



## **ODISHA POWER TRANSMISSION CORPORATION LTD**

**OFFICE OF THE SENIOR GENERAL MANAGER,  
CENTRAL PROCUREMENT CELL,  
JANPATH, BHUBANESWAR - 751022  
TENDER SPECIFICATION**

**NO. Sr.G.M.-CPC -e-TENDER-CIRCUIT BREAKER-38/2022-23**

**FOR PROCUREMENT OF**

**(E tendering mode only)**

- I. 420 KV SF6 Circuit breakers=04 Nos.**
- II. 245 KV SF6 Circuit breakers=20 Nos.**
- III. 145 KV SF6 Circuit breakers=45 Nos.**
- IV. 36 KV Vacuum Circuit breakers=100 Nos.**

**Request for online tender documents – From dt-28.02.2023 (11.00 AM) to dt-21.03.2023(1.00 PM)**

**Last date of submission of online tender - dt-21.03.2023(3.00 PM)**

**Date of opening of Tender - 22.03.2023(11.00 AM)**

## ODISHA POWER TRANSMISSION CORPORATION LTD.

REGD. OFFICE: JANPATH, BHUBANESWAR – 751 022,

ODISHA

*e-TENDER NOTICE NO. CPC-38/2022-23*

For and on behalf of ODISHA POWER TRANSMISSION CORPORATION LTD, Chief General Manager [C.P.C.] invites Tenders from reputed manufacturers in two part bidding system for supply of Circuit breakers. The interested bidders would be required to enroll themselves on the tender portal [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL). Complete set of bidding documents are available at [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL) from **28.02.2023 (11.00 AM)** to dt-21**03.2023(1.00 PM)**. Interested manufacturers may visit OPTCL's official web site <http://www.optcl.co.in> and [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL) for detail specification.

N.B:-All subsequent addendums / corrigendum to the tender shall be hosted in the OPTCL's official web site <http://www.optcl.co.in> and [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL) only.

SR GENERAL MANAGER [C.P.C.]

**NOTICE INVITING TENDER**  
**ODISHA POWER TRANSMISSION CORPORATION LTD.,**  
**REGD. OFFICE: JANPATH, Bhubaneswar.**

*e-TENDER NOTICE NO- CPC- 38/2022-23.*

For and on behalf of the ODISHA POWER TRANSMISSION CORPORATION LTD., the undersigned invites bids under two-part bidding system in e- tendering mode only as per the following details.

Sl. No	Tender Specification No.	Description of equipment/materials	Quantity In Nos.	Delivery schedule.	Earnest Money Deposit (In Rs.)	Cost of Tender document (in Rs.)	Last date of receipt & opening of tender
Lot-I	<b>Sr. GM-CPC-e-Tender-CIRCUIT BREAKER - 38/2022-23.</b>	420 KV SF6 Circuit breakers	04	(As per Appendix-II of technical specification)	71,054/-	<b>12,000/- + 2160/- (GST)</b>	<b>21.03.2023 (1.00 PM). &amp; 22.03.2023 (11.00AM).</b>
Lot-II		245 KV SF6 Circuit breakers	20		1,78,074/-		
Lot-III		145 KV SF6 Circuit breakers	45		1,61,158/-		
Lot-IV		36 KV Vacuum Circuit breakers.	100		1,02,164/-		

The bidders can view the tender documents from website free of cost.

**TENDER COST:**

The bidders who want to submit bid shall have to pay Rs. 14,160/- (Rupees Fourteen thousand one hundred sixty) only nonrefundable including GST @ 18%) towards the tender cost, **as per tender notice online through e-payment gateway link provided in e-tender portal (by using Net Banking, Debit Card or Credit Card) prior to last date & time of submission of online tender.** They have to also submit notarized hard copy of GST registration certificate on or before the scheduled date & time of opening of techno-commercial bid.

**TENDER PROCESSING FEE:**

The bidders shall have to submit non-refundable amount of Rs. **Rs. 2360/-** (Rupees Two thousand three hundred sixty) only including GST @ 18%) towards the tender processing fee to K.S.E.D.C.Ltd, in e-payment mode. The e-payment of above amount is to be made to enable the bidder to download the bid proposal sheets & bid document in electronic mode.

**SUBMISSION OF TENDER COST, TENDER PROCESSING FEE & EMD:**

The bidder shall deposit the tender cost, tender processing fee & EMD BG prior to last date & time for submission of bid as notified in tender notice. Local micro & small enterprisers (MSEs) **(In the state of Odisha)** based in Odisha and registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC can participate without payment of the cost of tender

specification. They have to submit notarized hard copy of valid registration as local MSE **(In the state of Odisha)** as above on or before the date & time of submission of techno-commercial bid.

**The demand draft/pay order for tender cost, processing fees are to be submitted along with the EMD at the office of the undersigned on or before the last date & time of submission of tender.**

The bidders shall scan the Demand Draft/Pay order/ Bank guarantee, towards EMD/ notarised hard copy of valid registration as local MSE **(In the state of Odisha)** (if any) and upload the same in the prescribed form in .gif or .jpg format in addition to sending the original as stated above.

The prospective bidders are advised to register their user ID, Password, company ID from website **[www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL)** by clicking on hyper link "Register Me".

Any clarifications regarding the scope of work and technical features of the tender can be had from the undersigned during office hours.

***Minimum qualification criteria of bidders: AS STIPULATED IN SECTION-II, (G.T.C.C) OF THE TENDER SPECIFICATION.***

**SR GENERAL MANAGER, CPC**

**ODISHA POWER TRANSMISSION CORPORATION LTD.**

**OFFICE OF THE SR. GENERAL MANAGER**

**CENTRAL PROCUREMENT CELL**

**FAX NO.:0674 – 2542964**

**TELEPHONE NO.:0674 – 2541801**

**JANAPATH, BHUBANESWAR – 751022**

**TENDER SPECIFICATION NO. Sr.G.M.-CPC –E-TENDER-CIRCUIT BREAKER-38 / 2022-23**

**CONTAINING**

**PART – I**

**SECTION – I : INSTRUCTION TO TENDERERS**

**SECTION – II : GENERAL TERMS AND CONDITIONS OF  
CONTRACT ( G.T.C.C.) (COMMERCIAL)**

**SECTION – III : LIST OF ANNEXURES (COMMERCIAL)**

**SECTION – IV : TECHNICAL SPECIFICATION**

**PART – II PRICE BID.**

**SECTION – I.**  
**INSTRUCTIONS TO TENDERERS**

<b><u>Clause.</u></b>	<b><u>Title.</u></b>	<b><u>Page.</u></b>
1.	Submission of Bids.	02
2.	Division of Specification.	02
3.	Tenders shall be in two parts.	
4.	Opening of Bids .	03
5.	Purchaser’s right regarding alteration in Quantities, Tendered.	04
6.	Procedure and opening time of tenders.	04
7.	Bidder’s liberty to deviate from specification.	
8.	Eligibility for submission of bids.	04
9.	Purchaser’s right to accept/reject bids.	10
10.	Mode of submission of tenders.	10
11.	Earnest money deposit.	10
12.	Validity of the bids.	11
13.	Price.	11
14.	Revision of Tender Price by Bidders.	11
15.	Tenderers to be fully conversant with the clauses of the Specification.	11
16.	Documents to accompany Bids.	11
17.	Documents/Papers to Accompany PART – II Bid. 12	
18.	Conditional Offer.	12
19.	General.	12

## COMMERCIAL SPECIFICATION.

### SECTION-I

#### INSTRUCTIONS TO TENDERER

##### 1. 1. Submission of Bids: -

The bidder shall submit the bid in Electronic Mode only i.e. [www.tenderwizard.com/OPTCL](http://www.tenderwizard.com/OPTCL). The bidder must ensure that the bids are received in the specified website of the OPTCL by the date and time indicated in the Tender notice. Bids submitted by telex/telegram will not be accepted. No request from any bidder to the OPTCL to collect the Bids in physical form will be entertained by the OPTCL.

The OPTCL reserves the right to reject any bid, which is not deposited according to the instruction, stipulated above. The participants to the tender should be registered under GST laws.

1. For all the users it is mandatory to procure the Digital Signatures.
2. Contractors / Vendors / Bidders / Suppliers are requested to follow the below steps for **Registration**:
  - a. Click "Register", fill the online registration form.
  - b. Pay the amount of **Rs. 2360/-** through DD in Favour of KSEDCL Payable at Bangalore.
  - c. Send the acknowledgment copy for verification.
  - d. As soon as the verification is being done the e-tender user id will be enabled.
3. After viewing Tender Notification, if bidder intends to participate in tender, he has to use his e-tendering User Id and Password which has been received after registration and acquisition of DSCs.
4. If any Bidder wants to participate in the tender he will have to follow the instructions given below:
  - a. Insert the PKI (which consist of your Digital Signature Certificate) in your System. (Note: Make sure that necessary software of PKI be installed in your system).
  - b. Click / Double Click to open the Microsoft Internet Explorer (This icon will be located on the Desktop of the computer).
  - c. Go to Start > Programs > Internet Explorer.
  - d. Type **www.tenderwizard.com/OPTCL** in the address bar, to access the Login Screen.
  - e. Enter e-tender User Id and Password, click on "Go".
  - f. Click on "Click here to login" for selecting the Digital Signature Certificate.
  - g. Select the Certificate and enter DSC Password.
  - h. Re-enter the e-Procurement User Id Password
5. To make a request for Tender Document Bidders will have to follow below mentioned steps.
  - Click "Un Applied" to view / apply for new tenders.
  - Click on Request icon for online request.
6. After making the request Bidders will receive the Tender Documents which can be checked and downloaded by following the below steps:

- Click to view the tender documents which are received by the user.
  - Tender document screen appears.
  - Click “Click here to download” to download the documents.
7. After completing all the formalities Bidders will have to submit the tender and they must take care of following instructions.
- Prior to submission, verify whether all the required documents have been attached and uploaded to the particular tender or not.
  - Note down / take a print of bid control number once it displayed on the screen
8. Tender Opening event can be viewed online.
9. Competitors bid sheets are available in the website for all.
10. **For any e-tendering assistant contact help desk number mentioned below.** Bangalore – 080- 40482000.

The participants to the tender should be registered under GST laws.

## **2. Division of Specification.**

The specification is mainly divided into two parts viz. Part-I & Part-II.

### **Part-1 Consists of**

- |                   |   |
|-------------------|---|
| [i] Section-I     | Instruction to Tenderers.               |
| [ii] Section-II   | General Terms & conditions of contract. |
| [iii] Section-III | Schedules and forms etc.                |
| [iv] Section-IV   | Technical Specification.                |

### **Part-II Consists of**

Schedule of prices as per Annexure-V

## **3. Tenders shall be in two parts.**

The Tenderers are required to submit the tenders in two parts viz. Part-I ( Techno commercial) & Part-II (Price bid).

## **4. Opening of Bids.**

- [a] The tender shall be opened on the date and time fixed by the OPTCL for opening of bids in Electronic mode in presence of such of the Tenderers or their authorized representatives [limited to one person only] on the due date of opening of tender who opt remain present. After scrutiny of the technical particulars and other commercial terms, clarifications, if required, shall be sought for from the bidders. The Tenderers shall be allowed 15 days time for such activity.
- [b] On receipt of technical clarification, the bids shall be reviewed, evaluated and those not in conformity with the technical Specification / qualifying experience, shall be rejected. If any of the technical proposal requires modification to make them comparable, discussion will be held with the participating bidders.



All the responsive bidders shall be given opportunity to submit the revised technical and revised price proposals as a follow up to the clarification (modification if any) on the technical proposals. The qualified bidders shall be given opportunity to submit revised price proposals within 15 days from the date of such discussion or within time frame mutually agreed, whichever is earlier.

- [c] When the revised price proposals are received, the original price proposals will be returned to the bidders unopened along with their original technical proposals. Only the revised technical and price proposals will be considered for bid evaluation. The price bids [Part-II] of such of the Tenderers, whose tenders have been found to be technically and commercially acceptable, including those supplementary revised price bids, submitted subsequently, shall be opened in the presence of the bidder's representative on a date and time which will be intimated to all technically and commercially acceptable Tenderers.
- [d] The bidders are required to furnish sufficient information to the Purchaser to establish their qualification, capacity to manufacture and/or supply the materials/perform the work. Such information shall include details of bidder's experience, its financial, managerial and technical capabilities.
- [e] The bidders are also required to furnish details of availability of appropriate technical staff and capability to perform after sales services. The above information shall be considered during scrutiny and evaluation of bids and any bid which does not satisfactorily meet these requirements, shall not be considered for price bid evaluation.
- [f] The price bids of the technically and otherwise acceptable bids shall only be evaluated as per the norms applicable in terms of this Specification.

5. Purchaser's Right Regarding Alteration of Quantities Tendered.

**The Purchaser may alter the quantities of materials/equipment at the time of placing orders. Initially the purchaser may place orders for lesser quantity with full freedom to place extension orders for further quantity under similar terms and conditions of the original orders. Orders may also be split among more than one tenderer for any particular item, if considered necessary in the interest of the Purchaser to get the goods/equipment earlier.**

6. Procedure and opening time of tenders.

Tenders will be opened in the office of the Chief General Manager [C.P.C.] on the specified date and time in presence of the Tenderers or their authorized representatives [limited to one person only] in case of each bidder who may desire to be present, at the time of opening the bids.

7. Bidder's Liberty to deviate from Specification.

The Tenderer may deviate from the specification while quoting, if in his opinion, such deviation is in line with the manufacturer's standard practice and conducive to a better and more economical offer. All such deviations should however be clearly indicated giving full justifications for such deviation. [Read with Clause-9, Section-II of the Specification].

8. Eligibility for submission of bids.

Only those manufacturers who have deposited the cost of tender specification are eligible to participate in the tender. They should submit the money receipt as a proof of such payment. The local Micro and small Enterprises(MSEs) (In the state of Odisha) registered with respective

DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC can participate without payment of the cost of tender specification

**9. Purchaser's right to accept/reject bids:**

The purchaser reserves the right to reject any or all the tenders without assigning any reasons what so ever if it is in the interest of OPTCL, under the existing circumstances. [Read with clause-10, Section-II of the specification].

**10. Mode of submission of Tenders.**

[A] Tenders shall be submitted in electronic mode only. (www.tenderwizard.com/OPTCL)

[B] **Telegraphic or FAX tenders** shall not be accepted under any circumstances.

**11. Earnest money deposit:**

The tender shall be accompanied by Earnest Money deposit of value specified in the notice inviting tenders against each lot / bid. Tenders without the required EMD as indicated at **Annexure-VIII** will be rejected out rightly.

The local Micro and small Enterprises(MSEs) (In the state of Odisha)registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC can participate by submitting Earnest Money Deposit @ fifty percent of the amount indicated in the Notice Inviting Tender.

The earnest money deposit shall be furnished in one of the following forms subject to the conditions mentioned below:

- (a) **Cash:-** Payable to drawing & disbursing Officer, OPTCL (Hd.qrs. Office), Bhubaneswar - 751022
- (b) **Bank Draft:** -To be drawn in favour of Drawing & Disbursing Officer, OPTCL [H.Qrs.Office], Bhubaneswar-751 022.
- (c) Bank Guarantee from any Nationalized/Scheduled Bank strictly as per enclosed proforma vide **Annexure-VI** to be executed on non-judicial stamp paper worth Rs.29.00 or as applicable, as per prevailing laws in force and also to be accompanied by the confirmation letter of the issuing Bank Branch.

**NOTE:**

- (i). The validity of the EMD in the form of Bank Guarantee shall be at least for 240 days from the date of opening of tender failing which the tender will be liable for rejection.
- (ii) No interest shall be paid on the Earnest Money Deposit.
- (iii) E.M.D. in shape of cash may be submitted up to Rs. 25,000/- (Rupees Twenty-five Thousand) only. Above Rs. 25,000/- (Rupees Twenty-five thousand) the Earnest Money Deposit shall be furnished in any one of the forms indicated above (i.e. Through Bank Draft, Bank Guarantee/ National Savings Certificate).
- (iv) No adjustment towards EMD shall be permitted against any outstanding amount with the **ODISHA POWER TRANSMISSION CORPORATION LTD.**
- (v) The chart showing particulars of EMD to be furnished by Tenderers of different categories is placed at **Annexure-VIII.**
- (vi) In the case of un- successful tenderer, the EMD will be refunded after the tender is decided. In the case of successful Tenderer, this will be refunded only after furnishing of security money referred to at clause-19 of Section-II.

- (vii) Suits, if any, arising out of this clause shall be filed in a Court of law to which the jurisdiction of High Court of ODISHA extends.
- (vii) EMD will be forfeited if the tenderer fails to accept the letter of intent and/or purchase order issued in his favour or to execute the order, placed on them.
- (viii) Tenders not accompanied by Earnest Money shall be disqualified.

**12. Validity of the Bids: -**

The tenders should be kept valid for a period of **180** days from the date of opening of the tender, failing which the tenders will be rejected.

**13. PRICE: -**

i) Tenderers are requested to quote-'FIRM' Price. No deviation from **FIRM PRICE** will be entertained irrespective of deviation clause No.7 of this part of the specification.

**14. Revision of tender price by Bidders: -**

[a] After opening of tenders and within the validity of period, no reduction or enhancement in price will be entertained. If there is any change in price, the tender shall stand rejected and the EMD deposited shall be forfeited.

[b] After opening of price bid if the validity period is not sufficient to place purchase order, the tenderer may be asked by the purchaser to extend the validity period of the bid under the same terms and condition as per the original tender.

However, the tender are free to change any or all conditions including price except delivery period of their bids at their own risk, if they are asked by the purchaser to extend the validity period of the bid prior to opening of price bid.

**15. Tenderers to be fully conversant with the clauses of the Specification: -**

Tenderers are expected to be fully conversant with the meaning of all the clauses of the specification before submitting their tenders. In case of doubt regarding the meaning of any clause, the tenderer may seek clarification in writing from the Chief General Manager (Central Procurement Cell) OPTCL. This, however, does not entitle the Tenderer to ask for time beyond due date, fixed for receipt of tender.

**16. Documents to Accompany Bids.**

Tenderers are required to submit tenders in the following manner:

**The Tender shall Contain the following documents.**

- [i] Declaration Form. [As per Annexure-I]
- [ii] Earnest Money. [As per **Annexure-VIII**]
- [iii] Technical specification and Guaranteed Technical Particulars conforming to the Purchaser's Specification along with drawings, literatures and all other required Annexures, duly filled in.
- [iv] Photostat copies of type test certificates of materials/equipments offered as stipulated in the Technical Specification.
- [v] Abstract of Terms & conditions in prescribed proforma as per **Annexure-II.**
- [vi] General Terms & Conditions of supply offer as per Section-II of the Specification.
- [vii] List of orders executed for similar materials/equipment's during preceding 2 (two) years indicating the customer's name, Purchase Order No. & Date, date of supply and date of commissioning etc.
- [viii] Data on past experience **as per Clause-7 of Section-II** of the Specification.

- [ix] Sales tax clearance certificate for the previous year and GST Compliance Rating. The GST Identification Number (GSTIN) under GST Laws and permanent account number [PAN] of the firm under Income tax Act are required.
- [x] Audited Balance sheet & profit loss accounts of the bidder, for past (3) three years.
- [xi] Schedule of quantity and delivery in the prescribed Proforma vide Annexure, as appended.
- [xii] List of Orders in hand to be executed.
- [xiii] Deviation schedule.
- [xiv] The bidder should not have any pending litigation or arbitration with OPTCL with regard to any project or related activity. The bidder should certify/declare the same in unequivocal terms by way of an affidavit duly sworn before a magistrate/notary.

[xv] Notarized hard copy and soft copy of valid registration as local MSE( In the state of Odisha)(if any).

**17. Documents/Papers to accompany Part-II Bid.**

- (a) Part-II of the tender shall consist of the following
- (i) Schedule of prices in the prescribed proforma

**18. Conditional Offer:**

Conditional offer shall not be accepted.

**19. General: -**

- (i) In the event of discrepancy or arithmetical error in the schedule of price, the decision of the purchaser shall be final and binding on the Tenderer.
- (ii) For evaluation, the price mentioned in words shall be taken if there is any difference in figures and words in the price bid.
- (iii) Notice inviting tender shall form part of this specification.
- (iv) The price bids of the technically and otherwise acceptable bids shall only be evaluated. The EMD of others, if any, shall be returned to the bidders.
- (v) Tenderer can offer any lot or all the lots of the tender, if there are more than one lots. But the tender (bid) must be furnished separately for each lot.
- (vi) It should be distinctly understood that the price bid shall contain only details/documents relating to price, as outlined in clause-17 mentioned herein above. Inclusion of any of the documents/information etc. shall render the bid liable for rejection.
- (vii) The tenderer must submit the EMD amount, cost of tender document (Form Fee) and Tender processing fee in a sealed cover envelope super-scribing the tender specification number, Tender Notice No & Date of tender clearly on the cover envelope. The said envelope is to be submitted in the office of the purchaser on or before the last date and time of submission of Bids.

**20.0 Expenses in respect of OPTCL's representative for witnessing the inspection & testing of the offered equipment/materials at the inspection and testing site.**

The testing and inspection of the equipment/ materials at manufacturer works are in the scope of work of the Contractor/Supplier.

OPTCL inspecting officer, on receipt of offer for inspection from the contractor/supplier, proceeds to the manufacturer works to witness the Type/Acceptance/Routine test.

Important:

It is hereby informed to all the bidders that the relevant clauses of the contract specification, pertaining to inspection and testing of equipment/materials, are hereby supplemented with following additional terms and conditions.

The expenses under the following heads, in respect of OPTCL's representative for witnessing the inspection & testing of the offered equipment/materials at the inspection and testing site, shall be borne by the contractor / supplier.

**a) Hotel Accommodation:**

- I. Single room accommodation in 4 star hotel for the OPTCL inspecting officer of the rank of Assistant General Manager (Grade E-6) and above.
- II. Single room accommodation in 3 star hotel for the OPTCL inspecting officer of the rank below Assistant General Manager (Grade E-6).

N.B.: It is the responsibility of the contractor to arrange the hotel accommodation matching with their inspection and testing schedule, so that the inspecting officer can check-in the hotel one day prior to the date of inspection and check out after the completion of the inspection, subject to availability of the return travel ticket. In case of extended duration of inspection or non-availability of the return travel ticket, Contractor/supplier/manufacturer shall arrange for the extended stay of the inspecting officer in the Hotel accordingly. In case there is no hotel with prescribed standard in and around the place of inspection, the contractor/supplier/manufacturer shall suggest alternative suitable arrangement at the time of offer for inspection, which is subjected to acceptability of OPTCL inspecting officer.

