CHHATTISGARH STATE POWER TRANSMISSION CO. LTD.
(A Govt. of Chhattisgarh undertaking) (A successor company of CSEB)
CIN- U40108CT2003SGC015820 GSTIN-22AADCC5773E1ZX

OFFICE OF EXECUTIVE DIRECTOR (PLANNING & PROJECT)
Third Floor, SLDC Building, CSEB Campus
Dangania, Raipur (C.G.)-492013

Phone: 0771-2574209/14/41 Fax: 0771-2574246
Website: - www.cspc.co.in/csptcl, email:- cepnp.csptcl@cspc.co.in

TENDER SPECIFICATIONS

TR-21/04

For

CONSTRUCTION OF 36 KV,12 MVAR CAPACITOR BAYS AT EXISTING EHV SUB-STATIONS OF CSPTCL ON TURNKEY BASIS

(Through E-Bidding)

RFx No. 8100023681

LAST DATE & TIME OF SUBMISSION OF TENDER
DATE: 04.01.2022 (TIME 14.00 HRS)

DUE DATE & TIME OF OPENING OF TENDER
DATE: 04.01.2022 (TIME 14.10 HRS)

Cost of Tender Document: - Rs.5,000 +18%GST(as applicable)

Website:- www.cspc.co.in/csptcl

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CHHATTISGARH STATE POWER TRANSMISSION CO. LTD

(A Government of Chhattisgarh Undertaking)

O/o Executive Director (Planning & Project)

Address : Third floor, SLDC Building, Danganiya Raipur-492013.

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TENDER FORM

TENDER SPECIFICATION TR-21/04 FOR

CONSTRUCTION OF 36 KV,12 MVAR CAPACITOR BAYS AT EXISTING EHV SUB-STATIONS OF CSPTCL ON TURNKEY BASIS

Tender document SL.No…….*

Issued to M/s…… *

Cost of Tender documents Rs…….

D.D.No……..Dtd……..

Name of Bank ……

** Not required in case tender document is downloaded*

Signature & Seal of Issuing Authority
CSPTCL; Raipur

The undersigned hereby tender and offer (subject to CSPTCL's conditions of tendering), the Chhattisgarh State Power Transmission Company to test and supply, plant, machinery, materials, deliver and execute and do the several works and things which are described or referred to in the enclosures & Annexures to the specification **TR-21/04** copies of which are annexed hereto and which under the terms thereof are to be supplied, executed and done by the contractor in a thoroughly good and workman like manner, and to perform and observe the provisions and agreements or the part of the contract contained in or reasonably to the inferred from the said tender documents for the sum and at the rates set out in schedules annexed hereto.

It is confirmed that:

(I) Questionnaire for Commercial terms and conditions.

(II) Questionnaire for Technical specifications of the Equipments, and

(III) All other conditions wherever described in the tender documents have been replied in full giving clear details. It has been noted that in case any reply is not given or any reply is incomplete/ambiguous the Company will have right to take the same to be advantageous for the Company. Company's decision in this regard will be final. The bidder will have no right to furnish any technical or commercial clarification after opening of the bid which may in any way alter the offered prices.

Dated, this …… day of …….

Bidder's Signature

Bidder's Address.

CHHATTISGARH STATE POWER TRANSMISSION CO. LTD
(A Government of Chhattisgarh Undertaking)
O/o EXECUTIVE DIRECTOR (Planning & Project)
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No.02-04/NIT/TR-21/04/ 1680 **Raipur/dtd.03/12/2021**

E-TENDER NOTICE

Sealed tenders are invited from experienced bidders for taking up the following work on turnkey basis:-

Tender No.	Particulars	Cost of Tender Documents (Non-refundable)		Earnest money	Due date of opening
		Printed Tender form	E-tender form online (Downloaded from website)		
TR-21/04 RFx No. 8100023681	Construction of 36 KV, 12 MVAR capacitor bays at existing EHV sub-stations of CSPTCL on turnkey basis.	Rs.5900/- (including 18 % GST)	Rs.5900/- (including 18 % GST)	Rs. 5.00 lacs	04/01/2022

SCOPE OF WORK:-

(i) All civil works associated with construction of 33 KV Capacitor Bank Bays by construction of foundation, cable trench, yard leveling etc. as per CSPTCL'S drawings along with supply of cement, steel and other required material.

(ii) All designing & drawing of structures shall be as per CSPTCL's design, all equipments/material conforming to relevant I.S.S./International Standards as per tender specification & as approved by CSPTCL, required for construction of Capacitor Bank Bays.

(iii) Erection, Testing & commissioning of individual equipments and energization of complete Capacitor Bank Bays.

NOTE:-

i) Bidders are requested to participate in all the works included in the tender. Part bidding is not acceptable.

ii) In case any of the above date is declared as holiday, then the particular date will automatically get shifted to next working day.

iii) Any notice for extension of due date of tender opening shall not be published in newspapers. It will be displayed only on official website of the company.

iv) The tender will be processed through e-bidding module of SAP-SRM. Bidders are advised to visit our website www.cspc.co.in/csptcl for viewing detailed instructions regarding submission of offer through SAP-SRM.

TERMS AND CONDITIONS:-

(i) The tender documents can be obtained from the office of the ED/CE (Planning & Projects) in person on payment of cost of tender document in the form of D.D. only made out in the name of MANAGER (RAO : HQ), CSPTCL, Raipur accompanied with firm's application on its letter head. If tender document is required by post, Rs.295/- (i.e., 250/- + 18% GST) shall be paid by D.D. additionally along with the cost of documents. If more than one tender document is required, separate DDs should be furnished for each tender. CSPTCL shall not be responsible for any postal delay in receipt/ non-receipt of tender documents. No receipt of tender shall be issued in any case.

(ii) The tender document can also be downloaded from official website of CSPTCL "www.cspc.co.in'' (go through Chhattisgarh State Power Transmission Co. Ltd. - Tender Notice) and Rs.5900/- (i.e. Rs.5000 /- + 18 % GST) in form of DD in favour of Manager (RAO: HQ), CSPTCL, Raipur payable at Raipur should be submitted along with cost of Earnest Money Deposit (EMD) in separate envelope. The envelope containing DDs towards cost of tender document & EMD should be suitably super scribed "DDs containing cost of tender document and EMD". The details of DDs should be mentioned on the outer side of the envelope also. Please note carefully that in absence of aforesaid requisite tender fee, further bid shall not be considered for opening.

(iii) Tender documents and the detailed specification can be obtained on any working day one day prior to the due date. The tenders duly filled in shall be dropped/get dropped in the specified tender box up to 14:00 Hrs. on the due date. Any other means of delivery shall not be accepted. No receipt of tender shall be issued in any case. The tender box shall be locked/sealed at 14:00 Hrs. on the due date and shall be opened at 14:10 Hrs. on the same date.

(iv) After publication of NIT & before the date of opening of TC Bid, corrigendum/ other information (if any) shall be displayed on our official website and in SAP SRM (E-bidding Portal only). The bidders are requested to remain in contact with this office or visit our web-site for any development/ clarification/amendment issued subsequently.

(v) CSPTCL reserves the right to accept or reject any or all the offers, in part or full without assigning any reason whatsoever.

