

**BIDDING DOCUMENT**

**FOR**

**Supply of terminal equipments at 220 KV Salakati GSS of AEGCL**

**ASSAM ELECTRICITY GRID CORPORATION  
LIMITED**



**BID IDENTIFICATION NO:  
AEGCL/MD/TECH-263/O&M(LAR)/SALAKATI SPARES/2023/BID**

**SECTION 1**

**INSTRUCTION TO BIDDERS**

**Corporate Office,  
Assam Electricity Grid Corporation Limited, Bijulee Bhawan,  
Paltan Bazar, Guwahati-781001**

PHONE: 0361-2739520 FAX NO.0361-2739513

Web: [www.aegcl.co.in](http://www.aegcl.co.in) Email: [managing.director@aegcl.co.in](mailto:managing.director@aegcl.co.in)

**1.1.0 INTRODUCTION:**

The Chief General Manager (O&M), LAR on behalf of Assam Electricity Grid Corporation Ltd(AEGCL), hereinafter referred to as AEGCL or Purchaser invites single stage two envelope e-bids for the following work from eligible firms/companies/ contractors.

**a) Name of work: Supply of terminal equipments at 220 KV Salakati GSS of AEGCL**

**1.2.0 INTENT OF THE TENDER ENQUIRY:**

The intent of the Tender Enquiry is to invite proposals from the prospective and relevantly experienced and financially sound contractor(s) /firms to carry out the works as specified in this bidding document.

**1.3.0 SCOPE OF WORK:**

The major scopes of work are as follows:-

- a) Design, manufacture, testing, supply, delivery of equipment to AEGCL site.
- b) Arrangements of any permits required for transportation and movement of supplied materials. However, AEGCL shall assist as far as practicable in the process.

**1.4.0 TIME SCHEDULE:**

The successful bidder shall have to complete the works within **3 (Three) months** from the date of contract commencement. Bidder must submit a completion schedule bar chart for activities to complete the work within this time schedule.

**1.5.0 ESTIMATE:**

**Rs. 33,69,555.00** (Rupees Thirty-Three Lakh sixty NineThousand Five Hundred Fifty-Five Only) including GST @ 18%.

**1.6.0 ELIGIBILITY CRITERIA:**

**1.6.1. GENERAL**

Bidder may be manufacturer of the offered products or a firm/company having authorisation from a manufacturer. In case the bidder is not a manufacturer of the offered products, bidder must submit manufacturer's authorisation using for that purpose Form-MA provided in Section-2 Bidding forms.

**1.6.2. EXPERIENCE**

To be qualified for the bid the bidder must compulsorily meet the following minimum criteria specified in (i), (ii) and (iii) below:.

## Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

- i. Bidder OR if the bidder is not a manufacturer, offered product's manufacturer must have least Five years of experience in design, manufacture and supply of the equipments. Bidder shall submit filled up form EXP-1 along with copy of past orders to establish its eligibility.
- ii. Bidder OR if the bidder is not a manufacturer, offered product's manufacturer must have supplied such equipments which are in successful operation for at least two years. Bidder shall submit filled up form EXP-2 along with copy of orders and performance certificates to establish its eligibility.
- iii. Bidder must have experience of executing a supply order of electrical items in Govt agency within past five years. Bidder shall submit filled up form EXP-3 along with copy of past orders and completion certificate/delivery Challan with customer signature to establish its eligibility.

**Joint venture is not allowed for this bid.**

### 1.6.3. FINANCIALS:

- i. As a minimum, a Bidder's net worth calculated as the difference between total assets and total liabilities should be positive. As supporting document, bidder should submit audited balance sheets or other financial statements acceptable to the Purchaser, for last 3 (three) financial years to demonstrate the current soundness of the Bidders financial position and its prospective long-term profitability. Apart from audited balance sheet, bidder shall submit duly filled and signed **Form 'FIN-1'** given in Section 2. Using the 'Form LIT – 1' (Section 2, Bidding Form), bidder shall list all Pending Litigation. All pending litigation shall be treated as resolved against the Bidder and so shall in total not represent more than 50% percent of the Bidder's net worth.
  - ii. Bidder must have minimum **Average Annual Turnover (AAT) of Rs. 51,00,000.00 (Rupees Fifty-one Lakh Only)**. AAT shall be calculated by averaging total certified payments received for contracts in progress or completed, for the last 3 (three) years. The bidder shall furnish, along with its bid, audited balance sheets and duly filled up Form '**FIN-2**' in support of this Clause.
  - iii. Bidder must demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered real assets, lines of credit, and other financial means, other than any contractual advance payments to meet:
    - (a) the cash-flow requirement, **Rs. 17,00,000.00 (Seventeen Lakh Only)** for this work. **The Cash flow statement must be submitted in the format prescribed by the Institute of Chartered Accountant of India.**
    - (b) the overall cash flow requirements for this contract and its current works commitment. .
- Bidder must submit duly filled and signed **Form FIN-3 & FIN-4** of section 2 in support of this clause.

### 1.6.4. TYPE TEST REPORT:

The offered product(s) must be type tested at CPRI or NABL accredited laboratory for critical performance at the time of bid submission. Bidder must submit full type test reports for the offered products along with the techmno-commercial bid.

### 1.7.0 SITE VISIT:

The bidders are advised to visit and examine the sites of work and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid. The costs of visiting the Site shall be at the bidder's own expense.

**Note: It will be binding on the contractor to visit the site and supply the terminal connector that will be suitable for 220kV Salakati GSS so as to avoid fitting mismatch.**

### 1.8.0 QUANTUM OF WORK:

The quantum of work is stated in the PRICE SCHEDULE at the end of section 2 – bidding forms. Tentative delivery locations shall be -

1) 220KV Salakati GSS, Salakati, Dist -Kokrajhar, Assam

### 1.9.0 QUERY ON THE BIDDING DOCUMENT:

Prospective bidder may submit queries, if felt necessary, requesting clarification of any bid clause. Such queries must be submitted in the e-tendering portal latest by the **Tender clarification end date and time** mentioned in the Bid Data Sheet. Purchaser shall clarify to the extent felt necessary or issue corrigendum for any amendment required in the bidding document. Such corrigendum/clarification shall be made available in the e-tendering portal and official website of AEGCL, [www.aegcl.co.in](http://www.aegcl.co.in) . Any query submitted outside the e-tender portal viz. email, or in physical letters, shall not be entertained.

### 1.10.0 CLARIFICATION OF BIDS

To assist in the examination, evaluation, and comparison of the Technical and Price Bids, and qualification of the Bidders, the Purchaser may, at its discretion, ask any Bidder for a clarification of its bid. Any clarification submitted by a Bidder that is not in response to a request by the Purchaser shall not be considered. The Purchaser's request for clarification and the response shall be in writing. No change in the substance of the Technical Bid or prices in the Price Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Purchaser in the evaluation of the bids. If a Bidder does not provide clarifications of its bid by the date and time set in the Purchaser's request for clarification, its bid may be rejected.

### 1.11.0 DEADLINE FOR SUBMISSION OF BIDS

Bids shall be received ONLINE only on or before the date and time indicated in the **Bid Data Sheet** The Purchaser may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

### 1.12.0 SUBMISSION OF BID:

The bidder shall submit the techno commercial & price bid through e-tendering portal <https://assamtenders.gov.in>. All documents as required by this bidding document shall be scanned and uploaded in the portal. Price schedule should be submitted in the format provided in the online portal. Bidder must go through the document checklist provided in this bidding document and submit all required document. Bidders are also requested to submit the informations in the format provided in this bidding document where applicable.

In addition to the online bid submission, (i) Original copy of **EMD BG(or receipt of online payment)**, (ii) Duly filled and signed **Letter of technical bid** and (iii) **Authorization letter of bid signatory** must be submitted in a sealed envelope superscribed with the name of bidder, full address, IFB reference, name of work etc. at the office of the Managing Director, Assam Electricity Grid Corporation Ltd, Bijulee Bhawan, Paltan Bazar Guwahati-781001 **one hour prior to bid submission end date and time. In case these any of these documents are not received; the bid shall be summarily rejected.**

### 1.13.0 BID VALIDITY

The validity of bid shall be for **180(One Hundred Eighty) days** from the date of bid submission end date.

### 1.14.0 OPENING OF TECHNO-COMMERCIAL BIDS

The Purchaser shall conduct the opening of Technical Bids through online process at the address, date and time specified in the BDS. Bidders at their discretion may attend the techno-commercial bid opening.

Price bid of those bidders shall only be opened whose techno-commercial bids are found to be responsive to the requirement of the bidding document.

**1.15.0 EARNEST MONEY DEPOSIT (EMD):**

The bid must be accompanied with earnest money as mentioned in the **Bid Data Sheet** against the works to be deposited in the form of Bank Guarantee (BG) of Nationalized or scheduled Bank **OR** FD/Term Deposit pledged in favour of "The Managing Director, AEGCL" **OR** through online mode. The EMD should be submitted along with Techno-Commercial bid. The earnest money will be released to the unsuccessful bidders on finalization of the tenders. The EMD to the successful bidder will be released on submission of Security Deposit after execution of the contract agreement.

**1.16.0 PRICE BASIS:**

Cost quoted by the bidder shall be inclusive of all scope of work as specified in this bidding document including any related services that is implicit to carry out the work successfully. Price will be firm and no price variation will be allowed within the completion period given in the work order.

**1.17.0 DEVIATIONS, RESERVATIONS, AND OMISSIONS:**

During the evaluation of bids, the following definitions apply:

- a) "Deviation" is a departure from the requirements specified in the Bidding Document;
- b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and
- c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.

**1.18.0 PRELIMINARY EXAMINATION OF TECHNICAL BIDS:**

The Purchaser shall examine the Techno-commercial Bid to confirm that all documents and technical documentation requested in this bidding document have been provided, and to determine the completeness of each document submitted. If any of these documents or information is missing, **the Bid may be rejected.**

The Purchaser shall confirm that the following documents and information have been provided in the Technical Bid. If any of these documents or information is missing, the offer **shall be rejected.**

- (a) Original copy of **EMD (or Receipt of online payment)**,
- (b) Duly filled and signed **Letter of technical bid** and
- (c) **Authorization letter of bid signatory**

**Bidder should submit hard copies of the documents mentioned above in (a), (b) and (c) in a physical envelope prior to deadline for technical bid submission. Techno-commercial bids shall be summarily rejected if these three documents are not submitted in hard copy deadline for technical bid submission.**

**1.19.0 RESPONSIVENESS OF TECHNO-COMMERCIAL BID:**

The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid itself. A substantially responsive Techno-commercial Bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,

- a) if accepted, would:
  - (i). Affect in any substantial way the scope, quality, or performance of the plant and services specified in the Contract; or
  - (ii). Limit in any substantial way, inconsistent with the Bidding Document, the Purchaser's rights or the Bidder's obligations under the proposed Contract; or

- b) If rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive bids.

The Purchaser shall examine the Techno-commercial Proposal, to confirm that the requirement of the bidding document have been met without any material deviation or reservation.

If a bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Purchaser and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

### **1.20.0 EVALUATION OF PRICE BIDS:**

The Purchaser shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be used.

To evaluate a Price Bid, the Purchaser shall consider the following:

- a) The bid price excluding taxes as quoted in the Price Schedules;
- b) Price adjustment for correction of arithmetical errors.
- c) The following methodology will be practiced for identification and treatment of the Abnormally Low Bids (ALB) in this tender process of AEGCL:
  - i. Absolute Approach is to be considered when there is fewer than five substantially responsive bidders and if the bid price is 20% or more below AEGCL's cost estimate then AEGCL's tender evaluation committee should clarify the Bid price with the bidder to determine whether the Bid is Abnormally low.
  - ii. Relative approach is to be considered when there are at least 5(five) nos. of substantially responsive bids and the lowest bid price is 20% or more below AEGCL's cost estimate. In this approach, first the Average bid price is determined and then by deducting the standard deviation from the Average bid price, potentially ALB may be determined.
- d) In case of an ALB, the tender evaluation committee/appropriate authority of the respective tenders shall undertake the following three stage review process which is as below:
  - i. To identify ALB as per the steps mentioned in SI no. 1.20.a.(i) and 1.20.b.(ii) Whichever is applicable.
  - ii. To seek and analyse the clarifications from the abnormally low Bidder in terms of resource inputs and pricing, including overheads, contingencies and profit margins. In that respect, the committee may refer to guideline of World Bank, AIIB, ADB etc. prescribed for ALB.
  - iii. To decide whether to accept or reject the bid.
  - iv. On acceptance of the bid, whether Additional Performance Security is to imposed on the bidder supplemented by adequate justification.
- e) In case of acceptance of ALB with Additional Performance Security:
  - I. If any abnormally low bid is accepted under point 1.20.d.(iii) with additional performance security, it is to be noted that the total performance security should not exceed 20% of the total contract value.
  - II. The additional performance security shall be treated as part of the original performance security and shall be valid for a period similar to that applicable for defect liability period of the contract.
  - III. Non submission of the additional performance security shall constitute sufficient ground for rejection of the bid and similar assessment shall then be initiated for next ranked bidder if that bidder is also identified as ALB.

**1.21.0 AWARD CRITERIA:**

Purchaser shall in general award the contract to the lowest substantially responsive bidder. However, the purchaser reserves the right to not award contract to the lowest substantially responsive bidder without thereby incurring any liability to Bidders.

**1.22.0 PURCHASER'S RIGHT TO ACCEPT ANY BID, AND TO REJECT ANY OR ALL BIDS:**

The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

**1.23.0 NOTIFICATION OF AWARD:**

Prior to the expiration of the period of bid validity, the Purchaser shall notify the successful Bidder, in writing, that its bid has been partially or fully accepted quoting acceptance of the bid. The notification letter (hereinafter called the "Notification of Award") shall specify the sum that the Purchaser will pay the Contractor (hereinafter called "Contract Price") in consideration of the execution and completion of the services. Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.

