployment: Bidders to provide details of all vehicles deployed during execution of work-(R7)

S. No.	Vehicle No.	Vehicle Type	Location	EV/CNG/Diesel/Petrol	Year	Whether CNG endorsed on RC

The Tata Power Company Ltd	TPC ODL TPS ODL	 TATA TATA POWER	TPN ODL TPW ODL	Contractor's Safety Code of Conduct
Document no TPSMS/GSP/ CSM/015/REV 07				Date of Issue: 01/08/2023

7. **Crane Deployment**-(R7): Bidders to provide details of crane to be deployed during the execution of work as and when required. Bidders to provide approved new gen crane ACE Model SX150, ACE FX150 and Escorts Model TRX 1550.

SI No	Crane No	Location	Year

8. **Training Records**-(R7): Bidders to provide training records of employees deployed for the execution of work during last one year. These training includes OHS (Occupational Health and Safety) Training, Training on SOP/Work Procedures and Medical Emergency trainings imparted at their own facility, cost, and expenses. Bidders to provide the following details:

Tata Power-Division /DISCOM Requirement	Bidders Response
Training records of employees at their own facility, cost, and expenses for last one year	
Training facility available with Bidders	
Future road map for enhancing the competency of workforce	

9. **Rewards and Recognition**-(R7): Bidders to provide the details of process deployed in their organization for sharing and resolution of safety concerns raised by their employees. Also, bidders to provide the details of Rewards and Recognition process in their organization for safety to encourage the morale of their workforce.

10. **Management System Certification: -**

Sr.No	Certification	Yes / No	If Yes, Year of Certification	If No, Target date for Certification
1	ISO 9001			
2	ISO 14001			
3	ISO 45001			
4	Any other (Specify....)			

Note: Please attach certificates to support above. In case not accredited for above but applied for, application letters may be attached.

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OPEN TENDER NOTIFICATION

Tender Reference: CC25NP003

Document Date: 07th May' 2024

Section D.1: Scope of Work/Technical Specification

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	110 kV POWER SUPPLY EXTENSION TO BPCL	

110 kV POWER SUPPLY EXTENSION TO BPCL

Document Title: SPECIFICATION FOR 110 kV/23.1 kV 40 MVA
POWER TRANSFORMERS

Document No: TE00517/SP/0055/FY24

TATA POWER

The Tata Power Company Limited

Engineering (T&D), The Tata Power Company Limited, Tata Power Antop Hill Receiving Station, Samadhan Road, Antop Hill, Mumbai-400037

Registered Office Bombay House 24 Homi Mody Street Mumbai 400 001

Revision	Date	Description	Approvals		
			Prepared By	Checked By	Approved By
A	08-01-2024	Final	PSA	VAS	SKV
			<i>Adarsh</i>	<i>Sankpal Vinod</i>	<i>Gustav</i> 090124

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PE scroll no.: ENGG/SP/0055/FY24

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A2	<u>PROJECT INFORMATION</u>
A3	<u>SCOPE OF WORK</u>
A4	<u>TERMINAL POINTS</u>
A5	<u>EXCLUSIONS</u>
A6	<u>CODES AND STANDARDS</u>
A7	<u>BIDDER'S QUALIFICATION REQUIREMENT</u>
A8	<u>PROJECT SCHEDULE / MILESTONES</u>
A9	<u>SUBMISSIONS BY BIDDERS</u>
A10	<u>DETAILED TECHNICAL SPECIFICATION</u>
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A10.2	<u>CIVIL AND ARCHITECTURAL</u>
A10.3	<u>CONTROL INSTRUMENTATION AND AUTOMATION</u>
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A11	<u>LAYOUT REQUIREMENT</u>
A12	<u>QUALITY REQUIREMENT</u>
A13	<u>PERFORMANCE REQUIREMENTS</u>
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E.10	<u>Approved Vendor List for Transformer.</u>

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CHECK LIST FOR DOCUMENTS TO BE SUBMITTED ALONG WITH THE BID

S No	Document Name	Submitted by Bidder Yes / No
1	Signed copy of bid document as a token of acceptance	
2	Dully filled in schedules, listed in section 'C'. i.e., Schedule C1 to C9 – Attached as Schedule C	
3	Qualifying Requirement in Format C1 – Attached as Annexure E.5	
4	Quality Assurance Plan (QAP), Manufacturing Quality Plan (MQP), Field Quality Plan (FQP) as applicable.	
5	General Arrangement Drawings for equipment offered.	
6	Filled up Data Sheets in Format E2 – Attached as annexure B1.	
7	Type Test Reports as applicable.	

Name of Bidder:

Signature & Stamp:

Date:

<p>TE00517/SP/0055/FY24 Rev: A Date: 08.01.2024</p>	<p align="center">SPECIFICATION FOR 2 X 40 MVA, 110/23.1 kV POWER TRANSFORMER</p> <hr/> <p align="center">110 kV POWER SUPPLY EXTENSION TO BPCL</p>	<p>Section-A Page 5 of 31</p>
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A1 INTENT OF SPECIFICATION

It is proposed to install 2 no. 40 MVA, 110/23.1 kV Power transformers at Trombay Station required for 110 kV power supply extension to BPCL. The equipment offered against this specification shall meet the requirements and shall be based on the latest technologies in the respective fields and conform to the relevant Indian / International Standards and codes of practices.

The technical specification document covers the requirements for Design, manufacture, factory testing, packaging, route survey, transportation, delivery, unloading on site foundation, installation, testing and commissioning of transformers.

All equipment, system and services covered under this specification shall comply with all current applicable statutory regulations and safety codes in the locality where the equipment is proposed to be installed. The equipment and systems shall also conform to the latest version of applicable codes and standards on the date of offer made by the Bidder unless otherwise indicated. Nothing in this specification shall be construed to relieve the Bidder of its responsibility.

A2 PROJECT INFORMATION

1	Location :	Tata Power Trombay Generating station
2	Altitude :	Mumbai, India Not more than 60 meters above sea level.
3	Maximum ambient temp.: Daily average maximum: Ambient temperature to be considered for design:	50 deg.C 40 deg.C 50 deg C
4	Minimum ambient air temperature	10 deg.C

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5	Climatic conditions	Atmosphere is generally hot, humid and is conducive to pollution, rust and fungus growth. It is laden with salt sprays, chemical fumes, steam and dust. Relative humidity is over 95% during four months in a year when about 2000 mm rainfall takes place.
6	Auxiliary Supply	
	a) Power devices :	415V, 3 Phase, 4 wire, 50 Hz AC System (voltage variation +10%, frequency variation + 3%, ambient variation + 10%).
	b) Light fixtures and :	240 V, 1 phase, 50 Hz AC System.
	Space heaters	
	c) Control devices :	220 V, 2 wire, centre point grounded DC System
	d) Communications :	48 V DC + ve grounded
	e) SCADA	48 V DC
9	Topicalization.	The equipment shall be given tropical and fungicidal treatment in view of the above-mentioned climatic conditions. Tropical protection shall conform to BS: CP 1014 entitled "Protection of Electrical Power Equipment against climatic condition.

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A3 SCOPE OF WORK

The scope of work shall include but not be limited to the following:

Design, manufacture, factory testing, packaging, route survey, transportation, delivery, unloading on site foundation, installation, testing and commissioning of 2 no. 40 MVA, 110/23.1 kV Power transformers at Trombay Station.

Details of Power Transformer at Trombay Station is as mentioned below:

2 no. 3 Phase, 50Hz, 40 MVA, 110/23.1 kV, Dyn11 Power Transformer with Mineral Oil	
HV	Oil to Air 145 kV RIS bushings with overhead AIS connection
LV	Air filled Cable Box (Power Cables) (Oil to Air, 52 kV RIS bushings)
COOLING	ONAN – 100%
Impedance @ 40 MVA base	HV-LV – 13.25%
TAP	On 110 kV side – 17 Tap OLTC with +5% to -15% range with steps of 1.25%

TECHNICAL SPECIFICATIONS

Please refer Section B – Standard specification of Power Transformer.

Annexure B.1 Data sheet shows the values of the different parameters required by the purchaser. The supplier shall confirm their guaranteed values as per the Annexure B.1 Datasheet.

Design Requirements

The following list shows the values of the different parameters required by the purchaser. The supplier shall confirm their guaranteed values as per the Schedule of Guaranteed particulars:

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	110 kV POWER SUPPLY EXTENSION TO BPCL	

I. 110 / 23.1 kV Transformer:

Sr. No	PARTICULARS	RATING / VALUE
1.	MVA RATING	40 MVA
2.	Cooling	ONAN– 100% of MVA rating
3.	Type	Power Transformer
4.	Voltage Ratio	110/23.1 kV
5.	Vector Group	Dyn11
6.	System Voltage	
a	110 kV side Nominal/ highest	110 / 123 kV
b	23.1 kV side Nominal / highest	23.1/24 kV
7.	Constant % Impedance @ 75 deg. C. @ 40 MVA base	HV-LV – 13.25%
8.	HV Taps	17 taps (+5% & -15% from nominal voltage) with steps of 1.25 %
9.	Type of Earthing	LV neutral shall be brought out through 52 kV RIS bushing for solid grounding.
10.	OLTC rating	170 kV, 350 A, Variation +5% & -15% from nominal voltage with 16 steps (No. of taps 17).
11.	Temperature rise test	Supplier to carry out Temperature rise Test by injecting highest no load and load losses to demonstrate temperature rise as per the limit given in the specification.
12.	Temperature rise over 50 deg C ambient temperature for Mineral Oil filled transformer	
a	Average Winding measured by resistance method.	50 deg C

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Sr. No	PARTICULARS	RATING / VALUE
b	Top Oil measured by thermometer	45 deg C
13.	Winding hotspots rise over yearly weighted temperature of 32 deg C	61 deg C
14.	Creepage distance for bushing	31 mm/ kV
15.	Bushing (HV and LV)	HV bushing shall be Oil to Air 145 kV RIS bushings with overhead AIS connection. LV and LV Neutral Bushing shall be 52 kV Oil to Air RIS bushing.
16.	Cable Details	For HV Cable: 110 kV, single core, 630 sqmm, XLPE, copper, lead sheath, Cable-per phase 01 no Cable. For LV Cable: 33 kV, single core, 630 sqmm, XLPE, copper, lead sheath cable - per phase 3 no cables.
17.	Penalty for exceeding Transformer Losses	Since Transformer Losses are specified, loss capitalization and commercial loading shall not be considered. Penalty on Bidder shall be applicable if Bidder is exceeding transformer losses as mentioned in the Annexure E.6.
18.	Transformer neutral formation and neutral CT details	Transformer neutral formation and tentative turret CT details shall be in line with attached Annexure E.8 drawing. Details to be finalised during detailed engineering.
19.	Proposed Transformer foundation details	Same shall be discussed jointly and finalized during detail engineering.

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Sr. No	PARTICULARS	RATING / VALUE
20.	Construction Power supply and storage	<p>Tata Power shall allocate 440V outlet for power supply free of cost. BIDDERS to consider cable supply, laying of cables termination of the allocated 440V outlet for power supply arrangement for erection of transformer.</p> <p>Only Storage space shall be provided by Tata Power. However, security and other arrangements for storage is in BIDDERS scope of work.</p> <p>Civil work is not in scope of BIDDERS.</p>
21.	Warranty	<p>Transformer warranty: BIDDERS to adhere to the following. Warranty Period for Transformers shall be 60 Months from date of Commissioning or 66 Months from date of dispatch, whichever is earlier. This includes any re Warranty or extended Warranty on account of repair or replacement of parts under Warranty. This includes Latent Defects Liability Period as well.</p> <p>Warranty Period for Spares shall be 24 Months from date of Commissioning or 30 Months from date of dispatch, whichever is earlier. This includes any re Warranty or extended Warranty on account of repair or replacement of parts under Warranty. This includes Latent Defects Liability Period as well.</p>

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A4 TERMINAL POINTS

- i. HV oil filled cable box, and LV air filled cable box.
- ii. All Transformer Marshalling boxes.
- iii. Transformer testing instruments required for commissioning of transformer at site is in Bidder's scope on returnable basis.
- iv. All necessary communication accessories required at Transformer end for commissioning and integration of conventional OTI and WTIs, DGA, FOP based winding hotspot measurement system, REG D or equivalent make IED for OLTC control, SDH type breather and all the transformer monitoring e-devices with the existing station SCADA system shall be in BIDDERS's scope. Also, SCADA / RTU panel accessories such as patch cords, LIUs, communication /data FO cables, splicing and termination of FO cables at both ends, LC, SC connectors at both ends required for commissioning and integration of condition monitoring devices with existing SCADA system is in Bidder's scope (Supply and services). Only laying of FO cables is in Tata Power Scope.

OEM Services required for condition monitoring devices are in BIDDERS scope for integration with the existing SCADA system. Services for existing SCADA OEM for integration of these devices is in Tata Power's scope.

The distance between Transformer and SCADA panel is approximately 200 meters.

A5 EXCLUSIONS

- i. Civil work
- ii. Power and Control Cable supply, laying and terminations beyond Transformer marshalling box. However, control cables from Transformer devices terminal box to marshaling box is in bidder's scope.
- iii. 110 kV and 33 kV power cables and its termination is not in the bidder's scope.
- iv. Services from station SCADA OEM for integration of condition monitoring devices with SCADA system is not in Bidder's scope.
- v. Earthing system-All the above work will be carried out by Tata Power contractor.

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A6 CODES AND STANDARDS

Please refer Section B – Standard specification of 110 kV Transformer.

A7 BIDDER'S QUALIFICATION REQUIREMENTS

Please refer Annexure E.5 – for PQR requirements

A8 PROJECT SCHEDULE / MILESTONES

Bidder shall submit with the bid, a detailed Project Schedule covering the following based on the milestones tabulated below:

- a. Start of 'Engineering'.
- b. Completion of 'Engineering'
- c. Commencement of 'Manufacturing'/Manufacturing process
- d. Commencement of Supply
- e. Commencement of erection, testing and commissioning

Bidder shall submit the following information along with the Technical Bid.

- a) Bidder shall provide the technical offer including data sheets, BOM, Bidder Qualification Requirement, footprint requirement (overall size), Guaranteed Losses of transformer, GA drawings, Type test reports, Guaranteed Particulars and Recourse if Guarantee is not met, unpriced copy of price schedule etc., of hardcopies and soft copies (in editable format) for the technical evaluation as filled in the format given along with the technical offer. In the absence of the above, the offer submitted by the bidder will not be considered.

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- b) The engineering data shall be furnished by the Contractor in accordance with the Schedule for each set of equipment as specified in the Technical Specifications.
- c) The Documents shall be submitted through Document management system 'WRENCH'. Necessary training on Wrench Software will be provided to Bidders representative by consultant. Master Document List (MDL) shall be prepared by contractor and submitted for Owner's approval.
- d) The drawings will be approved in four categories as follows:
- Code I: Approved
 - Code II: Approved subject to incorporation of comments as marked. Resubmit for formal approval.
 - Code III: Not Approved. Incorporate comments as marked. Resubmit for review / approval.
 - Code IVa: Retain for Information.
 - Code IVb: Resubmit after incorporation of comments.
 - It is responsibility of the Bidder to handover all project related drawings in Auto Cad format only. The pdf version of above drawings / documents shall be routed through Wrench for formal approval process.
- The Bidder shall submit 6 (six) sets of code I & code IVa approved drawings / design documents / data / test reports to the Owner.

DRAWINGS

- a) All drawings submitted by the Bidder including those submitted at the time of bid shall be with sufficient detail to indicate the type, size, arrangement, material description, Bill of Materials, weight of each component, break-up for packing and shipment, dimensions, internal & the external connections, fixing arrangement required and any other information specifically requested in the

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specifications.

- b) Each drawing submitted by the Bidder shall be clearly marked with the name of the Owner, the unit designation, the specifications title, the specification number and the name of the Project. If standard catalogue pages are submitted, the applicable items shall be indicated therein. All titles, noting, markings and writings on the drawing shall be in English. All the dimensions should be in metric units.
- c) Further work by the Bidder shall be in strict accordance with these drawings and no deviation shall be permitted without the written approval of the Owner, if so required.
- d) The review of these data by the Owner will cover only general conformance of the data to the specifications and documents interfaces with the equipment provided under the specifications, external connections and of the dimensions which might affect plant layout. This review by the Owner may not indicate a thorough review of all dimensions, quantities and details of the equipment, materials, any devices or items indicated, or the accuracy of the information submitted. This review and/or approval by the Owner shall not be considered by the Contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications and documents.
- e) All manufacturing and fabrication work relating to the equipment prior to the approval of the drawings shall be at the Bidders risk. The Bidder may make any changes in the design, which are necessary to make the equipment conform to the provisions and intent of the Contract and such changes will again be subject to approval by the Owner. Approval of Bidders drawing or work by the Owner shall not relieve the Bidder of any of his responsibilities and liabilities under the Contract.
- f) All engineering data submitted by the Bidder after final process including review

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and approval by the Owner shall form part of the Contract Document and the entire works performed under these specifications shall be performed in strict conformity, unless otherwise expressly requested by the Owner in Writing

A8 PROJECT SCHEDULE / MILESTONES

Bidder shall submit with the bid, a detailed Project Schedule covering the following based on the milestones tabulated below:

- a) Start of 'Engineering'
- b) Completion of 'Engineering'
- c) Commencement of 'Manufacturing'/Manufacturing process
- d) Commencement of Supply

Commencement of erection, testing and commissioning

Sr. No.	Milestone	Target
1	PO Placement	Zero Date
2	MDL & Project Detailed Project Execution Schedule submission & approval	Within 1 weeks from Sr. No. 1
3	Drawing submission & approval	Within 3 weeks from Sr. No. 1
4	Inspection of equipment	Within 5 months from Sr. No. 1
5	Delivery of equipment	Within 10 days from Sr. No. 4
6	Completion of installation	Within 4 weeks from Sr. No. 5

NOTE:

- i. The Bidder may please note that all resubmissions must incorporate all comments given in the earlier submission by the Owner or adequate justification for not incorporating the same must be submitted failing which the submission of documents is likely to be returned.
- ii. The list of drawings which are required to be referred during execution shall be finalized with the Bidder at the time of Award.

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- iii. All as build drawings should be submitted in the latest Auto CAD Version.
- iv. The instruction Manuals shall contain full details of drawings of all equipment being supplied under this contract, their exploded diagrams with complete instructions for storage, handling, erection, commissioning, testing, operation, trouble shooting, servicing and overhauling procedures.
- v. If after the commissioning of the project, the instruction manuals require any modifications/additions/changes, the same shall be incorporated and the updated final instruction manuals shall be submitted by the Contractor to the Owner.
- vi. The Bidder shall furnish to the Owner catalogues of spare parts.

A9 SUBMISSIONS BY BIDDERS

Bidder shall submit the following information along with the Technical Bid.

- a) Dully filled in schedules, listed in section 'C'.
- b) Quality Assurance Plan (QAP), Manufacturing Quality Plan (MQP), Field Quality Plan (FQP)
- c) General Arrangement Drawings for equipment offered.
- d) Filled up Data Sheets

A10 DETAILED TECHNICAL SPECIFICATIONS*

A10.1 MECHANICAL - NA

A10.2 CIVIL AND ARCHITECTURAL -NA

A10.3 CONTROL, INSTRUMENTATION AND AUTOMATION - NA

A10.4 ELECTRICAL

Refer Section B2 STANDARD SPECIFICATIONS

- B2.1 Standard specification for EHV Transformer
- B2.2 Standard specification for TRANSFORMER OIL
- B2.3 Standard Specifications for MV LV Power and Control cables

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A11 LAYOUT REQUIREMENTS

Please refer Annexure E.1 for Transformer footprint and Annexure- E.4 Reference Outline drawing with Part list.

A12 QUALITY REQUIREMENTS

Please refer Section B – Standard Specification for 110 kV Transformer

A13 PERFORMANCE REQUIREMENTS**A13.1 TEST PROCEDURE**

Please refer Section B – Standard Specification for Transformer

A14 MAINTAINANCE REQUIREMENTS

Please refer Section B – Standard Specification for Transformer

A15 TOOLS AND TACKLES FOR ERECTION AND COMMISSIONING

Please refer Section B – Standard Specification for Transformer

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A16 SPARES

Bidder needs to include competitive price for Mandatory Spare parts against the below specified list and schedules.

The Bidder shall supply the spares required as mentioned in the price schedule.

Bidder shall include list of spares with quantities as recommended by him required for three years trouble free operation of equipment.

< Clearance of Engineering Disciplines (as under) shall be taken on office copy for records. The concurrence signatures shall not be printed on document being sent outside of Project Engineering >

Rev No	Date	Originator	Reviewed By	Cleared By		Approved By (HOD)
				HOD	Signature	
				Mechanical		
				Civil		
				Piping & Layout		
				C & I		
				Automation		
				Electrical		

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B1 – DATA SHEETS
Refer Annexure B1

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B2 –STANDARD SPECIFICATIONS

Please refer Section B2 STANDARD SPECIFICATIONS

- B2.1 STANDARD SPECIFICATION FOR Power Transformer
- B2.2 STANDARD SPECIFICATION FOR TRANSFORMER OIL
- B2.3 Standard Specifications for MV LV Power and Control cables

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C1 - SCHEDULE OF QUANTITIES AND PRICES

Seal of the Company

Signature

Designation

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C2- PROJECT TIME SCHEDULE

Seal of the Company

Signature

Designation

Note: The bidder shall indicate schedule of milestones and also attach/furnish a detailed bar chart identifying customer inputs.

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C3- SCHEDULE OF DEVIATIONS FROM TECHNICAL SPECIFICATIONS

All deviations from this specification, shall be set out by the Bidders, indicating clause no and page in this schedule. Unless **specifically** mentioned in this schedule, the tender shall be deemed to conform to the purchaser’s specifications:

Sr. No.	Clause No.	Details of deviation with justifications
-----	-----	-----

We confirm that there are no deviations apart from those detailed above.

Seal of the Company

Signature

Designation

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C4- SCHEDULE OF DEVIATIONS FROM GENERAL & SPECIAL CONDITIONS OF CONTRACT

All deviations from this specification, shall be set out by the Bidders, indicating clause no and page in this schedule. Unless ***specifically*** mentioned in this schedule, the tender shall be deemed to conform to the purchaser's specifications:

Sr. No.	Clause No.	Details of deviation with justifications
-----	-----	-----

We confirm that there are no deviations apart from those detailed above.

Seal of the Company

Signature

Designation

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C5- SCHEDULE OF DRAWINGS & DOCUMENT SUBMISSION

As part of the proposal, the BIDDER shall furnish the schedule of drawing/document submission (

Sr. No.	Title of Drawing/Document	Target Date of submission	For Information/Review/Approval	Remarks
1.0				
1.1				
1.2				
2.0				
2.1				
2.2				
3.0				
3.1				
3.2				
4.0				
4.1				
4.2				
5.0				
5.1				
5.2				

Seal of the Company

Signature

Designation

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C6- SCHEDULE OF MANDATORY SPARES

As part of the proposal, the BIDDER shall indicate below the list of recommended spares for three years of trouble free operation of the equipment/system offered by him.

Sr. No.	Equipment tag no.	Description of spare	Material of construction	Part no	Quantity recommended per unit of equipment	Unit price	Total price	Delivery period from date of LOI	Remarks

Seal of the Company

Signature

Designation

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C7 - SCHEDULE OF SPECIAL ERECTION/MAINTENANCE TOOLS & TACKLES

As part of the proposal, the BIDDER shall indicate below, the list of erection/maintenance tools & tackles offered by him.

Sr. No.	Description of spare	Quantity recommended per unit of equipment	Unit price	Total price	Delivery period from date of LOI	Remarks

Seal of the Company

Signature

Designation

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C8 - SCHEDULE OF PLACES OF MANUFACTURE, TESTS AND INSPECTION

For major equipment / systems, the Bidder shall indicate the name of the Manufacturer / SUBCONTRACTOR and place of test and inspection.

ITEM OF EQUIPMENT	Manufacturer / SUBCONTRACTOR	PLACE OF TESTING & INSPECTION

Seal of the Company

Signature

Designation

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C9- SCHEDULE OF RECOMMENDED SPARES

As part of the proposal, the BIDDER shall indicate below the list of recommended spares for three years of trouble free operation of the equipment/system offered by him.

Sr. No.	Equipment tag no.	Description of spare	Material of construction	Part no	Quantity recommended per unit of equipment	Unit price	Total price	Delivery period from date of LOI	Remarks

Seal of the Company

Signature

Designation

<p><u>TE00497/SP/0055/FY24</u> Rev: A Date: 10.11.2023</p>	<p>SPECIFICATION FOR 110 KV/23.1 KV 40 MVA POWER TRANSFORMERS</p>	<p>Section-D Page 30 of 31</p>
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D- DRAWINGS AND DOCUMENTS

- D1 TENDER PURPOSE**
- D2 AFTER AWARD OF CONTRACT**

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E	<u>ANNEXURES</u>
E.1	<u>Transformer % Impedance and footprint requirement</u>
E.2	<u>Guaranteed Particulars and Recourse if Guarantee is not met</u>
E.3	<u>BOM for Transformers</u>
E.5	<u>Pre-qualifying requirements</u>
E.6	<u>Losses for Transformers</u>
E.7	<u>PRICE bid format and annexure</u>
E.8	<u>Tentative turret CT Details of Typical Transformer</u>
E.9	<u>Typical Master document list (MDL)</u>
E.10	<u>Approved Vendor List for Transformer.</u>

Annexure – E.1 Power Transformer % Impedance and Footprint requirement

TYPE	Constant % Impedance @ principal tap and @ 40 MVA base	FOOTPRINT (L X W in meter)		Remarks
		Utility Requirement	Provided by BIDDERS	
		L X W (Max.)	L X W (Max.)	
3 Phase, 50Hz, 40 MVA, 110/23.1 kV, Dyn11 Power Transformer with Mineral Oil	HV to LV: 13.25%	8 m x 6 m	By Bidder	

ANNEXURE- E.2: Guaranteed Particulars and Recourse if Guarantee is not met for Transformer

Sr No	Guaranteed Technical Particular	Permissible Deviation	Recourse if Guarantee is not met
1	No Load Loss at rated voltage and frequency	No deviation permissible on +ve side of maximum guaranteed losses as given in Annexure E.6.	The purchaser will reject the TRANSFORMER if the guaranteed losses exceed the losses as given in Annexure E.6.
2	Load Loss @ principal tap at rated current at 75 deg C		
3	Auxiliary Loss at rated load		
4	Temperature rise (Max temp. rise above ambient of 50 deg C).	Mineral Oil TRANSFORMER Top oil temp.: 45 deg C (max) Winding temp.: 50 deg C (max.)	The purchaser will reject the TRANSFORMER if the temperature rise exceeds the specified limits.
5	% Impedance value of TRANSFORMER.	Exceeds the guaranteed value by more than + 10% for HV- LV	The purchaser will reject the TRANSFORMER if % impedance value exceeds the guaranteed value. Impedance value lower than the specified value will be rejected.
6	Difference in % impedance values in any two phases during single phase short circuit test.	Should not exceed more than 2% of average value.	The purchaser will reject the TRANSFORMER if % impedance value exceeds the guaranteed value by more than 2 % of average value.
7	Impulse and Power frequency withstand voltage test at factory.	No deviation.	The purchaser will reject the TRANSFORMER in case of failure during test.
8	TRANSFORMER not manufactured as per agreed specification.	No deviations other than accepted deviations during post bid.	The purchaser will reject the TRANSFORMER.
Guaranteed Technical Particulars mentioned above will be witnessed at Bidder's factory during FAT			

Annexure E.3 BOM for 110/23.1 kV, 40 MVA, Dyn11 Transformer

	Item Description	Unit	Qty
1	Supply		
2	Design, manufacture, factory testing, packing, route survey, transportation to site 3 phase, 50 Hz, 40 MVA, 110/23.1 kV, Dyn11 Power Transformer including all accessories as per the specific and general requirements and complete with bushings, conservator, OLTC and without oil as per the specification	No.	2
	HV- Oil to Air 145 kV RIS bushings with overhead AIS connection, LV-Air Cable box, Cooling: ONAN		
3	TRANSFORMER Mineral Oil for above (filling of two TRANSFORMERS, conservator, and radiators + 5 % extra)	KL	2
4	RTCC panel for TRANSFORMER with A-Eberle or equivalent make Tap changer control relay (REG-D).	Set	2
5	Online DGA equipment	Set	2
6	Transit insurance up to site.		2
7	Type Test and Special Tests on TRANSFORMER at manufacturers' Works		2
	Type Test		
	Except Temperature rise test, all other type tests, special tests and routine tests shall be carried out on both the transformers.		
1	Lightning impulse voltage withstand test	EA	
2	Temperature rise test including DGA for only one TRANSFORMER	EA	
3	Lightning impulse voltage withstand test on neutral terminal	EA	
4	Measurement of zero sequence reactance.		
	Special test for each TRANSFORMER		
5	Lightning impulse voltage withstand test on neutral terminal	EA	
6	Long duration induced AC voltage test (ACLD) TRANSFORMER winding	EA	
7	Pressure test	EA	
8	Vacuum test	EA	
9	Vacuum and Pressure withstand test on tank and radiators		
10	ZPS Impedance test	EA	
11	Lightning Impulse test, incl chopped wave on	EA	
12	i) each phase (line end, HV,LV, neutral terminal)	EA	
13	ii) three phases	EA	
14	Switching Impulse Test for the line terminals		
15	LTAC withstand voltage test		
16	Measurement of the harmonics of the no load current	EA	

	Item Description	Unit	Qty
17	Acoustic Noise level measurement	EA	
18	Measurement of zero sequence impedances on three phase TRANSFORMERS.	EA	
19	415 V magnetic balance test	EA	
20	HV and LV Capacitance and tan delta measurement in all modes (GST and UST) for TRANSFORMER and its bushing.	EA	
21	Winding resistance measurement on all taps raising up and down	EA	
22	Determination of transient voltage transfer characteristics	EA	
23	Sweep Frequency Response Analysis (SFRA) on all the windings.	EA	
24	Dew point measurement before dispatch	EA	
25	Any other special/recommended test at manufacturer's works	EA	
26	OLTC test		
27	Routine tests as per IS for each TRANSFORMER	EA	
	Supply of spares for the TRANSFORMER.		
1	HV Oil to Air 145 kV RIS bushings	no.	1
2	LV (52 kV) RIS bushing	no.	1
3	LV Neutral (52 kV) RIS bushing	no.	1
4	Core grounding bushing	no.	1
5	Complete set of gaskets	no.	1
6	Bushing Current transformer of each rating	no.	1
7	Magnetic Oil Gauge for main conservator	no.	1
8	Conventional Winding temperature indicating equipment	no.	1
9	Conventional Oil temperature Indicating equipment	no.	1
10	FOP based temperature sensor external cubicle for hot spot and top oil temperature measurement	no.	1
11	OLTC motor	no.	1
12	Motor contactor of each type	no.	1
13	Pressure Release Device for Main Conservator	no.	1
14	SDH type Silica gel breather for main tank, HV oil filled cable box and OLTC	no.	3
15	One valve of each type	no.	1
16	Buchholz relay each type	no.	1
17	OSR Relay	no.	1
18	Prismatic Oil level indicator	no.	1
19	Set of spares for cooling cabinet [e.g., Contactors, relays & switches of each type (1 each)]	Set	1
20	Oil flow indicator	no.	1
21	Air bag for oil preservation system (COPS) for Main conservator	EA	1
22	Air Bag (COPS) rupture relay for main conservator	no.	1
23	Air Bag (COPS) for HV oil filled cable box	no.	1
24	Air Bag (COPS) rupture relay for HV Cable box conservator	no.	1
Services for			
a.	Packaging, route survey, transportation, delivery, unloading on site foundation, installation, testing and commissioning of 3 phase, 50 Hz, 40 MVA, 110/23.1 kV, Dyn11 Power transformer along with its accessories	No.	2

	Item Description	Unit	Qty

NOTE: 1

Anything extra not mentioned above can be added by bidder as per their requirement

NOTE: 2

ALL TESTING INSTRUMENTS REQUIRED FOR SITE TRANSFORMER TESTING SHALL BE PROVIDED BY BIDDER

E.5 Bidders Prequalifying Requirements for Mineral Oil (MO) Power Transformers

S No	Parameter	Tata Power Requirement	Documents To be submitted by Vendor to ascertain meeting of Pre-qualification requirement
1	2	3	4
1	Infrastructure	Bidder shall be an OEM of Transformer of 110 kV and above with manufacturing facility / assembly in India. The bidder must have in-house NABL accredited routine and acceptance testing facilities for acceptance as per relevant IS/IEC.	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.
2	Supply and Experience	Bidder shall have supplied from India minimum 5 no. Mineral Oil (MO) Transformer of 110 / 23.1 kV, 40 MVA or higher capacity rating in last 10 years. Minimum 2 no. of MO Transformer of 110 / 23.1 kV, 40 MVA or higher capacity should have been in satisfactorily commercial operation for a minimum period of two years as on the date of bid opening.	Supply List & Performance Certificates from the utilities / clients 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.
3	Type Test	The bidder shall submit Type test reports obtained from NABL/ International Accredited Lab for the transformer offered. The type tests should have been conducted on the 110 / 23.1 kV, 40 MVA or higher rating MO Transformer of the same design. Bidder to provide Short circuit type test report on 110 / 23.1 kV, 40 MVA or higher rating Mineral oil Transformer of similar design as offered. 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).	Type Test Report. Undertaking that there is no change in design / material of construction (MOC) if Type Test Report older than 5 years but less than 10 years prior to date of bid opening has to be considered (if applicable) Undertaking that type test shall be carried out for the offered equipment / material from NABL / International Accredited Lab without any cost implication to the owner and the Type Test reports shall be submitted before despatch 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)
4	EPC Experience	In case the package involves installation & commissioning of the Transformer, then the bidder shall have installed and commissioned minimum 2 no. of MO Transformer of 40 MVA or higher capacity and should have been in satisfactorily commercial operation for a minimum period of two years as on the date of bid opening.	Performance Certificates / reference list from the utilities / clients
5	Commercial Capability	Average annual turnover of the Bidder for last three financial years shall not be less than Rs. 40 Crore	CA Audited P&L Statements and balance sheets for last 03 years.
Sr no.	Additional Project specific qualification criteria		Documents to be submitted by Bidder
1	Performance criteria	In case the bidder has a previous association with Tata Power for similar products and services, the performance feedback for that bidder by Tata Power shall only be considered irrespective of performance certificates issued by any third organization. Technical performance, engineering deliverables, delivery timelines, Erection Testing and Commissioning (ETC) service and support records of past executed projects in Tata Power will be considered for technical evaluation of bidder.	-

S No	Parameter	Tata Power Requirement	Documents To be submitted by Vendor to ascertain meeting of Pre-qualification requirement
1	2	3	4
2	Delivery Criteria	<p>Bidder shall confirm delivery of power transformers within 17 months from date of award and commissioning within 18 months from date of purchase order for both power transformers. Details of delivery schedule are as below;</p> <p>Supply:</p> <p>a) Drawing submission/approval shall be completed within 02 month from the date of award (Bidder shall submit the complete drawings within 04 weeks from date of award and Tata Power shall approve the drawing and provide manufacturing clearance within 04 weeks from date of receipt of complete drawing)</p> <p>b) Material shall be delivered at site within 15 months from date of manufacturing clearance.</p> <p>Service: Installation, testing and commissioning shall be completed within 01 month from date of supply.</p>	Confirmation / Undertaking from incharge of transformer manufacturing factory is required. Alternatively, same can be issued by authorised person.
3	Owner complies with the provisions issued by the statutory bodies with regards to the subject Project.	<p>Business Associate/Bidder participating in the present tender also need to comply with the same, as elaborated below,</p> <p>i)Business Associate/Bidder participating in the present tender, agrees and undertake to procure the products associated with the present order as per the provisions of Public Procurement orders issued by Ministry of Power vide orders No. 11/5/2018 - Coord. dated 28.07.2020 for transmission sector, as amended from time to time read with Department for Promotion of Industry and Internal Trade (DPIIT) orders in this regard.</p> <p>ii)Bidder also agrees and undertake to comply with Department of Expenditure, Ministry of Finance vide Order (Public Procurement No 1) bearing File No. 6/18/2019-PPD dated 23.07.2020, Order (Public Procurement No 2) bearing File No. 6/18/2019-PPD dated 23.07.2020 and Order (Public Procurement No. 3) bearing File No. 6/18/2019-PPD, dated 24.07.2020, as amended from time to time, regarding public procurement from a bidder of a country, which shares land border with India.</p>	Undertaking from authorised person to be submitted.

[Annexure: E.6 Losses for Transformers](#)

TYPE	Transformer Losses in KW (Max. with no tolerance)	
3 Phase, 50Hz, 40 MVA, 110/23.1 kV, Dyn11 Power Transformer with Mineral Oil	No Load Loss at rated voltage, frequency and principal tap	Load Loss @ principal tap at rated MVA, rated frequency at 75 deg. C
	25kW	90 KW

The maximum permissible losses (No load loss and load loss) at rated voltage/current (at 75 deg C) have been specified in the above table for transformers. Following penalties shall be levied on the bidder if losses measured during routine test are found to be within +2% tolerance of the losses specified in specification, beyond which the transformer shall be liable for rejection. No benefit shall be given for supply of transformer with losses (measured during routine tests) less than the losses specified in specification.

Differential of specified losses vs Measured losses	RATE (in INR per KW)
No Load loss cost	Rs. 10,00,000/KW
I ² R Losses/Load Losses	Rs. 8,00,000/KW
Auxiliary Losses	Rs. 8,00,000/KW
Note: For a fraction of a kW, the penalty shall be applied on pro rata basis.	



ANNEXURE- E.7

Details regarding Price schedule Columns	
Column	
'b	Column "b" Refers to Ex-works Unit Cost of Power Transformer. The same shall include the following
	Ex-Design, manufacture, factory testing, packing, of Transformers, including all accessories as per the specific and general requirements and complete with bushings, cable dividing box, supply of conventional OLTC and RTCC panel for transformer, conservator and with adequate Transformer oil (for one filling of transformer, conservator, radiators, +5% extra for each transformer), Online DGA measurement device as per Specifications. Fiber optic-based Temperature Monitoring System and COPS airbags rupture monitoring relays as per specs also must be part of the basic transformer price.
	Price quoted will be on Price Variation Basis. Standard IEEMA Price Variation Clause will be applicable. Price Variation will be applicable on Item b only. Price Variation will be capped at 15% on positive side. There will be no cap on Negative Side.
	All special tests as specified in the Technical Specification will be carried out free of cost by the bidder and no extra charge will be paid for carrying out these tests. List of tests is detailed in Annexure 2
'c	Column "c" refers to one set of spares as detailed in Technical Specification for the said Power Transformer . List of set of spares is detailed in Annexure 3
'd	Column "d" indicates cost of Transportation and Insurance from factory to Tata Power site including route survey and cost of all permissions from statutory and relevant authorities for Transformer and its Accessories This cost includes also include all costs related to unloading of transformer at site, installation, testing and commissioning of Power Transformer
'f	It includes GST which is 18% at present
	Total Unit Cost of Transformer as delivered at site
	Column e, g, h, I and j are computations as detailed in Price Bid Format.
	Please note all other costs must be appropriately added in any one of the above line items



Annexure 2

List of tests

Refer Annexure E.3 BOM MO Power Transformer

Annexure 3

List of Spares with the transformer:

Refer Annexure E.3 BOM MO Power Transformer.



Annexure- 4

Guaranteed Particulars and Recourse if Guarantee is not met for Transformer

(Refer Annexure E.2 Guaranteed Particulars and Recourse if Guarantee is not met)

SIEMENS

3-PHASE POWER TRANSFORMER TO IS:2026

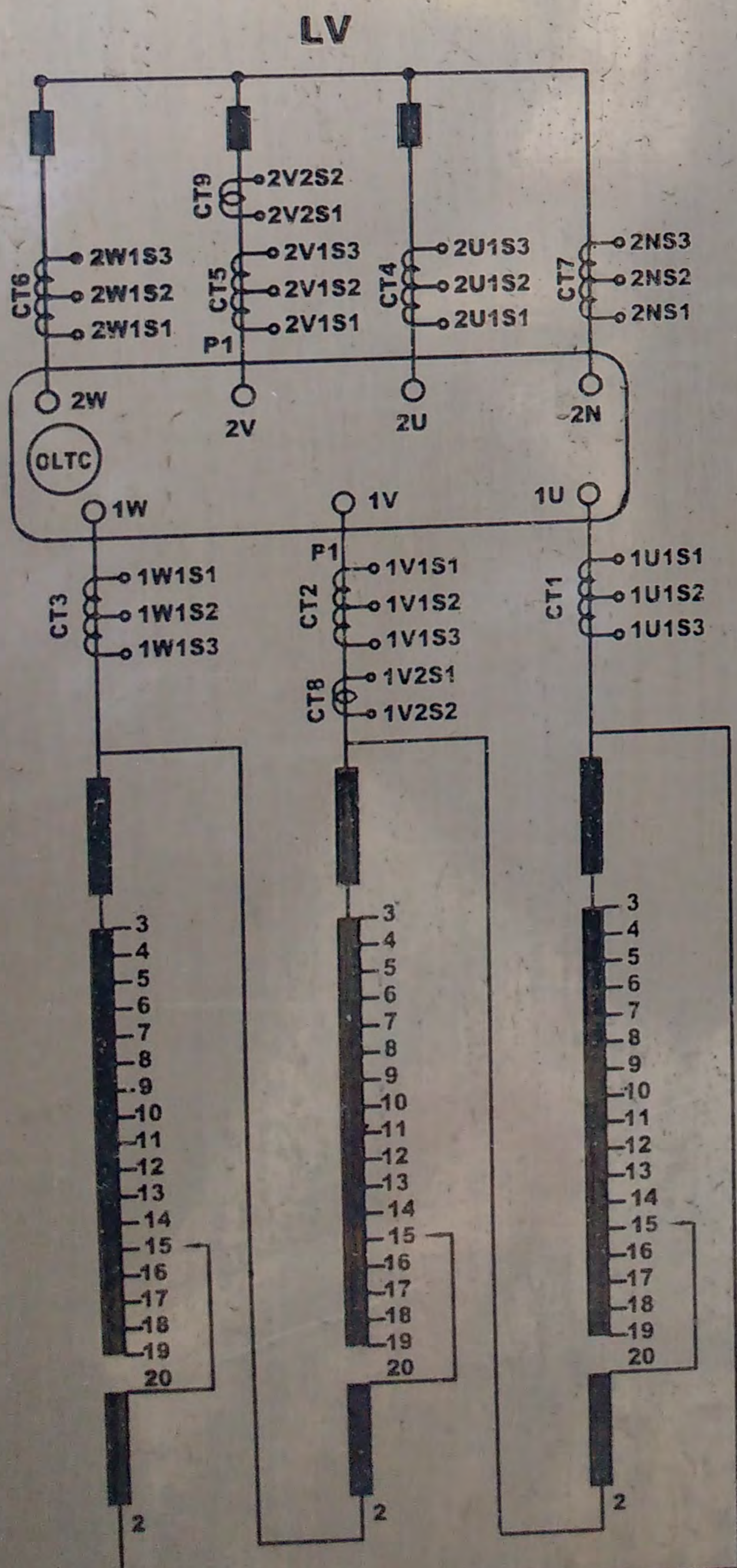
TYPE OF COOLING	ONAN		TYPE	POWER TRANSFORMER	
RATED POWER	HV	MVA	40	SERVICE	CONTINUOUS
	LV	MVA	40	VECTOR GROUP	Dyn11
RATED VOLTAGE AT NO LOAD	HV	kV	110	FREQUENCY	Hz
	LV	kV	23.1		50
RATED LINE CURRENT	HV	A	209.94	INSULATION	HV
	LV	A	999.74		LI 550 AC 230
NO. OF PHASES	3		INSULATION	LV	kV
					LI 125 AC 50
			LEVELS	LVN	LI 125 AC 50
IMPEDANCE	TAP1		12.35	APPROXIMATE WEIGHTS & OIL QUANTITY	
VOLTAGE (HV-LV)	TAP5	%	13.25%	CORE & WINDING	kg
40 MVA BASE	TAP17		13.53	TANK & FITTING	37500
				TOTAL MASS	17500
MAX. TEMPERATURE RISE OVER AN AMBIENT OF 50°C	TOP OIL	°C	45	SHIPPING WEIGHT (OIL FILLED)	72000
	AVG.WDG.	°C	50	VOLUME OF OIL	L
				DIAGRAM DRG. NO.	01 01 755
MAKER'S REFERENCE NO.	100081 - 01		YEAR OF MANUFACTURE	2012	

CUSTOMER REFERENCE

THE TATA POWER COMPANY LTD.

P.O No: 5100105637 dated 29/12/2011.

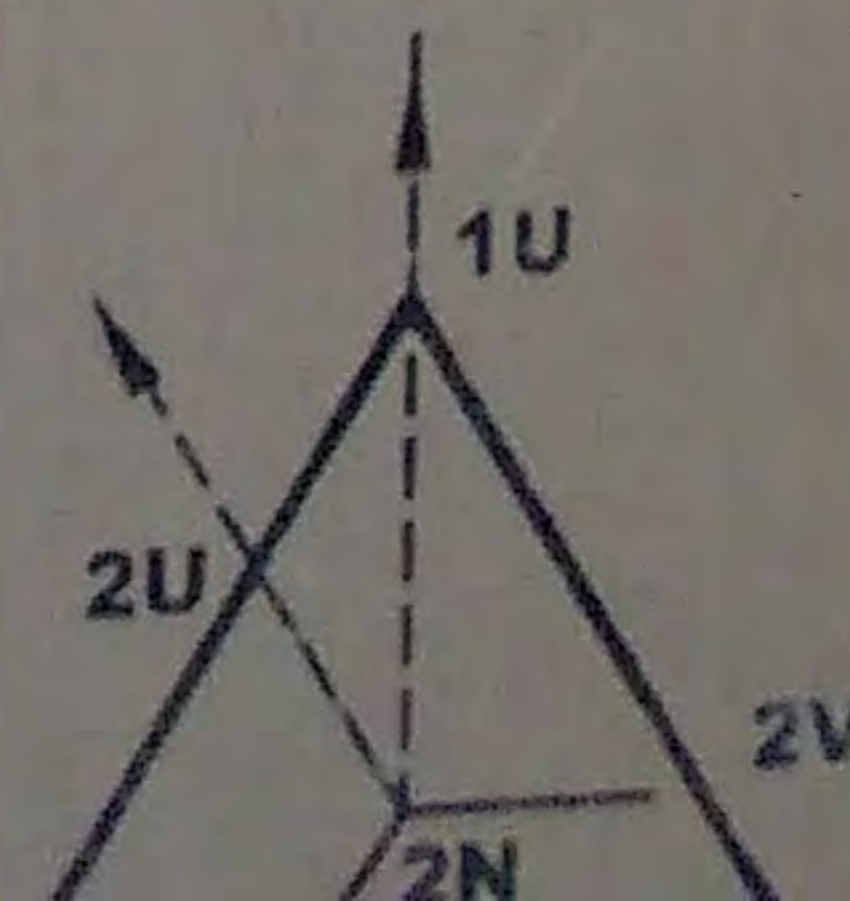
OLTC PROVIDED : D III 300 D 110 / 80 18.17.0 EASUN-MR MAKE



TAP POSITION	TAP SECT - CTOR	HV VOLTAGE (kV)	LV CURRENT (A)	
			ONAN 40 MVA	ONAN 40 MVA
1(MAX)	20 - 19	115.500	199.94	
2	20 - 18	114.125	202.35	
3	20 - 17	112.750	204.82	
4	20 - 16	111.375	207.35	
5(NOR)	20 - 15	110.000	209.94	
6	20 - 14	108.625	212.60	
7	20 - 13	107.250	215.32	
8	20 - 12	105.875	218.12	
9	20 - 11	104.500	220.99	
10	20 - 10	103.125	223.94	
11	20 - 9	101.750	226.96	
12	20 - 8	100.375	230.07	
13	20 - 7	99.000	233.27	
14	20 - 6	97.625	236.55	
15	20 - 5	96.250	239.93	
16	20 - 4	94.875	243.41	
17(MIN)	20 - 3	93.500	246.99	

CURRENT TRANSFORMERS TO IS:2705

LOCATION	IDENTIFICATION	APPLICATION	RATIO (A/A)	ACC. CLASS	BURDEN (VA)	KNEE POINT VOLT AT V _k (V)	MAGNETIZING CURRENT (I ₀)	MAX. R _{CT} IN OHM	CONNECTION
1U	CT-1	PRO	400-600 / 5	5P20	25	-	-	-	1U1S1-1U1S2-1U1S3
1V	CT-2	PRO	400-600 / 5	5P20	25	-	-	-	1V1S1-1V1S2-1V1S3
1W	CT-3	PRO	400-600 / 5	5P20	25	-	-	-	1W1S1-1W1S2-1W1S3
2U	CT-4	PRO	800-1200 / 5	5P20	25	-	-	-	2U1S1-2U1S2-2U1S3
2V	CT-5	PRO	800-1200 / 5	5P20	25	-	-	-	2V1S1-2V1S2-2V1S3
2W	CT-6	PRO	800-1200 / 5	5P20	25	-	-	-	2W1S1-2W1S2-2W1S3
2N	CT-7	PRO	800-1200 / 5	5P20	25	-	-	-	2NS1-2NS2-2NS3
1V	CT-8	WTI	247 / 2	3	15	-	-	-	1V2S1-1V2S2
2V	CT-9	LDC	1000 / 1	3	30	-	-	-	2V2S1-2V2S2



Annexure E.9 Typical MDL for Transformer

Annexure X
Typical MDL for Transformer

Sl. No:*	Task Name:*	Tata Power's Document Number
1	General Arrangement drawing of Transformer	TE00045-V001-00-E23-E1-001
2	FOUNDATION drawing of Transformer	TE00045-V001-00-E23-C12-001
3	Rating & Diagram Plate of Transformer	TE00045-V001-00-E23-E13-001
4	Oil filling instruction plate for air cell conservator of Transformer	TE00045-V001-00-E23-E13-002
5	Valve Schedule Plate of Transformer	TE00045-V001-00-E23-E1-002
6	HV Line Bushing of Transformer	TE00045-V001-00-E23-E1-003
7	MV Line Bushing of Transformer	TE00045-V001-00-E23-E1-007
8	LV Line Bushing and LV & MV Neutral Bushing of Transformer	TE00045-V001-00-E23-E1-004
9	HV Cable box (plan & section) of Transformer	TE00045-V001-00-E23-E1-005
10	MV Cable Box (Plan & Section)	TE00045-V001-00-E23-E1-008
11	LV Cable box (plan & section) of Transformer	TE00045-V001-00-E23-E1-006
12	Transport drawing of Transformer	TE00045-V001-00-E23-G3-001
13	Data Sheet of Transformer of Transformer	TE00045-V001-00-E23-G3-002
14	Winding Details - Connection and conductor details Stress proof of Transformer	TE00045-V001-00-E23-E2-001
15	Verification of Dynamic Short Circuit Strength, of Transformer	TE00045-V001-00-E-CA-001
16	Verification of Thermal Strength of Transformer	TE00045-V001-00-E-CA-002
17	Temp rise calculation of Transformer	TE00045-V001-00-E-CA-003
18	Fibre Optic Sensor Location of Transformer	TE00045-V001-00-E23-E1-007
19	Painting Specification of Transformer	TE00045-V001-00-E-SP-001
20	SCHEMATIC DIAGRAM OF COOLER CONTROL SCHEME of Transformer	TE00045-V001-00-E23-E15-001
21	SCHEMATIC OF OLTC of Transformer	TE00045-V001-00-E23-E15-002
22	SCHEMATIC OF FACIA & RTCC of Transformer	TE00045-V001-00-E23-E15-003
23	GA OF CT TERMINAL BOX of Transformer	TE00045-V001-00-E23-G1-001
24	GA OF M.BOX of Transformer	TE00045-V001-00-E23-G1-002
25	GA OF RTCC of Transformer	TE00045-V001-00-E23-G1-003
26	SPARE LIST FOR PANELS of Transformer	TE00045-V001-00-E-EL-001
27	SPARE LIST FOR DMBOX of Transformer	TE00045-V001-00-E-EL-002
28	WRITE-UP ON COOLER CONTROL SCHEME of Transformer	TE00045-V001-00-E-PH-001
29	WRITE-UP ON OLTC SCHEME of Transformer	TE00045-V001-00-E-PH-002
30	Spare BOM of Transformer	TE00045-V001-00-E-BOM-001
31	Vendor List of Transformer	TE00045-V001-00-E-SI-001
32	O & M Manual for transformer of Transformer	TE00045-V001-00-E-OMM-001
33	MQP for transformer of Transformer	TE00045-V001-00-QA-MQP-001
34	FQP for Transformer	TE00045-V001-00-QA-FQP-001
35	FAT inspection report for Transformer	TE00045-V001-00-QA-FAT-001
36	Test Plan of Transformer	TE00045-V001-00-E-TP-001

Annexure E.10 for Approved Vendor List for Transformers.

Sr. NO	Material	Makes / Vendors
1.	Conventional OLTC	HITACHI, Easun MR
2.	MOG	Precimeasure Bangalore, Sukrut Udyog, VIAT, MESSKO
3.	Conservator Oil Preservation System Bag)	Swastik Rubber Products Mumbai,Unirub Pune, Sukrut Pune, Pronal, NU-Cork products Gurgaon, MESSKO
4.	PRD, (Pressure release devices)	Qualitrol, HITACHI COMEM, VIAT, MESSKO
5.	SPR	Qualitrol, VIAT, MESSKO, HITACHI COMEM
6.	OSR	Qualitrol, Easun MR, HITACHI COMEM, MESSKO
7.	Annunciator	Minilec, Precimeasure Bangalore, Pradip Sales Mumbai
8.	Maintenance free Silica gel Breather (self-dehydrating type)	HITACHI COMEM, MESSKO MR.
9.	Buchholz Relay (Magnetic reed relay)	CEDASPE, HITACHI COMEM, Qualitrol, Viat, MESSKO
10.	HV Bushings (RIP)	HITACHI, Trench, HSP, GE, Passonivilla, MGC Switzerland
11.	RIS bushing	Siemens, HITACHI, Trench, HSP, Passonivilla, MGC Switzerland, Yash High voltage (upto 145 kV)
12.	Bushing OIP	CGL, GE, HITACHI, Yash high Voltage
13.	Control Cables	CCI, Torrent, RPG cables, Universal, Gemscab, Polycab, Fine Cab, KEI, Zenium, KEC
14.	Fans	M/s Ziehl-Abegg, MR Germany, M/s Koncar, Croatia, M/s Krenz, USA., Aerochem
15.	Tap changer control Relay	Pradeep Sales, A eberle Type REG D,
16.	MOG (Magnetic Oil Gauge)	Sukrut Udyog, Pune, Qualitrol, VIAT, Precimeasure Bangalore, MESSKO, Hitachi COMEM
17.	MCBs	Siemens, L&T, Schneider, HITACHI, C & S
18.	Oil Pumps	Best, CGL, SPXFLOW Ahmadabad and Flow Oil Bangalore, NXL flow.
19.	Insulators	WS Industries Ltd., CJI Khurja, JPI, Genesis, IEC Bhopal and BHEL
20.	Radiators	CTRL Pune, TTP Bangalore, Hi-tech, Tarang
21.	Selector Switches	Kaycee, Mumbai and SIEMENS
22.	Tank	Manufacturer itself or Mech & Fab, Satyam, Mechmen Bhopal, HELBON

[Annexure E.10 for Approved Vendor List for Transformers.](#)

		ENGINEERS PVT LTD
23.	Tap Position Indicators	Radix Mumbai, Precimeasure Bangalore and Pradeep Sales Mumbai
24.	Relays / Contactors	Alstom, Siemens, L&T, HITACHI, Schneider
25.	Terminal Blocks	ELMEX (KLTD-M4)
26.	Terminal Connectors	Nootan Engineering, Milind Engineering, Mumbai Exalt Engineering, Mumbai, Ustav Electromech
27.	Winding Temperature & Oil Temperature Indicators	Precimeasure, Bangalore, Perfect Control, Chennai
28.	Resistance Temperature Detectors (RTDs)	Radix, Mumbai, Precimeasure & Prefect Control
29.	Oil Level Indicator /Oil Flow Indicator	Qualitrol, Sukrut Pune.
30.	FOP based hot spot temperature detection System	Rugged Monitoring, Lumasense , Qualitrol, FISSO
31.	Online DGA system	Vaisala, GE, Morgan Schaffer, Qualitrol, SIEMENS, MTE, MESSKO
32.	Transformer Mineral Oil	Panama PetrochemLtd, Columbia Petrochem Ltd, Gandhar Oil, Savita Oil, Apar Industries Ltd,
33.	Surge Arrestor	HITACHI, SIEMENS, CGL, ELPRO
34.	COPS rupture monitoring relay	Qualitrol, CEDAPSE, MESSKO
35.	Bushing CT	Pragati, Mahindra, ENpay, Narayan power Tech, AU electro, Agarwal Industries, Toshiba Hyderabad
36.	Gas Collecting Device	Yogya, Sukrut
37.	Valves	GG valves Udaipur, EAPEN JOSEPH, VIAT, Apex, Leader Valves
38.	Control Panels	Pyrotech, Pradeep Sales, Suntron, Ashoka, United Industrial.