Website: - www.cspc.co.in/csptcl

Executive Director (Planning & Project)
CSPTCL: Raipur

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GENERAL DESCRIPTION OF PROJECT& SCOPE OF WORK

THIS COMPLETE TURNKEY PROJECT COVERS CONSTRUCTION OF 36 KV, 12 MVAR CAPACITOR BANK BAYS AT EXISTING EHV SUB-STATIONS OF CSPTCL

The tentative scope of works are as under:

(I) The subject tender specification has been issued for construction of 36 KV, 12 MVAR capacitor bays at existing EHV sub-stations of CSPTCL involves all civil works viz., construction of foundations for structures & equipments, cable trench, levelling & metaling etc. along with supply of all equipments and material for construction of capacitor bays at existing EHV sub-station including supply of galvanized steel structures as per CSPTCL's design, & material conforming to relevant I.S.S./International Standards as per tender specification, erection, testing & commissioning of individual equipments,energization of capacitor bay and handing over of the same to CSPTCL complete in all respect

(II) Complete design and detailed engineering shall be done by contractor . Design of Capacitor banks and its associated electrical & civil auxiliary system includes preparation of Capacitor banks foundation and other relevant documents required for engineering of all facilities to be provided under this contract are covered under the scope of the Contractor. However structural drawing of CT,LA,PI, Isolator along with foundation shall be provided by CSPTCL. Drawing of capacitor bank and circuit breaker shall be as per manufacturers drawing to be made available by contractor.

(III) Bidders are advised to visit the sub-station site to acquaint & satisfy themselves with its surrounding, topography, condition of soil strata, availability of construction material, labour, approach road, availability of water for construction purpose etc. and other local parameters, infrastructure and means to access the site, prior to submission of offer.

(IV) Bidders shall be deemed to have full knowledge of the site, whether he inspects it or not and no extra charges towards visit or otherwise shall be allowed. Submission of the offer by the bidder implies that he has read the tender document and made himself aware of the scope of the work to be done, local conditions and all other factors bearing on execution of the work.

(V) Any other item which are not specifically mentioned in the bill of quantities/price schedule, but are essential for completion of the project and its satisfactory operation, are deemed to be included in the scope of the work unless specifically excluded. Such works, which are beyond the scope of the contract, shall have to be done by the contractor as per clause-4 of GCC and as per approved drawing, specifications and as per direction of engineer-in-charge of CSPTCL.

BILL OF MATERIAL:

The scope of work involves construction of Complete Capcitor banks bay with all associated equipments at the existing EHV substations as mentioned here under:

Sl. No.	Name of S/S	Capacity of bank to be commissioned	Remarks
1	132KV Bagbahara	1x12 MVAR	Complete bay with all associated equipments
2	132KV Sankara	**2x12 MVAR**	Complete bay with all associated equipments
3	132KV Kuhera	1x12 MVAR	Complete bay with all associated equipments
4	132KV Mandirhasoud	1x12 MVAR	Complete bay with all associated equipments
5	132KV Mahasamund	1x12 MVAR	Complete bay with all associated

			equipments
6	132KV Dhamda	1x12 MVAR	Complete bay with all associated equipments
7	132KV Kurud(Bhilai)	1x12 MVAR	Complete bay with all associated equipments
8	220 KV Gendpur	1x12 MVAR	Complete bay with all associated equipments
9	132KV Dongargaon	1x12 MVAR	Complete bay with all associated equipments
10	220 KV Thelkadih	1x12 MVAR	Complete bay with all associated equipments
11	220 KV Bemetara	1x12 MVAR	Complete bay with all associated equipments
12	132KV Dongargadh	1x12 MVAR	Complete bay with all associated equipments
13	132KV S/s Nawagarh	**2x12 MVAR**	Complete bay with all associated equipments
14	132KV S/s Pandariya	1x12 MVAR	Complete bay with all associated equipments
15	132KV S/s Gandai	1x12 MVAR	Complete bay with all associated equipments
16	132KV S/s Rasmada	1x12 MVAR	Complete bay with all associated equipments
17	132KV S/s Silpahari	1x12 MVAR	Complete bay with all associated equipments
18	132KV S/s Chakarbhata	1x12 MVAR	Complete bay with all associated equipments
19	132KV S/s Renki	1x12 MVAR	Complete bay with all associated equipments
20	132KV S/s Balrampur	1x12 MVAR	Complete bay with all associated equipments
21	132KV S/s Berla	1x12 MVAR	Complete bay with all associated equipments
22	132KV S/s Pulgaon	1x12 MVAR	Complete bay with all associated equipments

Total number of capacitor banks to be installed at different substations =24 Nos

The quantities of equipments indicated in the schedules B-1 to B-3, C-1, D-1 & D-2 are tentative and there may be variations at the time of execution of the work. The contractor shall have to complete the works as per prevailing site and field conditions/requirements/approved drawing/scope of work/specifications and will have to ensure complete supply of equipments, steel structures including civil work etc. and also erection & commissioning of equipment in the sub-station as per the direction of concerned engineer- in-charge of CSPTCL.

SECTION-I

(INSTRUCTION TO BIDDERS, EARNEST MONEY DEPOSIT, PRE-QUALIFYING REQUIREMENT, PRICE BID EVALUATION, TAXES)

Special instructions to bidders for submission of bid through SAP- SRM module (E-bidding)

The price bid against tender specification No.**TR- 21/04** is to be processed through e-bidding. For participation in E-bidding, it is mandatory for prospective bidders to get registered online through our website & portal **http://www.cspc.co.in & https://ebidding.cspcl.co.in:50724/irj/portal**., on registration the bidders will get User ID and Password for participating in the tender.

The techno commercial bid is to be submitted in hard copy whereas the price bid is to be submitted online (E-Bidding portal). Details of NIT &Tender Documents are available on our website and portal as indicated above.

The bidder may download the same from the above site. In e-bidding portal, tender documents will be displayed in online tender display at Technical RFx section **(RFx No. 8100023681).**

For bidders, it is recommended to open the e-bidding portal by the following the path www.cspc.co.in->e-Bidding->"click **here for e-Bidding Web portal".**

Last date & time of submission of bid in hard copy and also in softcopy is **04.01.2022 upto 02:00 pm** and due date & time of opening of the tender is **04.01.2022 upto 02:10 pm.**

Important Instructions:-

1. Please note that this tender shall be processed online as well as offline. The bidder has to submit all the documents in hard copy as per tender specifications in four envelopes.
2. **The abstract (total) amount of Annexure from B-1 to B-3, C-1, D-1 & D-2 are to be filled in the item tab in e-bid in SAP SRM System (online e-tender). Amount should be quoted online & in specified fields only. It is required to upload scanned copy of ONLY price bid SCHEDULES DULY FILLED IN AND SIGNED WITH SEAL OF FIRM IN THE specified FOLDER along with the duly filled excel sheets of price schedules. It may be noted that the bid will not be considered for evaluation in case the bidder has not uploaded the scanned copies of duly filled price Bid annexure with seal & signature of bidder even he submit the summary in E-bidding portal.**

   Discount (if any) offered by the bidder should be filled in the respective field in the SAP SRM system (E-bidding Portal)) only. Discount for each of the schedules i.e. B-1 to B-3, C-1, D-1 & D-2 is to be indicated separately in the respective fields. No discount offer shall be considered which is indicated elsewhere for the purpose of evaluation and comparative statement. Once the rates are filled, the bidders may change their rates upto the due date and time of submission of tender. After due date and time, no change on any ground whatsoever will be accepted.
3. After scrutiny of techno-commercial bid, the price bid will be opened in e-bidding system only of eligible bidders for which suitable intimation will be given to the bidders offline & through email.
4. Please note that e-mail is always system generated, hence bidders are advised to regularly check their inbox/junk mail box.
5. CSPTCL shall not assume any responsibility for non-supporting of system, internet, line & associated hardware & software for bidding their tender. No extension in time shall be granted on such grounds. The bidder should submit their bid well before submission dead line to avoid any system related problem. It is strongly recommended not to wait for submission of bid in last minutes as internet/technical problem may disrupt their works.
6. Reference time for submission dead line shall be the time displayed in the portal and shall be treated as final.