**1.24.0 PERFORMANCE SECURITY:**

**Within 15 (five) days** of receipt of the Notification of Award from AEGCL, the successful bidder shall furnish to AEGCL a performance security in an amount of 10 (ten) percent of the Contract Price in accordance with the Conditions of Contract. The form of performance security provided in Section 3 of the bidding documents may be used or some other form acceptable to AEGCL. The performance guarantee BG shall be valid through 30 days beyond the guarantee period.

**1.25.0 SIGNING OF CONTRACT AGREEMENT:**

Within **15 (Fifteen) days** of receipt of the Notification of Award, the successful Bidder shall be required to sign the Contract Agreement with AEGCL using for that purpose, the contract form provided with this bidding document failing which AEGCL at its discretion may cancel the award.

Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

**Annexure to SECTION 1  
BID DATA SHEET**

|  |   |
|--|---|
| <b>Name of Work</b>                          | Supply of terminal equipments at 220 KV Salakati GSS of AEGCL   |
| <b>Location of Work</b>                      | Salakati, Dist-Kokrajhar, Assam   |
| <b>NIT No.</b>                               | AEGCL/MD/Tech-263/O&M(LAR)/Salakati Spares/2023/3, dated – 10.02.2023   |
| <b>Bid Identification No.</b>                | AEGCL/MD/TECH-263/O&M(LAR)/SALAKATI SPARES/2023/BID   |
| <b>Estimate(In Indian Rupees)</b>            | <b>Rs. 33,69,555.00</b> (Rupees Thirty-Three Lakh sixty Nine Thousand Five Hundred Fifty-Five Only) including GST @ 18%   |
| <b>Earnest Money Deposit(EMD)</b>            | <b>Rs. 68,000.00</b> (Rupees Sixty-Eight thousand) Only   |
| <b>Purchase's Address for correspondence</b> | <b>The Chief General Manager(O&amp;M), LAR, AEGCL</b><br>1 <sup>st</sup> Floor, Bijulee Bhawan, Paltanbazar<br>Guwahati(Assam)<br>781001<br><br>Telephone: 8473894987 (AGM, O&M, LAR)<br>Facsimile number: +91 361 2739513<br>Electronic mail address: <a href="mailto:cgmom.lar@aeqcl.co.in">cgmom.lar@aeqcl.co.in</a>         |
| <b>Pre-bid date</b>                          | Shall be notified, if any, in due course.   |
| <b>Bid submission mode</b>                   | E-tenders shall be accepted through online portal <a href="https://assamtenders.gov.in">https://assamtenders.gov.in</a> only)   |
| <b>Address for bid opening</b>               | <b>The Chief General Manager(O&amp;M), LAR, AEGCL</b><br>Floor/Room number: <b>First Floor</b><br>Street Address: <b>Bijulee Bhawan, Paltanbazar</b><br>City: <b>Guwahati (Assam)</b><br>PIN Code: <b>781001</b><br>Country: <b>India</b>   |
| <b>Key dates</b>                             | <b>Tender publishing date: 10:00 Hrs., 11.02.2023</b><br><b>Tender submission start date: 12:00 Hrs., 11.02.2023</b><br><b>Tender clarification end date: 17:00 Hrs., 18.02.2023</b><br><b>Tender submission end date and time: 12:00 Hrs., 04.03.2023</b><br><b>Techno-commercial bid opening date: 16:00 Hrs., 06.03.2023</b> |



**SECTION -2 BIDDING FORMS**

(This Section contains the forms which are to be completed by the Bidder and submitted as part of his Bid)

**Form – 1**  
**Document checklist**

| SL. No. | Document to be submitted   | Submitted(Yes/No) | Name of uploaded pdf |
|---------|--|-------------------|----------------------|
| 1.      | Letter of technical bid(Form-2)  |                   |                      |
| 2.      | Notarised Power of attorney for the person signing the tender  |                   |                      |
| 3.      | Bank Gurantee for EMD (Form-3)   |                   |                      |
| 4.      | Bidders company/firm registration certificate/certificate of incorporation                                 |                   |                      |
| 5.      | Manufacturer's authorization (Form MA) (Applicable for bidder who is not manufacturer of offered prodyuct) |                   |                      |
| 6.      | GST registration   |                   |                      |
| 7.      | Filled up Form ELI-1   |                   |                      |
| 8.      | Filled up Form LIT   |                   |                      |
| 9.      | Filled up Form FIN-1   |                   |                      |
| 10.     | Filled up Form FIN-2   |                   |                      |
| 11.     | Filled up Form FIN-3   |                   |                      |
| 12.     | Filled up Form FIN-4   |                   |                      |
| 13.     | Audited Balance sheet for last three years   |                   |                      |
| 14.     | Bank solvency certificate/other supporting document  |                   |                      |
| 15.     | Filled up Form EXP-1   |                   |                      |
| 16.     | Filled up Form EXP-2   |                   |                      |
| 17.     | Filled up Form EXP-3   |                   |                      |
| 18.     | Order/Contract copies establishing supplying offered product in past                                       |                   |                      |
| 19.     | Performance certificate of offered product   |                   |                      |
| 20.     | Document establishing manufacturing unit details   |                   |                      |
| 21.     | GTP and drawings   |                   |                      |
| 22.     | Type test reports  |                   |                      |
| 23.     | Completion schedule bar chart  |                   |                      |
| 24.     | Additional documents if any  |                   |                      |

**Note:** Bidders are requested to submit all required documents in e-tender portal and **physical copies of i) Letter of technical bid, ii) EMD and iii) Power of Attorney(notarized) for bid signatory to Tender inviting authority.**

# Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

(In bidders letterhead)

**Form-2**  
**Letter of technical bid**

Date:

To

The Chief General Manager (O&M), LAR  
AEGCL, 1<sup>st</sup> Floor, Bijulee Bhawan,  
Paltan Bazar, Guwahati-01

Bid Identification No: AEGCL/MD/Tech-263/O&M(LAR)/Salakati Spares/2023

Sir,

I/We the undersigned, declare that, we, [insert name of the bidder] having registered office at [insert address of the registered office] are established manufacturer/supplier of \_\_\_\_\_ items.

I/we have read the bid document and do not have any reservation to any of the clause therein. We offer to execute the work of:

**Supply of terminal equipments at 220 KV Salakati GSS of AEGCL**

in conformity with the bid specification. Our Bid shall be valid for a period of **180(One Hundred Eighty)** days from the date fixed for the bid submission deadline and it shall remain binding upon us at any time before the expiration of that period.

Common Seal and Signature of the authorised person:

Name:

Designation:

*Note:*

*i) Insert name and address in appropriate places.*

*ii) Strike out which is not applicable.*

**Form - 3**

**Format for Bank Guarantee (Earnest money deposit)**

Bank Guarantee  
(To be stamped in accordance with Stamp Act)  
(The non-Judicial Stamp Paper should be in the name of issuing Bank)

Bank's Name:  
Address of Issuing Branch or Office:  
Email id and phone no for correspondence:

Beneficiary: The Managing Director, AEGCL  
Name and Address of Purchaser

Bid Security No.:

We have been informed that . . . . . *name of the Bidder* . . . . . (Hereinafter called "the Bidder") intends to submit to you its bid against *Bid ref* . . . . . for Supply installation, testing & commissioning of solar street light system.

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee. At the request of the Bidder, we . . . . . *name of Bank with address* . . . . . hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of . . . . . *amount in figures* . . . . . (*amount in words* . . . . . ) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

- (a) has withdrawn its Bid during the period of bid validity specified by the Bidder in the Form of Bid; or
- (b) does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or
- (c) having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity, (i) fails or refuses to execute the Contract Agreement, or (ii) fails or refuses to furnish the Performance Security, in accordance with the ITB.

This guarantee will expire: (a) if the Bidder is the successful Bidder, upon our receipt of copies of the Contract Agreement signed by the Bidder and the performance security issued to you upon the instruction of the Bidder; and (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy your notification to the Bidder of the name of the successful Bidder; or (ii) twenty-eight days after the expiration of the Bidder's bid.

Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

BG expiry date:  
BG clam date:

*Bank's seal and authorized signature(s)*

**NOTE**

1. *All italicized text is for use in preparing this form and shall be deleted from the final document. An amount is to be inserted by the Guarantor, representing the EMD amount as per bid.*
2. *This guarantee shall be valid upto 30 days beyond the bid validity.*
3. *For BG amount equal to or more than 50,000.00, BG should be signed by two bank officers to be valid.*
4. *Address of the banker with email and phone number for correspondence with banker should be clearly mentioned. Any correspondence related to the BG with the banker shall be made to the address mentioned in the BG.*

Form 4

Manufacturer's Authorization

(To be submitted in Manufacturer's Letterhead)

Bid No.: AEGCL/MD/Tech-263/O&M(LAR)/Salakati Spares/2023

To

The Chief General Manager (PP&D)  
AEGCL, 1<sup>st</sup> Floor, Bijulee Bhawan,  
Paltan Bazar, Guwahati-01

WE *[insert: name of Manufacturer]* who are established and reputable manufacturers of *[insert: name and/or description of the Goods]* having production facilities at *[insert: address of factory]* do hereby authorize *[insert: name & address of Bidder]* (hereinafter, the "Bidder") to submit a bid the purpose of which is to provide the following goods, manufactured by us, and to subsequently negotiate and sign the Contract:

1. -----
2. -----

We hereby extend our full guarantee and warranty in accordance with **Clause 5.11.0** of the Special Conditions of Contract, for the above specified Goods supporting the Supply of specified Goods and fulfilling the Related Services by the Bidder against this Bidding Documents, and duly authorize said Bidder to act on our behalf in fulfilling these guarantee and warranty obligations.

Further, we also hereby declare that we and *[insert: name of the Bidder]* have entered into a formal relationship in which, during the duration of the Contract (**including related services and warranty / defects liability**) we, the Manufacturer or Producer, will make our technical and engineering staff fully available to the technical and engineering staff of the successful Bidder to assist that Bidder, on a reasonable and best effort basis, in the performance of all its obligations to the Purchaser under the Contract.

For and on behalf of the Manufacturer

Common Seal and Signature of the authorised person:

Name:

Designation:

**NOTE:**

This MA should be signed by a person having either of the following-

- 1) Valid Power of attorney
- 2) Authorised by Managing Director
- 3) Member of Board of Directors

Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

**Form-ELI-1**  
**Bidder's information Sheet**

| Sl. No. | Particulars   | Bidders response |
|---------|---|------------------|
| 1       | Bidders name and registered address                             |                  |
| 2       | Bidders authorised representative, designation and contacts     |                  |
| 3       | GST registration no.  |                  |
| 4       | MSME/SSI registration Udyog Adhaar/NSIC registration available? | Yes/No           |
| 5       | EMD exemption claimed   | Yes/No           |

(Signature and common seal)

Name:

Designation:

Date:

Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

Form – LIT  
Pending Litigation

| Year | Matter in Dispute | Value of Pending Claim in Rupees | Value of Pending Claim as a Percentage of Net Worth |
|------|-------------------|----------------------------------|---|
|      |                   |                                  |   |
|      |                   |                                  |   |
|      |                   |                                  |   |

(Signature and common seal)

Name:

Designation:

Date:

Form FIN – 1  
Financial Situation

Information from Balance Sheet

| Financial Data for Previous 3 Years [Rupees] | Year 1<br>[Mention Financial Year] | Year 2<br>[Mention Financial Year] | Year 3<br>[Mention Financial Year] |
|--|------------------------------------|------------------------------------|------------------------------------|
| Total Assets                                 |                                    |                                    |                                    |
| Total Liabilities                            |                                    |                                    |                                    |
| Net Worth                                    |                                    |                                    |                                    |
| Current Assets                               |                                    |                                    |                                    |
| Current Liabilities                          |                                    |                                    |                                    |

Information from Income Statement

|                      |  |  |  |
|----------------------|--|--|--|
| Total Revenues       |  |  |  |
| Profits Before Taxes |  |  |  |
| Profits After Taxes  |  |  |  |

Note: To be supported by audited financial documents

(Signature and common seal)

Name:

Designation:

Date:

Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

Form FIN – 2  
Average Annual Turnover

| Annual Turnover Data for the Last 3 Years |                    |
|---|--------------------|
| Year                                      | Amount<br>(Rupees) |
|   |                    |
|   |                    |
|   |                    |
| <b>Average Annual Turnover</b>            |                    |

The information supplied should be the Annual Turnover of the Bidder in terms of the amounts billed to clients for each year for contracts in progress or completed.

(Signature and common seal)

Name:

Designation:

Date:



## Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

### Form FIN – 3 Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total cash flow demands of the subject contract or contracts with necessary supporting documents.

| Financial Resources |                     |                 |
|---------------------|---------------------|-----------------|
| No.                 | Source of financing | Amount (Rupees) |
| 1                   |                     |                 |
| 2                   |                     |                 |
| 3                   |                     |                 |
|                     |                     |                 |

(Signature and common seal)

Name:

Designation:

Date:

## Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

### Form FIN- 4 Current Contract Commitments

Bidders should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

| No. | Contract No., Customer and name of work | Contract value(Rs.) | Estimated Completion Date | Value of Outstanding Work (Rs.) |
|-----|---|---------------------|---------------------------|---------------------------------|
| 1   |   |                     |                           |                                 |
| 2   |   |                     |                           |                                 |
| 3   |   |                     |                           |                                 |
| 4   |   |                     |                           |                                 |
| 5   |   |                     |                           |                                 |
|     |   |                     |                           |                                 |

## Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

### Form – EXP-1

Bidder must fill this form to establish eligibility as per clause 1.6.2(i)

| Sl. No. | Customer name | Contract No. and date | Work order value | Contractor/supplier | details of Product supplied and manufacturer of the product |
|---------|---------------|-----------------------|------------------|---------------------|---|
|         |               |                       |                  |                     |   |
|         |               |                       |                  |                     |   |
|         |               |                       |                  |                     |   |
|         |               |                       |                  |                     |   |
|         |               |                       |                  |                     |   |

Note: Order/contract copies are to be submitted as supporting document.