THE TATA POWER COMPANY LIMITED

STANDARD
TECHNICAL SPECIFICATION
FOR
EHV POWER TRANSFORMER

(DOCUMENT NO - TE/ELEC/STD-SPEC/0027)



Tata Power
Engineering (T&D)

Rev.	Date	Revision History	Prepared By	Checked By	Approved By (HOD)
A	26.06.2023	First Issue	SSC	VAS	SKV
B	08.01.2024	Updated details	PSA	VAS	SKV
			<i>Adarsh</i>	<i>Sankpal Vinod</i>	<i>Chakraborty</i> 090124

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- 2. Pre-Qualifying Requirements and Approved Vendor List**
- 3. System Description and Scope**
- 4. Codes & Standards.**
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- 6. Layout Requirements for the equipment**
- 7. Operational Requirements**
- 8. Technical Parameters of Equipment including DATA SHEET**
- 9. Quality Requirements (including SQP and FQP)**
- 10. Inspection, Testing and Performance Requirements along with Warranty**
- 11. Mandatory Spares**
- 12. Data Submission By Bidder**
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 - 12.2 After award of contract**
- 13. Annexures**

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1. Introduction

The technical specification document covers the requirements for design, manufacture, factory testing, packaging, route survey, transportation, delivery, unloading on site foundation, installation, testing and commissioning of Transformers.

All equipment, system and services covered under this specification shall comply with all current applicable statutory regulations and safety codes in the locality where the equipment is proposed to be installed. The equipment and systems shall also conform to the latest version of applicable codes and standards on the date of offer made by the Bidder unless otherwise indicated. Nothing in this specification shall be construed to relieve the Bidder of this responsibility.

2. Pre-Qualifying Requirements and Approved Vendor List

2.1. Refer Section A Annexure E.10 for Approved Vendor List for TRANSFORMER.

Acceptance of Owner's preferred list of vendor / sub vendor / OEM, which will be shared as part of Technical Specifications. However, if Bidder introduces additional vendor/sub vendor the same will be evaluated separately.

This vendor/sub vendor evaluation / assessment shall inter-alia include:

- (i) document verification.
- (ii) Bidders work / manufacturing facilities visit
- (iii) manufacturing capacity, details of works executed, works in hand, anticipated in future and the balance capacity available for present scope of works;
- (iv) details of plant and machinery, manufacturing and testing facilities, manpower and financial resources.
- (v) details of quality systems in place.
- (vi) experience and performance.
- (vii) customer feedback.
- (viii) response to complaint.

Bidder must agree for handing over, to Owner, all project related drawings in AutoCAD format only. The pdf versions of above drawings shall also be submitted through Wrench project management software for formal approval process.

Please refer Section A Annexure E.5 for Pre- Qualifying Requirements.

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3. System Description and Scope

The scope of work shall include but not be limited to the following:

Design, manufacture, factory testing, packaging, route survey, transportation, delivery, unloading on site foundation, installation, testing and commissioning of Transformer as specified in Section A Project Specification. Details are as mentioned below:

General Parameters: Please refer Section A for rating of the Transformer	
HV	Refer Section A
LV	Refer Section A
COOLING	Refer Section A

- a. Transformer mentioned above must have OLTC on HV side along with all accessories with standard engineering practices, IS & IEC Standards. OLTC step voltage and no. of tap positions shall be as per details mentioned in Section A.
- b. The bidder must provide Surge Arrester with LV rated voltage shall be provided in the LV cable Box as per IS standard for the Transformer.
- c. Bidder shall design orientation of HV & LV connection and Cooler banks as per site requirement.
- d. Transformer body grounding, HV neutral grounding, LV cable box grounding, etc. (at least 2 places) with specified short circuit rating and specified diameter of copper conductor up to existing earth pit shall be in bidders' scope. All the transformer grounding Copper bus shall be provided with adequate number of support insulators. All the Grounding Copper bus shall be extended up to ground level.
- e. The bidder must provide Remote Tap Changer Control Panel along with Tap Changer Relay (with 20 BI and 20 BOs) with 61850 communication protocol. The relay shall be integrated with SCADA to operate tap changer from SCADA. The OLTC tap position shall be displayed on SCADA screen.
- f. The bidder must confirm the technical and operational support for equipment being procured under this requirement.

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- g. The bidder shall support with all efforts to commission the equipment being procured under this requirement as per Tata Power commissioning schedule.
- h. All necessary communication accessories required at Transformer end for commissioning and integration of conventional OTI and WTIs, DGA, FOP based winding hotspot measurement system, REG D or equivalent make IED for OLTC control, SDH type breather and all the transformer monitoring e-devices with the existing station SCADA system shall be in BIDDERS's scope. Also, SCADA / RTU panel accessories such as patch cords, LIUs, communication /data FO cables, splicing and termination of FO cables at both ends, LC, SC connectors at both ends required for commissioning and integration of condition monitoring devices with existing SCADA system is in Bidder's scope (Supply and services). Only laying of FO cables is in Tata Power Scope.
- OEM Services required for condition monitoring devices are in BIDDERS scope for integration with the existing SCADA system. Services for existing SCADA OEM for integration of these devices is in Tata Power's scope.
- i. Radiators, HV LV interface location can be flexible as per the site requirement.

4. Codes & Standards

Sr. No	Equipment details	Code
1	Power Transformers	IS-2026 and IEC 60076 and CBIP manual on Transformers and CEA manual for Transformer and Reactor specification and commissioning.
2	Fittings and Accessories	IS-3639
3	Climate proofing	IS-3202
4	Loading of oil immersed transformer	IS-6600
5	Insulating Oil	IEC 60296 / IS-335 (whichever is more stringent)

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Sr. No	Equipment details	Code
6	Bushings	IS-2099
7	Degree of protection	IS-2147
8	Tests	IS-2026
9	Buchholz relay	IS-3637
10	Electrical insulation classified by thermal stability	IS-1271
11	Current transformer	IS-2705
12	Large hollow porcelains insulator	IS-5627
13	Insulators	IS-2544
14	Induction motors	IS-325

5. Design Requirements

5.1. The following list shows the minimum values of the different parameters required by the purchaser. The supplier shall confirm their guaranteed values as per the Schedule of Guaranteed particulars:

Sr.	PARTICULARS	RATING / VALUE
1.	MVA RATING	Please refer Section A
2.	Cooling	Please refer Section A
3.	Type	Power transformer
4.	Voltage Ratio	Please refer Section A
5.	Vector Group	Please refer Section A
6.	Direction of Power flow	Bi-directional
7.	System Voltage	
8.	a) 110 kV side Nominal/ highest b) 220 kV side Nominal/ Highest	110 / 123 kV 220/245 kV
9.	c) 11 kV side Nominal / highest	11/12 kV

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Sr.	PARTICULARS	RATING / VALUE
	d) 22 kV side Nominal / highest	22 / 24 kV
	e) 33 kV side Nominal / highest	33 / 36 kV
10.	Standards applicable (latest)	IS 2026, IEC 60076, CBIP Transformer manual and CEA manual on Transformer and reactor specification. IEC 62770 and IS-16659 (latest edition and whichever is more stringent)
11.	Constant % Impedance @ 75 deg. C. @ Ref Section A for MVA base	Refer Section A
12.	HV Taps	Refer Section A
13.	Type of Earthing	Refer Section A
14.	Direction of Power Flow	Bidirectional
15.	Phase arrangement	Shall be as per site requirement.
16.	Terminals	
17.	a)HV	<p>110 and 220 kV Bushings shall have a rated voltage of 145 kV and 245kV and shall be RIS or RIP type as per project requirement mentioned in Section A.</p> <p>Buchholz Relay and Conservator (with MOLG+ Prismatic Oil Gauge) shall be provided for Oil filled Cable boxes.</p> <p>The interface between Power Transformer and GIS cable termination shall be as per BS EN 50299 code. Please note that Tata Power shall be using dry type cable termination for interfacing with the transformer. This cable terminations are not in bidder's scope.</p>
18.	b) LV side cable box and bushings	<p>LV side phase bushings shall have a rated voltage as mentioned in Section A Project specification.</p> <p>i. The LV cable box should be provided with louvers and inner side of louvers shall be covered with a mesh. These louvers should be mounted on surfaces</p>

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		<p>of cable box in diagonally opposite locations to achieve cross ventilation. Louver size shall be adequate. Number of Louvers shall be at least 4 nos. or more with minimum size of 50 cm by 50 cm based on the size of LV cable box to minimize outside and inside temperature difference to avoid condensation.</p> <p>ii. Flexible copper droppers shall be provided for isolating cable in case of cable fault.</p> <p>iii. Adequate size manholes shall be provided on the cable box so that the cable as well as bushings can be disconnected and can be replaced easily.</p> <p>iv. Proper canopies shall be provided on entire LV cable box to avoid rainwater seepage inside the cable box.</p> <p>v. The cable box shall be designed to accommodate cable sealing ends for respective class cables including the stress cones. The electrical clearances ph- ph and ph to gnd inside the cable box shall be at least 530 mm or higher.</p> <p>vi. Cable box is designed for 6 nos. of 33 kV, 1C, 630 Sqmm., single phase, XLPE cable per phase for Transformer.</p> <p>vii. Cable Box and LV power cable Galvanized support structure shall be considered.</p> <p>viii. The support insulators shall be 52 kV or higher class (to achieve 530 mm clearance) and with silicon coating. The support insulator shall not break due to mechanical jerk caused by fault currents.</p> <p>ix. Copper bus arrangement of adequate</p>

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		size shall be considered for earthing of LV cable armor inside the cable compartment. Separate conductor for copper bus earthing shall be considered up to ground level. x. LV rated voltage LAs of appropriate rating shall be provided in the LV cable boxes. Separate Earthing flat shall be provided for each LA. xi. Disconnecting Chamber shall be provided for disconnection of LV bus from Transformer winding. xii. Drain plugs with proper mesh arrangement shall be provided on the bottom portion to LV cable box. xiii. Inspection cover/ Manholes are provided
19.	HV and LV Neutral terminal Arrangement	Neutral bushing on tank shall be suitable for direct grounding. Neutral bushing shall be 52 kV class RIS bushings.
20.	Temperature rise over 50 deg C ambient temperature For Mineral Oil filled transformer.	
	a) Average Winding measured by resistance method	As per Section A
	b) Top Oil measured by thermometer	As per Section A
21.	Winding hotspot rise over yearly weighted temperature of 32 deg C.	As per Section A
22.	Tank hot spot temperature	110 deg C
23.	For HV 245 kV Oil -Oil RIP bushing I _r , I _{sc}	1600 A, 50kA 3 sec
24.	For HV 245 kV Oil -Air RIS bushing I _r , I _{sc}	1600 A, 50kA 3 sec
25.	For HV 145 kV Oil -Oil RIP	1600 A, 40kA 3sec

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Sr.	PARTICULARS	RATING / VALUE
	bushing Ir, Isc	
26.	For HV 145 kV Oil -Air RIS bushing Ir, Isc	1600 A, 40kA 3sec
27.	For 52 kV HV Neutral bushing Ir, Isc	1600 A, 40kA 3sec
28.	For 52 kV LV, Neutral bushing Ir, Isc	2000 A, 31.5kA 3sec
29.	Transformer Basic insulation level	
	a) For HV (220kV) (Winding/Bushing)	1050 kVp / 1050 kVp
	b) For HV (110kV) (Winding/Bushing)	650 kVp / 650 kVp
	b) For 33 kV (Winding/Bushing)	250 kVp / 250 kVp
	b) For 22 kV (Winding/Bushing)	250 kVp / 250 kVp
	c) For HV neutral (Winding/Bushing)	250 kVp / 250 kVp
	d) For LV neutral (Winding/Bushing)	250 kVp / 250 kVp
	e) For 12 kV (Winding/Bushing)	95 kVp / 95 kVp
30.	Transformer 1-minute power frequency withstand voltage	
	a) For HV (220kV) (Winding/Bushing)	460 kVrms / 505 kVrms
	a) For HV (110kV) (Winding/Bushing)	275 kVrms / 305 kVrms
	b) For LV (33kV) (Winding/Bushing)	95 kV / 105 kVrms
	c) For HV neutral (Winding/Bushing)	95 kV / 105 kVrms
	d) For HV neutral (Winding/Bushing)	95 kV / 105 kVrms
	e) For 12 kV (Winding/Bushing)	38 kVp / 28 kVrms
31.	Creepage distance for bushing (HV, LV, Neutral) Applicable only for oil to air bushing	Refer Section A
32.		The transformer shall be provided with four flanged bi-directional rollers with locking and

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Sr.	PARTICULARS	RATING / VALUE
	Wheels	bolting device suitable for 1676 mm rail gauge in longer axis and 3010 mm in shorter axis for movement of the transformer in either direction. (Refer the Section A Annexure- E.4 Reference Outline drawing with Part list OGA drawing)
33.	Fault levels	At 400 KV – 63 kA, 3 sec or 50 kA, 3 sec At 220 KV – 50 kA, 3 sec At 110 KV – 40 kA, 3 sec At 33 kV – 31.5 kA, 3 sec 11 kV -25 kA, 3 sec
34.	Auxiliary Supply	
	AC	Refer Section A
	DC	Refer Section A
35.	Core	The core grounding connection shall be brought out through a separate 11 kV bushing for provision of external grounding. There shall not be any other ground to core inside tank. Entire core and frame insulation shall be rated for 11 kV. Stacking of core lamination shall be without Core bolt.
36.	Core frame and tank (CFT) insulation	CFT insulation shall be designed for 10 kV class.
37.	220 kV, 110 kV and 52 kV Bushing Tan delta (%) @ ambient temperature @ rated voltage without temperature correction factor	< or = 0.4
38.	Transformer Tan delta (%) @ ambient temperature @ rated voltage without temperature correction factor	< or = 0.5
39.	Maximum Partial Discharge (pC) @ 1.5Um/root3	100

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Sr.	PARTICULARS	RATING / VALUE
40.	Maximum noise level with cooler bank in service	75 db
41.	Moisture PPM IN OIL	5 PPM
42.	Moisture limit in Transformer insulation	There are 2 methods to check the moisture content in paper Insulation – i) Karl Fischer method & ii) FDS method. If moisture content is measured by Karl Fischer method, then the acceptable limit is < 0.5%. However, if it is to be measured by FDS method, then the acceptable limit shall be finalized mutually during detailed engineering.
43.	Frequency Domain Spectroscopy Test for HV, HVN and LV bushing (YES/NO)	YES Test reference: IEEE C57/152/2013 Omicron, Megger or equivalent make test instrument to be used for test
44.	Frequency Domain Spectroscopy Test for Transformer (YES/NO)	YES Test reference: IEEE C57/152/2013 Omicron, Megger or equivalent make test instrument to be used for test
45.	Transformer FDS test Moisture limit	0.50%
46.	Over fluxing capability	Transformer shall be designed for continuous over fluxing withstand capability due to +/- 10% voltage variation and frequency variation of +/- 5%. Combined variation shall, however, be within +/-10%. 1.10 – CONTINUOUS 1.25 – ONE MINUTE 1.40 – 5 SEC 1.50 – 2 SEC
47.	Capability of Transformer to remain in operation from hot condition after failure of forced cooling full load (minutes)	20
48.		Epoxy Bonded CTC shall be used for HV and LV winding. HV winding shall be of Disc type.

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Sr.	PARTICULARS	RATING / VALUE
	Windings	<p>HV Tap winding shall be of Disc or Helical Single Layer type. Vendor to submit during detailed engineering justification in case of Helical Single Layer.</p> <p>i. LV winding shall be Disc type or Helical Single Layer with semi hard, 150 MPa hardness conductor. Vendor to submit during detailed engineering justification in case of Helical Single Layer</p> <p>ii. PCB cylinder shall be 5 mm thick for LV winding.</p> <p>iii. Current density shall be less than or equal to 2.5 A/ sq. mm.</p> <p>iv. Flux density shall be less than or equal to 1.7 T at Rated Voltage and Frequency</p> <p>v. Pre-compressed high-density pressboard assembly insulations shall be WEIDMANN or equivalent make (HITACHI – PUCARO, ENPAY, and PFIKC).</p> <p>vi. Densified laminated wood shall be WEIDMANN or equivalent make (HITACHI – PUCARO, ENPAY, and PFIKC).</p> <p>vii. Bidders to provide Dynamic SC calculations asymmetrical, radial bursting force, no of support, hoop stress, resistance to collapse, temperature rise calculations winding diagrams indicating positions of winding with respect to core and data required for design review.</p> <p>viii. Nitrile rubber O rings shall be used in place of gaskets.</p> <p>ix. The winding needs to be designed for all short circuit conditions on HV, tap & LV at least for 3 sec thermal rating.</p>
49.	Transformer paint shade	Shade No. 631 of IS: 5 with polyurethane. finish coat.
50.	Tank Type and Tank design details	Bell type Bidder to provide rupture free tank design. Tank surface temperature shall be less than

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		95 deg C and the same is to be verified during FAT by infrared thermography. Viton gaskets to be used at LV termination areas. Tank shall be designed as per latest CBIP Transformer manual guidelines for EHV transformer. Adequate nos. of Insulated shorted Copper jumpers between bottom tank and bell tank shall be provided. Also, wherever gaskets are provided between the metallic parts.
51.	Transformer SC requirement	Transformer shall be designed for bolted Short Circuit (SC) at its terminal (HV, LV) considering only self-percentage Impedance.
52.	BCT details	
53.	HV phase side (3 sets per phase) HV Neutral (2 Sets) LV phase side (3 sets per phase)	Refer section A Project specification
54.	LV neutral side (2 Sets)	
55.	Main tank Conservator	
56.	Main tank Conservator with MOLG	The conservator shall be provided with Conservator Oil Preservation System (COPS Rubber bag). MOLG and prismatic oil level indication shall be provided for conservator. COPS rupture monitoring relay shall be provided.
57.	HV and Oil filled cable box conservator	The conservator shall be provided with Constant Oil Preservation System (COPS Rubber bag) COPS rupture monitoring relay shall be provided.

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Sr.	PARTICULARS	RATING / VALUE
58.	Safety Railing and Platforms for Transformers	Safety hand railing shall be provided on the top of transformer tank. Platform shall be provided for easy accessing of air-filled Cable boxes, and all transformer devices.
59.	5D/3D criterion with angle as per the standards for Buchholz relay to be followed (YES/NO)	Yes
60.	Isolating valve	Gate valve
61.	Cooler Bank	Capacity: 2X 50 % Cooler Bank. (Group A and B). Each cooler bank (Gr A and Gr B) shall have one spare fan and pump. Spare fan or pump shall be automatically switched in incase of failure of any fan or pump. Any fan can be selected as a spare. Both the Grp A and Grp B oil pump cutting in shall not result in Buchholz relay operation. Two independent power supply with auto changeover shall be provided. Radiator shall be separately mounted and not tank mounted. Please refer section A for the type of cooling preferred for the Transformer.
62.	On Load Tap changer control relay Details	Communication protocol: IEC 61850 Communication port for SCADA shall be fiber optic (FO) on ST type. Shall be compatible for integration with the station SCADA system.
63.	Transformer Silica Gel Breathers	Shall be maintenance free breather instead of conventional breather for main tank, OLTC as well as cable box conservator. Make shall be as mentioned in the vendor list. Same shall be supplied and integrated with SCADA for condition monitoring by the bidder.

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Sr.	PARTICULARS	RATING / VALUE
64.	Fibre Optic Based winding hot spot and oil temperature Monitoring System	<p>Bidder to note that Number of FOT probes shall be as per IEC 60076-2 Annex E. HV winding: 4 probes (1 in each outer phase & 2 in central phase) LV winding: 4 probes (1 in each outer phase & 2 in central phase) Top Oil Temperature: 1 probe</p> <p>The System shall be either IEC61850 or Modbus RTU protocol for SCADA Communication and shall have Fiber optic (FO) port on Multi-mode and the FO port type shall be LC/ST preferably (in case of IEC61850). The Selection Communication protocol will be finalized during detailed engineering.</p>
65.	Online DGA monitoring system for Transformer Oil	8 gases and moisture to be monitored as per standards. System shall be IEC 61850 compatible for integration with SCADA system.
66.	Transformer Marshalling Boxes (MBs)	<p>Separate Marshalling box shall be provided for CT MB, Main MB, OLTC MB, DGA MB, FOTS MB.</p> <p>Copper bus of adequate size shall be provided for CT and devices body earthing and shall be grounded at two locations. Marshalling box schematic shall be placed inside marshalling box.</p> <p>All MBs mentioned shall be SS304 (3mm thick) Stainless steel material.</p> <p>All control cable entry for above mentioned devices shall be from bottom side. Side entry of cables not allowed.</p>
67.	Inspection window for HV, LV and Neutral bushing.	HV, LV and Neutral bushing replacement shall be possible by keeping oil up to core yoke level without exposing winding outside mineral oil to air. All the Bushing shall be located on top tank cover accordingly. Inspection windows shall be provided for all

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	HV, LV and Neutral bushing replacement requirement.	the bushings. It is not acceptable to lower oil below yoke and expose windings to air for replacing the bushings. The transformer shall be designed and manufactured to meet this requirement.
68.	Transformer FAT testing with Own bushing	Bidder to carry out Transformer FAT testing with its own Oil-Oil RIP bushing. Own bushing will be in series with test bushing during FAT.
69.	Enclosure for spare RIP and RIS spare bushing	Spare 245 kV and 145 kV RIP bushings shall be provided with oil filled metal enclosure for storage at station. 245 kV, 145 kV and 52 kV RIS spare bushing shall also be provided with stand and proper storage accessories.
70.	Transformer size (Footprint)	Refer Section A, Annexure I - Transformer % Impedance and Footprint requirement
71.	Monsoon Protection	Transformer devices terminal boxes, junction boxes, marshalling boxes, CT junction boxes, OLTC MB and Power cable LV boxes shall be IP55 ingress protection. Also, canopy shall be provided in addition to IP55 protection. Canopy shall be adequately projected to avoid the water ingress.
72.	Warranty for the Transformer	Please refer section A.
73.	Transformer Losses, loss Capitalization and penalty	Please refer section A.

5.1.1.1. The Creepage distance for the bushing shall be 31mm/kV.

5.1.1.2. Winding and oil temperature indicators for the transformers:

5.1.1.2.1. The transformer should be provided with one set of “winding and oil temperature indicators” with Magnetic Reed type switches for alarm and trip purposes.

5.1.1.2.2. Remote temperature indicators for indication of the temperature at the control room shall use shielded cables up to the Marshalling Box. These shall

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be provided including the instruments to be mounted in the control room.

- 5.1.1.2.3. For purpose of remote recording and data acquisition system following shall be provided.
- 5.1.1.2.4. Top oil temperature detector along with suitable transducer and other necessary devices to provide 2 sets of 4-20 mA signals.
- 5.1.1.2.5. Winding temperature detector separately for HV and LV winding along with suitable transducers and other necessary devices to provide 2 sets of 4-20 mA signals.
- 5.1.1.2.6. Conventional and FOP based WTI, OTI, OLTC control relay (REG D or equivalent), SDH breather and DGA equipment shall be integrated with existing SCADA system. Material and services required for integration (FOP cable, switches, patch cords LIU, converter etc.) shall be in Bidders scope. SCADA HMI shall indicate WTI, OTI, Tap position and DGA values.
- 5.1.1.2.7. Bidder shall consider OLTC control relay (REG D or equivalent) in the RTCC Panel. The A-eberle or equivalent make relay shall have Min 20BI,20BO (BI/BO shall be combined based on requirement during detailed engineering) and 8 AI with IEC61850 Communication Protocol for SCADA. The Relay shall have Fiber optic (FO) port on Multi-mode and FO port type shall be LC/ST preferably. All Alarms, Status & Control (TAP Position & Control) related to Online Tap Changer and transformer condition monitoring alarms/values WTI, OTI etc and all cooler control alarms shall be wired to A-eberle or equivalent make relay.
- 5.1.1.2.8. In addition to above, the transformer shall have a direct hotspot temperature measurement system that shall meet the following specifications:
- 5.1.1.2.9. System shall be fibre optic rugged, proven technology. The probes shall be directly installed in each phase of power transformer to measure the winding hotspot and top oil temperature. Probes shall be able to be completely immersed in hot transformer oil, they shall withstand exposure to hot Kerosene vapour during the transformer insulation drying process.
- 5.1.1.2.10. Temperature range of the system should be -30°C to +200°C & accuracy of $\pm 2^\circ\text{C}$ with no recalibration required.
- 5.1.1.2.11. Probes shall be all silica, double PFA/PTFE Teflon jacketed, cabled fibre with perforated outer jacket to allow complete oil filling and Teflon protective Helix wrap for improved visibility and mechanical strength.
- 5.1.1.2.12. System should include analogue outputs for each measurement channel. Temperature resolution of the analogue outputs shall be $\pm 0.1^\circ\text{C}$ and the

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systems shall offer a user programmable temperature alarm outputs with minimum 6 relays, alarm lights and controller system status indicators. All inputs and outputs of the system shall meet the requirements of surge test of IEEE C37.90.1-1995 in which a 3000 V surge is applied to all the inputs and outputs without permanent damage to the instrument. Manufacturer should submit report for following tests on FO probes & Fibre: Crush Test, Bend test, Knot test and PD kV /mm.

- 5.1.1.2.13. The system shall be capable of taking 1 reading/minute and recording the temperature at every 30 minutes thereby retaining temperature data of about 90 days and should retain max temperature of each channel until reset.
- 5.1.1.2.14. The manufacturer should submit data showing that the probes are located in the hottest point of the winding.
- 5.1.1.2.15. Temperature Rise Test Measurements shall be made with the FO Thermometers. The equipment shall be operational during temperature tests and demonstrated during these tests. During probe verification, the hottest probes for each phase shall be identified, and temperature data for all probes recorded and reported in the test report.
- 5.1.1.2.16. Bushing CT's secondary wiring up to the CT terminal box shall be multi-stranded copper wire. All cabling from equipment to terminal boxes shall be of FRLS and laid in covered cable trays. Wiring of all the cores shall be brought up to the terminal block (ELMEX make) and disconnecting type terminals (Type KLTD-M4, 1.1 kV, 40 Amp) shall be used.
- 5.1.1.2.17. All the signals viz. WTI, OTI, Buchholz, PRD etc shall be brought to transformer Marshalling box terminal blocks of ELMEX make, disconnecting type KLTD-M4, 1.1 kV, 40 Amp rated TB's.
- 5.1.1.2.18. Bidder shall consider Switches, Converters and Networking accessories viz. Terminations box (LIU/IO/Boxes), Communication Cables (Serial /fibre Optic /UTP Armoured & Unarmoured), & Patch cords (Fibre Optic/UTP) with suitable length and Conduits for all non- Armoured cables to integrate with the existing Gateway/RTU Panel of the Receiving Station.

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5.2. **OLTC**

- 5.2.1. Convention OLTC shall be considered for Mineral Oil filled transformer. The OLTC shall have separate selector and diverter chambers. The oil in these two chambers shall not get mixed up during operation. The OLTC oil also shall not get mixed up with main transformer oil. Separate monitoring of oil levels shall be provided for OLTC oil.
- 5.2.2. The OLTC motor shall be provided with 415V auto changeover facility.
- 5.2.3. For the control of the OLTC, a Remote Tap Changer Control (RTCC) panel shall be provided. A-berle or equivalent make tap changer control relay (REG-D) with IEC61850 protocol shall be provided in the panel for OLTC control (Raise/ Lower command) and for indicating tap changer status on SCADA. Material required (FOP cable, patch cords, switches etc.) for integrating this relay with SCADA system shall be in Bidders scope except Gateway. All tap changer related alarms shall be connected to this relay. Operation of tap changer (Raise / Lower) from remote location shall be possible through SCADA system.
- 5.2.4. The tap changer shall be designed for most reliable operation. Suitable equipment for monitoring of tap changer shall be provided.

5.3. **Anti-Rusting / Corrosion Treatment**

- 5.3.1. The manufacturer shall ensure that all fabrication i.e., transformer tank, radiators, marshalling boxes and other accessories are treated for highest quality performance for the entire life of the transformer. The Vendor must submit plan for extra measures he is taking for prevention of corrosion along with the quotation.
- 5.3.2. The internal & external surfaces of all oil filled compartments & structural steel work along with its components should be grid blasted in accordance with ISO 2994-4-2017 / ISO 8501:1988 grade Sa2 1/2 / SSPC-SP10 with a surface profile equivalents to ISO 8503 comparator medium, to remove all rust, scales of foreign matters or grease or weld spatters.
- 5.3.3. After proper surface preparation, primer shall be applied by means of brush as stripe coat on all weld and hidden surface and thereafter by spray. The top coats may be applied by means of brush for stripe coat and by spray. The application of intermediate and topcoats, the natural tendency to a more uneven paint film obtained shall be encountered by more coats applied until

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the final DFT and hiding power is reached.

- 5.3.4. Depending upon the level of atmospheric corrosivity, external surface painting shall be applied as per ISO 12944-5:2017. C4 category should be opted for all external surfaces with paint thickness of 200µm for outdoor equipment. Type of paint used on steel external surface shall be polyurethane. Paint thickness of indoor control panels shall be 80µm (minimum) or power coated for 100µm (minimum)

5.4. **Marshalling Boxes (MB)**

- 5.4.1. A separate tank mounted marshalling boxes (MB) for transformer devices, bushing CTs, OLTC, online DGA, FOP based hot spot temperature measurement system etc. shall be provided. The marshalling box shall be easily accessible for during working.
- 5.4.2. All MBs mentioned in 2.4.1 shall be SS304 (3mm thick) Stainless steel material.
- 5.4.3. The wiring in the Marshalling boxes shall be done with multi-strand cables. All terminals should be disconnecting type and only round lugs shall be used.
- 5.4.4. Potential free contacts directly from the device shall be provided for various alarms/trips.

5.5. **Oil surge relay**

- 5.5.1. For OLTC tank, a suitable oil surge relay shall be provided as per IS standard. The terminals of the same shall be brought out to transformer terminal box.

5.6. **Pressure Relief Device**

- 5.6.1. For main tank, Pressure relief device shall be provided in place of explosion vent for protection against over-pressure. It shall be "Directed flow type".

5.7. **Monsoon Protection**

- 5.7.1. Transformer devices terminal boxes, junction boxes, marshalling boxes, CT junction boxes, OLTC MB etc shall be of IP55 ingress Protection.
- 5.7.2. In addition to IP55 protection, monsoon protection canopies made of Aluminium / GI shall be provided in such a way that it covers the devices & junction boxes from all sides and top thereby avoiding water ingress.
- 5.7.3. All the transformer devices shall have plug-in type cable connections designed

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in such a way that it will avoid moisture ingress.

- 5.7.4. Transformer top cover shall have a slight slope to avoid accumulation of water during rain.

5.8. Testing

- 5.8.1. All shop tests i.e. Routine Tests, Performance Tests, Special Tests and Acceptance Test as per the relevant standards and approved MQP shall be carried out on each Transformer. Minimum shop testing requirements are specified in the attached Standard Quality Plans and in this specification. All applicable Type test report shall be submitted with the bid and shall not be older than 5 years. All erection and installation activities shall be performed in line of approved FQP by Owner.

- 5.8.2. Testing: All the tests as per enclosed test protocol (SQP) shall be carried out on transformers.

5.9. Delivery Requirements

- 5.9.1. The Transformer shall be delivered at site as per the detailed schedule.
- 5.9.2. The transformer oil which is received at site must be tested (each oil drum/tanker) for dielectric strength and water content should be in line with the recommendations. The testing of oil shall be made by Contractors Engineer in presence of Purchaser's supervisor. It will be responsibility of the supplier to ensure that each oil drum/tanker has proper seal when dispatched from factory and to check that the seals are intact when drums/tankers are delivered at site. If required, escorting may be arranged with the oil drums/tankers during transportation of the oil.

5.10. Type & Duty Requirements

- 5.10.1. The transformers shall be of core type construction, 3 phase, 50 Hz, oil immersed self-cooled with external heat exchangers and shall be suitable for outdoor service. The rating and electrical characteristics of the transformers shall be as given in the specific requirements.

5.11. Duty Requirements

- 5.11.1. The transformers and all their accessories shall be designed to withstand without injury the thermal and mechanical effects of any external short circuit to earth and of short circuits at the terminals of any winding for a period of 3

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seconds. The short circuit level of the HV system to which the subject transformer will be connected is about 50 kA 3 Sec. Bidder shall furnish calculations to establish the short circuit withstand duration of 3 seconds for the reference & record of owner.

- 5.11.2. The transformer shall be capable of being loaded in accordance with IS: 2026 and IS: 6600 up to loads of 150%. There shall be no limitations imposed by bushing, tap changer etc. The transformers shall be suitable for bi-directional flow of rated power.
- 5.11.3. The transformer shall be capable of being operated without danger on any tapping at the rated MVA with voltage variation of $\pm 10\%$ corresponding to the voltage of that tapping.
- 5.11.4. Radio interference and Noise Level: When the transformer is energized at normal voltage and frequency, the noise level shall not exceed (when measured under standard conditions) the value specified in NEMA Standard.
- 5.11.5. Transformers shall be capable of operating under the natural cooled condition up to the specified load. Transformer shall be capable of withstanding the thermal and mechanical stresses caused by symmetrical or asymmetrical faults on any winding.
- 5.11.6. Transformer shall withstand, without injurious heating combined voltage and frequency fluctuation which produces the following over-fluxing condition:
 - a) 110% for continuous rating
 - b) 125% for at least one (1) minute
 - c) 140 % for at least five (5) seconds
- 5.11.7. Transformer design shall incorporate every reasonable precaution and provision for safety of all those concerned in the operation and maintenance of the Transformer & its accessories keeping in view the requirements of Indian Electricity Rules.
- 5.11.8. As the Transformers will be installed in areas prone to earthquakes, they shall be designed to withstand seismic forces equivalent to 0.1 g. acceleration. Necessary devices for clamping the wheels to the rails shall also be provided along with any other suitable anti earthquake clamping arrangement.

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5.12. **Insulation**

5.12.1. The dielectric strength of the winding insulation and of the bushings shall conform to the values given in IS: 2026 (latest version) or IEC 60076. The bushing shall comply with IS 2099, IS 12676 also.

5.13. **Phase Marking**

5.13.1. The phase marking shall be as specified in 'specific requirements' of the specification document.

5.14. **Frequency**

5.14.1. The transformer shall be suitable for continuous operation with a frequency variation of 5% from normal of 50 Hz without exceeding the specified temperature rise.

5.15. **Parallel Operation**

5.15.1. The similar ratio transformers shall operate satisfactorily in parallel with each other if standard parallel operating conditions are met.

5.16. **Guaranteed Losses**

5.16.1. The no load loss in kilowatts at rated voltage and rated frequency, Load losses in kilowatts at rated output, at principal tap at 75 deg C and Aux losses at rated load shall be guaranteed for each transformer and shall be as mentioned in Section A – Project Specification Annexure E.6.

5.16.2. Transformer losses are fixed, hence losses capitalization shall not be done.

5.16.3. Purchaser reserves the right to reject the transformer(s) if the losses during FAT are found to be more than the guaranteed loss figures.

5.17. **Cooling System**

5.17.1. The Transformer's shall be provided with ONAN/ONAF/OFAF or ODAF OR ONAN/ONAF1/ONAF2 cooling. Radiator Banks shall be 2X50% capacity. Please refer Section A project specification for details of the requirement.

5.17.2. Each radiator bank shall have one (01) spare fan and one spare pump with the automatic switching scheme.

5.17.3. Radiators shall be designed to withstand the vacuum and pressure conditions specified for the tank. Radiators shall be so designed as to avoid pockets in which moisture may collect and shall withstand pressure test.

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5.17.4. Radiator units shall be connected to the tank by machined steel flanges welded to the tank and provided with gaskets. At each cooler unit connection there shall be provided on the tank an indicating shut off valve which can be fastened in either open or closed position. A separate oil tight blank flange shall be provided for each tank connection for use when the cooler unit is detached. Each cooler unit shall have a lifting eye, an oil drain at the bottom, and a vent at the top. The vent and drain plugs of coolers should be provided with Teflon gaskets.

5.17.5. It shall be possible to install the radiator and the conservator on either side of the tank.

5.18. Radiators

5.18.1. It shall have 10 mm edge pressed together and seam welded uniformly over the sides of the tube and the 10 mm width shall be maintained at the corners of the tubes.

5.18.2. The radiators of cooler units shall be epoxy painted (viz. 2 coats of Shalimar blasted EPS primer plus 2 coats of Shalimar EP1 grid x 2 grey epoxy paint plus 1 coat Shalimar synthetic enamel paint ensuring 8 to 12 hrs. of drying for each coat). All the surfaces including edges should be cleaned properly before painting to avoid peeling of paint at the edges.

5.18.3. Radiators shall be metal spray painted.

5.18.4. Bidder shall submit procedure for surface preparation and painting/galvanizing of radiators along with the bid.

5.18.5. The following accessories shall be provided for each radiator bank.

5.18.6. Shut off valves and blanking plates for transformer tank at each point of connection at the inlet and outlet header.

5.18.7. Upper and lower shut-off valves and blanking plates for each group of radiators when radiators are assembled in groups.

- i. Lifting lugs, pulling eyes.
- ii. Top and bottom oil filtering valves.
- iii. Air release plug at top.
- iv. A drain valve at bottom, 25 mm size.
- v. A thermometer pocket with thermometer fitted with a captive screwed cap on the inlet and outlet pipes.

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- vi. Top oil filling plug: 19 mm size.
- vii. Earthing pads for a frame / supporting structure of radiators

5.18.8. All radiators shall be tested for: Vacuum test for one hour.

5.18.9. Hydraulic pressure test using transformer oil for one and half hour (as per ASME)

5.18.10. Air test can be done in place of hydraulic pressure test provided water tank will be made available for submerging the radiators into water for leak detection.

5.18.11. All the tests shall be done in black condition (i.e. before applying any paint).

5.18.12. The transformer design is such that the radiators and conservator can be mounted either side of the tank.

5.18.13. If the manufacturer chooses to fabricate Radiator other than approved sources indicated in specs the credentials of the fabricator shall be provided for TATA Power approval.

5.18.14. A local mechanical indication scheme for all annunciations shall be provided in the marshalling box with mechanical target relays/contactors.

5.18.15. The following alarm shall be provided each with one NO contacts (direct from the device).

- i. Conservator oil level low (MOG)
- ii. PRD tripped
- iii. Buchholz relay trip/alarm
- iv. HV & LV Winding temperature high
- v. HV & LV Winding temperature high-high
- vi. Oil temperature high
- vii. Oil temperature high-high
- viii. Buchholz /SPR of OLTC operated
- ix. OLTC oil level low
- x. Rapid pressure relay operated

5.18.16. The contacts shall be multiplied for local / SCADA alarms in Relay panel (not in scope of transformer supplier).

5.18.17. Anodized aluminium plate showing details of all terminal Nos. will be provided along with marshalling box.

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5.19. Control Cabinet and Wiring

- 5.19.1. Weatherproof control cabinets of sheet steel construction, not less than 3 mm thick and provided with weather-proof hinged doors, shall be used for terminating wiring for control, protection and alarm circuits. Suitable gaskets shall be provided to make it waterproof and dust proof. The transformer cabinet shall be of IP55 class. Heaters with automatic controls shall be provided to prevent moisture condensation. The control cabinet shall be mounted separately on an independent foundation. All cables and conduits between the transformer and control cabinet shall be included in the scope of supplies.
- 5.19.2. Heaters shall be provided with suitable protective cover to avoid accidental contact with the element. (i.e. wire mesh enclosure with suitable heat & fireproof cover at the front).
- 5.19.3. Wiring from the current transformers and other control and alarm equipment shall be carried out in conduits or alternatively in concealed trays and terminated in the control cabinet.
- 5.19.4. Terminal blocks shall be furnished in the control cabinet. All terminal blocks shall be disconnecting type. Terminal blocks for short circuiting the current transformer shall be provided separate from the terminal blocks accommodating the control and indicating circuits. The direct and alternating current terminals shall be isolated from each other.
- 5.19.5. Tapping's of all CTs shall be brought to terminals in the control cabinet and 10% spare links will be provided. The terminals for the current transformer leads shall be suitable for accommodating 6 sq.mm and must be with disconnecting type links. Cable leads with the terminals for the control and other circuits shall be suitable for accommodation 4 sq.mm. cable leads. A minimum of ten spare terminals for control wiring shall be provided.
- 5.19.6. All wiring in the housing shall be multi stranded copper and the insulation shall be 1.1 kV grade flame resisting control cable and shall be reputed make like CCI, Torrent, Reliance Engineers, RPG cables or Universal. Size of wires shall be not less than 6 - 4 sq.mm. for CT leads and are not less than 2.5 sq.mm. for other connections.
- 5.19.7. Suitably rated switches shall be provided to enable the control supply to the transformer to be cut off from the cabinet.
- 5.19.8. Enough Space shall be provided at the bottom of the operating cabinet to

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mount the Purchaser's control cables glands. The number and size of the cable glands will be intimated later. All terminal blocks for control shall be rated for 40 A.

- 5.19.9. Wire and cable bunching rods will be provided on all terminal blocks on either side. The wire terminals shall be engraved, or otherwise indelibly marked ferrules and the wires shall be colour coded.
- 5.19.10. All terminal blocks should have terminal Nos. on either side of terminals.
- 5.19.11. Stud type fuse mounts shall be provided with insulating cover as protection against accidental contact with live terminals.
- 5.19.12. Drawing pouch with cooler control scheme drawings covered in the polythene paper will be provided inside marshalling box on the door. Stainless steel name plates shall be provided on doors of cooler control cabinet, CT junction box and thermo junction box. Name plates shall also be provided for all the components inside the marshalling box and to each cooler component.
- 5.19.13. Additional 230V, 15 A, 3 pin plug point shall be provided for testing purposes inside the marshalling box.
- 5.19.14. A suitably rated light point with its associated control switches shall be provided inside the housing for use in emergency.
- 5.19.15. All alarm and control devices shall be ungrounded.
- 5.19.16. Vendor shall furnish a list of the relays, control switches, timers, and other accessories like PRD, COPS bag, bushing, MOG etc. indicating the make, type, auxiliary supply requirements, contact rating etc. along with quotation. The make of devices shall be subject to approval by purchaser, after finalisation of order.
- 5.20. **Core**
- 5.20.1. The core shall be built with new, high grade, non-aging, low loss and high permeability, cold rolled, grain oriented, silicon-steel laminations especially suitable for transformer cores.
- 5.20.2. After being sheared the laminations shall be treated to remove all burrs. Both sides of steel laminations shall be so constructed that eddy currents will be minimum and finally assembled core is free from distortion.
- 5.20.3. The core shall be rated for 11kV insulation level. Each core lamination shall be insulated with a material that will not deteriorate due to pressure and hot oil.

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5.20.4. The design of the magnetic circuit shall be such as to avoid static discharges, development of short circuit paths within itself or to the earthed clamping structure and production of flux component at right angles to the plane of laminations which may cause local heating.

5.20.5. Core and winding shall be capable of withstanding the shock during transport, installation and service. Adequate provision shall be made to prevent movement of core and winding relative to tank during these conditions.

5.20.6. The core shall be provided with lugs suitable for lifting the complete core and coil assembly of the transformer.

5.20.7. The core and the coil shall be so fixed in the tank that shifting will not occur when the transformer is moved or during a short circuit.

5.21. **Core Grounding**

5.21.1. The grounding lead from the core shall be brought out of the tank through 11 kV class bushing and grounded externally. A protective cover shall be provided for the bushing. The core grounding rod (stem) through the bushing will be solid rod (stem). The design of core grounding arrangement shall be such that the grounding links shall not come out of core during installation as well service conditions.

5.22. **Winding**

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

5.22.2. The conductors shall be of electrolytic grade copper, free from scales and burrs.

5.22.3. The windings shall be so designed that all coil assemblies of identical voltage ratings shall be interchangeable, and field repairs to the windings can be made readily, without special equipment. The coils shall be supported between adjacent sections by insulating spacers, and the barriers bracings and other insulation used in the assembly of the windings shall be arranged to ensure a free circulation of the oil and to reduce hot spots in the windings.

5.22.4. The windings shall be designed to minimize the out of balance forces in the transformer at all voltage ratios. The conductors shall be suitably transposed to minimize eddy current and equalize the distribution of currents and

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temperature along the windings.

- 5.22.5. All materials used in the insulation and assembly of the winding shall be new, insoluble, non-catalytic, chemically inactive in the hot transformer oil and shall not soften or otherwise be adversely affected under the operating conditions.
- 5.22.6. All threaded connections shall be provided with locking facilities. All leads from the winding to the terminal board and bushings shall be rigidly supported to prevent injury from vibration. Guide tubes shall be used where practicable.
- 5.22.7. The winding shall be brought out through bushing and provided with suitable terminal connectors.
- 5.22.8. The windings shall be clamped securely in place so that they will not be displaced or deformed during short circuits. The assembled core and windings shall be vacuum-dried and suitably impregnated before removal from the treating tank. The copper conductors used in the coil structure shall be best suited to the requirements, and all permanent current carrying joints in the windings and the leads shall be welded or brazed.
- 5.22.9. Sharp bends should be avoided in the windings as far as possible, where unavoidable such bends should be reinforced with extra insulation tapes.
- 5.22.10. The tolerance for the winding resistance measurement for different phases but at same taps shall be limited to 0.5%.
- 5.22.11. The change in impedance values shall not exceed 10% of nominal impedance value as specified at all taps/links on HV/LV side.
- 5.22.12. Coil clamping rings, if provided shall be of steel or of suitable insulating materials.
- 5.22.13. The air core reactance of HV winding shall not be less than 20 mH.
- 5.22.14. Current density at rated load should not be more than 2.5 A / sq.mm.
- 5.22.15. Vapour phase drying process shall be preferred for drying transformer.

5.23. **Short Circuit Withstand Capacity**

- 5.23.1. The transformer shall be designed to withstand bolted short circuit on HV & LV terminals without considering system impedance for minimum duration of 3 seconds.

5.24. **Insulating Oil**

- 5.24.1. Please refer Annexure 1 for Standard Specification of Transformer Oil.
- 5.24.2. The make of the oil shall be subject to approval by the Purchaser.

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5.25. Tank

5.25.1. Tanks design shall be of bell type construction and suitable projecting guides shall be provided on core-assembly to facilitate removal of tank.

5.25.2. New tank to be manufactured as per the following specifications:

5.25.3. TRANSFORMER's tank shall be bell type design.

5.25.4. The transformer tank and cover shall be fabricated from good commercial grade low carbon steel suitable for welding and of adequate thickness. The tank and the cover shall be of welded construction. All seams shall be welded and where practicable they shall be double welded. The tank shall have sufficient strength to withstand without permanent distortion

(i) filling by vacuum

(ii) continuous internal gas pressure of 0.35 atm. With oil and operating level.

5.25.5. The tank material shall be of IS: 2062 or equivalent with ultrasonic testing done for elimination of defects in rolled plates. The welding shall be as per prior approved WPS (Welding Procedure Specs) by trained and tested welders. The welding plan must be shown in general i.e. Category-wise or for each type of weld in the mechanical fabrication drawing, which shall be submitted to Purchaser. All fittings like elbows, bends etc. shall be seamless to American or Indian Standards. No resistance welding of fasteners will be done anywhere on the transformer.

5.25.6. The tank shall have an oil tight bolted flanged joint near the base of the transformer so that the tank can be lifted off to provide access to the core and coils. To ensure oil tightness, recessed neoprene or equivalent gaskets shall be used. The transformer tank Top shall be designed & fabricated in such a way that the water shall not get accumulated on top of the tank.

5.25.7. Manholes with welded flange and bolted covers shall be provided on the tank. The manhole shall be of enough size to afford easy access to the lower ends of all the bushings, terminals, etc. to permit replacement of auxiliaries without removing tank covers.

5.25.8. Inspection covers on elevation (on vertical plane) shall be provided for all HV bushing turrets.

5.25.9. All bolted connection to the tank shall be fitted with suitable oil-tight gaskets

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which shall give satisfactory service under the operating conditions. Gaskets shall be of rubber Nitrite. Special attention shall be given to the methods of making the oil-tight joints between the tank and the cover as also between the cover and the bushings and all other outlets to ensure that the joints can be remade satisfactorily and with ease, with the help of semi-skilled labor. Where compressible gaskets are used, steps shall be provided to prevent over compression. All the bolts provided shall be of hot dip galvanized or stainless steel, preferably stainless steel.

- 5.25.10. Suitable guides shall be provided for positioning the various parts during assembly or dismantling. Adequate space shall be provided between the cores and windings and the bottom of the tank for collection of any sediment.
- 5.25.11. All joints including bolted as well as flanged, shall have machined matching surfaces/inner edges with smooth finish, to ensure leak proof joints.
- 5.25.12. Lifting eyes or lugs shall be provided on all parts of the transformer requiring independent handling during assembly or dismantling. In addition, the transformer tank shall be provided with lifting lugs and bosses properly secured to the sides of the tank, for lifting the transformer either by crane or by jacks.
- 5.25.13. The design of the tank, the lifting lugs and bosses shall be such that the complete transformer assembly filled with oil can be lifted with the use of these lugs without any damage or distortions.
- 5.25.14. The tank shall be provided with 2 suitable copper alloy lugs for the purpose of grounding. Independent body grounding should be provided for fans and radiators.
- 5.25.15. Each tank shall be equipped with the following valves with standard flange connection for external piping:
- 5.25.16. One drain and lower filter valve located on the low voltage side of the transformer and placed to completely drain the tank. At the option of the contractor a large valve may be furnished with an eccentric reducer. This valve shall be equipped with a small sampling cock.
- 5.25.17. One filter valve located at the top of the tank on the high-voltage side. The opening of this valve shall be baffled to prevent aeration of the oil.
- 5.25.18. One filter valve located diagonally opposite to (b) slightly above the bottom

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of the tank.

5.25.19. One relief valve to operate at a pressure below the test pressure for the tank.

5.25.20. One valve for “online DGA sampling” with isolating valve.

5.25.21. One drain valve of 125 mm / 100 mm diameter at the bottom most level (below base plate) to remove entire sludge after flushing without much efforts.

5.25.22. A suitable locking arrangement should be provided for locking these valves in close/open position. All valves should be provided with clear open/close position indications. Wherever rising spindle type valves are provided the valves should be clockwise rotating for closing operations.

5.25.23. For the auxiliary lead wiring from individual instrument to marshalling cabinet, the cables should be provided in the conduits.

5.25.24. If the manufacturer chooses to fabricate Tank other than approved sources indicated in 2.1.1, credentials of the fabricator shall be provided for TATA Power approval

5.26. **Under Carriage**

5.26.1. The transformer tank shall be supported on a structural steel base equipped with forged steel or cast steel single flanged wheels suitable for moving the transformer filled with oil.

5.26.2. Jacking pads shall be provided. It shall be possible to change the direction of the wheels through 90 deg. when the transformer is lifted on jacks to permit movement of the transformer both in longitudinal and transverse directions.

5.26.3. Pulling eyes shall be provided to facilitate moving the transformers and they shall be suitably braced in a vertical direction so that bending does not occur when the pull has a vertical component.

5.27. **Tap Changing Mechanism**

5.27.1. ON Load Tap Changer shall be provided as specified below:

5.27.2. The equipment shall conform to the latest standard applicable in India and IEC standard. Equipment complying with any other authoritative standards such as British, USA, VDE etc. shall also be considered, if offered.

5.27.3. The OLTC gear shall be motor operated for local as well as remote operation. An external handwheel/ handle shall be provided for

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local/manual operation. This handwheel / handle shall be easily operable by a man standing at ground level.

- 5.27.4. A mechanical interlock shall be provided such that it shall not be possible to remove handle
- 5.27.5. /handwheel from the manual operation position unless one complete tap change has taken place, all contacts are correctly engaged, and the switch is set in a position where no open circuit or short circuit is possible. An indicating device should be provided to show the tap in use.
- 5.27.6. The whole of the apparatus shall be of robust design and capable of giving satisfactory service without requiring frequent maintenance under the operating conditions met with in service.
- 5.27.7. The OLTC gear shall be designed to complete successful tap changes for maximum current to which transformer can be loaded i.e. 150% of the rated current. Devices shall be incorporated to prevent tap change when the through current is in excess of the safe current that the tap changer can handle. The OLTC gear shall withstand through fault currents without injury. Short term current rating of the OLTC shall preferably be same as that of the transformer.
- 5.27.8. When a tap change has been commenced it shall be completed independently of the operation of the control relays and switches. Necessary safeguards shall be provided to allow for failure of auxiliary power supply or any other contingency which may result in the tap changer movement not being completed once it is commenced.
- 5.27.9. Oil in compartments which contain the making and breaking contacts of the OLTC shall not mix with oil in other compartments of the OLTC or with transformer oil. Gases released from these compartments shall be conveyed by a pipe to a separate oil conservator or to a segregated compartment within the main transformer conservator. An Oil Surge Relay shall be installed in the above pipe. The protective relay serves for signalling a fault in the diverter switch / selector switch oil compartment and is to limit the damage to the on-load tap changer in case of a failure. The housing shall consist of corrosion-proof light metal and is provided with flanges for the connection of a pipe leading to the tap changer head and to the oil conservator. An inspection window shall be located on the front side of the housing to check the flap valve position. The terminals of the tripping

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switch shall be housed in a terminal box, oil tightly sealed from the oil chamber of the relay. In addition, two test buttons in the terminal box shall serve for checking the tripping function of the protective relay as well as for resetting the flap valve. A clear plastic screen shall protect the terminals. The protective relay shall respond only if oil flows occur from the tap changer head to the oil conservator. The flowing oil shall actuate the flap valve which tips over into position 'Operated' and thereby actuating the tripping switch. Switching operations at rated switching capacity or at permissible overload shall not result in a response of the protective relay. The conservator shall be provided with a prismatic oil level gauge.

5.28. The Oil Surge Relay shall conform to the following specifications:

- 5.28.1. Housing: Outdoor design Protection type: IP 55
- 5.28.2. Relay drive: Flap valve with aperture
- 5.28.3. Tripping switch: Reed-contact, available as NO-contact
- 5.28.4. Make/break current, switching capacity:
 - i.3 A, AC 250 V, 400 VA
 - ii.3 A, DC 250 V, 250 W
- 5.28.5. Test voltage to ground: 2.5 kV, 50 Hz, 1 min.
- 5.28.6. Shock insensitivity: up to 3 g max.
- 5.28.7. Reset of OSR should be in manual.
- 5.28.8. Oil, in compartments of OLTC which do not contain the make and break contacts, shall be maintained under conservator head by valved pipe connections. Any gas leaving these compartments shall pass through the Buchholz relay before entering the conservator.
- 5.28.9. Oil filled compartments shall be provided with filling plug, drain valve with plug, air release vent, oil sampling device, inspection opening with gasketed and bolted cover with lifting handles.
- 5.28.10. OLTC driving mechanism and its associated control equipment shall be mounted in an outdoor, weather proof cabinet, which shall include :
 - i. Driving motor (415 V - 3 phase, 50 Hz, AC squirrel cage)
 - ii. Motor starting contactor with thermal overload relays, isolating switch and MCBs.

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- iii. Duplicate sources of power supply with automatic changeover from the running source to the standby source and vice versa.
 - iv. Control switch: Raise/Off/Lower (spring return to normal type). (Contacts to be provided for operation through SCADA).
 - v. Remote/Local selector switch (maintained contact type). (Contacts to be provided for operation through SCADA).
 - vi. Emergency "OFF" push button (maintained type).
- 5.28.11. Mechanical tap position indicator showing rated tap voltage against each position and resettable maximum and minimum indicators. Suitable transducers to be provided to indicate tap positions to SCADA.
- 5.28.12. Limit switches to prevent motor over travel in either direction or final mechanical stops.
- 5.28.13. Brake or clutch to permit only one tap change at a time on manual operation.
- 5.28.14. Emergency manual operating device (hand crank or hand wheel).
- 5.28.15. A five digit operation counter
- 5.28.16. Electrically interlocked reversing contactors (preferably also mechanically interlocked).
- 5.28.17. 220 V, 50 HZ, AC space heaters with switch and MCBs.
- 5.28.18. Interior lighting fixture with lamp door switch and MCBs.
- 5.28.19. Hinged door with Gasket and locking arrangement.
- 5.28.20. Terminal blocks, internal wiring, earthing terminals and cable glands for power and control cables. Necessary relays, contactors, current transformers etc.
- 5.28.21. Transducers or any other appropriate device for remote tap position indication.
- 5.29. **Control Requirements for OLTC**
- 5.29.1. Positive completion of load current transfer, once a tap change has been initiated, without stopping on any intermediated position, even in case of failure of external power supply.
- 5.29.2. Only one tap change from each tap change impulse, even if the control switches or push button is maintained in the operated position.

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- 5.29.3. Cut-off of electrical control when manual control is resorted to.
- 5.29.4. Cut-off of a counter impulse for a reverse tap change until the mechanism comes to rest and resets the circuits for a fresh operation.
- 5.29.5. Cut-off of electrical control when it tends to operate the tap beyond its extreme position.

5.30. Automatic Control of OLTC

- 5.30.1. For automatic OLTC control the following items shall be included:
 - 5.30.2. Voltage setting device
 - 5.30.3. Voltage sensing and Voltage regulating devices.
 - 5.30.4. Line drop compensator with adjustable R and X elements.
 - 5.30.5. Timer 5-25 seconds for delaying the operation of the tap changer in the first step for every tap change operation.
 - 5.30.6. Adjustable dead band for voltage variations.

5.31. Parallel Operation with OLTC

- 5.31.1. For parallel operation the following shall be included:
 - 5.31.2. CTs of relaying class, if parallel by circulating current method.
 - 5.31.3. Line drop compensator with adjustable X, suitable for reversing, if paralleling by reverse reactance method.
 - 5.31.4. Other special requirements of control if indicated.

5.32. Alarms

The following alarms shall be provided with the additional contact arrangement for connection to SCADA:

- 5.32.1. A.C. supply failure
- 5.32.2. Drive motor auto tripped
- 5.32.3. Other protective purpose considered essential by the VENDOR.
- 5.32.4. Out of step operation when paralleled transformers supposed to operate on the same tap are operating at different taps.
- 5.32.5. Tap change delayed
- 5.32.6. Oil Surge Relay of OLTC conservator.
- 5.32.7. Transformer cooler fail

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5.32.8. For all the specified above a “OLTC trouble” group alarm to be provided in DCS which is in control room.