**b) Journey of the inspecting officer:**

- (i) To and fro travel expenditure from the Head Quarters of the inspecting officer to the place of inspection/testing shall be borne by the contractor/supplier/manufacturer. Journey from the Head Quarters of the inspecting officer to the nearest Air Port by train (1st/IIInd A.C) & A/C Taxi then by Air to the place of inspection/testing or to the nearest place of inspection/testing and then by train (1st/IIInd A.C) & A/C taxi to the place of inspection/testing shall be arranged by the contractor/supplier/manufacturer.
- (ii) For train journey, inspecting officer of the rank Assistant General Manager and above shall be provided with 1st class AC ticket and inspecting officer below the rank of Assistant General Manager shall be provided with 2nd class AC ticket.
- (iii) The Air-ticket / train-ticket booking/cancellation is the responsibility of the contractor / supplier.
- (iv) Moreover, if during the journey there is an unavoidable necessity for intermediate travel by road/ waterway/sea-route, the contractor/supplier shall provide suitable conveyance to the inspecting officer for travel this stretch of journey or bear the cost towards this. Any such possibilities shall be duly intimated to OPTCL at the time of their offer for inspection.

**c) Local Conveyance:**

At the place of the inspection/testing, for local journey of the inspecting officer between Hotel and inspection/testing site and or any other places, Air-conditioned four wheeler vehicle in good condition shall be provided by the contractor/supplier/manufacturer.

**d) Following points are also to be considered:**

- (i) All the above expenses shall be deemed to be included in the bidder's quoted price for that supply item. Bidder shall not be eligible to raise any extra claim in this regard.
- (ii) Contractor/supplier/manufacturer may assume that only in 40% of the inspection and testing offer cases, OPTCL inspecting officer, not below the rank of Assistant General Manager will witness the inspection and testing.

- (iii) In case of inspection and testing of some critical equipment/materials like Power transformers, OPTCL may depute more than one inspecting officer.
  - (iv) Contractor/supplier/manufacture shall judiciously plan the inspection/testing schedule and place of inspection/testing, so that optimum number of inspection/testing and minimum time shall be required to cover all the equipment/materials of the relevant contract package.
  - (v) It shall be the responsibility of the Contractor/Supplier to organize the above tour related matters of OPTCL inspecting officer including the matters related to overseas inspection/testing, if any.
- 21.0 (a).** Detailed information on any litigation or arbitration arising out of contract completed or under execution by it over the last five years. A consistent history of litigation by or against the bidder may result in rejection of bid.
- 21.0 (b).** The bidder should not have any pending litigation or arbitration with OPTCL with regard to any project or related activity. The bidder should certify / declare the same in the unequivocal terms by way of an affidavit duly sworn before a magistrate/notary. Bid furnished by the bidder shall not be eligible for consideration if it is not accompanied by the affidavit. Further the bid / LOA/ LOI shall be liable for outright rejection/ cancellation at any stage if any information contrary to the affidavit / declaration is detected.

**SECTION – II.**  
**GENERAL TERMS AND CONDITIONS OF CONTRACT [G.T.C.C.]**

<b><u>Clause.</u></b>	<b><u>Title.</u></b>	<b><u>Page.</u></b>
1.	Scope of the contract.	03
2.	Definition of terms.	03
3.	Manner of execution.	04
4.	Inspection and testing.	04
5.	Training facilities.	05
6.	Rejection of materials.	05
7.	Experience of bidders.	05
8.	Language and measures.	06
9.	Deviation from Specification.	06
10.	Right to reject/accept any tender.	06
11.	Supplier to inform himself fully.	07
12.	Patent rights etc.	07
13.	Delivery.	07
14.	Despatch Instructions.	07
15.	Supplier's Default Liability.	07
16.	Force Majeure.	07
17.	Extension of Time.	08
18.	Guarantee Period.	08
19.	Bank Guarantee towards Security Deposit, Payment and Performance.	08
20.	Import License.	09
21.	Terms of Payment.	09
22.	Price Reduction for Delay in Completion of Contract.	20
23.	Insurance.	09
24.	Payment Due from the Supplier.	09
25.	Sales Tax clearance & GST rating, Audited Accounts	09
26.	Certificate of exemption from Goods & Services Tax.	10
27.	Supplier's Responsibility.	10
28.	Validity.	10
29.	Evaluation.	10
30.	Minimum qualification criteria of Bidders.	10

31.	Jurisdiction of High Court of ODISHA.	11
32.	Correspondences.	11
33.	Official Address of the Parties to the Contract.	11
34.	Outright rejection of Tenders.	12
35.	Documents to be treated as confidential.	13
36.	Scheme/Projects.	13



PART-I

SECTION-II

**GENERAL TERMS AND CONDITIONS OF CONTRACT [G.T.C.C.]**

1. **Scope of the contract:**

The scope of the contract shall be to design, manufacture, supply of equipment as per the specification at the consignee's site, and rendering services in accordance with the enclosed technical specification and bill of quantity.

2.0 **Definition of terms:**

For the purpose of this specification and General Terms and Conditions of contract [GTCC], the following words shall have the meanings hereby indicated, except where otherwise described or defined.

2.1 "The Purchaser" shall mean the Chief General Manager[Central Procurement Cell] for and on behalf of ODISHA POWER TRANSMISSION CORPORATION LTD., Bhubaneswar.

2.2 "The Engineer" shall mean the Engineer appointed by the Purchaser for the purpose of this contract.

2.3 "Purchaser's Representative" shall mean any person or persons or consulting firm appointed and remunerated by the Purchaser to supervise, inspect, test and examine workmanship and materials of the equipment to be supplied.

2.4 "The supplier" shall mean the bidder whose bid has been accepted by the purchaser and shall include the bidder's executives, administrators, successors and permitted assignees.

2.5 "Equipment" shall mean and include all machinery, apparatus, materials, and articles to be provided under the contract by the suppliers.

2.6 "Contract Price" shall mean the sum named in or calculated the bid.

2.7 "General Condition" shall mean these General Terms and Conditions of Contract.

2.8 "The Specification" shall mean both the technical as well as commercial parts of the specification annexed to or issued with GTCC and shall include the schedules and drawings, attached thereto as well as all samples and pattern, if any.

2.9 "Month" shall mean "Calendar month".

2.10 "Writing" shall include any manuscript, type written, printed or other statement reproduction in any visible form and whether under seal or under hand.

2.11 "Basic Price (Taxable value for Goods) at the point of destination" shall mean the price quoted by the bidder for equipment and material at the consignee's store/site. The cost is inclusive of packing, forwarding, freight, insurance and all expenses and taxes & duties at

the end of the supplier excluding Goods & Service Tax. The Goods & Service Tax shall be shown in a separate column item wise alongside the Basic Price quoted at the applicable rate in the Tax Invoice. The applicable rate of GST shall refer to the HSN code of the material supplied. The Basic Price and GST thereon shall be the "FOR Destination Price" as quoted by the bidder.

2.12 The term "Contract document" shall mean and include GTCC, specifications, schedules, drawings, form of tender, Notice Inviting Tender, covering letter, schedule of prices or the final General Conditions, any special conditions, applicable to the particular contract.

2.13 Terms and conditions not herein defined shall have the same meaning as are assigned to them in the Indian Contract Act, failing that in the Odisha General Clauses Act.

3. **Manner of execution:**

All equipment supplied under the contract shall be manufactured in the manner, set out in the specification or where not set out, to the reasonable satisfaction of the Purchaser's representative.

4. **Inspection and Testing:**

[i] The purchaser's representative shall be entitled at all reasonable times during manufacture to inspect, examine and test at the supplier's premises, the materials and workmanship of all equipment/materials to be supplied under this contract and if part of the said equipment/material is being manufactured in other premises, the supplier shall obtain for the purchaser's representative permission to inspect, examine and test as if the equipment/material were being manufactured in the contractor's premises. Such inspection, examination and testing shall not relieve the supplier from his obligations under the contract.

[ii] The Supplier shall give to the purchaser adequate time/notice (at least clear 15 days for inside the state suppliers and 20 days for outside the state suppliers) in writing for inspection of materials indicating the place at which the equipment/material is ready for testing and inspection and shall also furnish the shop Routine Test Certificate, Calibration certificates of Testing instruments, calibrated in Govt. approved laboratory with authenticity letter of that laboratory along with the offer for inspection. A packing list along with the offer, indicating the quantity which can be delivered in full truck load/Mini truck load to facilitate issue of dispatch instruction shall also be furnished.

[iii] Where the contract provides for test at the Premises of the supplier or any of his sub-vendors, the supplier shall provide such assistance, labour, materials, electricity, fuel and instruments, as may be required or as may be reasonably demanded by the Purchaser's

representative to carry out such tests efficiently. The supplier is required to produce shop routine test Certificate, calibration certificates of Testing Instruments before offering their materials/equipment for inspection & testing. The test house/laboratory where tests are to be carried out must be approved by the Govt. A letter pertaining to Govt. approved laboratory must be furnished to the purchaser along with the offer for inspection.

- [iv] After completion of the tests, the Purchaser's representative shall forward the test results to the Purchaser. If the test results conform to the specific standard and specification, the Purchaser shall approve the test results and communicate the same to the supplier in writing. The supplier shall provide at least five copies of the test certificates to the Purchaser.
- [v] The Purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is dispute regarding the quality of supply.
- [vi] If the firm fails to present the offered items for inspection/testing as per their inspection call due to any reason(s) during the visit of inspecting officer at the testing site, the firm shall have to bear all expenses towards repetition of inspection and testing of the total offered quantity or part thereof.

5. **Training facilities.**

The supplier shall provide all possible facilities for training of Purchaser's Technical personnel, when deputed by the Purchaser for acquiring first hand knowledge in assembly of the equipment, its erection, commissioning and for its proper operation & maintenance in service, wherein it is thought necessary by the purchaser.

6. **Rejection of Materials.**

In the event any of the equipment /material supplied by the manufacturer is found defective due to faulty design, bad workmanship, bad materials used or otherwise not in conformity with the requirements of the Specification, the Purchaser shall either reject the equipment/material or ask the supplier in writing to rectify or replace the defective equipment/material free of cost to the purchaser. The Supplier on receipt of such notification shall either rectify or replace the defective equipment/material free of cost to the purchaser within 15 days from the date of issue of such notification by the purchaser. If the supplier fails to do so, the Purchaser may:-

- [a] At its option replace or rectify such defective equipment /materials and recover the extra costs so involved from the supplier plus fifteen percent and/or.

[b] Terminate the contract for balance work/supplies, with enforcement of penalty Clause as per contract for the un-delivered goods and with forfeiture of Performance Guarantee/ CompositeBankguarantee.

[c] Acquire the defective equipment/materials at reduced price, considered equitable under the circumstances.

**7. Experience of Bidders:**

The bidders should furnish information regarding experience particularly on the following points:

[i] Name of the manufacturer:

[ii] Standing of the firm and experience in manufacture of equipment/material quoted:

[iii] Description of equipment/material similar to that quoted, supplied and installed during the last two years with the name(s) of the Organisations to whom supplies were made wherein, at least one (1) certificate shall be from a state/central P.S.U.

[iv] Details as to where installed etc.

[v] Testing facilities at manufacturer's works.

[vi] If the manufacturer is having collaboration with another firm [s], details regarding the same.

[vii] A list of purchase orders of identical material/equipment offered as per technical specification executed during the last two years along with users certificate. User's certificate shall be legible and must indicate, user's name, address, designation, place of use, and satisfactory performance of the equipment/materials for at least two years from the date of commissioning. Wherein at least one (1) certificate shall be from a State/Central or P.S.U. Bids will not be considered if the past manufacturing experience is found to be un-satisfactory or is of less than 2 (two) years on the date of opening of the bid and bids not accompanying user's certificate will be rejected..

**8. Language and measures:**

All documents pertaining to the contract including specifications, schedule, notices, correspondence, operating and maintenance instructions., drawings or any other writing shall be written in English language. The metric system of measurement shall be used exclusively in this contract.

**9. Deviation from specification:**

It is in the interest of the tenderers to study the specification, specified in the tender schedule

thoroughly before tendering so that, if any deviations are made by the Tenderers,(both commercial and Technical), the same are prominently brought out on a separate sheet under heading “Deviations Commercial” and “Deviations Technical”.

A list of deviations shall be enclosed with the tender. Unless deviations in scope, technical and commercial stipulations are specifically mentioned in the list of deviations, it shall be presumed that the tenderer has accepted all the conditions, stipulated in the tender specification, notwithstanding any exemptions mentioned therein.

10. **Right to reject/accept any tender:**

The purchaser reserves the right either to reject or to accept any or all tenders if the situation so warrants in the interest of the purchaser. Orders may also be split up between different Tenderers on individual merits of the Tenderer. The purchaser has exclusive right to alter the quantities of materials/ equipment at the time of placing final purchase order. After placing of the order, the purchaser may defer the delivery of the materials. It may be clearly understood by the Tenderer that the purchaser need not assign any reason for any of the above action [s].

11. **Supplier to inform himself fully:**

The supplier shall examine the instructions to tenderers, general conditions of contract, specification and the schedules of quantity and delivery to satisfy himself as to all terms and conditions and circumstances affecting the contract price. He shall quote price [s] according to his own views on these matters and understand that no additional allowances except as otherwise provided there in will be admissible. The purchaser shall not be responsible for any misunderstanding or incorrect information, obtained by the supplier other than the information given to the supplier in writing by the purchaser.

12. **Patent rights Etc.**

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

13. **Delivery:-**

[a] Time being the essence of the contract; the equipment shall be supplied within the delivery period, specified in the contract. The Purchaser, however, reserves the right to reschedule the delivery and change the destination if required. The delivery period shall be reckoned

from the date of placing the Letter of Intent/Purchase order, as may be specified in LOI/Purchase order.

- [b] The desired delivery period shall be as indicated at Appendix-II (Quantity & Delivery Schedule) of Section-IV (Technical Specification).

14. **Despatch instructions.**

- I] The equipment / materials should be securely packed and dispatched directly to the specified site at the supplier's risk by Road Transport only.

- II] **Loading & unloading of Ordered Materials.**

It will be the sole responsibility of the supplier for loading and unloading of materials both at the factory site and at the destination site/store.

The Purchaser shall have no responsibility on this account.

15. **Supplier's Default Liability.**

- [i] The Purchaser may, upon written notice of default to the supplier, terminate the contract in circumstances detailed hereunder.

- [a] If in the judgement of the Purchaser, the supplier fails to make delivery of equipment/material within the time specified in the contract or within the period for which if extension has been granted by the Purchaser in writing in response to written request of the supplier.

- [b] If in the judgement of the Purchaser, the supplier fails to comply with any of the provisions of this contract.

- [ii] In the event, Purchaser terminates the contract in whole or in part as provided in Clause-15 {I) of this section, the Purchaser reserves the right to purchase upon such terms and in such a manner as he may deem appropriate in relation to the equipment/material similar to that terminated and the supplier will be liable to the Purchaser for any additional costs for such similar equipment/material and/or for penalty for delay as defined in clause-22 of this section until such reasonable time as may be required for the final supply of equipment.

- [iii] In the event the Purchaser does not terminate the contract as provided in clause 15(I) of this Section, supplier shall be liable to the Purchaser for penalty for delay as set out in Clause-22 of this section until the equipment is accepted. This shall be based only on written request of the supplier and written willingness of the Purchaser.

16 **Force Majeure:**

The supplier shall not be liable for any penalty for delay or for failure to perform the contract for reasons of force majeure such as acts of god, acts of the public enemy, acts of

Govt., Fires, floods, epidemics, Quarantine restrictions, strikes, Freight Embargo and provided that the supplier shall within Ten (10) days from the beginning of delay on such account notify the purchaser in writing of the cause of delay. The purchaser shall verify the facts and grant such extension, if facts justify .

**17. Extension of time:-**

If the delivery of equipment/material is delayed due to reasons beyond the control of the supplier, the supplier shall without delay give notice to the purchaser in writing of his claim for an extension of time. The purchaser on receipt of such notice may or may not agree to extend the contract delivery date as may be reasonable but without prejudice to other terms and conditions of the contract.

**18. Guarantee period: - ( As per clause 35 of the technical specification.**

- [i] The stores covered by this specification should be guaranteed for satisfactory operation and against defects in design, materials and workmanship for a period of at least 18 [Eighteen] months from the last date of delivery or 12 [Twelve] months from the date of commissioning whichever is earlier. The above guarantee certificate shall be furnished in triplicate to the purchaser for his approval. Any defect noticed during this period should be rectified by the supplier free of cost to the purchaser provided such defects are due to faulty design, bad workmanship or bad materials used, within one month upon written notice from the purchaser failing which provision of clause 22 (ii) shall apply.
- (ii) Equipment/material failed or found defective during the guarantee period shall have to be guaranteed after repair/replacement for a further period of 12 months from the date of commissioning or 18 months from the date of receipt at the store/site after such repair/replacement whichever is earlier . The Bank Guarantee is to be extended accordingly. Date of delivery as used in this clause shall mean the date on which the materials are received in OPTCL'S stores/site in full & good condition which are released for Despatch by the purchaser after due inspection.
- (iii) The SF6 gas leakage should not exceed 0.5% per year and the leakage rate shall be guaranteed during the warrantee period. In case the leakage under the specified conditions is found to be greater than 0.5% per year after commissioning of circuit breaker during the warrantee period, the manufacturer will have to supply free of cost, the total gas requirement for subsequent ten (10) years, based on actual leakage observed during the warrantee period.

**B.G. towards security deposit, 100% payment and performance guarantee:**

- [i] For manufacturers situated Inside & out side the state of Odisha.

A Composite Bank Guarantee as per the Proforma enclosed at Annexure-VII of the specification for 10% [ten percent] of the Total Landing cost (Taxable Value plus GST thereon) of the purchase order (In case of successful bidder who is a local Micro and small Enterprise(MSEs) (In the state of Odisha) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC 5% (five percent) shall be furnished from any nationalized/scheduled bank having a place of business at Bhubaneswar, to the office of Chief General Manager [Central Procurement Cell] OPTCL within 15 days from the date of issue of the purchase order,. The BG shall be executed on non-judicial stamp paper worth of Rs.29.00 [Rupees twenty nine] only or as per the prevalent rules, valid for a period of 2 months more than the Guarantee Period, for scrutiny and acceptance, failing which the supply order will be liable for cancellation without any further written notices. The BG should be accompanied by a confirmation letter from the concerned bank and should have provision for encashment at Bhubaneswar, before the Bank Guarantee is accepted and all concerned intimated. The B.G should be revalidated as and when intimated to you to cover the entire guarantee period.

- [ii] No interest is payable on any kind of Bank Guarantee.
- [iii] In case of non-fulfillment of contractual obligation, as required in the detailed purchase order/Specification, the composite Bank guarantee shall be forfeited.

**20. Import License**

In case imported materials are offered, no assistance will be given for release of Foreign Exchange. The firm should arrange to import materials from their own quota. Equipment of indigenous origin will be preferred.

**21. (A) Terms of Payment.**

i) 100% taxable value of each consignment with 100% Goods and Services Tax in full as applicable will be paid on receipt of materials in good condition at stores/desired site and verification thereof, subject to furnishing and approval of a. Contract cum Performance Bank Guarantee at the rate of 10% (Ten percent) of Taxable Value plus GST thereon [In case successful bidder is a local Micro and small Enterprise (MSEs), based in Odisha & registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC, **5% (five percent) in place of 10%** (ten percent) will be applicable].

b. Guarantee certificate, c. Test certificate by the Purchaser.

ii) TDS under GST Laws for intra state transactions shall be deducted, if applicable.

iii) Any imposition of new tax or revision of tax shall be paid/reimbursed at the time of dispatch, scheduled or actual whichever is lower (i.e. If delivery is within schedule period,



tax variation as applicable shall be paid, and if delivery is made beyond schedule date, any additional financial implication due to statutory variation in tax shall be to bidder's account)

**[B]** The supplier shall furnish contract cum performance Bank Guarantee of appropriate amount to OPTCL as indicated in (i) above, within 30 days from the date of issue of the purchase order.

**22. Price Reduction Schedule for Delay in Completion of Supply under Purchase Order/Contract**

(i) If the Supplier fails to deliver the materials/equipment within the delivery schedule, specified in the Purchase Order/Contract including delivery time extension, if any, granted with waiver of Price Reduction Schedule, the Purchaser shall recover from the Supplier, Price Reduction Schedule for a sum of half per cent (0.5 per cent) of the Taxable Value of the un-delivered equipment /materials for each calendar week of delay or part thereof. For this purpose, the date of receipted challan shall be reckoned as the date of delivery. The total amount of Price Reduction Schedule shall not exceed five per cent (5%) of the Taxable Value of the un-delivered equipment/materials. Equipment will be deemed to have been delivered only when all its components, accessories and spares as per technical Specification are also delivered. If certain components, accessories and spares are not delivered in time, the equipment/materials will be considered delayed until such time as the missing components, accessories and spares are delivered.

(ii) During the guarantee period, if the Supplier fails to rectify/replace the equipment/material within 30 days from the date of intimation of defect by the purchaser, then the Price Reduction Schedule at the rate of half percent (0.5%) of the Total Taxable Value for each calendar week of delay or part thereof shall be recovered by the purchaser. For this purpose, Price Reduction Schedule shall be reckoned from the 30th day from the date of issue of letter on defectiveness of equipment/material. The total amount of Price Reduction Schedule in this case shall not exceed 10% (TEN PERCENT) of the Purchase Order/Contract amount except GST (i.e.Total Taxable Value). If the defects, so intimated are not rectified or equipment/materials not replaced by the supplier within the guarantee period, then whole of the C.P.B.G. will be forfeited by the purchaser, without any intimation to the supplier.

**23. Insurance**

The Supplier shall undertake insurance of stores covered by this Specification unless otherwise stated. The responsibility of delivery of the stores at destination in good condition rests with the Supplier. Any claim with the Insurance Company or transport

agency arising due to loss or damage in transit has to be settled by the supplier. The Supplier shall undertake free replacement of materials damaged or lost, which will be reported by the consignee within 30 days of receipt of the materials at destination without awaiting for the settlement of their claims with the carriers and underwriters.

**24. Payment Due from the Supplier.** All costs and damages, for which the supplier is liable to the purchaser, will be deducted by the purchaser from any money, due to the supplier, under any of the contract (s), executed with OPTCL.