(Signature and common seal)

Name:

Designation:

Date:

## Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

### Form – EXP-2

Bidder must fill this form to establish eligibility as per clause 1.6.2(ii)

| Sl. No. | Equipment/Product name | Contract No. and date | End Customer | Contractor/supplier | Completion date | Date of issue of performance certificate |
|---------|------------------------|-----------------------|--------------|---------------------|-----------------|--|
|         |                        |                       |              |                     |                 |  |
|         |                        |                       |              |                     |                 |  |
|         |                        |                       |              |                     |                 |  |
|         |                        |                       |              |                     |                 |  |
|         |                        |                       |              |                     |                 |  |

Note: Following documents are to be submitted as supporting document:

- i) Relevant order/contract copies.
- ii) Performance certificate(Should be in end customer's letterhead).

(Signature and common seal)

Name:

Designation:

Date:

## Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

### Form – EXP-3

**Bidder must fill this form to establish eligibility as per clause 1.6.2(iii)**

| Sl. No. | Customer name | Contract No. and date | Work order value | Contractor/supplier | Brief description of work | Completion date |
|---------|---------------|-----------------------|------------------|---------------------|---------------------------|-----------------|
|         |               |                       |                  |                     |                           |                 |
|         |               |                       |                  |                     |                           |                 |
|         |               |                       |                  |                     |                           |                 |
|         |               |                       |                  |                     |                           |                 |
|         |               |                       |                  |                     |                           |                 |

Note: Following documents are to be submitted as supporting document:

- i) Relevant order/contract copies.
- ii) Completion certificate or Delivery Challan with customer signature.

(Signature and common seal)

Name:

Designation:

Date:

## Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

### Price schedule - 1

All prices are in Indian Rupees and exclusive of taxes

| Sl. No | Item   | Unit | Qty | Unit Price | Unit F&I | Unit Total | Total | HSN |
|--------|--|------|-----|------------|----------|------------|-------|-----|
| A      | B  | C    | D   | E          | F        | G=E+F      | H     |     |
| 1      | 245kV 3-ph Single Pole Circuit Breaker with all fittings and accessories including terminal connectors                   | Set  | 1   |            |          |            |       |     |
| 2      | 145kV 1-ph 800-600/1-1-1-1-1 line CT with all fittings and accessories including terminal connectors and marshalling box | Nos. | 3   |            |          |            |       |     |

**Note:** The price schedule presented here is for reference only. Bidders must submit the price using the price schedule available in e-tending portal.

**Unpriced schedule with HSN codes is to be submitted with the techno-commercial envelope.**

**Section - 3**

**Purchaser's Requirements**

**As per attached technical specification document.**

**Section - 4**

**General Conditions of Supply and Erection of AEGCL**

***This Section 'General Conditions of Supply and Erection of AEGCL' supplementary to Section -5 'Special Conditions of Contract' of this document and [can be downloaded from www.aegcl.co.in](http://www.aegcl.co.in). Whenever there is a conflict, the provisions in SCC or the other Sections of this bid document shall prevail over those in the 'General Conditions of Supply and Erection of AEGCL'.***



**Section - 5**

**Special Conditions of Contract**

**5.1.0 DEFINITION OF TERMS**

“Contract” means the Contract Agreement entered into between the Purchaser and the Contractor, together with the Contract Documents referred to therein; they shall constitute the Contract, and the term “the Contract” shall in all such documents be construed accordingly.

“Contract Documents” means the documents listed in Article 1.1 (Contract Document) of the Contract Agreement (including any amendments thereto).

“Contract Price” means the price payable to the Contractor as specified in the Agreement, subject to such additions and adjustments thereto or deductions therefrom, as may be made pursuant to the Contract.

“Day” means calendar day

“Year” means 365 days.

“Month” means calendar month.

“Party” means the “Purchaser” or the “Contractor”, as the context requires.

“Purchaser” means the Assam Electricity Grid Corporation Limited (in short AEGCL) and its assignees.

The “Contractor” shall mean the tenderer / bidder whose tender/ bid has been accepted by the “Purchaser” and shall include the bidder’s legal representatives, successors and assignees.

“Goods” means all of the commodities, raw material, machinery and equipment, and/or other materials that the Contractor is required to supply to the Purchaser under the Contract.

“Delivery” means the transfer of the Goods from the Contractor to the Purchaser in accordance with the terms and conditions set forth in the Contract.

“Completion” means the fulfilment of the Related Services by the Contractor in accordance with the terms and conditions set forth in the Contract.

“Related Services” means the services incidental to the supply of the goods, such as insurance, installation, training and initial maintenance and other similar obligations of the Contractor under the Contract.

The “Specification” shall mean the “Purchaser’s Requirements”.

“Contractor” means the natural person, a company/firm, or a combination of these, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Agreement, and includes the legal successors or permitted assigns of the Contractor.

**5.2.0 CONTRACT DOCUMENTS**

5.2.1. Subject to Article 1.2 (Order of Precedence) of the Contract Agreement, all documents forming part of the Contract (and all parts thereof) are intended to be correlative, complementary and mutually explanatory. The Contract shall be read as a whole.

**5.3.0 LEGAL JURISDITCTION**

5.3.1. For any litigation arising out of the contract which cannot be resolve through mutual agreement or through Arbitration the honorable Guwahati High Court will have sole jurisdiction of all settlement.

**5.4.0 LANGUAGE**

5.4.1. The ruling language of the Contract shall be English.

### 5.5.0 SCOPE OF WORK

5.5.1. The Goods and Related Services to be supplied shall be as specified in section 3- Purchaser's requirement and quantity as stated in Schedule No. 1 of Section -2, Bidding Forms.

5.5.2. **Unless otherwise stipulated in expressly limited in the Purchaser's Requirements, the Scope of Supply shall include all such items not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Delivery and Completion of the Goods and Related Services as if such items were expressly mentioned in the Contract.**

### 5.6.0 DELIVERY SCHEDULE

5.6.1. Contract completion shall be **3(Three) months** from Contract commencement.

5.6.2. The Delivery of the Goods and Completion of the Related Services shall be in accordance with the Delivery and Completion Schedule specified in the Article 3 of the Contract Agreement (Contract Forms) or within such extended time to which the Contractor shall be entitled under SCC **Clause 5.16.0** hereof.

### 5.7.0 CONTRACT PRICE

5.7.1. The Contract Price shall be as specified in **Article 2 (Contract Price)** of the Contract Agreement.

5.7.2. Unless an escalation clause is provided for in the **Article 2 (Contract Price)**, the Contract Price shall be a firm shall not subject to any alteration, except in the event of a Change in the scope or changes in applicable tax rates or as otherwise provided in the Contract.

### 5.8.0 TERMS OF PAYMENT

5.8.1. The contract price shall be paid as specified in subsequent sub-clauses, if not provided in Contract Forms, Section-6.

5.8.2. Payment against supply of equipment and F&I shall be made as follows: -

1. Within 60 (sixty) days from the date of submission of the invoice against successful delivery, 80% (eighty percent) payment of the invoice value (without GST) would be made along with 100% GST on receipt and acceptance of materials in full and good condition.
2. In total 5 (five) Nos. of invoice/ bill would be entertained.
3. For payment upto 80% of the total contract value, maximum 4 (four) Nos. of progressive invoices/ bills would be entertained.
4. Final invoice/ bill of 20% would be entertained on completion work to the satisfaction of purchaser.

5.8.3. Documents required along with invoice: Following documents need to be submitted along with invoice –

- (i) Application for payment
- (ii) Contractors invoice showing LOA reference, Goods description, quantity dispatched, unit reclamation price, total amount (6 Copies)
- (iii) Packing List
- (iv) Railway receipt/ LR
- (v) Manufacturer's guarantee certificate of Quality
- (vi) Material inspection Clearance Certificate for dispatch issued by Purchaser
- (vii) Insurance certificate.
- (viii) Physical verification certificate of material received at site by Purchaser/Purchaser's site representative.

### 5.8.4. ADVANCE PAYMENT

No advance payment is applicable for this contract.

### **5.9.0 PERFORMANCE SECURITY DEPOSIT**

- 5.9.1. The successful bidder shall have to deposit to the extent of 10% (ten percent) of the Contract price as performance security (Bank Guarantee), within fifteen (15) days of receipt of notification of award(NoA), duly pledged in favor of the Managing Director, AEGCL and such security deposits shall be valid up to 60(sixty) days beyond the warranty period as per clause 5.11.3.
- 5.9.2. In the event of the successful bidder's quoted rate is determined to be ALB (Abnormally Low Bid), AEGCL at its discretion may increase the PBG amount from 10% (as stipulated in clause 5.9.1) upto a maximum of 20% of the contract Price.
- 5.9.3. In the event, the successful bidder contractor fails to submit the PBG within 15 days from the issue of NoA and AEGCL shall impose a penalty @ 0.1% per day of such delay. Such penalty shall be recovered from the amounts payable against the contract. However, this shall not entitle the successful bidder to delay submission of PBG and AEGCL shall retain the right to cancel the NoA for delay in submission of PBG.
- 5.9.4. If the Contractor fails or neglects to observe, perform any of his obligations under the contract, it will be lawful for the "Purchaser" to forfeit either in full or in part at his absolute discretion, the security deposit furnished by the Contractor.
- 5.9.5. No interest shall be payable on such deposits.

### **5.10.0 RETENTION MONEY**

- 5.10.1. Deduction shall be as per payment terms clause no. 5.8.2.
- 5.10.2. No interest shall be payable on such deductions/retentions.

### **5.11.0 WARRANTY**

- 5.11.1. The Contractor/Manufacturer warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.
- 5.11.2. The Contractor/Manufacturer further warrants that the Goods shall be free from defects arising from any act or omission of the Contractor or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination.
- 5.11.3. The warranty shall remain valid for **24 (Twenty-four) months** from the date of successful and complete delivery of materials at the final destination indicated in the Purchaser's Requirement.
- 5.11.4. If during the Period Warranty any defect should be found, the Purchaser shall give Notice to the Contractor/Manufacturer stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Contractor/Manufacturer to inspect such defects.
- 5.11.5. If having been notified, the Contractor/Manufacturer fails to remedy the defect within a period of 15 (fifteen) days, the Purchaser may, following notice to the Contractor/Manufacturer, proceed to do such work, and the reasonable costs incurred by the Purchaser in connection therewith shall be paid to the Purchaser by the Contractor or may be deducted by the Purchaser from any monies due the Contractor or claimed under the Performance Security.

### **5.12.0 QUANTITY VARIATION**

- 5.12.1. "Purchaser" shall have the right to increase/decrease the ordered quantity by 25% within 50 days of the period of completion and the same shall be carried out at the same rates /prices and terms and conditions stipulated in the contract except in regard to completion schedule, which shall be mutually agreed upon in case of enhancement of the ordered quantity.

### **5.13.0 INSPECTION AND TESTING**

## Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

- 5.13.1. The Contractor shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified in Sections 3, Purchaser's Requirements.
- 5.13.2. The inspections and tests shall generally be conducted on the premises of the Contractor/Manufacture. Subject to Sub-Clause 5.13.3, The Contractor shall furnish, all reasonable facilities and assistance, including access to drawings/process chart and production data to the inspectors at no charge to the Purchaser.
- 5.13.3. The Purchaser or its designated representative shall be entitled to attend the tests and/or inspections referred to in SCC Sub-Clause 5.13.2, provided that the Purchaser bear all of its own costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.
- 5.13.4. Whenever the Contractor is ready to carry out any such test and/or inspection, the Contractor shall give a reasonable advance notice (not less than 21 days) of such test and/or inspection and of the place and time thereof to the Purchaser. The Contractor shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.
- 5.13.5. The Contractor/manufacture shall provide the Purchaser with a certified report of the results of any such test and/or inspection.
- 5.13.6. The Purchaser may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Contractor shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Purchaser, and shall repeat the test and/or inspection, at no cost to the Purchaser, upon giving a notice pursuant to SCC Sub-Clause 5.13.4
- 5.13.7. If it is agreed between the Purchaser and the Contractor that the Purchaser shall not attend the test and/or inspection, then the Contractor may proceed with the test and/or inspection, and should provide the Purchaser with a certified report of the results thereof.
- 5.13.8. The Contractor agrees that neither the execution of a test and/or inspection of the Goods or any part thereof, nor the attendance by the Purchaser or its representative, nor the issue of any report pursuant to SCC Sub-Clause 5.13.5 & 5.13.7, shall release the Contractor from any warranties or other obligations under the Contract.