5.32.9. Remote Tap Changer Control Equipment (RTCC)

5.32.10. Digital voltage regulator for OLTC control shall be provided and shall be located in remote control room. It shall comprise of following features:

5.32.11. Control for Raise/Off/Lower the Taps Indications for:

- i. Tap change in progress
- ii. Lower limit reached
- iii. Upper limit reached
- iv. Auto/manual selector.
- v. Master/ follower selector for parallel operation
- vi. Tap position indicator.
- vii. Necessary auxiliary relays.
- viii. Oil Preserving Equipment for Main tank and OLTC tank

5.32.12. Oil preserving equipment shall be conservator (expansion tank) type.

5.32.13. The conservator shall have two filter valves, one at the bottom at one end, the other at the top, opposite end, in addition to the valve specified in the Accessories for the main tank. The conservator or expansion tank shall also have a shutoff valve and a small drain valve and sampling cock, the latter so arranged as not to interfere with oil lines. The oil level gauges (prismatic and magnetic) shall be mounted on the conservator or expansion tank. The top of the conservator shall have contact with COPS system through two silica gel breathers with oil cap to facilitate replacement of breather without having to keep Buchholz relay inoperative.

5.32.14. Conservator oil preservation bag (atmoseal bag) shall be provided. The design shall be such that it can be installed at site with ease without any special tools and tackles. Provide bypass piping to COPS on conservator.

5.33. Bushings

5.33.1. The bushings shall have high factors of safety against leakage to ground and shall be so located as to provide adequate electrical clearance between bushings and grounded parts. Bushings of identical voltage rating shall be interchangeable. All bushings shall be equipped with suitable terminals of approved type and size and all external current carrying

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contact surfaces shall be plated, adequately. The insulation class of the high voltage neutral bushing shall be properly coordinated with the insulation class of the neutral of the high voltage winding.

- 5.33.2. All main winding and neutral leads shall be brought out through outdoor type bushings as specified which shall be so located that the full flashover strength will be utilized, and the adequate phase clearance shall be realized.
- 5.33.3. Each bushing shall be so co-ordinated with the transformer insulation that flash-over, if any, will occur outside the tank.
- 5.33.4. Stresses due to expansion and contraction in any part of the bushing shall not lead to deterioration.
- 5.33.5. The HV bushings shall be equipped with following:
 - i. Provision for power factor testing.
 - ii. Stress rings and lower end shields.
- 5.33.6. Current transformers shall be provided, if specified and the bushing shall be so arranged that it can be removed without disturbing the current transformers and secondary terminals.
- 5.33.7. Bushing turrets shall be provided with vent pipes which shall be connected to route any gas collection through the Buchholz relay.
- 5.33.8. All oil filled bushing shall be provided with prismatic type oil gauge with red coloured float inside the gauge for oil level indication. The oil gauge glass shall be so designed that it shall give satisfactory service (without melting/cracking or bulging) at specified site conditions, throughout the life of transformer/bushing. It shall not turn opaque during the service.
- 5.33.9. In case of oil communicating type bushing, venting screw of the hollow stud, shall be provided with Teflon gaskets, to avoid oil leakage problem through the same.
- 5.33.10. Angle of inclination to vertical for any bushing shall not exceed 30 deg.
- 5.33.11. All bushings shall have puncture strength greater than the dry flash-over value.
- 5.33.12. Main terminals shall be solderless terminals and shall be of the type and size specified in the Schedule of requirements, or drawings.
- 5.33.13. The spacing between the bushings must be adequate to prevent flashover

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between phases under all conditions of operation.

5.33.14. The supplier is requested to give the guaranteed withstand voltages for the above and furnish a calibration curve with different settings of the co-ordination gap, to the purchaser to decide the actual gap setting. Supplier's recommendations are also invited in this respect.

5.33.15. The following routine tests shall be carried out on all bushings in the presence of purchaser's representative

- i. Visual examination
- ii. IR of main conductor to body and tap point to body
- iii. One-minute dry withstand test
- iv. Oil tightness test
- v. Partial discharge test
- vi. Test for capacitance and power factor measurement. The bushings shall have a link type isolating facility for tap for maintenance tests viz. power factor measurement etc.

5.34. Centre of Gravity

The centre of gravity of the assembled transformer shall be low and as near the vertical centre line as possible. The transformer shall be stable with or without oil. If the centre of gravity is eccentric relative to track either with or without oil, its location shall be shown on the outline drawing.

5.35. Central Line Marking

Central line of the transformer tank, cooler bank, cable box etc. shall be marked permanently and properly with indication to avoid any confusion during installation of the transformer.

5.36. Accessories/fittings

- 5.36.1. Each transformer shall be provided with the following accessories/ Fittings:
- 5.36.2. Oil conservator for main tank with oil filling (inlet) valve, isolating valves, drain valves, one magnetic-type oil-level gauge with low level alarm contacts and a dial showing minimum, maximum and normal oil levels. The gauge shall be readable from the transformer base level. It should have cable disconnecting facility at top of MOG, to facilitate testing of MOG.

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Along with MOG, prismatic type oil level indicator (glass window) shall also be provided on conservator.

- 5.36.3. Two silica gel dehydrating breathers each of 100% capacity for main tank. The breather shall be with maintenance free.
- 5.36.4. Conservator for OLTC with drain valve, filling hole with cap, prismatic oil level gauge and silica-gel breather.
- 5.36.5. Oil preservation equipment.

5.37. Pressure relief device

- 5.37.1. Adequate number of Pressure Relief Devices (PRD) shall be provided of enough size at suitable location for rapid release of any pressure that may be generated within the tank, and which might result in damage to the equipment. The device shall operate at a static pressure of less than the hydraulic test pressure for transformer tank. Means shall be provided to prevent the ingress of rainwater.
- 5.37.2. The PRD shall be mounted on the main tank and, if on the cover, shall be fitted with skirt projecting 25 mm inside the tank and of such a design to prevent gas accumulation. An oil splashguard pipe upto bottom portion of the tank shall be provided to the PRD to restrict spillage of hot oil in the event of operation of PRD.
- 5.37.3. A pair of potential free contacts of IP55 shall be provided to trip the transformer on action of the pressure relief device.
- 5.37.4. The pressure relief device shall conform to the following specifications:
- 5.37.5. The device shall have top seal configuration providing high reliability and consistent operation.
- 5.37.6. The flange shall be cast aluminium polyester powder coated.
- 5.37.7. The valve shall be stainless steel, sealing areas lubricated with silicone based lubricant.
- 5.37.8. The spring shall be oil tempered spring wire with polyester/epoxy coating for corrosion resistance.
- 5.37.9. All fasteners and hardware shall be stainless steel.
- 5.37.10. Prominently visible operation indicator shall be available.
- 5.37.11. The alarm switch shall be Die-cast aluminium with polyester powder coat,

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sealed weatherproof assembly having one changeover contact rated for 0.5A at 250V DC.

5.37.12. One gas detector relay (Buchholz relay) with alarm and tripping contacts to detect accumulation of gas and sudden changes of oil pressure complete with shut off valves and flange-couplings to permit easy removal without lowering oil level in the main tank, a bleed valve for gas venting and test valve. The installation shall be weatherproof to avoid any water seepage inside the relay. Magnetic reed type relays are preferred than double float type.

5.37.13. The Buchholz relay shall conform to the following specifications:

- i. The relay shall be provided with magnetic switches (aseismic execution), N/O contacts, with ratings as follows:
- ii. Rated current: 3 A ac or dc (max admitted)
- iii. Rated voltage: 24-240 V ac (50 Hz) or ac
- iv. Breaking capacity: 400 VA ac or 250 W ac
- v. The relays fitted with magnetic switches withstand sinusoidal vibrations with frequency variable from 3 up to 35 Hz and with accelerations up to 6 g in any direction.

5.37.14. The following Routine tests shall be done on the Buchholz relay:

- i. Tightness: Oil filled relay, oil overpressure 100 kPa, duration of the test 144 hours; without any leakage from any part of the relay.
- ii. Working of the floats and of the electric contacts: with oil filled relay and checking the electric alarm and trip contacts closure.
- iii. Volume of gas necessary for alarm: pumping air inside the relay, through the pneumatic test device and detecting at which value the contact operates
- iv. Trip for oil leakage: draining oil from the bottom until the closure of the contact within the limits shown in the operating values table.
- v. Insulation test: 2000 V ac (50 Hz), first between live parts (through the terminations in the cable box) and earth, and after between alarm and trip circuits, for 60 s.
- vi. Trip for oil surge: detecting the minimum oil flow rate at which the contact

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operates.

5.37.15. Separate Buchholz relay with above features for OLTC chamber shall be provided.

5.37.16. Sudden pressure rise relay shall be fitted on main tank to detect a sharp rise in internal pressure. It shall be provided with a test cock to take a flexible pipe connection for checking the operation of the relay. It shall be provided with

i. an electrically insulated trip contact.

ii. Air release plug

iii. Inspection openings & covers on all three phases in vertical plane.

iv. Bushings with metal parts and gaskets to suit termination arrangement.

5.38. Oil temperature indicator (OTI)

A dial-type indicating thermometer of robust pattern shall be mounted on the side of the transformer at a convenient height to read the temperature in the hottest part of the oil. It shall be fitted with alarm and trip contacts and contacts for switching in and switching out the cooling system at predetermined temperatures.

5.39. Winding temperature indicator (WTI)

5.39.1. Winding hot spot temperature detector to be provided in one winding of each phase. The WTI shall be indicating type, responsive to the combination of top oil temperature and winding current, calibrated to follow the hottest spot temperature of the transformer winding. The winding temperature detector shall operate a remote alarm in the event the hottest spot temperature approaches a dangerous level. The WTI shall have 2 independent NO contacts for alarm and trip.

5.39.2. The TRANSFORMER shall have fiber optic based oil and winding direct hotspot temperature measurement system. The system shall be supplied and integrated with station SCADA for indicating the temperatures on SCADA. No of sensors and location shall be as given in in the specifications.

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5.40. Online DGA Monitoring equipment:

- 5.40.1. Online Gas Monitoring shall be provided with microprocessor based IED for detection of gas build up and moisture content. The monitor shall be designed for permanent outdoor use in high voltage substation environment for ambient temperature from 20 °C to 50 °C and oil temperature from 20 °C to 105 °C. It shall be communicable to remote. Exterior enclosure and components shall be made of corrosion proof material to IP55.
- 5.40.2. Online DGA shall be provided with alarm contacts. The gas generated under abnormal electrical and thermal stresses are hydrogen (H₂), Methane (CH₄), ethane (C₂H₆), Ethylene (C₂H₄), Acetylene (C₂H₂), Carbon Monoxide (CO), Carbon Dioxide (CO₂), Nitrogen (N₂) and Oxygen (O₂) which get dissolved in Oil. 08 critical gases and moisture to be monitored in DGA equipment.
- 5.40.3. The Online DGA shall be on IEC61850 protocol for SCADA Communication and shall have Fiber optic (FO) port on Multi-mode and the FO port type shall be LC/ST preferably. Integration of DGA with SCADA is in Bidders scope. Material and services required for integration of DGA with SCADA is in the Bidders scope.
- 5.40.4. Online DGA system to have SCADA connectivity and net link facility to get results directly on laptop / PC.
- 5.40.5. Top oil temperature detector along with suitable transducer and other necessary devices to provide two sets of 4-20 mA signals.
- 5.40.6. Winding temperature detector along with, suitable transducers and other necessary devices to provide two sets of 4-20 mA signals.
- 5.40.7. Tap changer indicator of OLTC along with suitable transducer and other necessary devices to provide two sets of 4-20 mA signals.
- 5.40.8. Conventional OTI, WTI, FOP base WTI and DGA shall be integrated with SCADA system. All the material and services required (data cable/FOP cable, switches, converter, terminal boxes etc.) shall be in Bidders scope. Gateway not in Bidders scope. Readings of OTI and WTI shall be available on SCADA master/ HMI screen at local and remote.
- 5.40.9. Similarly, RTCC operation (Tap raise and lower) shall be possible through local and remote command through SCADA. Tap position number shall be available on SCADA screen. Integration of RTCC panel with SCADA is in

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bidder's scope to achieve above operational requirement. Material required for integration with SCADA system shall be in Bidders Scope.

5.41. Accessories for control cable routing, Clamps and Bolts

5.41.1. Cable trays provided for control cables shall be of stainless-steel material. Cable tray routing shall be proper and shall not foul with other components of power transformer. It shall be designed considering best practices followed in industries. Control cables shall be laid and tied properly and shall not come outside tray.

5.41.2. Bolts used for transformer shall be stainless steel type to avoid corrosion due to coastal atmosphere.

5.41.3. Clamps and connector required shall be supplied by Suppliers and shall be as per applicable IS and IEC standards.

5.41.4. Cover with lifting eyes, transformer lifting lugs, jacking pads, towing lugs and core and winding lifting lugs.

5.41.5. Bottom and top filter valves with threaded male adaptors, bottom and top sampling valve and drain valve.

5.41.6. Rating and diagram plates on transformers and auxiliary apparatus shall be provided.

5.41.7. Metallic Jumpers for all flanged connection for earthing continuity, Two Nos. earthing terminals, Flanged bi-directional wheels, Cooler Control Cabinet shall be provided.

5.41.8. On load tap changing (OLTC) equipment, local OLTC control cabinet and with provision for the necessary inputs to Digital Remote OLTC Control Cubicle (RTCC) shall be provided.

5.41.9. Drain valves/plugs shall be provided in order that each section of pipe work can be drained independently.

5.41.10. Drain valves/plugs shall be provided in order that each section of pipe work can be drained independently.

5.41.11. Oil flow indicator with alarm contacts (0.5A, 220V DC) shall be provided.

5.41.12. Following shall be provided:

- i. Terminal marking plate
- ii. Valve schedule plate

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- iii. Ladder with safety flap/barrier
 - iv. Clamping device with bolts and nuts.
 - v. Inspection opening and covers for access to interior of the tank
 - vi. Weather-proof marshalling box for housing control equipment and terminal connections.
 - vii. Oil filling valve (inlet)
 - viii. Oil drain valve
 - ix. One filter valve located at the top of the tank on the H.V. side.
 - x. Oil sampling valves.
 - xi. Heat exchangers or Radiators complete with fan /motors etc.
- 5.41.13. HV and LV bushing terminal connections complete with cable trunk / box, connecting lead/bus bar, conservator tank for the trunk with all accessories, support steel structures (hot dip galvanized) etc.
- 5.41.14. Control cable (as per IS: 1554) from transformer mounted equipment to transformer marshalling box / control cabinets.
- 5.41.15. Perforated GI cable trays to route the above all control cables and for control cables from transformer Marshalling Box to Transformer /cooling fans.
- 5.42. **Equipment for remote winding and oil temperature:**
 Indicators including these to be installed in the purchaser's control room shall be provided. Pocket with heater coil and CT for RTD for winding hot spots shall be provided.
- 5.43. **Remote recording and data acquisition system**
- 5.43.1. Top oil temperature detector along with suitable transducer and other necessary devices to provide two sets of 4-20 mA signals.
 - 5.43.2. Winding temperature detector along with, suitable transducers and other necessary devices to provide two sets of 4-20 mA signals.
 - 5.43.3. Tap changer indicator of OLTC along with suitable transducer and other necessary devices to provide two sets of 4-20 mA signals.
 - 5.43.4. Conventional OTI, WTI shall be integrated with SCADA system. All the material and services required (data cable/FOP cable, switches, converter, terminal boxes etc.) shall be in Bidders scope. Gateway not in Bidders scope. Readings of OTI and WTI shall be available on SCADA master/ HMI screen at local and remote.

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- 5.43.5. Similarly, RTCC operation (Tap raise and lower) shall be possible through local and remote command through SCADA. Tap position number shall be available on SCADA screen. Integration of RTCC panel with SCADA is in bidder's scope to achieve above operational requirement. Material required for integration with SCADA system shall be in Bidders Scope
- 5.43.6. All digital outputs for remote annunciation/control/DAS shall be provided with 2 changeover (NO) contacts for alarm condition and two changeover (NO) contacts for trip condition.
- 5.43.7. One set of equipment for control, protection, indication and annunciation for each transformer comprising motor contactors, detecting elements or devices, indicating apparatus instruments, relay, annunciators, etc.
- 5.43.8. Separate tank mounted marshalling box for terminal blocks for current transformer secondary and other cables, separate tank mounted marshalling box for oil and winding temperature indicators etc. and one indoor ground mounted cubicles for remote control of on-load tap-changer, alarms and indicating devices (RTCC). Cable conduits shall be provided for leading cables from devices to marshalling box/junction box.
- 5.43.9. Provision shall be made for installing resistance temperature detectors for temperature recording instruments arranged separately for the following:
 - i.Hot oil
 - ii.Winding hot spot
- 5.43.10. Any other accessories or appliances recommended by the manufacturer for the satisfactory operation of the transformers shall be supplied.
- 5.43.11. Transformer devices terminal boxes, junction boxes, marshalling boxes, CT junction boxes, OLTC MB and Power cable LV boxes shall be IP55 ingress protection. Also, canopy shall be provided in addition to IP55 protection.
- 5.43.12. The equipment and accessories furnished with the transformer shall be suitably mounted on the transformer for ease of operation, inspection and maintenance, and the mounting details shall be subject to the approval of the purchaser. All valves shall be provided either with blind companion flanges or with pipe plugs, for protection. All valves shall have open/close position clearly marked.

5.44. Bushing Current Transformers

- 5.44.1. The current transformers shall conform to Indian Standards and shall have

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the class of accuracy, volt-amp burden and other details set out elsewhere. The design and construction shall be sufficiently robust to withstand the thermal and mechanical stresses resulting from maximum short circuit current. The core laminations shall be of high-grade silicon steel or other equivalent alloy. The exciting current shall be as low as possible.

- 5.44.2. Characteristics of the CTs and CT test results (accuracy, kVp etc.) shall be furnished by the bidder.
- 5.44.3. The bushing CT terminals will be brought out through epoxy moulded common bushing block to a weatherproof outlet box near the bushing. Each phase bushing CTs shall have separate outlet box. The vendor shall arrange conduit wiring from this box up to transformer control cabinet.
- 5.44.4. Terminal blocks for all CT secondary leads shall be provided with test links and isolating facility. All CT secondary terminal links shall be disconnecting type with round lugs.
- 5.44.5. It shall be possible to remove turret mounted CTs from transformer tank, without removing the cover.
- 5.44.6. Bushing CT name plate shall be mounted on the equipment tank adjacent to the terminal box.
- 5.44.7. All the bushing turret CTs shall have test winding for testing CTs.
- 5.44.8. Bidder shall forward following information for CTs along with quotation:
 - i. Binding dimensional drawing of CT including mounting details.
 - ii. Total weight of each CT.
 - iii. Quantity of oil/CT (if applicable)
 - iv. Rating and diagram plate drawing.
 - v. CT characteristic curves with excitation current Vs secondary voltage for each core as measured in the case of protection CTs.
 - vi. CT secondary resistance as measured in ohms.
 - vii. Maximum shipping weight and volume.
 - viii. CT mounting drawing.

5.45. **Packing**

- 5.45.1. The packing may be in accordance with the Supplier's standard practice but he should give full particulars of packing for the approval of the

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purchaser. Special arrangement should be made to facilitate handling and to protect the projecting connections from damage during transit.

- 5.45.2. The TRANSFORMER shall be shipped filled with oil/without oil but with the tank filled with Dry air under pressure complete with gas cylinder reducer connection and pressure gauges (Despatch clearance will be given only after achieving satisfactory dryness i.e. on dew point measurement results). These accessories will become part of purchase. However, if neutral grounding transformer and reactors are included in the scope, these can be transported with oil. (whichever way desired by the purchaser depending on the size etc.)
- 5.45.3. Provisions shall be made for monitoring gas pressure during transport and storage and a make-up Dry air cylinder. A shock recorder also shall be provided during transport. Bushings shall be packed in proper containers for transport.
- 5.45.4. All parts shall be adequately marked to facilitate field erection. Boxes and crates shall be marked with the contract number and shall have a packing list enclosed showing the parts contained therein.

5.46. Tools and Spare Parts

- 5.46.1. The transformer shall be supplied with: -
 - i.A full outfit of tools, spanner, jacks, special tools for assembling and dismantling transformer with a rack for holding them. All spanners shall be single ended, and case hardened.
 - ii.Spare parts as ordered and listed.
- 5.46.2. Bidder shall give an assurance that spare parts and consumable items will continue to be available through the life of the transformer which shall be 25 years minimum. However, the Purchaser shall be given a minimum of 12 months' notice if the Bidder or any sub-vendor plans to discontinue manufacture of any component used in this equipment.
- 5.46.3. Any spare apparatus, parts or tools shall be subject to the same specification, tests and conditions as similar material supplied under the Contract. They shall be interchangeable and suitable for use in place of the corresponding parts supplied with the equipment and must be suitably marked and numbered for identification.

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5.46.4. Drawings, Data and Guaranteed Technical Particulars (GTP) to be furnished by the Bidder

5.46.5. After the award of the contract six (6) copies of drawings, drawn to scale & describing the equipment in detail, shall be forwarded to the purchaser for his approval. Subsequently on approval, the vendor shall provide eight (8) complete sets of final approved drawings, one of which shall be auto positive and editable soft copy suitable for reproduction, before the despatch of the equipment.

5.46.6. The following drawings/information for each item are to be supplied as part of this contract:

- i. Outline dimensional drawings of TRANSFORMER and accessories.
- ii. Shipping drawings showing dimensions and weights of each package.
- iii. Assembly drawings and weights of main component parts.
- iv. Drawings giving the weights for foundations.
- v. Tap changing and name plate diagrams.
- vi. Schematic control along with logic block diagram and wiring diagram for all auxiliary equipment.
- vii. Schematic diagram showing the flow of oil in the cooling system as well as each limb and winding. Longitudinal and cross-sectional views showing the duct sizes, cooling pipes etc for the transformer/heat exchanger drawn to scale shall be furnished.
- viii. Drawings of high- and low-tension windings of the transformers showing the nature and arrangement of insulation and terminal connections.
- ix. Bushing drawing and specifications
- x. Test reports
- xi. Crane requirements for assembly and dismantling
- xii. Cable box connections.
- xiii. Foundation drawing of TRANSFORMER, radiator supports, pumps, cable box etc.
- xiv. Manufacturer shall submit following for Purchaser's reference before despatch of the TRANSFORMER.
- xv. Six (6) copies of instruction books/operation and maintenance manuals and spare part bulletins.

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xvi. Descriptions literature and data on TRANSFORMER, construction, winding, bushing, heat exchanger, tap changing gear etc.

5.47. **Transport**

5.47.1. Transport, when specified, shall be arranged up to site. The transport shall be arranged either by Rail/Road. Road transport shall be arranged only on Hydraulic trailer (preferably by 12 axle) to minimise the transport jerks. Before arranging the transport, supplier should carry detailed route survey. The trailer details will be forwarded to purchaser for their approval before despatch of Transformer.

5.47.2. Suitable shock recorders to record maximum shock forces during shipment/ transport shall be provided. Shock recorders shall be provided on returnable basis.

5.47.3. Record of the impact recorder shall be submitted to the project manager of Tata Power on receipt of Transformer on site.

5.48. **Safety Requirement**

Electrical and Mechanical safety by design:

5.48.1. Bidder to design the transformer as per the technical parameter listed in the specification.

5.48.2. Bidder to ensure safety of the equipment by carrying out all the routine, type and special test mentioned in the specification.

5.48.3. Bidder to design the transformer and source bought item as per IS and IEC standards and CBIP guidelines.

5.48.4. Collapsible or detachable railing for all four sides shall be provided on the top cover of the transformer tank for maintenance work on dead transformer. In addition, arrangement for hooking the life-line jacket /full body harness shall be made at suitable multiple locations (minimum 12) on top cover of the transformer tank & conservator for safe working at height.

5.48.5. Safety platform with ladder (wherever reactor) and railing shall be provided for accessing all the transformer devices where ever the devices are not easily accessible.

People safety by design:

5.48.6. Bidder to consider safety railing on transformer tank, ladders at appropriate

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location and safety platform for accessing transformer devices safely as mentioned in the specification.

5.48.7. All the Marshalling boxes shall be mounted considering safe working access.

5.48.8. Safety during installation testing and commissioning.

General Safety Requirement

5.48.9. The TRANSFORMER shall be provided with detachable, flanged, bi-directional wheels for movement and mounting on rail gauge as specified. Purchaser will provide rail tracks grouted in concrete foundation. Vendor shall provide means for locking the wheels in positions parallel to and at right angles to the longitudinal axis of the tank.

5.48.10. A minimum of four jacking pads shall be provided on the tank to enable the transformer to complete with oil to be raised or lowered using hydraulic or screw jacks.

5.48.11. The TRANSFORMER shall be supplied with bolts, nuts, washers and accessories required for fixing the transformer to the foundation.

5.48.12. The specified creepage distances for terminal bushings/insulators shall be achieved by providing specially designed insulator sheds and not by increasing the overall height beyond normal insulator height.

5.48.13. The bidder shall ensure that dimensions and weight of the largest package shipping/transport do not exceed the permissible values imposed by Transporting Authorities.

5.48.14. The construction of transformer and location of the accessories like CTs, lower ends of bushings, terminals, tap changers etc. shall be such as to afford easy access and permit replacement of auxiliaries without removing the tank cover.

5.48.15. Tank top shall have adequate slope and shall have anti-skid bars (6 mm x 18 mm steel bars) welded on them to prevent workmen from slipping off. They shall be installed so that water is not trapped by them.

5.48.16. TRANSFORMER shall be provided with oil tight, bolted flanged joint located near bottom to permit untanking by lifting the tank and exposing core and coils.

5.48.17. Instruments and wiring in the local cooler control cabinet/ marshalling box

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shall be completely accessible.

5.48.18. Necessary calibration curves and complete information shall be furnished to enable checking and calibrating accurately all control devices of the fans and pumps controls and the hot spot temperature alarm and trip.

5.48.19. The rating plates of the TRANSFORMER (mounted at a height of approximately 1750 mm from ground level) shall be supplied as per IS-2026 and give the following additional information:

- i. Connection diagram showing the internal connections.
- ii. Temperature rise
- iii. Insulation levels of the windings, including neutral end of windings with non-uniform insulation.
- iv. Transportation weight
- v. Untanking weight.
- vi. Core and windings weight
- vii. Table giving the tapping voltage, tapping current and tapping power for each tapping.
- viii. Values of short circuit impedance on the extreme tapping's and on the principal tapping and indication of the winding to which the impedance is related.
- ix. A table of all guaranteed particulars.
- x. Quantity of oil required for normal filling.
- xi. HV and LV phase to phase clearances.
- xii. Transformer core loss at 90%, 100% & 110% excitation.
- xiii. HV and LV winding resistance at a particular temperature.
- xiv. TRANSFORMER shall also be provided with following non-corrodible data plates (mounted at a height of approximately 1750 mm from ground level) indelibly marked, showing:
 - xv. The location and function of all valves and plugs and indication of the maintenance instruction reference for applying vacuum treatment for drying and oil filling.
 - xvi. Connection diagram.

5.48.20. All outdoor bushings and their mounting arrangements shall be suitable for hot line washing of each bushing by portable nozzle.

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- 5.48.21. Transformer shall be capable of being used with any make of transformer oil complying with latest IS: 335.
- 5.48.22. As far as practicable, the Transformer and accessories shall be so designed that no special tools are necessary for installation and maintenance. However, if special tools are required, the Vendor shall supply one complete set.
- 5.48.23. The Vendor shall include supply of essential spares specified here and indicate recommended spares for 3 years operation in the Annexure form.
- 5.48.24. To facilitate easy un tanking of transformer during overhaul, the transformer shall meet the following requirements.
- 5.48.25. All tap-changer assembly and linkages shall be brought out of the transformer at the bottom.
- 5.48.26. Local cooler control cabinet/marshalling box shall be so located as to require minimum disconnection during transformer maintenance/movement.
- 5.48.27. In addition to the valves mentioned in specification, transformer shall be provided with a suitable nozzle along with valve for oil spray during filtering for degasification and other benefits like extraction of residual moisture from winding.
- 5.48.28. All points terminating in a flanged connection exposed to atmosphere, shall be supplied with blank flanges, bolts, nuts and gaskets
- 5.48.29. All meters, local instruments, protection devices, and devices for remote indication shall be wired up to the terminal boards of local control cabinets/marshalling box (Kiosk) along with all necessary cable lugs and glands.
- 5.48.30. Cable glands, sealing ends and lugs for purchaser's cables to be terminated in the equipment supplied by vendor shall be included in vendor's scope. The gland plate of cable box shall be made in two sections.
- 5.48.31. Customer hold points during the course of manufacture and acceptable limits for the respective parameters shall be forwarded to Purchaser along with the quotation.
- 5.48.32. The makes and vendors of major accessories of the TRANSFORMER are indicated in the enclosed list. The accessories shall be of specified make

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and the list of accessories makes shall be forwarded to purchaser for approval before finalizing the same.

5.48.33. All equipment, system and services covered under this specification shall comply with all currently applicable statutes, regulations and safety codes in the locality where the equipment will be installed. The equipment and systems shall also conform to the latest version of applicable codes and standards on the date of bid opening. Nothing in this specification shall be construed to relieve the BIDDER of this responsibility.

5.48.34. The standards not indicated in the specification are also acceptable subject to the approval of Owner, if they are established to be equal or superior to the standards indicated in the specification.

5.48.35. The metric units/SI units shall be used in all data / drawings submitted against this package.

5.48.36. If the Bidder offers equipment and systems conforming to other International Standards than those specified in the specification, the English translation of such standards shall be furnished by the Bidder along with the Bid. In such a case, if such standards are acceptable to the OWNER the stipulations of the English version of the Standards shall alone be binding and not the stipulations in the original language.

5.48.37. The deviation between standards followed by Vendor and the standards specified in this specification document shall be brought out separately as an Annexure to the "Technical Deviations".

5.48.38. In the event of any conflict between the codes and the standards referred to elsewhere in the specification and the requirements of this specification, more stringent of the two shall govern.

5.48.39. All terminals blocks shall be disconnecting type and ELMEX make, KLTD-M4 type 1.1kV 40 Amp rating.

6. **Layout Requirements for the equipment**

Proposed Transformer footprint (dimensions) shall be as mentioned in the specifications and will be installed by creating the space in the switchyard. Please refer Section A Annexure E.1.

7. **Operational Requirements**

As mentioned in the specs following requirement shall be considered

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- i. Safety railing, ladder and platform for safe working of operation and maintenance personnel
- ii. New Transformer orientation shall be as per the site requirement.
- iii. All MBs shall be easily accessible for safe working.
- iv. Operation and maintenance manual shall be submitted as mentioned in MDL for O & M practises

8. Technical Parameters of Equipment including DATA SHEET

Refer Annexure B.1 for Data Sheet.

9. Quality Requirements (including SQP and FQP) and Testing:

- 9.1. All shop tests i.e. Routine Tests, Performance Tests, Special Tests and Acceptance Test as per the relevant standards and approved MQP shall be carried out on each Transformer in presence of owner representatives. Minimum shop testing requirements are specified in the attached Standard Quality Plans and in this specification. All applicable Type test report shall be submitted with the bid and shall not be older than 5 years. All erection and installation activities shall be performed in line of approved FQP by Owner. Standard Quality Plan (SQP) and Standard Field Quality Plan (SFP) are as follows:

SQP document no.: TPQAIT-QAXX-00-EX-SQP-002: SQP for Transformer
SFP document no: TPQAIT-QAXX-00-EX- FQP-021 for Transformer installation

- 9.2. The Transformer shall be completely assembled including bushings, rollers, radiators, cable boxes, marshalling boxes etc. and tested at the factory. An inspection/test schedule shall be forwarded to the purchaser for his comments and approval. If the purchaser elects to have a representative, all tests shall be witnessed by the representative. Tests shall be performed in compliance with B.S.171, IEC 60076, IS 2026:1977 (parts I to V) and IS: 2026:1981 (Part III) or latest editions or any other authoritative standard.
- 9.3. After placement of PO, the Vendor shall share with Tata Power the Watt/kg curve and magnetization curve of the transformer.
- 9.4. Routine, Type and Special tests, as specified in standards shall be performed as per Standard Quality plan and Bill of material (BOM) MO transformer which includes all the required test to be performed.

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9.5. TESTS AT SITE

- i. All erection and installation activities shall be performed in line of approved FQP by Owner. Minimum site checking/ testing requirements are stated in Standard Field Quality Plan (SFP). SFP document no: TPQAIT-QAXX-00-EX-FQP-021 for Transformer installation
- ii. The Vendor should clear the TRANSFORMER for charging after carrying out all the tests on the transformer satisfactorily and test results shall be approved by Owner.
- iii. All test instruments used at site should be of reputed make, calibrated and certified. Some examples are as below: -

Instruments	Application	Typical Make
Digital Multiplier	Voltage & Currents (mA) during core loss, mag balance, short circuit, vector group test, CT Testing.	Rishab, Fluke
5 kV Megger	IR & PI of POWER TRANSFORMER	Megger, AVO
LV Megger	IR of bushing tap, CT circuit, marshalling box, OLTC & RTCC panels.	Megger, AVO
LV C&DF Set	C & Df of Bushing taps	Megger
HV C&DF Set	C & Df Of Bushing & POWER TRANSFORMER	Doble, Megger
TTR	Turns Ratio	Tettex
TRM	Megger, SCOPE	Megger,SCOPE
3 Ph & 1 Ph Variac	CT test, core loss test	
SFRA	SFRA in all modes	Doble
Dew point test	Dew point test	

9.6. TEST REPORTS

- i. After all tests have been completed six certified copies of each test report
- ii. shall be furnished. Each report shall supply the following information:
- iii. Complete identification data including serial number of the transformer.

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- iv. Method of application, where applied, duration and interpretation of results for each test.
- v. Shipment of the TRANSFORMER shall be effected only after approval of
- vi. the test reports/ certificates is communicated by Purchaser.
- vii. Type test reports of similar TRANSFORMER shall be provided along with the offer

10. Inspection, Testing and Performance Requirements along with Warranty

Routine tests & special tests shall be carried out on all associated equipment as per relevant Indian Standards. Refer the SQP (Annexure VII and VIII) for details on test to be carried out on the TRANSFORMER.

11. Mandatory Spares

- 11.1. The Bidder shall supply the spares required as mentioned in the price schedule
- 11.2. As part of the proposal, the BIDDER shall indicate the list of erection/maintenance tools & tackles offered by him.

12. Data Submission By Bidder

- 12.1. With the Bid
- 12.2. After award of contract
- 12.3. Bidder shall submit the following information along with the Technical Bid.
- 12.4. Bidder shall provide the technical offer including data sheets, BOM, Bidder Qualification Requirement, footprint requirement (overall size), Guaranteed Losses of transformer, GA drawings, Type test reports, Guaranteed Particulars and Recourse if Guarantee is not met, unpriced copy of price schedule etc., of hardcopies and soft copies (in editable format) for the technical evaluation as filled in the format given along with the technical offer. In the absence of the above, the offer submitted by the bidder will not be considered.
- 12.5. The engineering data shall be furnished by the Contractor in accordance with the Schedule for each set of equipment as specified in the Technical Specifications.
- 12.6. The Documents shall be submitted through Document management system 'WRENCH'. Necessary training on Wrench Software will be

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provided to Bidders representative by Consultant. Master Document List (MDL) shall be prepared by contractor and submitted for Owners approval.

- 12.7. The drawings will be approved in four categories as follows:
- i.Code I: Approved
 - ii.Code II: Approved subject to incorporation of comments as marked. Resubmit for formal approval
 - iii.Code III: Not Approved. Incorporate comments as marked. Resubmit for review / approval.
 - iv.Code IVa: Retain for Information.
 - v.Code IVb: Resubmit after incorporation of comments.
- 12.8. It is responsibility of the Bidder to handover all project related drawings in Auto Cad formats only. The pdf version of above drawings / documents shall be routed through Wrench for formal approval process.
- 12.9. The Bidder shall submit 6 (six) sets of code I & code IVa approved drawings / design documents / data / test reports to the Owner.

13. DRAWINGS

- 13.1.1. All drawings submitted by the Bidder including those submitted at the time of bid shall be with sufficient detail to indicate the type, size, arrangement, material description, Bill of Materials, weight of each component, break-up for packing and shipment, dimensions, internal & the external connections, fixing arrangement required and any other information specifically requested in the specifications.
- 13.1.2. Each drawing submitted by the Bidder shall be clearly marked with the name of the Owner, the unit designation, the specifications title, the specification number and the name of the Project. If standard catalogue pages are submitted, the applicable items shall be indicated therein. All titles, noting, markings and writings on the drawing shall be in English. All the dimensions should be in metric units.
- 13.1.3. Further work by the Bidder shall be in strict accordance with these drawings and no deviation shall be permitted without the written approval of the Owner, if so required.
- 13.1.4. The review of these data by the Owner will cover only general conformance of the data to the specifications and documents interfaces with the equipment provided under the specifications, external connections and of

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the dimensions which might affect plant layout. This review by the Owner may not indicate a thorough review of all dimensions, quantities and details of the equipment, materials, any devices or items indicated, or the accuracy of the information submitted. This review and/or approval by the Owner shall not be considered by the Contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications and documents.

13.1.5. All manufacturing and fabrication work relating to the equipment prior to the approval of the drawings shall be at the Bidders risk. The Bidder may make any changes in the design, which are necessary to make the equipment conform to the provisions and intent of the Contract and such changes will again be subject to approval by the Owner. Approval of Bidders drawing or work by the Owner shall not relieve the Bidder of any of his responsibilities and liabilities under the Contract.

13.1.6. All engineering data submitted by the Bidder after final process including review and approval by the Owner shall form part of the Contract Document and the entire works performed under these specifications shall be performed in strict conformity, unless otherwise expressly requested by the Owner in Writing.

13.1.7. The following schedule shall be generally adopted for drawing / document approval and for providing final documentation.

i.	Approval/comments/ by Owner on initial submission	As per agreed schedule
ii.	Resubmission (whenever required)	Within 1 (one) week from date of Comments through Wrench
iii.	Approval or comments	Within 1 (one) week of receipt of resubmission.
iv.	Furnishing of distribution copies in bound volume (3 copies)	2 weeks from the date of final approval for project site
v.	Furnishing of distribution copies of test reports	
vi.	a) Type test reports (3 copies)	2 weeks from the date of final approval

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vii.	b) Routine Test Reports (one copy each)	2 weeks from the date of final approval
viii.	Furnishing of instruction/operation manuals (two copies)	As per agreed schedule
ix.	Hard copy of approved RFC drawings (two sets)	As per agreed schedule
x.	As built drawings (Three sets)	On completion of entire works
xi.	CD / DVD for all As built drawings	On completion of entire works

NOTE:

- 13.1.8. The Bidder may please note that all resubmissions must incorporate all comments given in the earlier submission by the Owner or adequate justification for not incorporating the same must be submitted failing which the submission of documents is likely to be returned.
- 13.1.9. The list of drawings which are required to be referred during execution shall be finalized with the Bidder at the time of Award.
- 13.1.10. All as build drawings should be submitted in the latest Auto CAD Version.
- 13.1.11. The instruction Manuals shall contain full details of drawings of all equipment being supplied under this contract, their exploded diagrams with complete instructions for storage, handling, erection, commissioning, testing, operation, trouble shooting, servicing and overhauling procedures.
- 13.1.12. If after the commissioning of the project, the instruction manuals require any modifications/ additions/changes, the same shall be incorporated and the updated final instruction manuals shall be submitted by the Contractor to the Owner.
- 13.1.13. The Bidder shall furnish to the Owner catalogues of spare parts.

List of Annexures in Section B:

- Annexure - I: Standard Specification for Transformer Oil
- Annexure - II Typical MDL for Transformer
- Annexure - III: Standard Quality Plan (SQP) TRANSFORMER
- Annexure - IV: Standard Field Quality Plan (SFQP) TRANSFORMER

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List of Annexures in Section A:

E	ANNEXURES
E.1	Transformer % Impedance and footprint requirement
E.2	Guaranteed Particulars and Recourse if Guarantee is not met
E.3	BOM for Transformers
E.4	Reference Overall GA drawing of existing Transformer for dimension reference
E.5	Pre-qualifying requirements
E.6	Losses for Transformers
E.7	PRICE bid format and annexure
E.8	Tentative turret CT Details of Typical Transformer
E.10	Approved Vendor List for Transformer.
E.11	Typical Master document list (MDL)

Please refer Section A Annexure table for balance annexures.

Annexure I Standard Specifications for Transformer Oil

THE TATA POWER COMPANY LIMITED

STANDARD

TECHNICAL SPECIFICATION

FOR




Transformer Oil as Per Latest IS: 335

(DOCUMENT NO - ENGG/STD-SPEC/61/2018)



Tata Power

Engineering (T&D)

Rev. No	Date	Revision History	Prepared By	Checked By	Approved By (HOD)
R0	22.04.2018	First Issue	ABK	VAS	AM
R1	30.05.2020	Standard Format	VAS/VK	SVD	AM / RS
C	24.03.2022	Inhibited Type II paraffin oil updated as per IS 335 : 2018	SSC 	VK/VAS 	UGP 

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2. Pre-Qualifying Requirements including TTR
3. System Description and Scope
4. Codes & Standards.
5. Design Requirements
6. Layout Requirements for the equipment
7. Safety Requirements
8. Operational Requirements
9. Technical Parameters of Equipment including data sheet and make list for bought out items.
10. Quality Requirements (including SQP and FQP)
11. Inspection, Testing and Performance Requirements along with Warranty
12. Mandatory Spares
13. Data Submission by Bidder
 - 13.1 With the Bid (including list of key drawings with dates/period which are part of bidder's commercial compliance)
 - 13.2 After award of contract

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Transformer Oil as Per Latest IS: 335		

1. Introduction:

This specification has been prepared for Bidder to assist the Owner for supply of Inhibited Type II Transformer Mineral Oil as per IS-335 latest standard at Transmission Divisions, Mumbai.

The document covers the requirements for manufacturing, refining, testing, packing and supply of high quality electrical insulating oil for use in EHV equipment's.

All equipment, system and services covered under this specification shall comply with all current applicable statutory regulations and safety codes in the locality where the equipment is proposed to be installed. The equipment and systems shall also conform to the latest version of applicable codes and standards on the date of offer made by the Bidder unless otherwise indicated. Nothing in this specification shall be construed to relieve the Bidder of this responsibility.

2. Pre-Qualifying Requirements including type test report:

For bidders qualification requirement, refer Annexure-1.

3. System Description and Scope:

- a. The bidder should have ISO 9001: 2008 & ISO 14001: 2004 Certified Manufacturing facilities.
- b. The bidder should have ISO Certified / NABL / BIS approved in-house testing facilities for all the tests specified in IS 335 for Oil.

The scope includes manufacturing, refining, testing, packing and supply of high quality electrical insulating oil for use in EHV equipment's, as per specification here under. No inhibitors shall be used in oil.

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The supplied insulating oil shall conform to parameters given as per IS335:2018 inhibited Type-II. Insulating oil shall be of high quality electrical insulating oil, manufactured using specially selected base stocks to help provide protection against oxidation and sludge formation. It shall be ensured for careful processing and handling so that insulating oil is stable and free of water and other contamination and remains so until it reaches for final use.

4. Codes & Standards:

As per IS 335 latest edition

5. Design Requirements:

- 5.1. The transformers oil shall be of low viscosity and shall offer the minimum resistance and maximum convective assistance to the flow. The oil shall be thin enough to penetrate narrow ducts and assist in circulation through transformer winding to prevent local over heating. It must have low pour point. The viscosity of oil shall be such that the flow is not significantly impeded.
- 5.2. Low volatility for oil is desirable. Oil shall have excellent chemical stability such that degradation due to decomposition of high molecular weighed hydrocarbon molecules into lighter, more volatile fraction shall not occur at normal operating temperatures.
- 5.3. The oil shall have high electrical strength, good impulse strength and good arc quenching properties. It shall be clear, bright but nontoxic.
- 5.4. It shall be free from objectionable quantities of elemental and thermally unstable sulphur bearing compounds. If present, these compounds shall not cause corrosion of certain metals, paper or other components used in transformer. There should be no significant quantity of furanic compounds detected in new oil.
- 5.5. The oil shall have ability to resist transient voltage stresses caused by lightning strokes and high voltage switching surges.
- 5.6. Good oxidation stability is principal requirement for longer service life of oil. It shall not contain detectable amounts of polychlorinated biphenyls.
- 5.7. It is intended to use this oil as an electrical insulation and oil as coolant in applications

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such as transformers, reactors, tap changers etc. This oil shall also make an important contribution to the efficiency of the solid insulation by penetrating and filling the spaces between layers of winding.

- 5.8. The oil shall be pure hydrocarbon mineral oil, with additive, clean and sufficiently free from moisture or other foreign matter likely to impair its properties.

6. Layout Requirements for the equipment:
NA

7. Safety requirements

Bidder shall supply the oil which is safe for use in all EHV equipment's as per relevant safety standards. The oil shall be conform to human safety and shall be free from carcinogenic Poly chlorinated Bi-phenyls (PCB) and Poly aromatic hydrocarbon (PAH). The oil barrels supplied shall be properly sealed and there shall be no leakage. Bidder shall give recommendations and assist Tata Power for appropriate storage of these oil drums at site.

8. Operational Requirements

- 8.1. The tenderer should indicate in their offer whether they could supply transformer oil as per annexure. The transformer oil should be delivered in sealed non- returnable epoxy coated new steel barrels each containing 209/210 litres of oil. The barrels should conform to Type A or B of IS: 1783 – 1974

9. Technical Parameters of Equipment including DATA SHEET:

Sr. No.	Characteristics of Inhibited Transformer Oil	Requirement As per IS 335:2018 TYPE-II
1	Appearance	The oil shall be clear transparent & free from suspended matter of sediments.
2	Density, at 20 °C, gm/Cm ³	0.895 g/ml, Max

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3	Kinematics Viscosity CST mm ² /s max at (0) °C at 40 °C	1800 15
4	Flash point	135 °C Min.
5	Interfacial tension at 27 °C Newton/M ASTM D971	0.044 N/m
6	Pour point	(- 10) °C Max.
	Lowest Cold Start Energizing Temperature (LCSET)	(- 20) °C Max.
7	Neutralization value	
	a) (Total acidity) mg. (Max)	Nil
	b) Inorganic Acidity/alkalinity	Nil
8	Corrosive Sulphur (In terms of classification of copper strips)	Non-corrosive
9	Electric Strength	
	(Break down voltage) After filtration	70 kV, Min (rms)
10	Dielectric Dissipation Factor (Tan delta) at 90 °C	0.005 Max.
11	Specific Resistance (Resistively)	
	a) @ 90 °C	750 x10 ¹² Ohm-cm (Min.)
	b) @ 27 °C	11300 x10 ¹² Ohm-cm (Min.)
12	Oxidation Stability	
	a) Neutralization value after Oxidation	0.40 mg/ KOH/ gm Max.
Sr. No.	Characteristics of Transformer Oil	Requirement As per IS 335:2018 TYPE-II
	b) Total sludge after oxidation	0.8% by weight max.

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13	AGEING CHARACTERISTICS AFTER AGEING	
	Open breaker method with copper characteristics	
14	Specific resistance (resistivity) a) A:27 °C b) A:90 °C c) dielectric dissipation factor at 90 °C d) total acidity e) total sludge	350x10 ¹² ohm-cm 19x10 ¹² ohm-cm 1.2 mg KOH/g, Max 0.8%,Max
5	Presence of oxidation inhibitor,% by wt	0.08 to 0.04%
16	Water content, mg/kg(ppm)	30 mg/kg , Max

10. Quality Requirements (including SQP and FQP)

The bidder shall invariably furnish following information's along with his offer, failing which his offer shall be liable for rejection. Information shall be separately given for individual type of equipment's offered.

10.1. QAP for incoming material, in process and final checks and testing.

10.2. Statement giving list of important raw materials, names of sub suppliers for the raw materials, list of standards according to which the raw materials are tested. List of tests normally carried out on raw materials in presence of bidder's representatives, copies of test certificates.

10.3. Information and copies of test certificates as in (i) above in respect of bought out accessories.

10.4. List of manufacturing facilities available.

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

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

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- 10.7. Special features provided in the equipment to make it maintenance free.
- 10.8. List of testing equipment's available with the supplier for final testing of transformer specified and test plant limitation, if any, for the special acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out in 'The schedule of deviations' for specified test requirements.

Field Quality Plan shall be submitted with the technical bid.

11. Inspection, Testing and Performance Requirements along with Warranty:
- 11.1. The test reports for the all the tests listed in latest IS 335 shall be submitted with technical bid to justify Guaranteed Technical Particulars (GTP) by supplier.
- 11.2. Type Test Certificates shall be of accredited laboratory (accredited based on ISO/IEC Guide 25 / 17025 or EN 45001 by the National accreditation body of the country where laboratory is located), as per IEC / IS / technical specification.
- 11.3. The type test reports shall not be older than FIVE years and shall be valid up to expiry of validity of offer.
- 11.4. However, supplier shall carry out following tests at NABL approved laboratory on the samples selected from each lot offered for inspection, in presence of Tata Power representative, as listed in latest IS 335, before dispatch.
- 11.5. All the test reports shall be compiled and submitted to Tata Power for approval for dispatch clearance in spiral bound volume for each offered lot. Also, the same shall be sent to each consignee after dispatch clearance is issued.

12. Mandatory Spares:

NA

13. Data Submission by Bidder

- 13.1. With the Bid

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Following drawings and documents shall be prepared based on Owner specifications and statutory requirements and shall be submitted with the bid:

- 12.1.1 Filled in Technical Particulars
- 12.1.2 General description of the equipment and all components including brochures.
- 12.1.3 General arrangement for Transformer
- 12.1.4 Foundation plan
- 12.1.5 Bill of material
- 12.1.6 Experience List
- 12.1.7 Type test certificates

- 13.2. After award of contract
 - 13.2.1. Copy of Purchase Order
 - 13.2.2. Copy of Despatch Instruction
 - 13.2.3. Inspection Test Certificate
 - 13.2.4. Guarantee Certificate
 - 13.2.5. Proforma Invoice
 - 13.2.6. Calculation Sheet for Price Variation on the basis of IEEMA or CACMAI as applicable with base date of order.
 - 13.2.7. Seal list and packing list
 - 13.2.8. Challan in triplicate
 - 13.2.9. Way bill, if applicable.

- 14. Annexure List
 - Annexure I – PQR for Transformer Oil
 - Annexure II – MQP and SQP for Transformer Oil
 - Annexure III- IS 335, 2018

Bidders Prequalification Requirement Transformer Oil			
S No	Parameter	Tata Power Requirement	Documents To be submitted by Bidder to ascertain meeting of Pre-qualification requirement
1	Infrastructure	The bidder shall be Transformer oil manufacturer with manufacturing facility in India and with production capacity of atleast three thousand Kilo litres per annum.	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.
2	Supply and Experience	The bidder should have successfully manufactured and supplied orders of EHV Grade Transformer Oil of similar specification of Government Department / Public Sector Undertaking as per IS:335.	Supply List & Performance Certificates from the utilities / clients 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.
3	Type Test	<p>The type tests on specified oil 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 NABL / International Accredited Lab without any cost implication to the owner and the Type Test reports shall be submitted before despatch 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 but less than 10 years prior to date of bid opening has to be considered (if applicable)</p> <p>Undertaking that type test shall be carried out for the offered equipment / material from NABL / International Accredited Lab without any cost implication to the owner and the Type Test reports shall be submitted before despatch 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	-----	-----
5	Installation & Commissioning for same equipment	-----	-----

TATA POWER		The Tata Power Company Limited					
TPQA&I-QAXX-00-EX-SQP-374 REV.1		STANDARD QUALITY PLAN FOR INSULATING OIL (MINERAL Type)		01-Jun-2020			
Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	REMARKS			
1	2	3	4	5			
1.0 Raw material							
1.1	Base oil	Visual appearance, Density at 29.50 C, K Viscosity, Flash point, Pour point, Water content in PPM, Acidity in mg.	TC verification by Manufacturer				
2.0 In process inspection: (As per manufacturers standard as per IS 335-2018)							
3.0 Final inspection (As per IS 335-2018) Generally of Type II class Transsformer oil							
3.1	Acceptance test	Appearance (Clear, transparent and free from suspended matter or sediments)	Visual checks	*Inspection witness by Tata Power on sample			
3.2		Electrical strength Break Down Voltage Filtered oil (Min 70 KV)	Electrical tests				
3.3		Dielectric dissipation factor (Tan delta at 90 deg. C) shall be max 0.005					
3.4		Specific resistance (Resistivity) 1- 27 degree (min 3000x10 ¹² ohm-cm) 2- 90 degree (min 150X10 ¹² ohm-cm)					
3.5		Density at 20 deg.C gm/ ml (Max 0.895g/ml)	Chemical test			*TC verification by Tata Power (as these tests take longer time to conclude)	
3.6		Kinematic Viscosity at (minus) -30 deg.C (1800sqmm/s max) and at +40 deg C (13 sqmm/s max)					
3.7		Water content (30mg/ kg (PPM) max)					
3.8		SK value (for 100ml per batch, 1% max.)					
3.9		Interfacial tension at 27 deg.C Neuton /M (min shall be 0.044N/m)					
3.10		Presence of oxidation inhibitor % by weight (The oil shall contain anti oxidant additives)- Absent					
3.11		Neutralization value 1- Total Acidity (max 0.01mg KOH/G) 2- In organic acidity (shall be Nil)					
3.12		Flash point in deg.C (Min 140 degree)					
3.13		Pour point (-20 degree max)					
3.14		Oxidation stability 1- Neutralization value after oxidation / total acidity (max 1.2mg KOH/g) 2- Total sludge after oxidation (max 0.1 percent by weight)	Chemical test			*TC verification by Tata Power (as these tests take longer time to conclude)	
3.15		Ageing characteristics after accelerated ageing (open breaker method with copper catalyst) 1- Specific resistivity at 27deg.C (shall be minmin 50x10 ¹² ohm-cm) & 90deg.C (shall be min 5X10 ¹² ohm-cm) 2- Dielectric dissipation factor (Tan delta) at 90deg.C (0.005 max) 3- Total acidity- 0.01 mg KOH/gm max 4- Total sludge- Nil					
3.16	# NAS Value (Particle Content) (nill).						
3.17	# Furfural additives (0.05mg/kg)						
3.18	# Corrosive Sulphur (Non corrosive), Total Sulphur content- Nil						
3.19	# Metal Passivator / (Non corrosive)						
3.20	# PCA content- Max 3% & PCB content- Less than 2 mg/ kg						
* Tata Power would like to witness the acceptance test (except long duration test), if quantity of oil is more than 10KL. In case of less oil quantity, Tata power would consider the options to witness the tests or review the test certificates at the time of inspection call.							
Any Separate Type/ Design validation tests shall be carried out in accordance with TATA POWER specification or as per mutually agreed in MQP.							