7. After end of submission dead line, no alteration in the tender will be allowed by the system. However, in case of extension of due date of opening of tender, the bidders will be allowed to submit revised bid in the system.

8. CSPTCL will not accept incomplete bid.

9. The bidder must have a valid Digital Signature(class –III digital certificate) to establish the identity of the bidder & SAP SRM User ID. User ID & Password from CSPTCL and Digital Signing Certificate and Digital Encryption Certificate from any recognized digital signature issuing authority are required for participation in any Tender. The bidder shall intimate in advance regarding details of digital signature issuing authority for ensuring the reliability of the same. ***It may please be noted that the tender be submitted with valid digital signature else the same will not be considered for evaluation***.

10 The e-bidding vendor user manual displayed on website- https://ebidding.cspcl.co.in:50724/irj/portal for the help of the bidders. For any further queries the bidder may contact at Helpline No. 0771-2576672/73 (EITC, CSPDCL, Raipur).

11. Tender shall be opened in the scheduled time as notified. If the due date of opening/submission of tender documents is declared a holiday by the Govt. or local administration, it will be automatically shifted to next working day for which no prior intimation shall be given. Tender opening shall be continued on subsequent days, in case the opening of all tenders is not completed on due date because of the technical constraints of system on the day of opening. It may be noted that the due date of opening/time may be altered/ extended if desired by CSPTCL without assigning any reason. However, intimation shall be available on company‘s tender portal/bidders email (if participation shown). The bidders are requested to keep track of the same.

12. Amendment in tender specification will be published on our website as well as in SRM system and the intimation regarding amendment in date extension will be conveyed through system generated e-mail to registered bidders only.

13. Before participating the bidder shall carefully read all the instructions and processes.

14. Tender duly completed in all respects will be accepted online up to due date & time and will be opened on the due date at specified time in the presence of tenderers or their authorized representatives. In case of authorized representative(s) they shall bring the original authorization letter with their signature attested by the bidder.

Executive Director (P&P)
CSPTCL: Raipur

INSTRUCTION TO BIDDERS

1.1 Sealed Tenders in duplicate in Four envelopes (each complete with all details in the manner specified together with drawings, test reports, descriptive literature if any) and declarations form duly signed by the bidder are to be submitted in the office of the **E.D (Planning & Project), CSPTCL, Dangania, RAIPUR (CG)** in double sealed cover & super scribed on each of the covers the relevant tender specification number and due date of opening as indicated in "Notice Inviting Tenders".

1.2 This tender Specification is divided into following Sections namely:-

a) Section - I Instruction to Bidders
b) Section- II General Conditions of Contract for installation of 36 KV 12 MVAR capacitor bank at various EHV substations.
c) Section- III Price bid Annexures for switchyard equipments and accessories
d) Section- IV Annexures, schedules &formats
e) Section- V List of Vendors
f) Section- VI Technical Specification for construction of 36KV 12 MVAR capacitor bank bay with associated equipments
g) Section- VII GTP of equipment 1-A to 1-H
h) Section- VIII: Price Variation Formulae
i) Section- IX Structural drawing and Layout Drawing (shall be arrange by CSPTCL during execution)
j) Section- X Civil foundation drawings

1.3 The Company reserves the right to alter the quantities with respect to materials/equipments/ volume at the time of placing of order.

1.4 Tenders will be opened online as well as offline in the O/o E.D (Planning& Projects), CSPTCL in the presence of the bidders or their authorised representatives (limited to two persons only with a valid authorisation from their employer). At the time of opening, the techno-commercial bid and other relevant details will be read out. Price bid of Techno commercially successful bidder would be opened only in online SAP SRM Module (E-bidding Portal) at a later date with due information to all the successful bidders.

1.5 The bidder may deviate from the specification while quoting if in his opinion such deviation is in line with the manufacturer's standard practice and conductive to a better and more economical offer. All such deviations should however be clearly indicated giving full justifications for such deviations in separate sheet(s) under "Deviations/ Departures" title in Annexure-A-9 & A-10.

It may please be noted that any deviation mentioned elsewhere (other than the prescribed formats of Technical deviation (Format "A-9") & Commercial deviaton (Format "A-10") shall not be considered and shall have no effect.

1.6 Only those who have purchased / downloaded the copy of relevant Specification No. **TR-21/04** can submit their tender. Tenders submitted by others will be rejected. The Tender form duly signed by the bidder with the seal of the company must be furnished with the bid, failing which the tender may be rejected.

1.7 CSPTCL reserves the right to reject the lowest or any other tenders or all tenders without assigning any reason what so ever if it is considered expedient in the overall interest of CSPTCL.

1.8 The Tenders shall be submitted in **DUPLICATE** in Four envelopes should be enclosed in sealed cover both addressed to the E.D (Planning& Project), CSPTCL, Dangania, RAIPUR and online price bid in SAP SRM Module (E-Bidding Portal)of CSPTCL. Both inner and

outer cover envelops should be sealed and super scribed with tender specification No. **TR-21/04** and date of opening.

1) **Envelope No. 1** should contain a covering letter with EMD & cost of tender document (if tender document is downloaded from the website).
2) **Envelope No. 2** shall contain the original and duplicate copy of documents in support of PQR & check list along with Pre-contract Integrity pact (for entire project).
3) **Envelope No.3** shall contain the technical & commercial parts of the specification with Annexure-A-1 to A-25 & Un-priced Annexures- B-1 to B-3 , C-1, D-1 & D-2 complete in all respect in duplicate copy.
4) **Envelope No.4** should contain all the above three envelopes.

No any envelope apart from above mentioned envelope shall be entertained.
The tender should be dropped in specified tender box, kept at the office of the Executive Director (Planning & Project), CSPTCL, Raipur before due date and time of submission of tender or by post / courier. No receipt will be issued for tender received through post/courier. It is responsibility of bidder to drop/get dropped the tender in respective tender box. Any other means of delivery shall not be accepted. The tender box shall be locked/sealed at 14.00 hrs of due date and offers received after will not be accepted.