### **5.14.0 INSURANCE**

- 5.14.1. The "Contractor" shall, have, unless, otherwise specified by the Purchaser, insure the materials through their underwrites at their cost and shall keep it insured against any loss/ damaged/ pilferage in transit, destruction or damage by fire/ flood, without exposure to vagaries of weather or through riot, civil commotion, war or rebellion, for the full value of the materials until the materials are received at the purchaser's destination store.
- 5.14.2. The "Contractor" shall be responsible for safe arrival at destination, unloading and receipt of the materials by the consignee. The Purchaser will discharge consignee's responsibilities only and shall not be responsible for any damage/ loss/ pilferage/ non-delivery by the carriers.
- 5.14.3. In case of any loss/ damage/ pilferage/ non-delivery/ short delivery by carriers etc.; the Contractor shall replace free of cost missing / damaged / lost materials within 30(thirty) days from the receipt of report thereof from the consignee(s) without waiting for settlement of their claims with their carriers / under-writers. Normally, such reports from the consignee(s) to the Contractor shall be initiated within a period of 30(thirty) days from the date of receipt of each consignment by him /them.
- 5.14.4. If it is considered necessary that the damaged equipment either in part or in full to be sent back to the manufacturer's works for repair, the manufacturers/ Contractors will furnish the Bank Guarantee for the full value of equipment needing repairs and such Bank Guarantee shall remain valid till such time, the equipment are repaired and returned to the consignee in good condition. The to and fro freight, handling and insurance charges in such cases will be borne by the Contractor.
- 5.14.5. Unless, otherwise mutually agreed upon, in case of failure by the Contractor to replenish /make good of the loss /damage /short supplied quantities, within the stipulated period, the Purchaser reserves the right to forfeit the security deposit and/ or adjust any outstanding payment to the "Contractor" with the Purchaser or take any other appropriate action.

### 5.15.0 FORCE MAJEURE

- 5.15.1. "Force Majeure" shall mean any event beyond the reasonable control of the Purchaser or of the Contractor, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:
- (a) war, hostilities or warlike operations whether a state of war be declared or not, invasion, act of foreign enemy and civil war
  - (b) rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, conspiracy, riot, civil commotion and terrorist acts
  - (c) confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government or de jure or de facto authority or ruler or any other act or failure to act of any local state or national government authority
  - (d) strike, sabotage, lockout, embargo, import restriction, port congestion, lack of usual means of public transportation and communication, industrial dispute, shipwreck, shortage or restriction of power supply, epidemics, quarantine and plague
  - (e) earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster
  - (f) shortage of labor, materials or utilities where caused by circumstances that are themselves Force Majeure.
- 5.15.2. If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within fourteen (14) days after the occurrence of such event.
- 5.15.3. The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended in accordance with **SCC Clause 5.16.0**.

### 5.16.0 EXTENSION OF TIME FOR COMPLETION

- 5.16.1. The Time(s) for Completion specified in the Article 3 of the Contract Agreement (Contract Forms) shall be extended if the Contractor is delayed or impeded in the performance of any of its obligations under the Contract by reason of any of the following:
- (a) any Change in the scope of works by the Purchaser; which justifies extension of completion time as provided in **SCC Clause 5.12.0**; and
  - (b) any occurrence of Force Majeure as provided in **SCC Clause 5.15.0**.
- 5.16.2. Except where otherwise specifically provided in the Contract, the Contractor shall submit to the Purchaser's Representative a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Purchaser and the Contractor shall agree upon the period of such extension. In the event that the Contractor does not accept the Purchaser's estimate of a fair and reasonable time extension, the Contractor shall be entitled to refer the matter to a Dispute Board, pursuant to **SCC Sub-Clause 5.19.0**.

### 5.17.0 LIQUIDATED DAMAGE

- 5.17.1. The Contractor guarantees that it shall attain Completion of the Works within the Time for Completion specified in the Contract Agreement pursuant to **SCC Sub-Clause 5.6.2**, or within such extended time to which the Contractor shall be entitled under **SCC Clause 5.16.0** hereof.
- 5.17.2. If the Contractor fails to attain Completion of the Works within the Time for Completion or any extension thereof under **SCC Clause 5.16.0**, the Contractor shall pay to the Purchaser liquidated damages at the rate of **1% (one percent)** of the total Contract Price per week or part thereof delay. The aggregate amount of such liquidated damages shall in no event exceed **10% (ten percent)** of the total contract price.

However, the payment of liquidated damages shall not in any way relieve the Contractor from any of its obligations to complete the Works or from any other obligations and liabilities of the Contractor under the Contract.

- 5.17.3. Once the aggregated "Liquidated damage" reaches 10% of the total contract price, the Purchaser may consider following actions:
- (a) Procure the undelivered material/ equipment and/or complete the balance works from elsewhere giving notice to the Contractor and to recover any extra expenditure incurred thereby for having to procure these materials and works at higher price, at the risk and responsibility of the Contractor; or
  - (b) Cancel the contract wholly or in part and to complete the works at the full risk and cost of the Contractor and forfeit the security deposit.
  - (c) Declare it as a "Contractual Failure" and act in accordance with **SCC Clause 5.18.0**.

### **5.18.0 CONTRACTUAL FAILURE**

- 5.18.1. In the event of contractual failure of any respect on the part of the Contractor, the Purchaser shall be entitled to operate security deposit or any deposit or any payment due to Contractor irrespective of whether his default relates to the particular orders or not towards the Purchaser's claim for damages arising out of the failure. In addition, the Purchaser may black-list or bans the "Contractor" or pending enquiry, suspend him or take any other steps considered suitable.

### **5.19.0 ARBITRATION**

- 5.19.1. If at any time, any question, disputes or differences whatsoever shall rise between the Purchaser and the Contractor, upon or in relation to or in connection with the contract, either party may forthwith give notice to the other in writing of the existence of such question of dispute or difference and the same shall be referred to the adjudication of three Arbitrators, one to be nominated by the Purchaser the other by the Contractor and the third by the President of the Institution of Engineers, India/ Retired or Sitting Judge not below the status of a retired Judge of High Court of India. If either of the parties fail to appoint its arbitrators within 60(sixty) days after receipt of notice of the appointment of arbitrators then the President of the Institution of Engineers /retired or sitting Judge of India, as the case may be, shall have the power at request of either of the parties, to appoint an Arbitrator. A certified copy of the "President" making such an appointment shall be furnished to both parties
- 5.19.2. The arbitration shall be conducted as per provisions of the Indian Arbitration Act, shall be held at Guwahati or any other place as may be decided by the Purchaser. The decision of the majority of Arbitrators shall be final & binding upon the parties and the expenses of the arbitration shall be paid as may be determined by the Arbitrator. However, any dispute arising out of this contract will first be discussed and settled bilaterally between Purchaser and the Contractor.

**Section 6 - Contract Forms**

**This Section contains the format for Notification of Award, the Contract Agreement and Appendices to the Contract Agreement which, once completed, will form the Contract along with the Section 4 and Section 5. The Bidder should note that this Section shall be completed fully at the time of Contract signing.**

## Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

[AEGCL's letter head]

### Notification of Award

[ date ]

To: [ Name and address of the Contractor ]

This is to notify you that your Bid dated *[date]* for execution of the *[ name of the work]* against *[Bid identification number]* for the Contract Price in the aggregate of Rupees *[ amounts in numbers and words ]* (as per Price Schedule-1), as corrected and modified in accordance with the Instructions to Bidders is hereby accepted, and it is decided to award on you the '**Supply of terminal equipments at 220 KV Salakati GSS of AEGCL**' covering inter-alia supply of all services specified in bidding document.

You are requested to furnish the Performance Security within fifteen (15) days in accordance with the Conditions of Contract, using for that purpose one of the Performance Security Forms included in Section 6 (Contract Forms) of the Bidding Document.

[ Authorized Signature ]  
[ Name and Title of Signatory ]  
Assam Electricity Grid Corporation Limited

Attachment: 1) Price schedule (with arithmetic correction if any)  
2) Draft Contract agreement



STAMP

**1. Contract Agreement**  
(Supply and related services Contract)

THIS AGREEMENT made the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_,

BETWEEN

**Assam Electricity Grid Corporation Limited (herein after referred to as AEGCL or Purchaser)**, a corporation incorporated under the laws of Company Act, 1956 and having its registered office at First Floor, Bijuli Bhawan, Paltanbazar, Guwahati-781001, Assam and [**name of Contractor**], a firm/company incorporated under the laws of Company Act, 1956 and having its principal place of business at [**address of Contractor**] (hereinafter called "the Contractor").

WHEREAS AEGCL desires to engage the Contractor to the 'Ex-works Supply Contract' (also referred to as the 'First Contract') covering inter-alia supply of all equipment and materials for the complete execution of '**Supply of terminal equipments at 220 KV Salakati GSS of AEGCL**' as detailed in the Contract Document ("the Facilities"), and the Contractor has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

**Article 1**  
**Contract Documents**

- 1.1 **Contract Documents** (Reference SCC Clause 5.2.0)  
The following documents shall constitute the Contract between the Purchaser and the Contractor, and each shall be read and construed as an integral part of the Contract:
- (a) This Contract Agreement and the Appendices hereto
  - (b) Letter of Price Bid and Price Schedules submitted by the Contractor
  - (c) Letter of Technical Bid and Technical Proposal submitted by the Contractor
  - (d) Special Conditions of Contract
  - (e) General Conditions of Supply and Erection.
  - (f) Specification(Purchaser's Requirements)
  - (g) Drawings (Purchaser's Requirements)
  - (h) Other completed Bidding Forms submitted with the Letters of Technical and Price Bids
  - (i) Guaranteed and other Technical Particulars (as submitted with the Bid).
  - (j) Any other documents shall be added here
- 1.2 **Order of Precedence** (Reference SCC Clause 5.2.0)  
In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.
- 1.3 **Definitions** (Reference SCC Clause 5.1.0)  
Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the SCC.

**Article 2**  
**Contract Price and**  
**Terms of Payment**

- 2.1 **Contract Price** (Reference SCC Clause 5.7.0)  
The Purchaser hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall [ . . . **amounts in rupees in words** . . . ], [ . . . **amounts in figures** . . . ] as specified in Price Schedule No. 3 (Grand Summary).  
**The Contract Price is fixed.**

## Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

---

- 2.2 **Terms of Payment** (Reference SCC Clause 5.8.0)  
The terms and procedures of payment according to which the Purchaser will pay the Contractor are given in the Appendix (Terms and Procedures of Payment) hereto.
- Article 3**  
**Commencement Date and Completion Time**
- 3.1 **Commencement Date** (Reference SCC Clause 5.6.1)  
The Commencement Date upon which the period until the Time for Completion of the Works shall be counted from is the date when this Contract Document is signed.
- 3.2 **Completion Time** (Reference SCC Clause 5.6.2)  
The whole works under the scope of this Contract shall be completed within **3 (Three)** months from Contract Commencement Date.
- Article 4. Appendices**
- 4.1 The Appendices listed in the attached List of Appendices shall be deemed to form an integral part of this Contract Agreement.
- 4.2 Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

IN WITNESS WHEREOF the Purchaser and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by, for and on behalf of the  
Purchaser

[ **Signature** ]

[ **Title** ]

in the presence of

[ **Signature** ]

[ **Title** ]

Signed by, for and on behalf of the  
Contractor

[ **Signature** ]

[ **Title** ]

in the presence of

[**Signature** ]

[**Title** ]

**APPENDICES**

- Appendix 1 - Special Conditions of Contract
- Appendix 2 - Completion schedule (bar chart)
- Appendix 3 - Performance Security.
- Appendix 4 - Price Schedule.
- Appendix 5 - Guaranteed Technical Particulars

# Supply of terminal equipments at 220 KV Salakati GSS of AEGCL

## Appendix 4 - Form of Performance Security Bank Guarantee

(To be stamped in accordance with Stamp Act)  
(The non-Judicial Stamp Paper should be in the name of issuing Bank)

**Bank's Name:**  
**Address of Issuing Branch or Office:**  
**Email id and phone no for correspondence:**

**Beneficiary: Managing Director, AEGCL**  
**Name and Address of Purchaser**

**Bid Security No.:**

WHEREAS \_\_\_\_\_ [name and address of Contractor] (hereinafter called "the Contractor") has undertaken, in pursuance of LoA No. \_\_\_\_\_ dated \_\_\_\_\_ to execute \_\_\_\_\_ [name of Contract and brief description of Works] (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized/scheduled bank for the sum specified therein as security for compliance with its obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of \_\_\_\_\_ [amount of Guarantee] \_\_\_\_\_ [in words], such sum being payable in the currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of \_\_\_\_\_ [amount of Guarantee] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

BG expiry date:

BG clam date:

**Bank's seal and authorized signature(s)**

### NOTE

1. *All italicized text is for use in preparing this form and shall be deleted from the final document. An amount is to be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract.*
2. *This guarantee shall be valid upto 30 days beyond the Warranty Period as per the Contract.*
3. *For BG amount equal to or more than 50,000.00, BG should be signed by two bank officers to be valid.*
4. **Address of the banker with email and phone number for correspondence with banker should be clearly mentioned. Any correspondence related to the BG with the banker shall be made to the address mentioned in the BG.**

## TECHNICAL SPECIFICATIONS

### **A. Technical Specification of SF6 Circuit Breaker (Upto 400 kV)**

#### **1.0 GENERAL**

**1.1** The circuit breakers and accessories shall conform to latest revision of IEC: 62271-100, IEC: 62271-1 and other relevant IEC standards except to the extent explicitly modified in the specification and shall also be in accordance with requirements specified in GTR.

**1.2** 420/245/145 circuit breakers offered would be of Sulphur hexafluoride (SF6) type and of class C2-M2 as per IEC. The bidder may offer circuit breakers of either live tank type of proven design.

**1.3** The circuit breaker shall be complete with operating mechanism, common marshalling box, piping, inter-pole cables, cable accessories like glands, terminal blocks, marking ferrules, lugs, pressure gauges, density monitors (with graduated scale), galvanised support structure, platform with ladder for CB, their foundation bolts 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.

**1.4** Painting shall be done in line with GTR. Paint shade RAL-7032 or similar shades can be used for painting. The support structure, platform & ladder of circuit breaker shall be hot dip galvanised. Exposed hardware items shall be hot dip galvanised or Electro-galvanised.