The Tata Power Company Limited



TPQA&I-QAXX-00-EX-SQP-374 REV.1

STANDARD QUALITY PLAN FOR INSULATING OIL (MINERAL Type)

01/Jun/2020

Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	REMARKS
1	2	3	4	5
4	Quality dossier:			
4.1	Document review & issuance of IRN	Review of quality dossier along with index	Customer Hold Point.	
N O T E	A) STATUTORY REQUIREMENTS WILL BE COMPLIED BY THE CONTRACTOR.			
	B) ALL MATERIAL SHALL BE AS PER APPROVED DRAWINGS / DATA SHEET.			
	C) TATA POWER / ITS REP IDENTIFICATION STAMP ON MATERIALS WILL BE PRESERVED, IF REQD, SAME SHALL BE TRANSFERRED BY TATA POWER / ITS REP ONLY			
	D) FINAL INSPECTION OF THE MAJOR ACTIVITIES ARE WITNESSED BY CLIENT AND IT IS HOLD POINT (AT THE DISCRETION TATA POWER)			
	E) MANUFACTURER SHALL PREPARE AND SUBMIT COMPLETE MANUFACTURING QUALITY PLAN IN PRESCRIBED FORMAT OR THEIR REGULAR FORMAT INDICATING THEIR REGULAR PRACTICES, TAKING CARE OF MINIMUM REQUIREMENT AS INDICATED ABOVE.			
	F) INSPECTION OF SPARES SHALL BE MANUFACTURED & INSPECTED AS PER APPLICABLE CLAUSES OF THIS QUALITY PLAN .SPARES OFFERED FOR INSPECTION SHALL BE PREFERRED ALONG WITH MAIN ITEMS (IF ORDERD).			
	G) AS PER SEPCIFICATION PROPER PAINTING & PACKING SHALL BE ENSURED BY VENDOR BEFORE SHIPMENT TO AVOID ANY TRANSIT DAMAGE.			
	H) ANY SEPARAT TEST SHALL BE CARRIED OUT IF CALLED FOR IN ACCORDANCE WITH TATA POWER TECHNICAL SPECIFICATION OR AS PER MUTUALLY AGREED IN MQP.			
	I) CALIBRATION CERTIFICATES OF THE EQUIPMENT(INSTRUMENTS) USED FOR INSPECTION SHALL BE PROVIDED FOR REVIEW.			
	J) TATA POWER RESERVES THE RIGHT TO DEMAND/VERIFY/AUDIT/WITNESS ANY OF THE CHECK POINTS MENTIONED IN THE SCOPE OF THE Contractor.			
Meant for (Internal Circulation / External – Stakeholders Circulation)				
				<i>chhaya</i>
1	#Change in IS standard- 335 -2018	RRP	SR & 03-06-2020	CRB
0	First issue.	RRP	CRB	DSK
Rev. No	Reason for Revision	Prepared By & Date	Checked By & Date	Approved By & Date

Annexure II Typical MDL for Transformer

Typical MDL for Transformer

Sl. No:*	Task Name:*	Tata Power's Document Number
1	General Arrangement drawing of Transformer	TE00045-V001-00-E23-E1-001
2	FOUNDATION drawing of Transformer	TE00045-V001-00-E23-C12-001
3	Rating & Diagram Plate of Transformer	TE00045-V001-00-E23-E13-001
4	Oil filling instruction plate for air cell conservator of Transformer	TE00045-V001-00-E23-E13-002
5	Valve Schedule Plate of Transformer	TE00045-V001-00-E23-E1-002
6	HV Line Bushing of Transformer	TE00045-V001-00-E23-E1-003
7	MV Line Bushing of Transformer	TE00045-V001-00-E23-E1-007
8	LV Line Bushing and LV & MV Neutral Bushing of Transformer	TE00045-V001-00-E23-E1-004
9	HV Cable box (plan & section) of Transformer	TE00045-V001-00-E23-E1-005
10	MV Cable Box (Plan & Section)	TE00045-V001-00-E23-E1-008
11	LV Cable box (plan & section) of Transformer	TE00045-V001-00-E23-E1-006
12	Transport drawing of Transformer	TE00045-V001-00-E23-G3-001
13	Data Sheet of Transformer of Transformer	TE00045-V001-00-E23-G3-002
14	Winding Details - Connection and conductor details Stress proof of Transformer	TE00045-V001-00-E23-E2-001
15	Verification of Dynamic Short Circuit Strength, of Transformer	TE00045-V001-00-E-CA-001
16	Verification of Thermal Strength of Transformer	TE00045-V001-00-E-CA-002
17	Temp rise calculation of Transformer	TE00045-V001-00-E-CA-003
18	Fibre Optic Sensor Location of Transformer	TE00045-V001-00-E23-E1-007
19	Painting Specification of Transformer	TE00045-V001-00-E-SP-001
20	SCHEMATIC DIAGRAM OF COOLER CONTROL SCHEME of Transformer	TE00045-V001-00-E23-E15-001
21	SCHEMATIC OF OLTC of Transformer	TE00045-V001-00-E23-E15-002
22	SCHEMATIC OF FACIA & RTCC of Transformer	TE00045-V001-00-E23-E15-003
23	GA OF CT TERMINAL BOX of Transformer	TE00045-V001-00-E23-G1-001
24	GA OF M.BOX of Transformer	TE00045-V001-00-E23-G1-002
25	GA OF RTCC of Transformer	TE00045-V001-00-E23-G1-003
26	SPARE LIST FOR PANELS of Transformer	TE00045-V001-00-E-EL-001
27	SPARE LIST FOR DMBOX of Transformer	TE00045-V001-00-E-EL-002
28	WRITE-UP ON COOLER CONTROL SCHEME of Transformer	TE00045-V001-00-E-PH-001
29	WRITE-UP ON OLTC SCHEME of Transformer	TE00045-V001-00-E-PH-002
30	Spare BOM of Transformer	TE00045-V001-00-E-BOM-001
31	Vendor List of Transformer	TE00045-V001-00-E-SI-001
32	O & M Manual for transformer of Transformer	TE00045-V001-00-E-OMM-001
33	MQP for transformer of Transformer	TE00045-V001-00-QA-MQP-001
34	FQP for Transformer	TE00045-V001-00-QA-FQP-001
35	FAT inspection report for Transformer	TE00045-V001-00-QA-FAT-001
36	Test Plan of Transformer	TE00045-V001-00-E-TP-001



The Tata Power Company Limited

Quality Assurance Inspection & Testing



TPQAIT-0000-00-EX-SQP-001-REV 1		STANDARD QUALITY PLAN FOR POWER TRANSFORMER			Date of Issue: 15.02.2020
Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED		TYPE / METHOD OF CHECK	Remarks if any
1	2	3		4	5
1.0	MATERIAL:	(All material shall be as per approved drawing/ data sheet)			
1.1	Winding Conductor	1	Conductor Diameter/strand	Measurement	Review of Supplier TC during Final Inspection.
		2	Resistivity/Conductivity		
		3	Purity of Copper		
		4	Paper Width & Thickness		
		5	Overlapping	Visual inspection on sample	
		6	Electric & Mechanical Strength	Review	
1.2	Core Material	1	Grade of CRGO/Composition	Review	
		2	Specific Losses / B-H Curve		
		3	Thickness of sheet		
		4	Varnish on Sheets		
1.3	Insulation Material	1	Dimension	Measurement	
		2	Electric Strength in Oil & Air	Review	
		3	Density		
		4	Oil Absorption		
		5	Moisture Content		
		6	Ash Content		
1.4	Gasket	1	Dimension	Measurement	
		2	Hardness	Review	
		3	Nitrile content/ Cork (As applicable)		
1.5	Craft paper	1	Visual, Dimension	Measurement	
		2	Electrical properties	Review	
		3	Mechanical properties		
1.6	Press Wood	1	Density	Review	
		2	Compressive strength perpendicular to lamination		
		3	Modulus of elasticity		
		4	Flexibility strength perpendicular to lamination		
		5	Electrical strength at 20 deg C parallel & perpendicular to lamination		
		6	Oil Absorption		
		7	Moisture Content		
1.7	Tank Raw material	1	Chemical composition	Review	
		2	Mechanical property		
		3	Thickness		
		4	Antimecnetic property		
		5	electrode quality		
1.8	Tank, Radiator, Conservator	1	Overall Dimension- Foot Print	Measurement	
		2	Surface Preparation (by blast cleaning process) surface roughness checking by surface comparator/ profile guage	Review	
		3	Leak Proofness Test, DP test (As NDT)		

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STANDARD QUALITY PLAN FOR POWER TRANSFORMER

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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks if any
1	2	3	4	5
1.8	Tank, Radiator, Conservator	4 Vacuum Test (minimum one sample from the same rating and type)	Review	CHP for tank inspection Procedure and norms as per CBIP Manual
		5 Permanent Deflection of Tank during Pressure and vacuum test (minimum One sample from the same rating and type)		
		6 Weld finising and size	Visual/ Dimentional	
		7 Paint Adhesive test & Measurement of paint DFT	Measurement	
		8 Notes- Turrets for CT terminal boxes may also be inspected along with tank for leakage test		
1.9	Buchholz Relay	1 Type / Model / Size	Visual	Review of Supplier TC during Final Inspection.
		2 Rating & Continuity of contact	Review	
		3 Porosity test/ Oil Tigtness test		
		4 HV & IR Test		
		5 Element test		
		6 Gas volume test		
		7 Loss of oil & Surge test		
		8 Operation of contact 1) Alarm test 2) Trip test	TC review (Type tests)	
		9 For Reed type relay , vibration tests or seismic test, contact rating checks		
		10 Type tests on Buchholz relay Mechanical strength test and Velocity calibration test	Review	For new make, manufacturer, new design.
1.10	Oil Surge Relay for OLTC	1 Type / Model / Size	Visual	Review of Supplier TC during Final Inspection.
		2 Continuity of contact	Testing	
		3 Oil Tigtness test	Review	
		4 Surge test		
		5 Operation of contact on defined rate of oil flow		
		6 Dielectric Withstand test		
1.11	Sudden Pressure Relay	1 Type / Model / Size	Review	Review of Supplier TC during Final Inspection.
		2 Operation of contact on defined rate of oil/gas pressure		
		3 Functional tests		
1.12	Pressure Relief Valve	1 Type / Model / Size	Visual	Review of Supplier TC during Final Inspection.
		2 Switch contact	Testing	
		3 Operation (Pressure & Flag)	Review	
		4 Leakage test at 75% of specific operating pressure for 24 hrs		
		5 Dielectric Test.		
		6 IP Degree Verification.		

SQP
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STANDARD QUALITY PLAN FOR POWER TRANSFORMER

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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED		TYPE / METHOD OF CHECK	Remarks if any
1	2	3		4	5
1.13	Temperature Indicare (OTI, WTI)	1	Type / Model / Size	Review	
		2	Switch setting & continuity		
		3	Calibration		
		4	Functional Test		
		5	RTD for WTI and OTI- IR /functional test		
		6	Temperature transducers for DCS/SCADA		
1.14	MOG (Magnetic Oil Guage)	1	Type / Model / Size	Review	
		2	Dial calibration (full, empty)		
		3	Switch setting & functional checks.		
		4	Dielectric Test.		
1.15	Silicagel breather	1	Type / Model / Size	Review	
		2	Pressure test		
		3	Colour of gel		
		4	Oil cup arrangement at bottom		
1.16	Oil Pump & Motor set	1	Type / Rating / Model	Review	
		2	Physical condition		
		3	Routine test		
		4	Performance test		
1.17	Cooling fan & motor set	1	Type / Rating / Model	Review	
		2	Physical condition		
		3	Routine test		
		4	Performance test		
1.18	Valves	1	Type / size / Model	Review	Review of Supplier TC during Final Inspection.
		2	Leak test		
1.19	Air Cell	1	Type / Size	Review	
		2	Leakage test		
		3	Mechanical test at elevated temperature		
		4	Puncture & pressure test/inflation test for 24 hrs		
1.20	TAP CHANGER (OLTC/OCTC)	1	Type / Rating / Model	Review	
		2	Physical condition, Visual & dimensional checks		
		3	Endurance test of Diverter switch-4000 operation in oil filled test tank		
		4	Mechanical Test of Tap Selector-600 end to end operation after assembling with diverter in air		
		5	Endurance test of complete tap changer-10 cycles, Sequence test with times measurement on oscillograph.		
		6	Mili-volt drop test on Contact before and after above test		
		7	Pressure test on diverter tank, as per relevant standards		
		8	Vacuum test on diverter chamber		

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STANDARD QUALITY PLAN FOR POWER TRANSFORMER

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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks if any
1	2	3	4	5
1.20	TAP CHANGER (OLTC/OCTC)	9 Dielectric Test.	Review	Review of Supplier TC during Final Inspection.
		10 Auxiliary Circuit Insulation test.		
		11 Timing test & Healthiness of Proximity switch.		
		12 Resistance measurement test of Diverter switch		
		13 Paint visual & Adhesive check		
		14 Test of OLTC taps for make before break		
		15 RTCC panel and OLTC control panel checks.		
				(During Final transformer inspection)
1.21	CONDENSER BUSHING.	1 Dimension.	Measurement	
		2 IR Test	Review	
		3 Capacitance and Tan Delta measurements 1-In UST mode, from HV to tap 30%, 60% & 85% for 52KV and above voltages and at 60% for voltage below 52KV. 2-Tap to ground at 500 volt.	Measurement (TAN DELTA shall be less than 0.4 for RIP & 0.3 for OIP [#]). (increase in tan delta is as specified in IS 2099)	
		4 For site reference, Capacitance and Tan Delta measurements in UST mode shall be done at 02KV, 04KV, 06KV, 08KV and 10KV also.	IS 2099	During final testing of the transformer
		5 No. of Capacitance Grading foils. [#]	Review	
		6 Creepage Distance.		
		7 Partial Discharge.		
		8 Power frequency withstand Voltage test for bushing and test tap.		
		9 Switching Impulse test. (Type test)		
		10 Thermal Stability Test (Type test).	witness for 1 sample	
		11 Note- For Non condenser type bushings for LT, neutral , core, yoke etc. all applicable tests indicated above shall be done.		
1.22	MARSHALLING BOX & RTCC.	1 Dimensions.	Measurement	Review of Supplier TC during Final Inspection.
		2 Verification as per GA & BOM	Review	
		3 Completeness, Label fixing & wiring quality.		
		4 IR & HV Test.		
		5 Wiring & Functional Check.		
		6 IP Degree Verification.		
1.23	On line DGA/Gas analyser	1 Make, type, Model number Calibration	Review	
1.24	FOTS (Fibre optic based temperature sensor)	1 Make, type, Model number Calibration	Review	

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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks if any
1	2	3	4	5
1.25	CURRENT TRANSFORMER (BCT) IS:2705.	1 Dimensions.	Measurement.	CHP (Witness at OEM)
		2 Type & Finish.	Electrical testings	
		3 Marking & Polarity.		
		4 Insulation Resistance.		
		5 Over Voltage Inter turn test.		
		6 Power frequency Dry with stand test.		
		7 Ratio Test		
		8 Class of Accuracy.		
		9 Knee point Voltage for all cores of CTs including Metering.		
		10 ISF verification for Metering core.		
		11 Excitation current.		
		12 Secondary Resistance measurement.		
1.26	Transformer oil (as per IS 335).	1 Apperance, density, viscosity , water ppm, acidity, BDV, tan delta, neutralisation value,IFT, flash point and pour point, corrosive sulphur, resistivity at 27 and 90 degree, oxidation stability, neutralisation after oxidation, total sludge after oxidation; NAS Value.	Testing / supplier TC	
2.0	IN PROCESS INSPECTION: (Generally in line with manufacturer standard)			
2.1	Core Assembly	1 Dimension	Measurement	
		2 Insulation Resistance test on fully built Core: 1. Core to Yoke Bolts 2. Core & Core Clamp 3. Core Clamp & Yoke Bolts	Review	
		3 Anti rust Paint on Edges		
2.2	Coil Winding.	1 All spacers in winding should be locked on outer side. This will restrict the spiral movement of winding.	Review	
		2 All coils to be made on press/FRP board cylinder, thermally upgraded paper at bending in winding manufacturing (potential sharp edges & PD).		
		3 Brazing joints inspection.		
2.3	CORE COIL ASSEMBLY.	1 Visual checks for correctness of complete assembly including terminal connections.	Measurement	CHP
		2 Uniform gaps in core (Stack) with Seperators for oil flow.	Visual.	
		3 Spacer between turns in each coil in all winding (inner coil to outer coil) should be aligned properly and perfect concentricity need to me maintained.		
		4 Core and Frame Earthing arrangement.		
		5 Winding interlocking arrangement.		

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STANDARD QUALITY PLAN FOR POWER TRANSFORMER

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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks if any	
1	2	3	4	5	
2.3	CORE COIL ASSEMBLY.	6	Joint Checks (Brazing, Lugs).	Visual	CHP
		7	Smooth operation of OLTC/Off Ckt. TAP Switch.	Operational	
		8	Visual checks on FOP sensors and its positioning.	Visual	
		9	Visual checks of all leads for bushings, windings, tap changers (ensure sharp edges are covered by caps).	Visual	
		10	Photos from top side(Inspection) to confirm concentricity between winding.#	Visual	
		11	IR test on winding.	Testing	
		12	IR test at 2 kV for core/Frame/Tank Insulation (before and after HV test) 1. Core & Yoke Bolts. 2. Core & core clamps 3. Core Clamps & Yoke Bolts. 4. Yoke & Wall Shunts.	Testing (Ensure Core bolts are properly insulated).	
13	HV test at 2 kV AC for 1 minute, core/Frame/Tank Insulation 1. Core & Yoke Bolts. 2. Core & core clamps 3. Core Clamps & Yoke Bolts. 4. Yoke & Wall Shunts.	Testing.			
3.0	Final inspection and factory tests of the assembled transformer (As per IS 2026) Transformer shall be offered with fully assembled condition with all its own accessories.				
3.1	ROUTINE TESTS	1	Visual, Dimensional, BOM check, GA, Centre punch marking on <u>completely assembled</u> transformer as per approved drawing (including piping, welding joints, oil level gauges, conservator, fans, pumps, bushings, turret CTs, WTI, OTI, Life-line etc). All device cable should have U bend before entering device or MB box; Ensure canopy for all devices.	Visual Checks	Buchholz placement to follow 5d,3d criteria.
		2	Measurement of IR for 10, 60& 600 Sec and PI calculation of all winding wrt ground & between winding at 5 kV.	PI >= 1.3	
		3	Measurement of IR of Core, Frame at 0.5 kV w.r.t. tank & HV at 10kV.	>= 2 Mohms Withstand	
		4	Measurement of Voltage Ratio (error) & Polarity at all taps.	Error <= 0.5 %	
		5	Verification of Voltage Vector group.	Match Name plate.	
		6	Magnetic balance test of all winding on 415 V with magnetising current measurement from all winding.	Sudden increase in the Current shall not be there.	
		7	Tan Delta & Capacitance test on each winding in all possible mode and all bushing in steps of 2kV upto 10 kV; IR for Tap, Tan Delta of tap to Ground.	<0.5% (winding) at 20 dec C.	2 winding transformers - 5 modes

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STANDARD QUALITY PLAN FOR POWER TRANSFORMER

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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks if any	
1	2	3	4	5	
3.1	ROUTINE TESTS	8	Separate source Power frequency Voltage withstand test for one minute on all winding.	Should withstand	
		9	Measurement of no load loss and no load current at 90%, 100% & 110%. Of rated voltages.	As per GTP	
		10	Measurement of no load loss at 415 Volts, 3 phase from LV side.		For reference
		11	Measurement of short circuit Impedance Voltage and Load loss at 100% of rated current at Nominal, Minimum and at Maximum Tap.	As per GTP	
		12	Induced Over voltage withstand test with PD measurement.	< 500 PC	
		13	Frequency Domain Spectroscopy (FDS) (1 mHz to 1kHz) for all bushing & Insulation.	As per GTP	Refer IEEE-C57.161™-2008 guidelines
		14	Calculation of voltage regulation at rated load at unity, 0.8, 0.9 lagging PF.		C57.152-2013??
		15	Zero phase sequence test at reduced current.		
		16	Sweep Frequency Response Analysis (SFRA files shall be shared for future reference/ comparison)#.	(All combinations as per Tata Power recommendation).	Minimum combinations- 15 for 2 winding and 36 for 3 winding transformers. (Applicable for 10 MVA rating and above and voltage rating 33 KV and above).
		17	Measurement of winding Resistance at all TAPS (for On load tap changer with reversing switch (OLTC) only in one direction & in others, Ascending and Descending direction).	Testing and Measurement	Tata power recommendation- Max.deviation among phases- 1% for HV winding and 3% for LV winding.
		18 #	Functional checks on RTCC panel for Auto Tap change (AVR/ E-berle Relay) including Proximity switch function. Measure current of Tap Changer Motor during Tap change.	Testing and Measurement	
19	2 kv HVAC test on marshalling box, RTCC panel, Buchholz, PRD, SPRR common kiosk.	Withstand			
20	All CTs - IR, Winding Resistance, Polarity, ratio, Magnetisation characteristics from CT Marshaling box	TC review / Measurement			

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1	2	3	4	5	
3.1	ROUTINE TESTS	21	Calibration/verification of Temperature Indicators, PRD, MOG,BZ,OSR, SPR, Relays etc (Device trials)	TC review	
		22	Jacking & DP test on Jacking Pad.	Physical	
		23	Paint Shade, adhesion & Thickness verification.	Measurement	A good oil (with characteristic confirming to IS 335) shall be used during the testing of transformer.
		24	Oil Test (BDV, DGA, Moisture Content, Acidity, Resistivity, Tan Delta) before oil filling and before & after HV test, DGA & Impulse test.		
		25	Measurement of Acoustic sound/ Noise Level.		
		26	Oil Leakage test of completely assembled transformer.	Visual, Measurement	Normal head of oil plus 35KN/m2 for min. 08 hrs.
		27	Measurement of Power taken by Fan/Cooling system.	Measurement	
		28 [#]	Buchholz relay shall not operate on simultaneous operation of pumps [#] .	Testing	trial test
3.2	Type Tests	1	Temperature Rise test with all accessories installed on minimum tap, along with all temperature measurement devices including FOTS.	Thermal scanning to be done during test.	Type test will be decided during discussions with vendor in pre-ordering stage.
		2	DGA of Oil before and after Temperature Rise test.	Measurement	
		3	Degree of protection of panel, marshalling box, cable box etc.	TC review	
		4	Measurement of harmonics of No Load/magnetising current at 100% & 110% of rated voltage excitation at nominal tap.	FAT mandatory for 110 kV and above rating transformers. TC review for others	In case if its not new design type tests reports will be verified for similar design.
		5	Full wave and Chopped wave Impulse test on All line terminal.		
		6	Measurement of Transfer Surge Voltage on LV due to Impulse on HV/MV side.		
		7	Short circuit capacity test.		
		8	Any other special / type testing as per technical specifications.	Measurement	

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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks if any
1	2	3	4	5

4.0	PACKING, PRE-SHIPMENT & DISPATCH:				
4.1	PACKING	1	Overall Dimensions.	Measurement & Visual.	
		2	Completeness of accessories & fittings.		
		3	Packing of Accessories.		
		4	Spares as ordered, a set of spare gaskets.		
4.2	PRE-SHIPMENT	1	Placement of Impact trend recorder not max impact recorder.	Measurement & Visual.	
		2	Blanking of Openings.		
		3	Adjustment of Oil Level or Verification of N2 Gas Pressure & DEW point. (as applicable).		
		4	Paint finishing, cleaning and touch-up.		
4.3	DISPATCH	1	Issue of Release note / MDCC.	Customer Hold Point	

NOTES	A) ALL MATERIAL SHALL BE AS PER APPROVED DRAWING/ DATA SHEET. B) STATUTORY REQUIREMENTS WILL BE COMPLIED BY THE CONTRACTOR. C) TATA POWER / ITS REP IDENTIFICATION STAMP ON MATERIALS WILL BE PRESERVED, IF REQD, SAME SHALL BE TRANSFERRED BY TATA POWER / ITS REP ONLY. D) FINAL INSPECTION OF THE MAJOR ACTIVITIES ARE WITNESSED BY CLIENT AND IT IS HOLD POINT (AT THE DISCRETION TATA POWER) E) MANUFACTURER SHALL PREPARE AND SUBMIT COMPLETE MANUFACTURING QUALITY PLAN IN PRESCRIBED FORMAT OR THEIR REGULAR FORMAT INDICATING THEIR REGULAR PRACTICES, TAKING CARE OF MINIMUM REQUIREMENT AS INDICATED ABOVE. F) TEST CERTIFICATES /CALIBRATION CERTIFICATES OF ALL INSTRUMENTS USED FOR TESTING OF EQUIPMENT WILL BE SHOWN/SUBMITTED IF REQUIRED BY CLIENT G) INSPECTION OF THE MAINTAINCE SPARES SHALL BE OFFERED ALONG WITH THE MAIN SUPPLY AS PER THE INSPECTION STAGES OF 1 TO 3.			
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				<i>chhaya</i>
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R1	# Inputs from division and technical specifications	SR/ 15.02.2020	SKP	CRB
R0	ISSUE FOR USE	SR / RRP Aug 14	RG / CRB Aug 14	SS / SGP
Rev. No	Reason for Revision	Prepared By & Date	Checked By & Date	Approved By & Date.

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TPQAIT-QAXX-00-EX-FQP-021 REV.0		STANDARD FQP FOR POWER TRANSFORMER.				Date of Issue: October'15, 2015.		
Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
1		Availability of instruction manuals, drawings for storage and erection.	Major	Physical		Manufacturer's O&M Manual.	site log book.	
2		Verification of main unit and accessories for any visual damage during transit.	Major	Physical	At the Time of Receipt.	MDCC/ Packing list, BOM	site log book.	Any shortfall/ damage shall be reported through joint protocol with FQC.
3		Check for shortage of accessories & items fitted on Main Transformer.	Major	Physical		As per shipping list, BOM	site log book.	
4		For Gas/Dry air Filled shipment: Check Gas/ air pressure of the Main Tank. In case of absence of positive pressure, call manufacturing unit representative.	Major	Measurement	Weekly.	Manufacturer's Instruction Manual.	site log book.	Even pr drop or oil level drop shall be signed by FQC before reporting
5		For Oil Filled Shipment: Check Oil level as per the marking. Ensure no leakages and all valves closed.	Major	Visual	Weekly.	No leakage.	site log book.	
6		Check Core-Frame-Tank isolation test with 1000V DC IR tester when transformer is on trailer before unloading.	Major	Measurement	Before unloading from trailer	Healthy IR	Site Test Report.	
7		Check for all loose accessories like Radiators, conservator, pipes, Marshalling Box etc.	Major	Physical	At the Time of Receipt.	No damages.	site log book.	
8		Check the level of transformer foundation, rails are leveled and exact location of roller assembly locking is marked.	Major	Physical / Measurement	Once before erection.	Site Approved Drawing.	Inter dept. handing over protocol.	Check joint protocol for handing over of area from Civil to elect and FQC.
9		If Permanent location is not ready for placing the Transformer Tank, ensure availability of temporary storage at suitable location (elevated surface, no water logging, pollution free atmosphere).	Major	Physical	At the time of storage.	Storage Type 2.	site log book.	Pl refer note 'storage type'
1.0	MATERIAL RECEIPT & STORAGE:							

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1	2	3	4	5	6	7	8	9
1.0	MATERIAL RECEIPT & STORAGE:	10	Major	Visual	After Storage.	No significant impact.	Manufacturer Analysis Report.	Impact Recorder analysis shall reach site within 7 Days. (TATA Power Reserves the right to witness the Analysis).
		11	Major	Physical	During storage	Manufacturer's Instruction Manual.	site log book.	Any shortfall/ damage shall be reported through joint protocol with FQC.
		12	Major	Physical	At the Time of Receipt.	Type -3 storage.	site log book.	PI refer note 'storage type'.
		13	Major	Physical		Type-4 storage.		
		14	Major	Physical	No damage / defect.	site log book.	Jointly with FQC.	
15	Major	Visual	Weekly.	Manufacturer's Instruction Manual.	site log book.	If there is a drop in Pressure, source of leakage should be identified and it should be attended suitably. If the storage is for more than 3 months, it is recommended that transformer to be filled with oil.		
2.0	PRE-ERECTION:	1	Major	Visual	Once before erection.	Manufacturer's Instruction	site log book.	Check availability of all tools & tackles required for erection works are available.



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1	2	3	4	5	6	7	8	9
		2	Major	Visual	Once before erection.	Manual.	site log book.	
		3	Major	Visual			site log book.	
		4	Major	Visual	Once before erection.	Manufacturer's Instruction Manual.	site log book.	
		5	Major	Visual			site log book.	
		6	Major	Visual			site log book.	
2.0	PRE ERECTION	7	Major	Measurement		Manufacturer's Test Certificate.	Site Test Report.	
		8	Critical	Testing		Data sheet / Factory test Report.	Site Test Report.	
		9	Critical	Testing	Once before erection.	Data Sheet.	Site Test Report.	
3.0	ERECTION:	1	Major	Physical	During erection.	Manufacturer's Instruction Manual.		

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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
3.0	ERECTION	2	Major	Visual	During erection.	General Arrangement	Site log book.	
		3				Manufacturer's Instruction Manual.		
		4	Major	Physical	During erection.	General Arrangement		
		5	Major	Measurement		Manufacturer's Instruction Manual.		
		6	Minor	Visual	Once before erection.	Erection protocol		
		7	Major	Measurement	During erection	Manufacturer's Instruction Manual.		
		8	Minor	Physical.	During final box up.	Erection protocol		
		9	Major	Physical	During erection	General Arrangement		
		10						
		11	Major	Physical / Testing	Once before filling Oil.	Instruction Manual.		

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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS	
1	2	3	4	5	6	7	8	9	
		12	Major	Physical		Manufacturer's Drawing.	Site log book.	measure mvdrop for the connection	
		13	Major	Physical		Dew Point acceptable limit is as per the Dew Point Curve (as per CBIP Manual)	If Gas DEW point is not in acceptable limits, repeat vacuuming and Gas purging cycle for 24 hrs. each. (Provide Space Heater out side Tank of the Transformer for better result).		
		14	Major	Physical	Once				
		15	Critical	Measurement					
3.0	ERECTION	16	Major	Measurement	Every 4 hrs.				
		17	Major	Physical					
		18	Major	Physical		Manufacturer's Instruction Manual.	Site log book.		
		19	Major	Physical	Once			Moisture content testing should be through NABL accredited lab	

Vacuum shall be along with Radiators & Conservator???

WSP

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1	2	3	4	5	6	7	8	9
		Erect Radiators/cooler, Oil circulation pump, Marshalling box, Conservator, Buchholz relay, PRV, associated piping (equalizer piping), OTI, WTI, NGR, SPR, FOTS etc....	Major	Physical	Once for each Unit.	General Arrangement.		
		Fill the oil into Radiator / Cooler Bank systematically by releasing air from top side and from all the air vent plugs of main tank.	Major	Physical	Once for each Unit.			
		Circulate the oil inside the transformer. (Check IR or Tan Delta during oil circulation)	Major	Physical	100%	Manufacturer's Instruction Manual.	Site log book.	
		Ensure oil filling inside the conservator (with air cell), as per the manufacturer's instruction.	Major	Physical				
		Check functioning of MCG before oil filling.						
		24 Check the working of PRV's.	Major	Physical	100%			
		25 Check manual operation of Tap Changer.	Major	Physical	100%			
		26 Verify Earthing of Transformer.	Major	Visual	Once			
		27 Check transformer Oil BDV, Moisture content & DGA from any NABL approved lab.	Major	Testing	Once before site acceptance testing.	as per specifications.	NABL LAB test Report.	
		1 IR of core and frame with respect to tank (earth point) at 1000 kV						
		2 Magnetic Balance test with 230V. (From star side)						
3.0	ERECTION:							
4.0	PRE-COMMISSIONING TESTS		Critical	Testing	100%	Factory test report.	Site Test Report	



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1	2	3	4	5	6	7	8	9								
4.0	PRE-COMMISSIONING TESTS	3 Turns ratio test on each tap.	Critical	Testing	100%	Factory test report.	Site Test Report	Deviation within 1% of factory value.								
		4 Vector Group test.														
		5 Magnetizing current test on both winding with low voltage (415V).														
		6 IR and PI Tan Delta & capacitance measurement of each winding														
		7 Tan delta & capacitance measurement (HV- tap and tap- flange) and IR (tap to E) of HV busings														
		8 SFRA test.														
		9 Winding Resistance measurement at all taps in ascending & descending order.														
		10 IR & PI of windings with 1000V DC IR tester														
		11 Tap changer Oil BDV & Moisture content.														
		12 Check IR at 1000V DC, Winding Resistance of fan and pump motors														
		13 Direction of Rotation of Oil pumps & Cooling Fans and auto changeover. Buchholz shall not operate on operation of circulation oil pumps.														
		14 Check thermometer pockets, silica gel breather oil seal cup are filled with Oil.														
		15 Check interlocks/ device trials on OTI, WTI, PRD, Buchholz Relay, OLTC/OCTC etc..														
														Moisture content from NABL accredited lab only		

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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS	
1	2	3	4	5	6	7	8	9	
4.0	PRE-COMMISSIONING TESTS	16	Critical	Testing	100%	Manufacturer's Instruction Manual AND Approved scheme.	Site Test Report		
		Check for shorting of unused CT secondary terminals.							
		17							Check for Upstream & Downstream Breaker Interlocks. (Check for differential stability if Turret CTs are used).
		18							Check Silica gel breather colour & Condition.
		19							Check condition of breather, Oil seal cup, Buchholz, WT/OTI, indicators, confirm proper routing of FO Temperature Monitoring Device cables.
5.0	Post COMMISSIONING (These tests shall be performed by Commissioning team where Testing will be a member).	1	Major	Measurement.	Immediate after commissioning	Data sheet.	Commissioning Report.		
		2							Check for Noise.
		3							Check for Vibration.
		4							Check for Temperature of Oil & windings. DGA of oil from NABL approved Lab after 24 hrs of charging.
		5							DGA of Oil after 7 days of Full load operation (Recommended practice)
N O T E		A) STATUTORY REQUIREMENTS WILL BE COMPLIED WITH BY THE CONTRACTOR. B) FOR STAGES WITNESSED / DOCUMENTS REVIEWED BY TATA POWER, COPIES OF RELEVANT DOCUMENTS WILL BE FURNISHED TO TATA POWER. C) TATA POWER / ITS REP. IDENTIFICATION STAMP ON MATERIALS WILL BE PRESERVED / GOT TRANSFERRED BY TATA POWER / ITS REP AT APPROPRIATE STAGES (IF REQUIRED). D) THE EXTENT INDICATED IN COLUMN 5 IS IN CONTRACTOR'S SCOPE TATA POWER MAY INSPECT AS PER THIS COLUMN OR RANDOM SAMPLES AT ITS DISCRETION. E) COLUMN 7 WILL BE AS PER TATA POWER APPROVED DRAWINGS / DATA SHEETS / CONTRACT DOCUMENTS WHEREVER APPLICABLE. F) INSTRUMENTS FOR LEAK TESTS AND PERFORMANCE TESTS WILL HAVE VALID CALIBRATION CERTIFICATE WITH TRACEABILITY TO NATIONAL LEVEL.							

20. FDS test.



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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
	Critical Category is HOLD point.	This activity required inspection / Verification & acceptance by inspection authority responsible for this stage before further processing is permitted. 24 Hrs advance notice to be given to TATA POWER FQC. Contractor /sub contractor shall not process activity beyond HOLD point without written permission by TATA POWER FQC. This activity shall be performed by Main & Sub- Contractor (Execution + FQC) & witnessed jointly by TATA POWER (Execution + FQC). (Surveillance by Head FQC / Project Head).						
	Major Category is Witness point.	This activity required inspection / Verification & acceptance by inspection authority responsible for this stage before further processing. 24 Hrs advance notice to be given to TATA POWER (Execution) . Contractor /sub contractor shall not process activity beyond Witness point without written permission by TATA POWER (Execution). This activity shall be performed by Main and Sub- Contractor (Execution + FQC) & witnessed by TATA POWER Execution & Surveillance by FQC.						
	Minor Category is Review point.	This activity required review of documents by TATA POWER for the compliance & acceptance. However 24 Hrs advance intimation to be given to TATA power (Execution). This activity shall be performed by Main and Sub- Contractor (Execution +FQC). (Surveillance by Execution / Project Head).						
		TATA POWER reserves the right to carryout surveillance at any point of time through FQC.						

STORAGE TYPE:
 TYPE-1: OPEN AREA, ABOVE GROUND ON WOODEN PLANK WITH SLOPE FOR WATER DISPOSITION.
 TYPE-2: OPEN AREA, ABOVE GROUND ON WOODEN PLANK WITH SLOPE FOR WATER DISPOSITION AND COVERED WITH TARPAULIN.
 TYPE-3: OPEN SHED WITH FULLY FORMED FLOORING/CEMENT FLOORING.
 TYPE-4: COVERED SHED/STORE ROOM ON RACKS & IDENTIFIED LOCATION.
 TYPE-4A: CLOSED CHAMBER WITH TEMPERATURE & HUMIDITY CONTROL.
 NOTE: Items/equipments having shelf life like paints, alumina, desiccant etc. are to be stored separately for identification purpose.

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RO	ISSUE FOR USE	SR / 12.10.2015	CB / 13.10.2015	SS	

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STANDARD SPECIFICATION FOR

MV, LV POWER AND CONTROL CABLE

(DOCUMENT NO - ENGG/ ELEC/STD-SPEC/2017/31)



Tata Power

Engineering T&D

Rev. No	Date	Revision History	Prepared By	Checked By	Approved By
R0	11-10-2017	Final Specifications	PSA	AAB	AM
R1	27-08-2018	Information about time gradient of fault feed modified	PSA	AAB	AM
R2	20-12-2019	List of drawings and format updated	PSA	SVD	RS
B	13-04-2020	PQR updated	PSA	SVD	RS

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1. **INTRODUCTION :**

The document covers the specific requirements for complete design, detailed engineering, manufacture, supply, inspection & testing at Bidder's work, packing, transportation, loading and unloading, delivery to site, storage at site, handling at site, erection, testing, commissioning, performance testing and handing over of MV, LV Power and Control cable.

All equipment, system and services covered under this specification shall comply with all current applicable statutory regulations and safety codes in the locality where the equipment is proposed to be installed. The equipment and systems shall also conform to the latest version of applicable codes and standards on the date of offer made by the Bidder unless otherwise indicated. Nothing in this specification shall be construed to relieve the Bidder of this responsibility

2. **BIDDER'S QUALIFICATION REQUIREMENTS**

- 2.1. Bidder must be an OEM of LT Power and Control cables with manufacturing in India
- 2.2. The Bidder shall have supplied at least 50 kms of LT Power and control cable of similar size and rating to any major utilities/SEB for last 5 years as on date of bid submission. Out of which at least 10 kms of LT Power and control cables shall be in successful operation for more than two (2) years as on date of bid submission.

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.

- 2.3. The bidder shall submit Type test reports obtained from NABL/ International Accredited Lab for the equipment / material offered. The type tests should have been conducted on the equipment / material of the same design. 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). 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 NABL / International Accredited Lab without any cost implication to the owner and the Type Test reports shall be submitted before despatch of the equipment / material.
- 2.4. In case the package involves installation & commissioning of the equipment / material, then the bidder shall have the following experience:
 - a) He should have successfully completed one single order of value (80% of estimated value of similar work in last three years) OR

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- b) He should have successfully completed two single orders of value (50% of estimated value of similar work in last three years) OR
- c) He should have successfully completed three single orders of value (40% of estimated value of similar work in last three years).

3. **SYSTEM DESCRIPTION AND SCOPE:**

Scope includes Design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at site/store, erection and commissioning of Cables along with Necessary number of termination kit, jointing kit, trefoil clamps, cable glands and lugs etc as specified in Section A.

4. **CODES AND STANDARDS**

Given below are the acceptable code and standards. The Bidder shall take Owners approval for use of other codes & standards

Sr. no.	Applicable standard	Description
1.	IS:1554 (Part-I)	PVC insulated (heavy duty) electric cables for working
2.	IS:1554 (Part-II)	PVC insulated (heavy duty) electric cables for working voltage from 3.3kV upto and including 11kV.
3.	IS:7098 (Part-II)	XLPE insulated PVC sheathed cables for working voltages from 3.3 kV upto and including 33kV.
4.	IS:3961	Recommended current ratings for cables.
5.	IS:8130	Conductors for insulated electric cables and flexible cords.
6.	IS:5831	PVC insulation and sheath of electric cables.
7.	IS:2982	Copper conductor in insulated cables and cords.
8.	IS:3975	Mild steel wires, strips and tapes for armouring cables
9.	IS:5609	Specification for low frequency wires and cables with PVC insulation and PVC Sheath.
10.	IS:6380	Spec. of elastomeric insulation of sheath of electric cables
11.	IS:434(I and II)	Specification for rubber insulation cables
12.	IEC:540	The methods for insulations and sheaths of electric cables and cords (elastomeric and thermoplastic compounds).
13.	IEC:230	Impulse tests on cables and their accessories.
14.	IEC:60	High voltage test techniques.
15.	IEC:287	Calculations of the continuous current rating of cables (100% load factor)
16.	IEC:288	Nominal cross-sectional area and composition of conductor of insulated cables

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17.	IEC:502	Extruded solid dielectric insulated power cables for rated voltages from 1.00 kV upto 30 kV.
18.	NEMA-WC-5	Thermoplastic insulated wires and cables for transmission and distribution of electrical energy.
19.	IEEE:383	Standard for type test for class IE electric cables, filled splices and connections for nuclear power generation stations
20.	IEC: 332-1	Test on electric cables under fire conditions
21.	IEC-754-I	Test method for acid gas generation
22.	IEC-331	Fire resisting characteristics of electric cables

5. DESIGN REQUIREMENTS

- 5.1 This section covers the detailed requirements regarding design, supply, installation and commissioning of 33kV, 11kV, 6.6 kV and 1.1kV cables required for substation. The design, manufacture and performance of equipment shall comply with all currently applicable statues, regulations and safety codes in the locality where the equipment will be installed. Nothing in this specification shall be construed to relieve the BIDDER of this responsibility.
- 5.2 The equipment shall conform to the latest edition of applicable standards. In case of conflict between applicable standards and this specification, this specification shall govern.
- 5.3 All the cables feeding switchboards from transformers shall be sized based on transformer rating and considering the maximum negative voltage variations envisaged in the specifications. All the cables and bus ducts feeding transformers shall be sized based on current ratings of transformer at the minimum voltage tap of the transformer. All other cables shall be sized based on the load demand under most onerous conditions.
- 5.4 Cables shall be selected to so as to limit maximum voltage drop at equipment terminals during normal operation and starting conditions well within permissible values. Cables shall be de-rated for the site ambient and ground temperatures, grouping and soil resistivity and cable laying configuration.
- 5.5 All HT cables shall be of unearthed grade. The bidder shall furnish detailed cable selection/sizing criteria for Employer's approval.
- 5.6 Cable calculation and sizing shall be done for cable installation . It shall be in accordance with IEEE std-399-1997 and IEC-60287-2-2. EPC contractor shall submit all sizing calculations to Owner for review and approval before procurement.
- 5.7 There should not be any joint in the run of cable.

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5.8 Specific requirement:

5.7.1 MV cables:

- 5.7.1.1 The cable shall comply with the technical parameters of the specification and latest version of IS.
- 5.7.1.2 Aluminium stranded compacted circular, grade H4, class 2 as per IS 8130
- 5.7.1.3 Conductors shall be screened by extruded semi-conducting compound and XLPE insulated.
- 5.7.1.4 Cores shall be screened by extruded semi-conducting compound in combination with non-magnetic metallic tape.
- 5.7.1.5 Helically applied single layer of copper tape.
- 5.7.1.6 Provided with inner sheath of extruded black PVC compound type ST-2.
- 5.7.1.7 Aluminium armouring in the form of round wire followed by a binder tape
- 5.7.1.8 Extruded FRLS PVC compound type ST-2 outer sheath.
- 5.7.1.9 The insulation over the individual conductor core will be colour coded.
- 5.7.1.10 The construction, performance and testing of cables shall comply with IS 7098 Part II for HT cables.
- 5.7.1.11 Core identification shall be by printed numerals
- 5.7.1.12 Oxygen index shall be minimum 29 when tested at 27+2 degC as per ASTM D- 2863
- 5.7.1.13 The temperature index value shall be minimum 230 degC at oxygen index of 21 when tested as per NES 715.
- 5.7.1.14 Cable maximum pulling force shall be 70kN/ Sq.mm for copper conductor, unless specified by cable manufacturer.
- 5.7.1.15 Bending radii shall be 15 X D, where D will be overall diameter of cable.
- 5.7.1.16 All single core cable shall be supported with non-magnetic plate or member, while crossing floor or room.

5.7.2 L T Power Cables

LT Power cables for the 415V AC, 240V AC system and 220V DC system are single core / Multi core 1100V earthed H4 grade with stranded aluminium/copper conductor, extruded cross-linked polyethylene (XLPE) insulated, core identification by colour coding, extruded PVC (Type –ST 2) inner sheathed, armoured, aluminum wire armour for single core cables and galvanized steel wire for multi core cables and extruded PVC (Type ST-2) outer sheathed with FRLS properties, generally conforming to IS: 7098 (Part 1).

Upto 16 sq.mm cables, Copper conductor shall be used and above 16 sq.mm cables, Aluminium conductor shall be used for LT power cables. For DC all cables shall be of Copper conductor irrespective of its size. The cables used for DC system are of single core type. Only single core cables will be used between batteries / battery chargers and

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main distribution boards to eliminate the possibility of positive to negative faults in the cables.

5.7.3 Control Cables

Control cables shall be 1100 V grade, multi core, minimum 1.5 sq. mm cross section, PVC insulated, stranded copper conductor having minimum 7 strands, extruded PVC inner sheathed, galvanised steel wire armoured, over all sheathed, outer sheath (ST-2) made of FRLS PVC compound. The cables shall conform to IS-1554 (Part-I) 1988 / IEC-60502 (1998) & IEC-60502 – amendment –1 999 in all other respects.

In situations where accuracy of measurement or voltage drop in control circuit warrants, higher cross sections as required shall be used.

The minimum size of the stranded copper conductor used for panel wiring shall be as follows:

All circuits except CT & PT circuits	: 1.5 mm ² per lead.
CT & PT Circuits inside panel	: 4/6 mm ² per lead.
CT Circuits outside panel	: 4 mm ² per lead
DC circuit within panel	: 1.5 mm ² per lead
DC circuit outside panel	: 2.5 mm ² per lead

5.9 FIRE RETARDANT LOW SMOKE (FRLS PVC)

- a. FRLS PVC compound used for outer sheath shall meet the following performance requirements: The critical oxygen index value shall be minimum 29 when tested at 27+ 2 Deg.C. as per ASTM-D-2863-77 and the temperature index value shall be minimum 230 Deg.C. at oxygen index of 21 when tested as per NES-715.
- b. The maximum total acid gas generation as determined by titration method shall be less than 20% by weight when tested as per IEC-60754-1 (1994).
- c. The smoke generation under fire shall have maximum smoke density rating of 60% when tested as per ASTM-D-2843-77.
- d. Cables supplied against this specification may be exposed to Ultra-Violet (UV) radiation from the sunlight, humidity, atmospheric pollution and water either during storage in open stockyard with covers on cable reels removed or when laid in ladder type cable trays installed out door without cable tray covers. Under environment conditions, any reduction in mechanical property i.e., tensile strength and ultimate elongation of outer sheath material of cable shall not cause reduction in expected life of cable. More over the material shall meet the following test requirements.

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- e. The cables shall pass the hydrolytic stability and ultraviolet tests as per DIN 53387. The retention values of tensile strength and ultimate elongation after the tests shall be minimum 60% of tensile strength and ultimate elongation before test.
- f. The cables shall pass the ultra violet tests as per DIN: 53387. The same shall be conducted at an independent laboratory like CPRI/ERDA.
- g. The finished cable shall pass the flammability test as per IEC 60332-1 (1994) and IEEE.383. In addition, it shall also pass flammability test as per class F3 of Swedish Standard SS-424-14-75 (1978).
- h. The cables shall conform to applicable IS standard in all other respects.
- i. The FRLS PVC compound used for outer sheath shall also be resistant to termite, fungus and rodent attacks.
- j. The bidder shall submit along with the bid the results of tests carried out on the sheath material and finished cable to conform compliance to the requirements of FRLS properties specified above.
- k. The cables shall be suitable for continuous operation and satisfactory performance for the following power supply conditions.
Variation in supply voltage $\pm 10\%$ for MV cables
Variation in supply voltage (+) 10% & (-) 15% for LV cables
Variation in supply frequency $\pm 5\%$.
Combined voltage and frequency variation 10%.

5.10 Cable Terminations

All 6.6 kV, 11kV and 33kV termination kits shall be of heat shrinkable type and suitable for XLPE insulation.

All 1100V termination for XLPE/PVC power cables and control cables shall be by crimping type tinned copper / aluminium lugs. Cable termination will be done with suitable double compression type brass cable glands.

5.11 Cable Joints

Cable joints shall be avoided to the extent possible. If joints are unavoidable due to circuit length, in excess of permissible maximum drum length, they shall be heat shrinkable type having a short circuit withstands capacity of 40 kA for 1 sec. for MV cables and 50kA for 1 sec. for 1100V grade cables.

5.12 For Design /Sizing Cables:

5.11.1 The following data shall be used as the basis input data for sizing and selection of cable

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- a. Design ambient temperature: 50 deg.c
- b. Fault current for MV systems: 40 KA for 1 sec. for 33KV/22 kV system
- c. 40 kA for 1 sec. for 11KV/6.6 kV system
- d. Fault current for 415 systems: 50 KA for 1 sec.
- e. Fault current for 220V system: 20KA
- f. Main protection fault clearing time for cables to the feeders protected by breakers:
1.0 sec for Incomers, tie feeders, transformer feeders and 0.25 sec for motor feeders respectively

5.11.2 Design Considerations: Power Cables

5.11.2.1 In general, Power Cables are sized to satisfy the following criteria:

- a. Power cables will carry the full load current of the circuit continuously under site conditions considering the various derating factors like ambient air temperature, grouping, method of laying etc.
- b. Power cables will withstand the fault current of the circuit for the duration not less than the maximum time taken by the primary protective system to isolate the fault.
- c. For cables to 415V motors and feeders protected by fuses, the cross section will be chosen according to the cut-off current of the fuse and its fusing time.
- d. Maximum voltage drop limits under steady state and voltage dip during starting.
- e. Voltage dip at motor terminals during starting of motors will be limited to 15% of the rated voltage for LT motors and 20% HT motors.

5.11.2.2 The normal current ratings for the feeders are considered as under:

- a. Transformer feeders:
Current ratings corresponding to MVA rating of the transformer.
- b. 415V Supply feeders
 - i. Cable size of each incomer of MCC & PDB shall be selected such that the incomer can take full MVA rating of source transformer. Cable size for incomer of MLDB shall be selected on the basis of current rating corresponding to lighting transformer and voltage drop. Also additional voltage drop due to cable resistance and reactance for entire cable length shall be considered for cable sizing.
 - ii. For power feeders voltage drop shall be considered on normal rated current of the feeder.
 - iii. Power factor for 415V supply feeders are considered as below:
 - iv. $\text{Cos} = 0.8$
- c. 415V Motor feeders:
 - i. Normal current rating for motor feeder is taken as the full load current corresponding to the motor rating. For voltage dip consideration, the starting current is taken as 6 times the full load current. (+20% tolerance will be applied as per IS 323). Also

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additional voltage drop due to cable resistance and reactance for entire cable length shall be considered for cable sizing.

- ii. Power factor and efficiency for 415V motors under steady state conditions are considered as below:
- iii. $\text{Cos} = 0.8$
- iv. Efficiency = 0.85
- v. During motor starting conditions, the power factor shall be considered as 0.2
- vi. For Cable between transformers and respective switchgear transformer full load regulation voltage shall be considered for the voltage drop calculation.

5.11.3 Design consideration: Control Cables

Current transformers leads shall be checked for the lead burden vis-a-vis the current transformer VA capacity and 4 mm² cables shall be used for connection of CT to loads. In case 4 mm² conductors impose unacceptable high burden on CTs, conductor of higher cross section shall be used.

Voltage transformer leads shall be checked for voltage drop, which shall be limited to within 1% for all cases other than tariff metering. For tariff metering the voltage drop shall be limited to 0.2%. In case the voltage drop with 4 mm² Cu conductors exceed this value, higher conductor sizes shall be used.

5.11.4 The cable shall be suitable for installation in a tropical monsoon area having a hot humid climate. The reference ambient temperature to be considered for the purpose of this specification is 50 deg. C. The derating factor for the various conditions of installation including the following shall be considered while choosing the conductor size and calculations shall be submitted for purchaser's approval: a) Maximum ambient air temperature. b) Maximum ground temperature c) Depth of laying wherever applicable d) Grouping of cables .

5.11.5 The allowable voltage drop at terminal of the connected equipment shall be maximum 2.5% at full load while choosing the conductor size and calculations shall be submitted for purchaser's approval. In case of squirrel cage induction motors, the cable size shall be so chosen that the motor terminal voltage does not fall below 85% of the rated voltage, at the time of starting.

5.11.6 The maximum continuous conductor temperature and the maximum allowable conductor temperature during short circuit are to be taken as 70 deg. C and 160 deg. C respectively in case of PVC insulated cables and 90 deg. C and 230 deg. C respectively in case of XLPE insulated cables.

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5.11.7 For 415V power cables of size above 35 mm² , XLPE insulated cables shall also be acceptable.

5.11.8 The minimum size of all 33kV,11kV grade power cables and 415V power cables connected to circuit breakers shall be chosen taking into account the following factors: a) Fault level due to system contribution. b) Fault contribution of running motors. c) Expected time up to which motor contribution persists. d) Maximum time for fault clearance (i.e. operating time of the backup protection relays plus the time of operation of the circuit breakers). e) Full load current of the circuit. vi) The cables shall be capable of continuous satisfactory operation under a power supply system frequency variation of (±) 5%, voltage variation of (±) 10% and combined frequency and voltage variation of 10% (absolute sum).

6. LAYOUT REQUIREMENTS FOR THE EQUIPMENT / SYSTEM

- 6.1 Cable shall be laid through trenches/ ducts/ cable trays or shall be buried as per cable layout drawings to be prepared by the bidder and approved by Owner during detailed engineering.
- 6.2 Bidder shall maintain necessary clearances as per statutory and safety requirements as applicable.
- 6.3 Fire Barriers to be provided wherever applicable

7 OPERATIONAL AND MAINTENACE REQUIRMENT

7.1 OPERATIONAL REQUIRMENT

Equipment shall give continuous service under specified site conditions.

7.2 MAINTENACE REQUIRMENT

- 7.2.1 O& M manuals for the installation, operation and maintenance of Cables shall be furnished at least three months before despatch of equipment.
- 7.2.2 The manual shall contain minimum following details: a) General description of equipment. b) Approved Technical Data Sheet c) Salient constructional features. d) Technical leaflets of fittings/ important parts. e) All drawings. f) Type and routine test certificates. g) Instructions to be followed on receipt of equipment at site & for storage. i) Erection procedures and checks. j) Pre-commissioning checks. k) Commissioning procedures. l) Withdrawal arrangement/ material handling instructions. m) Operation instructions. n) Maintenance instructions. o) Trouble-shooting. p) Safety instructions.

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7.3 SAFETY REQUIREMENTS

7.3.1 All Power and Control cables shall be FRLS type only

8 TECHNICAL PARAMETERS OF EQUIPMENT

Data sheet: A: MV Power cable

Description	Specification requirement	To be filled by Bidder
Name of the manufacturer		
Cable type	XLPE	
Applicable Standard	IS 7098/P2/85	
Size	Suitable size	
Voltage grade	As applicable	
No. of cores	1C and 3C	
Permissible voltage and frequency variation for satisfactory operation	±10%	
Max. Rated conductor temp.	90 deg.C	
Max. Allowable conductor temp. during short ckt.	230 Deg.C	
Max. allowable conductor temp. during overload	130 Deg.C	
Conductor		
Material	Aluminium conforming IS:8130/84	
Shape	Compact Stranded circular	
Cross sectional area	Suitable size	
Min. no. of wires	By bidder	
Conductor screen		
material	semi conducting XLPE	
nominal thcikness	By Bidder	
Insulation		

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Description	Specification requirement	To be filled by Bidder
Material	XLPE	
Nominal thickness	By Bidder	
Insulation Screen		
Material	semi-conducting XLPE compound	
Nominal thickness	By bidder	
Core identification		
Inner sheath		
Material	PVC compound ST-2 to IS:5831/84	
Extruded OR wrapped	Extruded	
Armour		
Material	Aluminium	
type armouring	Round wire armour	
Outer Sheath		
Material	FRLS PVC compound(ST-2 type)	
Minimum thickness	By bidder	
App. Overall dia. Of cable(mm)	By bidder	
app. Weight . Of cable(kg/mm)	By bidder	
Colour of outer sheath	By bidder	
Std. length of cable(m)	By bidder	
Min. bending radius	By bidder	
Safe pulling force	By bidder	
Short ck. Current of conductor for 1 sec.	By bidder	
Max. DC resistance of conductor at 20deg.c	By bidder	
Max. AC resistance of conductor at 90deg.c	By bidder	
Approx. reactance	By bidder	

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Description	Specification requirement	To be filled by Bidder
Approx. capacitance	By bidder	
FRLS properties	By bidder	

Data sheet: B: LT Power cable

The 1.1KV grade Power Cables will comply with the particulars indicated below.

Sl. No.	Description	Unit	Specification Requirements	BY BIDDER
1.0	Name of the Manufacturer			
2.0	General Requirements			
2.1	Voltage Grade	kV	1.1	
2.2	No. of Cores		1, 2 , 3 & 4	
2.3	Conductor Material		H4 Grade Aluminium for above 16 Sq mm /copper for below 16 Sq mm	
2.4	Design Ambient Temperature	°C	50	
3.0	Specific Requirements			
3.1	Conductor (stranded/solid)		Stranded	
3.2	Form-circular/segmented			
3.3	Insulation		Extruded XLPE	
3.4	Inner Sheath		Extruded PVC Compound (ST-2)	
3.5	Armour		Aluminium wire for single core cables and Galvanized Steel wire for multicore cables.	

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Sl. No.	Description	Unit	Specification Requirements	BY BIDDER
3.6	Outer Sheath		Extruded FRLS PVC Compound (ST-2)	
3.7	Incremental running lengths and all details as specified in IS-7098 (Part-1) are marked on cable sheath at every 1m interval		Required	
3.8	Category for Flame Retardance Test		Category- A	
4.0	Cable drums			
4.1	Length of cables in cable drum and tolerance	ms		
4.2	Type of end sealing			
4.3	Marking on cable drums as per IS-7098 (Part-1)		Required	

Data sheet: C: Control cable

The 1.1KV grade Control Cables will comply with the particulars indicated below

Sl. No.	Description	Unit	Specification Requirements	BY BIDDER
1.0	Name of the Manufacturer			
a.	General Requirements			
b.	Voltage Grade	kV	1.1	
c.	Conductor Material		Annealed, high conductivity, copper conductor, nominal cross sectional area 2.5/4 sq.mm (having 7/11 strands of 0.67 mm dia)	

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Sl. No.	Description	Unit	Specification Requirements	BY BIDDER
d.	Design Ambient Temperature	° C	50	
e.	Nominal Diameter	mm	*	
f.	Overall Diameter	mm	*	
g.	Conductor (stranded/solid)		Stranded	
h.	Insulation		Extruded PVC Compound type C	
i.	Inner Sheath		Extruded PVC type ST-2	
j.	Outer Sheath		Extruded black FRLS PVC compound type ST-2	
k.	Identification of cores		Colour coded upto 5 cores and cable with more than 5 cores will have printed numerals	
l.	Incremental running lengths and all details as specified in IS-1554 (Part-1) are marked on cable sheath at every 1m		Required	
m.	Category for Flame Retardance Test		Category- A	
n.	Cable drums			
o.	Length of cables in cable drum and tolerance		*	
p.	Weight of cable drum without cables		*	
q.	Weight of cable drum with cables		*	
r.	Type of end sealing		*	

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Sl. No.	Description	Unit	Specification Requirements	BY BIDDER
S.	Marking on cable drums as per IS-1554 (Part-1)		Required	

9 QUALITY REQUIREMENTS, INSPECTION & TESTING (INCL. SQP & SFP)

- 9.1 The Quality Control Plan shall list and define in sequential order all process control activities, inspection and tests proposed to be performed on the equipment/material starting from component procurement and from testing stages to product dispatch. The Quality Control Plan shall indicate and identify the applicable standards, detailed description with diagram the procedure, acceptance criteria, extent of check and record to be generated. This QAP shall be submitted by bidder and approved by Owner.
- 9.2 All erection and installation activities shall be performed in line of approved FQP by Owner.
- 9.3 All test routine test, performance test, special tests and acceptance test as per the relevant standards specified in this specification and approved MQP shall be carried out on each cable. Minimum shop testing requirements are specified in the attached Standard Quality Plans. All applicable Type test report shall be submitted with the bid and shall not be older than 5 years.