1.9 Tenders received after due date and time shall be returned without being opened.

1.10 FAX or E-mail tenders shall not be accepted under any circumstances.

1.11 The submitted offer by the bidders should contain page numbers along with Index.

1.12 **Discount (if any) offered by the bidder should be indicated in E-bidding portal only. No discount offer shall be considered which is given elsewhere for evaluation and comparative statement.**

1.13 **<u>"Bidders to note this to avoid rejection of their bid"</u> - It will be the responsibility of the bidder to make sure that all the documents required as per tender are submitted along with bid on or before due date of tender. The bid submission date is cut-off date for submission of all the documents required as per tender and every bidder must adhere to this dead line.**
However, if any short coming is observed during scrutiny of TC bid, CSPTCL reserves the right to seek required clarifications/documents from bidder by giving them only one chance to submit required documents/ clarifications/confirmations within specified time limit.
If a bidder has quoted 'NIL' deviations in Annexure A-9 (Deviation from technical specification / condition) and Annexure A-10 (Deviation from Commercial conditions of contract), this will have an overriding effect on any other conditions noted as deviations elsewhere in the bid.

1.14. **<u>CHECK LIST: -</u>** The check list (Annexure-22) in respect of various documents/ schedules etc. in respect of PQR and other eligibility requirement is required to be submitted by the bidder without which the tender will be considered incomplete and liable for rejection. The bidder should submit all schedules duly filled in along with this offer.

2. EARNEST MONEY DEPOSIT:

2.1 The tender shall be accompanied by Earnest Money Deposit of **Rs.5 lacs (Rs. Five Lakh) only.** The Earnest Money Deposit shall be offered in the form of demand draft, subject to conditions mentioned below:-

i. Bank Draft to be drawn in favour of "Manager (RAO-HQ) CSPTCL, RAIPUR (CG)".
ii. No interest shall be paid on Earnest Money Deposit.
iii. No adjustment towards Earnest Money Deposit shall be permitted against any outstanding amount with CSPTCL.
iv. In the case of unsuccessful bidder, the Earnest Money will be refunded after finalization of tender. In case of successful bidder Earnest Money will be refunded only after furnishing Bank Guarantee against security deposit & its acceptance.
v. Earnest Money will be forfeited if the bidder fails to accept the letter of intent and / or work order(s) issued in his favour.
vi. Tenders not accompanied by Earnest Money shall be disqualified.
vii. Cost of tender document is not refundable.

2.2 Fully owned Under Taking of the State Govt. / Central Govt. e.g. BHEL etc. are exempted from furnishing the EMD as per rules on furnishing documentary proof.

2.3 **FORFEITURE OF EARNEST MONEY:-**

The Bid security is required to protect CSPTCL against the risk of Bidder's conduct, which would warrant the Earnest Money's forfeiture, due to following reasons:

a) If a Bidder withdraws his Bid during the period of Bid validity specified.
b) In the event of refusal to accept the Letter of Intent placed by CSPTCL within the validity period.
c) In case of a successful Bidder, if he fails to sign Agreements and fails to furnish Security Deposit as specified in the Tender Specification.

The successful Bidder's Earnest Money will be discharged only after the execution of various Agreements and Security deposit by the Bidder (as specified in this tender Specification).

2.4 **VALIDITY:** The tenders should be kept valid for a period of **180 days** from the date of opening of the tenders as notified in the tender notice and subsequent amendment thereof, failing which the tenders will be rejected.

2.5 Bidders are expected to be fully conversant with the meaning of all the clauses of the specifications before submitting their tenders. In case of doubt regarding the meaning of any clause, the bidder may ask for clarification in writing from the O/o Executive Director (Planning & Project), CSPTCL that must reach at least 15 days before the scheduled date of opening of tender. This however, does not entitles the bidder to ask for time extension beyond due date of opening of the tender.

3. PRE-QUALIFYING REQUIREMENTS:-

The bidder should comply the following requirements along with the offer:-

3.1 Only Indian manufacturer having manufacturing facility for 33 KV (or above) capacitor banks in India with minimum technical experience as per clause 3.3 shall be eligible to participate in the tender. **JV/ Consortium is not permitted**.

3.2 FINANCIAL CRITERIA OF PQR :-

i) **Net Worth :-**Net Worth of the bidder for each of the last three Financial Years (2017-18, 2018-19 & 2019-20) should be positive.
Net worth means the sum total of the paid up capital and free reserves (excluding reserves created out of revaluation) reduced by aggregate value of accumulated losses (including debit balance in profit and loss account for current year) and intangible assets.

ii) **MAAT :-** The bidder collectively must have minimum average annual turnover (MAAT) for best 3 years out of last 5 financial years (i.e., FY 2015-16 to FY 2019-20) equal to **Rs.15.48 Cr.** For calculation of turnover, other income indicated in balance sheet shall not be taken into account

iii) **Liquid Assets:- :-** The bidders shall currently have (i) liquid assets (LA) not less than Rs. **2.58 Cr**. or (ii) evidence of access to or availability of fund based credit facilities not less than Rs. **2.58 Cr** or (iii) sum of liquid assets and access to availability of fund based credit facilities of not less than **Rs.2.58 Cr**.

In case bidder is a holding company, the Financial Position criteria referred above (i.e., Networth, MAAT & LA), shall be that of holding company only (i.e. excluding its subsidiary/group companies)
In case bidder is a subsidiary of a holding company, the Financial Position criteria referred above, shall be that of subsidiary company only (i.e. excluding its holding company).

Note :- For the instant tender, the turnover for best 3 years out of last 5 financial years i.e. 2015-16, 2016-17, 2017-18, 2018-19 and 2019-20 shall be considered for calculation.

iv) **Cash Flow Requirement**: The bidders 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 out the cash flow during the contract period, estimated as not less than **Rs.2.58 Cr**. taking into account the bidder's overall cash flow requirements for this contract and his current works' commitment for other contracts.
Difference of Total proposed Financial Resources to be available during the period of execution of work against the instant tender as per Annexure **(A-13/A**) and total Expected value of work to be carried out against bidder's other current contracts commitments/works in progress during the completion period against instant tender as per Annexure (**A-13/B**) must be positive & should not be less than **Rs. 2.58 Cr**.

v) The bidder shall submit certificates **(in original duly mentioning UDIN no. of that CA certification as per prescribed Annexure A-23)** confirming fulfilment of following criteria:-

a) Bidder should have discharged all its payment obligations (principal/interest) on outstanding debentures (i.e. debentures which have not yet been redeemed), if any and no such payments as on **30.09.2021** should be outstanding / overdue.

b) Bidder should not be presently in default in payment of any bank loan or interest thereon for more than three months or any loan account of the bidder should not have been classified as NPA (Non performing assets) by the creditor/ lending bank, as on date of issue of NIT.

c) Bidder should not be under process of insolvency or liquidation as on the date of issue of NIT. Even, if at a later date up to opening of price bid against the instant tender, if it comes to the notice of CSPTCL that the bidder has been going through the process of insolvency or liquidation, their bid will be rejected.

vi) The Bidder should not be debarred/ blacklisted by Bank/State Govt/Central Govt/State PSU/CPSU/SEB/public utility as on date of issue of NIT. A declaration in this regard **(as per prescribed Annexure A-24)** shall be furnished by the bidder.