**1.5** The circuit breakers shall be designed for use in the geographic and meteorological conditions as given Below:

|    |   |                               |
|----|---|-------------------------------|
| a) | Peak ambient day temperature in still air | : 45°C                        |
| b) | Minimum night temperatures                | : 0°C                         |
| c) | Ground temperatures                       | : 40°C                        |
| c) | Reference ambient day temperature         | : 45°C                        |
| d) | Relative Humidity                         | a) Maximum : 100 %            |
|    |   | b) Minimum : 10 %             |
| e) | Altitude                                  | : Below 1000 M above MSL      |
| f) | Maximum wind pressure                     | : As per IS: 802 latest code. |
| g) | Seismic Intensity                         | : ZONE-V as per IS 1893.      |

**1.6** All 400kV Circuit Breaker control schematics shall be finalized in such a way, that it may operate with or without CSD by using a suitable selector switch irrespective of whether circuit breakers to be supplied are envisaged along with CSD or not as per bid price schedules.

#### **2.0 DUTY REQUIREMENTS**

2.1 The circuit breakers shall be capable of performing their duties without opening resistors.

2.2 The circuit breaker shall meet the duty requirements for any type of fault or fault location and also for line switching when used on effectively grounded system and perform make and break operations as per the stipulated duty cycles satisfactorily.

**2.2.1 PRE-INSERTION RESISTER**

420kV circuit breakers shall be provided with single step pre- insertion closing resistors (wherever the requirement of PIR is explicitly specified in bid price schedules) to limit the switching surges. The resistance value of pre-insertion resistor and the duration of pre-insertion time is given in clause 16.0 of this section. The resistor shall have thermal rating for the following duties:

i) **TERMINAL FAULT**

Close .... 1 Min .... Open Close Open.....2 min .... Close ..... 1 Min .....  
Open Close Open.

ii) **RECLOSING AGAINST TRAPPED CHARGES**

Duty shall be the same as under (i) above. The first, third and fourth closures are to be on de - energised line while second closing is to be made with lines against trapped charge of 1.2 p.u. of opposite polarity.

iii) **OUT OF PHASE CLOSING**

One closing operation under phase opposition, that is with twice the voltage across the terminals.

iv) No allowance shall be made for heat dissipation of resistor during time interval between successive closing operations. The resistors and resistor supports shall perform all these duties without deterioration. Test reports of resistors proving thermal rating for duties specified above shall be furnished during detailed engineering. The calculations shall be provided to take care of the effect of tolerances on resistance values and insertion time.

**2.3 The breaker shall be capable of:**

i) Interrupting the steady and transient magnetizing current corresponding to Power transformers as follows:

| Voltage rating of CB | Type of Transformer | Rating (in MVA) |
|----------------------|---------------------|-----------------|
| 420kV                | 400/220kV           | 250 to 630      |
|                      | 400/132kV           | 160 to 315      |
| 245kV                | 400/220kV           | 200 to 630      |
|                      | 220/132kV           | 50 to 200       |

|       |           |           |
|-------|-----------|-----------|
|       | 220/66kV  | 50 to 200 |
| 145kV | 220/132kV | 50 to 200 |
|       | 132/33kV  | 10 to 50  |

- ii) 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  $U/\sqrt{3}$  and 1.4
- iii) Clearing short line fault (kilometric faults) with source impedance behind the bus equivalent to symmetrical fault current specified.
- iii) Breaking 25% of the rated fault current at twice rated voltage under phase opposition condition.
- iv) 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).
- v) Circuit breakers shall be able to switch in and out the shunt reactor as detailed below:

| Voltage rating of CB | Reactor Rating (in MVAR) | Max. rise of over voltage (in p.u.) |
|----------------------|--------------------------|-------------------------------------|
| 420kV                | 50 to 150                | 2.3                                 |
| 245kV                | 25 to 50                 | 2.3                                 |

- a. Capability of 400 kV circuit breakers to interrupt inductive current below 100 A without giving rise to overvoltage more than 2.3 p.u. (As specified in IEC-62271-110) shall be validated by carrying out the simulation study/analysis (EMTP/PSCAD) by modeling an equivalent circuit comprising all circuit component i.e. Inductance of Shunt Reactor, Stray capacitance of Shunt Reactor, Circuit Breaker, Stray capacitance of Bus Connection, Capacitance of grading Capacitor, inductance of neutral grounding reactor, Network Thevenin's equivalent, any other series/parallel inductance/capacitance connected to simulate the actual inductive load switching.

- b. Current chopping capability (chopping number) of circuit breakers as per IEC-62271-306 to be figured out from actual Laboratory test and / or field test report and same Current chopping capability (chopping number) shall be used in above said simulation study/analysis.
  - c. To validate the results of above said simulation study/analysis report, the same study shall be carried out for capability of tested circuit breaker and the study/analysis results shall be comparable with actual Laboratory test and / or field test reports.
  - d. Laboratory test/ field test reports shall be submitted for 400 kV CBs in case there is change in design including change in following:
    - i. Different short circuit current capability
    - ii. Different model/type
- vi) The breakers shall also withstand the voltages specified under clause 16.0 of this section.

## 2.6 CONTROLLED SWITCHING DEVICE (CSD):

Circuit Breakers shall be equipped with controlled switching device with consequent optimization of switching behavior, when used in:

- Switching of transformer (from 400kV side circuit breakers only)
- Switching of shunt Reactor

The CSD shall be provided in Circuit breaker of switchable line reactor bay and in Main & Tie Bay circuit breakers of Transformers, line with non- switchable line reactors and Bus reactors. The CSD shall be supplied as per bid price schedules.

### 2.6.1 Technical Requirement for controlled switching device:

- a) The CSD shall be designed to operate correctly and satisfactorily with the excursion of auxiliary A/C & DC voltages and frequency as specified in section - GTR.
- b) The CSD shall meet the requirements of IEC-61000-4-16 class IV for HF disturbance test (for short and long durations both) and fast transient test shall be as per IEC-61000-4-4 level IV and insulation test as per IEC 60255-5.
- c) The CSD shall have functions for switching ON & OFF the circuit breakers.



- d) The CSD shall get command to operate the breakers manually. The controller shall be able to analyze the current and voltage waves available through the signals from secondaries of CTs & CVTs for the purpose of calculation of optimum moment of the switching the circuit breaker and issue command to circuit breaker to operate.
- e) The CSD shall also have an adaptive control feature to consider the next operating time of the breaker in calculation of optimum time of issuing the switching command. In calculation of next operating time of the breaker, the CSD must consider all factors that may affect the operating time of the breaker such as, but not limited to, ambient temperature, control voltage variation, SF6 gas density variations etc. Schematic drawing for this purpose shall be provided by the contractor. The accuracy of the operating time estimation by the controller shall be better than  $\pm 0.5$  ms.
- f) The CSD should have display facility at the front for the display of settings and measured values.
- g) The CSD shall be PC compatible for the setting of various parameters and downloading of the settings and measured values, date, time of switching etc. Window based software for this purpose shall be supplied by the contractor to be used on the owner's PC.
- h) The controller shall be suitable for current input of 1 ampere from the secondary of the CTs. and 110 V (Ph to Ph) from the CVTs. The CSD shall withstand transient and dynamic state values of the current from the secondary of the CTs and CVTs.
- i) The CSD shall have time setting resolution of 0.1 ms or better.
- j) The CSD shall have sufficient number of output/input potential free contacts for connecting the monitoring equipment and annunciation system available in the control room. Necessary details shall be worked out during engineering of the scheme.
- k) The CSD shall also record and monitor the switching operations and make adjustments to the switching instants to optimize the switching behavior as necessary. It shall provide self-diagnostic facilities, signaling of alarms and enable downloading of data captured from the switching events.
- l) The provision for bypassing the Controlled switching device shall be provided through BCU and SCADA both so that whenever, the CSD is not healthy due to any reason (including auxiliary supply failure), uncontrolled trip/close command can be extended to the circuit

Breaker. Alternatively, in case of any non-operation of the CSD after receiving a close/trip command after a pre-determined time delay, the CSD should automatically be bypassed so as to ensure that the trip and close commands are extended to the Trip/Close coils through subsequent command.

- m) The CSD shall be provided with a communication port to facilitate online communication of the CSD with Substation automation system directly on IEC 61850 protocols. If the CSD does not meet the protocols of IEC 61850, suitable gateway shall be provided to enable the communication of CSD as per IEC 61850.

### **3.0 TOTAL BREAK TIME**

**3.1** The total break time as specified under this section shall not be exceeded under any of the following duties:

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

**3.2** The total break time of the breaker shall not be exceeded under any duty conditions specified such as with the combined variation of the trip coil voltage (70-110%), arc extinguishing medium pressure etc. While furnishing the proof of the total break time of complete circuit breaker, the effect of non-simultaneity between contacts within a pole or between poles shall be brought out to establish guaranteed total break time.

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

### **4.0 CONSTRUCTIONAL FEATURES**

The features and constructional details of circuit breakers shall be in accordance with requirements stated hereunder:

#### **4.1 Contacts**

**4.1.1** The gap between the open contacts shall be such that it can withstand at least the rated phase to ground voltage for 8 hours at zero gauge pressure of SF<sub>6</sub> gas due to the leakage. The breaker should be able to withstand all dielectric stresses imposed on it in open condition at lock out pressure continuously (i.e., 2 p.u. across the breaker continuously, for validation of which a power frequency dielectric with stand test conducted for a duration of at least 15 minutes is acceptable).

**4.2** 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 withstand rating of the grading elements shall be adequate for the service conditions and duty specified.

**4.3 The SF6 Circuit Breaker shall meet the following additional requirements:**

- a) The circuit breaker shall be single pressure type. The design and construction of the circuit breaker shall be such that there is a minimum possibility of gas leakage and entry of moisture. There should not be any condensation of SF6 gas on the internal insulating surfaces of the circuit breaker.
- b) All gasketed surfaces shall be smooth, straight and reinforced, if necessary, to minimise distortion and to make a tight seal, the operating rod connecting the operating mechanism to the arc chamber (SF6 media) shall have adequate seals. The SF6 gas leakage should not exceed 0.5% per year and the leakage rate shall be guaranteed during the warranty 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 warranty 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 warranty period.
- c) In the interrupter assembly there shall be an absorbing product box to minimise the effect of SF6 decomposition products and moisture. The material used in the construction of the circuit breakers shall be fully compatible with SF6 gas decomposition products.
- d) Each pole shall form an enclosure filled with SF6 gas independent of two other poles (for 420 & 245 kV CBs) and the SF6 density of each pole shall be monitored individually. For CBs of voltage class of 145 kV or less, a common SF6 scheme/density monitor shall be acceptable.
- e) The dial type SF6 density monitor shall be adequately temperature compensated to model the pressure changes due to variations in ambient temperature within the body of circuit breaker as a whole. Separate density monitor and dial type temperature compensated pressure gauge is also acceptable. The density monitor shall have graduated scale and it shall be possible to dismantle the density monitor for checking/replacement without draining the SF6 gas by providing suitable interlocked non return valve coupling.
- f) Circuit Breaker shall be capable of withstanding a vacuum of minimum 8 millibars without distortion or failure of any part.

- g) Sufficient SF6 gas (including that will be required for gas analysis during filling) shall be provided to fill all the circuit breakers being supplied. Spare gas shall be supplied in separate unused cylinders as per requirement specified in BPS.

**4.4** Provisions shall be made for attaching an operational analyser to record contact travel, speed and making measurement of operating timings, preinsertion timings of closing resistors if used, synchronisation of contacts in one pole.

**4.5** The CO (Close-open) operation and its timing shall be such as to ensure complete travel/insertion of the contact during closing operation and then follow the opening operation.

## **5.0 SULPHUR HEXAFLUORIDE GAS (SF6 GAS)**

- a) The SF6 gas shall comply with IEC 60376 and shall be suitable in all respects for use in the switchgear under the operating conditions.
- b) The high-pressure cylinders in which the SF6 gas is shipped and stored at site shall comply with requirements of the relevant standards and regulations. SF6 gas shall be supplied (in returnable cylinders) for all circuit breakers. However, SF6 gas for spare circuit breakers and mandatory spare quantity of SF6 gas shall be supplied in non- returnable cylinders.
- c) Test: SF6 gas shall be tested for purity, dew point, air, hydro-soluble fluorides and water content as per IEC 60376 and test certificates shall be furnished to Employer indicating all the tests as per IEC 60376 for each lot of SF6 gas and Material safety datasheet shall be provided. Gas bottles should be checked for leakage during receipt at site.

## **6.0 INSULATORS**

- a) The porcelain/polymer of the insulators shall conform to the requirements stipulated under relevant IS/IEC.
- b) The mechanical characteristics of insulators shall match with the requirements specified under this section.
- c) All porcelain & polymer hollow column insulators shall conform to IEC-62155 & IEC-61462 respectively.
- d) Hollow Porcelain/polymer for pressurised columns/chambers should be in one integral piece in green and fired stage.

## **7.0 SPARE PARTS AND MAINTENANCE EQUIPMENT**

The bidder shall include in his proposal, spare parts and maintenance equipment in accordance with BPS. Calibration certificates of each maintenance equipment shall be supplied along with the equipment.