Standard SQP and SFP are as follows:

(Standard Quality plan) SQP document no.: TPQAIT-QAXX-00-EX-SQP-113: SQP for LV cable

(Standard Quality plan) SQP document no.: TPQAIT-QAXX-00-EX-SQP-138: SQP for MV cable

(Standard Field Quality plan) SFP document number: TPQAIT-QAXX-00-EX- FQP-161: FQP for cable installation

10 PERFORMANCE REQUIREMENTS

- 10.1 The cable shall be suitable for installation in a tropical monsoon area having a hot humid climate. The reference ambient temperature to be considered for the purpose of this specification is 50 deg. C.
- 10.2 Cables shall be capable of carrying continuous load current under a power supply system frequency variation of (\pm) 5%, voltage variation of (\pm) 10% and combined frequency and voltage variation of 10% within specified limits of temperature rise.

11 SPARES AND SPECIAL TOOLS & TACKLES

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The spares supplied shall be strictly interchangeable with parts for which they are intended for replacement.

The spares shall be treated and packed for long storage (minimum 5 years) under the climatic conditions prevailing at the site.

The start-up spares shall be delivered at the site well in time before the start-up and commissioning of the plant.

11.1 Start-Up Spares

The start-up spares are those spares which will be required during start-up and commissioning of the equipment/systems, and until Final Take Over. It is the responsibility of the bidder to supply all the necessary spares as required until the equipment/systems are handed over to the Owner. An adequate stock of start-up spares shall be available at the site such that the start-up and commissioning of the equipment/systems, performance testing and handing over the equipment/systems to the Owner will be carried out without hindrance and delay. All start-up spares which remain unused after the taking over the sub-station shall remain the property of the Owner. The Bidder shall furnish the Schedule of Start-up Spares.

11.2 Essential Spares

Essential spares are those considered necessary by the owner for first three (5) years of normal sub-station operation. A list of such spares has been listed in the below mentioned table and the same shall be included in bidder's scope. When a particular item of spares is indicated as 'percentage', it shall be considered as percentage of total number of that item of spares in the single equipment/system, unless specified otherwise and the fraction shall be rounded-off to the next higher whole number. Whenever the item of spares has been indicated as 'set' the same shall mean the supply for a single equipment/system. One set of spares for the particular equipment shall mean the total quantities of that particular spares for a single equipment e.g., 'set' of Server, set of Gateway, shall include HMI, keyboard, mouse etc. The 'set' shall however include all components required to replace that item of spares. The Owner reserves the right to buy any of the essential spare parts as considered necessary.

In case during start-up and commissioning certain essential spares are used up, the same shall be replaced within one (1) month without any commercial implications.

VENDOR shall furnish details for all essential spares as per the approved vendor document list.

11.3 Recommended Spares

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In addition to the spares mentioned above, the Bidder shall also furnish in his bid a list of recommended spares with unit prices. The Owner reserves the right to buy any of the recommended spare parts as considered necessary by him. The prices of recommended spares shall be consistent with those of start-up/essential spares. Purchase of these spare parts will be covered by a separate order or an amendment to the contract.

The Bidder shall provide a list of recommended spares for a period of five years from the date of Site Acceptance Test (SAT) and confirm that the shelf-life of these spares is such as to last for at least 7 years from the date of SAT.

The Bidder shall provide the MTBF of various components, sub-assemblies, assemblies etc. (recommended as spares) and the relationship between MTBF and spare quantities recommended.

The Bidder shall submit the product life cycle details of the all hardware offered under this RFP.

The table below indicate the minimum requirement of the owner, bidder to include the spares, which are not part of this table, but required for maintenance and upkeep of the system.

11.4 SPECIAL TOOLS & TACKLES

11.4.1 Commissioning spares are those, which may be required during commissioning of the equipment. Bidder to furnish list of commissioning spares (price deemed to be included in the total bid price) along with technical offer.

11.4.2 The bidder shall supply with the equipment, one unused complete set of all special tools & tackles required for the erection, assembly, disassembly and proper maintenance of the equipment. A list of such tools & tackles (price deemed to be included in the total bid price) shall be submitted by the bidder along with the offer.

12 DATA SUBMISSION BY BIDDER:

12.1 ALONGWITH BID

Following drawings and documents shall be prepared based on Owner specifications and statutory requirements and shall be submitted with the bid:

- 12.1.1 Completely filled in Technical Particulars
- 12.1.2 General description of the equipment and all components including brochures.
- 12.1.3 General arrangement
- 12.1.4 Bill of material
- 12.1.5 Experience List

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12.1.6 Type test certificates

12.2 AFTER AWARD OF CONTRACT

Sr. No	Descriptions	For Approval	For Review Information	Final submission
1.	Technical parameters	√		√
2.	Cross section Drawing		√	√
3.	Installation Instruction		√	√
4.	Transport / Shipping dimension drawing			√
5.	QA & QC Plan	√	√	√
6.	Test Certificates	√	√	√

13 ANNEXURES :

- 13.1 Annexure-1: (Standard Quality plan) SQP document no.: TPQAIT-QAXX-00-EX-SQP-113: SQP for LV cable
- 13.2 Annexure- 2: (Standard Quality plan) SQP document no.: TPQAIT-QAXX-00-EX-SQP-138: SQP for MV cable
- 13.3 Annexure-3: (Standard Field Quality plan) SFP document number: TPQAIT-QAXX-00-EX- FQP-161: FQP for cable installation


TPQAIT-QAXX-00-EX-SQP-138
REV.0

STANDARD QUALITY PLAN FOR
MEDIUM VOLTAGE CABLES
(3.3 kV to 33 kV)


Date of Issue:
01/09/2015

Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks
1	2	3	4	7
1	MATERIAL:	(All material shall be as per approved drawing/ data sheet/		
1.1	XLPE/TR-XLPE Compound & Aluminium/Copper Conductor	Relevant Standards & Specifications	Review of co-related MTC.	Additional sample testing by cable manufacturer. In case TR-XLPE is used as insulation, quality/ grade certificate to be furnished.
1.2	Outer Sheath, Inner Sheath, Semiconducting Compound, Cu-insulation screen, Water Swellable tapes, Galvanized Steel Wire.	Relevant Standards & Specifications	Review of co-related MTC.	
2	INPROCESS INSPECTION: (Generally in line with manufacturer standard)			
3	FINAL INSPECTION - (IS 7098 Part-2)			
3.1	Routine Tests	1 Conductor Resistance	Testing and Measurement	100%
		2 Partial Discharge		
		3 High Voltage Test		
		1 Thickness of Insulation (eccentricity), Inner and Outer Sheath & colour code, Armour Size, Cable Construction, Conductor Dia, No. of Strands, & Overall dia.	Testing and Measurement as per relevant IS and IS 7098 Part-2 on sample selected by Tata Power.	
		2 Annealing test (for Copper)*		
		3 Tensile Test (for Aluminium) *		
		4 Wrapping Test (for Aluminium) *		
		5 Tensile Strength and Elongation at Break for Insulation, Inner and Outer sheath (Before and after ageing)		
		6 Insulation Resistance (Volume Resistivity) at Room Temperature and Elevated Temperature		
		7 Conductor Resistance		
		8 High Voltage Test		
		9 Partial Discharge (Full Drum Length)		
		10 Hot Set Test		
		11 Galvanizing Tests on armour		
		12 Rewinding of Drums to check for Length, Surface Defects, Finishing, Undulation, Joints, Embossing, Printing (Min.Two Drums from offered lot)		
		13 Test for cross linking for extruded semi-conducting screen.		
		14 <u>Additional Tests on insulation:</u>		
		i) Void & contamination test	One Sample as per relevant standard/ specification	
		ii) Neutral wire/ tap indent on surface of insulating screen.		
		iii) Concentricity of Insulation		
		iv) Protrusion of conductor & insulation screen.		



TATA POWER		The Tata Power Company Limited Corporate Engineering-Quality Assurance Inspection & Testing		 Date of Issue: 01/09/2015	
TPQAIT-QAXX-00-EX-SQP-138 REV.0		STANDARD QUALITY PLAN FOR MEDIUM VOLTAGE CABLES (3.3 kV to 33 kV)			
Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks	
1	2	3	4	7	
3.3	FRLS Tests (One Sample from offered lot for FRLS cables)	1 Oxygen Index	ASTM-D-2863/ NES-715	CHP	
		2 Temperature Index	ASTM-D-2863		
		3 Smoke Density Rating	ASTM D-2843		
		4 Acid Gas Generation	IEC 60754-1		
		5 Flammability Test	IS 10810-53, 61 & 62 (Category-A)		
3.4	Type tests	1 Test for Armour (wire/ strip)	Clause 7, Table-6 (IS7098-2), IS 3975	Valid & Approved Type Test Report Review during final inspection. (Not older than 5 years)	
		2 Physical Tests on Insulation			
		a Ageing in Air Oven	IS 10810 - 11		
		b Degree of cross linking			
		c Shrinkage Test	IS 10810 - 12		
		d Water Absorption Test (Gravimetric)	IS 10810 - 33		
		3 Test on extruded semi-conducting screens			
		a Test for strippability of semiconducting strippable insulation screen (when applicable)	Table 2 and Annex B of IS 8097-2		
		b Volume Resistivity	Table 2 and Annex E of IS 8097-2		
		4 Physical Tests on Outer Sheath			
		a Ageing in Air Oven	IS 10810 - 11		
		b Shrinkage Test	IS 10810 - 12		
		c Hot deformation	IS 10810 - 15		
		d Loss of mass in air oven	IS 10810 - 10		
		e Heat Shock	IS 10810 - 14		
		f Thermal Stability	IS 10810 - 60		
		9 Carbon black content of polythene sheath	Table 3 of IS 7098-2		
		5 Thermal ageing test for complete cable	IS 10810 - 19.9		
		6 Bending Test	IS 10810 - 50		
7 Dielectric Power Factor Test as a function of voltage & temperature	IS 10810 - 48				
8 Heating Cycle Test of complete cable	IS 10810 - 49				
9 Impulse withstand test	IS 10810 - 47				
3.5	TR XLPE Type Test	1 Type Test as indicated in contract technical specifications	Technical Specifications		



TATA POWER		The Tata Power Company Limited Corporate Engineering-Quality Assurance Inspection & Testing		 Date of Issue: <i>01/09/2015</i>	
TPQAIT-QAXX-00-EX-SQP-138 REV.0		STANDARD QUALITY PLAN FOR MEDIUM VOLTAGE CABLES (3.3 kV to 33 kV)			
Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks	
1	2	3	4	7	
3.6	Optional Tests (if applicable as per contract technical specifications)	1 Resistance to Ultra Violet Radiation on outer sheath	The retention values of TS and ultimate elongation after the tests shall be minimum 60% of TS and ultimate elongation before test. (DIN 53387 or ASTM-G-154)	Test Certificates (not older than one year) from recognised testing laboratory to be furnished for review for similar design mix. In case test certificates are not available, test is to be conducted on randomly selected one sample by Tata Power, in approved lab before acceptance of cable.	
		2 Accelerated water absorption test on PVC Insulation	NEMA-WC-70		
		3 Water Absorption on outer sheath	IS-10810 Part 33, Type-B compound as per IS-5831	Water Absorption value shall not exceed 10 mg/sq.cm	
4.0	Document review & Issuance of IRN	Review of Quality dossier (*) & Inspection report	Review	(*) along with Index.	
N O T E	A) STATUTORY REQUIREMENTS WILL BE COMPLIED BY THE CONTRACTOR. B) ALL MATERIAL SHALL BE AS PER APPROVED DRAWINGS / DATA SHEET. C) TATA POWER / ITS REP IDENTIFICATION STAMP ON MATERIALS WILL BE PRESERVED, IF REQD, SAME SHALL BE TRANSFERRED BY TATA POWER / ITS REP ONLY. D) FINAL INSPECTION OF THE MAJOR ACTIVITIES ARE WITNESSED BY CLIENT AND IT IS HOLD POINT (AT THE DISCRETION TATA POWER) E) MANUFACTURER SHALL PREPARE AND SUBMIT COMPLETE MANUFACTURING QUALITY PLAN IN PRESCRIBED FORMAT OR THEIR REGULAR FORMAT INDICATING THEIR REGULAR PRACTICES, TAKING CARE OF MINIMUM REQUIREMENT AS INDICATED ABOVE INCLUDING ADDITIONAL TESTING REQUIREMENTS AS PER CONTRACT SPECIFICATION. F) INSPECTION OF SPARES SHALL BE MANUFACTURED & INSPECTED AS PER APPLICABLE CLAUSES OF THIS QUALITY PLAN. SPARES OFFERED FOR INSPECTION SHALL BE PREFERRED ALONG WITH MAIN ITEMS (IF ORDERD). G) CALIBRATION CERTIFICATES OF THE EQUIPMENT USED FOR TESTING SHALL BE PROVIDED FOR REVIEW. H) AS PER SPECIFICATION PROPER PAINTING & PACKING SHALL BE ENSURED BY VENDOR BEFORE SHIPMENT TO AVOID ANY TRANSIT DAMAGE. I) TATA POWER RESERVES THE RIGHT TO DEMAND / VERIFY / AUDIT / WITNESS ANY OF THE CHECK POINTS MENTIONED IN THE SCOPE OF SUPPLIER. J) JOINTING IN THE CONDUCTOR DURING MANUFACTURING OF CABLES IS NOT PERMITTED. * As applicable as per IS 8130.				
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RO	First Issue	RG	<i>31/08/15</i>	<i>31/08/15</i>	<i>31/08/2015</i>
Rev. No	Reason for Revision	Prepared By & Date	Checked By & Date	Approved By & Date	

TATA POWER

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Corporate Engineering-Quality
Assurance
Inspection & Testing



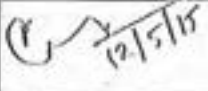


TPQAIT-QAXX-00-EX-SQP-113
REV.0

STANDARD QUALITY PLAN
FOR LV (UPTO & INCLUDING
1.1 kV) POWER & CONTROL
CABLES

Date of Issue:


14/5/15

Document Title
STANDARD QUALITY PLAN FOR
LV (UPTO & INCLUDING 1.1 kV)
POWER & CONTROL CABLES

		 12/5/15	 14/5/15	 14/5/15	RG 14/5/15
0	Initial Submission	RG	CRB (Head QA-E)	SS Head (QA&I)	
Revision No.	Reason for revision	Prepared By & Date	Checked By & Date	Approved By & Date	Issued by & Date

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TATA POWER		The Tata Power Company Limited Corporate Engineering-Quality Assurance Inspection & Testing		 Date of Issue: 14/5/15	
TPQAIT-QAXX-00-EX-SQP-113 REV.0		STANDARD QUALITY PLAN FOR LV (UPTO & INCLUDING 1.1 kV) POWER & CONTROL CABLES			
Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks	
1	2	3	4	7	
1	MATERIAL:	(All material shall be as per approved drawing/ data sheet/ Specifications)			
	PVC FRLS Outer Sheath, Inner Sheath, Insulation Compound, Copper Conductor, Galvanized Steel Flat Strip/Round Wire.	Relevant Standards & Specifications	Review of co-related MTC.	Additional sample testing for insulation, conductor & sheath by cable manufacturer	
2	INPROCESS INSPECTION: (Generally in line with manufacturer standard)				
3	FINAL INSPECTION - CHP/ Witness by Tata Power.				
3.1	Routine Tests	1 Conductor Resistance 2 High Voltage Test	Testing and Measurement	100% test by cable manufacturer & review by Tata Power	
3.2	Acceptance Tests	1 <u>Dimensions:</u> Thickness of Insulation, Inner and Outer Sheath & colour code, Armour Size Conductor Dia & Overall dia 2 Annealing test (for Copper) 3 Tensile Test (for Aluminium) 4 Wrapping Test (for Aluminium) 5 Tensile Strength and Elongation at Break for Insulation, Inner and Outer sheath 6 Insulation Resistance (Volume Resistivity) at Room Temperature and Elevated Temperature 7 Conductor Resistance 8 High Voltage Test 9 Hot Set Test (For XLPE Insulation) 10 Sheath Embossing/ Printing 11 Galvenizing Tests on armour 12 Rewinding of Drum to check for Length, Surface Defects, Finishing, Embossing, Printing etc. (Min. Two Drums from offered lot) 13 Anti Rodent and Anti Termite Test	Testing and Measurement as per relevant IS standard IS 1554 - Part 1 (for PVS Insulated Cables) / IS 7098 Part -1 (XLPE insulated Cables) on sample selected by Tata Power as per IS.	CHP	
3.3	FRLS Tests (One Sample from offered lot) (If applicable as per contract technical specifications)	1 Oxygen Index 2 Temperature Index 3 Smoke Density Rating 4 Acid Gas Generation 5 Flammability Test	ASTM-D-2863/ NES- ASTM-D-2863 ASTM D-2843 IEC 60754-1 IS 10810-53, 61 & 62 (Category-A)		
3.4	Type tests	1 Test for Armour (wire/ strip) 2 <u>Physical Tests on Insulation</u> a Ageing in Air Oven b Shrinkage Test c Water Absorption Test (Gravimetric) (For XLPE) d Hot deformation (For PVC) e Heat Shock test (For PVC) f Loss of Mass in air oven (For PVC) g Thermal Stability (For PVC)	Table-5 (IS1554), Table (IS7098),IS 3965 IS 10810 - 11 IS 10810 - 12 IS 10810 - 33 IS 10810 - 15 IS 10810 - 14 IS 10810 - 10 IS 5831	Approved Type Test Report Review during final inspection.	

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TPQAIT-QAXX-00-EX-SQP-113 REV.0		STANDARD QUALITY PLAN FOR LV (UPTO & INCLUDING 1.1 kV) POWER & CONTROL CABLES		Date of Issue: 14/5/15	
Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	TYPE / METHOD OF CHECK	Remarks	
1	2	3	4	7	
3.4	Type tests	3 Physical Tests on Outer Sheath		Approved Type Test Report Review during final inspection.	
		a Ageing in Air Oven	IS 10810 - 11		
		b Shrinkage Test	IS 10810 - 12		
		c Hot deformation	IS 10810 - 15		
		d Heat Shock test	IS 10810 - 14		
		e Loss of Mass in air oven	IS 10810 - 10		
		f Thermal Stability	IS 5831		
3.5	Optional Tests (If applicable as per contract technical specifications)	1 Resistance to Ultra Violet Radiation on outer sheath	The retention values of TS and ultimate elongation after the tests shall be minimum 60% of TS and ultimate elongation before test. (DIN 53387 or ASTM-G-154)	Test Certificates (not older than one year) from recognised testing laboratory to be furnished for review for similar design mix. In case test certificates are not available, test is to be conducted on randomly selected one sample by Tata Power, in approved lab before acceptance of cable.	
		2 Accelerated water absorption test on PVC Insulation	NEMA-WC-70		
		3 Water Absorption on outer sheath	IS-10810 Part 33, Type-B compound as per IS-5831	Water Absorption value shall not exceed 10 mg/sq.cm	
4.0	Document review & Issuance of IRN	Review of Quality dossier (*) & Inspection report	Review	(*) along with index.	
N O T E	A) STATUTORY REQUIREMENTS WILL BE COMPLIED BY THE CONTRACTOR. B) ALL MATERIAL SHALL BE AS PER APPROVED DRAWINGS / DATA SHEET. C) TATA POWER / ITS REP IDENTIFICATION STAMP ON MATERIALS WILL BE PRESERVED, IF RECD, SAME SHALL BE TRANSFERRED BY TATA POWER / ITS REP ONLY. D) FINAL INSPECTION OF THE MAJOR ACTIVITIES ARE WITNESSED BY CLIENT AND IT IS HOLD POINT (AT THE DISCRETION TATA POWER) E) MANUFACTURER SHALL PREPARE AND SUBMIT COMPLETE MANUFACTURING QUALITY PLAN IN PRESCRIBED FORMAT OR THEIR REGULAR FORMAT INDICATING THEIR REGULAR PRACTICES, TAKING CARE OF MINIMUM REQUIREMENT AS INDICATED ABOVE INCLUDING ADDITIONAL TESTING REQUIREMENTS AS PER CONTRACT SPECIFICATION. F) INSPECTION OF SPARES SHALL BE MANUFACTURED & INSPECTED AS PER APPLICABLE CLAUSES OF THIS QUALITY PLAN. SPARES OFFERED FOR INSPECTION SHALL BE PREFERRED ALONG WITH MAIN ITEMS (IF ORDERD). G) CALIBRATION CERTIFICATES OF THE EQUIPMENT USED FOR TESTING SHALL BE PROVIDED FOR REVIEW. H) AS PER SPECIFICATION PROPER PAINTING & PACKING SHALL BE ENSURED BY VENDOR BEFORE SHIPMENT TO AVOID ANY TRANSIT DAMAGE. I) TATA POWER RESERVES THE RIGHT TO DEMAND / VERIFY/ AUDIT/ WITNESS ANY OF THE CHECK POINTS MENTIONED IN THE SCOPE OF SUPPLIER.				

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TPOAIT-QAAX-00-EX-FQP-161
Rev.0.

STANDARD FQP FOR CABLE INSTALLATIONS (Upto 33KV).

Date of issue:
September 2015.

Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
1.0	MATERIAL RECEIPT.	Check cable type, quantity and size. Report shortage/damage, if any (including cable drum).	Major	Visual	100%	MDC/IRN & Packing list.	Site register	Joint Report (site QC/store & contractor) to be prepared in case of damage.
		Unloading of cable without damage.	Major	Visual	100%	Ensure cable ends are in sealed condition.	log book, store register.	Spreader to be used for the slings while unloading cable.
		Storage type: TYPE 1.	Major	Visual	100%	Manufacturer's instructions	Site register	Cable drums are stored in cable yards in open plots. Proper access should be there for trailer and crane.
2.0	MATERIAL STORAGE.	Drum must be stacked or stored standing on the flanges, not lying flat. Wood chocks should be placed under the flanges to prevent accidental rolling. When stacking it is essential to have the flanges meet, particularly with heavy drums.	Major	Visual	100%	Manufacturer's instructions	Site register	For long storage, periodic visual inspection of cable drums to be carried out.

NOTE: For Cable drums stored for long time (more than a year) in water logging area or with damaged drums, IR & HV (as recommended below) to be done before cannibalization and shifting to covered storage area for use at later stage.

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STANDARD FQP FOR CABLE INSTALLATIONS (Upto 33KV).

Date of Issue:
September 2015.

Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
		<p>Planning: Check availability of cabling notes, layout drawings, drum schedules etc.</p>	Major	N/A	N/A	Engineering & approved notes and details	N/A	
		<p>Route survey: i. Check availability of the route for laying of cable as per approved drawings. ii. Check for readiness of cable tray/ trench. iii. Check for any obstacles in conduits/ hume pipes. iv. Check for any crossover of water line/ drain line/ road etc. v. Preparation of bedding incase of directly buried trench.</p>	Major	Visual	100%	Manufacturer's instructions	Site register	<p>1) Trench diversion of other utilities may be required. 2) Joint bays to be prepared at either ends. 3) Check the trench for proper cable bending radius. 4) Barricading. Walkways and proper lighting should be provided on site.</p>
3.0	PRE-ERECTION (Preparedness).	<p>Availability of Resources: i. Check for arrangement of backfilling, protective tiles, caution tape and cable route markers etc. ii. Availability of tools and tackles: Like Drum handling equipment, cable pulling equipment, jacks, megger, rollers etc.</p>	Major	Visual	100%	Manufacturer's instructions	Site register	<p>Cable laying equipments like winch, power rollers and other rollers should be properly placed at site.</p>



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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
		Transportation of cable drums to site (Check IR Value before shifting from stores).	Major	Visual	100%	Cable schedule/ Approved layout drawings.	erection protocol	
		Cable pulling (Check for use of rollers & toils for pulling).	Major	Visual	100%	Manufacturer's instructions.	erection protocol	
		Cable cutting/laying: 1. HT, Power, Control & Instrumentation Cables shall be laid separately in the designated cable trays. 2. For trenches, minimum 300 mm gap shall be maintained between, HT/Power & Control/instrumentation cables.	Major	Visual	100%	Manufacturer's instructions/ Cable schedule/ Approved layout drawings.	erection protocol	
4.0	ERECTION.	For directly buried cables: following steps to be followed. 1. Cable trench (min 1.0 mtr deep/ as per drawing) to be prepared. 2. Ensure 4-6 inch sand bedding before laying of cable. 3. After laying of cable ensure 300 mm of sand over cable. 4. Place protective tiles above sand. 5. Fill soil above tiles. 6. Place Caution tape on Soil in the trench (below 300 - 450 mm of ground level). 7. Fill the trench with soil to level. 8. Conduits to be used for cable crossing water line/ drain line/ road etc.	Major	Visual	100%	Approved layout drawings/ IS:1255.	erection protocol	Fluidized Thermal Backfill (FBT) is recommended for Increased Ampacity & Thermal Stability. Recommended composition of FBT: 87% Sand. 11% Fly ash. 2% Cement.



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Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
		MARKING & TAGGING: i. Ensure Route marking for cables routed through underground. ii. For Cables laid in cable trays, Tagging of cables along the cables to be done at 50 mtr intervals and at both sides of corners.	Major	Visual	100%	Cable schedule/ Approved layout drawings	erection protocol	
4.0	ERECTION.	Cables Dressing for HT cables: i. Use Trefoil clamps for single core cables (crossing at equal intervals and in reference with other laid trefoiled cables). ii. 3 core cables shall be laid in single layer. iii. Cables shall not be laid crossing each other, min gap of 300mm shall be ensured between cable, if crossing is necessary.	Major	Visual	100%	Cable schedule/ Guidelines.	erection protocol	
		Check Glanding, Termination, straight jointing (if required), support arrangement for cable & ferruling.	Major	Visual, Measurement	100%		erection protocol	
		For HT cables: End termination, cables straight jointing and installation of other accessories.	Major	Visual	100%	Manufacturer's instructions/ Cable schedule/ Approved layout drawings	erection protocol	Certified Jointers to carryout the termination.
		Ensure clearances, earthing, protection from sharp edges & continuity of armour. (As applicable).	Major	Visual	100%		erection protocol	



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TPQA/IT-QA/XX-00-EX-FQP-161 Rev.0.		STANDARD FQP FOR CABLE INSTALLATIONS (Upto 33KV).				Date of Issue: September 2015.		
Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
		Insulation Resistance measurement.	Major	Measurement	100%	Mfr's instructions/ IS 1255.	Test Report	
		HV test:						
		a. For PVC/PILC Cables: DC Hipot with 2 times the rated voltage of cable or 80% of the factory test voltage for 1 minute.	Critical.	testing.	100%	Manufacturer's instructions/ IS 1255/ Factory TC.	Test Report	
		b. For XLPE cable: AC Hipot / Very Low Frequency Hipot (less than 1Hz).	Critical.	testing.	100%		Test Report	
		After HV test for HT cables: Insulation Resistance measurement.	Critical.	Measurement	100%		Test Report	
		Phasing check at both ends for power cables.	Critical.	Visual	100%	Approved layout drawings	Test Report	
		Check loop checks, continuity checks for C&I cables.	Major	Visual	100%	Approved layout drawings	Test Report	
		For HT Cables: Check grounding of sheath (one end for single core cables & both ends for multi core cables).	Critical.	Physical.	100%	Manufacturers instruction.	erection protocol	
		HT Cable system: Test charge at minimum relay settings and then the same is continued for next 24 hrs as Soak test.	Critical.	Measurement	100%	Manufacturer's instructions	Commissioning Protocol	
5.0	Pre-commissioning & Commissioning checks.	On successful completion of Soak Test, the cable system to be released for Load service.	Critical.	Measurement	100%	—	Test Report	



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Rev.0.

STANDARD FQP FOR CABLE INSTALLATIONS (Upto 33KV).

Date of Issue:
September 2015.

Sr. No	COMPONENT / OPERATION	CHARACTERISTICS CHECKED	CLASS OF CHECK	TYPE OF CHECK	EXTENT / FREQUENCY OF CHECK	REFERENCE DOCUMENTS / ACCEPTANCE NORM	FORMAT OF RECORD	REMARKS	
1	2	3	4	5	6	7	8	9	
N O T E	<p>A) STATUTORY REQUIREMENTS WILL BE COMPLIED WITH BY THE CONTRACTOR. B) FOR STAGES WITNESSED / DOCUMENTS REVIEWED BY TATA POWER, COPIES OF RELEVANT DOCUMENTS WILL BE FURNISHED TO TATA POWER. C) TATA POWER / ITS REP. IDENTIFICATION STAMP ON MATERIALS WILL BE PRESERVED / GOT TRANSFERRED BY TATA POWER / ITS REP AT APPROPRIATE STAGES. (IF REQUIRED). D) THE EXTENT INDICATED IN COLUMN 8 IS IN CONTRACTOR'S SCOPE.TATA POWER MAY INSPECT AS PER THIS COLUMN OR RANDOM SAMPLES AT ITS DISCRETION. E) COLUMN 7 WILL BE AS PER TATA POWER. APPROVED DRAWINGS / DATA SHEETS / CONTRACT DOCUMENTS WHEREVER APPLICABLE. F) INSTRUMENTS FOR LEAK TESTS AND PERFORMANCE TESTS WILL HAVE VALID CALIBRATION CERTIFICATE WITH TRACEABILITY TO NATIONAL LEVEL.</p>								
		Critical Category is HOLD point.	This activity required inspection / Verification & acceptance by inspection authority responsible for this stage before further processing is permitted.. 24 Hrs advance notice to be given to TATA POWER FCC. Contractor /sub contractor shall not process activity beyond HOLD point without written permission by TATA POWER FCC. (Surveillance by Head FCC / Project Head).						
		Major Category is Witness point	This activity required inspection / Verification & acceptance by inspection authority responsible for this stage before further processing, 24 Hrs advance notice to be given to TATA POWER (Execution) . Contractor /sub contractor shall not process activity beyond Witness point without written permission by TATA POWER (Execution). This activity shall be performed by Main and Sub- Contractor (Execution + FCC) & witnessed jointly by TATA POWER Execution & Surveillance by FCC.						
		Minor Category is Review point	This activity required review of documents by TATA POWER for the compliance & acceptance, However 24 Hrs advance intimation to be given to TATA power (Execution). This activity shall be performed by Main and Sub- Contractor (Execution +FCC) . (Surveillance by Execution / Project Head).						
			TATA POWER reserves the right to carryout surveillance at any point of time through FCC.						

Fibre Optic cable is not covered in this FQP.

STORAGE TYPE:

- TYPE-1: OPEN AREA & ABOVE GROUND ON WOODEN PLANK WITH SLOPE FOR WATER DISPOSITION.
- TYPE-2: OPEN AREA & ABOVE GROUND ON WOODEN PLANK (WITH SLOPE FOR WATER DISPOSITION) AND COVERED WITH TARPAULIN.
- TYPE-3: OPEN SHED WITH FULLY FORMED FLOORING/CEMENT FLOORING.
- TYPE-4: COVERED SHED/STORE ROOM ON RACKS & IDENTIFIED LOCATION.
- TYPE-4A: CLOSED CHAMBER WITH TEMPERATURE & HUMIDITY CONTROL

NOTE: Items/equipments having shelf life like paints, alumina, desiccant etc. are to be stored separately for identification purpose.

Rev. No	Reason for Revision	Prepared By & Date	Checked By & Date	Approved By & Date	Issued By.
RO	ISSUE FOR USE	SR / 08.09.2015	.CB/ 08.09.2015	SS	11/09/15

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The Tata Power Company Ltd



OPEN TENDER NOTIFICATION

Tender Reference: CC25NP003

Document Date: 07th May' 2024

Section E.1: Special conditions of contract

CONFIDENTIAL

SITC of 02 nos. 110KV/23.1KV 40MVA Power Transformer for Trombay Station-A. Ref. No. CC25NP003	THE TATA POWER COMPANY LIMITED	
	E.1 SPECIAL CONDITIONS OF CONTRACT	SHEET 1 OF 5

Sr. No.	TOPIC	PRINCIPLES OF TERMS & CONDITIONS
1	GENERAL	<p>The following Special Conditions of Contract (SCC) shall supplement the General Terms and Conditions – Supply & Service.</p> <p>Wherever there is a conflict, the provisions herein shall prevail over those in the “General Terms and Conditions – Supply & Service”.</p>
2	CONTRACT PRICE AND CONTRACT STRUCTURE	<p>Contract Price Variation: The Contract prices shall be subject to IEEMA Price Variation Clause.</p> <p>IEEMA price variation shall be applicable on Transformer supply portion only. Price variation formula shall be as per IEEMA circular Ref: 140/PVC/DT_PT/05 dated 10th Nov 2021. PV formula Ref shall be IEEMA/PVC/PWR TRF Up to 400 KV/2021 effective from 1st September 2021.</p> <p>Base circular shall be of March’ 2024 issued in April’2024. Base month for Bid Price shall remain same throughout the contract period.</p> <p>Above mentioned price variation shall be applicable on Transformer Supply portion only.</p> <p>Price for spares, freight, and services portion, shall be firm and fixed for the entire duration of the Contract and shall not be subject to escalation. After the price variation is arrived, the said revised price shall then remain firm till completion of delivery and payment disbursal.</p> <p>Bidder to submit relevant IEEMA formulae circulars and base month circular (base values) as part of Bid submission.</p>

SITC of 02 nos. 110KV/23.1KV 40MVA Power Transformer for Trombay Station-A. Ref. No. CC25NP003	THE TATA POWER COMPANY LIMITED	
	E.1 SPECIAL CONDITIONS OF CONTRACT	SHEET 2 OF 5

3	COMMENCEMENT / EFFECTIVE DATE (Note: It is to be noted that commencement date, effective date and notice to proceed are one and the same.)	<p>The Vendor will commence work / manufacturing of equipment on issue of Letter of Award (LOA) / Firm Purchase Order by TATA POWER and notice to proceed by the Order Manager.</p> <p>No equipment/material shall be delivered without specific dispatch clearance from project Manager TATA POWER.</p>
4	CONTRACT PERFORMANCE BANK GUARANTEE	<p>This is further to the General Terms & Conditions – Supply Clause 9.0 / General Terms & Conditions-Services-Clause 10;</p> <p>Successful Vendor shall submit a CPBG cum PBG of 10% of Contract Value in format specified by Tata Power within 15 days from the placement of confirmed Purchase Order.</p> <p>This CPBG cum PBG shall be valid till warranty period with additional claim period of 6 months.</p>
5	TERMS OF PAYMENT	<p>This is further to General Terms & Conditions – Supply Cl. 6.0 and General Terms and conditions-Services Cl 8.0 respectively.</p> <ol style="list-style-type: none"> 1) No Advance Payment. 2) Supply: 80% of supply cost shall be payable against supply on pro-rata basis. 3) Remaining 20% of supply cost shall be payable upon commissioning and handover of the project, submission of as built drawing. 4) If Commissioning is delayed due to reasons attributable to Tata Power, then balance 20% of supply part shall be paid within 90 days from scheduled date of Commissioning against submission of CPBG cum PBG. 5) Service: 100% of payment upon commissioning. (Pro-rata basis).

SITC of 02 nos. 110KV/23.1 KV 40MVA Power Transformer for Trombay Station-A. Ref. No. CC25NP003	THE TATA POWER COMPANY LIMITED	
	E.1 SPECIAL CONDITIONS OF CONTRACT	SHEET 3 OF 5

		<p>6) Credit period is 60 days.</p> <p>7) Safety Retention shall be as per safety Terms and Conditions (Enclosed as Annexure to GCC).</p> <p>8) Income tax and any other statutory recoveries as applicable shall be recovered from Contractor monthly running bills and TDS certificate for the deductions shall be furnished.</p> <p>9) All payments against supply and services are subject to submission of unconditional CPBG cum PBG (as per clause 4 of SCC above) and unconditional acceptance/signing of the PO/Contract agreement.</p>
6	INSURANCE	<p>This is as per General Terms and conditions-Supply clause 5, and Services Clause 12, -</p> <p>Complete Insurance will be in Vendor's scope.</p>
7	LIQUIDATED DAMAGES FOR DELAYS, NON – PERFORMANCE & OVERALL CAP	<p>This is further to General Terms & Conditions – Supply Clause 10.0. and General Terms & conditions-Services clause 11</p> <p>LD Clause percentages specific to this package will be:</p> <ul style="list-style-type: none"> • In the event of delay, 1% of Contract value per week of delay subject to maximum of 10% of Contract value.
8	WORK COMPLETION PERIOD	<p>Supply:</p> <p>a) Drawing submission/approval shall be completed within 02 month from the date of award (Bidder shall submit the complete drawings within 04 weeks from date of award and Tata Power shall approve the drawing and provide manufacturing clearance within 04 weeks from date of receipt of complete drawing)</p> <p>b) Material shall be delivered at site within 15 months from date of manufacturing clearance.</p> <p>Service: Installation, testing and commissioning shall be completed within 01 month from date of supply.</p>

SITC of 02 nos. 110KV/23.1 KV 40MVA Power Transformer for Trombay Station-A. Ref. No. CC25NP003	THE TATA POWER COMPANY LIMITED	
	E.1 SPECIAL CONDITIONS OF CONTRACT	SHEET 4 OF 5

9	WARRANTY PERIOD	<p>Warranty period shall be 66 months from date of delivery at site or 60 months from date of commissioning whichever period concludes earlier.</p> <p>Warranty Period for Spares shall be 30 Months from date of delivery or 24 Months from date of commissioning, whichever period concludes earlier.</p> <p>The CPBG cum PBG shall valid till warranty period.</p>
10	Total Compliance to TCOC, safety Terms & Conditions and International Safety standards	Tata Power Contractor Safety Terms and Conditions is enclosed as Annexure to the GTC. Vendor shall have to abide fully without any deviation.
11	BID SUBMISSION (In Ariba)	Bidders are requested to submit their offer in line with this Tender document, instructions given in "Tender Notice and instructions to Bidders"
12	TPSDI Training	To improve work safety and to ensure that all work force deployed at owner premises have the right orientation / induction and skills training before they undertake any work, the Vendor shall accordingly plan and enrol his and sub-contractors work force to the respective skills / crafts training (Levels L1/L2/L3) offered by TPSDI.
13	Special note for Statutory requirements related to contract workmen	In addition to all prevailing admin / statutory approvals Vendor to take special note of following All employees should submit medical fitness on Form No 6. ESIC / PF is mandatory for all employees deputed for the project. Police Verification / Indemnity Bond to be produced for all employees working at site.
14	Reverse Auction	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.

SITC of 02 nos. 110KV/23.1 KV 40MVA Power Transformer for Trombay Station-A. Ref. No. CC25NP003	THE TATA POWER COMPANY LIMITED	
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		<p>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.</p> <p>Date and time of e-auction will be intimated through E-Tender system to Authorized Person of eligible Bidders. Provided minimum three techno-commercially qualified bids are available.</p>
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The Tata Power Company Ltd



OPEN TENDER NOTIFICATION

Tender Reference: CC25NP003

Document Date: 07th May' 2024

Section E.2: Price bid format

CONFIDENTIAL

E.2 Price bid format (MO Power Transformers at Trombay Station-A)

Sr No	Type of Transformer	Qty	UoM	Unit Price (INR)	Total Price (INR)
1	Design, manufacture, factory testing, packing, route survey, transportation to site 3 phase, 50 Hz, 40 MVA, 110/23.1 kV, Dyn11 Power Transformer including all accessories as per the specific and general requirements and complete with bushings, conservator, OLTC and with oil and other accessories as per the technical specification and BOM.	2	Nos.		-
2	Set of Spares	1	Lot		-
3	Freight	2	Nos.		-
4	Services for Unloading ,Installation, testing & commissioning	2	Nos.		-
				Total Basic Price	0
				GST-18%	0
				Total All inclusive Price	0

Note: Above description shall be read in conjunction with the Technical specifications.

The Tata Power Company Ltd



OPEN TENDER NOTIFICATION

Tender Reference: CC25NP003

Document Date: 07th May' 2024

Section E.3: General Terms Condition-Supply

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The Tata Power Company Limited is hereunder referred to as the "Purchaser" or "Company". The person, firm or company selling the goods, the subject of this purchase order is referred to as "Vendor" or "Contractor". The subject of this purchase order is hereinafter referred to as the "Material(s)" or "Goods".

The Contract shall mean the contract as derived from the following:

1. Purchase Order (with 'Commercial Notes' and Annexures to the Purchase Order referred thereon)
2. Technical Specifications.
3. General Terms & Conditions

The documents including all reference document (s) and Annexures forming the Contract are to be read together as a whole and are to be taken as mutually explanatory.

1. Price:

Unless otherwise specifically stipulated, the price shall be firm and shall not be subject to escalation for any reason till the validity of this Contract.

Unless otherwise specifically stipulated, the price shall be inclusive of road/ rail worthy water-proof packing & forwarding charges up to effecting delivery at FOT/ FOR despatch point, GST and shall also be inclusive of inland freight, terminal taxes and entry taxes as leviable on the transportation or entry of goods into any local area limits pursuant to the Contract.

2. Taxes and Duties:

- 2.1 The Contract Price shall be inclusive of all taxes, duties, including but not limited to GST or any local taxes, levies imposed by State/Central/Local governments
- 2.2 Taxes as mentioned in the Contract Price or Price Schedule shall be paid to the contractor subject to the Contractor complying with all the statutory requirements and furnishing the relevant documents including error free invoices containing detailed break-up of the taxes
- 2.3 However the payment of GST or local levies shall be restricted to the total amount as indicated in the price schedule.
- 2.4 Any duties, levies or taxes not mentioned in Contract Price or Price Schedule but applicable as per any statute (s) shall be deemed to be

Rev. date: 25 July 2017

included in the Contract price and shall be to the account of the Contractor.

- 2.5 Any statutory variation in duties, levies or taxes if applicable and specified in this Contract till the scheduled date for supply of Goods and limited to direct invoices of the Contractor shall be to the account of Purchaser. The Contractor shall have the obligation to provide the necessary documentary evidence / supporting by way of gazetted notifications etc. to prove the change in such levies or taxes between the due date of submission of the Bid and the scheduled date of supply of goods to claim the difference.
- 2.6 The Contractor shall pass on to the Purchaser all the benefits of either reduction in tax rates, exemptions, concessions, rebate, set off, credits etc. or introduction of new tax rates exemptions, concessions, rebate, set off, credits etc. pertaining to all taxes, duties, imposts, fees and levies in respect of the supplies of Goods or performance of obligations under the contract. This would specifically include reduction of tax rates as a result of statutory changes or judicial rulings.
- 2.7 Any other taxes, levies and duties not mentioned in Contract Price or Price Schedule but applicable as per any statute (s) or introduction (omission) of new taxes, levies and duties shall be deemed to be included in the Contract Price and shall be to the account of the Contractor.
- 2.8 For facilitating availment of a credit, set-off, rebate, drawback or like benefit available to the Purchaser, the Contractor will facilitate the Purchaser by providing the necessary documentary and/or procedural support. In any process of assessment or re-assessment, of taxes payable by the Purchaser. Wherever expressly agreed the purchaser would provide the statutory form 'C' to the seller for availing the concessional rate of Central sales tax.
- 2.9 The Contractor shall bear and pay all the costs, liabilities, levies, interest, penalties in respect of non-compliances of any legal requirements as per various statutory provisions. The contractor shall keep the owner indemnified at all times from any tax liability, interest, penalties or assessments that may be imposed by the statutory authorities for non-compliances or non-observation of any statutory requirements by the Contractor.
- 2.10 Purchaser shall pay the invoices to the Vendor after necessary deductions as prescribed under the applicable law, income - tax or other

deductions under the State Tax laws as may be applicable to the Contract.

3 Packing details:

Packing details: The material must be packed in suitable packing to suit the mode of transport and to ensure its safe receipt at point of delivery. Any damage to material noticed at the time of delivery at site, due to improper packing or any other reason whatsoever shall be the responsibility of the Vendor. Such damaged goods shall be replaced within 14 days from intimation from the Purchaser.

4 Transportation and Unloading at Site:

The Vendor shall deliver the Material(s) at site/ Stores as per the delivery address specified in the Purchase order. The unloading at delivery shall be organised by the Purchaser unless otherwise specified. The receipt of the material/ equipment is subject to inspection and rejection if Material(s) is found unsatisfactory or any of the clauses under this purchase order are violated.

5 Insurance:

Unless otherwise specified, Purchaser will be responsible to obtain transit insurance for the Material(s). The Vendor shall intimate the Order Manager (as mentioned in the Purchase Order) along with Invoice, packing list, the Railway Receipt/Truck or Lorry Receipt etc. immediately after the consignment is booked, at the e-mail id mentioned in the Purchase order.

6 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 herein.

7 Bills and invoice:

The tax invoices should contain the details to comply with the GST Law. The supplier shall:

- i) Furnish (electronically) and communicate to the Owner, the details of Goods or Services supplied by the 10th of the month succeeding the said tax period,
- ii) Upon discovery of any discrepancy, rectify it and shall pay the tax and interest thereof,
- iii) Furnish the returns (electronically), for the inward and outward supplies of

Goods and/or Services, before the specified dates as per the GST Law,
iv) Communicate the tax paid, credits etc. as and when credited.

v) The Invoice should clearly state the description of the goods, quantity, sale price, tax %, and tax amount;

vi) The Invoice should be signed by an Authorized Signatory.

Bills/Invoices in the name of The Tata Power Company Ltd. with packing lists in triplicate shall be forwarded along with the equipment.

Contractor to furnish GST Registration no. in all invoices as well as Purchaser's (Tata Power's) GST no.

8 Transfer of Title and risk:

The transfer of property and risk of Material(s) shall be deemed to take place as follows:

a. For delivery F.O.R. or F.O.T. despatch point: Transfer of property on handing over the Material(s) to the carrier against receipt of clean Railway Receipt/Truck or Lorry Receipt and such receipt having been handed over to Purchaser. However, the risk of loss shall pass to the Purchaser on delivery of goods at the specified destination.

b. In case the Material(s) are procured by the Vendor from sub-vendors on receipt of duly endorsed documents of title to the goods.

9 Contract Performance Bank Guarantee (In case applicable):

9.1 The Vendor shall within 15 days of issue of this Purchase Order furnish an unconditional irrevocable bank guarantee duly stamped and strictly as per the prescribed format of the Purchaser from any nationalized bank or any scheduled bank having a branch in Mumbai and approved by the Purchaser for a sum equivalent to 10% of the Total value of Order valid for a period not less than 6 months from the expiry of the Warranty period.

9.2 Irrespective of the performance demonstrated as part of the Factory Acceptance Tests Take-over tests / Performance Tests etc, the Purchaser may call for re-validation of performance of the system during the performance guarantee period by conducting fresh performance tests if in its opinion, the

system is not able to deliver the designed performances based on its operational performance results. If the equipment fails to prove the performance during such performance tests, the Purchaser may allow the Vendor to either rectify the system by addition / modification of equipment etc at the Vendor's costs & risk to restore the performance levels. Failure to rectify the system to achieve the designed performance levels may result in imposition of penalties including revocation of the Performance Bank Guarantee and forfeiture of the entire amount under the Performance Guarantee.

- 9.3 In case the Vendor fails to furnish the requisite Bank Guarantee as stipulated above, then the Company shall have the option to terminate the contract besides other contractual remedies.

10 Price reduction:

- 10.1 The Vendor agrees that time of supply of Material(s) is of prime importance. If the Vendor fails to supply Material(s) before the respective scheduled / fixed date for supply. Company may without prejudice to any other right or remedy available to the Company: -

10.1.1 Recover from the Vendor ascertained and agreed, genuine pre-estimate liquidated damages, and not by way of penalty, a sum equivalent to 1% (of total value of order) per week or part thereof for each week's delay, beyond the scheduled supply date each subject to maximum of 10% of the total order value, even though the Company may accept delay in supply after the expiry of the scheduled supply date. The Company may, at its discretion, set off the aforesaid amounts from any other amounts owed by the Company to the Vendor or recover such amounts in other manner as may be permissible under applicable laws.

10.1.2 Arrange to get supply from elsewhere on account and at the sole risk of the Vendor, such decision of the Company being final and binding on the Vendor; or

10.1.3 Terminate the contract or a portion of supply of the supply work thereof, and if so desired, arrange for the supply in default by the Vendor to be attained from elsewhere at the sole risks and costs of the Vendor.

10.2 Liquidated damages for performance shortfall (if applicable) shall be specified in the Technical Specifications.

10.3 The Liquidated Damages referred in this clause 10 may be recovered by the Company from the Vendor as set off against any monies owed by the Company to the Vendor or in any other manner permissible under applicable laws.

11 Warranties:

11.1 Materials and Workmanship: Vendor shall fully warrant that all the stores, equipment and component supplied under the order shall be new and of first class quality according to the specifications and shall be free from defects (even concealed fault, deficiency in design, materials and workmanship).

11.2 Should any defects be noticed in design, material and/or workmanship within 12 months after the Material(s) or any portion thereof as the case may be have been commissioned or for 24 months from the date of delivery, whichever period concludes earlier. Purchaser shall inform Vendor and Vendor shall immediately on receipt of such intimation, depute their personnel within 7 days to investigate the causes of defects and arrange rectification/ replacement/modification of the defective equipment at site, without any cost to Purchaser within a reasonable period. If the Vendor fails to take proper corrective action to repair/replace defects satisfactorily within a reasonable period, Purchaser shall be free to take such corrective action as may be deemed necessary at Vendor's risk and cost after giving notice to the Vendor, including arranging supply of the Goods from elsewhere at the sole risk and cost of the Vendor.

11.3 In case defects are of such nature that equipment shall have to be taken to Vendor's work for rectification etc., Vendor shall take the equipment at his costs after giving necessary undertaking or security as may be required by Purchaser. After repair Vendor shall deliver the equipment at site on freight paid basis. Any taxes applicable in relation to this repair shall be to the Vendor's account. All risks in transit to and fro shall be borne by the Vendor.

11.4 Equipment or spare parts thereof replaced shall have further warranty for a period of 12 months from the date of acceptance.

12 Quality, Testing, inspection, installation:

12.1 All Material(s) supplied under this Contract shall be new and unused.

- 12.2 Wherever a specific Quality Assurance Plan is provided with the Request for Quotation (RFQ) or agreed as part of the commercial/ technical discussions, the same shall be binding on the Vendor.
- 12.3 The material shall be inspected
- a. At consignee end by Purchaser.
 - b. At factory premise of the Vendor/ sub-vendor by Purchaser or third party duly nominated by Purchaser. The Vendor shall extend all necessary co-operation to Purchaser/ third party inspector carrying out the inspection. The Inspector(s) shall have the right to carry out the inspection or testing, which will include inspection and testing of the raw materials at manufacturers shop, at fabricators shop and at the time of actual despatch before and/or after completion of packing.
- 12.4 The Vendor will inform Purchaser at least eight (8) days in advance of the exact place, date and time of tendering the Material(s) for required inspection and provide free access to the Inspector(s) during normal working hours at Vendor's or his/ its sub-Suppliers works, and place at the disposal of the Inspector(s) all useful means for undertaking the Inspection, checking the results of tests performed, marking the Material(s), getting additional tests conducted and final stamping of the Material(s).
- 12.5 Even if the inspection and tests are fully carried out, the Vendor shall not be absolved from its responsibilities to ensure that the Material(s), raw materials, components and other inputs are supplied strictly to conform and comply with all the requirements of the Contract at all stages, whether during manufacture and fabrication, or at the time of Delivery as on arrival at site and after its erection or start up or consumption, and during the defect liability period. The inspections and tests are merely intended to prima facie satisfy Purchaser that the Material(s) and the parts and components comply with the requirements of the Contract.
- 12.6 *All costs associated with the inspection shall be included in cost of Material(s).*
- 12.7 Original material test certificate/ performance test certificate/ fitment certificate/ test reports etc. relevant/ applicable as per the specifications/ standards shall be dispatched along with the material supply failing which the material may be rejected.
- 13 Rejection:**
- 13.1 Rejected goods shall be removed and replaced within 14 days of the date of communication of rejection.
- 13.2 Claim in respect of breakage/shortages in any cases shall be referred on the Vendor within ninety (90) days from the date of receipt of Goods by the Purchaser which shall be replaced/made good by the Vendor at his own cost. All risk of loss or damage to the material shall be upon the Vendor till it is delivered to the purchaser/consignee.
- 14 General Indemnity:**
- The Vendor shall indemnify and keep the Purchaser indemnified from and against any and all claims, costs, liabilities (financial), litigations, compensations, judgments, expenses or damages (including attorney's fees and other related expenses) arising out of any breach or alleged breach of any of the conditions of this Contract, performance of the obligations hereunder, or any representation or misrepresentation made by the Vendor or any third party with regard to the subject of this Contract.
- 15 Indemnity against IPR:**
- The equipment, system, drawings, and other materials that shall be supplied against the order will become the Purchaser's property. Without limitation of any liability of whatsoever nature, the Purchaser shall be indemnified and kept indemnified against any claim for infringement or breach of any of the statues, rules & regulations by the use of or sale of any article or material supplied by the Vendor. The indemnity shall include any infringement of patent, trade mark, design, copyright or other property rights whether in Country of Origin, or elsewhere resulting from the Vendor's design, manufacture, use, supply or re-supply & would also cover use or sale of any article or material supplied by the Vendor to the Purchaser under the Purchase Order. The Indemnity shall cover any claim/action taken by a third party either directly against the Purchaser or any claim/action made against the Vendor & where under the Purchaser is made liable. The

Indemnity shall be for losses, damages, and costs including litigation costs, attorney fees etc incurred by the Purchaser in relation to the Purchase Order.

16 Latent Defects Liability period (if applicable):

Notwithstanding the inspections, acceptance tests, quality checks etc carried out by the Vendor and witnessed/accepted by the Purchaser, the Vendor shall further warrant the equipment for any latent defects in its design, material or workmanship against the specifications set forth and shall make good any such defects by way of repair or replacement of the part or whole of the defective product at its own cost & risks as and when such latent defects are observed and intimated by the Purchaser and intimated to the Vendor within 36 months of completion of warranty period.

17 Force Majeure:

- 17.1 In the event of either party being rendered unable by force majeure to perform any obligation required to be performed by it under this Contract the relative obligation of the party affected by such force majeure shall, after notice under this articles be suspended for the period during which such cause lasts. The term 'Force Majeure' as employed herein shall mean acts of God, wars (declared or undeclared), riots or civil commotion, fire, floods, and acts and regulations of the Government of India or State Government or any of the statutory agencies. Both the party shall pay to the other party, the amount payable upon the date of the occurrence of such force majeure.
- 17.2 Upon the occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid, thereby shall notify the other party in writing immediately but not later than twenty four (24) hours of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of the claims.
- 17.3 During the period, the obligations of the parties are suspended by force majeure, the contractor shall not be entitled to payment of any rate.
- 17.4 In the event of the force majeure conditions continuing or reasonably expected to continue for a period more than thirty (30) days, Purchaser shall have the option of terminating the contract by giving seven (7) days notice thereof to the contractor.

18 Variation:

Except for any provisions in this Purchase Order, any change /modification to the terms and conditions of this Order can be issued only by Purchaser or with the prior written approval from Purchaser.

19 Termination

- 19.1 The Contract shall be deemed to be terminated on completion of delivery of Material(s)
- 19.2 Termination of Default by Vendor:
Purchaser may terminate the contract at any time if the Vendor fails to carry out any of his obligations including timely delivery under this Contract. Prior to termination, the Vendor shall be advised in writing of the causes of unsatisfactory performance to be improved upon 15 days of the receipt of notice. In case, if the Vendor fails to bring about the improvement to the satisfaction of the Purchaser, then the order shall be terminated.
- 19.3 Without prejudice to the rights and remedies available to Purchaser, Purchaser may terminate the Contract or part thereof with immediate effect with written notice to the Vendor if,:
- 19.3.1 The Vendor becomes bankrupt or goes into liquidation.
- 19.3.2 The Vendor makes a general assignment for the benefit of creditors.
- 19.3.3 A receiver is appointed for any substantial property owned by the Vendor.
- 19.3.4 The Vendor has misrepresented to Purchaser, acting on which misrepresentation Purchaser has placed the Purchase Order on the Vendor.

The Vendor/ Contractor shall not be entitled to any further payment under the Contract if the Contract is terminated. If the order is terminated under clause 19.2 and 19.3, the Vendor shall not be entitled to any further payment, except that, if Purchaser completes the supply of Material(s) and the costs of completion are less than the Total Order value, the Purchaser shall pay Vendor an amount properly allocable to supply of Material(s) fully performed by Vendor prior to termination for which payment was not made to Vendor. In case, the cost of completion of Material(s) exceed the total Order value, the additional cost incurred by Purchaser for such completion shall be paid by the Vendor.

19.4 Purchaser shall be entitled to terminate the Contract at its convenience, at any time by giving thirty (30) Days prior notice to the Contractor. Such notice of termination shall specify that termination is for Companies convenience and the date upon which such termination becomes effective. Upon receipt of such notice, the Contractor shall proceed as follows:

- 19.4.1 cease all further work, except for such work as may be necessary and instructed by the Company/ Company's representative for the purpose of protecting those parts of the supplies already manufactured;
- 19.4.2 stop all further sub-contracting or purchasing activity, and terminate Sub-contracts;
- 19.4.3 handover all Documents, equipment, materials and spares relating to the supply of goods prepared by the Contractor or procured from other sources up to the date of termination for which the Contractor has received payment equivalent to the value thereof; and
- 19.4.4 handover those parts of the supplies manufactured by the Contractor up to the date of termination.