However, the bid may not be considered for further processing in following cases also:

a) If Bidder is debarred/ blacklisted by Bank/State Govt/Central Govt./State PSU/CPSU/SEB/public utility up to date of opening of price bid of the instant tender.

b) If case comes to notice regarding submission of forged/ fake document in any other tender under process in CSPTCL, up to date of opening of price bid in the instant tender.

vii) All the documents/ statements/ attachments/ information submitted by the bidder in proof of the qualifying requirements must be authentic / genuine /correct and in case, any of the said documents / statements / attachments / information is found to be false / fake / misleading, the bidder will be disqualified and action will be taken against the bidder as per relevant provisions of the tender. A declaration in this regard **(as per prescribed Annexure A-24)** shall be furnished by the bidder.

3.3 TECHNICAL EXPERIENCE CRITERIA OF PQR:-

Bidders are requested to carefully note the Pre-qualification requirement mentioned hereunder in respect of technical experience capability. They are required to furnish self-attested documentary proof in support of having the following Pre-Qualifying Requirement (PQR)

S.No.	Voltage Class	Particular
1	33 KV	• **Project Capability** :- The bidder should be a manufacturer of Shunt Capacitors having manufacturing and testing facilities in India. The bidder should have constructed and commissioned at least 10 Nos., 3 phase Capacitor banks (cumulatively) along with associated equipments of 33 KV or higher voltage class during last five financial years i.e. FY 2016-17 to FY 2020-21 (between 1st Apl'2016 & 31st March'2021) against order issued by following Indian entities: **a**. Power utilities owned and controlled by Central or State Govt. or **b.** PSUs or **c.** Government organisations • The date of order should not be older than 7 years from the date of issue of NIT of the instant tender . • Out of 10 Nos, at least 08 No. Capacitor Banks of 33 KV or higher voltage class must have been in successful operation for minimum one year from the date of commissioning as on date of issue of NIT of instant tender.

The word "Commissioning" shall mean energization of capacitor bay duly certified by above entities.

Bidders may note that evaluation of various pre-qualifying experience criteria shall be done on the basis of documents / certificates submitted by the bidder, for which responsibility to furnish essential authentic, genuine & correct documentary proof / statements / attachments / information etc., entirely rests on the participating bidder(s). CSPTCL will not be responsible if the bid is considered non-responsive and rejected in the absence of such documentary proof.

4. OTHER ELIGIBILITY CRITERIA:-

i) The bidder should submit a certified copy of 'A' class electrical contractor license issued by **C.G. Anugyapan Mandal /CG State licensing Board** along with his offer and the license should be valid as on the date of opening of tender **OR** the bidder shall furnish an Undertaking to submit 'A' class electrical contractor license issued by C.G. Anugyapan Mandal / CG State licensing Board within 30 days after issue of Letter of Award (LOA).

ii) The bidder should have EPF code number allotted by EPF Commissioner and a copy of registration certificate should be submitted along with the T/C Bid.

iii) The bidder should have adequate tools & plants, financial and technical resources and infrastructure backed with qualified agencies to execute the work properly and expeditiously within the specified time frame.

iv) Power of attorney issued to legally authorised signatory should be submitted with the TC bid.

v) The bidder has to furnish GST registration certificate .Those bidders which are not registered under GST shall not be allowed to participate in the tender.

vi) The bidder shall have to submit pre contract integrity pact in the format enclosed as **Annexure A-20** on non-judicial stamp paper worth Rs 300/- duly signed by the bidder for the project along with techno commercial bid. The validity of this integrity pact shall be from the date of its signing and extended up to 2 years or the complete execution of the contract to the satisfaction of both the Buyer and the Bidder/Seller, whichever is later. In case Bidder is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the contract.

vii) Detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five years (counted from the date of bid submission) shall be provided in **Annexure A-12** by the bidders. A consistent history of awards involving litigation against the bidder may result in rejection of bid.

viii) A certificate to be produced by the bidder as per format given in **Annexure-A-25** as per order No. F.No.6/18/2019-PPD dated 23/07/2020 read with amended order No.18/37/2020-PPD dtd.08.02.2021 issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India.

The bidders shall be required to submit following documents in respect of PQR & other requirements for the instant tender TR-21/04:-

A) Documents in respect of manufacturing facility:-

- Self attested copy of valid NSIC/DIC certificate In case manufacturing firm is not registered with NSIC/DIC bidder should furnish copy of valid factory registration certificate issued by industry department of state/central government to capacitor manufacturer.

B) Documents in respect of financial PQR:-

- Self-attested copies (i.e., copies attested by authorised signatory of the tender) of the audited Balance Sheets and profit & loss accounts for last 5 years i.e. from 2015-16 to 2019-20 of bidder should be furnished in support, duly certified by chartered accountants of the firm. For calculation of turnover, other income indicated in balance sheet shall not be taken into account.
- A certificate issued by Chartered Accountant in original mentioning UDIN number of that CA certificate indicating details of Net Worth of last 3FY (2017-18 to 2019-20) , turnover of last five FY i.e. from 2015-16 to 2019-20 & break up of available liquid assets (issued on a date not older than date of issue of NIT) should be furnished {**as per Annexure-A-6**} in support of this. Liquid assets would include cash (and equivalents), bank deposits, securities that can be freely traded and receivables which has general certainty of getting received.
- For evidence of access to or availability of credit facilities, a certificate (in original) from their banker(s) **{as per Annexure-A-7}** indicating various fund based limits sanctioned to the bidder and the extent of utilisation as on date. **Such certificate should have been issued not earlier than 3 months prior to the date of bid opening.** Wherever necessary, CSPTCL may make queries with the bidder's banker.
- Regarding cash flow requirement, bidder shall submit information (Financial Resources) in Annexure (A-13/A) and information regarding current contract commitments/ works in progress in Annexure (A-13/B) provided in bid documents.
- The bidder shall submit certificates **(in original as per prescribed Annexure A-23 issued by CA mentioning UDIN number of that CA certificate**) confirming fulfillment of following criteria:-
  a) Bidder should have discharged all its payment obligations (principal/interest) on outstanding debentures (i.e. debentures which have not yet been redeemed), if any and no such payments as on **30.09.2021** should be outstanding / overdue.
  b) Bidder should not be presently in default in payment of any bank loan or interest thereon for more than three months or any loan account of the bidder should not have been classified as NPA (Non performing assets) by the creditor/ lending bank, as on date of issue of NIT.
  c) Bidder should not be under process of insolvency or liquidation as on the date of issue of NIT. Even, if at a later date up to opening of price bid against the instant tender, if it comes to the notice of CSPTCL that the bidder has been going through the process of insolvency or liquidation, their bid will be rejected and action will be taken against the bidders as per relevant provisions of the tender.

- A declaration by the bidder (as per prescribed **Annexure A-24**) that their firm is not debarred/ blacklisted by Bank/State Govt/ Central Govt./State PSU/ CPSU/ SEB/ public utility as on date of issue of NIT**.**

- A declaration by the bidder (as per prescribed **Annexure A-24)** All the documents/ statements/ attachments/ information submitted by the bidder in proof of the qualifying requirements must be authentic / genuine /correct and in case, any of the said documents / statements / attachments / information is found to be false / fake / misleading, the bidder will be disqualified and action will be taken against the bidder as per relevant provisions of the tender.