## **8.0 OPERATING MECHANISM AND CONTROL**

### **8.1 General Requirements**

- 8.1.1 Circuit breaker shall be operated by spring charged mechanism. The mechanism box shall meet the requirements of IP-55.
- 8.1.2 The operating mechanism box shall be strong, rigid, rebound free and shall be readily accessible for maintenance.
- 8.1.3 The mechanism shall be anti-pumping and trip free under every method of closing.
- 8.1.4 The mechanism shall be such that the failure of any auxiliary spring will not prevent tripping and will not cause unwanted trip or closing operation of the Circuit Breaker
- 8.1.5 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 common marshalling box.
- 8.1.6 Working parts of the mechanism shall be of corrosion resisting material, bearings which require grease shall be equipped with pressure type grease fittings. Bearing pin, bolts, nuts and other parts shall be adequately pinned or locked to prevent loosening or changing adjustment with repeated operation of the breaker.
- 8.1.7 The contractor shall furnish detailed operation and maintenance manual of the mechanism along with the operation manual for the circuit breaker. The instruction manuals shall contain exploded diagrams with complete storage, handling, erection, commissioning, troubleshooting, servicing and overhauling instructions.
- 8.1.8 Size of common marshalling Box shall be such that adequate space is available for working in the panel and all wiring shall be routed through non-inflammable wire troughs with covers.
- 8.1.9 Operating mechanism and Marshalling box should be provided with space heater with thermostat, CFL/LED lamp and AC point /Socket.

- 8.2** Control:
- 8.2.1 The close and trip circuits shall be designed to permit use of momentary contact switches and push buttons.
- 8.2.2 Each breaker shall be provided with two (2) independent tripping circuits, pressure switches and coils each to be fed from separate DC sources.
- 8.2.3 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 close and trip control switch/push buttons shall be provided in the Breaker common marshalling box.
- 8.2.4 The trip coils shall be suitable for trip circuit supervision during both open and close position of breaker.
- 8.2.5 Closing coil and associated circuits shall operate correctly at all values of voltage between 85% and 110% of the rated voltage. Shunt trip coil and associated circuits 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 rated voltage. However, even at 50% of rated voltage the breaker shall be able to open. 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 during detailed engineering.
- 8.2.6 In trip and closing circuits, relays/relay contacts shall preferably be used instead of contactors.
- 8.2.7 Controlled switching scheme/device, wherever required shall be considered as integral part of CB and shall be commissioned along with CB.
- 8.2.8 Density Monitor contacts and pressure switch contacts shall be preferably suitable for direct use as permissive in closing and tripping circuits. The devices shall provide continuous & automatic monitoring of the state of the gas as follows:
- a)** 'Gas Refill' level

This contact will be used for remote indication/ to annunciate the needfor gas refilling.

**b) 'SF6 gas density Low' Alarm level - 1**

This contact will be used for remote indication/ to annunciate the needfor the urgent gas refilling.

**c) 'SF6 gas density Low' Alarm level - 2**

This contact will be used to annunciate the need for gas refilling under emergency or trip the Circuit Breaker.

**d) 'Breaker Block' 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.

It shall be possible to test all gas monitoring relays/devices without de- energizing the primary equipment & without reducing pressure in the main section. Plugs & sockets shall be used for test purposes. It shall also damp the pressure pulsation while filling the gas in service, so that flickering of the pressure switch contacts does not take place.

The density monitor shall be placed suitably inclined in such a way so that thereadings are visible from ground level with or without using binoculars. Separate contacts have to be used for each of tripping and closing circuits. If contacts are not suitably rated and multiplying relays are used then fail safe logic/schemes are to be employed. DC supplies for all auxiliary circuits shall be monitored and provision shall be made for remote annunciations andoperation lockout in case of D.C. failures. Density monitors are to be so mounted that the contacts do not change on vibration during operation of circuit Breaker.

8.2.9 The auxiliary switch of the breaker shall be positively driven by the breaker operating rod.

**8.3 Spring operated mechanism:**

- a) Spring operated mechanism shall be complete with motor as per manufacturer practice. Opening spring and closing spring with limit switch for automatic charging and other necessary accessories to make the mechanism a complete operating unit shall also be provided.
- b) As long as power is available to the motor, a continuous sequence ofthe closing and opening operations shall be possible. The motor shall have adequate thermal rating for this duty.

- c) After failure of power supply to the motor one close open operation shall be possible with the energy contained in the operating mechanism.
- d) Breaker operation shall be independent of the motor which shall be used solely for compressing the closing spring. Facility for manual charging of the closing spring shall also be provided. The motor rating shall be such that it requires not more than 30 seconds for full charging of the closing spring.
- e) Closing action of circuit breaker shall compress the opening spring ready for tripping.
- f) When closing springs are discharged after closing a breaker, closing springs shall be automatically charged for the next operation and an indication of this shall be provided in the local and remote control cabinet.
- g) Provisions shall be made to prevent a closing operation of the breaker when the spring is in the partial charged condition. Mechanical interlocks shall be provided in the operating mechanism to prevent discharging of closing springs when the breaker is already in the closed position.
- h) 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.
- i) The spring charging failure alarm shall be provided with a time delay relay having setting range from 0-1minute.
- j) Separate MCBs shall be provided for each spring charging motor and the rating of MCBs shall be suitably selected to match the starting, running and stalling time.
- k) An overload relay shall be provided for protection of the spring charging motor.

## **9.0 SUPPORT STRUCTURE**

- a) The structure design shall be such that during operation of circuit breaker vibrations are reduced to minimum.
- b) Ladder and Maintenance platform for 400kV Circuit breaker:



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 maintenance personnel to stand and carry out the activities along with the tools and plant.

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. All structural steel for the platform shall be as per IS: 2062 and to be galvanized. For 220kV, 132kV circuit breakers a suitable platform cum ladder shall be provided as per manufacturer design.

#### **10.0** TERMINAL CONNECTOR PAD

The circuit breaker terminal pads shall be made up of high-quality electrolytic copper or aluminium and shall be conforming to Australian Standard AS- 2935 or equivalent standard for rated current. The terminal pad shall have protective covers which shall be removed before interconnections.

#### **11.0** INTER-POLE CABLING

**11.1** All cables to be used by contractor shall be armoured and shall be as per IS – 1554/ IEC-60502 (1100 Volts Grade). All cables within & between circuit breaker poles and its marshaling box and up to the controlled switching device is included in the scope of work. Special cables like screened cable if required for Circuit Breaker, temperature Transducer/CB Status Signals for CSD and its associated C&R panel shall be laid in 50mm diameter PVC pipe. Suitable supports for PVC pipe shall be included in the scope of Supply.

**11.2** Only stranded conductor shall be used. Minimum size of the conductor for inter-pole control wiring shall be 2.5 sq.mm. Copper.

**11.3** The cables shall be with oxygen index Minimum 29 and temperature index as 250°C as per relevant standards.

**11.4** Separate cables shall be used for AC, DC-I, DC-II and selected DC.

**11.5** All inter-pole cabling of Circuit breakers and up to common marshaling box shall be done by plug-in type arrangement. Suitable removable type

encasing cover shall be provided in case plug-in type connection arrangement is provided exterior side of LCC/MB. The plug-in type cable termination shall be conforming to IP-67 as per IEC60529. Cable sealing arrangement shall be provided (as per requirement) to avoid entry of moisture etc.

**11.6** Vertical run of cables to the operating mechanism box shall be properly supported by providing the perforated closed type galvanized cable tray (Cable tray also to be supplied along with the Circuit Breaker) to be fixed as an integral part of the structures. The load of the cable shall not be transferred to the mechanism box/plug-in type terminal arrangement in any circumstances. Hanging or loose run of cable is not permitted. The drawing of cable tray including fixing arrangement shall be incorporated in the GA drawing of CB also.

**11.7** Wiring shall be done with stud type terminals and ring type lugs. More than two wires shall not be connected on each side of terminal.

## **12.0 FITTINGS AND ACCESSORIES**

**12.1** Following is list of some of the major fittings and accessories to be furnished by Contractor in the common marshalling box. Number and exact location of these parts shall be indicated in the drawing.

- i) Cable glands (Double compression type), Lugs, Ferrules etc.
- ii) Local/remote changeover switch.
- iii) Operation counter
- iv) Control switches to cut off control power supply.
- v) Fuses/MCBs as required.
- vi) The number of terminals provided shall be adequate enough to wire out all contacts and control circuits plus 24 terminals spare for future use.
- vii) Anti-pumping relay.
- viii) Pole discrepancy relay (for electrically ganged CBs).
- ix) D.C. Supervision relays.
- x) Rating plate description in accordance with IEC incorporating year of manufacture.
- xi) Controlled switching accessories like sensors, timers, relays etc. (as applicable)

- xii) Transducers/Fixtures required for travel measurement shall be supplied by CB manufacturer. The complete set of Transducers/Fixtures for measurement of complete 3-phase CB shall be supplied for each station. Further, one set of gas filling adopter (Including coupling, regulator, connecting hose pipe up to ground level) shall be supplied as per BPS.

### **13.0 ADDITIONAL DATA TO BE FURNISHED**

- a) Drawing, showing contacts in close, arc initiation, full arcing, arc extinction and open position.
- b) The temperature v/s pressure curves for each setting of density monitor along with details of density monitor.
- c) Method of checking the healthiness of voltage distribution devices (condensers) provided across the breaks at site.
- d) Data on capabilities of circuit breakers in terms of time and number of operations at duties ranging from 100% fault currents to load currents of the lowest possible value without requiring any maintenance or checks.
- e) Maximum non-simultaneity between contacts, between poles and effect of the same on the guaranteed total break time.
- f) Sectional view of non-return couplings used for SF<sub>6</sub> pipes.
- g) Details & type of filters used in interrupter assembly and also the operating experience with such filters.
- h) Details of SF<sub>6</sub> gas:
  - i) The test methods used in controlling the quality of gas used in the circuit breakers particularly purity and moisture content.
  - ii) Proposed tests to assess the conditions of the SF<sub>6</sub> within a circuit breaker after a period of service particularly with regard to moisture contents of the gas.
- j) Shall furnish curves supported by test data indicating the opening time under close open operation with combined variation of trip coil voltage.
- k) Detailed literature and schematic diagrams of switching mechanism for closing resistor showing the duration of insertion shall also be furnished along with the calculations in respect of thermal rating of resistors for the duties specified under clause 2.2.1 of this section in case of 420 kV circuit breakers.

- l) All duty requirements as applicable to 420 kV, 245 kV & 145 kV CBs specified under Clause 2.0 of this section shall be provided with the support of adequate test reports.

**15.0 TESTS**

**15.1** In accordance with the requirements stipulated under Section-GTR the circuit breaker along with its operating mechanism shall conform to the type tests as per IEC: 62271-100.

**15.2** The type test reports as per IEC and the following additional type test reports shall also be submitted for purchaser's/employer's review:

- i) Corona extinction voltage test
- ii) Out of phase closing test as per IEC: 62271-100.
- iii) Line charging interrupting current for proving parameters as per clause no. 16.0 of this section.
- iv) Test to demonstrate the Power Frequency withstand capability of breaker in open condition at Zero Gauge pressure and at lockout pressure (Ref. Clause 4.1.1).

- v) Seismic withstand test in unpressurised condition.
- vi) Verification of the degree of protection.
- vii) Low temperature test (applicable only for minimum ambient temperatures of less than (-) 10 deg. C application purpose) and High temperature test. Contractor can also submit the field performance report in line with IEC stipulations.
- viii) Static Terminal Load test.
- ix) Critical Currents test (if applicable).
- x) Switching of Shunt Reactors. Test reports shall be submitted as per IEC. Calculations shall be submitted for meeting the requirements of clause 2.3(v) of this section.
- xi) Circuit breakers meant for controlled switching shall conform to requirements of IEC/TR-62271 – 302. The contractor shall submit test reports to demonstrate that the offered CB conforms to the requirements of performance verification tests and parameter definition tests as per IEC/TR 62271-302. The contractor shall also furnish the report for the re-ignition free arcing window for switching 3-phase shunt reactor as demonstrated in the shunt reactor switching test.

### 15.3 Routine Tests

Routine tests as per IEC:62271-100 shall be performed on all circuit breakers.

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

- i) 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 control voltage conditions. 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. This test shall also be performed at site for which the necessary operation analyzer along with necessary transducers, cables, console etc. shall be arranged by the contractor at his own cost.
- ii) During testing of CB, dynamic contact resistance measurement (DCRM) shall be carried out for close-open (CO) operations with delay of 300ms between close and trip operations. Minimum 100A

current shall be injected for DCRM test. Travel characteristics, injected current, trip/close coil current shall also be recorded along with DCRM test.

- iii) Routine tests on Circuit breakers with Controlled switching devices as per IEC/TR 62271-302.
- iv) Tan delta and Capacitance measurement for grading capacitors at rated voltage and also at 10kV (for reference).