Upon termination pursuant to clause 19.4, the Vendor shall be entitled to be paid the full value on the Material(s) delivered in accordance with the Contract.

19.5 The Contractor shall not be released from any of his obligations or liabilities accrued under the Contract on termination. For the avoidance of doubt, the termination of the Contract in accordance with this clause shall neither relieve the Contractor of his accrued obligations for Warranty or his accrued liability to pay (liquidated) damages for Delay nor shall entitle him to reduce the value of Performance Security.

20 Sub letting and assignment:

The contractor shall not without prior consent in writing of the Purchaser, sublet, transfer or assign the contract or any part thereof or interest therein or benefit or advantage thereof in any manner whatsoever, provided nevertheless that any such consent shall not relieve the contractor from any obligation, duty or responsibility under the contract.

21 Dispute Resolution:

Dispute or differences arising out or relating to this Order shall be resolved amicably by the parties. Failing such amicable resolution of dispute / differences either party may refer the matter to arbitration of a Sole Arbitrator to be appointed jointly by both the parties. The award of the Arbitrator shall be final, binding and conclusive on the parties. The venue for arbitration shall be Mumbai. The Arbitration proceedings will be governed and regulated by the provisions of Indian Arbitration and Conciliation Act, 1996 as amended from time to time and the rules framed there under.

22 Governing laws

This Contract shall be construed in accordance with and governed by the Laws of India without giving effect to any principle of conflict of law.

23 Jurisdiction

This Contract and the transaction contemplated herein shall be subject to the exclusive jurisdiction of the competent Courts in Mumbai only.

24 Limitation of Liability

Notwithstanding anything contained in the Contract, the Contractor's aggregate liability under this Contract shall be limited 100% of the Total order value. This shall however, exclude liability arising pursuant to clause 2.8- tax indemnity, clause 14- General Indemnity, clause 15- Indemnity against IPR, clause 25 – Confidentiality and liabilities arising due to wilful misconduct, gross negligence, third party claims and corrupt acts attributable to the Vendor.

25 Confidentiality:

The Vendor shall use the Confidential Information of the Purchaser only in furtherance of this Contract and shall not transfer or otherwise disclose the Confidential Information to any third party. The Vendor shall (i) give access to such Confidential Information solely to those employees with a need to have access thereto; and (ii) take the same security precautions to protect against disclosure or unauthorized use of such Confidential Information that the party takes with its own confidential information but, in no

event, shall a party apply less than a reasonable standard of care to prevent such disclosure or unauthorized use.

26 Consequential Damages:

Unless otherwise specified, neither Party shall be responsible for and nor shall be liable to the other Party for indirect/consequential losses and damages suffered by such Party including for loss of use, loss of profit whether such liability or claims are based upon any negligence on the part of the other Party or its employees in connection with the performance of the Purchase Order.

27 New Legislation (The Micro, Small and Medium Enterprise Development Act 2006)

- a. This Act has been enacted and made effective from 2nd October 2006. The Interest on Delayed Payments to Small Scale and Ancillary Industrial Undertaking Act, 1993 is repealed.
- b. Vendor is requested to inform the purchaser if vendor fall under The Micro, Small and Medium Enterprises Development Act, 2006 legislation and provide the purchaser, registration number and date to enable purchaser to take necessary care. The vendors are also requested to mention the same on their invoice / bill.

28 Relation between parties:

The Purchase Order shall be entered into on a principal-to-principal basis only. The Purchase order shall not be construed as a partnership or an association of persons. There is no agent and principal relationship between the parties. Each party shall be responsible for its own conduct. The Vendor shall ensure at all times that all the work carried out under this contract either by its own person or through any of its sub-Vendors shall be always done under its own direct supervision.

29 Environment / ISO 14001 Certification:

The Vendor to confirm whether their organization is ISO 14001 certified. If not, the Vendor must certify that the handling, use and disposal of their product / by-products conform to practices consistent with sound environmental management and local statutes. The Vendor shall ensure that all the wastes are disposed in environmental friendly way with strict compliance to applicable laws including

adherence to MoEF guidelines with respect to disposal of batteries, lead waste, copper cables, ash, waste oil, e-waste etc which shall be disposed through MoEF approved parties only. The Vendor shall also be responsible to collect and recycle all the e-waste generated at the end of the product life cycle at its own costs and risks as per the MoEF guidelines/ orders.

30 Tata Code of Conduct

The Purchaser abides by the Tata Code of Conduct in all its dealing with stake holders and the same shall be binding on the Purchaser and the Vendor for dealings under this Purchase Order. A copy of the Tata Code of Conduct is available at our website: <http://www.tatapower.com/aboutus/code-of-conduct.aspx>. The Vendor is requested to bring any concerns regarding this to the notice of our Chief Ethics Officer on the e-mail ID: cecounsellor@tatapower.com.

31 Responsible Supply Chain Management:

The Purchaser is committed for a cleaner environment and respect of Human rights through its Responsible Supply Chain Management policy. The Vendor is required to comply with all the environment & Human rights related laws, including emission norms, Labour and environmental regulations. The Purchaser encourages its Vendors/ Contractors/ Business partners to pay more attention to green design, green supply, green production, green logistics and green packaging in performing their business obligations.

The Vendor is required to abide by the Tata Power Corporate Environment policy, Energy Conservation and Corporate Sustainability Policy.

A copy of the Responsible Supply Chain Management Policy along with Environment policy, Energy Conservation policy, Sustainability policy, Health & Safety policy and Human Rights policy is available at website: <http://www.tatapower.com/sustainability/policies.aspx>.

Vendor/Bidder is required to completely fill the attached "Supplier Sustainability Questionnaire" in support of their Green Supply Chain Management initiatives and submit the same with their offer.

The Owner recognizes that diversity in the workplace positively impacts business. The Owner is committed to help people from SC/ST background either by helping them to become entrepreneurs or by engaging workforce from SC/ST community under the contracts agreed herein. To encourage engaging SC/ST community, the owner may consider on the merit to incentivize the Contractor by paying additional 1% of the service contract portion if the number of SC/ST workforce engaged in the contract exceeds 30% of the total deployed strength and 2%, if the strength goes beyond 50%. While the Contractor will assist the workforce so engaged to become self-reliant in meeting the work expectation, the Owner may also volunteer its training resources to the extent possible to improve their employability. The Contractor shall maintain the proper documentation of such category of the workforce engaged and the owner may consider to pay the incentive after its verification.

The Owner may also consider extending price preference of 5% in the bid evaluation for an order value up to Rs.50 Lacs, provided the company is owned by a person from SC/ST community having minimum 50% holding in the company.

32 Vendor rating

You are requested to ensure compliance to the terms of the individual orders with regards to timely delivery, provision of all applicable documents / challans / test certificate, quality of the material etc. Your performance with respect to the said factors will be taken into consideration for future business.

33 Vendor Feedback:

- 33.1 In this dealing Vendors feedback is important for the purchaser to improve its processes. If vendor have to report any grievance, problem or require any clarification, information, vendor is requested to contact purchaser at email ID: CC_CUSTOMERFEEDBACK@tatapower.com
- 33.2 Vendor is requested to ensure compliance to the terms of the individual orders with regards to timely delivery, provision of all applicable documents / challans / test certificate, quality of the material etc. Vendor performance with

respect to the said factors will be taken into consideration for future business.

34 Non-Waiver:

Failure of Purchaser or its representatives to insist upon adherence to any of the terms or conditions incorporated in the Contract or failure or delay to exercise any right or remedies herein or by law accruing, or failure to promptly notify the Vendor in the event of breach or the acceptance of or the payment of any Material(s) hereunder or approval of any design or Material(s) shall not release the Vendor and shall not be deemed a waiver of any right of Purchaser to insist upon the strict performance thereof or of any of its rights or remedies as to any such Material(s) regardless of when the Material(s) are shipped, received or accepted not shall any purported oral modification or revisions of the Contract by Purchaser or its representative(s) act as waiver of the terms hereof.

35 Repeat Order:

Purchaser may place the repeat order for 100% of ordered quantities within a span of 6 months from the date of issue of this Purchase Order & Vendor shall execute it at same rates, terms and conditions.

36 Severability

If any provision of this Contract is invalid, unenforceable or prohibited by law, this Contract shall be considered divisible as to such provision and such provision shall be inoperative and shall not be part of the consideration moving from any Party hereto to the others, and the remainder of this Contract shall be valid, binding and of like effect as though such provision was not included herein.

ESG FRAMEWORK FOR BUSINESS ASSOCIATES

Tata Power's Sustainability philosophy sits at the core of its Business Strategy. Tata Power Sustainability Model has an overarching objective of 'Leadership with care' with key elements of 'Care for the Environment'; 'Care for the Community'; 'Care for our Customers / Partners' and 'Care for our People'. These sustainability objectives encompass the Environmental, Social and Governance objectives driven as integrated elements.

Tata Power, together with its stakeholders is determined to achieve sustainable growth while creating shared value for all.

As a part of future ready roadmap, Tata Power has targeted following as our Environment, Social and Governance priorities:

- Being Carbon Net Zero before 2045
- Growing Clean capacity (80% by 2030)
- Customer centricity
- Becoming water neutral before 2030
- Achieving zero waste to landfill before 2030
- No net loss of biodiversity before 2030
- Positively impacting 80 million lives by 2027

In order to create a sustainable business ecosystem, Tata Power expects that all its Business Associates (BA) which includes its suppliers, vendors, consultants and service providers to align to its ESG and sustainability commitments.

Tata Power encourages improved efficiencies and scaling up of green initiatives through technology and innovation taking us farther on the journey of reducing carbon emissions and preparing the entire eco-system towards products and services that would have net positive impact on the environment and communities that we operate in.

The Vendors/ bidders wishing to associate with Tata Power are expected to share their own sustainability and ESG journey. We at Tata Power promote all Business Associates to have a sustainable procurement policy for their supplier and service providers to contribute to our integrated approach in achieving a sustainable supply chain. The BA is encouraged to carry out the assessment of their sub-contractors and sub-vendors on sustainability readiness so that they are aware of the expectation/ business requirement.

The Vendor/ Bidder shall fill-in the 'Environment, Social and Governance Compliance Screening Questionnaire for Business Associates' attached at Annexure-I and submit the same along with the Bid in Ariba online platform.

Responsible Supply Chain Management:

Tata Power is committed for a cleaner environment and respect of Human rights through its Responsible Supply Chain Management policy.

Tata Power Business Associate (BA) shall comply with all the environment & Human rights related laws, including emission norms, Labour and environmental regulations.

Tata Power encourages its BA to focus on green design, green supply, green production, green logistics and green packaging in performing their business obligations. The BA is expected to abide by the Tata Power Corporate Environment policy, Energy Conservation and Corporate Sustainability Policy (enclosed with this document as Annexure-II).

The BA is expected to:

- Strive towards Conservation of Energy, Water, Resources and optimize transportation of Men & Materials to minimize environmental impact and reduce carbon footprint.
- Carry out the assessment of materials used for construction, operation & maintenance, consumables and accordingly phase out those materials which are environmentally hazardous.
- Be cognizant that diversity in the workplace positively impacts business.
- Promote affirmative action by supporting people from SC/ ST background by engaging workforce from SC/ ST community under the contracts agreed herein.
- Share the commitment of 'No child labour', 'No forced labour', Non-discrimination on the basis of caste, colour, religion, gender, disability, maternity or pregnancy or any other factor unrelated to the requirements of the job
- Pay the wages or remuneration to the workforce, personnel deployed in compliance to all applicable laws and regulations.
- Provide its employees/ deployed labor with an employment environment that is free of physical or psychological harassment.
- Carry out the assessment of their Sub-contractors on their Sustainability Readiness so that they are aware of the above expectation/ standards
- To ensure usage of suitable package material which is more environmentally sustainable. Further the packing material shall be recycled to the extent possible. The material used for packing is expected to suit the mode of transport and to ensure its safe receipt at point of delivery.

Waste Disposal:

The BA is expected to follow best practices for disposal of waste, few of which are listed below:

- Have a detailed project plan that includes the waste management, segregation of all designated waste material (Recyclable/ Non-Recyclable), collecting, storing, disposing and transferring the same to pre-arranged facility/ destination in timely and safe manner as per environmental legislations. The project plan shall also include the innovative construction practice to eliminate or minimize waste, protect surface/ground water, control dust and other emissions to air and control noise.
- Have purchase policy to encourage the procurement of material with recycled and minimum packaging of goods during delivery and appropriate means for site-to-site transportation of materials to avoid damage and litter generation.
- Ensure that the residents living near the site are kept informed about proposed working schedule and timings/ duration of any abnormal noise full activity that is likely to happen.
- Ensure the regular maintenance and monitoring of vehicles and equipment for efficient fuel use so that emissions and noise are within acceptable limits to avoid air pollution.

Water Management:

The BA is expected to follow best practices for water management, few of which include a management and monitoring system for water withdrawals and consumption, procedures to reduce water usage or reuse/recycle water, and pretreatment of wastewater before disposal.

Compliance to Law:

The BA shall adhere to responsible business practices and comply with the provision of all the Statutory Acts Applicable. Special attention of the BA is drawn towards the compliance of provision of the following statutes: (along with the latest amendments/additions, as applicable):

- The Child Labour (Prohibition and Regulation) ACT, 1986.
- The Contract Labour (Regulation and Abolition) ACT, 1970.
- The Employee's Pension Scheme, 1995.
- The Employee's Provident Funds and miscellaneous provisions Act, 1952.
- The Employees State Insurance Act, 1948.
- The Equal Remuneration Act, 1976.
- The Industrial Disputes Act, 1947.
- The Maternity Benefit Act, 1961.
- The Minimum Wages Act, 1948.
- The Payment of Bonus Act, 1965
- The Payment of Gratuity Act, 1972.
- The Payment of Wages Act, 1936.
- The Shops & Establishment Act, 1954.
- The Workmen's Compensation Act, 1923.
- The Employer's Liability Act, 1938.
- and any other applicable statutory act

Social Accountability (SA 8000):

Tata Power expects its BAs to follow guidelines of SA 8000:2014 on the following aspects

- Child Labour
- Forced or Compulsory Labour
- Health & Safety
- Freedom of Association & Right to Collective Bargaining
- Discrimination
- Disciplinary Practices
- Working Hours
- Remuneration
- Management System

Health and Safety

The BA is expected to ensure the health and safety of his and his Sub-contractor's staff and labour. The BA shall, in collaboration with and according to the requirements of the local health authorities, ensure that medical staff, first aid facilities, sick bay and ambulance service are available at the accommodation and on the Site at all times, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. The BA shall maintain records and make reports concerning health, safety and welfare of persons deployed, and damage to property, as the Owner's Representative may reasonably require. The BA shall be responsible for the medical treatment / hospitalization of his and his Sub-contractor's staff/ labour.

The BA shall appoint a qualified Safety officer at the Site to be responsible for maintaining the safety, and protection against accidents, of all personnel on the Site. Such Safety officer shall have the authority to issue instructions and take protective measures to prevent accidents.

The BA shall comply in toto with the Tata Power's Contractor Safety Terms & Conditions, Health Safety & Environment Manual while working on Tata Power Site/ Services/ Contracts.

Grievance Mechanism

The BA is expected to have grievance procedures that allow stakeholders to anonymously bring environmental and/or work-related violations and/or concerns to the attention of management. In addition, the BA is expected to have procedures for examining reports of environmental and/or work-related violations or concerns and/or privacy complaints.

Data Protection

The BA is expected to have a formal process to address data security or privacy issues.

ANNEXURE-I



Sr. No.	Question Description	Response (Y/N)	Remarks
Organization			
1	Does your Company have Sustainability Policy at Organization Level? If Yes, Please attach		
2	Do you have sustainable procurement policy in place for your own suppliers? If Yes, Please attach		
3	Does your company do regular assessment of its suppliers on ESG parameters?		
4	Are there ESG risks, or negative impacts identified in your supply chain		
Governance			
1	Is diversity taken into consideration when appointing board members/ senior management? Do you have an independent director/s?		
2	Has your company taken initiatives to ensure ethical practices at workplace? Please share the details, Policies etc.		
3	Does your company have a formal process to address data security or privacy issues? Please share the details, Policies etc.		
4	Does your company have grievance mechanism for stakeholder issues and track resolution?		
Environment/ Planet			
1	Does your company have Environmental Policy? If Yes, Please attach		
2	Do you have a formal process for waste management including solid wastes, liquid wastes and hazardous waste?		
3	Does your company track greenhouse gas emission? Also, what percentage of own consumption comes from the renewable energy?		
4	Does your company have a formal process for water management including monitoring of water consumption and withdrawals, and if applicable, pretreatment of wastewater?		
Green Technology/ Innovation			
1	Are your facility/ Product/ Services provided by you is based on green design, green production, green packaging or green logistics considerations? Please elaborate.		
2	Do your products or services have any environmental or social features or benefits (e.g. environmental/energy certification, ecolabels, fair trade certification, etc.)?		
Social/ People			
1	Does you facility/ Company have written personnel policies in place Are you an equal opportunity employer?		
2	Please describe any formal programme / campaign in place to promote company involvement with the community (volunteering, etc.). What is the percentage of profit spend on community activities?		
3	Does your company have a written Health & Safety Policy or Program? If Yes, Please attach		
Certifications: Does your company have following certifications (valid till date-please mention validity)			
1	ISO9001 accreditation		
2	SA8000 or equivalent		
3	ISO 14001 certification		
4	ISO 18001/45001 or equivalent		
5	ISO/IEC 27001 or equivalent		
6	Any Other (Please specify)		

Signature

Business Associate Name

ANNEXURE-II

CORPORATE SUSTAINABILITY POLICY

At Tata Power, our Sustainability Policy integrates economic progress, social responsibility and environmental concerns with the objective of improving quality of life. We believe in integrating our business values and operations to meet the expectations of our customers, employees, partners, investors, communities and public at large

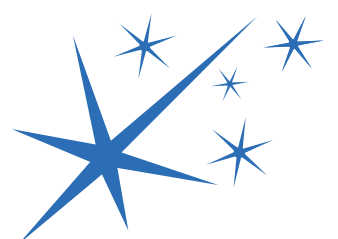
- We will uphold the values of honesty, partnership and fairness in our relationship with stakeholders
- We shall provide and maintain a clean, healthy and safe working environment for employees, customers, partners and the community
- We will strive to consistently enhance our value proposition to the customers and adhere to our promised standards of service delivery
- We will respect the universal declaration of human rights, International Labour Organization's fundamental conventions on core labour standards and operate as an equal opportunities employer
- We shall encourage and support our partners to adopt responsible business policies, Business Ethics and our Code of Conduct Standards
- We will continue to serve our communities:
 - By implementing sustainable Community Development Programmes including through public/private partnerships in and around our area of operations
 - By constantly protecting ecology, maintaining and renewing bio-diversity and wherever necessary conserving and protecting wild life, particularly endangered species
 - By encouraging our employees to serve communities by volunteering and by sharing their skills and expertise
 - By striving to deploy sustainable technologies and processes in all our operations and use scarce natural resources efficiently in our facilities
 - We will also help communities that are affected by natural calamities or untoward incidence, or that are physically challenged in line with the Tata Group's efforts

The management will commit all the necessary resources required to meet the goals of Corporate Sustainability.



(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018



Supplier Code of Conduct

Tata Power follows the Tata Code of Conduct (TCoC) and the Whistle blower Policy and expect all its Suppliers to adhere to the same principles. “**Supplier**” here means any business, company, corporation, person or other entity that provides, sells or seeks to sell, any kind of goods or services to Tata Power, including the Supplier’s employees, agents and other representatives. The suppliers are expected to adhere to the following Do’s and Don’ts:

Do’s

1. The Suppliers shall be committed to supplying products and services of high quality that meet all applicable standards and laws, including product packaging, labelling and after-sales service obligations.
2. Comply with all applicable laws and regulations, both in letter and in spirit, in all the territories in which it operates.
3. Strive to provide a safe, healthy and clean working environment for its employees.
4. Strive for environmental sustainability, particularly with regard to the emission of greenhouse gases, consumption of water and energy and the management of waste and hazardous materials.
5. The Supplier shall represent our company (including Tata brand) only with duly authorised written permission from our company.
6. Safeguard the confidentiality on the use of intellectual property, information and data of the Company.
7. Gifts and hospitality given or received should be modest in value and appropriate as per Company Policy.
8. The assets of Tata Power shall be employed primarily and judiciously for the purpose of conducting the business for which they are duly authorised.
9. All actual or potential conflicts due to financial or any other relationship with a Tata Power employee shall be disclosed.

Don’ts

1. The Supplier shall not make unfair or misleading statements about the products and services of competitors.
2. Children shall not be employed at workplaces.
3. Forced labour shall not be used in any form.
4. The Suppliers shall neither receive nor offer or make, directly or indirectly, any illegal payments, remunerations, gifts, donations or comparable benefits that are intended, or perceived, to obtain uncompetitive favours for the conduct of its business with Tata Power.

Reporting Violations

The Supplier shall notify the Company regarding any known or suspected improper behaviour of other suppliers or employees relating to its dealings with Tata Power, by email to: cecounsellor@tatapower.com.

The same can also be raised through our 3rd party ethics helpline facility:

1. Email id: tatapower@ethics-line.com ; Website: www.tip-offs.com
2. Helpline numbers: Toll free - 0008001004382 and 0008001008277. Also accessible at normal domestic call rates within India: +91-11-71279005
3. Postal address: Deloitte Touche Tohmatsu India LLP
c/o Arjun Rajagopalan, Partner (Ethics Helpline Services)
19th Floor, 46 - Prestige Trade Tower, Palace Road,
High Grounds, Bengaluru, Karnataka – 560001

The Tata Power Company Ltd



OPEN TENDER NOTIFICATION

Tender Reference: CC25NP003

Document Date: 07th May' 2024

Section E.4: General Terms Condition-Service

CONFIDENTIAL

The Tata Power Company Limited is hereunder referred to as the "Owner" or "Company". The person, firm or company offering the services, the subject of this order is referred to as "Contractor". The subject of this order is hereinafter referred to as the "Work".

"Sub-Contractor" means any person named in the Contract as a Sub-contractor, sub-vendor, manufacturer or supplier for a part of the Works or any person to whom a part of the Works has been subcontracted and the legal successors in title to such Person, but not any assignee of such Person.

The Contract shall mean the contract as derived from the following:

1. Work Order (with 'Commercial Notes' and Annexures to the Work Order referred thereon)
2. Scope of Work.
3. General Terms & Conditions - Service

The documents including all reference document (s) and Annexures forming the Contract are to be read together as a whole and are to be taken as mutually explanatory, provided however, in the event of any inconsistency or discrepancy between the aforementioned documents, the order of precedence in interpretation of the documents shall be as set out above. For the avoidance of doubt, it is clarified that the terms set forth in the Work Order (with 'Commercial Notes' and Annexures to the Work Order referred thereon) shall take precedence over the terms set out in the Scope of Work, which shall in turn take precedence of the terms set out in the General Terms & Conditions – Service.

1. Contractor's obligation:

- 1.1 Contractor warrants that it is a competent, qualified and experienced contractor, equipped, organised and financed to perform and complete the services in the operating area in an efficient and professional manner and capable of meeting all the requirements of the Contract.
- 1.2 The Contractor has the overall responsibility of executing the contract, conducting Planning, Job Scheduling, Maintenance Planning, Maintenance Job Scheduling, executing the Work and maintenance jobs as per the Scope of work & schedule.
- 1.3 Except to the extent that it may be legally or physically impossible or create a hazard to safety, the Contractor shall comply with the Owner's representative(s) instructions and directions on all matters relating to the Work.
- 1.4 Contractor shall at all times have full responsibility for control of the Equipment and for the direction and supervision of operations being carried out under the Contract.
- 1.5 In the performance of the Work, Contractor shall be and act as an independent Contractor fully responsible and accountable for the proper execution of its responsibilities, obligations and

liabilities under this Contract and for its own acts and the acts of its Sub-Contractors and the Personnel. Owner's supervision, examination or inspection of the (performance of the) Work or omission to carry out the same shall not be construed in any manner whatsoever as relieving Contractor from its responsibilities, obligations or liabilities under this Contract.

- 1.6 Contractor shall submit list of tools & tackles with details of make, year of manufacturing, valid certification to the Project Manager/ User for their approval.

Project Manager may during the execution of project inspect & verify that the tools & tackles are as per the qualification requirements approved by him and will have right to seek replacements in case of any discrepancies. The Contractor shall always comply with such directives.

- 1.7 Contractor shall engage Tata Power Skill Development Institute (TPSDI) certified labour force at the site for execution of the job. Requirement & fees for TPSDI certification shall be as per Company Policy.
- 1.8 Contractor shall take full responsibility for the protection and security of Owner's materials and equipment while such materials and equipment are temporarily stored in Contractor's facility or otherwise in Contractor's custody.
- 1.9 All notices, instructions, information, and other communications given by the Contractor to Owner under the Contract shall be given to the Order Manager/ Owner's representative, except as otherwise provided for in this Contract.
- 1.10 The Contractor shall make its own arrangements for movement of personnel and equipment, within and outside the sites / units / offices at the various locations covered by the Contract.
- 1.11 The Contractor shall acquire in its name all permits, approvals, and/or licenses from all local, state, or national government and other statutory authorities and/or public service undertakings that are necessary for the performance of the Contract.
- 1.12 Neither the Contractor nor its personnel shall during the term of this Contract, engage in any business or professional activities in India/abroad which would conflict with the activities assigned to them under this Contract.

2. Service Warranties:

Contractor warrants that all services performed for or on behalf of Owner will be performed in a competent,

workmanlike manner and shall be free from faults and defects. Said warranties shall be in addition to any warranties of additional scope given by Contractor to Owner. None of said warranties and no other implied or express warranties shall be deemed is claimed or excluded unless evidenced by a change notice or revision issued and signed by Owner's authorized representative.

3. Compliance of Local Laws:

Contractor shall be responsible and shall comply with the provision of all the Statutory Acts Applicable. Special attention of the Contractor is drawn towards the compliance of provision of the following statues: (along with the latest amendments/additions, as applicable):

- a) The Child Labour (Prohibition and Regulation) ACT, 1986.
- b) The Contract Labour (Regulation and Abolition) ACT, 1970.
- c) The Employee's Pension Scheme, 1995.
- d) The Employee's Provident Funds and miscellaneous provisions Act, 1952.
- e) The Employees State Insurance Act, 1948.
- f) The Equal Remuneration Act, 1976.
- g) The Industrial Disputes Act, 1947.
- h) The Maternity Benefit Act, 1961.
- i) The Minimum Wages Act, 1948.
- j) The Payment of Bonus Act, 1965
- k) The Payment of Gratuity Act, 1972.
- l) The Payment of Wages Act, 1936.
- m) The Shops & Establishment Act, 1954.
- n) The Workmen's Compensation Act, 1923.
- o) The Employer's Liability Act, 1938.
- p) and any other applicable statutory act

Site Specific requirements shall be as Annexure at I. The compliance to these Site Specific requirements shall not absolve the Contractor of its obligation to comply with the Owner's Contractor Safety Management Policy.

4. Owner's Obligation:

- 4.1 The order manager (As specified in the 'Commercial Notes') shall have the authority to represent Owner on all day-to-day matters relating to the Contract or arising from the Contract. All notices, instructions, orders, certificates, approvals, and all other communications under the Contract shall be given by the order manager, except as otherwise provided for in this Contract. The order manager may appoint the Engineer-In-Charges for different areas for monitoring the work progress, inspections and signing of bills.

- 4.2 Owner shall ensure the availability of site access, all information and/or data to be arranged/ supplied by Owner to the Contractor for execution of the Work . The terms on which the Contractor shall be allowed access to the site shall be specified by the Owner prior to commencement of the execution of the Work and thereafter shall be governed in accordance with such policies as the Owner may provide in writing to the Contractor from time to time.

5. Contractor's/ Sub-contractor's employees:

- 5.1 The Contractor shall engage appropriately qualified persons to provide the services with the prior approval of Owner. Owner may withhold such approval for any reason whatsoever.

- 5.2 The Contractor hereby represents and warrants that:

- i) the personnel are duly qualified, and are, and will remain, sufficiently qualified, careful, skilful, diligent and efficient to provide the services to Owner; and
- ii) the Services will be rendered carefully, skilfully, diligently and efficiently, and to the professional standard reasonably expected by Owner of a contractor qualified and experienced in providing services substantially the same as the Services.

- 5.3 The Contractor must ensure that the Contractor's personnel conduct themselves in a proper manner and comply with the procedures and all policies, regulations and directives of Owner including any occupational, health and safety policies and the relevant prevailing laws and regulations in the Country of operations and specifically in the area where Work is being executed.

- 5.4 Owner may inform the Contractor to immediately remove Contractor's personnel from the relevant premises in the event of misconduct or incompetence on the part of the Personnel. The Contractor shall at all times remain liable for all acts and/or omissions of its Personnel.

- 5.5 It is made clear that no relationship of Owner and employee is created between Owner and the Contractor's resident engineers, employees and no claim for employment of any such personnel shall be tenable or entertained.

6. Title of Property:

- 6.1 Unless otherwise provided in this order or agreed to in writing, property of every description including but not limited to all tooling, tools, equipment and material furnished or made available to Contractor, title to which is

in Owner, and any replacement thereof shall be and remain the property of Owner. Such property other than material shall not be modified without the written consent of Owner. Such property shall be plainly marked or otherwise adequately identified by Contractor as being owned by Owner and shall be safely stored separately and apart from Contractor's property.

6.2 Contractor shall not use such property except for performance of work hereunder or as authorized in writing by Owner. Such property while in Contractor's possession or control shall be listed in writing and kept in good condition, shall be held at Contractor's risk, and shall be kept insured by Contractor, at its expense, in an amount equal to the replacement cost with loss payable to Owner. To the extent such property is not material consumed in the performance of this order, it shall be subject to inspection and removal by Owner and Owner shall have the right of entry for such purposes without any additional liability whatsoever to Contractor. As and when directed by Owner, Contractor shall disclose the location of such property, prepare it for shipment and ship it to Owner in as good condition as originally received by Contractor, reasonable wear and tear excepted.

7. Work Completion schedule:

Contractor shall plan and execute the Work in accordance with a detailed schedule mutually agreed upon by the Parties (Owner and Contractor).

8. Contract Price and Payment:

8.1 The Contract Price shall be a firm & fixed Contract Value for the Work inclusive of all the taxes, levies & duties and shall remain firm till the validity of this contract.

8.2 Unless Specifically stated elsewhere in the contract, the Contractor is solely liable for payment of , and warrants that it will pay, or ensure the payment of all taxes imposed, assessment made in relation to the Work.

8.3 An amount as stated in the table below shall be retained towards Contractor's safety performance against every RA bill:

Contract Value	Retention Amount (%)
Upto Rs. 10 lakhs	2.5
Above Rs. 10 lakhs and below Rs. 50 lakhs	2
Above 50 lakhs and upto Rs. 10 Crores	1.5
Above Rs. 10 Crores	1

Rev. date: 25 Jul 2017

The above mentioned safety retention shall be over and above any other retentions/ deferred payments as may have been specifically agreed in the Contract.

8.4 For Contract Price Rs. 1 crores or above and Contract Completion Schedule 12 months or more, the above safety retention will be released half yearly against the Safety Performance Score (methodology for evaluation enumerated in the Safety Terms & Conditions attached as Appendix to this General Terms & Condition) which will be evaluated by the Order Manager every month. For all other contracts, the above said safety retention shall be released along with the final settlement only at the end of the contract period.

8.5 The Owner shall have the right to stop any work which in its opinion is not meeting the safety standards/ guidelines of the Owner and good engineering practice. The Contractor shall not be eligible for and shall not be granted any extension in Completion Schedule due to such stoppage of work by the Owner.

8.6 The above retention towards safety shall not absolve the Contractor of its liabilities including statutory liabilities towards safety violations, injury or death (whether by accident or otherwise). An amount between Rs. 5 to 50 lakhs as deemed appropriate by Owner's appointed Committee for incident investigation and/ or as determined by statutory authorities (whichever higher), will be payable by the Contractor in case of such severe incidents of injury leading to loss of property or partial/ permanent disablement (e.g. loss of limb/s, vision etc.) or death.

8.7 Notwithstanding anything else stated in the Contract, the Contractor shall be liable for termination without any notice and without recourse to Owner in case of three (3) or more severe safety violations. There shall be no termination fees/ compensation payable to Contractor for such termination.

8.8 In case the Contractor achieves 100% on the Safety Performance Score, the Contractor shall be awarded a discretionary bonus of 1% of invoiced value subject to a maximum of Rs. 50 lakhs towards Safety Performance.

8.9 Payment shall be released within 60 days of submission of error free invoice with supporting documents duly certified by the Order Manager/ Engineer-in-Charge after deducting taxes at source as prescribed under the applicable law, income – tax or other deductions under the state value added tax laws . If such payment release

day falls on a holiday of Owner, payment will be released on the next working day. Against deduction of statutory taxes, tax deduction certificates where ever applicable shall be issued as per the applicable provisions of the statute. The Order Manager may recover any amount wrongly paid in excess in any previous bills certified by him.

8.10 *Mode of Payment:* All payments shall be made direct to the Contractor or his authorized representative in the shape of RTGS or Electronics Transfer method, on certification of the Order Manager/Engineer-in-Charge and on compliance of contractual terms & conditions.

9. **Taxes and Duties:**

9.1 The Contract Price shall be inclusive of all taxes, duties, including but not limited to Customs duty, GST or any local taxes, levies imposed by State/Central/Local governments.

9.2 Taxes as mentioned in the Contract Price or Price Schedule shall be paid to the contractor subject to the Contractor complying with all the statutory requirements and furnishing the relevant documents including error free invoices containing detailed break up of the taxes.

9.3 The tax invoices should contain the details to comply with the GST Law. The supplier shall:

- i) Furnish (electronically) and communicate to the Owner, the details of Goods or Services supplied by the 10th of the month succeeding the said tax period,
- ii) Upon discovery of any discrepancy, rectify it and shall pay the tax and interest thereof,
- iii) Furnish the returns (electronically), for the inward and outward supplies of Goods and/or Services, before the specified dates as per the GST Law,
- iv) Communicate the tax paid, credits etc. as and when credited.
- v) The Invoice should clearly state the description of the goods, quantity, sale price, tax %, and tax amount;
- vi) The Invoice should be signed by an Authorized Signatory.

Bills/Invoices in the name of The Tata Power Company Ltd. with packing lists in triplicate shall be forwarded along with the equipment.

Contractor to furnish GST Registration no. in all invoices as well as Purchaser's (Tata Power's) GST no.

9.4 However the payment of tax shall be restricted to the total amount as indicated in the price schedule.

9.5 Any statutory variation in duties, levies or taxes if applicable and specified in this Contract till the scheduled date for completion of Work and limited to direct invoices of the Contractor shall be to the account of Owner. The Contractor shall have the obligation to provide the necessary documentary evidence / supporting by way of gazetted notifications etc. to prove the change in such levies or taxes between the due date of submission of the Bid and the scheduled date of completion of work to claim the difference.

9.6 The Contractor shall pass on to the Owner all the benefits of either reduction in tax rates, exemptions, concessions, rebate, set off, credits etc. or introduction of new tax rates exemptions, concessions, rebate, set off, credits etc. pertaining to all taxes, duties, imposts, fees and levies in respect of the supplies of Goods or performance of obligations under the contract. This would specifically include reduction of tax rates as a result of statutory changes or judicial rulings.

9.7 Any other taxes, levies and duties not mentioned in Contract Price or Price Schedule but applicable as per any statute (s) or introduction (omission) of new taxes, levies and duties shall be deemed to be included in the Contract Price and shall be to the account of the Contractor.

9.8 For facilitating availment of a credit, set-off, rebate, drawback or like benefit available to the Owner, the Contractor will facilitate the Owner by providing the necessary documentary and/or procedural support. In any process of assessment or re-assessment, of taxes payable by the Owner,

9.9 The Contractor shall bear and pay all the costs, liabilities, levies, interest, penalties in respect of non-compliances of any legal requirements as per various statutory provisions. The contractor shall keep the owner indemnified at all times from any tax liability, interest, penalties or assessments that may be imposed by the statutory authorities for non-compliances or non-observation of any statutory requirements by the Contractor.

9.10 All formalities required under statutes, for availing any concessions under relevant tax laws shall be adhered to by the Contractor.

9.11 Deduction at source: Recovery at source towards income tax calculated at the rate prescribed from time to time under the Income Tax Act 1961 and other relevant sections of Income Tax Act shall be made from the bills of the Contractor and the amount so recovered shall be

deposited with the Income Tax Department. Necessary TDS certificate to this effect will be issued to the Contractor in the prescribed proforma.

- 9.12 If any other taxes / duties / cess etc are to be recovered at source as per government regulations / Legislation from time to time, the same shall be recovered from the bills payable to the Contractor. Necessary receipt to this effect will be issued to the Contractor in this regard as per the applicable legislation.

10. Contract Performance Guarantees (If applicable)

The Contractor shall within 15 days of issuance of this Order/Contract furnish an unconditional irrevocable bank guarantee duly stamped, strictly as per the prescribed format of Owner from any nationalized bank or any scheduled bank having a branch in Mumbai and approved by the Owner for a sum equivalent to 10% of the Total Contract Price valid for the Contract Period and with a claim period of not less than 6 months from the completion of Contract Period. The issuing bank should be advised to send a direct confirmation of issue of bank guarantee to Owner.

In case the Contractor fails to furnish the requisite Bank Guarantee as stipulated above, then the Owner shall have the option to cancel the Contract besides other contractual remedies.

11. Price Reduction:

- 11.1 In case the Contractor fails to deliver the service/ Complete the work as per the agreed Completion Schedule including intermediate milestones (if applicable), the Owner shall recover from Contractor, as ascertained and agreed Liquidated Damages, and not by way of penalty, a sum equivalent to 1% of the Contract Value per week of delay. The Liquidated Damages referred above may be recovered by the Owner as set off against any amounts payable by the Owner to the Contractor or in any other manner in accordance with applicable laws.
- 11.2 The overall cap on liquidated damages shall be limited to 10% of the Contract Price.

12. Insurance

- 12.1 The Contractor agrees to indemnify and protect Owner against all liability, claims or demands for injuries or damages to any person or property growing out of the performance of this order/ Contract.
- 12.2 The Contractor further agrees to furnish evidence of insurance showing that Contractor has and will maintain adequate insurance coverage during the life of this Contract/ order in the opinion of Owner, including but not

limited to comprehensive general liability insurance. Such evidence of insurance must set forth the name of the insurer, policy number, expiration date, and limits of liability. Compliance by Contractor with insurance requirements does not in any way affect Contractor's indemnification of Owner under Indemnification clause

13. Indemnification:

The Contractor shall indemnify, save harmless and defend the Owner and keep the Owner indemnified from and against any and all claims, costs, liabilities (financial), litigations, compensations, judgments, expenses or damages (including attorney's fees and other related expenses) arising out of any breach or alleged breach of any of the conditions of this Contract including compliance to statutory laws of provisioned under clause 3, performance of the obligations hereunder, or any representation or misrepresentation made by the Contractor or by any third party in respect of death or bodily injury or in respect to loss or damage to any property with regard to the subject of this Contract.

14. Indemnity against IPR:

The equipment, system, drawings, and other materials that shall be supplied against the Contract will become the Owner's property. Without limitation of any liability of whatsoever nature, the Owner shall be indemnified and kept indemnified against any claim for infringement or breach of any of the statues, rules & regulations by the use of or sale of any article or material supplied by the Contractor. The indemnity shall include any infringement of patent, trade mark, design, copyright or other property rights whether in Country of Origin, or elsewhere resulting from the Contractor's design, manufacture, use, supply or re-supply & would also cover use or sale of any article or material supplied by the Contractor to the Owner under the Contract. The Indemnity shall cover any claim/action taken by a third party either directly against the Owner or any claim/action made against the Contractor & where under the Purchaser is made liable. The Indemnity shall be for losses, damages, and costs including litigation costs, attorney fees etc incurred by the Owner in relation to the Contract.

15. Free Issue Material:

Wherever contracts envisage supply of Free Issue Material (FIM) by the Owner to the contractor for fabrication/ use in service performance, such Free Issue Material shall be safeguarded by an insurance policy to be provided by the Contractor at his own cost for the full value of such materials and the insurance policy shall cover the following risks specifically and shall be valid for six months beyond the Contract Validity date :

RISKS TO BE COVERED: Any loss or damage to the Owner's materials due to fire, theft, riot, burglary,

strike, civil commotion, terrorist act, natural calamities etc. and any loss or damage arising out of any other causes such as other materials falling on Owner's materials.

The amount for which insurance policy is to be furnished shall be indicated in the respective Contract.

Free Issue material (FIM) will be issued to the Contractor only after receipt of the Insurance Policy from the Contractor. The contractor shall arrange collection of the FIM from the Owner's premises and safe transportation of the same to his premises at his risk and cost. Notwithstanding the insurance cover taken out by the Contractor as above, the Contractor shall indemnify the Owner and keep the Owner indemnified to the extent of the value of free issue materials to be issued till such time the entire contract is executed and proper account for the free issue materials is rendered and the left over/surplus and scrap items are returned to the Owner. The contractor shall not utilize the Owner's free issue materials for any job other than the one contracted out in this case and also not indulge in any act, commission or negligence which will cause/result in any loss/damage to the Owner and in which case, the Contractor shall be liable to the Owner to pay compensation to the full extent of damage/loss. The Contractor, shall be responsible for the safety of the free issue materials after these are received by them and all through the period during which the materials remain in their possession/control/custody. The Free issue materials on receipt at the Contractor's works shall be inspected by them for ensuring safe and correct receipt of the material. The contractor shall report the discrepancies, if any, to the Owner within 5 days from the date of receipt of the material. The contractor shall take all necessary precautions against any loss, deterioration, damage or destruction of the FIMs from whatever cause arising while the said materials remain in their possession/custody or control. The free issue materials shall be inspected periodically at regular intervals by the Contractor for ensuring safe preservation and storage, the Contractor, shall also not mix up the materials in question with any other goods and shall render true and proper account of the materials actually used and return balance remaining unused material on hand and scrap along with the final product and if it is not possible within a period of one month from the date of delivery of the final product/ completion of Service covered by this Contract. The Contractor shall also indemnify the Owner to compensate the difference in cost between the actual cost of the free issue material lost/damaged and the claim settled to the Owner by the insurance company.

16. Relation between parties:

The Contract shall be entered into on a principal-to-principal basis only. The Contract shall not be construed as a partnership or an association of persons. There is no agent and principal relationship between the parties. Each party shall be responsible for its own conduct. The Contractor shall ensure at all times that all the work carried out under this contract

either by its own person or through any of its sub-Vendors shall be always done under its own direct supervision.

17. Safety:

Contractor shall comply with all legal and statutory provisions including all rules and regulations pertaining to Safety, Health and the Environment and will be responsible for all legal liabilities arising due to any of their acts or of their personnel.

The Contractor shall comply with the Owner's Contractor Safety Policy and Safety Terms and Conditions. Any misconduct and/ or violation with respect to the Owner's Contractor Safety Policy and Safety Terms and Conditions or any other legal and statutory provisions pertaining to Safety, Health and Environment shall be dealt with as per the Safety Terms and Conditions.

Prior to commencement of any work at site Contractor shall submit an undertaking in writing to adhere to and comply with all the provisions of Owner's Contractor Safety Code of Conduct.

The Contractor shall have a valid ISO 14001/ OHSAS certification. In absence of the same, the Contractor shall obtain the same within 6 months from the date of the Effective Date of Contract.

18. Suspension of Work

Owner may instruct Contractor at any time to suspend performance of the Work or any part thereof with a notice of 7 days for whatever reason. Provided Contractor is not in default under this Contract subject to Articles 1 and 5 inclusive, the Contractor shall be paid a mutually agreed fee, if any, necessarily incurred by Contractor as a direct consequence thereof of suspension and the Project Completion Schedule may be revised accordingly.

Without prejudice to any other rights Owner may have under this Contract or at law if Contractor is in default under this Contract, Owner may instruct Contractor to suspend performance of the Work or any part thereof by giving 7 days notice till such default has been corrected to the satisfaction of Owner. Also Liquidated Damages in accordance with Clause 11 shall continue to be applicable during such period until the default is cured. The costs incurred by the Contractor for such correction shall be to the Contractor's account, and furthermore no payment shall become due to the Contractor. Any cost incurred due to non - performance of the Contractor by the Owner shall be charged to the Contractor.

19. Change Management:

Owner shall have the right at any time to order any change in the Work in accordance with the following procedure. Contractor shall furnish to Owner upon request as soon as reasonably possible but no later

than five (5) days following the request, a written statement specifying:

- (a) the increase or decrease, as the case may be, in the costs of the Work which will result from a change in the Work as requested by Owner,
- (b) any effect such change in the Work may have on any other provision of this Contract originating from either parties, and
- (c) such other details as Owner may require.

Any change in costs shall be reasonably related to the proportional change in the Work and any other costs incurred by Contractor. If Owner agrees to Contractor's statement Owner shall notify Contractor thereof in writing in the form of a change order, whereupon the change in the Work shall be incorporated in the Work and immediately implemented. In the event that the change relates to a reduction in Work, the work in question shall not be undertaken pending the issue of an appropriate Change Order.

20. Governing Laws

This Contract shall be construed in accordance with and governed by the Laws of India without giving effect to any principle of conflict of law.

21. Jurisdiction

This Contract and the transaction contemplated herein shall be subject to the exclusive jurisdiction of the competent Courts in Mumbai only.

22. Dispute settlement:

Dispute or differences arising out or relating to this Order shall be resolved amicably by the parties. Failing such amicable resolution of dispute / differences either party may refer the matter to arbitration of a Sole Arbitrator to be appointed jointly by both the parties. The award of the Arbitrator shall be final, binding and conclusive on the parties. The venue for arbitration shall be Mumbai. The Arbitration proceedings will be governed and regulated by the provisions of Indian Arbitration and Conciliation Act, 1996 as amended from time to time and the rules framed there under.

23. Force majeure:

- 23.1 In the event of either party being rendered unable by force majeure to perform any obligation required to be performed by it under this Contract the relative obligation of the party affected by such force majeure shall, after notice under this articles be suspended for the period during which such cause lasts. The term 'Force Majeure' as employed herein shall mean acts of God, wars (declared or undeclared), riots or civil commotion, fire, floods, and acts and regulations of the Government of India or State Government or any of the statutory agencies. Both the party

shall pay to the other party, the amount payable upon the date of the occurrence of such force majeure.

- 23.2 Upon the occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid, thereby shall notify the other party in writing immediately but not later than twenty four (24) hours of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of the claims.

- 23.3 During the period, the obligations of the parties are suspended by force majeure; the contractor shall not be entitled to payment of any rate.

- 23.4 In the event of the force majeure conditions continuing or reasonably expected to continue for a period more than thirty (30) days, Owner shall have the option of terminating the contract by giving seven (7) days notice thereof to the contractor.

24. Sub letting and Assignment

The contractor shall not, without prior consent in writing of the Owner, sublet, transfer or assign the contract or any part thereof or interest therein or benefit or advantage thereof in any manner whatsoever, provided nevertheless that any such consent shall not relieve the contractor from any obligation, duty or responsibility under the contract.

25. Limitation of Liability:

Notwithstanding anything contained in the Contract, the Contractor's aggregate liability under this Contract shall be limited 100% of the Total Contract value. This shall exclude liability arising pursuant to clause 3- Compliance to Local Laws, clause 9.10, clause 14- Indemnity against IPR, clause 13- Indemnity, clause 26 – Confidentiality, liability arising due to loss of or damage to the Free Issue Material (FIM) issued by Owner to Contractor for completion of the Work and liability arising due to wilful misconduct, gross negligence, third party claims and corrupt acts attributable to the Contractor.

26. Confidentiality:

The Contractor shall use the Confidential Information of the Owner only in furtherance of this Contract and shall not transfer or otherwise disclose the Confidential Information to any third party. The Contractor shall (i) give access to such Confidential Information solely to those employees with a need to have access thereto; and (ii) take the same security precautions to protect against disclosure or unauthorized use of such Confidential Information that the party takes with its own confidential information but, in no event, shall a party apply less than a reasonable standard of care to prevent such disclosure or unauthorized use.

27. Termination:

27.1 The Contract shall be deemed to be terminated on completion of the Contract period.

27.2 Termination of default by Contractor:
Owner may terminate the contract at any time if the Contractor fails to carry out any of his obligations under this Contract. Prior to termination, the Contractor shall be advised in writing of the causes of unsatisfactory performance to be improved upon 15 days of the receipt of notice. In case, if the Contractor fails to bring about the improvement to the satisfaction of the Owner, then the Contract shall be terminated.

27.3 Without prejudice to the rights and remedies available to Owner, Owner may terminate the Contract or part thereof with immediate effect with written notice to the Contractor if:

27.3.1 The Contractor becomes bankrupt or goes into liquidation.

27.3.2 The Contractor makes a general assignment for the benefit of creditors.

27.3.3 A receiver is appointed for any substantial property owned by the Contractor.

27.3.4 The Contractor is in breach of any representation or warranty made to the Owner by the Contractor.

The Contractor shall not be entitled to any further payment under the Contract if the Contract is terminated. If the order is terminated under clause 27.2 and 27.3, the Contractor shall not be entitled to any further payment, except that, if Owner completes the Work and the costs of completion are less than the Contract Price, the Owner shall pay Contractor an amount properly allocable to services fully performed by Contractor prior to termination for which payment was not made to Contractor. In case, the cost of completion of Work exceeds the Contract Price, the additional cost incurred by Owner for such completion shall be paid by the Contractor.

27.4 Owner shall be entitled to terminate the Contract at its convenience, at any time by giving thirty (30) Days prior notice to the Contractor. Such notice of termination shall specify that termination is for Companies convenience and the date upon which such termination becomes effective. Upon receipt of such notice, the Contractor shall proceed as follows:

27.4.1 cease all further work, except for such work as may be necessary and instructed by the Owner/ Owner's representative for the purpose of preserving and protecting Work already in progress and protect

materials, facilities and equipment on the Work Site or in transit;

27.4.2 stop all further sub-contracting or purchasing activity, and terminate Sub-contracts;

27.4.3 handover all Documents, equipment, materials and spares relating to the portion of Work already executed by the Contractor or procured from other sources up to the date of termination for which the Contractor has received payment equivalent to the value thereof; and

27.4.4 handover those parts of the supplies manufactured/ work executed by the Contractor up to the date of termination.

Upon termination pursuant to clause 27.4, the Contractor shall be entitled to be paid (a) all sums properly due to the Contractor under the Contract up to the date of termination; and (b) any direct and substantiated charges already incurred or committed for cancellation of the procurement of third party goods or services which were to have been supplied by the Contractor in connection with this Contract provided that the Contractor shall use its best endeavours to minimise such charges

25.5 The Contractor shall not be released from any of his obligations or liabilities accrued under the Contract on termination. For the avoidance of doubt, the termination of the Contract in accordance with this clause shall neither relieve the Contractor of his accrued obligations for Warranty or his accrued liability to pay (liquidated) damages for Delay nor shall entitle him to reduce the value of Performance Security.

28. Consequential Damages:

Unless otherwise specified, neither Party shall be responsible for and nor shall be liable to the other Party for indirect/consequential losses and damages suffered by such Party including for loss of use, loss of profit whether such liability or claims are based upon any negligence on the part of the other Party or its employees in connection with the performance of the Contract.

29. Environment / ISO 14001 Certification:

The Contractor to confirm whether their organization is ISO 14001 certified. If not, the Contractor must certify that the handling, use and disposal of their product / by-products conform to practices consistent with sound environmental management and local statutes. The Contractor shall ensure that all the wastes are disposed in environmental friendly way with strict compliance to applicable laws including adherence to MoEF guidelines with respect to disposal of batteries, lead waste, copper cables, ash, waste oil, e-waste etc which shall be disposed through MoEF approved

parties only. The Contractor shall also be responsible to collect and recycle all the e-waste generated at the end of the product life cycle at its own costs and risks as per the MoEF guidelines/orders.

30. Non-Exclusive Agreement

This Contract is non-exclusive and Owner reserves the right to engage other contractors to perform similar or identical work. Contractor shall accord such other contractors adequate opportunity to carry out their contracts and shall accomplish the Work in co-operation with those contractors and with Owner, in accordance with such instructions as may be issued by the Owner from time to time.

31. Severability

In the event that any of the provisions, or portions or applications thereof, of this Contract are held to be unenforceable or invalid by any court or arbitration panel of competent jurisdiction, Contractor and Owner shall negotiate an equitable adjustment to the provisions of the Contract with a view towards effecting the purpose of the Contract and the validity and enforceability of the remaining provisions, or portions or applications thereof, shall not be affected thereby.

32. Housekeeping & Removal of scrap:

The Contractor shall be responsible for keeping the areas of his work at site, neat and tidy throughout the period of his work. All excess material/ spares/ consumables taken by Contractor, as well as the scrapped items and wooden logs/ crates/ planks shall be returned, from time to time, to the Stores, and transported/ unloaded by Contractor's personnel at the place shown by Order Manager/Engineer-in charge.

The Contractor shall so arrange that all the scrap generated during the progress of his work, is separated into two categories, viz.

- i) Saleable scrap like steel, copper or other metals, etc., and,
- ii) Others, which have nil or negligible resale value, like insulation material, jute, debris, etc. (or as directed by the Order Manager/Engineer-in charge).

The saleable scrap shall be shifted to and unloaded at a central place as per directions of the Stores-in charge, while the other scraps shall be shifted to other locations as per directions from Order Manager/Engineer-in Charge, or as per terms of the order.

The Contractor shall arrange to remove the scrap on regular basis, or even on daily basis, depending upon the requirement, to keep the area around his workplace neat and tidy. In case, it is observed that the

Contractor is not carrying out regular cleaning of his areas of work, or, is not returning the excess materials/ scrap, etc., to the Stores, Owner reserves the right to arrange the same through other sources, and back-charge the Contractor the cost of doing so, along-with overheads, by deducting the amount from Contractor's bills.

Contractor's final bill will be cleared by Owner only after confirming that proper clearing of his areas of work has been completed by the Contractor, and same is certified by the Order Manager/ Engineer in-charge

33. Tata Code of Conduct

The Owner abides by the Tata Code of Conduct in all its dealing with stake holders and the same shall be binding on the Owner and the Contractor for dealings under this Order/ Contract. A copy of the Tata Code of Conduct is available at our website: <http://www.tatapower.com/aboutus/code-of-conduct.aspx>. The Contractor is requested to bring any concerns regarding this to the notice of our Chief Ethics Officer on the e-mail ID: cecounsellor@tatapower.com.

34. Responsible Supply Chain Management:

The Owner is committed for a cleaner environment and respect of Human rights through its Responsible Supply Chain Management policy. The Contractor is required to comply with all the environment & Human rights related laws, including emission norms, Labour and environmental regulations. The Owner encourages its Vendors/ Contractors/ Business partners to pay more attention to green design, green supply, green production, green logistics and green packaging in performing their business obligations.

The Contractor is required to abide by the Tata Power Corporate Environment policy, Energy Conservation and Corporate Sustainability Policy.

A copy of the Responsible Supply Chain Policy along with Environment policy, Energy Conservation policy, Sustainability policy, Health & Safety policy and Human Rights policy is available at website: <http://www.tatapower.com/sustainability/policies.aspx>.

Contractor/Bidder is required to completely fill the attached "Supplier Sustainability Questionnaire" in support of their Green Supply Chain Management initiatives and submit the same with their offer.

The Owner recognizes that diversity in the workplace positively impacts business. The Owner is committed to help people from SC/ST background either by helping them to become entrepreneurs or by engaging workforce from SC/ST community under the contracts agreed herein. To encourage engaging SC/ST community, the owner may consider on the merit to incentivize the Contractor by paying additional 1% of

the service contract portion if the number of SC/ST workforce engaged in the contract exceeds 30% of the total deployed strength and 2%, if the strength goes beyond 50%. While the Contractor will assist the workforce so engaged to become self-reliant in meeting the work expectation, the Owner may also volunteer its training resources to the extent possible to improve their employability. The Contractor shall maintain the proper documentation of such category of the workforce engaged and the owner may consider to pay the incentive after its verification.

The Owner may also consider extending price preference of 5% in the bid evaluation for an order value up to Rs.50 Lacs, provided the company is owned by a person from SC/ST community having minimum 50% holding in the company.

35. Vendor rating:

You are requested to ensure compliance to the terms of the individual orders with regards to timely delivery, provision of all applicable documents / challans / test certificate, quality of the material etc. Your performance with respect to the said factors will be taken into consideration for future business.

36. Vendor Feedback:

34.1 In this dealing Vendors feedback is important for the purchaser to improve its processes. If Contractor have to report any grievance, problem or require any clarification, information, Contractor is requested to contact purchaser at email ID:
CC_CUSTOMERFEEDBACK@tatapower.com

34.2 Contractor is requested to ensure compliance to the terms of the individual orders with regards to timely delivery, provision of all applicable documents / challans / test certificate, quality of the material etc. Contractor performance with respect to the said factors will be taken into consideration for future business.

37. Non-Waiver:

Failure of Owner or its representatives to insist upon adherence to any of the terms or conditions incorporated in the Contract or failure or delay to exercise any right or remedies herein or by law accruing, or failure to promptly notify the Contractor in the event of breach or the acceptance of or the payment of any Material(s) hereunder or approval of any design or Material(s) shall not release the Contractor and shall not be deemed a waiver of any right of Owner to insist upon the strict performance thereof or of any of its rights or remedies as to any

such Material(s) regardless of when the Material(s) are shipped, received or accepted not shall any purported oral modification or revisions of the Contract by Owner or its representative(s) act as waiver of the terms hereof.