**25. Sales Tax clearance certificate , Rating under Goods and Services Tax and Balance sheet and profit & Loss Account:**

The following documents are to be submitted at the time of Tender Submission:

- i. Compliance rating under Goods and Services Tax for immediate preceding financial year.
- ii. Audited Balance Sheet and Profit & Loss Account of the bidder for the previous three years to assess the financial soundness of the bidder(s).
- iii. GST registration certificate and PAN Card Copy.
- iv. Tax holiday/exemption certificate under GST or any other Act.
- v. TDS exemption certificate under the Income Tax Act or any other act.

**26. Certificate of Exemption from Goods and Services Tax.**

Offers with exemption from Goods and Services Tax shall be accompanied with authenticated attested Photostat copy of exemption certificate. Any claim towards Goods and Services Tax shall be paid on actual basis subject to payment of GST by the supplier. In case Outward supply details of the supplier of Goods in GSTR-1 do not match with GSTR -2 of OPTCL on GSTN portal, the same will be adjusted through debit/credit advice issued by OPTCL under intimation to the supplier after allowing cooling period of 3 months after the date of supply.

**27. Supplier's Responsibility.**

Notwithstanding anything mentioned in the Specification or subsequent approval or acceptance by the Purchaser, the ultimate responsibility for design, manufacture, materials used and satisfactory performance shall rest with the Tenderers. The Supplier(s) shall be responsible for any discrepancy noticed in the documents, submitted by them along with the bid(s)

**28. Validity.**

Prices and conditions contained in the offer should be kept valid for a minimum period of **180** days from the date of opening of the tender, failing which the tender shall be rejected.

**29. EVALUATION.**

(i) Evaluation of price bids will be on the basis of the FOR DESTINATION PRICE including Goods and Services Tax & other levies as may be applicable. The FORD PRICE shall consist of the following components:

- a) Taxable value of equipment/materials including mandatory spares, if any for maintenance of equipment. (At discretion of the purchaser )
- b) Good and Services Tax
- c) Other levies, if any.
- d) Test charges, if any.
- e) Supervision of erection, testing and commissioning charges, if any.
- f) Any other items, as deemed proper for evaluation by the purchaser.
- g) Loading will be made for items not quoted by the bidder at the highest rate quoted by other bidders unless particular item is included in other items.
- h) Any imposition of new tax or revision of tax shall be considered between due date of submission of bids and the date of price bid opening.

**(II) Weightage shall be given to the Following factors in the Evaluation & Comparison of Bids.**

In comparing bids and in making awards, the Purchaser will consider other factors such as compliance with Specification, minimum qualification criteria as per clause-30, outright rejection of tenders clause-34 of this tender, relative quality, adaptability of Supplies or services, experience, financial soundness, record of integrity in dealings, performance of materials/equipment earlier supplied, ability to furnish repairs and maintenance services, the time of delivery, capability to perform including available facilities such as adequate shops, plants, equipment and technical organization.

(III) The local MSE (In the state of Odisha) bidders shall be required to furnish their willingness to match their bid price with that of the lowest evaluated bidder without any price preference and in case they agree, they shall be eligible to get up to 30% of the tendered quantity to be distributed suitably among the willing MSE bidders failing which the said 30% of the tendered quantity be awarded to the lowest evaluated bidder.

**2) e-Reverse Auction process shall be resorted to in the tender as follows.**

<b>STRATEGY FOR E-REVERSE AUCTION</b>	
1	Bidders are required to go through the guide lines given below and submit their acceptance to the same.
2	e-Reverse Auction (RA) will be conducted in e-tender portal of OPTCL on specified date and time, while bidders shall quote from their own offices/places of their choice. Internet connectivity shall be ensured by the respective agencies/bidders themselves.
3	Demonstration/ training (if not trained earlier) of bidder's nominated person(s), shall be done by KEONICS to explain all the rules related to e-Reverse Auction/ Business Rule

	document to be adopted.
4	The strategy to be used for reverse auction shall be “DYNAMIC TEMPLATE BIDDING”
<b>Procedure for electronic Reverse Auctioning (e-RA):</b>	
5	<p>a. The e-RA shall be conducted on <a href="http://www.tenderwizard.com/OPTCL">www.tenderwizard.com/OPTCL</a> only.</p> <p>b. Bidder has to submit letter towards agreement to the Process related Terms &amp; Conditions for e-Reverse Auction, as per (Reverse Auction Process Compliance Form at Annexure-IA). In non-receipt of the same, vendors will not be allowed to participate in e-RA.</p> <p>c. e-RA shall be carried out after opening of Price bids and completion of Price bid evaluation, which will be intimated only to the techno-commercially qualified bidders by OPTCL as per procedure given below.</p> <p>d. OPTCL reserves the right to conduct e-RA and it is obligatory on part of bidder(s) invited to participate in e-RA process once they have responded to the techno-commercial bid.</p>
6	<p>Prior intimation/ Notice for RA invitation will be given to techno-commercially qualified bidders regarding the date &amp; time of opening of the e-RA.</p> <p>The start bid price (SBP) for e-Reverse Auction of each bidder under a particular package shall be the L1 evaluated price for the subject package including Taxes &amp; Duties for the total scope for subject Package. Taking the above discovered L1 price as the upper limit e-RA will be conducted to determine the lowest possible price.</p> <p>Reverse Auction will be conducted amongst first 50% of the technically qualified bidders arranged in order of prices from lowest to highest, as L1, L2,L3-----Ln, and L1 price will be discovered. Minimum of 3 bidders shall be eligible for e RA. (eg. If 4 bidders are financially evaluated then the L1, L2 and L3 bidders shall be eligible for e-RA). Number of bidders eligible for participating in RA would be rounded off to next higher integer value if number of technically qualified bidders is odd (e.g. if 7 bids are technically qualified, then RA will be conducted amongst L1 to L4).</p> <p>However, in case only two bidders are found to be responsive, e-RA would be carried out with both the parties without any elimination. However, OPTCL reserves the right to invite the evaluated L1 bidder for negotiation without conducting the e-RA.</p> <p>In case of price submitted by any bidder is found to be abnormal, OPTCL reserves the right to reject the bid of the bidder(s) .</p> <p>Rank of bidders would be displayed as per the total cost to OPTCL, i.e including Taxes and Duties payable by OPTCL as per the provisions of the bidding document &amp; after e-RA process is over.</p>
7	<p>Names of bidders/ vendors shall not be disclosed during the e-RA process. Names of bidders/ vendors shall be anonymously masked in the e-RA process.</p> <p>(i) In case of RA, start/ reference price and step value of decrement shall be indicated to the bidders at the start of the auction. Any participating bidder can bid one or multiple step decrement lower than the prevailing lowest bid at that time. The Bidder shall be able to view Bid Start Price, Bid Decrement Value, Prevailing Lowest Bid value, last Bid Placed by him and time left for bidding.</p>

	<p>(ii) The step value of decrement in a package to be offered by bidder (the minimum amount of reduction in the total bid price including all taxes &amp; duties during auction), shall be kept at 0.15% of L1 bidder's final evaluated price (or) at approved amount as decided by OPTCL.</p> <p>(iii) Bidders can only quote any value lower than their previous quoted price. However, at no stage, increase in Price will be permissible.</p> <p><b>(iv) At any point during Reverse Auction, bidding Price field (Total price) shall remain enabled for the bidders. The total reverse auction period shall be unlimited and the initial auction period (1<sup>st</sup> slot) will be of thirty (30) minutes with provision of auto extension by (10) ten minutes from the schedule/ extended closing time. If any fresh lower bid is received in last ten minutes of auction period or extended auction period, the reverse auction process shall get extended automatically for another 10(ten) minutes. In case, there is no Bid received during schedule/extended slot, the Auction shall get closed automatically without further extension.</b></p> <p>(v) However, bidders are advised not to wait till the last minute or last few seconds to enter their bid during the period of e-reverse auction to avoid complication related with internet connectivity, network problem, system crash down, power failure etc.</p>
8	<p>After conclusion of e-Reverse Auction i.e (Closing Price in Reverse Auction will be taken as offered price by the L1 bidder), decrease in price of individual head of the template shall be considered proportionately on all individual line items of the respective head of the price schedule of the successful L1 bidder .</p> <p>Any bid received at the tender wizard server end subsequent to closure of the e-RA shall be summarily rejected and shall not be considered as a valid bid under whatsoever circumstances. For this purpose, tender wizard server log shall prevail.</p> <p>The bidder shall not involve himself or any of his representatives in price manipulation of any kind directly or indirectly by communicating with other bidders.</p> <p>During Reverse Auction, If no bid is received within the specified time, OPTCL, at its discretion, may decide to close the reverse auction process/ proceed with conventional mode of tendering [ Evaluation of Part-II (price bid) submitted by bidders earlier].</p>
9	<p>Consequent upon completion of e-Reverse Auction, OPTCL's decision on award of contract shall be final and binding on the bidders.</p> <p>OPTCL shall be at liberty to call the L1 bidder for further process/ negotiation and also at liberty to cancel the e-reverse auction process/ re-tender at any time, without assigning any reason thereof. OPTCL can decide to reschedule or cancel any reverse auction: the bidders shall be informed accordingly.</p> <p>OPTCL/ Service Provider shall not have any liability to bidders for any interruption or delay in access to the e-Tender site/ Reverse Auction link irrespective of the cause.</p>

### 30. Minimum Qualification Criteria of Bidders.

All the prospective bidders are requested to note that their bids for tendered equipment can only be considered for evaluation if:

- i) The bidder should have manufacture and supply experience of above rated or higher capacity equipment for a minimum period of 3 (three) years as on the date of opening of the tender
- ii) At least 50% of the tendered quantity of above rated or higher capacity equipment should have been supplied within the above-stipulated period.
- iii) The above rated or higher capacity equipment should have at least 3 (three) years successful performance from the date of commissioning. At least one of the performance certificates shall be submitted from Govt. of India/State Govt.(s) or their undertakings.
- iv) The bidder should have conducted type tests on the tendered equipment in Government approved laboratory within ten years from the date of opening of the tender.

**31. Jurisdiction of the High Court of Orissa.**

Suits, if any, arising out of this contract shall be filed by either Party in a court of Law to which the jurisdiction of High court of Orissa extends.

**32. Correspondences.**

- i) Any notice to the supplier under the terms of the contract shall be served by Registered Post or by hand at the Supplier's Principal Place of Business.
- ii) Any notice to the Purchaser shall be served at the Purchaser's Principal Office in the same manner.

**33. Official Address of the Parties to the Contract**

The address of the parties to the contract shall be specified:-

- [i] **Purchaser:** Senior General Manager (Procurement)(CPC) OPTCL  
Bhubaneswar-751022 (Orissa)

Telephone No. 0674 - 2541801

FAX No. 0674 - 2542964

- [ii] **Supplier:** Address  
Telephone No.  
Fax No.

**34. Outright Rejection of Tenders**

Tenders shall be outrightly rejected if the followings are not complied with.

- [i] The tenderer shall submit the bid in electronic mode only and shall submit the tender cost on or before the date and time of submission of technical bid. In case of local Micro and small Enterprises(MSEs) registered with respective DICs, Khadi, Village, Cottage & Handicrafts Industries, OSIC and NSIC participating in the tender they have to submit

- notarised hard copy of valid registration as local MSE as above on or before the date and time of submission of technical bid.
- [ii] The tenderer shall submit the bid in electronic mode only
  - [iii] The Tender shall not be submitted telegraphically or by FAX.
  - [iv] The prescribed EMD shall be submitted on or before the date and time of submission of technical bid.
  - [v] The Tender shall be kept valid for a minimum period of 180 days from the date of opening of tender.
  - [vi] The Tender shall be submitted in two parts as specified.
  - [vii] The Tenders shall be accompanied by a list of major supplies effected prior to the date of opening of tender. Data of at least 3 (three) years shall be furnished.
  - [viii] The tenderer shall upload the scanned copy of latest type test certificates (for the tests, carried out on the tendered equipment, being offered). Such type tests should have been conducted within last five years from the date of opening of this tender in a Government approved laboratory/CPRI in presence of any Government Organization's representative(s).
  - [ix] The schedule of prices should be filled up fully to indicate the break-up of the prices including taxes and duties. Incomplete submission of this schedule will make the tender liable for rejection. Vide Clause-4(ii) of Part-II.
  - [x] The Tenderer should quote 'FIRM' price only and the price should be kept valid for a minimum period of 180 days from the date of opening of the tender.
  - (xi) The tenderer shall upload the scanned copy legibly written user's certificate to prove the satisfactory operation of the offered equipment/materials for a minimum period of 3 (three) years from the date of commissioning/use as per the tender specification. User's certificate shall include the detailed address of the user with Equipment/Material, Name and type as per this specification, number of years of satisfactory use/operation & date of issue of this user's certificate with official seal written in English only & clearly visible must be furnished. At least one of the user's certificates shall be from state or Central Govt. or their Undertakings.
  - (xii) Guaranteed Technical particulars & Abstract of terms and Conditions should be filled in completely.
  - (xiii) (a) Detailed information on any litigation or arbitration arising out of contract completed or under execution by it over the last five years. A consistent history of litigation by or against the bidder may result in rejection of bid.

(b) The bidder should not have any pending litigation or arbitration with OPTCL with regard to any project or related activity. The bidder should certify/declare the same in unequivocal terms by way of an affidavit duly sworn before a magistrate. Bid furnished by the bidder shall not be eligible for consideration if it is not accompanied by the affidavit. Further, the bid/LOA/LOI shall liable for outright rejection/cancellation at any stage if any information contrary to the affidavit/declaration is detected.

35. **Documents to be treated as confidential.**

The supplier shall treat the details of the specification and other tender documents as private and confidential and these shall not be reproduced without written authorization from the Purchaser.

36. **Scheme/Projects**

The materials/equipment covered in this specification shall come under "O&M WORKS "



**SECTION – III****[LIST OF ANNEXURES]**

The following schedules and proforma are annexed to this specification and contained in Section-III as referred to in the relevant clauses.

1	Declaration form	ANNEXURE-I
2	Abstract of terms and conditions to accompany Section-II of	ANNEXURE-II
3	Schedule of Quantity and Delivery	ANNEXURE-III
4	Abstract of price component	ANNEXURE-IV
5	Schedule of prices	ANNEXURE-V
6	Bank Guarantee form for earnest money deposit	ANNEXURE-VI
7	Composite Bank Guarantee form for security deposit, payment and performance	ANNEXURE-VII
8.	Chart showing particulars of E.M.D.	ANNEXURE – VIII
9.	Data on Experience.	ANNEXURE – IX
10.	Schedule of spare parts.	ANNEXURE-X
11.	Schedule of Installations.	ANNEXURE-XI
12	Schedule of deviations ( Technical)	ANNEXURE-XII (A)
13.	Schedule of deviations (Commercial)	ANNEXURE-XII (B)
14	Litigation /Arbitration	ANNEXURE-XIII
15	E-Reverse Auction Compliance Form(Annexure-XIX)	

**ANNEXURE - I**

## DECLARATION FORM

To

The Chief. General Manager (CPC)

OPTCL Head Qrs.BBSR,751022

Sub:- Tender Specification No-\_\_\_\_\_

Sir,

1. Having examined the above specification together with terms & conditions referred to therein \* I/We the undersigned hereby offer to supply the materials/equipment covered therein complete in all respects as per the specification and General conditions, at the rates, entered in the attached contract schedule of prices in the Tender.
2. \* I/We hereby undertake to have the materials/equipment delivered within the time specified in the Tender.
3. \* I/We hereby guarantee the technical particulars given in the Tender supported with necessary reports from concerned authorities.
4. \* I/We certify to have submitted the bid electronically by remitting \*cash/money order/D.D./ remitting the cost of tender, herewith and this has been acknowledged by your letter/ money receipt No. \_\_\_\_\_ Dated, \_\_\_\_\_
5. In the event of Tender, being decided in \*my/our favour, \* I/We agree to furnish the Composite B.G. in the manner, acceptable to ODISHA POWER TRANSMISSION CORPORATION LTD., and for the sum as applicable to \*me/us as per clause-19 of section-II of this specification within 15 days of issue of letter of intent/purchase order failing which \*I/We clearly understand that the said letter of Intent/Purchase order will be liable to be withdrawn by the purchaser, and the EMD deposited by us shall be forfeited by OPTCL.

Signed this \_\_\_\_\_ day of \_\_\_\_\_ 2016

Yours faithfully

Signature of the Tenderer with seal of the company

[This form should be dully filled up by the tenderer and uploaded at the time of submission of tender.]

\* (Strikeout whichever is not applicable).

**ANNEXURE-II**

**ABSTRACT OF GENERAL TERMS AND CONDITIONS OF CONTRACT [COMMERCIAL]**

(To be filled up by the tenderer as indicated in the excel sheet)

**ANNEXURE-III**

**SCHEDULE OF QUANTITY AND DELIVERY**

(To be filled up by the tenderer)

SL No	Description of materials	Quantity required	Desired Delivery	Destination	Remarks.
1	2	3	4	5	6

Signature of Tenderer  
with seal of Company

ANNEXURE-IV

*(To be filled up by the tenderer as indicated in the excel sheet)*

NB:- Abstract of price component shall be done for equipment/material offered, for testing & commissioning charges, if any. All the above prices will be taken during bid price evaluation.

**ANNEXURE-V.**

*(To be filled up by the tenderer as indicated in the excel sheet)*

NB: -

1. The tenderer should fill up the price schedule properly in Excel file in e-tender mode. The tender will be rejected, if the price bid is not submitted in accordance with the price schedule. No post tender correspondence will be entertained on break-up of prices. Also, the supplier should agree for delivery at the desired site.
2. The Tenderer shall give an undertaking in part-I of the bid that, entire implication of lower Tax and Input Tax Credit benefit have been fully passed on to the purchaser as per anti-profiteering and other provisions under GST Laws while quoting the tender price.
3. Conditional offers will not be acceptable.

**ANNEXURE-VI**

PROFORMA FOR BANK GUARANTEE FORM FOR EARNEST MONEY DEPOSIT

Ref	Date	Bank Guarantee No:
1	In accordance with invitation to Bid No. _____	Dated _____ of ODISHA POWER TRANSMISSION CORPORATION LTD. [OPTCL][herein after referred to as the OPTCL for the purchase of _____
	Messers _____	
	Address _____	
	_____ wish/wished	
	to participate in the said tender and as a Bank Guarantee for the sum of	
	Rs. _____ [Rupees _____	
	Valid for a period of 240 days [Two hundred forty days] is required to be submitted by	
	the _____ Tenderer.	We _____ the _____
		[Indicate the Name of the Bank]
	[Hereinafter referred to as 'the Bank'] at the request of M/S _____	
	[Herein after referred to as supplier (s)] do hereby unequivocally and unconditionally	
	guarantee and undertake to pay during the above said period, on written request by the	
	Chief General Manager [Procurement] ODISHA POWER TRANSMISSION CORPORATION	
	LTD. _____	
		[Indicate designation of the purchaser]
	an amount not exceeding Rs. _____ to the OPTCL, without any	
	reservation. The guarantee would remain valid up to _____	

[date] and if any further extension to this is required, the same will be extended on receiving instructions from the \_\_\_\_\_ on whose

behalf this guarantee has been issued.

2. We the \_\_\_\_\_ do hereby, further undertake  
[Indicate the name of the bank]

to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the OPTCL stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the OPTCL by reason of any breach by the said supplier [s] of any of the terms or conditions or failure to perform the said Bid . Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. \_\_\_\_\_

3. We undertake to pay the OPTCL any money so demanded not withstanding any dispute or disputes so raised by the contractor [s] in any suit or proceeding instituted/pending before any Court or Tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the supplier(s) shall have no claim against us for making such payment.

4. We, the \_\_\_\_\_ further agree that the guarantee  
[Indicate the Name of the Bank]

herein contained shall remain in full force and effect during the aforesaid period of 240 days [two hundred forty days] and it shall continue to be so enforceable till all the dues of the OPTCL under or by virtue of the said Bid have been fully paid and its claims satisfied or discharged or till Managing Director, ODISHA POWER TRANSMISSION CORPORATION LTD. certifies that the terms and conditions of the said Bid have been

fully and properly carried out by the said Supplier [s] and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the \_\_\_\_\_

we shall be discharged from all liability under this guarantee thereafter.

5. We, the \_\_\_\_\_ further agree with the OPTCL that

[Indicate the name of the Bank]

the OPTCL shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Bid or to extend time of performance by the said Supplier [s] from time to time or to postpone for any time or from time to time any of the powers exercisable by the OPTCL against the said supplier [s] and to forbear or enforce any of the terms and conditions relating to the said bid

and we shall not be relieved from our liability by reason of any such variation, postponement or extension being granted to the said Supplier [s] or for any forbearance act or omission on the part of the OPTCL or any indulgence by the OPTCL to the said Supplier[s] or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the name, style and constitution of the Bank or the supplier [s].

7. We, \_\_\_\_\_ lastly undertake not revoke this

[Indicate the name of the Bank]

Guarantee during its currency except with the previous consent of the OPTCL in writing.



8. We the \_\_\_\_\_ Bank further agree that this guarantee shall also be invocable at our place of business at ----- Branch of Bhubaneswar (indicate the name of the branch)in the state of ODISHA.

Notwithstanding anything contained herein.

- 1) Our liability under this bank guarantee shall not exceed Rs.-----(  
Rupees-----).
- 2) The bank guarantee shall be valid up to dt.-----
- 3) We are liable to pay the guaranteed amount or any part there of under this bank guarantee only & only if you serve upon us at -----branch at Bhubaneswar (indicate the name of the branch) a written claim or demand on or before dt.-----  
-----.

Dated \_\_\_\_\_ Day of \_\_\_\_\_

For \_\_\_\_\_

[Indicate the name of Bank]

Witness ((Signature, names & address)

1.

2.

**N.B. : To be Stamped in accordance with Stamp Act and the Non-Judicial Stamp Paper of appropriate value should be in the name of Issuing Bank**

ANNEXURE-VII

PROFORMA FOR COMPOSITE BANK GUARANTEE FOR SECURITY DEPOSIT PAYMENT AND PERFORMANCE

This Guarantee Bond is executed this \_\_\_\_\_ day  
of \_\_\_\_\_ 20-- by us the \_\_\_\_\_ Bank  
at \_\_\_\_\_

P.O. \_\_\_\_\_ P.S. \_\_\_\_\_

District \_\_\_\_\_ State \_\_\_\_\_

1. WHEREAS the ODISHA POWER TRANSMISSION CORPORATION LTD., a body corporate constituted under the Electricity Act, 2003 [hereinafter called "the OPTCL" which shall include its successors and assigns has placed orders No. \_\_\_\_\_ Date \_\_\_\_\_ [hereinafter called "The Agreement"] on M/s. \_\_\_\_\_ [hereinafter called "The Supplier"] which shall include its successors & assigns for supply of materials.