C) Details of documents to be submitted by bidders in support of Technical qualifying requirements:-

i) Complete detailed order copy (self-attested by authorised signatory of the tender), in support of technical experience criteria of PQR for having constructed & commissioned required capacitor bay on turnkey basis during last 5 financial years i.e. FY 2016-17 to FY 2020-21 (between 1st Apl'2016 & 31st March'2021) against order issued by Power utilities owned and controlled by Central or State Govt. or PSUs or Govt. organizations. Complete order copy along with annexure containing bill of quantity/ scope of work etc shall be invariably submitted in support of technical experience criteria of PQR. **The date of order should not be older than 07 years from the date of issue of NIT of the instant tender.**

(ii) Self attested copy (by authorised signatory of the tender) of performance certificate of corresponding work order (for which orders have been furnished) for successful commissioning & satisfactory operation of the above capacitor bay for a period of one year (from the date of commissioning) as on the date of issue of NIT of instant tender, indicating date of commencement of work and date of commissioning of capacitor bank bays duly issued by the concerned Power utilities owned and controlled by Central or State Govt. or PSUs or Govt. organizations in the name of participating bidder(s). The word "Commissioning" shall mean energization of capacitor bank bay duly certified by the mentioned Indian entities.

D) Documents in respect of other eligibility requirement:-

i. Self attested copy of 'A' class electrical contractor license issued by **C.G. Anugyapan Mandal /CG State licensing Board** along with his offer and the license should be valid as on the date of opening of tender **OR** the bidder shall furnish an Undertaking to submit 'A' class electrical contractor license issued by C.G. Anugyapan Mandal / CG State licensing Board within 30 days after issue of Letter of Award (LOA).

ii. Copy of EPF code number/ EPF registration No. allotted by EPF Commissioner in the name of the bidder.

iii. Certficates as per **Annexure A-4 & A-5** that the bidder collectively have adequate tools & plants, financial and technical resources and infrastructure backed with qualified agencies to execute the work properly and expeditiously within the specified time frame.

iv. Power of attorney issued to legally authorized signatory for this tender.

v. The bidder has to furnish GST registration certificate .

vi. **Pre-contract Integrity pact** in prescribed format in **Annexure A-20** on non judicial stamp paper worth Rs 300/- duly signed by legally authorized signatory of bidder. The validity of this integrity pact shall be from the date of its signing and extended up to 2 years or the complete execution of the contract to the satisfaction of both the Buyer and the

Bidder/Seller, whichever is later. In case Bidder is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the contract.

vii. Detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five financial years (counted from the date of bid submission) shall be furnished in prescribed **Annexure A-12** by bidder .

viii. A certificate to be produced by the bidder as per format given in **Annexure-A-25** as per order No. F.No.6/18/2019-PPD dated 23/07/2020 read with amended order No.18/37/2020-PPD dtd.08.02.2021 issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India.

The bidders are required to submit tenders in the manner described as detailed hereunder

All documents / information as per Annexure, schedules and formats enclosed in this tender document and as described below shall be placed in a sealed envelope containing four separate sealed envelopes as mentioned below.

In certain cases confusion takes place regarding furnishing of Earnest Money Deposit since the Envelopes are not properly super-scribed and sealed by the bidder. It is therefore, intimated that envelopes shall be submitted by bidders as under:

a) **Envelope-I: -** This envelope should contain a covering letter (in company's letterhead) with earnest money deposit (EMD) in the form of Demand Draft and cost of tender document. The cover of envelope should be suitably super-scribed with details of E.M.D. and cost of tender document. The envelope should be sealed properly.

b) **Envelope-II: -** This envelope should contain the documents meeting the Pre-Qualifying Requirements (PQR). The Main documents to be furnished should be:-

1) Self-attested copies (i.e copies attested by authorised signatory of the tender) for profit & loss account statement and audited balance sheets for last 5 financial years (i.e., FY 2015-16 to FY 2019-20).

   A statement showing 'Annual Turnover' for the last five financial years (FY 2015-16, 2016-17, 2017-18, 2018-19 & 2019-20) & 'Net worth' including assets and liability of the bidder duly certified **original by chartered accountant duly mentioning UDIN number of that certificate** indicating details for the last three financial years (FY 2017-18, 2018-19 & 2019-20) shall be furnished.

2) **A certificate in original of Chartered Accountant duly mentioning UDIN number** indicating details (break-up) of available 'Liquid assets' (LA) for bidder, self attested by authorised signatory shall be furnished.
   The bidder shall also furnish certificate (in original) from their banker(s) (as per prescribed annexure A-7) indicating various fund based /non fund based limits sanctioned to the bidder and the extent of utilization as on date.
   Such Certificate should have been issued not earlier than 3 months prior to the date of bid opening.

3) The bidder must demonstrate overall cash flow requirements for this contract and his current works' commitment for other contracts. Bidder shall submit above information (Financial Resources) in **Annexure (A-13/A)** and information regarding current contract commitments/ works in progress in **Annexure (A-13/B)** provided in bid documents

4) The bidder shall submit Certificates **(in original duly mentioning UDIN no. of that CA certification as per prescribed Annexure A-23)** issued by CA, confirming fulfilment of following criteria :-

a) Bidder should have discharged all its payment obligations (principal/interest) on outstanding debentures (i.e. debentures which have not yet been redeemed), if any and no such payments as on **30.09.2021**should be outstanding / overdue.

b) Bidder should not be presently in default in payment of any bank loan or interest thereon for more than three months or any loan account of the bidder should not have been classified as NPA (Non performing assets) by the creditor/ lending bank, as on date of issue of NIT.

c) Bidder should not be under process of insolvency or liquidation as on the date of issue of NIT. Even, if at a later date up to opening of price bid against the instant tender, if it comes to the notice of CSPTCL that the bidder has been going through the process of insolvency or liquidation, their bid will be rejected and action will be taken against the bidder as per relevant provisions of the tender.
This certificate shall be submitted by bidder .

5) A declaration by the bidder **(as per prescribed Annexure A-24)** that their firm is not debarred / black-listed by Bank / State Govt. / Central Govt. / State PSU / CPSU / SEB / Public utility as on date of issue of NIT and in case any of the document/ statements / attachments / information is found to be faulse / fake / misleading, the bid will be disqualified and action will be taken against the bidder as per relevant provisions of the tender.

6) A declaration by the bidder **(as per prescribed Annexure A-24)** that all the documents / statements / attachments / information submitted by the bidder in proof of the qualifying requirements are authentic / genuine /correct and in case any of the said documents / statements / attachments / information are found to be false / fake / misleading, the bidder will be disqualified and action will be taken against the bidder as per relevant provisions of the tender.

7) **Self attested detailed order copy and performance certificate issued by competent authority towards successful operation in support of PQR as mentioned in (3.2) above for fulfilling the technical experience criteria of PQR**.

8) Copy of Valid 'A' class Electrical Contractor License issued by CG anugyapan Mandal/ CG state licensing board in the name of bidder , an undertaking to submit 'A' class electrical contractor license issued by C.G. Anugyapan Mandal / CG State licensing Board within 30 days after issue of LOA, by the bidder .