ESG FRAMEWORK FOR BUSINESS ASSOCIATES

Tata Power's Sustainability philosophy sits at the core of its Business Strategy. Tata Power Sustainability Model has an overarching objective of 'Leadership with care' with key elements of 'Care for the Environment'; 'Care for the Community'; 'Care for our Customers / Partners' and 'Care for our People'. These sustainability objectives encompass the Environmental, Social and Governance objectives driven as integrated elements.

Tata Power, together with its stakeholders is determined to achieve sustainable growth while creating shared value for all.

As a part of future ready roadmap, Tata Power has targeted following as our Environment, Social and Governance priorities:

- Being Carbon Net Zero before 2045
- Growing Clean capacity (80% by 2030)
- Customer centricity
- Becoming water neutral before 2030
- Achieving zero waste to landfill before 2030
- No net loss of biodiversity before 2030
- Positively impacting 80 million lives by 2027

In order to create a sustainable business ecosystem, Tata Power expects that all its Business Associates (BA) which includes its suppliers, vendors, consultants and service providers to align to its ESG and sustainability commitments.

Tata Power encourages improved efficiencies and scaling up of green initiatives through technology and innovation taking us farther on the journey of reducing carbon emissions and preparing the entire eco-system towards products and services that would have net positive impact on the environment and communities that we operate in.

The Vendors/ bidders wishing to associate with Tata Power are expected to share their own sustainability and ESG journey. We at Tata Power promote all Business Associates to have a sustainable procurement policy for their supplier and service providers to contribute to our integrated approach in achieving a sustainable supply chain. The BA is encouraged to carry out the assessment of their sub-contractors and sub-vendors on sustainability readiness so that they are aware of the expectation/ business requirement.

The Vendor/ Bidder shall fill-in the 'Environment, Social and Governance Compliance Screening Questionnaire for Business Associates' attached at Annexure-I and submit the same along with the Bid in Ariba online platform.

Responsible Supply Chain Management:

Tata Power is committed for a cleaner environment and respect of Human rights through its Responsible Supply Chain Management policy.

Tata Power Business Associate (BA) shall comply with all the environment & Human rights related laws, including emission norms, Labour and environmental regulations.

Tata Power encourages its BA to focus on green design, green supply, green production, green logistics and green packaging in performing their business obligations. The BA is expected to abide by the Tata Power Corporate Environment policy, Energy Conservation and Corporate Sustainability Policy (enclosed with this document as Annexure-II).

The BA is expected to:

- Strive towards Conservation of Energy, Water, Resources and optimize transportation of Men & Materials to minimize environmental impact and reduce carbon footprint.
- Carry out the assessment of materials used for construction, operation & maintenance, consumables and accordingly phase out those materials which are environmentally hazardous.
- Be cognizant that diversity in the workplace positively impacts business.
- Promote affirmative action by supporting people from SC/ ST background by engaging workforce from SC/ ST community under the contracts agreed herein.
- Share the commitment of 'No child labour', 'No forced labour', Non-discrimination on the basis of caste, colour, religion, gender, disability, maternity or pregnancy or any other factor unrelated to the requirements of the job
- Pay the wages or remuneration to the workforce, personnel deployed in compliance to all applicable laws and regulations.
- Provide its employees/ deployed labor with an employment environment that is free of physical or psychological harassment.
- Carry out the assessment of their Sub-contractors on their Sustainability Readiness so that they are aware of the above expectation/ standards
- To ensure usage of suitable package material which is more environmentally sustainable. Further the packing material shall be recycled to the extent possible. The material used for packing is expected to suit the mode of transport and to ensure its safe receipt at point of delivery.

Waste Disposal:

The BA is expected to follow best practices for disposal of waste, few of which are listed below:

- Have a detailed project plan that includes the waste management, segregation of all designated waste material (Recyclable/ Non-Recyclable), collecting, storing, disposing and transferring the same to pre-arranged facility/ destination in timely and safe manner as per environmental legislations. The project plan shall also include the innovative construction practice to eliminate or minimize waste, protect surface/ground water, control dust and other emissions to air and control noise.
- Have purchase policy to encourage the procurement of material with recycled and minimum packaging of goods during delivery and appropriate means for site-to-site transportation of materials to avoid damage and litter generation.
- Ensure that the residents living near the site are kept informed about proposed working schedule and timings/ duration of any abnormal noise full activity that is likely to happen.
- Ensure the regular maintenance and monitoring of vehicles and equipment for efficient fuel use so that emissions and noise are within acceptable limits to avoid air pollution.

Water Management:

The BA is expected to follow best practices for water management, few of which include a management and monitoring system for water withdrawals and consumption, procedures to reduce water usage or reuse/recycle water, and pretreatment of wastewater before disposal.

Compliance to Law:

The BA shall adhere to responsible business practices and comply with the provision of all the Statutory Acts Applicable. Special attention of the BA is drawn towards the compliance of provision of the following statutes: (along with the latest amendments/additions, as applicable):

- The Child Labour (Prohibition and Regulation) ACT, 1986.
- The Contract Labour (Regulation and Abolition) ACT, 1970.
- The Employee's Pension Scheme, 1995.
- The Employee's Provident Funds and miscellaneous provisions Act, 1952.
- The Employees State Insurance Act, 1948.
- The Equal Remuneration Act, 1976.
- The Industrial Disputes Act, 1947.
- The Maternity Benefit Act, 1961.
- The Minimum Wages Act, 1948.
- The Payment of Bonus Act, 1965
- The Payment of Gratuity Act, 1972.
- The Payment of Wages Act, 1936.
- The Shops & Establishment Act, 1954.
- The Workmen's Compensation Act, 1923.
- The Employer's Liability Act, 1938.
- and any other applicable statutory act

Social Accountability (SA 8000):

Tata Power expects its BAs to follow guidelines of SA 8000:2014 on the following aspects

- Child Labour
- Forced or Compulsory Labour
- Health & Safety
- Freedom of Association & Right to Collective Bargaining
- Discrimination
- Disciplinary Practices
- Working Hours
- Remuneration
- Management System

Health and Safety

The BA is expected to ensure the health and safety of his and his Sub-contractor's staff and labour. The BA shall, in collaboration with and according to the requirements of the local health authorities, ensure that medical staff, first aid facilities, sick bay and ambulance service are available at the accommodation and on the Site at all times, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. The BA shall maintain records and make reports concerning health, safety and welfare of persons deployed, and damage to property, as the Owner's Representative may reasonably require. The BA shall be responsible for the medical treatment / hospitalization of his and his Sub-contractor's staff/ labour.

The BA shall appoint a qualified Safety officer at the Site to be responsible for maintaining the safety, and protection against accidents, of all personnel on the Site. Such Safety officer shall have the authority to issue instructions and take protective measures to prevent accidents.

The BA shall comply in toto with the Tata Power's Contractor Safety Terms & Conditions, Health Safety & Environment Manual while working on Tata Power Site/ Services/ Contracts.

Grievance Mechanism

The BA is expected to have grievance procedures that allow stakeholders to anonymously bring environmental and/or work-related violations and/or concerns to the attention of management. In addition, the BA is expected to have procedures for examining reports of environmental and/or work-related violations or concerns and/or privacy complaints.

Data Protection

The BA is expected to have a formal process to address data security or privacy issues.

ANNEXURE-I



Sr. No.	Question Description	Response (Y/N)	Remarks
Organization			
1	Does your Company have Sustainability Policy at Organization Level? If Yes, Please attach		
2	Do you have sustainable procurement policy in place for your own suppliers? If Yes, Please attach		
3	Does your company do regular assessment of its suppliers on ESG parameters?		
4	Are there ESG risks, or negative impacts identified in your supply chain		
Governance			
1	Is diversity taken into consideration when appointing board members/ senior management? Do you have an independent director/s?		
2	Has your company taken initiatives to ensure ethical practices at workplace? Please share the details, Policies etc.		
3	Does your company have a formal process to address data security or privacy issues? Please share the details, Policies etc.		
4	Does your company have grievance mechanism for stakeholder issues and track resolution?		
Environment/ Planet			
1	Does your company have Environmental Policy? If Yes, Please attach		
2	Do you have a formal process for waste management including solid wastes, liquid wastes and hazardous waste?		
3	Does your company track greenhouse gas emission? Also, what percentage of own consumption comes from the renewable energy?		
4	Does your company have a formal process for water management including monitoring of water consumption and withdrawals, and if applicable, pretreatment of wastewater?		
Green Technology/ Innovation			
1	Are your facility/ Product/ Services provided by you is based on green design, green production, green packaging or green logistics considerations? Please elaborate.		
2	Do your products or services have any environmental or social features or benefits (e.g. environmental/energy certification, ecolabels, fair trade certification, etc.)?		
Social/ People			
1	Does you facility/ Company have written personnel policies in place Are you an equal opportunity employer?		
2	Please describe any formal programme / campaign in place to promote company involvement with the community (volunteering, etc.). What is the percentage of profit spend on community activities?		
3	Does your company have a written Health & Safety Policy or Program? If Yes, Please attach		
Certifications: Does your company have following certifications (valid till date-please mention validity)			
1	ISO9001 accreditation		
2	SA8000 or equivalent		
3	ISO 14001 certification		
4	ISO 18001/45001 or equivalent		
5	ISO/IEC 27001 or equivalent		
6	Any Other (Please specify)		

Signature

Business Associate Name

ANNEXURE-II

CORPORATE SUSTAINABILITY POLICY

At Tata Power, our Sustainability Policy integrates economic progress, social responsibility and environmental concerns with the objective of improving quality of life. We believe in integrating our business values and operations to meet the expectations of our customers, employees, partners, investors, communities and public at large

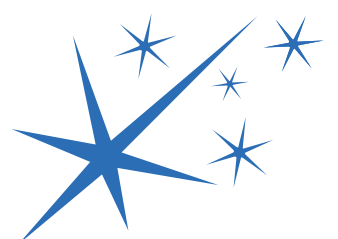
- We will uphold the values of honesty, partnership and fairness in our relationship with stakeholders
- We shall provide and maintain a clean, healthy and safe working environment for employees, customers, partners and the community
- We will strive to consistently enhance our value proposition to the customers and adhere to our promised standards of service delivery
- We will respect the universal declaration of human rights, International Labour Organization's fundamental conventions on core labour standards and operate as an equal opportunities employer
- We shall encourage and support our partners to adopt responsible business policies, Business Ethics and our Code of Conduct Standards
- We will continue to serve our communities:
 - By implementing sustainable Community Development Programmes including through public/private partnerships in and around our area of operations
 - By constantly protecting ecology, maintaining and renewing bio-diversity and wherever necessary conserving and protecting wild life, particularly endangered species
 - By encouraging our employees to serve communities by volunteering and by sharing their skills and expertise
 - By striving to deploy sustainable technologies and processes in all our operations and use scarce natural resources efficiently in our facilities
 - We will also help communities that are affected by natural calamities or untoward incidence, or that are physically challenged in line with the Tata Group's efforts

The management will commit all the necessary resources required to meet the goals of Corporate Sustainability.



(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018



Supplier Code of Conduct

Tata Power follows the Tata Code of Conduct (TCoC) and the Whistle blower Policy and expect all its Suppliers to adhere to the same principles. **“Supplier”** here means any business, company, corporation, person or other entity that provides, sells or seeks to sell, any kind of goods or services to Tata Power, including the Supplier’s employees, agents and other representatives. The suppliers are expected to adhere to the following Do’s and Don’ts:

Do’s

1. The Suppliers shall be committed to supplying products and services of high quality that meet all applicable standards and laws, including product packaging, labelling and after-sales service obligations.
2. Comply with all applicable laws and regulations, both in letter and in spirit, in all the territories in which it operates.
3. Strive to provide a safe, healthy and clean working environment for its employees.
4. Strive for environmental sustainability, particularly with regard to the emission of greenhouse gases, consumption of water and energy and the management of waste and hazardous materials.
5. The Supplier shall represent our company (including Tata brand) only with duly authorised written permission from our company.
6. Safeguard the confidentiality on the use of intellectual property, information and data of the Company.
7. Gifts and hospitality given or received should be modest in value and appropriate as per Company Policy.
8. The assets of Tata Power shall be employed primarily and judiciously for the purpose of conducting the business for which they are duly authorised.
9. All actual or potential conflicts due to financial or any other relationship with a Tata Power employee shall be disclosed.

Don’ts

1. The Supplier shall not make unfair or misleading statements about the products and services of competitors.
2. Children shall not be employed at workplaces.
3. Forced labour shall not be used in any form.
4. The Suppliers shall neither receive nor offer or make, directly or indirectly, any illegal payments, remunerations, gifts, donations or comparable benefits that are intended, or perceived, to obtain uncompetitive favours for the conduct of its business with Tata Power.

Reporting Violations

The Supplier shall notify the Company regarding any known or suspected improper behaviour of other suppliers or employees relating to its dealings with Tata Power, by email to: cecounsellor@tatapower.com.

The same can also be raised through our 3rd party ethics helpline facility:

1. Email id: tatapower@ethics-line.com ; Website: www.tip-offs.com
2. Helpline numbers: Toll free - 0008001004382 and 0008001008277. Also accessible at normal domestic call rates within India: +91-11-71279005
3. Postal address: Deloitte Touche Tohmatsu India LLP
c/o Arjun Rajagopalan, Partner (Ethics Helpline Services)
19th Floor, 46 - Prestige Trade Tower, Palace Road,
High Grounds, Bengaluru, Karnataka – 560001

The Tata Power Company Ltd



OPEN TENDER NOTIFICATION

Tender Reference: CC25NP003

Document Date: 07th May' 2024

CONFIDENTIAL

Section E.5: Annexure to GTC

The Tata Power Company Ltd	TPCODL		TPNODL	Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05	TPSODL		TPWODL	Date of Issue: 01/08/2023

Appendix 3:

Safety Terms and Conditions

Reason for Change	Date of Last Revision	Prepared By	Reviewed By	Approved by
Inclusion of Odisha Discom and periodic Revision	<u>10-Jan-2021-R4</u>	All Discom and CFT members	Debi Prasad Acharya (Head-Safety-Odisha Discom)	Suresh H Khetwani <i>(Chief safety and Environment)</i>

Clause	Sub-clause	Description	Page No
1.0		Objectives	3
2.0		Scope	3
3.0		Safety Organization & Responsibilities	3
	3.1	Contractor Site Management and Supervision	3
	3.2	Contractor Supervisors and General Staff	4
	3.3	Contractor Workforce	4
	3.4	Vendor/Contractor/sub-contractor	5
4.0		<u>Tools and Tackles(R5)</u>	6
5.0		Site Safety Rules and Procedures	6
6.0		Critical safety Rules and Procedures	6
7.0		<u>General Safety Rules and Procedure(R5)</u>	8
8.0		Training and Capability Building	10
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10.0		Safety performance retention(R5) and Safety Performance Evaluation	12
11.0		<u>Recognition to the Prior Learning in Safety-R5</u>	12
12.0		Other Conditions	13
<u>General Safety Conditions for various contracts Specific to Discom(R5)</u>			
13.0		<u>Safety Conditions for maintenance of STS (Sub Transmission System) Network for Discom(R5)</u>	14
14.0		<u>Safety Conditions for maintenance of 11 KV and LT Network for Discom(R5).</u>	15
15.0		<u>Safety Conditions for the major contract work in Civil Projects for Odisha Discom(R5)</u>	16
16.0		<u>Safety Conditions for the major contract work in Commercial Department like - MMG, RRG, EAG, etc(R5)</u>	17
17.0		<u>Safety Conditions for Major Projects in Distribution Network(R5)</u>	18
18.0		<u>Schedule of Safety Audits by BA Safety Staff(R5)</u>	19

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1.0 Objective:

The Objective of Safety Terms and Conditions is to apprise the Business Associates about various critical procedures of the Tata power Division/Discoms and the expectations from the BA to implement such procedures without fail. Certain terms and conditions are also mentioned to ensure a safe work atmosphere round the year. Refer Contractor's Safety Code of Conduct- Document no TPSMS/GSP/ CSM/015

2.0 Scope:

This procedure applies to all operating and project sites of The Tata Power Company Ltd and Group companies including new businesses like Electric Vehicle charging, Home Automation, Microgrid, Roof top solar etc. This Code of Conduct also applies to all operating and project sites of four Odisha Discoms and New business based on mutually agreed timeline for implementation. R5

3.0 Safety Organization & Responsibilities

3.1 Contractor Site Management and Supervision

Each Contractor will be responsible for fulfilling all statutory and safety requirements as per the laws of the land and not limited to Factory Act, Electricity Act, Electricity Rules and Regulations, Shop and Establishment Act etc.

Each Contractor shall provide at least one competent full-time safety supervisor for workforce of every 50 workers or less than that. When workforce ranges to 500, the contractor must provide at least one qualified safety officer (This may be subjected to change as per applicable act). Thus, for work force of 500 workers there will be one qualified safety officer and 10 safety supervisors. For every 500 additions in workforce, the contractor must add 1 safety officer and 10 safety supervisors. The Order Manager or Safety Department of the Tata Power Division /Discoms will review and approve the appointment of all safety officers and supervisors. The safety supervisors/officers will work with the guidance from Tata Power Division /Discoms Safety Department and align themselves with Tata power Division/Discom safety requirements.

For O&M related AMC activities, minimum one qualified safety officer to be deployed for each Division of the Discoms.

Qualified safety officer means he or she has completed PDIS or ADIS from a recognized institute.

Site Safety Officer/Safety Supervisor / Safety Coordinator shall be interviewed by the Order Manager/ Safety head of the Tata Power Division/Discom and then gate passes shall be issued if the interview is successful.

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Site Manager of Contractor/Subcontractor is responsible, and will be held accountable, for the safety of their own workforce as well as that of sub-contractors. He should also ensure that all equipment, materials, tools, and procedures remain in safety compliance at job site.

Responsibility of Site manager includes, but not limited to:

- 3.1.1 Holding officer/supervisors accountable for safety and actively promote safe work performance.
- 3.1.2 Participate in and cooperate with all safety program requirements to be implemented to meet Tata Power Division /Discoms safety objectives
- 3.1.3 Ensure timely reporting of safety incidents, near misses, unsafe acts, and conditions.
- 3.1.4 Identify the training needs of BA employees and maintain all safety training documents.
- 3.1.5 Provide Safety Performance Report at an agreed frequency.
- 3.1.6 Stopping of unsafe work (Acts and/or Conditions) immediately. Work to start only after corrective actions are implemented.
- 3.1.7 Ensure and participate in daily toolbox talk for all the jobs.
- 3.1.8 Ensure that only tested and certified tools and equipment are issued to the workers and being used at the site.

3.2 Contractor Supervisors and General Staff.

Contractors' site supervisors and general staff members in charge of job site functions such as field engineering, warehousing, purchasing, costing, and scheduling etc. are responsible for the safe performance of the work of those they supervise. They must set an example for their fellow employees by being familiar with applicable sections of the Site Safety program and ensuring that all site activities are performed with SAFETY as the primary objective.

Each site supervisor is responsible and will be held accountable for identifying, analyzing, and eliminating or controlling all hazards through implementation of an aggressive, pro-active Health, Safety and Environmental Program. Each supervisor will proactively participate in the Safety program by observing, correcting, and recording unsafe acts and conditions at plant / sites.

3.3 Contractor Workforce

- 3.3.1 Contractors shall provide adequate quality and quantity of manpower as mutually agreed. (R5)
- 3.3.2 All the contractor employees shall attend "SHE L0(Other than new business and Odisha Discom)/L1 Foundation Course in Safety". Depending on the critical procedure in job employees shall also be required to attend "SHE L2 course of critical/high risk operations". All Supervisors shall be required to attend "SHE L3 Supervisory Training". All the above trainings will be conducted by TPSDI/Skill development institute of Disco, or other equivalent institute approved by Tata Power.

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- 3.3.3 Contractor employees shall be required to attend any other additional training if suggested by Order manager or Site Safety Head. The cost of such additional training shall be borne by the Vendor.
- 3.3.4 Contractor / Vendor shall mobilize their manpower well in advance to complete the training through TPSDI/Sill development Institute.
- 3.3.5 The Vendor / BA shall arrange or bear the conveyance and food expenses incurred during training of BA employees in Odisha Discom. (R5)
- 3.3.6 The validity of the training L1, L2 and L3 is 3 years. There will be competency assessment as Revalidation test in every three months for Tata Power Division and six months for Odisha Discom till one year from implementation of CSCC.(R5) Those who fail in the competency assessment shall undergo training again.
- 3.3.7 Supervisors/Welder/Electricians/Line man /Fitters /Radiographers/Riggers engaged by the contractor shall have valid competency certificates issued by authorized agency/Institute.
- 3.3.8 Contractor workforce must make safety a part of their job by following safety rules and regulations and by using all safeguards and safety equipment. They must take an active part in the Safety programs for the Site.
- 3.3.9 Every member of the workforce is expected to report for work without influence of any Drug/Alcohol. Failure to comply with this requirement shall result in immediate termination of employees under the influence of drug and alcohol plus show cause notice/penalty to the vendor.
- 3.3.10 All employees shall report hazardous conditions, practices and behaviours in their work areas and correct wherever possible.
- 3.3.11 Workforce is responsible for active participation in safety and health programs, suggestion systems, trainings and reporting of unsafe act/practices, Unsafe conditions incidents and injuries to their supervisors.

3.4 Vendor/Contractor/sub-contractor

- 3.4.1 Vendors/Contractor shall always comply with and ensure that their workforce comply with all site safety rules and regulations. Specifically, with applicable provisions of the Site Safety Management Plan and all statutory safety rules and regulations.
- 3.4.2 After receiving the work order/ purchase order vendor/contractor/bidder shall not appoint Sub-contractor without safety assessment of the sub-contractor through safety concurrence group Under Contractor Safety Code of Conduct. Penalty of 5% of contract value will be applicable to the contractor if subcontractor is appointed without the permission of SCG and without evaluation through CSCC process.

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4.0 Tools and Tackles(R5)

- 4.1 Tools & Tackles used to carry out the job shall be checked and inspected by Order Manager and safety Officer.
- 4.2 Vendor must submit a valid Certificate from Competent person under the Factories Act 1948 and State Factories Rule for all Lifting Tools and Tackles (like Hoist, D Shackles, chain Block, wire ropes etc.).
- 4.3 All Electrical Hand Tools must be tested for leakage of current by a person /agency authorized by Tata Power Division /Discoms. Electrical power must be taken though RCCB of 30mA. Electrical hand tools should not have cord more than 3 meters in length. If power source is at > 3 meters, extension boards with RCCB of 30 mA and ON/OFF switch, shall be used.
- 4.4 Removal or inclusion of tools any new tool /tackles / machinery / equipment at site should only be done with concurrence of the order Manager / Head Safety.

5.0 Site Safety Rules and Procedures:

The work in the safest possible manner can only happen when it has been carefully planned and all applicable procedures are followed. The Tata Power Safety Procedures are derived from Tata Power best practices and the applicable Government acts regulations. In each case, the most stringent regulation is used. All safety rules and procedures developed from time to time shall be mandatorily followed by the vendor and his employees while working at Site.

6.0 Critical safety Rules and Procedures: Following is the list of Tata Power's critical Safety Rules and Procedures. Contractor shall refer to approved Rules and Procedures for detailed requirements and ensure conformance

6.1 Lock Out and Tag Out Procedure.

This procedure is intended to be used for the protection of Personnel while servicing or performing maintenance on distribution network/ equipment / pipeline / vessel / process systems. This is a general procedure that shall be used as the minimum requirements for isolation of equipment, pipelines, machines, system from all possible sources of hazardous energy and / or material such as Steam, Hot Water, Compressed Air, any other process fluid / chemical energy /Mechanical energy or Electrical energy. For complete procedure kindly refer Procedure Document No. **TPSMS/CSP/LOTO/001**

6.2 Excavation Safety (Shoring and Sloping) Procedure

This procedure is developed to cover the safe practices required for shoring and sloping in excavation and trenching jobs. This procedure is developed to establish mandatory requirements for practices to protect personnel, property and equipment from hazards associated with above activities. For complete procedure kindly refer Procedure Document No **TPSMS/CSP/EXS/002**

6.3 Confined Space Entry Procedure:

This procedure outlines the steps required to perform the confined space entry and to protect personnel from the hazards of entering and conducting operations in confined spaces. For complete procedure kindly refer Procedure Document No – **TPSMS/CSP/CSE/003**.

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6.4 Working at Height Procedure:

This procedure describes the rules and procedures to protect employees from the hazards of working at heights. This procedure is developed to cover the safe practices required for Working at Heights. This procedure is developed to establish mandatory requirements for practices to protect personnel from hazards associated in this area. For complete procedure kindly refer Procedure Document No – TPSMS/CSP/WAH/004.

6.5 Heavy Equipment Movement Safety Procedure.

Heavy equipment lifting and movement is an activity involving loading, unloading, storage and movement from one place to another including lifting and erection or repairing of equipment with cranes or hoists. Material, machinery and equipment handling operations are being carried out by large capacity cranes and hoists, which make the job safer and faster. This procedure addresses the hazards and precautions associated with such equipment and their use. For complete procedure kindly refer Procedure Document No – TPSMS/CSP/HEMS/005.

6.6 Mobile Crane Safety Procedure.

Mobile cranes are responsible for many incidents, injuries. Falling loads from mobile cranes pose a severe hazard to operators and nearby workers and property. Many types of cranes, hoists, and rigging devices are used for lifting and moving materials. To maintain safe, appropriate standards must be adhered to and only qualified and licensed individuals shall operate these devices. For complete procedure kindly refer Procedure Document No – TPSMS/CSP/MCS/006.

6.7 Scaffold Safety Procedure.

This procedure is developed to provide information on the safe erection, use, dismantling and maintenance of access scaffolding in the workplace. It is developed to establish mandatory requirements for practices to protect personnel from hazards associated with erection, use and dismantling of scaffolds. For complete procedure kindly refer Procedure Document No – TPSMS/CSP/SCAF/007.

6.8 Permit to Work Procedure.

Given the inherent hazards of the power generation and distribution industry, a significant number of TATA POWER operations and installations are critical. Work Permit (WP) System is an essential element in controlling the workplace risks in an effective manner. For complete procedure kindly refer Procedure Document No – TPSMS/CSP/PTW/008.

6.9 Job Safety Analysis (JSA) Procedure.

This objective of this procedure is to have a task-based risk assessment process in place that identifies, evaluates and controls the risks associated with work activities, and as a result, prevents those involved in the task or those potentially affected by the task, from being harmed. For complete procedure kindly refer Procedure Document No- TPSMS/CSP/JSA/009 REV 01.

6.10 Electrical Safety Procedure.

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The objective of these standards is to specify minimum mandatory requirements and advisory guidance for identifying and controlling hazards to ensure 'Zero Harm' regarding operation maintenance and testing of electrical equipment. For complete procedure kindly refer Procedure Document No- TPSMS/CSP/ELEC/010

6.11 Fire Safety Management Procedure.

Objective of This standard is to specify the minimum mandatory requirements and advisory guidelines to ensure prevention of fire related incidents and managing / controlling their impacts if they do occur. For complete procedure kindly refer Procedure Document No - TPSMS/CSP/ELEC/011

6.12 Hazard Identification & Risk Assessment (HIRA) Procedure(R5):

Objective of this procedure is to define guidelines for Hazard identification, Risk assessment and determination of controls. For complete procedure kindly refer Procedure Document No - TPSMS/CSP/HIRA/012.

6.13 Management Of Change (MOC) Procedure(R5):

The objective of this document is to establish the procedures necessary to ensure that HSE risks are managed to an acceptable level in Tata Power Management of Change (MOC) process. For complete procedure kindly refer Procedure Document No - TPSMS/CSP/MOC/013.

6.14 Pre-Start-up Safety Review (PSSR) Procedure(R5).

Objective of this procedure is to provide guidelines for safe initial startup of a new facility or restart of a modified facility. The PSSR process verifies that the new/modified facility meets the original design and operating parameters. The intent is to prevent incidents caused by inadequate, incomplete, unauthorized design, construction, installation, and/or commissioning. For complete procedure kindly refer Procedure Document No - TPSMS/CSP/MOC/014.

6.15 Road Safety procedure(R5):

To provide Safety Rules for road travel management and safe usage of all types of vehicles viz. passenger/ commercial, owned/ hired by company, driven by employees or contractors. For complete procedure kindly refer Procedure Document No - TPSMS/CSP/RSP/015.

7.0 General safety Rules and Procedure:

7.1 Lift (Elevator) Safety Procedure:

To provide safe operating procedure for taking control of lift car before entering and existing the pit of OTIS make elevators. For complete procedure kindly refer Procedure Document No – TPSMS/GSP/LIFT/001,

7.2 Working on conveyor belt Procedure:

This procedure is developed to cover the safe practices required for Working on live equipment and to protect personnel from hazards associated with it. For complete procedure kindly refer Procedure Document No – TPSMS/GSP/CONV/003

7.3 Batteries Handling & Disposal(R5)

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To provide procedure for recycling and / or safe disposal of used / waste batteries in compliance with all legislation. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/HAZM/003**

7.4 Material Handling and Storage Procedure:

The purpose of this document is to provide procedures to assist the safe handling of materials (manual handling and mechanical handling). For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/MATL/004**.

7.5 Office Safety Procedure(R5):

The objective is to provide a safe working environment to those working in office premise, who may be exposed to emergency situations and other chronic / cumulative risks that may arise due to various reasons of unsafe act, unsafe condition, fire and or pandemic crisis like COVID-19 etc. For complete procedure kindly refer Procedure Document No - **TPSMS/GSP/OFS/006**

7.6 Earth Leakage Circuit Breaker (ELCB) Testing Procedure(R5):

The objective of this procedure is to define the minimum requirements for testing of Earth Leakage Circuit Breaker (ELCB). For complete procedure kindly refer Procedure Document No - **TPSMS/GSP/ELCB/008**.

7.7 Occupational Health & Safety Legal Compliance Procedure(R5):

Objective of this procedure is provide guidelines for compliance of Occupational Health & Safety (OH&S) legal requirements and all ratified protocols and agreements are incorporated in Tata Power Safety Management System (SMS). For complete procedure kindly refer Procedure Document No - **TPSMS/GSP/LEGL/009**.

7.8 Incident Reporting & Investigation Procedure(R5):

Objective of this procedure is to outline the process for reporting, recording and investigating an incident, recommending corrective and preventive actions and to communicate the lessons learned to prevent recurrence of similar incidents. For complete procedure kindly refer Procedure Document No - **TPSMS/GSP/IRI/011**.

7.9 Contractor Safety Management Procedure.

The purpose of this document is to engage with contractors in a way to create safe work environment for everyone working for Tata Power. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/CSM/015**.

7.10 Tree Trimming Procedure(R5):

The objective of this procedure is to define guidelines and minimum requirements for Tree trimming. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/TTRM/017**

7.11 Safe Lone Working Procedure(R5):

Objective of this procedure is to lay down guidelines for reduction and safe managing of any additional risk arising from lone working. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/LONE/019**.

7.12 Good Housekeeping(5S) Procedure(R5):

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Objective of this procedure is to explain the meaning, importance and provide guidelines for implementation of Good Housekeeping(5S) at workplaces across organization. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/GHK/022**.

7.13 Personal Protective Equipment(R5):

This procedure describes the basic requirements, applicability, minimum specifications of Personal Protective Equipment (PPE). For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/PPE/023**.

7.14 Process Safety Management Procedure(R5):

The objective of this document is to provide a standardized & uniform guideline to implement Process Safety Management in Tata Power, its JVs, and subsidiaries to prevent or minimize the consequences of releases of toxic, flammable, pressurized or uncontrolled chemicals/Steam/Water or any other material which may result in toxic, fire, explosion, burn or flood like situation. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/PSM/024**

The above procedures will be updated time to time and the updated version of the procedures as well as any additional critical procedure will be available on official website of Tata Power (www.tatapower.com) for your reference.

8.0 Training and Capability Building.

Safety Training and capability building of workforce is a major component of safety management program. All training required must be provided and documented as specified by Tata Power and Indian Regulations. Tata Power Division /Discoms Safety department will audit contractors training and related documentation to assure its adequacy.

8.1 Tata power Odisha Discom Site Safety Orientation.R5

All Tata Power contractor and subcontractor workforce is required to attend Site Safety Orientation Training to receive a Safety Training Card, which is required to obtain a Gate Pass to the site, prior to entry. This Safety Orientation Course will be for duration of minimum half day. The information provided during the orientation will include, but is not limited to following:

- 8.1.1 Job rules, personal safety, and conduct
- 8.1.2 Hazard's reporting
- 8.1.3 Reporting of injuries
- 8.1.4 Emergency procedures
- 8.1.5 Safety Activities and Program including disciplinary measure and incentives.
- 8.1.6 Critical safety procedure relevant to the job

8.2 Capability Building:

- 8.2.1 All Tata Power contractor and subcontractor workforce is required to attend L1 Training to receive a Safety Training Card, which is required to obtain a Gate Pass to the site, prior to entry.
- 8.2.2 Appropriate practical training such as SHE L1, L2& L3 is given to ensure that a jobholder, either supervisor or worker, is competent to do his/her job safely. The skill training is provided through TPSDI, and other agencies authorized

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- by Tata Power on the list of 15 critical Safety procedures mentioned under safety procedures. Duration of course is as specified by Division/Discom
- 8.2.3** Contractor shall ensure that concerned workmen are provided with adequate training before he/she is allowed to execute the work. An evaluation test will be conducted after the completion of the training. Those employees who meet the minimum required competency will be provided with Certificate (Card), which will be valid for 3 years, post which the workmen have to reappear for assessment.
- 8.2.4** If the workman is not able to qualify the assessment, he/she will be given 3 additional attempts to clear in 3-month time failing which he/she will not be allowed to work in the Division /Discoms.
- 8.2.5** After expiry of Certificate or Training /Competency Card again one day recertification of L1, L2 and L3 skill training will be provided. R7.
- 8.2.6** Quarterly /Half yearly(For Odisha and New business) Revalidation Test - "SHE L1 Revalidation test" will be conducted for the contractor's employees to revalidate their safety awareness and knowledge.
- 8.2.7** Order Manager and Safety In charge of the Division/Site /Plant will conduct a Competency Assessment of all workforces, going to be deployed at site / plant for high-Risk job.
- 8.2.8** The Contactor shall bear the conveyance and food expenses of his staff for attending training sessions and capability building sessions in new business-like Odisha Discom.
- 8.2.9** The Contactor shall bear the entire cost of L1/L2/L3, the costs towards training, salaries/wages, boarding and lodging of his staff for attending training sessions and capability building sessions. These trainings are offered on nominal chargeable basis payable by Contractor and rates shall be decided by TPSDI from time to time in case of training through TPSDI. Generally, L0 is of one day, L1 is for 2 days for each critical procedure and L3 is for one day. Around Rs 700+GST is approx. cost /Day/Candidate. -R5
- 8.2.10** Competency assessment of all critical workforce to be carried out for all who has taken L2 training. R5

9.0 Recognition to the Prior Learning in Safety-R5

If "Order Manager" recommends and "Head of the Safety Department of Discom" is satisfied with the safety knowledge and competency of the employee of contractor, a test may be conducted by Tata power Skill development Institute/ other recognized institute to assess the prior learning in safety. If employees of the contractors pass in such test, he will be exempted from appearing in SHE L1 training. This assessment is on nominal chargeable basis and rates are decided by TPSDI from time to time.

10.0 Safety performance retention(R5) and Safety Performance Evaluation: A certain percentage of the bill value will be retained against every running bill as safety performance retention. The amount will be released with the last invoice or every six-month based on Safety Performance Score of contractors. This is as per CSCC Document no TPSMS/GSP/ CSM/015

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This safety retention shall be waived for Contractors who have either submitted a Contract Performance Bank Guarantee or have a retention from each running bill for an amount not less than 10% of each bill subject to the express undertaking / understanding that if there are any deductions required to be made for safety non-performance as per the Safety Performance Score, then Tata Power shall recover any such deductions against safety non-performance directly from the monthly bills / final settlement as the case may be failing which it shall be within its right to recover such sum from accounts payable or the CPBG or the retention of the Contractor available with Tata Power for the said contract or any other contract between the Contractor and Tata Power.

11.0 Pre-Employment and Periodic Medical check-up:

Contractor shall arrange to conduct a pre-employment and periodic medical check-up for its entire workforce by Tata Power medical officer or Tata Power authorized medical officer. The contractor shall be able to produce the certificate prior to the employment. The contractor shall also organize to conduct periodical medical checkup (six monthly) for the following category of employees:

- Drivers (Check for Vision & Hearing)
- HEM Equipment Operators (Check for Vision & Hearing)
- Workforce working at Height (Check for Vision, Hearing, Vertigo & Height Phobia)
- Workforce Handling the hazardous substances - Coal, ash and chemicals (Chest X-ray and Lung Function T)
- Workforce in high Noise area (> 90 Decibel), Check for Hearing
- Workforce handling radiography equipment for conducting NDT.
- Workforce, working in specific areas requiring specific medical attention should conduct the medical tests test as laid down in the respective Site Safety Management Plan.

12.0 Other Conditions:

- 12.1. The manpower/vehicles/Tools & Tackles/Equipment provided shall be as per mutually agreed SLA.
- 12.2. No Supervision No work policy should strictly be followed.
- 12.3. Test Before Touch must be ensured every time a job is being carried out in electrical network.
- 12.4. HIRA /JSA as per the job scope must be prepared in detail and submitted along with Site Safety Plan by the successful bidder.
- 12.5. Personal protective equipment (PPE) must always be checked before use to ensure that they are in good condition and clean. Replace them if necessary.
- 12.6. All relevant PPE shall be provided by the vendor while working at the site.
- 12.7. Housekeeping shall be maintained all the time while execution of work. All the unwanted material shall be removed from the site at the end of the day's work. Old/damaged parts if taken out of the system shall be kept at

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identified placed and it shall be shifted to scrap yard or disposed of as per instruction of order manager.

- 12.8. Site Safety Plan shall be prepared by successful bidder along with order manger. Appendix 1 to be filled by successful bidder and submitted to Tata Power safety in-charge, before mobilization of team at site and start of the work.
- 12.9. The Owner or Proprietor of BA must visit worksite at least once in a month and meet Order Manager every month. In case of incidents, the Owner or Proprietor of BA is required to attend Time Out Meetings to understand the gaps that contributed to the incident.

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General Safety Conditions for various contracts Specific to Odisha Discom(R5)

13.0. Safety Conditions for maintenance of STS (Sub Transmission System) Network.

A BA awarded a major contract work of maintenance of sub – transmission network in area of a power system will be required to fulfil the following conditions:

- Availability of Discharge Rods - Minimum 6 Nos. in each maintenance vehicle, fit for purpose and in good conditions and defective rods are removed from service.
- Availability of Neon tester - Minimum one Neon Tester in each Maintenance Vehicle, in good and working condition and defective or non-standard neon testers are removed from service.
- Electrical hand Gloves - Minimum two sets of 33 KV and two sets of 11 KV in maintenance vehicles.
- The BA linemen must be having required ELBO certification for the voltage level involved.
- BA shall provide Safety Policy, Safety Objectives, Organogram showing structure and responsibility of Safety management of his company and shall document the work practices and procedures in terms of Safety Management.
- BA shall comply with all statutory requirements like applicable acts, regulations, codes of practice, OHSAS Standards, Labour laws, etc.
- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- BA shall abide by Safety manuals and guidelines of Discom issued from time to time.
- BA shall ensure safety training and induction program for the employees. The BA employees must carry safety training card / competency card to the worksite and produce the card on demand.
- All BA employees must be given valid ID card issued by BA cell of Discom who will check statutory compliances before issuing ID cards.
- BA shall not employ a new workman without training and issue of ID card.
- BA shall conduct safety audits & inspections as per Discom procedures.
- BA shall provide proper PPEs as per CSM F-8 ensure periodic inspection of PPE, Tools and tackles to ensure their serviceability.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by the Discoms.
- BA shall ensure that no job shall be carried out without efficient supervision.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident, or accident to engineer in-charge and SAFETY team of the Discom.
- BA shall provide safety performance and Safety MIS to engineer in-charge and Discom SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA safety staff shall work as per the guidance of the Discom safety department and functionally report Safety Head of Discom. Any leaves by safety staff of the BA shall have to approved by Discom Safety Department.
- BA shall ensure to depute Safety Staff for managing safety in worksites. In case the BA has been awarded work in more than one area power system, then the following safety structure will be adopted.
- Safety manager and Safety engineer must be having PDIS or ADIS.

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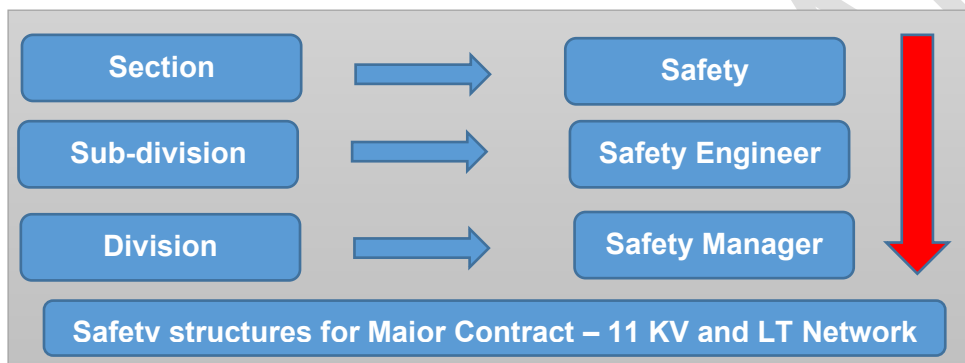
14.0 Safety Conditions for maintenance of 11 KV and LT Network.

A BA awarded a major contract work of maintenance of 11 KV and LT Network in area of a power system will be required to fulfil the following conditions:

- Availability of Discharge Rods - Minimum 6 Nos. in each PSS/FCC and maintenance vehicle, fit for purpose and in good conditions and defective rods are removed from service.
- Availability of Neon tester - Minimum one Neon Tester in each PSS/FCC/ Maintenance Vehicle, in good and working condition and defective or non-standard neon testers are removed from service.
- Electrical hand Gloves - Minimum two sets of 33 KV and two sets of 11 KV in each PSS/Maintenance vehicles and two sets of LT hand gloves at each FCC.
- The BA linemen must be having required ELBO certification for the voltage level involved.
- BA shall provide Safety Policy, Safety Objectives, Organogram showing structure and responsibility of Safety management of his company and shall document the work practices and procedures in terms of Safety Management.
- BA shall comply with all statutory requirements like applicable acts, regulations, codes of practice, OHSAS Standards, Labour laws, etc.
- BA shall abide by Safety manuals and guidelines of Discom issued from time to time.
- BA shall ensure safety training and induction program for the employees. The BA employees must carry safety training card / competency card to the worksite and produce the card on demand.
- All BA employees must be given valid ID card issued by BA cell of Discom who will check statutory compliances before issuing ID cards.
- BA shall not engage new workman without training and issue of ID card.
- PSS operator shall not be involved in maintenance activities.
- BA shall conduct safety audits & inspections as per Discom procedures.
- BA shall provide proper PPEs as per CSM F-8 ensure periodic inspection of PPE, Tools and tackles to ensure their serviceability.
- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- BA to ensure that all LT complaints are routed through Call Centre and recorded in FCC. Rectification of fault shall be done only after call centre logging and with the knowledge of BA supervisor.
- No one will work alone or unsafely under public pressure or otherwise.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by the Discoms.
- BA shall ensure that no job shall be carried out without efficient supervision.

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- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident, or accident to engineer in-charge and SAFETY team of the Discom.
- BA shall provide safety performance and Safety MIS to engineer in-charge and Discom SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA safety staff shall work as per the guidance of the Discom safety department and functionally report Safety Head of Discom. Any leaves by safety staff of the BA shall have to approved by Discom Safety Department.
- BA shall ensure to depute Safety Staff - One safety supervisor per section, One safety engineer per sub-division and one safety manager per Division Safety manager and Safety engineer must be having PDIS or ADIS.



15.0 Safety Conditions for the major contract work in Civil Projects:

A BA awarded a major contract work of / in civil project will be required to fulfil the following safety conditions:

- BA shall provide Safety Policy, Safety Objectives, Organogram showing structure and responsibility of Safety management of his company and shall document the work practices and procedures in terms of Safety Management.
- BA shall comply with all statutory requirements like applicable acts, regulations, codes of practice, OHSAS Standards, Labour laws, etc.
- BA shall abide by Safety manuals and guidelines of Discom issued from time to time.
- BA shall ensure safety training and induction program for the employees. The BA employees must carry safety training card / competency card to the worksite and produce the card on demand.
- All BA employees must be given valid ID card issued by BA cell of Discom who will check statutory compliances before issuing ID cards.
- BA shall not employ a new workman without training and issue of ID card.
- BA shall conduct safety audits & inspections as per Discom procedures.
- BA shall provide proper PPEs as per CSM F-8 ensure periodic inspection of PPE, Tools and tackles to ensure their serviceability.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by the Discoms.
- BA shall ensure that no job shall be carried out without efficient supervision.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident, or accident to engineer in-charge and SAFETY team of the Discom.

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- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- BA shall provide safety performance and Safety MIS to engineer in-charge and Discom SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA safety staff shall work as per the guidance of the Discom safety department and functionally report Safety Head of Discom. Any leaves by safety staff of the BA shall have to approved by Discom Safety Department.
- BA shall refer Construction Safety Manual of the Discom for details.
- BA shall ensure to depute a Safety Supervisor (for workforce up to 100 at site) / a safety engineer (for workforce up to 250 at site) / safety manager (for more than two safety engineers) for managing safety at the project site. In case the BA has been awarded more than one major contracts, then the following safety structure will be adopted.
- Safety Engineers and Safety Managers must be having PDIS or ADIS.



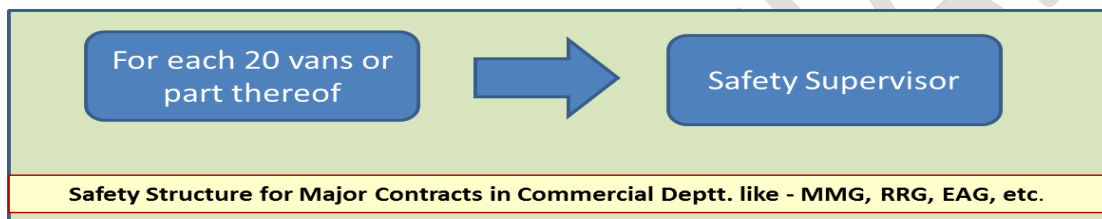
16.0 Safety Conditions for the major contract work in Commercial Department like - MMG, RRG, EAG, etc.:

A BA awarded a major contract work in meter management group & energy auditing group will be required to fulfil the following safety conditions:

- BA shall provide Safety Policy, Safety Objectives, Organogram showing structure and responsibility of Safety management of his company and shall document the work practices and procedures in terms of Safety Management.
- BA shall comply with all statutory requirements like applicable acts, regulations, codes of practice, OHSAS Standards, Labour laws, etc.
- BA shall abide by Safety manuals and guidelines of Discom issued from time to time.
- BA shall ensure safety training and induction program for the employees. The BA employees must carry safety training card / competency card to the worksite and produce the card on demand.
- All BA employees must be given valid ID card issued by BA cell of Discom who will check statutory compliances before issuing ID cards.
- BA shall not employ a new workman without training and issue of ID card.
- BA shall conduct safety audits & inspections as per Discom procedures.
- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- BA shall provide proper PPEs as per CSM F-8 ensure periodic inspection of PPE, Tools and tackles to ensure their serviceability.

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- BA shall ensure the adherence to standard operating procedures or guidelines laid down by the Discoms.
- BA shall ensure that no job shall be carried out without efficient supervision.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident, or accident to engineer in-charge and SAFETY team of the Discom.
- BA shall provide safety performance and Safety MIS to engineer in-charge and Discom SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA safety staff shall work as per the guidance of the Discom safety department and functionally report Safety Head of Discom. Any leaves by safety staff of the BA shall have to be approved by Discom Safety Department.
- BA shall ensure to depute a Safety Supervisor for managing safety at worksite.
- The BA for the RRG work shall depute one Safety supervisor.



17.0 Safety Conditions for Major Projects in Distribution Network

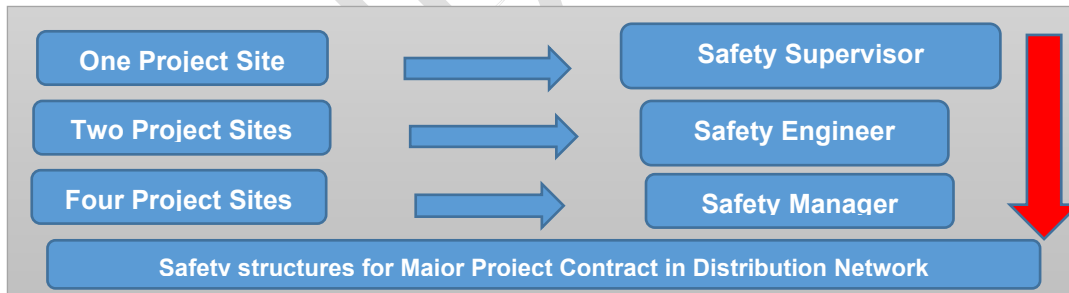
A BA awarded a major Projects in Distribution Network shall be required to fulfil the following conditions:

- Availability of Discharge Rods - Minimum 6 Nos. for each project site, fit for purpose and in good conditions and defective rods are removed from service.
- Availability of Neon tester - Minimum one Neon Tester in each project site, in good and working condition and defective or non-standard neon testers are removed from service.
- Electrical hand Gloves - Minimum one sets of 33 KV, 11 KV and LT in each project site.
- The BA linemen must be having required ELBO certification for the voltage level involved.
- BA shall provide Safety Policy, Safety Objectives, Organogram showing structure and responsibility of Safety management of his company and shall document the work practices and procedures in terms of Safety Management.
- BA shall comply with all statutory requirements like applicable acts, regulations, codes of practice, OHSAS Standards, Labour laws, etc.
- BA shall abide by Safety manuals and guidelines of Discom issued from time to time.
- BA shall ensure safety training and induction program for the employees. The BA employees must carry safety training card / competency card to the worksite and produce the card on demand.
- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- All BA employees must be given valid ID card issued by BA cell of Discom who will check statutory compliances before issuing ID cards.
- BA shall not employ a new workman without training and issue of ID card.
- BA shall conduct safety audits & inspections as per Discom procedures.
- BA shall provide proper PPEs as per CSM F-8 ensure periodic inspection of PPE, Tools and tackles to ensure their serviceability.

- BA shall ensure the adherence to standard operating procedures or guidelines laid down by the Discoms.
- BA shall ensure that no job shall be carried out without efficient supervision.

Sr. No	Type of Audit	Frequency
1	Tool Bag and PPE audit	Weekly
2	First Aid Box Maintenance Record	Fortnightly
3	Fire Extinguisher Record(Applicable for the BA involved in major construction works and have storage of flammable material at worksite)	Monthly
4	Safety Talk Register	Weekly
5	Site Safety Audit	Daily

- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident, or accident to engineer in-charge and SAFETY team of the Discom.
- BA shall provide safety performance and Safety MIS to engineer in-charge and Discom SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- BA safety staff shall work as per the guidance of the Discom safety department and functionally report Safety Head of Discom. Any leaves by safety staff of the BA shall have to approved by Discom Safety Department.
- BA shall ensure to depute Safety Staff for managing safety in worksites. One safety supervisor per project site or 100 persons, one safety engineer for 2 project sites of 250 persons, and one safety manager for four project sites or 500 persons.
- Safety manager and Safety engineer must be having PDIS or ADIS.



18.0 Schedule of Safety Audits by BA Safety Staff

Safety Undertaking of BA by way of Affidavit

I _____ s/o _____ R/o _____ (AUTHORIZED REPRESENTATIVE/PARTNER/DIRECTOR/PROPRIETOR) of M/S _____(name of company/firm)___ having its office at (Complete address of Company), authorized vide power

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of attorney dated -----/Board resolution dated----/letter of authority dated----, hereinafter referred to as **Contractor [or Business Associate (BA)]** which expression shall, unless it be repugnant to or inconsistent with the meaning or context thereof, be deemed to include its heirs, executors, administrators, and assigns do hereby affirm and undertake as under :

1. The present undertaking shall remain in force from the date of execution of contract and shall be valid till the date of termination of the said contract by either party. The undertaking is binding on me (contractor) as well as my sub-contractor and its employees, representatives etc.
2. That I (the contractor) will be responsible and liable to comply and abide by all the safety rules, instructions and regulations as may be specified and laid down by the Discom to achieve its goal of Zero for on-site incidences.
3. That the Contractor shall be fully responsible for ensuring occupational health and safety of its employees, representatives, agents as well as of its subcontractor's employees, at all times during the discharge of their respective obligations under the contract including any methods adopted for performance of their tasks / work.
4. That Contractor shall ensure ,at its own expense to arrange for and procure, implement all requisite accident prevention tools, first aid boxes, personal protective equipment, fire extinguisher, safety training, Material Safety Data Sheet, pre-employment medical test, etc. for operations & activities including as & when so specified by Discom specifically. , failing which Discom shall be entitled, but not obliged, to provide the same and recover the actual cost thereof from the Contractor's payments.
5. That the Contractor shall engage adequate and competent Safety – Supervisor / Engineer / Manager / Skilled persons at site as per the Para 5 (Qualification and experience of safety personnel) and Annexure 3 of Contract Safety Management.
6. That the Contractor shall engage the competent Site – Supervisor with each group of workers for safe and correct workmanship, proper co-ordination of material and site work as per contract.
7. That the Contractor shall immediately replace supervisor in case it is found to be not up to the level of skill and experience required, but any such replacement shall be only with the prior concurrence of the Discom representative.

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8. That the Contractor and its subcontractors shall abide by all the safety guidelines as per Safety Manual, Contract Safety Management and other guidelines issued from time to time by Discom during the contract period.
9. That in case the Contractor and/or any of its Subcontractor fail to ensure the compliance as required in terms of this undertaking the Contractor shall keep and hold Discom / its directors / officers / employees indemnified against any / all losses / damage / expense / liability / fines / compensation / claims / action / prosecutions or the like which might be suffered by Discom or to which Discom might get exposed to as a result of any breach /wilful negligence /deliberate default on the part of the Contractor /Subcontractor in complying with the same. Contractor shall also furnish any press release, clarification etc. if sought by Discom for any near miss or safety violations, accidents, which are attributable to fault of Contractor.

DEPONENT

VERIFICATION

Verified aton this _Day of _____20__ that the contents of the above affidavit are true and correct and nothing material has been concealed therefrom

ANNEXURE TO
Appendix 3: Safety Terms and Conditions
(Document No - TPSMS/GSR/STC/009 REV 05)

***(Excerpts of Tata Power Safety Code of Conduct as relevant for
Safety Terms & Conditions)***

(A) Definitions

- **Order Manager/Engineer in charge:** Order Manager/Engineer in charge is the Tata Power-Division /DISCOM representative, who has the ownership of the given job.
- **Site Safety Management Plan:** It is the safety plan agreed between Contractor and Tata Power-Division/DISCOM. It will contain the entire job specific safety requirement and will be signed by the contractor.
- **Contractor/Business Associate/Vendor (BA):** An individual or a company that provides services to Tata Power-Division/DISCOM under a signed contract.
- **Emergency:** It is a serious, unexpected, or dangerous situation requiring immediate action, which may result in *loss of life*, loss of revenue/property, business discontinuity. In case of Emergency, services may be procured by selecting the qualified vendor based on the vendor category without the safety bid evaluation and approved by adequate authority of MB level or above.
- **Expert Service jobs:** Jobs which needs expert services of contractor which does not involve direct exposure to the potential risk or work which involves only supervisory work such as expert for AI-ML, expert for transmission and distribution network, expert for civil works, expert on transformers, expert for PSCC, expert for equipment overhaul etc.
- **CEO/Chief/Head of division/Unit/Utility:** Business in charge who is overall custodian of the Tata Power-Division/DISCOM.
- **High Risk Jobs:** A Job or its activities are considered as Very High or High Risk when Order manager apply the “Tata Power Hazard Identification and Risk Analysis” procedure and found safety risk associated with are under Very High or High category. Indicative lists of jobs are given in appendix 14 of this document.
- **Medium Risk Jobs:** Jobs or its activities are considered as medium risk when Order manager apply “Tata Power Hazard Identification and Risk Analysis” procedure and found the same as Medium Risk.
- **Low Risk Jobs:** Any job or its activities are considered as Low or Very low risk while Order manager calculated it by applying “Tata Power Hazard Identification and Risk Analysis” procedure and found it under Low or Very Low category.

(B) Safety performance retention(R7):

A certain percentage of the bill value will be retained against every running bill as safety performance retention. The amount will be released with the last invoice or every six-month based on Safety Performance Score of contractors. The retention amount will be calculated based on contract value as below. (R7)

Risk Category-(R7)	Contract Value	Retention Amount (%)
<i>Very high/High risk job/ Medium Risk jobs</i>	Up to 10 Lakhs	2.5
<i>Very high/High risk job/ Medium Risk jobs</i>	10 – 50 Lakhs	2
<i>Low/Very Low Risk jobs</i>	10 – 50 Lakhs	1
<i>Very high/High risk job</i>	0.5 to 10 Cr	2
<i>Medium Risk jobs</i>	0.5 to 10 Cr	1.5
<i>Low/Very Low Risk jobs</i>	0.5 to 10 Cr	1
<i>Very high/High risk job</i>	>10 Cr	1.5
<i>Medium Risk jobs</i>	>10 Cr	1

This safety retention shall be waived for Contractors who have either submitted a Contract Performance Bank Guarantee or have a retention from each running bill for an amount not less than 10% of each bill subject to the express undertaking / understanding that if there are any deductions required to be made for safety non-performance as per the Safety Performance Score, then Tata Power shall recover any such deductions against safety non-performance directly from the monthly bills / final settlement as the case may be failing which it shall be within its right to recover such sum from accounts payable or the CPBG or the retention of the Contractor available with Tata Power for the said contract or any other contract between the Contractor and Tata Power.