AND WHERE AS the supplier has agreed to supply materials to the OPTCL in terms of the said agreement AND

WHEREAS the OPTCL has agreed [1] to exempt the supplier from making payment of Security [2] to release 100% payment of the cost of materials as per the said agreement and [3] to exempt from performance guarantee on furnishing by the Supplier to the OPTCL, a Composite bank Guarantee of the value of 10 % [ten percent] of the contract price of the said agreement.

NOW THEREFORE, in consideration of the OPTCL having agreed [1] to exempt the Supplier from making payment of Security [2] releasing 100% payment to the Supplier and [3] to exempt from furnishing performance guarantee in terms of the said

agreement as aforesaid, we, the \_\_\_\_\_  
[Bank][hereinafter referred to as 'the Bank'] do hereby undertake to pay to the OPTCL  
an amount not exceeding Rs. \_\_\_\_\_  
[Rupees \_\_\_\_\_] against any loss or damage caused to or  
suffered by or would be caused to or suffered by the OPTCL by reason of any breach by  
the said Supplier [s] of any of the terms or conditions contained, in the said agreement.

2. We the ( \_\_\_\_\_ Bank) do hereby undertake to  
pay the amounts due and payable under this guarantee without any demur, merely on  
demand from the OPTCL stating that the amount claimed is due by way of loss or  
damage caused to or suffered by the OPTCL by reason of any breach by the said Supplier  
[s] of any of the terms or conditions, contained in the said agreement or by reason of  
the supplier's failure to perform the said agreement. Any such demand made on the  
bank shall be conclusive as regards the amount due and payable by the Bank under this  
guarantee. However, our liability under this guarantee shall be restricted to an amount  
not exceeding Rs. \_\_\_\_\_  
[Rupees \_\_\_\_\_]

3. We the \_\_\_\_\_ Bank} also undertake to pay to the OPTCL  
any money so demanded notwithstanding any dispute or disputes raised by the  
supplier [s] in any suit or proceeding instituted/pending before any Court or Tribunal  
relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our  
liability for payment there under and the Supplier [s] shall have no claim against us for  
making such payment.

4 We, ( \_\_\_\_\_ Bank) further agree that the  
guarantee herein contained shall remain in full force and effect during the period that  
would be taken for the performance of the said agreement and that it shall continue to  
do so enforceable till all the dues of the OPTCL under or by virtue of the said agreement

have been fully paid and its claims satisfied or discharged or till Managing Director, ODISHA POWER TRANSMISSION CORPORATION LTD. certifies that the terms and conditions of the said agreement have been fully and properly carried out by the said Supplier [s] and accordingly discharges this Guarantee.

Unless a demand or claim under this guarantee is made on us in writing on or before the [Date\_\_\_\_\_], we shall be discharged from all liability under this guarantee thereafter.

5. We,(\_\_\_\_\_Bank) further agree that the OPTCL shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Supplier [s] and we shall not be relieved from our liability by reason of any such variations or extension being granted to the said supplier [s] or for any forbearance, act or omission on the part of the OPTCL or any indulgence by the OPTCL to the said Supplier [s] or by any such matter or thing whatsoever which under the law relating to sureties would but these provisions have effect of so relieving us.
6. This guarantee will not be discharged due to the change in the name , style and constitution of the Bank and supplier [s].
7. We,[\_\_\_\_\_Bank] lastly undertake not to revoke this guarantee during its currency except with the previous consent of the OPTCL in writing.
8. We the \_\_\_\_\_ Bank further agree that this guarantee shall also be invocable at our place of business at ----- Branch of Bhubaneswar ( indicate the name of the branch)in the state of ODISHA.

Notwithstanding anything contained herein.

1) Our liability under this bank guarantee shall not exceed Rs.----- ( Rupees--  
-----).

2) The bank guarantee shall be valid up to dt.-----

3) We are liable to pay the guaranteed amount or any part there of under this bank  
guarantee only & only if you serve upon us at -----branch at Bhubaneswar a  
written claim or demand on or before dt.-----.

Dated \_\_\_\_\_ Day of \_\_\_\_\_

For \_\_\_\_\_

[Indicate the name of Bank]

Witness ((Signature, names & address)

1.

2.

**N.B. : To be Stamped in accordance with Stamp Act and the Non-Judicial Stamp Paper of  
appropriate value should be in the name of Issuing Bank**

ANNEXURE-VIII

CHART SHOWING PARTICULARS OF EARNEST MONEY DEPOSIT FURNISHABLE BY TENDERERS

1.	Central and State Government Undertakings	Exempted
2.	All other inside & outside state units.	The amount of EMD as specified in the specification /Tender Notice in shape of bank guarantee /DD.

NB: - REFUND OF E.M.D.

[a] In case of unsuccessful tenderers, the EMD will be refunded immediately after the tender is decided. In case of successful tenderer, this will be refunded only after furnishing of Composite Bank Guarantee referred to in clause No.19 of Section-II of this specification.

Suits, if any, arising out of EMD shall be filed in a court of law to which the jurisdiction of High Court of ODISHA extends.

[b] Earnest Money will be forfeited if the tenderer fails to accept the letter of intent/purchase order, issued in his favour or revises the bid price[ s] within the validity period of Bid.

## **ANNEXURE-IX**

### DATA ON EXPERIENCE

- [a] Name of the manufacturer.
- [b] Standing of the firm as manufacturer of equipment quoted.
- [c] Description of equipment similar to that quoted [supplied and installed during the last two years with the name of the organizations to whom supply was made].
- [d] Details as to where installed etc.
- [e] Testing facilities at manufacturer's works.
- [f] If the manufacturer is having collaboration with another firm, details regarding the same and present status.
- [g] A list of purchase orders, executed during last three years.
- [h] A list of similar equipment of specified MVA rating, voltage class, Impulse level, short circuit rating, Designed, manufactured, tested and commissioned which are in successful operation for at least two years from the date of commissioning with legible user's certificate. User's full complete postal address/fax/phone must be indicated. (Refer clause No.7 of the Part-I, Section-II of the specification).

Place:

Date:

Signature of tenderer

Name, Designation, Seal

**ANNEXURE-X**

**SCHEDULE OF SPARE PARTS FOR FIVE YEARS OF NORMAL OPERATION & MAINTENANCE**

SL. No	Particulars	Quantity	Unit delivery rate	Total price

Place:

Date:

Signature of Tenderer

Name, Designation, Seal



**ANNEXURE-XI**

**SCHEDULE OF INSTALLATIONS.**

		Place of installation and complete postal address	Year of commissioning

Place: -

Date

Signature of Tenderer:

Name, Designation, Seal

**ANNEXURE-XII**

**DEVIATION SCHEDULE.**

**Tenderer shall enter below particulars of his alternative proposal for deviation from the specification, if any.**

A) Technical

(To be filled up by the tenderer as indicated in the excel sheet)

**B) Commercial deviations.**

(To be filled up by the tenderer as indicated in the excel sheet)

Place: -

Date

Signature of Tenderer:

Name, Designation, Seal

**ANNEXURE – XIII**

**LITIGATION HISTORY**

Year.	Award for or against bidder	Name of client, cause of litigation and matter in dispute	Disputed amount (current value in Rs.)

Place: -

Date

Signature of Tenderer:

Name, Designation, Seal

(To be submitted on letter head of the bidding company with sign and stamp and along with Technical bid)

To,

Sr.GM (CPC), OPTCL

Bhubaneswar-751010, Odisha

Sub: Agreement to the Process related Terms & Conditions for e-Reverse Auction.

Dear Sir,

This letter is to confirm that:

- The undersigned is authorized representative of the company.
- We have studied the Commercial Terms and the Business rules governing the Reverse Auction as mentioned in your tender and confirm our agreement to that.
- We also confirm that we have gone through the auction manual and have understood the functionality of the same thoroughly.
- We, hereby, confirm that we will honour the Bids placed by us during the tendering/ e-Reverse auction process as called as e-RA.
- We also confirm that we will accept our Rank / Position that will be displayed when the Bidding Time for the Online Reverse Auction is over.

With regards,  
company seal Name & Address  
package.

Signature with Designation with  
Person having power of attorney for the subject

## **PART – II**

### **PRICE BID**

#### **1. PRICE:**

(i) Bidders are required to quote their price(s) for goods offered indicating they are 'FIRM'

(ii) The prices quoted shall be FOR Destination only at the consignee's site/store inclusive of packing, forwarding, Freight & Insurance. In addition, the break-up of FOR Destination price shall be given as per schedule of Prices in Annexure-V of Section – III. The Bidders has to certify in the price bid that any implication of lower Tax and Input Tax Credit benefit as per anti-profiteering and other provisions under GST Laws, have been fully passed on to the Purchaser, while quoting the tender prices.

#### **2. INSURANCE:**

Insurance of materials/equipment, covered by the Specification should normally be done by the Suppliers with their own Insurance Company unless otherwise stated. The responsibility of delivery of the materials/equipment at destination stores/site in good condition rests with the Supplier. Any claim with the Insurance Company or Transport agency arising due to loss or damage in transit has to be settled by the Supplier. The Supplier shall undertake free replacement of equipment/materials damaged or lost which will be reported by the Consignee within 30 days of receipt of the equipment/materials at Destination without awaiting for the settlement of their claims with the carriers and underwriters.

#### **3. CERTIFICATE FOR EXEMPTION FROM GOODS AND SERVICES TAX:**

Offers with exemption from Goods and Services Tax shall be accompanied with authenticated proof of such exemption. Authenticated proof for this clause shall mean Photostat copy of exemption certificates, attested by Gazetted Officers of State or Central Government.

#### **4. PROPER FILLING UP OF THE PRICE SCHEDULE:**

The Bidders should fill up the price schedule (Annexure-V of Section-III) properly and in full. The tender may be rejected if the schedule of price is submitted in incomplete form as per clause-34 (ix) of Section-II of the Specification.

#### **5. NATURE OF PRICE INDICATED IN SPECIFICATION SHALL BE FINAL.**

The nature of price indicated in the Clause-13, Section – I of PART –I of the Specification shall be final and binding.

**SECTION –IV**

**Technical Specification**

**for**

- 1. 420 kV, 245 kV & 145 kV SF<sub>6</sub> Circuit Breaker**
- 2. 36 kV Vacuum Circuit Breaker**

**Revision 1**

**January 2023**

# CONTENTS

## IMPORTANT INSTRUCTION

### 420/245/145 KV RATED SF6 CB & 36 KV RATED VCB:

- SECTION 1 SCOPE, STANDARDS, TOPOGRAPHICAL AND METROLOGICAL CONDITIONS,  
AUXILIARY POWER SUPPLY
- SECTION 2 420/245/145 KV RATED SF6 CIRCUIT BREAKERS : TECHNICAL DETAILS
- SECTION 3 36 KV RATED VACCUM CIRCUIT BREAKERS (OUT DOOR TYPE) : TECHNICAL DETAILS
- SECTION 4 420/245/145 KV SF6 CB & 36 KV VCB: TESTS, INSPECTION, QAP, DOCUMENTATION,  
PACKING AND FORWARDING, SUPERVISION OF ERECTION, TESTING AND  
COMMISSIONING (ET&C), QUANTITY AND DELIVERY REQUIREMENTS

## **IMPORTANT INSTRUCTION**

**(Please read the following instructions carefully before submitting your bid)**

1. All the drawings, i.e. dimension, elevation, side view, front view, plan, cross sectional view, isometric view, important component drawing etc., in PDF along with AutoCAD format and manuals (Technical/Installation/Operation) in PDF format, for offered item shall be submitted. The hard copies as per specification also shall be submitted. All above documents should be legible.
  2. The acceptability of type test report submitted by any bidder/EPC agency shall be strictly in adherence to the broad guidelines mentioned in clause no 2 of "GUIDELINES FOR THE VALIDITY PERIOD OF TYPE TEST(S) CONDUCTED ON MAJOR ELECTRICAL EQUIPMENT IN POWER TRANSMISSION" published in May 2020.
  3. The Bidder/ EPC agency shall have to submit all the required type test reports for the offered item along with the accessories. In case of submission of soft copy of type test report, high resolution colour scan of the original test report must be submitted. Scanned copy of Xerox of type test reports shall not be entertained. If required, the firm has to show the original type test report for the purpose of verification. In absence of this, the evaluation shall be carried out accordingly as non-submission of type test reports. The type test report of Circuit Breaker submitted by the manufacturer shall be considered valid if the date of type test does not exceed 10 years as on the last date of submission of bid; provided:
    - a. There is no major changes introduced in the basic design / technology /material /mechanical /construction /functionalities /performance characteristics/ manufacturing process of the equipment.
- OR
- b. Until the relevant IS/IEC / statutory guidelines is revised which warrants fresh type tests because of introduction of new type tests even though there is no change in material/basic design of the equipment.
4. The Bidder/ EPC agency must fill up all the point of GTP for offered item/s. Instead of indicating "refer drawing, or as per IS/IEC", the exact value/s must be filled in. All the points other than GTP, which are asked to confirm in technical specifications must be submitted separately with the bid.
  5. The Bidder/ EPC agency is required to impart training in view of manufacture, assembly, erection, operation and maintenance for offered item, at his works, to the person/s identified by OPTCL, in the event of an order, free of cost. The cost of logistics will be borne as per the clauses of respective purchase orders/work orders.
  6. The discrepancies between the specification and the catalogues or literature, submitted as part of the offer or with prevalent standards or government guidelines shall not be considered as valid deviations unless otherwise the same deviations related to TS is brought out separately by the Bidder/ EPC agency in the pre-bid queries or in form of clarification.
  7. If any modifications felt necessary to improve performance, efficiency and utility of equipment, the same must be submitted along with pre bid queries which reasons duly supported by documentary evidences and such modifications not mentioned in pre bid queries will not be considered.
  8. For purpose of Agreement, the firm shall provide warranty as specified in the purchase order / tender document. Notwithstanding the foregoing, Supplier agrees to waive the expiration of the Warranty Period in the event where in a pattern of defect/trend of failure is observed after the Warranty Period in a significant portion of the supplied quantity, or any critical defect discovered which, in Purchaser's opinion, constitutes a threat of damage to property or to the health and safety of any person.
  9. Warranty certificate for purchase of any material, whether directly procured by OPTCL or through EPC agency, shall be issued directly in favour of OPTCL.

## **SECTION 1:**

### **420/245/145 KV RATED SF6 CB & 36 KV RATED VCB:**

#### **SCOPE, STANDARDS, TOPOGRAPHICAL AND METROLOGICAL CONDITIONS, AUXILIARY POWER SUPPLY**

##### **1. SCOPE:**

- 1.1. This specification provides for the design, manufacture, inspection and testing before dispatch, packing and delivery F.O.R. (destination) by road transport only and supervision of erection, testing and commissioning, of outdoor 420/245/145 kV SF<sub>6</sub> circuit breakers and 36 kV Vacuum Circuit Breakers along with structures, all the accessories and auxiliary equipment and mandatory spares, described herein, required for their satisfactory operation in various substations of the state.
- 1.2. The circuit breaker shall conform in all respects to high standards of engineering, design, workmanship and latest revisions of relevant standards at the time of offer and purchaser shall have the power to reject any work or material, which, in his judgment, is not in full accordance therewith.

##### **2. STANDARDS:**

- 2.1. Except as modified in this specification, the circuit breakers shall conform to the latest revisions with amendments thereof, of following standards

##### 2.2.

<b>IS/IEC 62271-1</b>	<b><i>High-voltage switchgear and controlgear – Part 1: Common specifications</i></b>
<b>IS/IEC 62271-100</b>	<b><i>High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers</i></b>
<b>IEC 62271-110</b>	<b><i>High-voltage switchgear and controlgear - Part 110: Inductive load switching</i></b>
<b>IS/IEC 62271-300</b>	<b><i>High-Voltage switchgear and controlgear - Part 300: Seismic Qualification of Alternating Current Circuit-Breakers</i></b>
<b>IS/IEC TR 62271-301</b>	<b><i>High-voltage switchgear and controlgear – Part 301: Dimensional standardisation of high-voltage terminals</i></b>
<b>IEC TR 62271-310</b>	<b><i>High-voltage switchgear and controlgear - Part 310: Electrical endurance testing for circuit-breakers above a rated voltage of 52 kV</i></b>
<b>IS 7572</b>	<b><i>Guide for Testing Single-phase AC and Universal Motors</i></b>
<b>IS 5578</b>	<b><i>Guide For Marking Of Insulated Conductors</i></b>
<b>IEC 62155</b>	<b><i>Hollow pressurized and unpressurized ceramic and glass insulators for use in electrical equipment with rated voltages greater than 1 000 V</i></b>
<b>IS 11353</b>	<b><i>Guide for Uniform System of Marking and Identification of Conductors and Apparatus Terminals</i></b>
<b>IS/IEC 60137</b>	<b><i>Bushings for alternating voltages above 1 000 Volts</i></b>
<b>IS/IEC 60947</b>	<b><i>Low-voltage switchgear and controlgear</i></b>
<b>IS 802</b>	<b><i>Structural Steel in Overhead Transmission Line Towers</i></b>
<b>IS 2629</b>	<b><i>Recommended Practice for Hot-Dip Galvanizing of Iron and Steel</i></b>
<b>IS 13072/ IEC 60376</b>	<b><i>Specification of Technical Grade Sulphur Hexafluoride SF<sub>6</sub> for Use in Electrical Equipment purposes</i></b>
<b>IS 4379</b>	<b><i>Identification of the Contents of Industrial Gas Cylinders</i></b>
<b>IS 1893</b>	<b><i>Criteria for Earthquake Resistant Design of Structures</i></b>

- 2.3. Equipment meeting with the requirements of any other authoritative standards, which ensures equal or better quality than the standard mentioned above shall also be acceptable. If the equipment offered by the Bidder/ EPC agency conforms to other standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought



out in relevant schedule. Two copies of such standards with authentic English Translations shall be furnished along with the offer.

**3. TOPOGRAPHICAL AND METROLOGICAL CONDITIONS:**

<b>Location</b>	<b>State of Odisha</b>
<b>Altitude</b>	<b>1000 m</b>
<b>Air Temperature</b>	
<b>Minimum</b>	<b>0 °C</b>
<b>Maximum</b>	<b>50 °C</b>
<b>Maximum Daily Average</b>	<b>35 °C</b>
<b>Maximum Humidity</b>	<b>99 %</b>
<b>Pollution Level</b>	<b>Heavy/Very Heavy</b>
<b>Airborne Contamination</b>	<b>Highly Polluted</b>
<b>Isoceraunic Level</b>	<b>70 day/annum</b>
<b>Average no. of dust storm days per annum</b>	<b>20 day/annum</b>
<b>Seismic withstand level</b>	<b>0.3 g</b>
<b>Wind velocity</b>	<b>55 m/s (Wind zone VI)</b>
<b>Average Annual Rain Fall</b>	<b>150 cm</b>
<b>Special Environmental Conditions</b>	<ol style="list-style-type: none"> <li>1. In coastal areas of the state presence of salinity in air and exposure to moisture</li> <li>2. In industrial belts of the state excessive dust in air</li> </ol>

**4. AUXILIARY POWER SUPPLY:**

4.1.

Type	Details	Purpose	Tolerance
<b>Auxiliary AC</b>	<b>415 V, 50 Hz, 3Ø, 4 wire, neutral earthed</b>	<b>Lighting, Heater &amp; Spring Charge Motor</b>	<b>Voltage ± 10%, frequency ± 5%</b>
<b>DC Supply</b>	<b>220 V 2 wire DC</b>	<b>Protection, Control, Indication, Coil &amp; Spring Charge Motor (During AC fail)</b>	<b>Voltage -15% +10%</b>

4.2. Each of the foregoing supplies shall be made available by the Purchaser at the terminal point for each circuit breaker for operation of accessories and auxiliary equipment. Supplier's scope include supply of interconnecting cables (limb-limb, limb-control cabinet, internal wirings etc.), terminal boxes etc. The above supply voltage may vary as above and all devices shall be suitable for continuous operation over entire range of voltages & frequencies.

## SECTION 2 :

### **420/245/145 KV RATED SF<sub>6</sub> CIRCUIT BREAKERS: TECHNICAL DETAILS**

#### **1. GENERAL TECHNICAL REQUIREMENTS:**

- 1.1. The 420/245/145 kV circuit breakers offered shall be sulfur hexafluoride (SF<sub>6</sub>) type only. **Circuit breakers shall be of live tank design.**
- 1.2. Any part of the breaker, especially the removable ones, shall be freely interchangeable without the necessity of any modification at site.
- 1.3. Circuit breaker shall comprise of three identical single-pole units. For 420 /245 kV CB If the circuit breaker is not meant for single pole reclosure, these units shall be linked together electrically. Complete circuit breaker with all the necessary items for successful operation shall be supplied, including but not limited to the following:
  - 1.3.1. The circuit breaker shall be complete with operating mechanism, common control cabinet with foundation bolts, piping, inter-pole cables, internal cables, control cabinet – pole cables, cable accessories like glands, terminal blocks, marking ferrules, lugs, pressure gauges, density monitors (with graduated scale), galvanized support structure with foundation bolts, platform with ladder for CB with foundation bolts (except concrete foundations) and all other accessories required for carrying out all the functions of the CB. All necessary parts to provide a complete and operable circuit breaker installation such as terminal pads, control parts and other devices shall be provided.
  - 1.3.2. Compressed SF<sub>6</sub> gas, spring-spring operated systems in complete shape including piping, fittings, valves and controls and etc.
  - 1.3.3. One central control cabinet for each breaker and one control box for each pole with all the required electrical devices mounted therein and the necessary terminal blocks for termination of interpole wiring. The necessary interpole cabling at site shall be done by the Purchaser based on the schematic, wiring diagram and termination schedule to be supplied by the Supplier.
  - 1.3.4. Instruments, pressure gauges and other devices like gas density monitor, temp. monitor & etc. for SF<sub>6</sub> gas pressure supervision.
  - 1.3.5. All necessary parts to provide a complete and operable circuit breaker installation such as main equipment, terminal, control parts, connectors and other devices, whether specifically called for herein or not.
- 1.4. The circuit breaker shall be designed for high speed single and three pole reclosing with and operating sequence and timing as specified in this specification.
- 1.5. The support structure of circuit breaker shall be hot dip galvanized. The minimum weight of zinc coating shall be 610 gram/sqm and minimum thickness of coating shall be 86 microns for all items. The control cabinet/mechanism box shall be stainless steel/aluminum alloy of minimum 2 mm / 3 mm thickness respectively.
- 1.6. Circuit breaker shall be suitable for hot line washing.
- 1.7. **All breakers shall be supplied with terminal connectors. The exact requirement of terminal connectors would be intimated to the supplier during detailed engineering (during drawing approval).**
- 1.8. CB Terminal pads shall have silver plating of at least 50 microns thickness. CB terminals shall be Eight hole HV terminal (2 × 4 hole pattern) as per IEC/TR 62271-301.