9) Copy of EPF code number/ EPF registration No. allotted by EPF Commissioner in the name of the bidder.

10) Bidder shall also furnish undertakings (as prescribed in **Annex.-4 & Annex.-5**) in support that the bidder has adequate sub-station design infrastructure, erection facilities, capacity and procedures including quality control.

11) Power of attorney issued to legally authorised signatory should be submitted with the TC bid.

12) The bidder has to furnish GST registration certificate

13) **Pre-contract Integrity pact** in prescribed format in **Annexure A-20** on non judicial stamp paper worth Rs 300/- duly signed by legally authorized signatory of bidder .

14) Detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five financial years (counted from the date of bid submission) shall be furnished in prescribed **Annexure A-12** by bidder

15) Bidder shall enter deviations/departures (if any) from the technical specification/ commercial conditions of contract clearly indicated giving full justifications for such deviations in separate sheet(s) under "Deviations/ Departures" title in Annexure-**A-9 & A-10.**

16) **Check list**: The check list **(Annexure-22)** in respect of various documents/ schedules etc. in respect of PQR & other eligibility requirement is required to be submitted by the bidder without which the tender will be considered incomplete and liable for rejection. The bidder should submit all schedules duly filled in along with this offer.

17) **Vital document to be submitted with the T/C bid: -** Duly filled in "Check list" in **Annexure A-22** and "Questionnaire" in **Annexure A-3** attached with this tender document, indicating Name of organisation with address, Turnover details, and guaranteed losses of offered capacitor bank etc..

18) A certificate to be produced by the bidder as per format given in **Annexure-25** as per order No. F.No.6/18/2019-PPD dtd. 23/07/2020 read with amended order No.18/37/2020-PPD dtd.08.02.2021 issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India.

c) Envelope-III: - This envelope should contain the Technical Bid and Commercial Bid complete in all respects in duplicate. The bidders are requested to invariably furnish all the Un-priced price bid schedules B-1 to B-3, C-1, D-1, D-2 to assess the quantities being offered.
For evaluation of techno-commercial bid, duly filled in **Annex. A-1 to Annex. A-13 & A-25** shall be furnished by the bidder.

d) Envelope-IV: - This large envelope should contain all the above Three envelops.

In case above instructions are not followed properly and any of the envelope of the bidder is not available for inspection on opening, no representation at the time of tender opening shall be accepted and such offers shall not be opened. The large envelope should be properly superscribed with Tender No., Due Date & Name of Project in Bold & should bear complete address of the Bidder.

It may be noted that in no case the request for return of offer/bid, dropped in the tender box shall be considered.

e) For submission of online price bids, may please refer the "Special Instructions to bidders for submission of bid through SAP-SRM Module (E-bidding)" annexed with this tender document.

The bidders are required to submit the Summaries of the prices bid annexures {B-1 to B-3 (supply of materials for sub-station), C-1 (civil works), D-1 (Erection charges) , D-2 (Testing & Commissioning charges),} in E-bidding portal and to upload these schedules in form of excel sheets as well as the scanned copies of all these annexure duly filled in & signed by the bidder.

5. PRICE-BID & ITS EVALUATION:-

Bidder must quote their price in accordance with the specifications and conditions. Any deviation from the above shall be considered as an alternate bid. The bids will be evaluated based on the main offer only.

Price Part of only those Bidder shall be opened on-line who are determined as having submitted substantially responsive bids and are ascertained to be qualified to satisfactorily perform the Contract. Such Bidder shall be intimated about the date and time for opening of Price Part by the Employer.

The Employer will on-line open Price Bid at the specified time and date in the presence of bidder' designated representatives who choose to attend, at the time, date, and location stipulated in the intimation for opening of price bid. The bidder' representatives who are present shall sign a register evidencing their attendance.

The bidder' names, the Bid Prices or any discounts, and any such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.

The prices and details as may be read out during the bid opening and recorded in the Bid Opening Statement would not be construed to determine the relative ranking amongst the bidder, or the successful bidder, and would not confer any right or claim whatsoever on any bidder. The successful bidder (also referred to as the L1 bidder) shall be determined as per the provisions of this evaluation criteria.

The Employer shall prepare minutes of the bid opening, including the information disclosed to those present who present at the time of opening.

Bidder must quote their price in accordance with the specifications and conditions. Any deviation from the above shall be considered as an alternate bid. The bids will be evaluated based on the main offer only.

i. In the event of noticing arithmetical errors viz. multiplication of price & quantity, grand total of total amount etc. these shall be corrected and computation shall be done accordingly.

ii. **The quoted price should be kept valid for the contractual period/ completion of the project. However the provision of price variation shall be applicable as per the relevant clause of the tender.**

iii. All columns shall be completely filled up properly.

iv. No conditional prices should be quoted.

v. The evaluation of price bids shall be done by comparing the Grand total (i.e. Total of all the price bid annexures) quoted by the bidder in price schedule i.e. B-1 to B-3, C-1, D-1 & D-2 of all the items including GST & levies. Based on the comparative evaluation, LOA shall be placed on the L-1 bidder (lowest quoted price for entire project) on the final accepted price.

vi. **The loading of the items for which the prices are not being quoted by bidder: - In such cases, loading will be done at highest prices quoted amongst the participating bidder. But, while ordering, lowest price amongst the bidder will be considered.**

vii. If the quantity quoted is less than B.O.Q. /or required for turnkey completion of the job, loading will be done on the pro-rata basis.

viii. In case the bidder makes contradictory statement in the Technical & Commercial Bid or for items for which the prices are not being quoted by bidder, loading will be done at highest prices quoted among the participated tenderers. But, while ordering, lowest price among the bidder will be offered.

ix. All the equipments/material, accessories, including charges for erection & commissioning etc required for construction & commissioning of Sub-station have been included in the price schedule i.e. B-1 to B-3, C-1, D-1 & D-2. If there is discrepancy between the Unit Price and the total price that is obtained by multiplying the unit price & Quantity, the Unit Price shall prevail and total price shall be corrected accordingly.

NEGOTIATION OF PRICES: - CSPTCL reserves the right to hold negotiation with L-1 bidder as deemed necessary. Procedure adopted by CSPTCL for holding negotiation shall be final and binding on all bidders.

Although details presented in this tender specification have been compiled with all reasonable care, it is the responsibility of the bidder to satisfy himself that the information given in each section are adequate and there are no conflicts between various clauses/sections/specifications. The clarification/decision of the Executive Director / Chief Engineer (Planning & Project) shall be final and conclusive

6. TAXES

The bidder should furnish valid GST registration number in Annexure A-1. In absence of GST registration the offer shall not be accepted.

(i) GST and other levies in respect of supplies and services under the Contract, should be indicated separately in respective columns in the Price Bid Proposal Sheets. The ITC (Input tax credit) available to bidder should be duly considered while quoting the rate. Any variation in tax rate during scheduled completion period will be on CSPTCL"s account.

(ii) **Cess under "Building and other Construction Workers Welfare Cess Act, 1996: -** The contractor for carrying out any construction work in Chhattisgarh State must get themselves registered under section 7 (1) of the "Building and Other Construction Workers Welfare Cess Act, 1996" and rules made thereunder by the Chhattisgarh Govt. and submit Certificate of Registration issued by the Registering Officer of the Chhattisgarh Govterment (Labour Department) for enforcement of the Act. The cess @ 1% on cost of supply of materials and construction charges including civil works shall be borne by the contractor and same shall be deducted from each bill. Any variation in this respect within scheduled completion period shall be to the account of CSPTCL.