(C) Safety Performance Evaluation & Responsibility of Business Associate / Contractor:

During the time of job execution, regular site inspection will be carried out by the Tata Power-Division / DISCOM officials to evaluate monthly safety performance of the contractor and monthly score will be maintained by the Order Manager. Violations will be dealt as per **CSM F12 Safety Violation Penalty Criteria**.

1. During the progress of the work, concerned site Supervisor/Engineer/Safety representative will visit and inspect the work site regularly and evaluate the safety performance of the contractor based on matrix **Appendix 13** and apply the Consequence management policy/Penalty criteria as applicable.
2. The evaluation criteria include Lead Indicators such as percentage of workers trained in TPSDI, inspection of critical equipment. Lag indicators such as Fatalities, LWDC and man-days lost.
3. In case of job stoppage due to safety violations / unsafe observations at the site, no time extension from PO completion date shall be given to the contractor, if such delays are attributable to contractor.
4. In case of fatality, limb loss or loss of property, vendor must pay for liability, legal, statutory, and additional mutually agreed settlement charges imposed by the appointed committee by Division Chief/CEO. This charge is over and above the retention amount. The committee will finalize penalty amount based on factors such as advice by statutory authorities, contract value and impact of accident etc.

5. Order Manager, Head of Business and functional Chief have the authority to terminate the contract as per **CSM F12 Safety Violation Penalty Criteria** Through contract department.

(D) Other Appendices are attached,

Appendix 6: CSM F6 - Safety Competency Assessment Form (Template).

(This is to be filled by Bidder and submit to Tata Power as part of bid submission).

Appendix 8: CSM F8 - PPE requirements-(R7)

Appendix 9: CSM F9 - Site Safety Management Plan / Method Statement (Template)

Appendix 12: CSM F12 - Safety Violation Penalty Criteria

Appendix 13: Checklist To Be Used During Site Visit

Appendix 14: Indicative List of High-Risk Jobs

---XXX---XXX---XXX---

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Appendix 8: CSM F8 - PPE requirements-(R7)

The Contractor shall ensure that the following PPE of Approved standards shall be always available and shall be used by his employees with no exception whatsoever. • PPE shall be conforming to BIS/DGMS/DIN specifications, in good condition and shall be comfortable to his employees, when used. This is indicative. For better clarification refer PPE procedure-TPSMS/GSP/PPE/023. as per safety terms and condition Appendix 3 CFM 3 in detail. R7

PPE Requirement

1	All contractor's employees at site	Safety Florescent Jacket (orange color), Safety helmet & safety shoes with composite or steel toe cap
2	Workers mixing asphalt, cement, lime / concrete	Safety goggle & protective Hand gloves and footwear, Nose mask.
3	Welders / Grinders/Gas cutters	Welding screen/goggles, safety shoes, leather hand gloves, aprons, leg guard
4	Stone breaker	Protective goggle, hearing protection, anti-vibration hand gloves and Protective clothing.
5	Electricians / Linemen	Rubber hand gloves <i>with correct voltage rating and expiry date normally one year from Manufacturing date-(R7)</i> & Electrical resistant shoes, Safety helmet with induction strip to alert about presence of voltage for those linemen who climb the poles or work on electrical equipment
6	Workers working at a height of 1.8 Meter or above.	Double lanyard full body harness, fall arrestor and safety net made of reinforced nylon fiber ropes firmly supported with steel structures, Work positioning attachment


PPE Type and Testing Frequency

Sl. No.	Name of PPE	IS / EN Standard	Testing Frequency	Remarks
01	Leather Safety Shoes (Color – Black) with PU toe cap.	IS:15298 (Part-2)	Monthly and visual check every day for any crack or damage in the leather or sole.	

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02	HDPE Safety helmet with chin strap and ratchet type for adjustment for non-Electrical work	IS:2925-1984	Monthly and visual check every day for any crack in shell.	
03	Full body harness (Safety belt)	EN 361	Monthly and visual check every day of the bends and the harness.	
04	Electrical Safety Gloves	EN: 60903 CE marked	Weekly and visual check for any crack and blow test before every work.	Manufactured not beyond 12 months.
05	Full face visor with safety helmet	EN: 166 CE marked (Visor)	Monthly and visual check every day for any crack in shell.	Clear acrylic visor attached with safety helmet.
06	Fireproof jacket for chest protection		Monthly and visual check every day.	
07	Safety helmet with induction Strip for linemen and working for electrical work-Class E	EN 397/2012	Monthly and visual check everyday	Induction Strip alerts presence of voltage
08	Shorting clamps, crocodile clamps, Discharge Rod and Neon tester		Monthly and visual check everyday	For discharging the residual voltage and test before touch

Pictorial View of PPEs for reference purpose

Sl. No.	Name of PPE	IS / EN Standard	Picture
01	Leather Safety Shoes (Color – Black) with PU toe cap.	IS:15298(Part-2) and with test report of electrical resistance.	

02	<p>HDPE Safety helmet with chin strap and ratchet type for adjustment for Nonelectrical work and electrical work</p>	<p>IS:2925-1984/ EN 397/2012</p>	
03	<p>Full body harness (Safety belt) The straps at shoulder and thigh shall have full pad for comfort. The back shall be so designed that harness straps do not tangle with each other.</p>	<p>EN 361:2002 EN 358 : 2000 IS: 3521:1991/2002</p>	
04	<p>Electrical Safety Gloves – Composite type Soft electrical gloves as per size of individual.</p>	<p>EN: 60903 CE marked</p>	
05	<p>Full face visor with safety helmet</p>	<p>EN: 166 CE marked (Visor)</p>	
06	<p>Fireproof jacket for chest protection</p>		
08	<p>Reflective jacket to each workman</p>	<p>As per Tata Power standard</p>	

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These pictures are indicative. Actual product may vary.

Note:

1. Any other Personal Protection Equipment required beyond above list will be according to BIS or EN Standards.
2. All Personal Protection Equipment will be checked by the engineer in-charge or SAFETY group of company.
3. Safety Representative of the BA must maintain the record of the availability, condition and checking of the PPEs.
4. All tools required as per the contract must be according to respective IS / EN standards.
5. Company may revise or add the above list of PPE and their specifications as and when feel necessary. The information about new specifications /models will be circulated by the Engineer In-charge (EIC), which shall adhere by the business associated in the shortest possible time. The EIC shall issue a memo / instruction to BA with timeline for implementation. Any delay will be treated as non- compliance / safety violations.

Appendix 9: CSM F9 - Site Safety Management Plan / Method Statement

Site Safety Plan / Method Statement (Template)

This Method Statement describes the specific safe working methods which will be used to carry out the described work. It gives details of work procedure with control measures to counter health and safety issues related to this work. The listed content of this Method Statement can be changed/modified subjected to job scope / specifications, but task specific method statement once finalized & approved, that should not be modified during work execution without permission from the approving authority.

Project/Job Name		
Scope of work: -		
Drawing References: -		
Detail of Sub contractors involved: -		
Method Statement Prepared By: - Designation: - (e.g., Site Manager)	<u>Signature</u>	<u>Date</u>

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1.0 Introduction (*Describe purpose of the work, give details of type and scope of work being carried out*)

2.0 Location of Work (*Give site address and precise location on site where work is to be carried out*)

3.0 Safety Document /Specific Approval Required (*Details of any safety documents or specific approval i.e., Client specific approval required to undertake the work*)

5.0 Role & Responsibilities of Personnel/Parties Involved in activities: *Clearly define roles and responsibilities of all personnel involved in activity i.e., Site management staff including subcontractors' staff, Project Manager/Site Manager of principal contractor, Sub Contractor Site Manager, Project Engineer, Safety officer, Competent Supervisory Staff etc.)*

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6.0 Working/Activity Description: - *It is important that all operatives should have clear idea of those operational sequences and responsible supervisor must verify their competency prior to their engagement in operation.*

6.1 Pre-Working Checks

6.2 Resources (Equipment, tools including manpower) Details *i.e., Equipment and Tools, specific operational equipment, test kits, lifting resources, Details of materials to be used in operation, including any reference to COSHH assessments in case of use of any chemicals, Details of the manpower allocated to the task, e.g., titles, qualifications, competences, direct manpower, contractors. Details of plant, tools, and equipment to be used for the work, including the availability of relevant statutory documents, checks or inspections etc. Details of fencing, barriers, cones, chains, dangers notices, warning signs etc.*

Tools required for work:

Sr.No	Tools /Equipment /Machine	UOM	Required Qty.	Remark
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

6.4 Operational Sequence of work: - *Full description of the work, setting out the methodology in a sequential manner, including any reference to any identified operational restraints. Also refer here sec. 5.0 responsibilities part for every step of work sequence).*

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S. No	Activity	Details of job sequence	Risk Involved	Control Checks
1.				
2.				
3				
4				
5.				

6.7 Final Checks & restoration of work area after completion of work: *Those checks to be carried out by responsible supervisor in witness of his line hierarchy by use of specific checklist of certain operational checks and once those completed satisfactory, PTW (if applicable) to be closed and isolation arrangements to be restored by removing barricades/cautionary tags.*








7.0 Task Specific Hazards: - *Refer to Task Specific Risk Assessment and attach in appendix*

Attachment: - Specific Risk Assessment

In addition, please provide below control measures in risk assessment *(as applicable)*.

Fall Protection Measures: (Where Work at height cannot be avoided)	
Control Measures for Electrical Hazards	
Others Hazard if any (please provide details)	

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Hazardous Substances to be used in job: (Attach MSDS if required)							
	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N

7.0 Emergency Provisions: *Relevant operational possibility of a programme in the case of emergency situation i.e. electrical supply restoration. In addition, emergency response provisions i.e., first aiders, firefighting, and first aid arrangements, nearest onsite/offsite emergency response also to be considered during emergency planning.*

8.0 "5S issues" / Waste Disposal/ Housekeeping and Environmental issues: *Details waste disposal processes and or housekeeping activities, Details of environmental impacts and control measures.*

9.0 Personal Protective Equipment (PPE): *Tick on PPE requirements for the task/Job*

<i>Safety Helmet / Hard Hats</i>		<i>Safety Shoe / Safety Boots</i>	
<i>Gum Boot</i>		<i>Double Lanyard Safety Harness with work positioning attachment</i>	
<i>Electrical Hand gloves</i>		<i>Other hand gloves</i>	
<i>Eye protection</i>		<i>Respiratory protection</i>	
<i>Ear Protection</i>		<i>Electrical Arc flash suit</i>	
<i>Chemical resistant suit</i>		<i>Reflective Jackets</i>	
<i>Any Other</i>		<i>Any Other</i>	

10.0 First Aid facilities and Nearby Hospitals Details

- Name of On Site First Aider
- First Aid Box Location
- Location of nearest hospital

11.0 Occupational Health, Fitness and COVID-19 related Preparedness:

- Please give a brief writeup / methodology of your organization's plan to avoid impact of the COVID-19 pandemic at Tata Power working site.
 - Please give brief details of occupational health and hygiene related interventions planned by your organisation to ensure good health and fitness of workforce at Tata Power site.

Appendix 12: CSM F12 - Safety Violation Penalty Criteria

Major Violations and Escalation matrix--(R7)

Consequence of safety violation observed not related to incidents or accidents		Violations				
Sl. No.	<u>Safety Violation</u>	1st	2nd	3rd	4th	<u>Subsequent violation</u>
1	Working without required PPE such as Helmet/gloves/safety shoes/Safety harness etc.	A	B	C	D	Will Attract the same penalty as 4th violation
2	Working without proper tools and tackles	A	B	C	D	
3	Poor or bad condition of Crane/Hydra/Vehicle and/or Incompetent driver and/or helper).	B	C	D	E	Termination of Contract and blacklisting after repetition of violations (3 to 4 times as the case may be)
4	Improper Working at Height	B	C	D	E	
5	Untrained /unauthorized workman engaged in high-risk jobs	B	C	D	E	
6	Violation of SOP or WI or LOTO	C	D	E		
7	Working without PTW or LC / Without authorization / Without creating Safe Zone	C	D	E		

Legend	Action to be Taken	Responsibility	Penalty (INR)	Repeat Violations
A	Levy of Penalty	Order manager / EIC	5000	The no. of repeat violations shall be calculated cumulative during the contract period, not on a monthly basis
B	Memo to BA and Levy of Penalty	Order manager / EIC	10000	
C	Memo to BA and Levy of Penalty	Order manager / EIC	25000	
D	Memo to BA and Levy of Penalty	Order Manager / EIC	50000	
E	Memo to BA, Levy of Penalty, Termination of Contract, Blacklist	Order Manager / EIC	100000	

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Other Violations and Penalty

Penalty shall be imposed on the contractors under the following circumstances for breaching the contractual agreements. The list is not exhaustive, but indicative.

Sl. No	Description of Violation	Severity	Penalty (INR)
1.	Unhygienic/Bad condition of PPE	2	500
2.	Unsafe Act/Condition of Severity 4	4	4000
3.	Unsafe Act/Condition of Severity 5	5	5000
4.	No Earthing of Electrical equipment	5	5000
5.	Working without efficient supervision	4	4000
6.	Non-reporting of incidents	3	3000
7.	Starting the job without Toolbox Talk	4	4000
8.	Electric cable tied with metal wire / Use of damaged electrical cable / Use of two core cable	3	3000
9.	Rubber mat not available in front of electrical panels.	3	3000
10.	Inserting naked wire into the socket instead of a plug	5	5000
11	Inflammable materials stored inside PSS/FCC/Distribution Room	5	5000
12	Water accumulation found near electrical panels / equipment	5	5000
13	Grinding wheel/ Coupling/ Piling winch/other rotating parts without guard	4	4000
14	Inadequate illumination of working area	3	3000
15	Bringing inside PSS/FCC or any other work area any chemicals without approval.	5	5000
16	Loose materials in work area which can fall down or fly during a storm	5	5000
17	Misusing emergency facilities like fire hydrant line/ hose box/ spray system/ eye wash etc.	3	3000
18	Entering restricted areas like switch yard, hazardous material storage room etc. without authorization	3	3000
19	Not using 24 V lamp inside confined spaces	3	3000
20	Bypassing/overriding safety interlocks	5	5000
21	Working besides road without proper barricading and monitoring of traffic	5	5000

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22	Smoking in prohibited area (Closed Go-downs, Storage of flammable material, Storage of Gas cylinders, PSS , Offices etc.)	3	3000
23	Improper stacking of materials in Storage Yard	4	4000
24	Sleeping at workplace	3	3000
25	First aid box not available / in locked condition	2	2000
26	Appointment of subcontractor without his Safety Bid Evaluation and/or without the permission of engineer in charge or Order manager.	5	5% of order value
27	<p>Bad Housekeeping with respect to TPSMS/GSP/GHK/022</p> <ul style="list-style-type: none"> • 1st Instant • 2nd instant • 3rd instant • 4th instant • Subsequent instants 	2	<ul style="list-style-type: none"> • 1000 • 2000 • 5000 • 10000 • 10000
28	<p>Violations related to vehicles with respect to TPSMS/CSP/RSP/015.</p> <ul style="list-style-type: none"> • Parking without wheel choke • Parking in undesignated area • Heavy vehicle without helper or co-driver • Seat belt not available / not used • Driver without license • Heavy vehicles without reverse horn • Using mobile phone while driving • Lights/mirrors not working /broken 	3	1000 per each violation
28	<p>Violation in Gas cutting and Gas cylinder handling</p> <ul style="list-style-type: none"> • Cylinder valve without guard • No flashback arrester • Leaky DA/Oxygen hose • Cylinders not kept in secured manner • Cylinder trolley not available • Cylinders are transported by manual rolling 	5	2000 per each violation
29	<p>Violations in Lifting Operations w.r.t. to TPSMS/CSP/HEMS/005</p> <ul style="list-style-type: none"> • Hook latch missing • Load raised or swung over people or occupied areas of building • Persons standing within the swing area of the crane • No barricading of crane working area • Use of damaged lifting tools and tackles 	5	2000 per each violation

	<ul style="list-style-type: none"> Lifting tools and tackles not tested / Test certificate expired Crane operator without proper license Angular loading Lifting / shifting heavy material without guide rope Using mobile phone during loading and unloading jobs 		
30	Violation in Scaffolding work w.r.t. to TPSMS/CSP/SCAF/007 <ul style="list-style-type: none"> Unstable scaffolding/nonstandard Scaffolding in use Handrails/mid rails/toe guards missing Safety harness not anchored on fixed structure Opening found in working platform 	5	2000 per violation
31	Violation in Excavation Work w.r.t. to TPSMS/CSP/EXS/002 <ul style="list-style-type: none"> Loose material falling into excavated pit Water logging in excavated pits / trenches Inadequate or no barricading Undercut / cave in found on sides of excavated pits 	4	2000 per violation
32	Caution boards, danger signs (luminescent /red) along with emergency contact number are not found displayed.	3	3000
34	Spillage of hazardous material/chemicals during transportation	4	4000

Penalty for Incidents / Accidents-(R7)

Consequence of incident / Accident		Incident / Accident				Action Required
Sr.No.	Type of Injury	1st	2nd	3rd	4th	
1	Major Injury (Bone injury or burn or hospitalization >48 hrs.) Non-fatal	F	F	G	G	Required
2	Major Injury (Bone injury or burn or hospitalization >48 hrs.) Non-Fatal (Two or more non-Fatal in one event)	G	G	H		Intolerable
3	Single fatality	G	H			
4	Multiple fatalities (Two or more fatalities in one event). Anywhere in Tata power.	H				

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Legend	Action to be taken	Responsibility	Penalty (INR)	The no. of violations shall be calculated cumulative during the contract period for all contracts in SBU, not on a monthly basis
F	Memo to BA and Levy of Penalty	Order Manager/Engineer in charge	200000	
G	Memo to BA and Levy of Penalty	Order Manager/Engineer in charge	500000	
H	Memo to BA, Levy of Penalty, Termination of Contract and Blacklisting the BA	Order Manager/Engineer in charge	1000000	

Appendix -13: CHECKLIST TO BE USED DURING SITE VISIT

Checklist to be used: During site visit to check the adequacy Safety systems.			
		Observation	Score* (1-5)
1	Check the adequacy of safety policy and Safety Management system of the contractor.		
2	Does the contractor have written down safety procedures?		
3	Check the records of Near miss, unsafe act, unsafe conditions, and incidents.		
4	Check the organization setup to implement the safety systems at site (safety officer, safety supervisor)		
5	Check whether safety meeting and toolbox talk carried out regularly and records maintained or not.		
6	Is the process of incident investigation adequate or not?		
7	Verify incident reporting and recording system		
8	Check the usage of equipment/tools and tackles.		
9	Check for housekeeping at site		
10	Check the use of PPEs and general behavior of workforce towards safety		
	Total Score		
	Site Visit Score		

Score*- rating on the scale of 1-5 to be given based on the observations on site. Score of 1 is the lowest and core of 5 is the highest.

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Appendix 14: Indicative List of High-Risk Jobs

Indicative high-risk jobs are given below. This is not an exhaustive list. This is only indicative.

Sl. No.	Jobs
1	Transmission Line Tower Erection on columns, near live lines, In congested areas, In creeks, In the Sea.
2	Conductor Stringing on Tower Using Tensioner & Puller in the area such as Line Crossing, Near Live lines, Congested Areas, Road Crossing, Bridge Crossing, Railway line Crossing, In creeks, In the Sea
3	Cable Pulling by Using winch Machine in City and Rural Areas
4	Hot Washing of HT and Extra HT lines, Towers and switchyards equipment
5	Maintenance / Testing and Replacement of High Voltage (33 KV etc.) Switchyard equipment
6	Installation of Lifts
7	Installation of EOT Cranes
8	Tower Dismantling
9	Working on H Frame /Pole mounted Transformers
10	Excavation in operational Area having power cables in receiving station
11	Identification and spiking of cable / disconnection of cables from poles
12	Working on Electrical Panels
13	Working on live electrical switch yard, Material handling and equipment repair/installation.
14	All activities that require climbing on a pole/structures/Towers/Transformers
15	Cable laying and termination jobs
16	Excavation beyond 5 feet near existing building and structures
17	Working in confined Spaces
18	Stringing of new conductors over poles

CORPORATE ENVIRONMENT POLICY

Tata Power is committed to a clean, safe and healthy environment, and we shall operate our facilities in an environmentally sensitive and responsible manner. Our commitment to environmental protection and stewardship will be achieved by:

- Complying with the requirements and spirit of applicable environmental laws and striving to exceed required levels of compliance wherever feasible
- Ensuring that our employees are trained to acquire the necessary skills to meet environmental standards
- Conserving natural resources by improving efficiency and reducing wastage
- Making business decisions that aim towards sustainable development
- Engaging with stakeholders to create awareness on sustainability



(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018



CORPORATE SUSTAINABILITY POLICY

At Tata Power, our Sustainability Policy integrates economic progress, social responsibility and environmental concerns with the objective of improving quality of life. We believe in integrating our business values and operations to meet the expectations of our customers, employees, partners, investors, communities and public at large

- We will uphold the values of honesty, partnership and fairness in our relationship with stakeholders
- We shall provide and maintain a clean, healthy and safe working environment for employees, customers, partners and the community
- We will strive to consistently enhance our value proposition to the customers and adhere to our promised standards of service delivery
- We will respect the universal declaration of human rights, International Labour Organization's fundamental conventions on core labour standards and operate as an equal opportunities employer
- We shall encourage and support our partners to adopt responsible business policies, Business Ethics and our Code of Conduct Standards
- We will continue to serve our communities:
 - By implementing sustainable Community Development Programmes including through public/private partnerships in and around our area of operations
 - By constantly protecting ecology, maintaining and renewing bio-diversity and wherever necessary conserving and protecting wild life, particularly endangered species
 - By encouraging our employees to serve communities by volunteering and by sharing their skills and expertise
 - By striving to deploy sustainable technologies and processes in all our operations and use scarce natural resources efficiently in our facilities
 - We will also help communities that are affected by natural calamities or untoward incidence, or that are physically challenged in line with the Tata Group's efforts

The management will commit all the necessary resources required to meet the goals of Corporate Sustainability.



(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018





**TATA CODE OF CONDUCT
2015**

LEADERSHIP THAT INSPIRES

For over 100 years, the Tata group has been led by visionaries who have stayed true to the vision of the founder, Jamsetji Tata.

A vision that placed the greater good of society at par with business growth.

A vision that put into practice pioneering social initiatives that changed the way responsible business was run.

And a vision that brought into the group a strong social conscience.



We do not claim to be more unselfish, more generous or more philanthropic than other people. But we think we started on sound and straightforward business principles, considering the interests of the shareholders our own, and the health and welfare of the employees, the sure foundation of our success.

Jamsetji Tata
Founder of the Tata group
Chairman (1868 – 1904)

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FOREWORD

Tata companies have consistently adhered to the values and ideals articulated by the Founder for over 150 years. The Tata Code of Conduct was first formalized by Mr Ratan Tata. It articulates the Group's values and ideals that guide and govern the conduct of our companies as well as our colleagues in all matters relating to business. Today, the Code is a bedrock on which we base our individual, as well as leadership commitments to core Tata values.

The Tata Code of Conduct outlines our commitment to each of our stakeholders, including the communities in which we operate, and is our guiding light when we are sometimes faced with business dilemmas that leave us at ethical crossroads. The Code is also dynamic in that it has been periodically refreshed in order to remain contemporary and contextual to the changes in law and regulations. However it remains unaltered at its core.

Our stellar reputation and success as a business entity has been defined by the powerful commitment and adherence to the core values and principles expressed in this Code, by all our employees, directors and partners. I trust every Tata colleague and Tata company will continue to not only comply with the laws and regulations that govern our business interests around the world, but will continue to set new standards of ethical conduct that will generate deep respect and inspire emulation by others.

N. Chandrasekaran

21st February, 2017



A. OUR VALUES

TATA has always been values-driven. The five core values that underpin the way we conduct our business activities are:



INTEGRITY

We will be fair, honest, transparent and ethical in our conduct; everything we do must stand the test of public scrutiny.

UNITY

We will invest in our people and partners, enable continuous learning, and build caring and collaborative relationships based on trust and mutual respect.

RESPONSIBILITY

We will integrate environmental and social principles in our businesses, ensuring that what comes from the people goes back to the people many times over.

PIONEERING

We will be bold and agile, courageously taking on challenges, using deep customer insight to develop innovative solutions.

EXCELLENCE

We will be passionate about achieving the highest standards of quality, always promoting meritocracy.

These universal values serve as the foundation for the Tata Code of Conduct. They find expression within the value system of every Tata company.

B. SCOPE AND PURPOSE OF THIS CODE

1. This Code sets out how we behave with:
 - our employees, or those who work with us;
 - our customers;
 - the communities and the environment in which we operate;
 - our value-chain partners, including suppliers and service providers, distributors, sales representatives, contractors, channel partners, consultants, intermediaries and agents;
 - our joint-venture partners or other business associates;
 - our financial stakeholders;
 - the governments of the countries in which we operate; and
 - our group companies.
2. In this Code, “we or us” means our company, our executive directors, officers, employees and those who work with us, as the context may require.
3. The term “our group companies” in this Code typically means companies Tata Sons intends for this Code to apply to, and / or to whom Tata Sons has issued this Code.
4. This Code sets out our expectations of all those who work with us. We also expect those who deal with us to be aware that this Code underpins everything we do, and in order to work with us they need to act in a manner consistent with it.

REMEMBER...

It is our commitment to protect our reputation and our brand equity by adhering to the values and principles set out in this Code. By doing so, we strengthen our unique culture and identity.

OUR CORE PRINCIPLES



The Tata philosophy of management has always been, and is today more than ever, that corporate enterprises must be managed not merely in the interests of their owners, but equally in those of their employees, of the consumers of their products, of the local community and finally of the country as a whole.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

C. OUR CORE PRINCIPLES

1. We are committed to operating our businesses conforming to the highest moral and ethical standards. We do not tolerate bribery or corruption in any form. This commitment underpins everything that we do.
2. We are committed to good corporate citizenship. We treat social development activities which benefit the communities in which we operate as an integral part of our business plan.
3. We seek to contribute to the economic development of the communities of the countries and regions we operate in, while respecting their culture, norms and heritage. We seek to avoid any project or activity that is detrimental to the wider interests of the communities in which we operate.
4. We shall not compromise safety in the pursuit of commercial advantage. We shall strive to provide a safe, healthy and clean working environment for our employees and all those who work with us.
5. When representing our company, we shall act with professionalism, honesty and integrity, and conform to the highest moral and ethical standards. In the countries we operate in, we shall exhibit culturally appropriate behaviour. Our conduct shall be fair and transparent and be perceived as fair and transparent by third parties.
6. We shall respect the human rights and dignity of all our stakeholders.
7. We shall strive to balance the interests of our stakeholders, treating each of them fairly and avoiding unfair discrimination of any kind.
8. The statements that we make to our stakeholders shall be truthful and made in good faith.
9. We shall not engage in any restrictive or unfair trade practices.
10. We shall provide avenues for our stakeholders to raise concerns or queries in good faith, or report instances of actual or perceived violations of our Code.
11. We shall strive to create an environment free from fear of retribution to deal with concerns that are raised or cases reported in good faith. No one shall be punished or made to suffer for raising concerns or making disclosures in good faith or in the public interest.
12. We expect the leaders of our businesses to demonstrate their commitment to the ethical standards set out in this Code through their own behaviour and by establishing appropriate processes within their companies.
13. We shall comply with the laws of the countries in which we operate and any other laws which apply to us. With regard to those provisions of the Code that are explicitly dealt with under an applicable law or employment terms, the law and those terms shall take precedence. In the event that the standards prescribed under any applicable law are lower than that of the Code, we shall conduct ourselves as per the provisions of the Code.

REMEMBER...

"Good faith" means having a reasonable belief that the information you have provided is truthful. It does not mean having 'all the evidence' about the potential violation or case reported.

OUR EMPLOYEES



Once you got the best people, the people who shared our values and ideals, we left them free to act on their own. We do not fetter them. We encourage them and give them opportunities for leadership.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

D. OUR EMPLOYEES

Equal opportunity employer

1. We provide equal opportunities to all our employees and to all eligible applicants for employment in our company. We do not unfairly discriminate on any ground, including race, caste, religion, colour, ancestry, marital status, gender, sexual orientation, age, nationality, ethnic origin, disability or any other category protected by applicable law.
2. When recruiting, developing and promoting our employees, our decisions will be based solely on performance, merit, competence and potential.
3. We shall have fair, transparent and clear employee policies which promote diversity and equality, in accordance with applicable law and other provisions of this Code. These policies shall provide for clear terms of employment, training, development and performance management.

Q & A

A job requirement entails extensive travel. One of the candidates has excellent relevant experience and qualifications. However, this candidate is a single parent. As a result, I feel such a situation would significantly hinder this candidate's ability to cope with the job requirement. What should I do?

In accordance with the Code, the decision to recruit an employee should be based upon merit. We cannot make a presumption that the candidate would not be able to meet the travel requirements of the job. All eligible candidates should be provided with equal opportunity to demonstrate or justify that they can cope with the travel requirements of the job. Being a single parent cannot be a ground to be discriminated against at any stage of recruitment or ongoing employment in our company.

REMEMBER...

We do not tolerate harassment in any form and therefore we expect every employee to discourage such misdemeanours in the workplace.

Dignity and respect

4. Our leaders shall be responsible for creating a conducive work environment built on tolerance, understanding, mutual cooperation and respect for individual privacy.
5. Everyone in our work environment must be treated with dignity and respect. We do not tolerate any form of harassment, whether sexual, physical, verbal or psychological.
6. We have clear and fair disciplinary procedures, which necessarily include an employee's right to be heard.
7. We respect our employees' right to privacy. We have no concern with their conduct outside our work environment, unless such conduct impairs their work performance, creates conflicts of interest or adversely affects our reputation or business interests.

Human rights

8. We do not employ children at our workplaces.
9. We do not use forced labour in any form. We do not confiscate personal documents of our employees, or force them to make any payment to us or to anyone else in order to secure employment with us, or to work with us.

Bribery and corruption

10. Our employees and those representing us, including agents and intermediaries, shall not, directly or indirectly, offer or receive any illegal or improper payments or comparable benefits that are intended or perceived to obtain undue favours for the conduct of our business.

REMEMBER...

Violation by even a single employee of any law relating to anti-bribery, anti-corruption, anti-competition, data privacy, etc. could result in severe financial penalties and cause irreparable reputational damage to the company.

Gifts and hospitality

11. Business gifts and hospitality are sometimes used in the normal course of business activity. However, if offers of gifts or hospitality (including entertainment or travel) are frequent or of substantial value, they may create the perception of, or an actual conflict of interest or an 'illicit payment'. Therefore, gifts and hospitality given or received should be modest in value and appropriate, and in compliance with our company's gifts and hospitality policy.

Freedom of association

12. We recognise that employees may be interested in joining associations or involving themselves in civic or public affairs in their personal capacities, provided such activities do not create an actual or potential conflict with the interests of our company. Our employees must notify and seek prior approval for any such activity as per the 'Conflicts of Interest' clause of this Code and in accordance with applicable company policies and law.

REMEMBER...

As a general rule, we may accept gifts or hospitality from a business associate, only if such a gift:

- has modest value and does not create a perception (or an implied obligation) that the giver is entitled to preferential treatment of any kind;
- would not influence, or appear to influence, our ability to act in the best interest of our company;
- would not embarrass our company or the giver if disclosed publicly.

The following gifts are never appropriate and should never be given or accepted:

- gifts of cash or gold or other precious metals, gems or stones;
- gifts that are prohibited under applicable law;
- gifts in the nature of a bribe, payoff, kickback or facilitation payment*;
- gifts that are prohibited by the gift giver's or recipient's organisation; and
- gifts in the form of services or other non-cash benefits (e.g. a promise of employment).

(*'Facilitation' payment is a payment made to secure or speed up routine legal government actions, such as issuing permits or releasing goods held in customs.)

Working outside employment with us

13. Taking employment, accepting a position of responsibility or running a business outside employment with our company, in your own time, with or without remuneration, could interfere with your ability to work effectively at our company or create conflicts of interest. Any such activity must not be with any customer, supplier, distributor or competitor of our company. Our employees must notify and seek prior approval for any such activity as per the 'Conflicts of Interest' clause of this Code and in accordance with applicable company policies and law.

Integrity of information and assets

14. Our employees shall not make any wilful omissions or material misrepresentation that would compromise the integrity of our records, internal or external communications and reports, including the financial statements.
15. Our employees and directors shall seek proper authorisation prior to disclosing company or business-related information, and such disclosures shall be made in

accordance with our company's media and communication policy. This includes disclosures through any forum or media, including through social media.

16. Our employees shall ensure the integrity of personal data or information provided by them to our company. We shall safeguard the privacy of all such data or information given to us in accordance with applicable company policies or law.
17. Our employees shall respect and protect all confidential information and intellectual property of our company.
18. Our employees shall safeguard the confidentiality of all third party intellectual property and data. Our employees shall not misuse such intellectual property and data that comes into their possession and shall not share it with anyone, except in accordance with applicable company policies or law.
19. Our employees shall promptly report the loss, theft or destruction of any confidential information or intellectual property and data of our company or that of any third party.

Q&A

I am an accountant in the finance department of my company. Due to my artistic skills, I received an offer to pen cartoons for a children's publication for which I would receive compensation. I plan to undertake this activity during week-ends. What should I do before accepting this offer?

Before accepting the offer, you should ascertain whether the company policies and rules require you to make a disclosure to your supervisor so that the company may determine whether your undertaking this activity adversely affects our company's interests. On confirmation from the company that it does not do so, you would be free to take up the activity. It is also your duty to bring to the attention of the company whenever there is any change in the situation you have disclosed.

20. Our employees shall use all company assets, tangible and intangible, including computer and communication equipment, for the purpose for which they are provided and in order to conduct our business. Such assets shall not be misused. We shall establish processes to minimise the risk of fraud, and misappropriation or misuse of our assets.
21. We shall comply with all applicable anti-money laundering, anti-fraud and anti-corruption laws and we shall establish processes to check for and prevent any breaches of such laws.

Insider trading

22. Our employees must not indulge in any form of insider trading nor assist others, including immediate family, friends or business associates, to derive any benefit from access to and possession of price sensitive information that is not in the public domain. Such information would include information about our company, our group companies, our clients and our suppliers.

Q & A

Our company has recently announced the launch of a new business initiative. In connection with this, your friend who is a journalist with a leading business newspaper has asked you to provide some information that he could cover in his forthcoming article. He has promised not to quote you, or reveal your identity. Should you be giving him this information?

No. You should not be sharing information of this nature with the media, even if it is assured that the source would remain anonymous. Only authorised personnel in the company are permitted to speak to the media and provide information of this nature.

Our company has a “Use of Social Media” policy that lays down the “dos and don’ts” for use of social media even if you may access such media on your own time. Why is there such a policy?

External communication is a serious matter. It must be carefully managed because information put out with reference to our company or its businesses needs to be clear, truthful and not violate any undertakings we have given to other parties. In each business there are managers nominated to authorise and make different types of statements to the outside world. These managers should be consulted about any request for information you may receive or information you think we should give out.

In using social media, in particular blogs or social networking sites, you should exercise great caution while talking about our company or the business we do. It may feel like you are chatting with friends or expressing a personal opinion but even while doing so you cannot share any confidential information of our company.

REMEMBER...

We must respect the property rights of others by never misusing their assets, intellectual property or trade secrets, including the copying or downloading of unauthorised software, trademarks, copyrighted material or logos. We should never make unauthorised copies of computer software programs or use unlicensed personal software on company computers.

Prohibited drugs and substances

23. Use of prohibited drugs and substances creates genuine safety and other risks at our workplaces. We do not tolerate prohibited drugs and substances from being possessed, consumed or distributed at our workplaces, or in the course of company duties.

Conflicts of interest

24. Our employees and executive directors shall always act in the interest of our company and ensure that any business or personal association *including close personal relationships* which they may have, does not create a conflict of interest with their roles and duties in our company or the operations of our company. Further, our employees and executive directors shall not engage in any business, relationship or activity, which might conflict with the interest of our company or our group companies.

25. Should any actual or potential conflicts of interest arise, the concerned person must immediately report such conflicts and seek approvals as required by applicable law and company policy. The competent authority shall revert to the employee within a reasonable time as defined in our company's policy, so as to enable the concerned employee to take necessary action as advised to resolve or avoid the conflict in an expeditious manner.

26. In the case of all employees other than executive directors, the Chief Executive Officer / Managing Director shall be the competent authority, who in turn shall report such cases to the Board of Directors on a quarterly basis. In case of the Chief Executive Officer / Managing Director and executive directors, the Board of Directors of our company shall be the competent authority.

Q & A

You are responsible for maintaining our company's customer database. One of your friends is starting a business venture and requests you to share a few particulars from this database for marketing purposes of his business. He assures you that he would keep the data as well as his source confidential. Should you do so?

No. You should respect the confidentiality of customer information and not share any part of the database with any person without due authorisation.

You have access to revenue numbers of different business units of our company. While having a conversation with you over evening drinks, your friend enquires about the financial performance of our company. You do not share detailed information with your friend, but share approximate revenue figures. Is this conduct of yours correct?

No, it is not. You are not permitted to share financial information of our company with others who do not need to know this information. Financial information should always be safeguarded and disclosed only on a need-to-know basis after obtaining requisite approvals. Sharing of any price sensitive information that is not generally available with the public could also lead to violation of applicable insider trading laws.



27. Notwithstanding such or any other instance of conflict of interest that exists due to historical reasons, adequate and full disclosure by interested employees shall be made to our company's management. At the time of appointment in our company, our employees and executive directors shall make full disclosure to the competent authority, of any interest leading to an

actual or potential conflict that such persons or their immediate family (including parents, siblings, spouse, partner, children) or persons with whom they enjoy close personal relationships, may have in a family business or a company or firm that is a competitor, supplier, customer or distributor of, or has other business dealings with, our company.

REMEMBER...

A conflict of interest could be any known activity, transaction, relationship or service engaged in by an employee, his/her immediate family (including parents, siblings, spouse, partner, and children), relatives or a close personal relationship, which may cause concern (based upon an objective determination) that the employee could not or might not be able to fairly perform his/her duties to our company.

Examples of Potential Conflicts of Interest

A conflict of interest, actual or potential, arises where, directly or indirectly, an employee or executive director:

- (a) engages in a business, activity or relationship with anyone who is party to a transaction with our company;
- (b) is in a position to derive an improper benefit, personally or for any family member or for any person in a close personal relationship, by making or influencing decisions relating to any transaction;
- (c) conducts business on behalf of our company or is in a position to influence a decision with regard to our company's business with a supplier or customer where a relative of, or a person in close personal relationship with, an employee or executive director is a principal officer or representative, resulting in a personal benefit or a benefit to the relative;
- (d) is in a position to influence decisions with regard to award of benefits such as increase in salary or other remuneration, posting, promotion or recruitment of a relative or a person in close personal relationship employed in our company or any of our group companies;
- (e) undertakes an activity by which the interest of our company or our group companies can be compromised or defeated; or
- (f) does anything by which an independent judgement of our company's or our group companies' best interest cannot be exercised.



28. If there is a failure to make the required disclosure and our management becomes aware of an instance of conflict of interest that ought to have been disclosed by an employee or executive director, our management shall take a serious view of the matter and consider suitable disciplinary action as per the terms of employment. In all such matters, we shall follow clear and fair disciplinary procedures, respecting the employee's right to be heard.

Examples of activities normally approved (post-disclosure) as per applicable company policy

Acceptance of a position of responsibility (whether for remuneration or otherwise) in the following cases would typically be permitted, provided the time commitments these demand do not disturb or distract from the employee's primary duties and responsibilities in our company, and are promptly disclosed to the relevant competent authority:

- Directorships on the Boards of any of our group companies, joint ventures or associate companies.
- Memberships/positions of responsibility in educational/professional bodies, where such association will promote the interests of our company.
- Memberships or participation in government committees/bodies or organisations.

Q&A

You are in a relationship with a colleague who has been recently moved into your team and would now be reporting to you. What should you do?

Romantic or close personal relationships with another employee where a reporting relationship exists and one is responsible for evaluating the other's performance, is likely to create a conflict of interest. In such a situation, you would need to report the potential conflict to your supervisor.

Your company is submitting a proposal to a company in which you were previously employed. You have confidential information pertaining to your previous employer, which you believe will help your present employer in winning the contract. Should you share this information?

No. You should not share this information with your company since it relates to confidential information of a third party. Your company respects its employees' duty to protect confidential information that they may have relating to their previous employers.

You are the purchasing manager in the procurement department of your company. You receive an invitation from a supplier to attend a premier sporting event as her guest. This particular supplier is one of the vendors who has submitted a proposal for an open tender issued by your company. Should you accept the invitation?

No. You should not accept the invitation in this instance. Since you are in a key decision-making role for the tender, any unusual benefit that you receive could be perceived as an inducement that could compromise your objectivity.

OUR CUSTOMERS



We have continued to enjoy prosperity, even with adverse times to fight against. Our relations with all concerned are the most friendly. We have maintained the same character for straight-forward dealing with our constituents and customers. Our productions have continued to be of the same high quality, and therefore command the best reputation and realise the highest prices. ... I mention these facts only to point out that with honest and straight-forward business principles, close and careful attention to details, and the ability to take advantage of favourable opportunities and circumstances, there is a scope for success.

Jamsetji Tata
Founder of the Tata group
Chairman, Tata Sons (1868 – 1904)

E. OUR CUSTOMERS

Products and services

1. We are committed to supplying products and services of world-class quality that meet all applicable standards.
2. The products and services we offer shall comply with applicable laws, including product packaging, labelling and after-sales service obligations.
3. We shall market our products and services on their own merits and not make unfair or misleading statements about the products and services of our competitors.

Export controls and trade sanctions

4. We shall comply with all relevant export controls or trade sanctions in the course of our business.

Fair competition

5. We support the development and operation of competitive open markets and the liberalisation of trade and investment in each country and market in which we operate.
6. We shall not enter into any activity constituting anti-competitive behaviour such as abuse of market dominance, collusion, participation in cartels or inappropriate exchange of information with competitors.
7. We collect competitive information only in the normal course of business and obtain the same through legally permitted sources and means.

Dealings with customers

8. Our dealings with our customers shall be professional, fair and transparent.
9. We respect our customers' right to privacy in relation to their personal data. We shall safeguard our customers' personal data, in accordance with applicable law.

Q&A

You are the Regional Sales Manager of our company. You have become a member of an “informal group”, on an instant messaging service, whose members are the regional sales heads of our company’s competitors. The administrator of the group has requested an in-person meeting to informally discuss market conditions and brainstorm on “pricing strategy” from an industry perspective. What should you do?

Any meeting with competitors, especially to discuss “pricing strategy”, could be an attempt to promote an anti-competitive practice or manipulate prices. You should respond by declining this invitation and exiting the “informal group”. You should also report this incident to your supervisor and your Legal department.

You are attending a customer meeting with a colleague, and your colleague makes an untruthful statement about the company’s services. What should you do?

You should assist your colleague in correcting the inaccuracy during the meeting if possible. If this is not possible, raise the issue with your colleague after the meeting to enable him/her or the company to correct any misrepresentation made to the customer.

While working on a customer project, you receive a call from your colleague. He used to manage that customer account before you took over his role. He recalls that he had worked with the customer on developing a new ordering system which he thinks would be beneficial for another customer and requests you to send him the project details. What should you do?

You must not share this information without specific approval of the customer; you are not permitted to use a customer’s assets, including software, for another customer or for any personal use.

REMEMBER...

Striving for excellence in the standards of our work and in the quality of our goods and services is a core Tata value. It is the unwavering practice of this value that builds and sustains customer trust in our brand.

OUR COMMUNITIES AND THE ENVIRONMENT



In a free enterprise, the community is not just another shareholder in business but is in fact the very purpose of its existence.

Jamsetji Tata

Founder of the Tata group
Chairman, Tata Sons (1868 – 1904)

F. OUR COMMUNITIES AND THE ENVIRONMENT

Communities

1. We are committed to good corporate citizenship, and shall actively assist in the improvement of the quality of life of the people in the communities in which we operate.
2. We engage with the community and other stakeholders to minimise any adverse impact that our business operations may have on the local community and the environment.
3. We encourage our workforce to volunteer on projects that benefit the communities in which we operate, provided the principles of this Code, where applicable, and in particular the 'Conflicts of Interest' clause are followed.

The environment

4. In the production and sale of our products and services, we strive for environmental sustainability and comply with all applicable laws and regulations.
5. We seek to prevent the wasteful use of natural resources and are committed to improving the environment, particularly with regard to the emission of greenhouse gases, consumption of water and energy, and the management of waste and hazardous materials. We shall endeavour to offset the effect of climate change in our activities.

OUR VALUE-CHAIN PARTNERS



If we had done some of the things that some other groups have done, we would have been twice as big as we are today. But we didn't, and I would not have it any other way.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

(on the pace of expansion of the Tata group in the 1960s and 70s)



G. OUR VALUE-CHAIN PARTNERS

1. We shall select our suppliers and service providers fairly and transparently.
2. We seek to work with suppliers and service providers who can demonstrate that they share similar values. We expect them to adopt ethical standards comparable to our own.
3. Our suppliers and service providers shall represent our company only with duly authorised written permission from our company. They are expected to abide by the Code in their interactions with, and on behalf of us, including respecting the confidentiality of information shared with them.
4. We shall ensure that any gifts or hospitality received from, or given to, our suppliers or service providers comply with our company's gifts and hospitality policy.
5. We respect our obligations on the use of third party intellectual property and data.



Q & A

You head the procurement function in our company. You have tight budgetary constraints for a project that you are working on. In order to complete the project within the targeted costs, you intend to request your supplier to provide you an exceptional discount on this project order on the understanding that you would “make it up to him” in future orders. Would you be violating the Code?

Yes, you would. Inducement in any form, including future benefits to the supplier, could compromise your ability to act objectively and in the best interests of the company and therefore must be avoided.

REMEMBER...

Our value-chain partners would include our suppliers and service providers, distributors, sales representatives, contractors, channel partners, consultants, intermediaries and agents; joint-venture partners and other business associates.



OUR FINANCIAL STAKEHOLDERS



Ethical behaviour in business – in every sphere and with all constituents – has been the bedrock on which the Tata group has built, and operates, its enterprises. This has been an article of faith for the group ever since its inception, a fundamental element of our cherished heritage and the essence of our way of life.

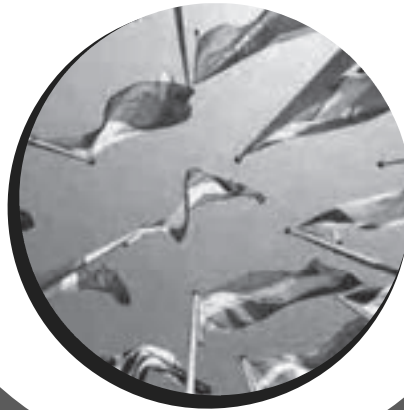
Ratan Tata

Chairman, Tata Sons (1991 – 2012)

H. OUR FINANCIAL STAKEHOLDERS

1. We are committed to enhancing shareholder value and complying with laws and regulations that govern shareholder rights.
 2. We shall inform our financial stakeholders about relevant aspects of our business in a fair, accurate and timely manner and shall disclose such information in accordance with applicable law and agreements.
 3. We shall keep accurate records of our activities and shall adhere to disclosure standards in accordance with applicable law and industry standards.
-

GOVERNMENTS



Business, as I have seen it, places one great demand on you; it needs you to impose a framework of ethics, values, fairness and objectivity on yourself at all times. It is not easy to do this; you cannot impose it on yourself forcibly because it has to become an integral part of you.

Ratan Tata

Chairman, Tata Sons (1991 – 2012)

I. GOVERNMENTS

Political non-alignment

1. We shall act in accordance with the constitution and governance systems of the countries in which we operate. We do not seek to influence the outcome of public elections, nor to undermine or alter any system of government. We do not support any specific political party or candidate for political office. Our conduct must preclude any activity that could be interpreted as mutual dependence/favour with any political body or person, and we do not offer or give any company funds or property or other resources as donations to any specific political party, candidate or campaign.

Any financial contributions considered by our Board of Directors in order to strengthen democratic forces through a clean electoral process shall be extended only through the Progressive Electoral Trust in India, or by a similar transparent, duly-authorized, non-discriminatory and non-discretionary vehicle outside India.

Government engagement

2. We engage with the government and regulators in a constructive manner in order to promote good governance. We conduct our interactions with them in a manner consistent with our Code.
3. We do not impede, obstruct or improperly influence the conclusions of, or affect the integrity or availability of data or documents for any government review or investigation.

OUR GROUP COMPANIES



I do not think anyone was on par with Jamsetji as an industrial visionary. But that is not the sole reason why I have been an admirer of Jamsetji. The major reason was his sense of values, sterling values, which he imparted to this group. If someone were to ask me, what holds the Tata companies together, more than anything else, I would say it is our shared ideals and values which we have inherited from Jamsetji Tata.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

J. OUR GROUP COMPANIES

1. We seek to cooperate with our group companies, including joint ventures, by sharing knowledge, physical resources, human and management resources and adopting leading governance policies and practices in accordance with applicable law including adherence to competition law, where relevant.
2. We shall strive to achieve amicable resolution of any dispute between us and any of our group companies, through an appropriate dispute resolution mechanism so that it does not adversely affect our business interests and stakeholder value.
3. We shall have processes in place to ensure that no third party or joint venture uses the TATA name/brand to further its interests without proper authorisation.
4. Our Board of Directors shall consider for adoption policies and guidelines periodically formulated by Tata Sons and circulated to group companies.

Q & A

You are in the process of selecting potential vendors for an IT project in our company. In the final shortlist of two companies, one is a new start-up with limited references and a lower price-quotation, while the other is a Tata company with thirty years of implementation experience and good references, but a marginally higher quote for the same job. With all other parameters of choice being nearly equal, which company should you select for the job?

While price is undoubtedly an important criterion for decision making, it is clearly not the only one to be evaluated. You may also need to consider good customer references, proven track record and shared value systems in order to decide on your IT partner.

You are in the process of selecting potential vendors for a project. One of the three finalists is a group company. In reviewing the final proposals, you rank the group company second out of the three proposals based on pricing and total cost of ownership, and select the first-ranked vendor. Is this the right decision?

Yes. You should select the vendor that, on its own merits, is the vendor that is most appropriate for your company's requirements. You should not select a group company only because of its affiliation.

RAISING CONCERNS

We encourage our employees, customers, suppliers and other stakeholders to raise concerns or make disclosures when they become aware of any actual or potential violation of our Code, policies or law. We also encourage reporting of any event (actual or potential) of misconduct that is not reflective of our values and principles.

Avenues available for raising concerns or queries or reporting cases could include:

- immediate line manager or the Human Resources department of our company
- designated ethics officials of our company
- the 'confidential reporting' third party ethics helpline (if available)
- any other reporting channel set out in our company's 'Whistleblower' policy.

We do not tolerate any form of retaliation against anyone reporting legitimate concerns. Anyone involved in targeting such a person will be subject to disciplinary action.

If you suspect that you or someone you know has been subjected to retaliation for raising a concern or for reporting a case, we encourage you to promptly contact your line manager, the company's Ethics Counsellor, the Human Resources department, the MD/CEO or the office of the group's Chief Ethics Officer.

Q & A

My supervisor has asked me to do something which I believe may be illegal. I am afraid if I do not do what I am told, I could lose my job. Should I do it?

No. Breaking the law is never an option. Discuss the situation with your supervisor to be certain that you both understand the facts. If your concerns are not resolved, contact a higher level supervisor, the Ethics Counsellor, the Legal department or report them via the company's confidential reporting system, if available.

I feel that my supervisor is treating me unfairly for reporting a concern to the Ethics Counsellor. What should I do?

Retaliation against anyone who raises a concern is a violation of the Code. You should therefore promptly report this action of your supervisor to the Ethics Counsellor or the MD/CEO of your company or via the company's confidential reporting system, if available.

ACCOUNTABILITY

This Code is more than a set of prescriptive guidelines issued solely for the purpose of formal compliance. It represents our collective commitment to our value system and to our core principles.

Every person employed by us, directly or indirectly, should expect to be held accountable for his/her behaviour. Should such behaviour violate this Code,

they may be subject to action according to their employment terms and relevant company policies.

When followed in letter and in spirit, this Code is *'lived'* by our employees as well as those who work with us. It represents our shared responsibility to all our stakeholders, and our mutual commitment to each other.

SPEAK UP...

If you are unsure whether a particular action you are about to take is consistent with the principles set forth in the Code, ask yourself:

- Could it directly or indirectly endanger someone or cause them injury?
- Is it illegal/unlawful or out of line with our policies and procedures?
- Does my conscience reject it? Does it conflict with my personal values?
- Would I feel uncomfortable if the story appeared in the media? Would it shame my company, spouse, partner, parent or child?
- Does it 'feel' wrong?

If the answer to any of these questions is "Yes", please stop and consult your reporting manager, the Ethics Counsellor, the Human Resource department, the Legal department or any member of the senior management team, to assist you in making the decision.

When faced with a dilemma: Stop, Think, Act Responsibly

NOTE

The Code does not provide a comprehensive and complete explanation of all expectations from a company standpoint or obligations from a stakeholder standpoint.

Our employees have a continuing obligation to familiarise themselves with all applicable law, group-level advisories and policies, company-level policies, procedures and work rules as relevant. For any guidance on interpretation of the Code, we may seek support from our company's Ethics Counsellor or from the group's Chief Ethics Officer, as appropriate.

All joint ventures are encouraged to adopt the Tata Code of Conduct (TCOC) or a code of conduct that incorporates all elements of the TCOC.

This version of the Tata Code of Conduct supersedes all earlier versions and associated documents and stands effective from 29th July, 2015.

For any query or clarification on the Code, please contact the office of the group's Chief Ethics Officer via email at: ethicsoffice@tata.com.



TATA CODE OF CONDUCT – 2015

I acknowledge that I have received the Tata Code of Conduct.

I have read the Tata Code of Conduct and I acknowledge that as a Tata employee, I am required to comply with the guidelines described therein and failure to do so may subject me to action as per my employment terms and relevant company policies.

If I have a concern about a violation, or a potential violation of the Tata Code of Conduct, I understand that there are channels available to me in my company to report such concerns. By making use of these channels when necessary, I will play my part in maintaining the high ethical standards to which we hold ourselves.

Signature: _____

Date: _____

Name: _____

Department: _____

Address: _____

(Please submit this declaration to your Ethics Counsellor or the Human Resource department of your company.)







For further information on the Code please contact:
 The Ethics Office,
 Tata Sons Ltd.,
 Bombay House,
 24, Homi Mody Street,
 Mumbai - 400001, India.
 Email: ethicsoffice@tata.com

The Tata Power Company Ltd



OPEN TENDER NOTIFICATION

Tender Reference: CC25NP003

Document Date: 07th May' 2024

CONFIDENTIAL

Section F.1: EMD Format

FORMAT F.3

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed and stamped by the bidder)

In a bid to make our entire procurement process more fair and transparent, Tata Power intends to use the reverse auctions through E-Tender system as an integral part of the entire tendering process. All the bidders who are found as technically qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid event:

1. Tata Power shall log-in to the authorized representative of the bidder.
2. Tata Power will make every effort to make the bid process transparent. However, the award decision including sharing of work would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of Tata Power, bid process, bid technology, bid documentation and bid details.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through Internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs, power failure or any other reason shall not be the responsibility of Tata Power.
6. Tata Power has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case of an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out-rightly rejected by Tata Power.
8. The bidder shall be prepared with competitive price quotes on the day of the bidding event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR at Tata Power site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by Tata Power.
12. Detailed price split of E-auction price will be submitted within 24 hours from completion of E-auction. If not submitted, the original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all inclusive prices offered during conclusion of the auction event for arriving at Contract amount.

Signature & Seal of the Bidder

FORMAT F.4

Format of BID BG / EMD

Whereas (Name of the Contractor), a Company incorporated under the Indian Companies Act 1956, having its Registered office at _____, (hereinafter called the "BIDDER") has in response to your Invitation to Bid against Enquiry No. _____ dated _____, for (name of work), offered to supply and/or execute the works as contained in Employers letter dated _____.

AND WHEREAS BIDDER is required to furnish to you a Bank Guarantee for the sum of Rs. _____/-(Rupees ____ only) as Earnest Money against Bidder's offer as aforesaid.

AND WHEREAS we, (name of the bank) having our Registered Office at _____ and Branch office at _____, have at the request of Bidder, agreed to give you this Guarantee as hereinafter contained.

NOW THEREFORE, in lieu of earnest money deposit, we, the undersigned, hereby covenant that the aforesaid Bid of the BIDDER shall remain open for acceptance by you during the period of validity as mentioned in the Bid Document or any extension thereof as requested by you and if Bidder shall for any reason back out, whether expressly or impliedly, from this said Bid during the period of its validity or any extension thereof as aforesaid, we hereby guarantee to you the payment of the sum of Rs. _____/-(Rupees ____ only) on demand and without demur and notwithstanding the existence of any dispute between you and the BIDDER in this regard and we hereby further agree as follows:

- (a) You shall have the right to file/make a claim on us under the Guarantee for a further period of six months from the said date of expiry.
- (b) That this guarantee shall not be revoked during its currency without your written express consent.
- (c) That you may without affecting this guarantee grant time or other indulgence to or negotiate further with BIDDER in regard to the conditions contained in the said Bid