#### **2. CONTACTS:**

- 2.1. All making and breaking contacts shall be sealed free from atmospheric effects. Contacts shall be designed to have adequate thermal and current carrying capacity for the duty specified and to have a life expectancy so that frequent replacements due to excessive burning will not

be necessary. Provision shall be made for rapid dissipation of heat generated by the arc on opening.

- 2.2. Main contacts shall be first to open and the last to close so that there will be little contact burning and wear. If arcing contacts are used, they shall be first to close and the last to open. Tips of arcing contacts and main contacts shall be as per the type tested design.
- 2.3. Any device provided for voltage grading to damp oscillations or to prevent restriking prior to the complete interruption of the circuit or to limit over voltages on closing shall have a life expectancy comparable to that of the breaker as a whole.
- 2.4. Contacts shall be kept permanently under pressure of SF<sub>6</sub> gas. The gap between the open contacts shall be such that it can withstand at least the rated phase to ground voltage continuously at zero-gauge pressure of SF<sub>6</sub> gas due to its leakage. The breaker should be able to withstand all dielectric stresses imposed on it in open condition at lock out pressure continuously.
- 2.5. If multi-break interrupters are used these shall be so designed and augmented that a uniform voltage distribution is developed across them. Calculations/test reports in support of the same shall be furnished. The thermal and voltage withstands of the grading elements shall be adequate for the service conditions and duty specified.

### 3. PORCELAIN HOUSING:

- 3.1. The porcelains used shall be homogenous and free from cavities and other flaws. They shall be designed to have ample insulation, mechanical strength and rigidity for satisfactory operation under conditions specified above.
- 3.2. The porcelain housing shall be of single-piece construction without any joint or coupling. It shall be made of homogeneous, vitreous porcelain of high mechanical and dielectric strength. Glazing of porcelain shall be uniform brown or dark brown color with a smooth surface arranged to shed away rainwater or condensed water particles (fog). The type and profile of the porcelain insulator sheds shall be in accordance with IEC 60815 & IEC 62155.
- 3.3. The puncture strength of the bushings shall be greater than the flashover value.
- 3.4. The mechanical characteristics of insulators shall match with the requirements specified in this specification.
- 3.5. **The specific creepage distance of insulators shall be 25 mm/kV in general unless specifically called for 31mm/kV in the tender.**

### 4. ADDITIONAL REQUIREMENTS:

- 4.1. The circuit breakers shall be single pressure type, the design and construction of the circuit breaker shall be such that there is minimum possibility of gas leakage and entry of moisture. There should not be any condensation of SF<sub>6</sub> gas on the internal insulating surface of the circuit breaker.
- 4.2. **All sealing surfaces shall be smooth, straight, and reinforced, if necessary to minimize distortion and to make a tight seal. The operating rod connecting the operating mechanism to the arc chamber (SF<sub>6</sub> media) shall have adequate seals, Double –O–ring seals and test holes for leakage test of the internal seal shall be provided on each static joint. The O ring sealing shall have compression set of < 15% in adherence to ASTM D395-16. O rings shall be housed in CNC machined O ring groove.**
- 4.3. In the interrupter assembly, there shall be an absorbing product box to eliminate SF<sub>6</sub> decomposition products and moisture. The material used in the construction of the circuit breakers shall be fully compatible with SF<sub>6</sub> gas decomposition products.
- 4.4. Each pole shall form an enclosure filled with SF<sub>6</sub> gas independent of two other poles (for 420/245 kV CB). The SF<sub>6</sub> density of each pole shall be monitored and regulated by individual pressure switches for 420/245 kV CB. For 145 kV CB pressure switches shall be common for all 3 poles.
- 4.5. The SF<sub>6</sub> gas density monitor shall be adequately temperature compensated to model the pressure changes due to variations in ambient temperature within the body of circuit breaker. The density monitor shall meet the following requirements:
  - 4.5.1. It shall be possible to dismantle the density monitor for checking/replacement without draining the SF<sub>6</sub> gas or de-energizing the primary equipment by using suitable interlocked non-return couplings.

- 4.5.2. It shall damp the pressure pulsation while filling the gas in service so that the flickering of the pressure switch contacts does not take place.
- 4.5.3. A pressure indicator (pressure gauge) shall also be provided.
- 4.6. Facility shall also be provided to reduce the gas pressure within the breaker to a value not exceeding 8 millibars within 4 hours or less. Each circuit breaker shall be capable of withstanding this degree of vacuum without distortion or failure of any part.
- 4.7. Sufficient SF<sub>6</sub> gas shall be provided to fill all the circuit breakers installed. **In addition to this 20% of the total gas requirement per circuit breaker (3 limbs) shall be supplied in separate cylinders as spare requirement.**
- 4.8. Provisions shall be made for attaching an operation analyzer after installation at site to record contact travel speed, making measurement of operation timings, contact resistance and synchronization of contacts.
- 4.9. **The SF<sub>6</sub> gas leakage should not exceed 0.5% per year and the leakage rate shall be guaranteed during the warrantee period. In case the leakage under the specified conditions is found to be greater than 0.5% per year after commissioning of circuit breaker during the warrantee period, the manufacturer will have to supply free of cost, the total gas requirement for subsequent ten (10) years, based on actual leakage observed during the warrantee period.**

**5. SULPHUR HEXAFLUORIDE GAS:**

- 5.1. The SF<sub>6</sub> gas shall comply with IS 13072/ IEC 60376.
- 5.2. The high pressure cylinders in which the SF<sub>6</sub> gas is shipped and stored at site shall comply with requirements of the following standards and regulations:
  - 5.2.1. IS:4379 Identification of the contents of industrial gas cylinders.
  - 5.2.2. Gas cylinders as per relevant Indian Standard.
  - 5.2.3. The cylinders shall also meet Indian Boiler regulations.
- 5.3. **Test:** SF<sub>6</sub> gas shall be tested for purity, dew point, break down voltage, water contents, and decomposition products as per IS 13072/ IEC 60376 and test certificates shall be furnished to OPTCL for each lot of SF<sub>6</sub> cylinders provided with CB.
- 5.4. OPTCL may ask for random re-testing of SF<sub>6</sub> to cross check quality of gas provided.
- 5.5. The SF<sub>6</sub> gas leakage should not exceed 0.5% per year and the leakage rate shall be guaranteed during the warrantee period.
- 5.6. SF<sub>6</sub> gas shall be supplied (in returnable cylinders) for all circuit breakers. However, SF<sub>6</sub> gas for spare circuit breakers and mandatory spare quantity of SF<sub>6</sub> gas shall be supplied in nonreturnable cylinders.

**6. DUTY REQUIREMENTS:**

- 6.1. The circuit breaker shall be totally restrike free under all duty conditions. Opening resistors shall not be used.
- 6.2. The circuit breaker shall meet the duty requirements for any type of fault or fault location, for line charging and dropping when used on an effectively grounded system and perform make and break operations as per stipulated duty cycles, satisfactorily.
- 6.3. It shall withstand the maximum expected dynamic loads (including the seismic) to which the circuit breaker may be subjected during its service life.
- 6.4. The circuit breaker shall be capable of:

6.4.1. Interrupting the steady and transient magnetizing current corresponding to Power transformers as follows:

CB Rating	Transformer Ratio	Transformer Rating
<b>420kV</b>	<b>400/220</b>	<b>Upto 500 MVA</b>
<b>245 kV</b>	<b>400/220</b>	<b>Upto 500 MVA</b>
	<b>220/132</b>	<b>Upto 160 MVA</b>
	<b>220/33</b>	<b>Upto 63 MVA</b>

145 kV

220/132

Upto 160 MVA

132/33 kV

Upto 63 MVA

6.4.2. Interrupting line/cable charging current as per IEC without use of opening resistors. The breaker shall be able to interrupt the rated line charging current as per IEC-62271-100 with test voltage immediately before opening equal to the product of  $\frac{U_m}{\sqrt{3}}$  and 1.4.

6.4.3. Clearing short line fault (kilometric faults) with source impedance behind the bus equivalent to symmetrical fault current specified.

6.4.4. Breaking 25% of the rated fault current at twice rated voltage under phase opposition condition.

6.4.5. Withstanding all dielectric stresses imposed on it in open condition at lock out pressure continuously (i.e. shall be designed for 2 p.u. across the breaker continuously, for validation of which a power frequency withstand test conducted for a duration of at least 15 minutes is acceptable).

6.4.6. Circuit breakers shall be able to switch in and out the 420 kV shunt reactor of rating 50 to 100 MVAR with max rise of over voltage of 2.3 p.u as per IEC-62271-110.

6.5. The critical current, which gives the longest arc duration at lockout pressure of extinguishing medium and the arc duration shall be indicated.

6.6. The breaker shall satisfactorily withstand the high stresses imposed on them during fault clearing, load rejection and re-energisation of lines with trapped charges.

6.7. The breaker shall also withstand the short time power frequency, impulse and switching voltages specified in **clause 23 Technical Requirements** of this specification.

## 7. TOTAL BREAK TIME:

7.1. The "Total Break Time" as specified in **clause 23 Technical Requirements** of this section shall not be exceeded under any of the following duties:

- a. Test duties T10, T30, T60, T100a, and T100s (with TRV as per IEC-62271-100).
- b. Short line fault L90, L75 (with TRV as per IEC-62271-100).

7.2. The bidder/ EPC agency may please note that there is only one specified break time of the breaker which shall not be exceeded under any duty conditions specified such as with the combined variation of the trip coil voltage, (70-110%) spring-spring operation and arc extinguishing medium pressure etc. while furnishing the proof for the total break time of complete circuit breaker, the bidder/ EPC agency may specifically bring out the effect of non-simultaneity between contacts within a pole or between poles and show how it is covered in the guaranteed total break time.

7.3. The break time discrepancy between poles shall be  $\leq 3$  ms.

7.4. The make time discrepancy between poles shall be  $\leq 5$  ms.

7.5. The values guaranteed shall be supported with the type test reports.

## 8. OPERATING MECHANISM AND ASSOCIATED EQUIPMENT:

8.1. The circuit breaker shall be designed for electrical local as well as remote control. In addition there shall be provision for local mechanical control (emergency trip).

8.2. SPRING OPERATED MECHANISM: The operating mechanism for 420 kV/245 kV / 145 kV class breakers shall be of spring-spring type only operated by electrical/mechanical control. The mechanism shall be adequately designed for the specified tripping and re closing duty. The entire operating mechanism control circuitry etc as required, shall be housed in an outdoor type, Aluminum alloy (minimum 3mm thickness)/Stainless Steel (minimum 2 mm thickness) enclosure. This enclosure shall conform to the degree of protection IP - 55 of IS - 2147.

8.3. The common enclosure shall be mounted on a separate concrete plinth for 420/245 kV CB. Driving mechanism box for individual poles to be mounted on CB structure for 420/245 kV CB. The common enclosure may be mounted on the structure for 145 kV CB.

8.4. All working parts in the mechanism shall be of corrosion-resistant material. All bearings which require greasing, shall be equipped with pressure grease fittings.

- 8.5. The design of the operating mechanism shall be such that it shall be practically maintenance-free. The guaranteed years of maintenance-free operation, the number of full load and full rated short circuit current breaking/operation without requiring any maintenance or overhauling shall be clearly stated in the bid. As far as possible the need for lubricating the operating mechanism shall be kept to the minimum and eliminated altogether if possible.
- 8.6. The operating mechanism shall be non-pumping and trip-free electrically and mechanically under every method of closing. There shall be no rebounds in the mechanism and it shall not require any critical adjustments at site. Operation of the power-operated closing device, when the circuit breaker is already closed, shall not cause damage to the circuit breaker or endanger the operator, provision shall be made for attaching an operation analyzer to facilitate testing of breaker at site.
- 8.7. A mechanical indicator shall be provided to show open and close position of the breaker. It shall be located in a position where it will be visible to a man standing on the ground level with the mechanism housing closed. An operation counter shall also be provided in the central control cabinet.
- 8.8. **Potential free contacts shall be provided in the operation counter for integration of status in SAS if swipe contacts are not provided in CB auxiliary switch.**
- 8.9. **Four (4) nos spare contacts shall be provided in LR and TNC switch for (2 nos for each operation) for future use.**
- 8.10. **2 NO + 2 NC spare contacts shall be provided in the spring charge limit switch for future use.**
- 8.11. **Two (2) nos add-on contacts (2 NC) shall be provided in each DC & AC supply MCB for use in SAS. (For AC & DC supply supervision.)**
- 8.12. The supplier shall furnish detailed operation and maintenance manual of the mechanism along with the operation manual for the circuit breaker.
- 8.13. The Breaker shall have spare auxiliary switches for owners use (i.e, for Interlocking, indication, contacts to main and back up relay etc). A minimum of 20 N/O (52a) & 20 N/C (52b) spare auxiliary switch contacts should be provided.

## **9. CONTROL:**

- 9.1. The close and trip circuits shall be designed to permit use of momentary contact switches using pistol grip type.
- 9.2. Each breaker pole shall be provided with two (2) independent tripping circuits, pressure switches and coils each connected to a different set of protective relays, fed from separate DC sources.
- 9.3. The breaker shall normally be operated by remote electrical control. Electrical tripping shall be performed by shunt trip coils. However, provisions shall be made for local electrical control. For this purpose a local/remote selector switch and non-lockable pistol grip TNC switch shall be provided in the breaker central control cabinet (supplier's scope). Remotely located LR switch and TNC switch and indicating lamps shall be provided in the C/R panel (purchaser's scope).
- 9.4. The trip coils shall be suitable for trip circuit supervision. The trip circuit supervision relay would be provided in the CR panel. Necessary terminals shall be provided in the central control cabinet of the circuit breaker by the supplier.
- 9.5. Closing coil shall operate correctly at all values of voltage between 85% and 110% of the rated voltage. Shunt trip shall operate correctly under all operating conditions of the circuit breaker up to the rated breaking capacity of the circuit breaker and at all values of supply voltage between 70% and 110% of the rated voltage. If additional elements are introduced in the trip coil circuit their successful operation and reliability for similar applications on outdoor circuit breakers shall be clearly brought out in the additional information schedules. In the absence of adequate details the offer is likely to be rejected.
- 9.6. The pressure switches used for interlock purposes shall have adequate contact ratings to be directly used in the closing and tripping circuits.

- 9.7. Spring charge handle shall be easily operated by one man standing on the ground and direction of motion of handle shall be clearly marked.
- 9.8. The auxiliary switch of the breaker shall be positively driven by the breaker operating rod.
- 9.9. The devices shall provide continuous & automatic monitoring of the state of the gas as follows:
- 'SF6 gas density Low' Alarm level – 1:** This contact will be used for remote indication/ to annunciate the need for the gas refilling.
  - 'SF6 gas density Low' Alarm level – 2:** This contact will be used to annunciate the need for gas refilling under emergency. **Provision for tripping the circuit breaker at this level shall be available in the control circuit for tripping the CB, which may be implemented if required by OPTCL.**
  - 'Lockout' level:** This is the minimum gas density at which the manufacturer will guarantee the rated fault interrupting capability of the breaker. At this level the breaker block contact shall operate & the tripping & closing circuit shall be blocked.
- 9.10. The density monitor shall be placed suitably inclined in such a way so that the readings are visible from ground level or from platform level. Separate contacts have to be used for each of tripping and closing circuits. Contacts shall be suitably rated.
- 9.11. Density monitors are to be so mounted that the contacts do not change on vibration during operation of circuit Breaker.

#### **10. MOTOR COMPRESSED SPRING CHARGING MECHANISM:**

- 10.1. Spring operated mechanism shall be complete with motor, opening spring, closing spring, limit switches and all other necessary accessories to make the mechanism a complete unit.
- 10.2. Breaker operation shall be independent of motor which shall be used solely for the purpose of charging the closing spring. Motor rating shall be such that it requires only 15 seconds for fully charging the closing spring.
- 10.3. Closing operation shall compress the opening spring and keep ready for tripping.
- 10.4. The mechanism shall be provided with means for charging the spring by hand. This operation shall be carried out with the doors of the cubicle open. During the process no electrical or mechanical operation of the mechanism shall endanger the operator or damage the equipment.
- 10.5. A mechanical indicating device shall be provided to indicate the state of the charge spring and shall be visible with the door of the cubicle closed.
- 10.6. An alarm shall be provided for spring failing to be charged within a pre-set time after circuit breaker closing.
- 10.7. Opening spring and closing spring with limit switches for automatic charging and other necessary accessories to make the mechanism a complete operating unit shall also be provided.
- 10.8. As long as power is available to the motor, a continuous sequence of the closing and opening operations shall be possible. The motor shall have adequate thermal rating for this duty.
- 10.9. After failure of power supply to the motor one close open operation shall be possible with the energy contained in the operating mechanism.
- 10.10. Closing action of the breaker shall compress the opening spring ready for tripping.
- 10.11. When closing spring are discharged after closing a breaker, closing spring shall automatically get charged for the next operation and an indication of this shall be provided in the local and remote control cabinet.
- 10.12. The spring operating mechanism shall have adequate energy stored in the operating spring to close and latch the circuit breaker against the rated-making current and also to provide the required energy for the tripping mechanism in case the tripping energy is derived from the operating mechanism.
- 10.13. Provision shall be made to prevent a closing operation of the breaker when the spring is in the partial charged condition. Mechanical interlocking shall be provided in the operating

mechanism to prevent discharging of closing spring when the breaker is already in the closed position.

**11. OPERATING/DRIVING MECHANISM HOUSING:**

The operating mechanism housing shall conform to the requirement specified in **clause 21**. This enclosure shall conform to the degree of protection IP - 55 of IS - 2147.

**12. INTERLOCKS:**

It is proposed to electrically interlock the circuit breaker with purchaser's associated air break disconnectors in accordance with switchyard safety interlocking scheme. The details of the scheme will be furnished to the supplier. All accessories required on breaker side for satisfactory operation of the scheme shall be deemed to be included in the scope of supply of this specification.

**13. SUPPORT STRUCTURE:**

The circuit breakers shall be suitable for mounting on steel galvanized structures. The prices of these support structure shall be included in the price of the equipment and same shall be indicated clearly in the bid proposal sheet.

However, purchaser reserves the right to procure these from the supplier or through separate contract.

The steel support structure shall be designed with factor of safety of 2.5 based on elastic limit of tension members and on crippling load of compression members.

The steel support structure shall be designed with **factor of safety of 2.5** based on elastic limit of tension members and on crippling load of compression members.

The support structure design shall be so that it shall meet the Minimum statutory safety clearances as per clause 24 Technical Requirements, IE rules and relevant IS/IEC.

**14. PLATFORM & LADDER:**

14.1. A suitable ladder with the safety cage and a free standing maintenance platform with railing for each pole of the circuit breaker shall be supplied along with the equipment and its support structure. The platform shall be suitable for 2 nos maintenance personnel to stand and carryout the activities along with the tools and plant.

14.2. The ladder cum maintenance platform shall be designed as a free standing structure without taking any support from the main circuit breaker structure. The ladder having height more than 3.0m shall have at least 15 degree slope and is to be provided with safety guard above 2.0m level. The steps in ladder shall start from ground level and shall not be more than 1 feet apart from each other.

14.3. All structural steel for the platform shall be as per IS: 2062. The ladder shall be hot dip galvanized with zinc coating thickness of 86 micron and weight of 610 gram/sqm.

14.4. The ladder should be such that the driving mechanism of all 3 poles are accessible from both front and back sides, if required for CB maintenance.

14.5. The ladder shall be provided with suitable foundation bolts similar to the structure. OPTCL shall make its own concrete foundation for mounting the ladders on the concrete foundations.

14.6. Plan of foundation details with center-center distance of bolts, distance between various concrete plinths including circuit breaker support structure plinth shall be provided by the OEM.

14.7. For 145 kV circuit breakers, ladders are not to be provided by the OEM. OPTCL shall make its own concrete/brick masonry step & platform for accessing the mechanism box. The recommended height of the concrete platform for carrying out maintenance shall be specified in the GA drawing by the OEM.

14.8. **The structural details shall be finalized during detail engineering.**

**15. FITTINGS AND ACCESSORIES:**

15.1. The central control cabinet shall be complete with but not limited to cable glands, LR changeover switch, TNC switch, operation counter, indication lamps, MCBs (fuses not allowed), terminal blocks with 20% spare for OPTCL use, anti-pumping relay, rating plate, internal wiring, external locking arrangement, indication lamps (SF<sub>6</sub> pressure gauges, coils &



operating mechanism in case of 145 kV CB). Number and exact locations of these parts shall be indicated in the bid.

15.2. All the terminal blocks to be used in the operating mechanism and control cubicle should be of stud type of Melamine material of Elmex/Connectwell make for 2.5 sqmm cable or higher.

15.3. Rating and diagram plate in accordance with IEC / IS incorporating year of manufacture.

**16. PAINTING, GALVANISING AND CLIMATE PROOFING:**

16.1. Ferrous parts such as support channels, structures, ladders, all sizes of nuts, bolts, foundation bolts shall be hot dip galvanized conforming to latest version of IS 2629. For HDG galvanization thickness shall be 86 micron and weight of zinc coating 610 gram/sqm. Spring washers shall be electro galvanized.

16.2. All other parts shall be painted.

16.3. All paints shall be carefully selected to withstand tropical heat and extremes of weather within the limits specified. All steel surfaces shall be cleaned with sand blasting, given a coat of primer and finished with two coats of synthetic enamel paints.

16.4. The paint shall not scale off or wrinkle or be removed by abrasion due to normal handling. All external paintings shall be as per shade no. 697 of IS:5.

16.5. Metal parts not accessible for painting shall be made of corrosion resisting material.

16.6. Paint inside the metallic housing shall be of anti-condensation type and the paint on outside surfaces shall be suitable for outdoor installation.

**17. EARTHING:**

The operating mechanism housing, control cabinets, support structure etc. shall be provided with two separate earthing terminals suitable for bolted connection to 50X6 mm<sup>2</sup> mild steel flat to be provided by the purchaser for connection to station earth mat.