## 16.0 TECHNICAL PARAMETERS FOR CIRCUIT BREAKER

(In addition to those indicated in section-GTR)

| Sl. no. | Parameter  | 400kV system        | 220kV system        | 132 kV system       |
|---------|--|---------------------|---------------------|---------------------|
| 1.      | Rated voltage (U <sub>max</sub> ) kV (rms)   | 420                 | 245                 | 145                 |
| 2.      | Rated frequency (Hz)   | 50                  | 50                  | 50                  |
| 3.      | No. of poles   | 3                   | 3                   | 3                   |
| 4.      | Type of circuit breaker  | SF6 gas insulated   | SF6 gas insulated   | SF6 gas insulated   |
| 5.      | Rated continuous current (A) at an ambient temperature of 50°C   | 4000                | 3150                | 3150                |
| 6.      | Rated short circuit capacity with percentage of DC component as per IEC- 62271-100 corresponding to minimum opening time under operating conditions specified. | 63kA                | 50 kA               | 40 kA               |
| 7.      | Symmetrical interrupting capability kA (rms)   | 63                  | 50                  | 40                  |
| 8.      | Rated short circuit making current kA <sub>p</sub>   | 157.5               | 125                 | 100                 |
| 9.      | Short time current carrying capability kA (rms)  | 63 for three second | 50 for three second | 40 for three second |
| 10.     | Out of phase breaking current carrying capability kA (rms)   | 15.75               | As per IEC          | As per IEC          |
| 11.     | Rated line charging interrupting current at 90 deg. Leading power factor angle (A rms) (The breakers shall be able to interrupt the rated line charging)       | 600                 | As per IEC          | As per IEC          |

|     |  |  |  |   |
|-----|--|--|--|---|
|     | current with test voltage immediately before   |  |  |   |
|     | opening equal to the product of $U/\sqrt{3}$ and 1.4 as per IEC-62271-100                |  |  |   |
| 12. | First pole to clear factor   | 1.3  | 1.3  | 1.3   |
| 13. | Temperature rise over an ambient temperature of 50°C                                     | As per IEC: 62271-100                      | As per IEC: 62271-100                      | As per IEC: 62271-100   |
| 14. | Rated break time as IEC(ms)  | 40   | 60   | 60  |
| 15. | Total break time (ms)  | 45   | 65   | 65  |
| 16. | Total closing time (ms)  | Not more than 150                          | Not more than 150                          | Not more than 150   |
| 17. | Operating mechanism or a combination of these  | Spring                                     | Spring                                     | Spring  |
| 18. | Rated operating duty cycle   | O-0.3s-CO-3 min-CO                         | O-0.3s-CO-3 min-CO                         | O-0.3s-CO-3 min-CO  |
| 19. | Reclosing  | Single phase & Three phase auto reclosing. | Single phase & Three phase auto reclosing. | Three phase auto reclosing. (Single phase auto reclosing if specified in section-project) |
| 20. | Pre-insertion resistor requirement   | As per BPS                                 | NA   | NA  |
| i)  | Rating (ohms)  | 400(max.) with tolerance as applicable     | NA   | NA  |
| ii) | Minimum electrical (mechanical insertion time + pre-arcing time) pre-insertion time (ms) | 8  | NA   | NA  |

|      |  |  |   |   |
|------|--|--|---|---|
| iii) | Opening of PIR contacts  | PIR contacts should open immediately after closing of main contacts<br>OR<br>At least 5 ms prior to opening of main contacts at rated air/gas pressure where the | NA  | NA  |
|      |  | PIR contacts remain closed   |   |   |
| 21.  | Max. difference in the instants of closing/opening of contacts (ms) between poles at rated control voltage and rated operating & quenching media pressures | 2.5 (within a pole)<br>3.3 (opening)<br>5.0 (closing)  | 3.3 (opening)<br>5.0 (closing)                      | 3.3 (opening),<br>3.3 (closing)                     |
| 22.  | Maximum allowable switching over voltage under any switching condition   | 2.3 p.u.   | As per IEC  | As per IEC  |
| 23.  | Trip coil and closing coil voltage with variation as specified   | 220V DC or 110VDC  | 220V DC or 110V DC                                  | 220V DC or 110V DC                                  |
| 24.  | Noise level at base and up to 50 m distance from base of circuit breaker   | 140dB (max.)   | 140dB (max.)  | 140dB (max.)  |
| 25.  | Rating of Auxiliary contacts   | 10A at 110/220V DC   | 10A at 110/220V DC                                  | 10A at 110/220V DC                                  |
| 26.  | Breaking capacity of Aux. Contacts   | 2A DC with circuit time constant not less than 20ms  | 2A DC with circuit time constant not less than 20ms | 2A DC with circuit time constant not less than 20ms |
| 27.  | <b>Rated insulation levels</b>   |  |   |   |
| i)   | Full wave impulse withstand (1.2 /50 $\mu$ s) between line terminals and ground  | □1425 kVp  | □1050 kVp   | □650 kVp  |



|      |  |   |                                   |                          |
|------|--|---|-----------------------------------|--------------------------|
| ii)  | Full wave impulse withstand (1.2 /50 $\mu$ s) between terminals with circuit breaker open                          | 1425 kVp impulse on one terminal & 240 kVp power frequency voltage of opposite polarity on the other terminal   | <input type="checkbox"/> 1050 kVp | + 650kVp                 |
| iii) | Rated switching impulse withstand voltage (250/2500 $\mu$ s) Dry & wet between line terminals and ground           | +1050 kVp   | NA                                | NA                       |
| iv)  | Rated switching impulse withstand voltage (250/2500 $\mu$ s) Dry & wet Between terminals with circuit breaker open | 900 kVp impulse on one terminal & 345 kVp power frequency voltage of opposite polarity on the other terminal    | NA                                | NA                       |
| v)   | One minute power frequency dry withstand voltage between line terminals and ground                                 | 520 kV rms.   | 460 kV rms.                       | 275 kV rms               |
| vi)  | One minute power frequency dry withstand voltage between terminals with circuit breaker open                       | 610 kV rms.   | 460 kV rms.                       | 275 kV rms               |
| 28.  | Minimum corona extinction voltage with CB in all positions   | 320kV rms   | 156 kV rms                        | 92 kV rms                |
| 29.  | Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz (Micro volts)                              | 1000 $\mu$ V (at 266kVrms)  | 1000 $\mu$ V (at 156kV rms)       | 500 $\mu$ V (at 92kVrms) |
| 30.  | Minimum Creepage distance*   |   |                                   |                          |
| i)   | Phase to ground (31mm/kV)  | 13020mm   | 7595mm                            | 4495mm                   |
| ii)  | Between CB terminals   | 13020mm   | 7595mm                            | 4495mm                   |
| 31.  | System neutral earthing  | Effectively earthed   |                                   |                          |
| 32.  | Rated terminal load  | As per IEC or as per the value calculated based on specific switchyard layout requirement, whichever is higher. |                                   |                          |

|     |  |  |
|-----|--|--|
| 33. | Auxiliary contacts                         | Besides requirement of technical specification, the manufacturer/contractor shall wire up 10 NO + 10 NC contacts exclusively for purchaser's use and wired up to common marshalling box. |
| 34. | No. of terminals in common marshalling box | All contacts & control circuits to be wired out up to common marshalling box + minimum 24 terminals exclusively for purchaser's future use   |
| 35. | Seismic level                              | 0.5g horizontal for the site location under the Zone-V as per IS-1893<br>0.3g horizontal for the site location under other than the Zone-V as per IS-1893                                |

## 17.0 PRE-COMMISSIONING TESTS

**17.1** An indicative list of tests is given below. All routine tests except power frequency voltage dry withstand test on main circuit breaker shall be repeated on the completely assembled breaker at site. Contractor shall perform any additional test based on specialties of the items as per the field Q.P./instructions of the equipment Supplier or Employer without any extra cost to the Employer. The Contractor shall arrange all instruments required for conducting these tests along with calibration certificates and shall furnish the list of instruments to the Employer for approval.

- (a) Insulation resistance of each pole.
- (b) Check adjustments, if any suggested by manufacturer.
- (c) Breaker closing and opening time.
- (d) Slow and Power closing operation and opening.
- (e) Trip free and anti-pumping operation.
- (f) Minimum pick-up voltage of coils.
- (g) Dynamic Contact resistance measurement.
- (h) Functional checking of control circuits interlocks, tripping through protective relays and auto reclose operation.
- (i) Insulation resistance of control circuits, motor etc.
- (j) Resistance of closing and tripping coils.
- (k) SF6 gas leakage check.
- (l) Dew Point Measurement
- (m) Operation check of pressure switches and gas density monitor during gas filling.
- (n) Checking of mechanical 'CLOSE' interlock, wherever applicable.
- (o) Testing of grading capacitor.

- (p) Resistance measurement of main circuit.
- (q) Checking of operating mechanisms
- (r) Check for annunciations in control room.
- (s) Point of wave switching test (wherever applicable)

**17.2** The contractor shall ensure that erection, testing and commissioning of circuit breaker shall be carried out under the supervision of the circuit breaker manufacturer's representative. The commissioning report shall be signed by the manufacturer's representative.

**18.0 ACTIONS REQUIRED FOR DEFECTS OBSERVED DURING DEFECT LIABILITY PERIOD**

The actions required to be taken by contractor in case of defects observed in AIS type Circuit Breakers of ratings 132kV & above during the warranty period (defect liability period) shall be as per following. Further, the replaced/repared/ refurbished equipment (or part of equipment) shall have warranty in line with the GCC clause in SCC.

| Sl.no. | Nature of problem   | Corrective measures to be taken by contractor  |
|--------|---|--|
| 1.     | Blasting of interrupter, PIR, pole column,  | Replacement of complete CB pole Including SF6 gas  |
|        | a. Abnormal DCRM and Travel Measurement<br>b. Contact assembly and internal component damage, misalignment not leading to complete failure of interrupter/ PIR                | Repair/replacement of affected assembly/component based on repair procedure approved by QA   |
| 2.     | Crack in insulator, cementing joint of interrupter, PIR , pole column   | Replacement of affected part   |
| 3.     | SF6 gas leakage from sealing and bolted joints.SF6 gas leakage detectable by any Leakage Detection Method   | Rectification by replacement of gasket,O-ring, sealing, Interrupter or affected part to be replaced etc<br>If unable to arrest the leakage in 02 attempts, replacement of interrupter/column |
| 4.     | SF6 gas low dew point: > (-)35 deg C at atmospheric pressure.   | Re-conditioning of gas.<br>If does not improve, complete evacuation of CB, replacement filter material and gas   |
| 5.     | Oil leakage of grading capacitor<br>Change in Capacitance value beyond +/- 5 % w.r.t. to value of Capacitance obtained at site during pre-commissioning test.                 | Replacement or Refurbishment of grading capacitor  |
| 6.     | Pole/ break discrepancy (during O&M)Limits:<br>Break to Break (Opening/Closing): max. 2.5 ms<br>Phase to Phase (Opening): max. 3.33 ms<br>Phase to Phase (Closing) : max 5 ms | Rectification/replacement of affected parts  |
| 7.     | Static Contact Resistance: increase >50% from factory/ pre-commissioning value or >75 micro-ohm/ break whichever is lower   | Rectification/Replacement of pole  |
| 8.     | Drive mechanism assembly failure  | Rectification/ Replacement of affected part  |

|    |  |                              |
|----|--|------------------------------|
| 9. | Trip/ close coil, density monitor, relays and contactors and components of common MB | Replacement of affected part |
|----|--|------------------------------|

**Note: 1) Replaced/Repaired/Refurbished Equipment (or part of equipment) shall have 2) years warranty without prejudice to contractual warranty period.**

**B. TECHNICAL SPECIFICATION FOR 132KV & 33KV CURRENT TRANSFORMERS (AIS)**

**1. SCOPE OF CONTRACT**

1.1. This Section of the Specification covers general requirements for design, engineering, manufacture, assembly and testing at manufacturer's works of 132 kV and 33 kV outdoor Current and Potential Transformers.

**2. STANDARDS**

- 2.1. The equipment covered by this specification shall, unless otherwise stated be designed, constructed and tested in accordance with the latest revisions of relevant Indian Standards and shall conform to the regulations of local statutory authorities.
- 2.2. In case of any conflict between the Standards and this specification, this specification shall govern.
- 2.3. The current transformer shall comply also with the latest issue of the following Indian standard.

|       |                    |  |
|-------|--------------------|--|
| (i)   | IS: 2705(Part-I)   | Current transformers: General requirement.   |
| (ii)  | IS: 2705(Part-II)  | Current transformers : Measuring Current transformers                                  |
| (iii) | IS: 2705(Part-III) | Current transformers : Protective Current transformers                                 |
| (iv)  | IS: 2705(Part-IV)  | Current transformers: Protective Current transformers for special purpose application. |

**3. GENERAL REQUIREMENTS**

- 3.1. The cores of the instrument transformers shall be of high grade, non-aging CRC steel of low hysteresis loss and high permeability.
- 3.2. Current transformers shall be of Live Tank design.
- 3.3. The instrument transformers shall be truly hermetically sealed to completely prevent the oil inside the tank coming into contact with the outside temperature. To take care of oil volume variation the tenderer are requested to quote the current transformers with stainless steel diaphragm (bellow).
- 3.4. The instrument transformers shall be completely filled with oil.
- 3.5. A complete leak proof secondary terminal arrangement shall be provided with each instrument transformers, secondary terminal shall be brought into weather, dust and vermin proof terminal box. Secondary terminal boxes shall be provided with facilities for easy earthing, shorting, insulating and testing of secondary circuits. The terminal boxes shall be suitable for connection of control cable gland. IP rating of terminal box shall be IP 55. Spare terminals shall be provided.
- 3.6. All instrument transformers shall be of single phase unit.
- 3.7. The instrument transformers shall be so designed to withstand the effects of temperature, wind load, short circuit conditions and other adverse conditions.
- 3.8. All similar parts, particularly removable ones, shall be interchangeable with one another.
- 3.9. All cable ferrules, lugs, tags, etc. required for identification and cabling shall be supplied complete for speedy erection and commissioning as per approved schematics.
- 3.10. The instrument transformers shall be designed to ensure that condensation of moisture is controlled by proper selection of organic insulating materials having low

moisture absorbing characteristics.

- 3.11. All steel work shall be degreased, pickled and phosphated and then applied with two coats of Zinc Chromate primer and two coats of finishing synthetic enamel paint.