**18. NAME AND RATING PLATES:**

Circuit breaker and its operating device shall be provided with rating plates marked with the data as mentioned in **Annexure I** and as per IS/IEC 62271-100. The rating plate shall be visible in position of normal service and installation. The rating plate shall be made of stainless steel with text engraved on it in black color.

**19. LIMITS OF TEMPERATURE RISE:**

The temperature rise of any part of the circuit breaker at an ambient air temperature not exceeding 40 °C shall not exceed the temperature-rise limits specified in latest editions and amendments of IEC 62271-1 and IEC 62271-100. If the maximum ambient temperature rises from above mentioned value (of 40 °C), permissible values shall be reduced accordingly.

**20. TERMINAL CONNECTORS:**

The terminal connectors shall meet the following requirements:

20.1. Terminal connectors design should be type tested and manufactured as per IS: 5561.

20.2. Terminal connectors shall be meant for take-off by Twin Moose/Moose/Zebra/IPS aluminum tube. **Both the pad portion and conductor holding portion shall be six (6) bolted type.**

20.3. **The nuts and bolts shall be stainless steel type.**

20.4. All castings shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges and corners shall be blurred and rounded off.

20.5. No part of a clamp shall be less than 10 mm thick.

20.6. All ferrous parts shall be hot dip galvanized.

20.7. For bimetallic connectors, copper alloy liner of minimum thickness of 2 mm shall be cast integral with aluminum body.

20.8. Flexible connectors shall be made from tinned copper.

20.9. All current carrying parts shall be designed and manufactured to have minimum contact resistance.

20.10. Connectors shall be designed to be corona free in accordance with the requirements stipulated in IS: 5561.

**21. CONTROL CABINETS:**

- 21.1. The common control cabinet enclosure shall be mounted on a separate concrete plinth for 420/245 kV CB. Mechanism box for individual poles to be mounted on CB structure for 420/245 kV CB.
- 21.2. The common enclosure may be mounted on the structure for 145 kV CB.
- 21.3. Control cabinet of the operating mechanism shall be made out of Aluminum alloy sheet (minimum 3 mm thickness)/Stainless steel (minimum 2 mm thickness). The gland plates shall be made of same material as the control cabinet and its sheet thickness shall be 1 mm more than the control cabinet. The operating mechanism shall be strong, rigid & not subject to rebound. Hinged door shall be provided with lock and key arrangement. The door shall have door handle for opening and closing. Sloping rain hood shall be provided to cover all sides. 15 mm thick neoprene or better type of gaskets shall be provided to ensure degree of protection of at least IP55 as per IS: 2147.
- 21.4. The motors used in the supplied circuit breakers shall be the same as the type-tested CB design in extended mechanical endurance test on class M2 circuit-breakers. The motors for the three individual poles shall be taken from 3 separate phases of the 415 V, 3 phase 50 Hz LVAC system.
- 21.5. MCBs shall be group operated units (3 pole for use on 3-phase supply systems and 2 pole for single phase supply systems) quick make quick break type. All MCBs shall be C curve type. No fuses shall be used in the control cabinet, only MCBs shall be used.
- 21.6. No Push buttons shall be used in the cabinet, only pistol grip type switches shall be used. Red, Green and Amber LED indicating lamps shall be flush mounted.
- 21.7. Single phasing preventer relay shall be provided for 3 phase motors to provide positive protection against single phasing.
- 21.8. Purchaser's power cables will be of 1100 volts grade stranded aluminum conductor, XLPE/PVC insulated, PVC sheathed, steel round wire/strip armored and PVC jacketed. Purchaser's control cables shall be 1100 volts grade stranded copper conductor, PVC insulated, PVC sheathed, steel wire/strip armored/non armored and PVC jacketed. Necessary termination arrangement in control cabinet shall be made keep this in view.
- 21.9. All necessary cable terminating accessories such as intra panel/internal cables, inter limb cables, control cubicle to limb cables, glands, crimp type tinned copper lugs etc. for power as well as control cables shall be included in supplier's scope of supply. Suitable brass/stainless steel cable glands shall be provided for cable entry.
- 21.10. All cables for inter-limb wiring and wiring from cubicle to the limbs which are external to the control cubicles shall be armored type.
- 21.11. Wiring for all control circuits shall be carried out with 1100 volts grade PVC insulated tinned copper stranded conductors of sizes not smaller than 2.5 sq. mm.
- 21.12. Wiring for all LV power circuits shall be carried out with 1100 volts grade XLPE insulated tinned copper stranded conductors of appropriate sizes as per IS 3961. At least 20% spare terminal blocks for control wire terminations shall be provided on each panel. The terminal blocks shall be of non-disconnecting stud type. All terminals shall be provided with ferrules indelibly marked or numbered and these identifications shall correspond to the designations on the relevant wiring diagrams. The terminals shall be rated for adequate capacity which shall not be less than 10 Amps.
- 21.13. Separate terminal blocks shall be provided for terminating circuits of AC & DC.
- 21.14. Control cabinet shall be provided with 240 V, 1-phase 50 Hz, 20 W LED light fixture and a suitably rated 240 V, 1-phase, 5 amps, 3 pin socket for hand lamps.
- 21.15. Strip heaters shall be provided inside each cabinet complete with thermostat (preferably differential type) to prevent moisture condensation. Heaters shall be controlled by suitably rated double pole miniature Circuit Breakers.
- 21.16. **Care should be taken in placement of the heaters so that it shall not come into contact the internal wires or external wires which enter into the control cubicle.**

21.17. **The terminal blocks shall be so placed that the clearance from bottom of cabinet shall be minimum 100 mm and clearance from side walls and top wall of cabinet shall be 50 mm minimum, for ease of working during maintenance.**

21.18. Items inside the cabinet made of material shall be coated with a fungus resistant varnish.

**22. MOTORS:**

Motors shall be **universal type** suitable for operation in AC & DC supply of sufficient size capable of satisfactory operation for the application and duty as required for the driven equipment. The motors used in the supplied design should be same as the type tested CB design.

### 23. Technical Requirements for SF<sub>6</sub> Circuit Breaker:

The CB shall be in accordance with requirements specified hereunder.

SI No	Description	400 kV	220 kV	132 kV
<b>1.0</b>	<b>System Particulars</b>			
1.1	Nominal Voltage of System (U <sub>n</sub> )	400 kV	220 kV	132 kV
1.2	Highest System Voltage	420 kV	245 kV	145 kV
1.3	Frequency	50 Hz		
1.4	Number of Phases	3		
1.5	Neutral Earthing	Solid Ground/Effectively Earthed		
1.6	Phase-to-phase spacing in switchyard	7000 mm	4500 mm	2700 mm
1.7	Height of the concrete plinth (to be provided by OPTCL)	Above Switchyard Gravel Level 200 mm Above Finished Ground Level 300 mm		
<b>2.0</b>	<b>Minimum Statutory Safety Clearances</b> (IEC 61936-1/IS 10118-3/ IE Rules)			
2.1	Minimum phase-to-phase clearance	4.2 m	2.1 m	1.3 m
2.2	Minimum phase-to-earth clearance	3.4 m	2.4 m	1.3 m
2.3	Minimum ground clearance of live part	8 m	5.5 m	4.8 m
2.4	Minimum safety working clearance	6.4 m	5 m	4 m
2.5	Minimum height to base of insulator (IE Rules 1956)	2.44 m	2.44 m	2.44 m
<b>3.0</b>	<b>Characteristics of CB</b>			
3.1	Rated Voltage U <sub>r</sub>	420 kV	245 kV	145 kV
3.2	Type	SF <sub>6</sub> for AIS substation		
3.3	Number of poles	3		
3.4	Class: indoor or outdoor	Outdoor		
3.5	Type of Housing and support insulator	Brown Porcelain		
3.6	Mounting	HDG lattice/pipe steel support structure to be supplied by the CB manufacturer		
3.7	Type of Operation	Individually Operated Single Poles	Individually Operated Single Poles	Gang Operated
3.8	Operating Mechanism	Spring-Spring		
3.9	Mechanism Enclosure/Control	Stainless Steel (2 mm thick)/Aluminum Alloy (3 mm thick).		

	Cubicle	Gland Plate same material as cubicle with 1 mm higher thickness.		
3.10	Auto reclosing duty	Single & Three phase		3 phase
3.11	Inter-pole Spacing of CB	As per switchyard phase-to-phase spacing.		As per the type-tested design, with due regard to the minimum statutory phase-to-phase clearance requirement.
3.12	Rated Insulation Level			
3.12.1	1 minute Power Frequency withstand Voltage ( $U_d$ )			
3.12.1.1	phase-earth (Type Test & Routine Test )	520 kV <sub>rms</sub>	460 kV <sub>rms</sub>	275 kV <sub>rms</sub>
3.12.1.2	phase-phase (Type Test & Routine Test )	520 kV <sub>rms</sub>	460 kV <sub>rms</sub>	275 kV <sub>rms</sub>
3.12.1.3	across open breaker contacts	Type Test : 610 kV <sub>rms</sub> Routine Test: 520 kV <sub>rms</sub>	460 kV <sub>rms</sub>	275 kV <sub>rms</sub>
3.12.2	Rated (1.2/50 $\mu$ s) Lightning Impulse Withstand Voltage ( $U_p$ )			
3.12.2.1	phase-earth & phase-phase	1425 kV <sub>p</sub>	1050 kV <sub>p</sub>	650 kV <sub>p</sub>
3.12.2.2	across open breaker contacts	COMBINED VOLTAGE : 1. One Terminal - 1425 kV <sub>p</sub> 2. Opposite Terminal - pf voltage with peak value of 240 kV	1050 kV <sub>p</sub>	650 kV <sub>p</sub>
3.12.3	Rated (250/2500 $\mu$ s) Switching Impulse Withstand Voltage ( $U_s$ )			
3.12.3.1	phase-earth & across open breaker contacts	1050 kV <sub>p</sub>	NA	NA
3.12.3.2	phase-phase	1575 kV <sub>p</sub>	NA	NA
3.13	Rated Frequency	50 Hz		
3.14	Rated Normal (Continuous) Current ( $I_r$ )	3150 A	3150 A	3150 A
3.15	Rated Short Circuit			

	Breaking Current ( $I_{sc}$ )			
3.15.1	Symmetrical AC Component ( $kA_{rms}$ )	63 $kA_{rms}$	50 $kA_{rms}$	40 $kA_{rms}$
3.15.2	DC Component	50 %/As per IEC 62271-100		
3.16	Temperature rise of parts, materials and dielectrics over an ambient temperature of 40 °C	As per IEC 62271-1 and 62271-100		
3.17	Rated Short Time Withstand Current ( $I_k$ )	63 $kA_{rms}$	50 $kA_{rms}$	40 $kA_{rms}$
3.18	Rated duration of short circuit( $t_k$ )	3 sec		
3.19	Rated Peak Withstand Current ( $I_p$ )	157.5 $kA_p$	125 $kA_p$	100 $kA_p$
3.20	Rated Short-circuit making current	157.5 $kA_p$	125 $kA_p$	100 $kA_p$
3.21	Out of phase breaking current capability kA	15.75 $kA_{rms}$	12.5 $kA_{rms}$	10 $kA_{rms}$
3.22	Out of phase making current capability kA	157.5 $kA_p$	125 $kA_p$	100 $kA_p$
3.23	Rated Capacitive Switching Currents	400 $A_{rms}$	250 $A_{rms}$	160 $A_{rms}$
3.24	Small inductive current (A) rms	100 without switching o/v exceeding 2.3 p.u. /(As per IEC 62271-110)		
3.25	Rated first-pole-to-clear factor	1.3	1.3	1.5
3.26	Rated operating sequence/Duty cycle	O - 0.3s – CO – 3 min - CO		
3.27	Type of tripping	Trip Free		
3.28	Rated Break-time (Max)	≤ 40 ms	≤ 60 ms	≤ 60 ms
3.29	Total Closing Time	≤ 100 ms	≤ 100 ms	≤ 100 ms
3.30	Time Discrepancy between poles (@Rated Control Voltage, Rated Operating Duty & SF <sub>6</sub> pressure)			
3.30.1	Pole to Pole Break time discrepancy	≤ 3 ms	≤ 3 ms	≤ 3 ms
3.30.2	Pole to Pole Make time discrepancy	≤ 5 ms	≤ 5 ms	≤ 5 ms
3.31	CB Class			
3.31.1	Mechanical operations class	M2 class		
3.31.2	Restrike performance	C2 class		
3.31.3	Electrical Endurance Class as per IEC	E2 Class		

	62271-310			
3.32	Rated auxiliary AC supply voltage ( $U_{aAC}$ )	3 $\emptyset$ , 4 wire, 50 Hz, 415 $V_{rms}$ neutral grounded AC (Tolerance $\pm 10\%$ )		
3.33	Method of earthing of LVAC system	Effective Earthing/Soild ground		
3.34	Rated DC supply voltage for coils, control, protection & indication/alarm circuits ( $U_{aDC}$ )	220 V, 2 wire, DC (Tolerance -15% + 10%)		
3.35	Type of Spring Change Motor	Universal Type		
3.36	Electromagnetic Compatibility Requirements			
3.36.1	Minimum Corona Extinction Voltage ( $kV_{rms}$ )	320	156	92
3.36.2	RIV at $1.1 \times \frac{U_m}{\sqrt{3}}$	$\leq 1000 \mu V$	$\leq 1000 \mu V$	$\leq 1000 \mu V$
3.37	Spare Auxiliary Contacts for CB			
3.37.1	NO	20 nos/pole	20 nos/pole	20 nos
3.37.2	NC	20 nos/pole	20 nos/pole	20 nos
3.37.3	Rating of Auxiliary Contacts	20 A	20 A	20 A
3.38	Total Auxiliary Contacts for Pressure Switch			
3.38.1	For SF <sub>6</sub> pressure low Level 1	3 NC/pole	3 NC/pole	3 NC total
3.38.2	For SF <sub>6</sub> pressure low Level 2	4 NC/pole	4 NC/pole	4 NC total
3.38.3	For SF <sub>6</sub> pressure lockout	2 NC/pole	2 NC/pole	2 NC total
3.38.4	Healthy	1 NO/pole	1 NO/pole	1 NO total
3.38.5	Rating of Pressure Switch Auxiliary Contacts	10 A	10 A	10 A
3.39	Spare Contacts (10 A rating) for TNC Switch	4 nos (2 trip + 2 close)	4 nos (2 trip + 2 close)	4 nos (2 trip + 2 close)
3.40	Spare Contacts for LR Switch	4 nos (2 local + 2 remote)	4 nos (2 local + 2 remote)	4 nos (2 local + 2 remote)
3.41	Spare Contacts for Spring Charge Limit Switch (10 A rating)	(2 NO + 2 NC)/pole	(2 NO + 2 NC)/pole	2 NO + 2 NC
3.42	Potential Free Contact for Operation Counter (refer clause 8.9)	2 swipe contacts	2 swipe contacts	2 swipe contacts
3.43	Add-on contacts for	2 NC	2 NC	2 NC

	AC & DC supply MCB			
3.44	Number of Tripping Coils	2/pole	2/pole	2 total
3.45	Number of Closing Coils	1/pole	1/pole	1 total
3.46	Spring Charging Time Through Motor Operation	≤ 15 s	≤ 15 s	≤ 15 s
3.47	Minimum Creepage Distance			
3.48	Specific Creepage Distance mm/kV (Refer clause 3.5)	31	31	31
3.49	Phase to Ground (mm)	13020	7595	4495
3.50	Between CB Terminals (mm)	13020	7595	4495
3.51	Seismic Requirement			
3.51.1	Seismic Qualification Level as per IEC 62271-300	AF3		
3.51.2	Zero Point Acceleration	0.3g		
3.52	Maximum noise level at base and up to 50 m	140 dB		



## Annexure I Nameplate Information

SF <sub>6</sub> Circuit Breaker		UOM	Value
Description	UOM		Value
Manufacturer	█		
Type designation	█		
Serial number	█		
Rated voltage (U <sub>r</sub> )	kV		
Rated Power Frequency Withstand Voltage (U <sub>d</sub> )	kV		
Rated lightning impulse withstand Voltage (U <sub>p</sub> )	kV		
Rated switching impulse withstand Voltage (U <sub>s</sub> )	kV		
Rated frequency (f <sub>r</sub> )	Hz		
Rated normal current (I <sub>r</sub> )	A		
Rated duration of short circuit (t <sub>k</sub> )	s		
Rated short-circuit breaking current (I <sub>sc</sub> )	kA		
D.C. time constant of the rated short circuit breaking current (τ)	ms		
D.C. component of the rated short circuit breaking current at contact separation corresponding to the d.c. time constant of the rated short-circuit breaking current (p <sub>cs</sub> )	%		
First pole-to-clear factor(k <sub>pp</sub> )	█		
Rated out-of-phase breaking current (I <sub>d</sub> )	kA		
Rated line-charging breaking current (I <sub>l</sub> )	A		
Rated cable-charging breaking current (I <sub>c</sub> )	A		
Rated single capacitor bank-breaking Current (I <sub>sb</sub> )	A		
Rated filling pressure for interruption (p <sub>re</sub> )	MPa		
Number of Closing & Tripping Coils	nos		
Breaking Time	ms		
Closing Time	ms		
Mass of CB including SF <sub>6</sub> (M)	kg		
Mass of SF <sub>6</sub> per CB (m)	kg		
Rated operating sequence	█		
Year of manufacture	█		
Mechanical Performance Classification	█		M2
Electrical Endurance Classification (if applicable)	█		E2
Restriking Performance Classification	█		C2
Relevant Standard	█		IEC 62271-100
<b>Operating Device</b>			
Manufacturer	█		
Type designation	█		
Serial number	█		
Rated filling pressure for operation (p <sub>rm</sub> )	MPa		
Rated supply frequency of closing and opening devices (U <sub>op</sub> )	V		
Rated (AC) supply frequency of closing and opening devices	Hz		
Rated (AC) supply voltage of the auxiliary Circuits (U <sub>a</sub> )	V		3 Ø 415 (±10%)
Rated supply frequency of (AC) auxiliary	Hz		50

<b>circuits</b>		
<b>Rated (DC) supply voltage of the auxiliary</b>	<b>V</b>	<b>220 (-15% +10%)</b>
<b>Circuits</b>		
<b>Mass</b>	<b>kg</b>	
<b>Relevant Standard</b>		<b>IEC 62271-100</b>

## Annexure II

### Mandatory Spares to be provided with SF<sub>6</sub> CB

As per price bid Sheet

SN	Description	Quantity
1	SF <sub>6</sub> Cylinder	20% of total gas requirement of supplied CBs
2	Tripping Coil Assembly	1 nos/CB
3	Closing Coil Assembly	1 nos/CB
4	Motor limit switch	1 nos/CB
5	Spring Charging Motor	1 nos/PO or 1 nos/Turnkey Project
6	Anti-pumping Relay	1 nos/PO or 1 nos/Turnkey Project
7	Auxiliary Switch Assembly (12 NO + 12 NC)	2 nos/PO or 1 nos/Turnkey Project
8	TNC Switch and LR Switch	2 set each /PO or 1 set each/Turnkey Project
9	Operation and maintenance manual	1 nos/CB

1.

## Annexure III

### GUARANTEED TECHNICAL PARTICULARS FORMAT

(To be filled up by bidder/OEM separately for 420 kV, 245 KV & 145 KV SF<sub>6</sub> Circuit Breakers)

SN	Description	Value as per TS/Standard	Guaranteed Value
1.0			
1.1	Maker's name and country of manufacture		
1.2	Manufacturer's type Designation		
2.0	Applicable technical standards		
3.0			
3.1	Rated voltage(kV)		
3.2	Rated frequency(Hz)		
4.0	Number of Poles		
5.0	<b>Class</b>		
6.0	Rated normal current		
6.1	Under site conditions		
6.2	Rated		
7.0			
7.1	Rated short circuit breaking current		
7.1.1	RMS value of AC component of rated short circuit current (KA)		
7.1.2	Percentage DC component		
7.1.3	Asymmetrical Breaking Current at Highest System Voltage		
7.1.4	Certificate or report no		
7.1.5	Oscillogram no.		
7.2	Rated short circuit making current (KA peak)		
7.2.1	At Higher rated Voltage		
7.2.2	At Lower rated Voltage		
7.3	Maximum Breaking capacity Under Phase Opposition(KAP)		
7.3.1	Max Pole discrepancy(ms)		
7.3.2	Max arc duration & Corresponding current under lockout pressure		
8.0	First pole to clear factor		
9.0	Rated transient recovery voltage for terminal faults (kV peak)		
10.0	Rated characteristics for short line faults.		
11.0	Rated operating sequence		
12.0	Rated duration of short circuit(Sec.)		
13.0	Rated out of phase making & breaking current (kA)		
14.0	<b>Operation Times</b>		
14.1	Opening time (ms)		
14.1.1	Maximum Opening time under any condition		
14.1.2	With limiting Voltage & Pressure.		
14.2	Arcing time (ms)		
14.2.1	At 100% rated breaking current (ms)		
14.2.2	At 50% rated breaking current (ms)		
14.2.3	At 25% rated breaking current (ms)		
14.2.4	At 10% rated breaking current (ms)		

- 14.2.5        **Maximum arcing time at lowest fault current (ms).**
- 14.3                Break Time (ms)
- 14.3.1            **At 100% rated breaking current (ms)**
- 14.3.2            **At 50% rated breaking current (ms)**
- 14.3.3            **At 25% rated breaking current (ms)**
- 14.3.4            **At 10% rated breaking current (ms)**
- 14.3.5        **Maximum break time at lowest fault current (ms).**
- 14.3.6            **Maximum Total Break Time under any duty condition For any current up to rated breaking current with limiting condition of Voltage & Pressure(ms)**
- 14.4                Closing time (ms)
- 14.5                **Minimum dead time for 3 phase reclosing**
- 14.6                **Maximum Close Open Time under any condition With limiting Voltage & Pressure**
- 14.7                **Minimum Time Interval between each make/ Break Operation**
- 15.0                **Rated line charging breaking current (kA)**
- 16.0                **Rated small inductive breaking current (kA)**
- 17.0
- 17.1                **Max. rise of temperature over ambient for current rating under sl. 6.**
- 17.2                **Max. rise of temperature for Main contacts over design ambient temperature of 50 deg C.**
- 18.0                **Interrupting capacity based on duty cycle as per sl. 11.**
- 18.1                **AC component (kA)**
- 18.2                **Percentage DC component**
- 19.0                **Latching current (kA)**
- 20.0                **No. of breaks in series per pole**
- 21.0                **Length of contact travel (mm)**
- 22.0                **Total length of break per pole (mm)**
- 23.0                **Rate of contact travel:**
- 23.1                **At tripping (metres/sec.)**
- 23.2                **At closing (metres/sec.)**
- 24.0                **Type of devices, if any, used to obtain uniform voltage distribution between breaks.**
- 25.0                **Recovery voltage distribution between breaks in percent of rated voltage.**
- 25.1                **Single line to ground fault**
- 25.2                **Interruption on short lines**
- 25.3                **Switching off an unloaded, transformer**
- 26.0
- 26.1                **Type of main contact**
- 26.2                **Number of auxiliary contacts per pole for normal operation (NO & NC)**
- 26.3                **Number of auxiliary contacts per pole provided for Owner's use (NO & NC)**
- 26.4                **Current rating of Auxiliary contacts**
- 27.0                **Type of arcing-contacts and/or arc control device**
- 28.0                **Material of contacts:**
- 28.1                **Main**
- 28.2                **Arcing**
- 28.3                **Whether contacts are silver plated**

28.4	Thickness of silver coating mm	
28.5	Contact pressure, kg/sq. mm	
29.0	Insulation level of the breaker:	
29.1	1 minute power frequency withstand voltage kV rms (Dry & Wet)	
29.1.1	Between live terminals & Ground	
29.1.2	Between terminals with Breaker contacts open	
29.2	Switching surge withstand test Voltage kV (peak)	
29.2.1	To earth	
29.2.2	Across open contacts	
29.3	Lightning impulse withstand test voltage, kV(peak)	
29.3.1	To earth	
29.3.2	Across open contacts	
29.4	Max. dynamic power frequency over voltage withstand kV (peak)	
30.0		
30.1	RIV level (Max)	
30.2	Corona inception voltage (kV rms)	
30.3	Corona extinction voltage (kV rms)	
31.0	Minimum clearances	
31.1	Between phases (live parts) (mm)	
31.2	Between live parts and earth (mm)	
31.3	Total Creepage Distance	
31.3.1	To ground	
31.3.2	Between Terminals	
32.0	Whether the circuit breaker is fixed trip or trip free	
33.0	Method of closing	
33.1	Normal	
33.2	Emergency	
34.0	Type of closing mechanism	
35.0		
35.1	Normal voltage of closing	
35.2	Pick up range (volts DC)	
36.0		
36.1	Power at normal voltage of closing mechanism (watts)	
36.2	Power at 85% of normal voltage of closing mechanism (watts)	
36.3	No of closing coils in operation	
37.0	Type of tripping mechanism Number of Tripping Coil	
38.0		
38.1	Normal voltage of tripping coils(volts)	
38.1.1	Power at normal voltage for Tripping coils (watts)	
38.1.2	Power at 70% normal voltage for Tripping coils (watts)	
38.1.3	No. of tripping coils in operation	
38.1.4	Pick up range (V DC)	
38.2	Number of close open operation possible after failure of AC supply to motor	
38.2.1	Time required for motor to charge the closing spring(Sec)	
38.2.2		
38.2.3	Whether indication of spring charged condition	

- will be provided in control cabinet
- 39.0 Arc duration at 100% (ms)
- 40.0 Interruption capacity:
- 40.1 Opening
- 40.1.1 Arcing time no. of loops and time including resistor current duration (cycle)
- 40.1.2 Resistor current duration (cycle)
- 40.1.3 Total length of the arc (mm)
- 40.1.4 Max. length of the arc (mm)
- 40.1.5 Total interrupting time measured from instant of trip coil energization to arc extinction of resistor current (cycles)
- 40.2 Closing time measured from instant of application of power to closing device upto arcing contacts touchings (cycles)
- 41.0 Critical current (current giving the longest arc when a break takes place) (kA)
- 41.1 Recovery voltage when circuit breaker tested at 100% rated breaking capacity (kV inst.)
- 41.2 Rate of rise of restriking voltage at breaking
- 41.2.1 for 30% breaking capacity (kV/microsecs.)
- 41.2.2 for 100% breaking capacity (kV/microsecs.)
- 41.3 Maximum over-voltage factor of the circuit breaker when switching off.
- 41.3.1 Unloaded transformers
- 41.3.2 Loaded transformer
- 41.3.3 Open circuited lines
- 42.0 When switching of synchronous systems:
- 42.1 Max. current (kA)
- 42.2 Max. contacts of 1 pole (kV)
- 43.0 No. of openings the circuit breaker is capable of performing without inspection, replacement of contacts or other main parts.
- 43.1 at 50% rated current
- 43.2 at 100% rated current
- 43.3 at current corresponding to 50% rated breaking capacity.
- 43.4 at current corresponding to 100% rated breaking capacity.
- 44.0
- 44.1
- 44.1.1 Weight of complete circuit breaker (Kg)
- 44.1.2 Impact loading for foundation design, to include dead load plus impact value on opening at maximum interrupting ratings, in terms of equivalent static load (Kg.)
- 44.1.3 Overall dimensions:
- 44.1.3.1 Height (mm)
- 44.1.3.2 Width (mm)
- 44.1.3.3 Length (mm)
- 44.2 **Type & Material of Gasket used to ensure gas tight joints**
- 44.2.1 Metal to Metal Joint
- 44.2.2 Metal to Porcelain Joints
- 44.3 Type & make of



- 44.3.1 Density Monitor
- 44.3.2 Pressure Gauge
- 44.4 Density Monitor Setting
- 44.4.1 Lock Out
- 44.4.2 Alarm
- 45.0 Porcelain:
- 45.1 Make
- 45.2 Type
- 45.3 Descriptive pamphlet no.
- 45.4 Weight (kg.)
- 45.5 Transport dimensions (mm)
- 45.6 Height above floor, required to remove porcelain (mm).
- 45.7 Insulation class
- 45.8 One minute power frequency withstand, kV (rms) (dry & wet)
- 45.9 Flash over voltage (kV)
- 45.10 Lightning impulse withstand voltage kV (peak) (dry & wet)
- 45.11 Switching surge withstand voltage kV (peak) (wet)
- 45.12 Corona discharge voltage (kV rms)
- 45.13 Creepage distance, total protected (mm)
- 45.14 Permissible safe cantilever loading on installed porcelain (Kg.m)
- 46.0
- 46.1 Rated pressure of SF6 gas in the circuit breaker (Kg/sq.cm )
- 46.2 Rated Pressure of SF6 in operating Chamber(kg/cm<sup>2</sup>) at 20deg C
- 46.3 Limits of Pressure of extinguishing medium
- 47.0 Rated pressure of SF6 gas in the gas cylinders (Kg/sq.cm )
- 48.0
- 48.1 Quantity of SF6 gas required per single pole unit (Kg.) at rated Pressure & at 20 deg C
- 48.2 Guaranteed Maximum Leakage rate per Year.
- 49.0 Quantity of SF6 gas per cylinder (Kg.) & Standard to which SF6 Gas Complies.
- 49.1 Weight of empty cylinder (Kg.)
- 49.2 Whether Breakers are dispatched filled with SF6 Gas or filled at site.
- 49.3 Quantity of absorbent required per pole (Kg.)
- 49.4 Recommended interval for renewal of absorbent in case of outdoor circuit breakers operating in tropical conditions.
- 49.5 Chemical composition of absorbent
- 49.6 Quantity of absorbent covered in the scope of supply (including spare quantities)
- 49.7 Limits of gas pressure for pressure operation of circuit breaker – (Kg/sq.cm )
- 49.8 Pressure and temperature at which the temperature compensated gas pressure switch will
- 49.8.1 give alarm (Kg/sq.cm., deg. C)
- 49.8.2 cut off (Kg/sq.cm. deg. C)





- 49.9 Name of SF6 supplier and country of origin. ██
- 49.10 Quantity of SF6 gas supplied for ██
- 49.10.1 Actual use in breakers (Kg.)
- 49.10.2 As spare (Kg.) ██
- 49.11 Chemical composition of gas: ██
- 49.11.1 Qty. of air by weight (ppm)
- 49.11.2 Qty. of H<sub>2</sub>O by weight (ppm)
- 49.11.3 Qty. of CF<sub>4</sub> by weight (ppm)
- 49.11.4 Qty. of free acid by weight (ppm)
- 49.11.5 Density
- 49.11.6 Oil Content
- 49.11.7 Resistivity ██
- 49.12 Motor For Circuit Breaker ██
- 49.12.1 Manufacture's name & address
- 49.12.2 Equipment driven by motor or not.
- 49.12.3 Motor Type
- 49.12.4 Country of Origin
- 49.12.5 Type of Duty
- 49.12.6 Type of Enclosure & Method of Cooling
- 49.12.7 Applicable Standard to which motor confirms
- 49.12.8 Type of mounting
- 49.12.9 Direction of rotations as viewed from non-driving end.
- 49.12.10 Standard Continuous rating at 50deg C
- 49.12.11 Rated Voltage
- 49.12.12 Rated Speed at rated Voltage & Frequency (rpm).
- 49.12.13 Full Load current at rated voltage & frequency.
- 49.12.14 Power Factor at rated load.
- 49.12.15 Rating of the Motor.
- 49.12.16 Time for fully charging the closing spring ██
- 49.13 Control Cabinet ██
- 49.13.1 Material of enclosure
- 49.13.2 Thickness of sheet steel
- 49.13.3 Painting for control cubicle
- 49.13.4 Paint shade
- 49.13.5 Degree of protection
- 49.13.6 Dimension
- 49.13.7 Material of gasket
- 49.13.8 Material of O ring
- 49.13.8.1 **Manufacturer**
- 49.13.8.2 **Material**
- 49.13.8.3 **Compression set**
- 50.0 The guaranteed years of maintenance free operation
- 51.0 Number of full load and full rated short circuit current breaking/operation without requiring any maintenance or overhauling

Name of the firm .....

Signature of Bidder .....

Designation & Seal .....

Date .....

**SECTION 3:**  
**36 KV RATED VACCUUM CIRCUIT BREAKERS**  
**(OUT DOOR TYPE): TECHNICAL DETAILS**

**1. TYPE AND RATING:**

The circuit breakers shall be vacuum type suitable for outdoor operation under the climatic conditions specified without any protection from sun and rain.

The circuit breaker shall have the following ratings:

- 1.1. Number of poles : 3 (One unit with three phase making and breaking).
- 1.2. Frequency. : 50 Hz
- 1.3. Nominal system voltage : 33 KV rms.
- 1.4. Highest system voltage : 36 KV rms.
- 1.5. Basic insulation level :
  - 1.5.1. Rated Lightning Impulse Withstand Voltage : 170 KVP
  - 1.5.2. Rated 1 min Power frequency withstand Voltage : 70 KV (rms.)
- 1.6. Nominal Current/ Continuous current rating : 1600 Amps rms.
- 1.7. First pole to clear factor : 1.5
- 1.8. Breaking capacity
  - 1.8.1. Symmetrical. : 31.5 KA<sub>rms</sub>
  - 1.8.2. Asymmetrical. : As per IEC
- 1.9. Making capacity : 78.75 KA Peak.
- 1.10. Operating Duty. : O-0.3 Sec-CO-3 Min-CO.
- 1.11.
  - 1.11.1. Break time : 3 Cycle
  - 1.11.2. Make time : 5 Cycle
- 1.12. Insulator or bushing
  - 1.12.1. Dry one minute power Frequency voltage : 70 KV
  - 1.12.2. Wet one minute power Frequency withstand Voltage.: 70 KV
  - 1.12.3. Creepage distance : **1116 mm (Minimum)**
- 1.13. Short time current withstand rating for 3 seconds. : 31.5 KA for 3 seconds.
- 1.14. Control circuit voltage : 220 V D.C
- 1.15. Type of Operating Mechanism : Spring-Spring
- 1.16. **Actual** ground clearance of bottom live part : 3800 ± 100 mm
- 1.17. Class of VCB : M2-E2-C2
- 1.18. No of Coils: 2 Trip + 1 Close
- 1.19. Auto-reclosing : 3 phase
- 1.20. Seismic Qualification Level as per IEC 62271-300 : AF3

**2. GENERAL:**

The circuit breakers shall be of vacuum type. The breakers shall be furnished as a complete unit with all accessories and equipment in place and all internal wiring installed and terminated in the mechanism. The circuit breakers shall consist of three identical single-phase units with a common operating mechanism.

The circuit breakers shall provide rapid and smooth interruption of current under all conditions, completely suppressing all undesirable phenomena even under the most severe and persistent short circuit conditions or when interrupting small currents of leading or lagging reactive current. The details of any device incorporated to limit or control the rate of rise of restricting voltages across the circuit breaker contacts shall be stated. The over voltages caused by the circuit breaker switching on inductive or capacitive load shall not exceed, 2.5 times the normal phase to neutral voltage. The total break time for the circuit breakers throughout the range of their operating duty shall be stated in the tender and guaranteed.

The vacuum interrupter, consisting of fixed contact and moving contact, shall be interchangeable among the same type interrupter.

**3. CONSTRUCTIONAL FEATURES:**

Each circuit breaker shall comprise 3 identical poles complete with a gang operated mechanism for specified duty. All these poles of the C.B. shall be linked together Electrically, mechanically for specified duty.

The breaker shall be capable of interruptions of low reactive current (lagging/leading) without undue over voltage and restrike.

**4. CONTROL CUBICLE:**

A common control cubicle shall be furnished to house electrical controls, monitoring devices and all other accessories. The cubicle shall be of gasketed weather proof construction, fabricated from sheet Aluminum alloy (minimum 3 mm thick) / Stainless Steel sheet (minimum 2 mm thick). The operating mechanism shall be strong, rigid and not subject to rebound.

The cubicle shall have front access door with lock and keys and removable gland plate at the bottom for owner's cable entry. Thermostat controlled space heater, internal illumination lamp, 5 A 3 pin socket with individual on off switches shall be provided in the cubicle.

**5. MOUNTING SUPPORT STRUCTURE:**

The circuit breakers shall be suitable for mounting on steel galvanized structures. The prices of these support structure shall be included in the price of the equipment and same shall be indicated clearly in the bid proposal sheet.

However, purchaser reserves the right to procure these from the supplier or through separate contract.

The steel support structure shall be designed with **factor of safety of 2.5** based on elastic limit of tension members and on crippling load of compression members.

The support structure design shall be so that it shall meet the Minimum statutory safety clearances as per IE rules and relevant IS/IEC.

The circuit breaker shall be supplied complete with the necessary lifting tools, foundation bolts and other accessories.

**For 36 kV circuit breakers, ladders are not to be provided by the OEM. OPTCL shall make its own concrete/brick masonry step & platform for accessing the mechanism box. The recommended height of the concrete platform for carrying out maintenance shall be specified in the GA drawing by the OEM.**

**6. TEMPERATURE RISE:**

The temperature rise of any part of the circuit breaker at an ambient air temperature not exceeding 40 °C shall not exceed the temperature-rise limits specified in latest editions and amendments of IEC 62271-1 and IEC 62271-100. If the maximum ambient temperature rises from above mentioned value (of 40 °C), permissible values shall be reduced accordingly.

**7. INSULATION OF THE CIRCUIT BREAKERS:**

The insulation to ground, the insulation between open contacts, the insulation between phases of the completely assembled circuit breakers, should be capable of withstanding satisfactorily dielectric test voltages corresponding to basic insulation level specified in **clause-1.5.**

The minimum statutory clearance in open air shall be maintained as per IEC 61936-1, IS 10118-3 and Indian Electricity Rules. However, higher clearances as per type test design is acceptable.

7.1.Phase to phase	:	320 mm
7.2.Phase to earth	:	320 mm
7.3.Minimum ground clearance to live part	:	3700 mm
7.4.Safety Working Clearance	:	2800 mm
7.5.Height of lowest point on the insulator (where it meets the earthed metal):		2440 mm
7.6.Actual ground clearance to bottom live part	:	<b>Refer clause 1.16</b>

**8. PORCELAIN HOUSING:**

- 8.1. The porcelains used shall be homogenous and free from cavities and other flaws. They shall be designed to have ample insulation, mechanical strength and rigidity for satisfactory operation under conditions specified above.
- 8.2. The porcelain housing shall be of single-piece construction without any joint or coupling. It shall be made of homogeneous, vitreous porcelain of high mechanical and dielectric strength. Glazing of porcelain shall be uniform brown or dark brown color with a smooth surface arranged to shed away rainwater or condensed water particles (fog). The type and profile of the porcelain insulator sheds shall be in accordance with IEC 60815 & IEC 62155.
- 8.3. The breaker porcelain shall be capable of withstanding all pressure resulting from any specified performance of the breaker.
- 8.4. The puncture strength of the bushings shall be greater than the flashover value.
- 8.5. The mechanical characteristics of insulators shall match with the requirements specified in this specification.
- 8.6. **The specific creepage distance of insulators shall be 25 mm/kV in general unless specifically called for 31mm/kV in the tender.**

#### **9. OPERATION MECHANISM:**

- 9.1. The operating mechanism shall be spring-operated type. Spring charging shall be motor operated having provision of hand-operated spring charging. Provision of local/remote electric control under normal operation shall be there. The mechanism shall be able to close/trip electrically as well as mechanically. All working parts in the mechanisms shall be corrosion resistant material and all bearings which require greasing shall be equipped with pressure grease fittings. The mechanism shall be strong, positive, quick in action and shall be removable without disturbing the other parts of the circuit breakers. The mechanisms of breaker shall be such that the failure of any spring will not prevent tripping.
- 9.2. The circuit breakers shall have motor wound spring charged trip free mechanism with anti-pumping feature. In addition, facility for manual charging of spring, shall be provided.
- 9.3. The operating mechanism along with its accessories shall be mounted in a weather proof cabinet with hinged, gasketed doors located near the breakers, on the VCB support structure. A local pistol grip TNC control switch and the breaker position indicator shall be provided in the cabinet. The circuit breakers shall also be provided with means for manual operation for maintenance purposes. The cabinet shall be IP 55 rated.
- 9.4. Each breaker shall be provided with manual close & open facility, mechanical ON-OFF indication, an operation counter and mechanism charge/discharge indication.
- 9.5. Spring charging shall take place automatically after each breaker closing operation. One open-close-open operation of the circuit breaker shall be possible after failure of power supply to the motor. A visual mechanical indicating device will also be provided to show the position of the spring.
- 9.6. The control circuits shall be designed to operate on 220V DC. The closing and tripping coils shall be designed to operate satisfactorily at any control voltage from 70% to 110% of the normal rated voltage. A heater shall be provided in the cabinet to prevent moisture condensation.
- 9.7. Necessary cable glands (bronze/stainless steel) for the cables of the operating mechanism shall be provided.
- 9.8. All the terminal blocks to be used in the operating mechanism should be of stud type of Melamine material of Elmex/Connectwell for 2.5 sqmm cable or higher.
- 9.9. The Motor to be used for spring charging shall be of Universal type and suitable for AC and DC supply (220 V DC).
- 9.10. Wiring for all control circuits shall be carried out with 1100 volts grade PVC insulated tinned copper stranded conductors of sizes not smaller than 2.5 sq. mm.
- 9.11. **Potential free contacts shall be provided in the operation counter for integration of status in SAS if swipe contacts are not provided in CB auxiliary switch.**
- 9.12. **Four (4) nos spare contacts shall be provided in LR and TNC switch for (2 nos for each operation) for future use.**
- 9.13. **2 NO + 2 NC spare contacts shall be provided in the spring charge limit switch for future use.**
- 9.14. **Two (2) nos add-on contacts (2 NC) shall be provided in each DC & AC supply MCB for use in SAS. (For AC & DC supply supervision.)**

## **10. TERMINAL CONNECTORS:**

The terminal connectors shall meet the following requirements:

- 10.1. Terminal connectors design should be type tested and manufactured as per IS: 5561.
- 10.2. Terminal connectors shall be meant for take-off by Moose/Zebra. **Both the pad portion and conductor holding portion shall be six (6) bolted type.**
- 10.3. **The nuts and bolts shall be stainless steel type.**
- 10.4. All castings shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges and corners shall be blurred and rounded off.
- 10.5. No part of a clamp shall be less than 10 mm thick.
- 10.6. All ferrous parts shall be hot dip galvanized.
- 10.7. For bimetallic connectors, copper alloy liner of minimum thickness of 2 mm shall be cast integral with aluminum body.
- 10.8. Flexible connectors shall be made from tinned copper.
- 10.9. All current carrying parts shall be designed and manufactured to have minimum contact resistance.
- 10.10. Connectors shall be designed to be corona free in accordance with the requirements stipulated in IS: 5561.

## **11. AUXILIARY SWITCHES:**

Spare 15 Nos N/O (normally open) & 15 Nos N/C (normally closed) of auxiliary switches (contacts) shall be provided on each circuit breaker for use in the remote indication and control scheme of the circuit breaker and for providing safety interlocking with disconnecter etc. Special contact for use with trip coil and single short reclosing operation which permits relative adjustment with respect to the travel of the moving contact of the circuit breaker shall also be provided. There shall be provision to add more auxiliary switches at the later date if required.

## **24. INTERLOCKS:**

It is proposed to electrically interlock the circuit breaker with purchaser's associated air break disconnectors in accordance with switchyard safety interlocking scheme. The details of the scheme will be furnished to the supplier. All accessories required on breaker side for satisfactory operation of the scheme shall be deemed to be included in the scope of supply of this specification.

## **25. PAINTING, GALVANISING AND CLIMATE PROOFING:**

- 25.1. Ferrous parts such as support channels, structures, ladders, all sizes of nuts, bolts, foundation bolts shall be hot dip galvanized conforming to latest version of IS 2629. For HDG galvanization thickness shall be 86 micron and weight of zinc coating 610 gram/sqm. Spring washers shall be electro galvanized.
- 25.2. All other parts shall be painted.
- 25.3. All paints shall be carefully selected to withstand tropical heat and extremes of weather within the limits specified. All steel surfaces shall be cleaned with sand blasting, given a coat of primer and finished with two coats of synthetic enamel paints.
- 25.4. The paint shall not scale off or wrinkle or be removed by abrasion due to normal handling. All external paintings shall be as per shade no. 697 of IS:5.
- 25.5. Metal parts not accessible for painting shall be made of corrosion resisting material.
- 25.6. Paint inside the metallic housing shall be of anti-condensation type and the paint on outside surfaces shall be suitable for outdoor installation.