#### **4. INSULATING OIL**

- 4.1. The quantity of insulating oil for instrument transformers and complete specification of oil shall be stated in the tender. The insulating oil shall conform to the requirement of latest edition of IS: 335

#### **5. COMMON MARSHALLING BOXES (shall be supplied by CT manufacturer)**

- 5.1. The outdoor type common marshalling boxes shall conform to the latest edition of IS 5039 and other general requirements specified hereunder.
- 5.2. The common marshalling boxes shall be suitable for mounting on the steel mounting structures of the instrument transformers.
- 5.3. One common marshalling box shall be supplied with each set of instrument transformers. The marshalling box shall be made of sheet steel and weather-proof. The thickness of sheet steel used shall be not less than 3.0 mm. It is intended to bring all the secondary terminals to the common marshalling. The marshalling box shall be of hot dipped galvanized steel.
- 5.4. The enclosures of the common marshalling boxes shall provide a degree of protection of not less than IP 55 (As per IS 2147).
- 5.5. The common marshalling boxes shall be provided with double hinged front doors with pad locking arrangement. All doors and removable covers and plates shall be sealed all around with neoprene gaskets or similar arrangement.
- 5.6. Each marshalling box shall be fitted with terminal blocks made out of moulded non-inflammable plastic materials and having adequate number of terminals with binding screws washers etc. Secondary terminals of the instrument transformers shall be connected to the respective common marshalling boxes. All out going terminals of each instrument transformer shall terminate on the terminal blocks of the common marshalling boxes. The terminal blocks shall be arranged to provide maximum accessibility to all conductor terminals.
- 5.7. Each terminal shall be suitably marked with identification numbers. Not more than two wires shall be connected to any one terminal. At least 20 % spare terminals shall be provided over and above the required number.
- 5.8. All terminal strips shall be of isolating type terminals and they will be of minimum 10 A continuous current rating.
- 5.9. All cable entries shall be from bottom. Suitable removable gland plate shall be provided on the box for this purpose. Necessary number of cable glands shall be supplied fitted on to this gland plate. Cable glands shall be screw on type and made of brass.
- 5.10. Each common marshalling box shall be provided with two numbers of earthing terminals of galvanised bolt and nut type.
- 5.11. All steel, inside and outside work shall be degreased, pickled and phosphated and then applied with two coats of Zinc Chromate primer and two coats of finishing synthetic enamel paint. The colour of finishing paint shall be as follows: -
- i) Inside: Glossy White
  - ii) Outside: Light Grey (Shade No. 697 of IS: 5)

#### **6. BUSHINGS AND INSULATORS**

- 6.1. Bushings and Insulators shall be of Porcelain, Solid core type. Porcelain used for the manufacture of bushings and insulators shall be homogeneous, free from defects, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and shall be thoroughly vitrified, tough and impervious to moisture.
- 6.2. Glazing of the porcelain shall be of uniform brown colour, free from blisters, burns and other similar defects. Bushings shall be designed to have sufficient mechanical strength and rigidity for the conditions under which they will be used. All bushings of identical ratings shall be interchangeable.
- 6.3. Puncture strength of bushings shall be greater than the dry flashover value. When operating at normal voltage, there shall be no electric discharge between the conductors and bushing which would cause corrosion or injury to conductors, insulators or supports by the formation

of substances produced by chemical action. No radio interference shall be caused by the bushings when operating at the normal rated voltage.

- 6.4. The design of bushing shall be such that the complete bushing is a self-contained unit and no audible discharge shall be detected at a voltage up to a working voltage (Phase Voltage) plus 10%. The minimum creepage distance for severely polluted atmosphere shall be 31 mm/KV.
- 6.5. Sharp contours in conducting parts should be avoided for breakdown of insulation. **The insulators shall be capable to withstand the seismic acceleration of 0.5 g in horizontal direction and 0.6g in vertical direction.**
- 6.6. Bushings shall satisfactorily withstand the insulation level specified in data sheet.
- 6.7. Rain shed/drain cover/dome shall be present in CT.
- 6.8. Bellow level indicator shall be present in CT.
- 6.9. **Nitrite butyl rubber/Neoprene gaskets shall be used.**

## **7. TESTS**

### **7.1. Routine/Acceptance Tests (all units)**

All routine tests shall be carried out in accordance with relevant Standards. All routine/acceptance tests shall be witnessed by the Employer/his authorised representative.

- 7.2. **Type Tests:** The bidder shall furnish type test certificates and results for the all tests as per relevant Standards along with the bid for current and potential transformers of identical design.

Type test certificates so furnished shall not be older than 5 (five) years as on date of Bid opening.

**QAP:** QAP shall be submitted.

## **8. NAME PLATES**

- 8.1. All equipment shall have non-corrosive name plates fix at a suitable position indelibly mark with full particular there on in accordance with the standard adapted. Thickness (1mm), purchase order, project name, serial no etc. shall be present in the Name plate.

## **9. MOUNTING STRUCTURES**

- 9.1. All the equipment covered under this specification shall be suitable for mounting on steel structures. Supply of mounting structures is also in the scope of this tender.
- 9.2. Each equipment shall be furnished complete with base plates, clamps, and washers etc. and other hardware ready for mounting on steel structures.

## **10. SAFETY EARTHING**

- 10.1. The non-current carrying metallic parts and equipment shall be connected to station earthing grid. For these two terminals suitable for 40mm X 10mm GI strip shall be provided on each equipment.

## **11. TERMINAL CONNECTORS (Shall be under manufacturer scope)**

- 11.1. The equipment shall be supplied with required number of terminal connectors of approved type suitable for ACSR. The type of terminal connector, size of connector, material, and type of installation shall be approved by the Employer, as per installation requirement while approving the equipment drawings. No part of a clamp shall be less than 12mm. thick.

## **12. PRE-COMMISSIONING TESTS**

- 12.1. Contractor shall carry out following tests as pre-commissioning tests. Contractor shall also perform any additional test based on specialties of the items as per the field instructions of the equipment Supplier or Employer without any extra cost to the Employer. The Contractor shall arrange all instruments required for conducting these tests along with calibration certificates and shall furnish the list of instruments to the Employer for approval.

### **(a) Current Transformers**

- (i) Insulation Resistance Test for primary and secondary.
- (ii) Polarity test.
- (iii) Ratio identification test - checking of all ratios on all cores by primary injection of current.
- (iv) Dielectric test of oil (wherever applicable).
- (v) Magnetising characteristics test.
- (vi) Tan delta and capacitance measurement
- (vii) Secondary winding resistance measurement

(viii) Contact resistance measurement (wherever possible/accessible).

### 13. TECHNICAL DATA SHEET FOR CURRENT

13.1. For 245/145/36 kV CTs the instrument security factor at all ratios shall be less than five (5) for metering core. If any auxiliary CTs/reactor are used in the current transformers then all parameters specified shall have to be met treating auxiliary CTs as an integral part of the current transformer. The auxiliary CTs/reactor shall preferably be inbuilt construction of the CTs. In case these are to be mounted separately these shall be mounted in the central marshalling box suitably wired upto the terminal blocks.

#### 13.2. TYPE AND RATING:

All instrument transformer shall be outdoor type, single phase, oil immersed, self-cooled suitable for mounting on steel structure. The instrument transformer shall have the following ratings and particulars.

| SL No. | A. Item  | Ratings and Particulars |               |
|--------|--|-------------------------|---------------|
| I      | II   | III                     | IV            |
| A      | Nominal system voltage                         | 132 kV                  | 33 kV         |
| B      | Highest system voltage, kV                     | 145                     | 36            |
| C      | Rated frequency ,HZ                            | 50                      | 50            |
| D      | System earthing                                | Solidly earth           | Solidly earth |
| E      | Insulation level                               |                         |               |
| a)     | Impulse withstand voltage: kVp                 | 650                     | 170           |
| b)     | One-minute p.f. Withstand voltage, kV (r.m.s.) | 275                     | 70            |
| F      | Short time current for 3 seconds, kA           | 40                      | 31.5          |
| G      | Minimum creepage distance, mm                  | 4495                    | 1116          |
| H      | Temperature rise                               | As per ISS              | As per ISS    |
| I      | <b>FEEDER C.T.</b>                             |                         |               |
|        | (i) No. of Cores                               | 5                       | 2             |
|        | (ii) Transformation ratio                      | As per BoQ              |               |
|        | (iii) Rated out put                            |                         |               |
|        | (a) Core-1                                     | 30 VA                   | 30 VA         |
|        | (b) Core-2                                     | 15 VA                   | 15 VA         |
|        | (c) Core-3                                     | -                       | N.A.          |
|        | (d) Core-4                                     | -                       | N.A.          |
|        | (e) Core-5                                     | -                       | N.A.          |
|        | (iv) Accuracy class                            |                         |               |
|        | (a) Core-1                                     | 0.2S                    | 0.2S          |
|        | (b) Core-2                                     | 5P                      | 5P            |
|        | (c) Core-3                                     | PS                      | N.A.          |
|        | (d) Core-4                                     | PS                      | N.A.          |
|        | (e) Core-5                                     | PS                      | N.A.          |
|        | (v) Accuracy limit factor                      |                         |               |
|        | (a) Core-1                                     | -                       | -             |
|        | (b) Core-2                                     | 20                      | 20            |

|          |  |       |       |
|----------|--|-------|-------|
|          | (c) Core-3                                   | -     | -     |
|          | (d) Core-4                                   | -     | N.A.  |
|          | (e) Core-5                                   | -     | N.A.  |
|          | (vi) Instrument security factor              |       |       |
|          | (a) Core-1                                   | <5    | <5    |
|          | (b) Core-2                                   | -     | -     |
|          | (c) Core-3                                   | -     | -     |
|          | (d) Core-4                                   | -     | N.A.  |
|          | (e) Core-5                                   | -     | N.A.  |
|          | (vii) Minimum Knee point voltage, Volts      |       |       |
|          | (a) Core-1                                   | -     | -     |
|          | (b) Core-2                                   | -     | -     |
|          | (c) Core-3                                   | 1200  | N.A.  |
|          | (d) Core-4                                   | 800   | N.A.  |
|          | (e) Core-5                                   | 800   | N.A.  |
|          | (viii) Maximum secondary resistance, ohm     |       |       |
|          | (a) Core-1                                   | -     | -     |
|          | (b) Core-2                                   | -     | -     |
|          | (c) Core-3                                   | 3     | N.A.  |
|          | (d) Core-4                                   | 3     | N.A.  |
|          | (e) Core-5                                   | 3     | N.A.  |
|          | (ix) Maximum exciting current, at $V_k/4$ mA |       |       |
|          | (a) Core-1                                   | -     | -     |
|          | (b) Core-2                                   | -     | -     |
|          | (c) Core-3                                   | -     | N.A.  |
|          | (d) Core-4                                   | -     | N.A.  |
|          | (e) Core-5                                   | -     | N.A.  |
|          |  |       |       |
| <b>J</b> | <b>TRANSFORMER C.T.</b>                      |       |       |
|          | (i) No. of Cores                             | 5     | 4     |
|          | (ii) Transformation ratio                    |       |       |
|          | (iii) Rated out put                          |       |       |
|          | (a) Core-1                                   | 30 VA | 30 VA |
|          | (b) Core-2                                   | 15 VA | 15 VA |
|          | (c) Core-3                                   | -     | -     |
|          | (d) Core-4                                   | -     | -     |
|          | (e) Core-5                                   | -     | N.A.  |
|          | (iv) Accuracy class                          |       |       |
|          | (a) Core-1                                   | 0.2s  | 0.2s  |
|          | (b) Core-2                                   | 5P    | 5P    |
|          | (c) Core-3                                   | PS    | P.S.  |
|          | (d) Core-4                                   | PS    | P.S.  |
|          | (e) Core-5                                   | PS    | PS    |



|  |  |      |      |
|--|--|------|------|
|  | (v) Accuracy limit factor                    |      |      |
|  | (a) Core-1                                   | -    | -    |
|  | (b) Core-2                                   | 20   | 20   |
|  | (c) Core-3                                   | -    | -    |
|  | (d) Core-4                                   | -    | -    |
|  | (e) Core-5                                   | -    | N.A. |
|  | (vi) Instrument security factor              |      |      |
|  | (a) Core-1                                   | <5   | <5   |
|  | (b) Core-2                                   | -    | -    |
|  | (c) Core-3                                   | -    | -    |
|  | (d) Core-4                                   | -    | -    |
|  | (e) Core-5                                   | -    | N.A. |
|  | (vii) Minimum Knee point voltage, Volts      |      |      |
|  | (a) Core-1                                   | -    | -    |
|  | (b) Core-2                                   | -    | -    |
|  | (c) Core-3                                   | 1200 | 600  |
|  | (d) Core-4                                   | 800  | -    |
|  | (e) Core-5                                   | 800  | N.A. |
|  | (viii) Maximum secondary resistance, ohm     |      |      |
|  | (a) Core-1                                   | -    | -    |
|  | (b) Core-2                                   | -    | -    |
|  | (c) Core-3                                   | 3    | 3    |
|  | (d) Core-4                                   | 3    | 3    |
|  | (e) Core-5                                   | 3    | N.A. |
|  | (ix) Maximum exciting current, at $V_k/4$ mA |      |      |
|  | (a) Core-1                                   | -    | -    |
|  | (b) Core-2                                   | -    | -    |
|  | (c) Core-3 (at $V_k/4$ )                     | 30   | 15   |
|  | (d) Core-4 (at $V_k/2$ )                     | -    | -    |
|  | (e) Core-5 (at $V_k/2$ )                     | -    | N.A. |

Note:

- (i) It is intended to use different ratios of the same CT at the same time for various protections and metering cores. The CTS should therefore be suitable for the above purpose by secondary tapings only. The ratio change by secondary taps is acceptable as long as the required CT specifications are achieved at all ratios.
- (ii) The knee point voltage specified above shall be at higher ratio/ taps.
- (iii) CT and PT sizing calculations shall be submitted. Burden values and knee point voltage, shall be decided as per the calculations during detailed engineering
- (iv) For Station service bay equipments rated system voltage shall be 33kV and highest system voltage shall be 72.5kV.