## **26. EARTHING:**

The operating mechanism housing, control cabinets, support structure etc. shall be provided with two separate earthing terminals suitable for bolted connection to 50X6 mm<sup>2</sup> mild steel flat to be provided by the purchaser for connection to station earth mat.

## **27. NAME AND RATING PLATES:**

Circuit breaker and its operating device shall be provided with rating plates marked with the data as per IS/IEC 62271-100. The rating plate shall be visible in position of normal service and installation. The rating plate shall be made of stainless steel with text engraved on it in black color.

**Annexure IV**  
**Mandatory Spares to be provided with VCB**

As per price bid Sheet

SN	Description	Quantity
<del>1</del>	<del>Tripping Coil Assembly</del>	<del>1 nos/CB</del>
<del>2</del>	<del>Closing Coil Assembly</del>	<del>1 nos/CB</del>
<del>3</del>	<del>Motor limit switch</del>	<del>1 nos/CB</del>
<del>4</del>	<del>Spring Charging Motor</del>	<del>1 nos/PO or 1 nos/Turnkey Project</del>
<del>5</del>	<del>Anti-pumping Relay</del>	<del>1 nos/PO or 1 nos/Turnkey Project</del>
<del>6</del>	<del>Auxiliary Switch Assembly (12 NO + 12 NC)</del>	<del>2 nos/PO or 1 nos/Turnkey Project</del>
<del>7</del>	<del>TNC Switch and LR Switch</del>	<del>2 set each /PO or 1 set each/Turnkey Project</del>
<del>8</del>	<del>Operation and maintenance manual</del>	<del>1 nos/CB</del>
<del>9</del>	<del>Complete Pole Assembly</del>	<del>1 nos/PO or 1 nos/Turnkey Project</del>
<del>10</del>	<del>Insulating Rod</del>	<del>2 nos/PO or 1 nos/Turnkey Project</del>
<del>11</del>	<del>Vacuum Interrupter</del>	<del>2 nos/PO or 1 nos/Turnkey Project</del>

## Annexure V

### GUARANTEED TECHNICAL PARTICULARS FORMAT

(To be filled up by bidder/OEM for 36 KV Vacuum Circuit Breakers)

SN	Description	Value as per TS/Standard	Guaranteed Value
1.0	Name of Manufacturer.		
2.0	Manufacturer's type designation.		
3.0	Rated Voltage. KV		
4.0	Maximum (continuous) service rated Voltage KV		
5.0	Normal current rating.		
5.1	Under normal conditions.		
5.2	Under site conditions.		
6.0	Short time current rating for seconds (rms)		
7.0	Maximum temperature rise over ambient. °C		
8.0	Breaking capacity.		
8.1	Symmetrical. <span style="color: red;">KVA</span>		
8.2	Asymmetrical. <span style="color: red;">MVA</span>		
9.0	Making capacity. KA		
10.0	Total break time in ms.		
10.1	at 10% rated interrupting capacity ms		
10.2	at rated interrupting capacity ms		
11.0	Arcing time. ms		
12.0	Make time. ms		
13.0	Minimum reclosing time at full rated Interrupting MVA from the instant of Trip coil energisation. ms		
14.0	Minimum dead time for 3 phase reclosing. ms		
15.0	Whether restricting free. Yes/No		
16.0	One minute dry power frequency Withstanding test voltage (KV rms)		
16.1	Between line terminal and ground objects. - KV rms.		
16.2	Between terminal with breaker contacts open. - KV rms.		
17.0	1.2/50 micro s full wave impulse withstand test voltage for the two cases above.		
17.1	Between line terminal & grounded objects. - KV(Peak)		
17.2	Between terminal with breaker Contacts open.		
18.0	Busing or Insulators:		
18.1	Type of bushing.		
18.2	Dry 1 minute power frequency withstand test voltage. KV rms		
18.3	Dry flashover value. KV rms.		
18.4	Wet flashover value. KV rms.		
18.5	1.2/50 impulse withstand KV(Peak)		
18.6	Creepage distance. mm		
18.7	Puncture value of bushing. KV		
18.8	Weight of bushing. Kg.		
19.0	Minimum clearance in air.		

19.1	Between phases.	mm
19.2	Live parts to earth.	mm
19.3	Live parts to ground level	mm
19.4	Between live parts & grounded object.	mm
20.0	Number of poles of circuit breaker.	
21.0	Number of breaks per phase.	
22.0	Total length of break per phase.	
23.0	Type of main contacts.	
24.0	Type of Aux. Contacts.	
25.0	Materials of auxiliary contacts.	
26.0	Contacts silver plated or not.	
27.0	Thickness of silver plating.	
28.0	Contact pressure.	
29.0	Voltage distribution between breaker.	
30.0	Type of device if any, used to limit the rate of rise or restricting voltage.	
31.0	Voltage grading device if any used.	
32.0	Number of auxiliary contacts provided.	
32.1	Those closed when breaker is closed.	
32.2	Those open when breaker is closed.	
32.3	Those adjustable with respect to the position of main contacts.	
33.0	Type of operating mechanism.	
33.1	Opening	
33.2	Closing	
34.0	Control circuit voltage.	
35.0	Power required for trip coil at 220V D.C. Watts	
36.0	Power required for close coil at 220V D.C. Watts	
37.0	Frequency at which contacts are To be replaced.	
38.0	Nos. of terminal connector.	
39.0	Steel support structure galvanized With foundation Nuts & Bolts to be provided - Whether yes or no	
40.0	Type test certificate Furnished	Yes/No
41.0	Circuit Breaker weight.	- Kg.
42.0	Quantity.	Nos.

Name of the firm .....

Signature of Bidder .....

Designation & Seal .....

Date .....



## **SECTION 4:**

### **420/245/145 KV SF6 CB & 36 KV VCB:**

#### **TESTS, INSPECTION, QAP, DOCUMENTATION, PACKING AND FORWARDING, SUPERVISION OF ERECTION, TESTING AND COMMISSIONING (ET&C), QUANTITY AND DELIVERY REQUIREMENTS**

##### **1. TESTS:**

###### **1.1. Type Tests:**

- 1.1.1. All the equipment offered shall be fully type tested as per the relevant standards (IEC 62271-1 & IEC 62271-100 with latest amendments) & tests as indicated below. The bids offering equipment not type tested will be rejected. In case, the equipment of the type & design offered has already been type tested, the bidder/ EPC agency shall furnish four sets of the type test reports along with the offer. The test must have been conducted not later than ***ten years*** from the date of opening of the bids.
- 1.1.2. The purchaser reserves the right to demand repetition of some or all the type & additional type tests in the presence of its representative. For this purpose, the bidder/ EPC agency may quote unit rates for carrying out such type tests.
- 1.1.3. For any change in the design/type of already type tested CB offered against this specification, the purchaser reserves the right to demand repetition of tests without any extra cost or reject the bid without any intimation.
- 1.1.4. All type test reports should have been conducted in independent third-party NABL laboratories. The tests for which testing facility is not available in India, should have been conducted in a laboratory of foreign Country accredited by National Accreditation Body of that Country.
- 1.1.5. The type tests conducted in-house by manufacturers shall also be acceptable provided the lab is accredited by National Accreditation Body of the Country and the tests have been witnessed by a representative of NABL accredited laboratory/Government Power Utility.
- 1.1.6. **List of Type Tests as per IS/IEC:**
  - a. Dielectric tests
  - b. Measurement of the resistance of the main circuit
  - c. Temperature-rise tests
  - d. Short-time withstand current and peak withstand current tests
  - e. Additional tests on auxiliary and control circuits
  - f. Mechanical operation test at ambient temperature (class M1)
  - g. Short-circuit current making and breaking tests
  - h. Radio interference voltage tests for  $U_r$  145 kV, 245 kV & 420 kV
  - i. Verification of the degree of protection
  - j. Tightness test
  - k. Extended mechanical endurance tests on circuit-breakers for special service conditions (class M2)
  - l. High temperature tests for an ambient temperature ( $T_H$ ) of 50 °C
  - m. EMC tests
  - n. Capacitive current switching tests:
    - i. line-charging current breaking tests
    - ii. cable-charging current breaking tests
  - o. Single-phase fault test
  - p. Critical current tests
  - q. Short line fault tests
  - r. Out-of-phase making and breaking tests

s. X-ray radiation test (for VCB)

**1.1.7. Additional Type Tests as per Annexure VI:**

- a. Corona extinction voltage test for Ur 145kV, 245 kV & 420 kV
- b. Seismic withstand voltage test as per IEC/TR 62271-300

**1.2. Acceptance/Routine Tests:**

1.2.1. All acceptance/routine tests as stipulated in IEC-62271-100 and its latest amendments & routine tests as indicated below shall be carried out by the supplier in the presence of purchaser's representative.

**1.2.2. No sampling is allowed for factory acceptance tests. FAT of 100% of the offered quantity shall be witnessed by OPTCL representative.**

**1.2.3. List of Acceptance/Routine Tests:**

- a. Dielectric test on the main circuit
- b. Partial discharge measurement for  $U_r$  145kV, 245 kV & 420 kV
- c. Tests on auxiliary and control circuits
  - i. Inspection of auxiliary and control circuits, and verification of conformity to the circuit diagrams and wiring diagrams
  - ii. Functional tests
  - iii. Verification of protection against electrical shock
  - iv. Dielectric tests
- d. Measurement of the resistance of the main circuit
- e. Tightness test
- f. Design and visual checks
- g. Mechanical operating tests

1.2.4. In addition to the mechanical and electrical tests specified by IEC as above, the following shall also be performed.

- a. Speed curves for each breaker shall be obtained with the help of a suitable operation analyzer to determine the breaker contact movement during opening, closing, auto-reclosing and trip free operation under normal as well as limiting operating conditions (control voltage, pressure etc.). The tests shall show the speed of contacts directly at various stages of operation, travel of contacts, opening time, closing time, shortest time between separation and meeting of contacts at break/make operation etc.
- b. Measurement of coil current & resistance.
- c. Verification of Closing time, Opening time and CO time as per guaranteed values in the approved GTP.
- d. Any additional tests required by the inspecting officer.

**1.3. ADDITIONAL TESTS:**

The purchaser reserves the right for carrying out any other tests of a reasonable nature at the works of the supplier/laboratory or at any other recognized laboratory/research institute in addition to the above mentioned type, acceptance and routine tests at the cost of the purchaser to satisfy that the material complies with the intent of this specification.

**2. INSPECTION:**

2.1. The inspection may be carried out by the purchaser at any stage of manufacture. The supplier shall grant free access to purchaser's representative at a reasonable time when the work is in progress. Inspection and acceptance of any equipment under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective.

2.2. Before offering for inspection, the supplier shall furnish shop routine test certificates and calibration reports of the equipment/instruments to be used during testing. After acceptance of these calibration reports and shop routine test certificate, inspecting officer will be deputed for witnessing such inspections.

- 2.3. The purchaser reserves the right to insist for witnessing the acceptance/routine testing of the bought out items.
- 2.4. No material shall be dispatched from its point of manufacture unless the material has been satisfactorily inspected and tested or unless the same is waived by the purchaser in writing.

**3. QUALITY ASSURANCE PLAN:**

- 3.1. The Successful Bidder/ EPC agency shall submit Quality Assurance Plan for manufacturing process for approval (or may comply to the Standard Manufacturing Quality Plan of OPTCL as available with the Technical specification).
- 3.2. The Successful Bidder/ EPC agency shall submit process flow chart for the manufacturing process along with the drawings/GTP.
- 3.3. The QAP shall contain the followings:
- 3.3.1. RAW Materials/Bought out items:
- Incoming raw materials/bought out items from sub vendors,
  - Name of the sub vendors,
  - List of standards to which the raw materials/bought out items adhere/according to which the raw materials are manufactured,
  - List of tests carried out by the OEM on the raw materials/bought out items to verify the quality of the incoming raw materials with sampling rate of the tests,
  - Acceptance norms,
  - The record of these test results shall be kept for verification by OPTCL.
- 3.3.2. In process inspection by OEM:
- List of tests carried out by OEM to ensure quality at various stages of manufacture.
  - Sampling rate of the tests
  - Reference standards for tests and acceptance norms,
  - The record of these test results shall be kept for verification by OPTCL.
  - OPTCL preserves the right to witness all/some of these tests at the factory premises of OEM.**
- 3.3.3. Factory acceptance tests:
- All tests as per IEC 62271-1/62271-100 as applicable on circuit breakers.
  - Quantum of check/Sampling rate = 100%.
  - Reference standards for tests and acceptance norms,
  - Tests shall be carried out by manufacturer and witnessed by OPTCL representative.
- 3.3.4. Type test reports:
- The QAP shall also contain list of type test conducted on the design,
  - Reference standard,
  - Acceptance norms.
- 3.3.5. List of testing equipment available with the OEM for final testing of breakers vis-à-vis, the type, special, acceptance and routine tests specified in the relevant standards.
- 3.3.6. Packing and Dispatch:
- List of checks to ensure the completeness of equipment and accessories as per PO,
  - List of checks to ensure proper packing of CB and spares,
  - Supply of O&M Manual and test reports.
- 3.4. Subsequent to(/During) approval of drawings/GTP & before offering inspection, the supplier shall, submit following information to the purchaser:
- 3.4.1. List of raw materials as well bought out accessories and the names of sub-suppliers selected from those furnished along with offer.
- 3.4.2. Type test certificates of the raw material and bought out accessories. **(Vacuum bottle, Terminal Clamps & Hollow Insulators)**
- 3.4.3. Quality assurance plan (QAP) with hold points for purchaser's inspection (if purchaser so desires).
- 3.5. The supplier shall submit the raw material/ bought out item test certificates and routine test reports, before/at the time of offering inspection call.

#### **4. DOCUMENTATION:**

4.1. All dimensions in submitted drawings shall be in SI units.

4.2. All submitted drawings, GTP, MQP, and other documentations shall confirm to IS/IEC and this TS.

4.3. List of drawings & documents:

The Bidder/ EPC agency shall furnish four sets of the following drawings/documents along with the offer.

- a. General outline drawings showing dimensions and shipping weights, quantity of insulating media etc.,
  - b. Guaranteed technical Particulars,
  - c. Isometric view,
  - d. Porcelain Insulator details,
  - e. Control cabinet details,
  - f. Terminal clamp with isometric view,
  - g. Sectional views showing the general constructional features of the circuit breaker including operating mechanism, arcing chambers, contacts with lifting dimensions for maintenance,
  - h. Schematic diagrams of breaker offered for control supervision and reclosing,
  - i. Structural drawing, design calculations and loading data for support structures and ladders,
  - j. Schematic drawing of control circuit,
  - k. Bill of materials,
  - l. Legends and abbreviations,
  - m. Foundation drilling plan and loading data for foundation design,
  - n. Detail sketch of component wise details of operating mechanism of CB,
  - o. Digital Animation of operating mechanism, internal working and arc quenching of circuit breaker – in digital shape,
  - p. Type test reports.
- 4.4. After placement of order the supplier shall submit four sets of final version of all the above drawings/GTP for purchaser's approval. The purchaser shall communicate his comments/approval on the drawings to the supplier within reasonable period. The supplier shall, if necessary, modify the drawings and resubmit four copies of the modified drawings for purchaser's approval. After receipt of purchaser's approval, the supplier shall, submit 15 prints of the approved drawings for purchaser's use.
- 4.5. The supplier shall also furnish fifteen (15) copies of manuals covering erection, commissioning, operation and maintenance instructions and all relevant information and approved drawings pertaining to the main equipment as well as auxiliary devices. Marked erection drawings shall identify the component parts of the equipment as shipped to enable purchaser to carry out erection with his own personnel. Each manual shall also contain one set of all the approved drawings, type test reports as well as acceptance reports of the corresponding consignment dispatched. The instruction manuals shall contain storage, handling, erection, commissioning, troubleshooting, servicing and overhauling instructions.
- 4.6. The manufacturing of the equipment shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the supplier's risk.
- 4.7. Approval of drawings/work by purchaser shall not relieve the supplier of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirement of the latest revision of applicable standards, rules and codes of practices. The equipment shall conform in all respects to high standards of engineering design workmanship & latest revisions of relevant standards at the time of ordering & purchaser shall have the

power to reject any work or materials which in his judgment is not in full accordance therewith.

**4.8. TEST REPORTS:**

4.8.1. Four copies of acceptance test reports shall be furnished to the purchaser as per the inspection of testing. One copy will be returned, duly certified by the purchaser and only there afterwards shall the material be dispatched.

4.8.2. All records of routine test reports shall be maintained by the supplier at his works for periodic inspection by the purchaser.

4.8.3. All test reports of tests conducted during manufacture shall be maintained by the supplier. These shall be produced for verification as and when requested for by the purchaser.

**5. PACKING AND FORWARDING:**

5.1. The equipment shall be packed in suitable crates so as to withstand handling during transit. The supplier shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing and handling. The easily damageable materials shall be carefully packed and marked with the appropriate caution symbols. Wherever necessary, proper arrangement for lifting such as lifting hooks etc. shall be provided. Any material found short inside the packing cases shall be supplied by the supplier without any extra cost.

5.2. Each consignment shall be accompanied by a detailed packing list containing the following information:

- a. Name of the consignee.
- b. Details of consignment.
- c. Destination.
- d. Total weight of consignment.
- e. Sign showing upper / lower side of the crate.
- f. Handling and unpacking instructions.
- g. Bill of material indicating contents of each package and spare material.
- h. Manuals containing approved drawings & test reports

5.3. The supplier shall ensure that the packing list and bill of material are to be supplied in advance to the purchaser & to the consignees before dispatch.

**6. SUPERVISION OF ERECTION, TESTING AND COMMISSIONING (ET&C):**

The erection, testing and commissioning of the breakers shall be supervised, by trained personnel (Engineer) of the supplier/OEM who shall direct the sequence of ET&C and make the necessary adjustments to the apparatus and correct in the field any errors or omissions in order to make the equipment and material properly perform in accordance with the intent of this specification. The Engineer shall also instruct fully (up to the satisfaction) to the plant operators, in the operation and maintenance of equipment furnished. The supplier shall be responsible for any damage to the equipment, on commissioning the same, if such damage results from faulty or improper ET&C procedure. Purchaser shall provide adequate number of skilled/semi-skilled workers as well as all ordinary tools and equipment and cranes required for breaker erection, at his own expense. Apart from the above, the purchaser shall not be responsible for any other expenses incurred by the supplier and against personal injuries to the Engineer etc., shall be to supplier's account. Special tools, if required for erection and commissioning shall be arranged by the supplier at his cost and on commissioning these shall be supplied to the purchaser, free of cost, for future use.

**7. QUANTITY AND DELIVERY REQUIREMENTS:**

The scope of supply shall include a supply of 25% extra-quantity of bolts, nuts, washers, split pins, cotter pins and such other small loose items free of cost.

**8. AFTER SALES SERVICE:**

The guarantee period shall be as per tender condition/PO/WO. The supplier also should guarantee after sales service beyond the free service period. Supplier also should provide after sales service

within 15 days of receipt of intimation from the field Engineer-in-charge of the equipment or the purchaser.

**9. COMPLETENESS OF EQUIPMENT:**

Any fittings, accessories or apparatus which may not have been specifically mentioned in the specification but which are usual or necessary in the equipment of similar plant shall be deemed to be included in the contract and shall be supplied by the supplier without extra charges. All plant and equipment shall be complete in all details whether such details are mentioned in the specification or not. The detail bill of materials list to be furnished along with the tender.

## ANNEXURE VI

### CORONA, RIV AND SEISMIC TEST PROCEDURES

#### Corona and Radio Interference Voltage (RIV) test

1. **General:** Unless otherwise stipulated, all equipment together with its associated connectors, where applicable, shall be tested for external corona both by observing the voltage level for the extinction of visible corona under falling power frequency voltage and by measurement of radio interference voltage (RIV).
2. **Test Levels:** The test voltage levels for measurement of external RIV and for corona extinction voltage are listed under the relevant clauses of the specification.
3. **Test Methods for RIV: (For  $U_r \geq 145$  kV)** As per IEC 62271-100.
4. **Test Methods for Visible Corona: (For  $U_r \geq 145$  kV)**
  - 4.1. The purpose of this test is to determine the corona extinction voltage of apparatus and connectors, the test shall be carried out in the same manner as RIV test described above with the exception that RIV measurements are not required during test and a search technique shall be used near the onset of extinction voltages, when the test voltage is raised and lowered to determine their precise values. The test voltage shall be raised to 130% of RIV test voltage and maintained there for five minutes. The voltage will then be decreased slowly until all visible corona disappears. The voltage will then be raised slowly again to the same maximum voltage. The procedure shall be repeated at least 4 times with corona inception and extinction voltage recorded each time. The corona extinction voltage for purposes of determining compliance with the specification shall be the lowest of the four values at which visible corona (negative or positive polarity) disappears. Photographs with laboratory in complete darkness shall be taken under test conditions, at all voltage steps i.e., 85%, 100%, 115% and 130%. Additional photographs shall be taken at corona inception and extinction voltages. At least two photographs shall be taken in each case.
  - 4.2. The “test to determine the visible corona extinction voltage” need not be carried out simultaneously with “test to determine RIV levels”. However, both tests shall be carried out with the same test set up and as little time duration between tests as possible. No modifications or treatment of the sample between tests will be allowed. Simultaneous RIV and visible corona extinction voltage testing may be permitted at the discretion of owner’s inspector if, in his opinion, will not prejudice other tests.

#### Seismic Withstand Test

The seismic withstand test on the complete equipment shall be carried out along with the supporting structures etc. The seismic level specified shall be applied at the base of the structure. The accelerometers shall be provided at the terminal pad of the equipment and any other point as agreed by the purchaser. The seismic test shall be carried out in all possible combinations of the equipment. IEC/TR 62271-300 Seismic qualification of alternating current circuit-breakers shall be followed.

**APPENDIX-I**

**SCHEDULE OF QUANTITY AND DELIVERY(FY 2022-23 & 2023-24)**

**CIRCUIT BREAKER**

Sl. No.	Description of materials	Quantity (1 <sup>st</sup> Slot)	Delivery period Required	Quantity (2 <sup>nd</sup> Slot)	Delivery period Required
1	420 KV CB	4 Nos	Within <b>four</b> months from the date of Issue of Purchase order	-	-
2	245 KV CB	20 Nos		-	-
3	145 KV CB	20 Nos		25	Within <b>four</b> months after the schedule date of delivery of 1 <sup>st</sup> Slot
4	36 KV VCB	60 Nos		40	

N.B: The detail delivery programme & quantity to be delivered will be informed at the time of placing P.O / issue of release order.