If the rate of applicable cess beyond contractual completion period undergoes upward revision, the payment will continue to be made only on the basis of rates prevailing during completion period. In case the rate of cess undergoes downward revision then the delayed works beyond contractual completion period will attract reduced rate of cess.

(iii) **Payment of other taxes/charges which are not described above**:-The bidder should be aware of the various taxes, duties, levies imposed by the Central Government, State Government or Local Bodies applicable in this contract as on the date of TC bid opening. Further, in the price bid, it should be specifically stated regarding each tax whether it is inclusive or exclusive. However, if there is no specific mention of any duties/levies as exclusive in the price bid, it will be presumed to be inclusive if it is applicable as on the date of TC bid opening and will not be paid extra.

(iv) Any variation in statutory taxes within stipulated completion period shall be in the account of CSPTCL.

Tax Beyond contractual completion period: - If the rate of applicable taxes / duties beyond contractual completion period undergoes upward revision, the payment will continue to be made only on the basis of rates prevailing during scheduled completion period. In case the rate of statutory levies undergoes downward revision then the supplies/ work performed beyond contractual completion period will attract reduced rate of taxes.

(v) **Any other new tax: -** If any other tax or duty becomes payable during the completion period of contract, (after TC bid opening) the same shall be paid extra by CSPTCL to the contractor as per actual on submission of documentary evidence, having paid the same as per the rules. However, tax due to increase of Turnover or withdrawal of tax exemption earlier available to the vendor etc. will not be reimbursed.

(vi) The contractor shall be solely responsible for payment of all taxes, duties, license fee etc. if any, for all the equipments and materials covered under this contract to the concerned authority as may be applicable from time to time.

S E C T I O N – II

(GENERAL CONDITIONS OF CONTRACT)

GENERAL CONDITIONS OF CONTRACT FOR INSTALLATION OF CAPACITOR BANK AT EHV SUBSTATIONS

Clause No.	P A R T I C U L A R S
1	Definition of Terms
2	Contract document
3	Variation, additions & omissions
4	Inspection during erection
5	Completion of work
6	Contractors default liabilities
7	Force majeure
8	Rejection of works
9	Extension of time
10	Guarantee period
11	Performance guarantee
12	Terms of payment
13	Liquidated Damage for delay in completion of contract
14	Security Deposit
15	Insurance
16	Inspection of equipments
17	Dispatch instructions
18	Payment due from the contractor
19	Jurisdiction of High Court of Bilaspur
20	Contractors responsibility:
21	Responsibility to rectify loss & damage
22	Non-assignments
23	Certificates not to affect rights of CSPTCL
24	Settlement of dispute
25	Arbitration
26	Laws governing contract
27	Language and measures
28	Correspondence
29	Secrecy
30	Agreement
31	Time schedule & clarifications
32	Safety precautions
33	Engagement of workers by contractor
34	Nature of contract
35	Prices
36	Design of capacitor bank
37	Losses for capacitor bank
38	Issue of structural drawings
39	Variation in weight of structure/earth flats/quantity of equipments
40	Engagements of sub vendors
41	Power and water supply for construction work
42	Award of contract.
43	Storage & shipment of equipment/material
44	Unsatisfactory performance
45	Drawing & literatures
46	Discrepancy with approved drawing
47	Electrical inspector fee
48	Compliance with regulations
49	Full time site engineer
50	EPF code
51	List of vendors
52	Limitatiion of Liability

GENERAL CONDITIONS OF CONTRACT FOR INSTALLATION OF CAPACITOR BANK AT EHV SUBSTATIONS

1. DEFINITION OF TERMS:

In writing this General Condition of Contract, the specification and bill of quantity, the following words shall have the meaning hereby indicated, unless there is something in the subject matter content inconsistent with the subject.

- **"CSPTCL**" shall mean the Chhattisgarh State Power Transmission Company represented through the Executive Director/ Chief Engineer (Procurement & Projects).
- "**The Engineer- in- Charge**" shall mean the Engineer or Engineers authorised by the Chief Engineer (P&P) for the purpose of this contract.
- "**CSPTCL Engineer**" shall mean an Engineering person or personnel authorised by the CSPTCL to supervise and inspect the erection of the sub-station.
- "**The Contractor**" shall mean the successful bidder awarded with the contract or their successors and permitted assigns.
- "**Contract Price"** shall mean the sum named in or calculated in accordance with the provisions of the contract as the contract price.
- "**General Conditions**" shall mean these General Conditions of Contract.
- "**Owner**" shall mean CSPTCL.
- "**Specification**" shall mean the specification annexed to these General Conditions of Contract and shall include the Schedules and drawings attached thereto or issued to the contract as well as all samples and patterns, if any.
- "**Month**" shall mean calendar month.
- "**Writing**": shall include any manuscript, typewritten, printed or other statement reproduced in any visible form whether under seal or under hand.
- **"Date of Tendering"** shall mean the original due date of opening of TC bid.

2. CONTRACT DOCUMENT:

The term "Contract" shall mean and include the General Conditions, specifications, Annexures, drawings, work orders issued against the contract Annexures of price or the final general conditions, any special conditions applying to the particular contract specification and drawings and agreement to be entered into. Terms and conditions not here in defined shall have the same meaning as assigned to them in the Indian Contract Act falling that in CG Act.

3. VARIATION, ADDITIONS & OMISSIONS:

CSPTCL shall have the right to alter, amend, omit, or otherwise vary the quantum of work by notice in writing to the contractor. The contractor shall carry out such variations in accordance with the rates specified in the contract, so far as they may apply.

Item not Included in BoQ:- In case of requirement of material(s) which is not included in the price schedule and rates are not available but mandatory as per site conditions, prior approval of order placing authority should be obtained before using such unscheduled items. The rates of such items shall be finalized by the nominated committee and approved after obtaining competent approval.

4. INSPECTION DURING ERECTION:

The Engineer-in-Charge or his authorised representative(s) shall be entitled at all reasonable times to inspect and supervise and test during erection of sub-stations. Such inspection will not relieve the contractor from their obligations under this contract.

In addition to the routine inspection to be carried out by the Engineer-in-charge, the field officers from Civil, EHT & Testing of the level of Superintending Engineer shall carry out inspection at least once in two months at different stages of construction i.e. marking of civil foundations, excavation, structure erection, breaker & CT PT erection, testing & commissioning. The Senior Engineer from the contractor's side shall be present during such inspection and the guide lines issued by the SEs shall be noted and complied by the contractor. A copy of the inspection note and its compliance shall also be submitted to the ED/CE (Planning & Projects),

If after testing & commissioning, the material is found to be defective, the same shall be replaced free of cost immediately and commissioning charges for equipment will not be paid.

5 COMPLETION OF WORK

It may be noted that the capacitor banks covered under the tender specification are required to be commissioned within a time bound schedule as detailed below.

(a) Supply:-

The delivery of the equipments should be made well in advance so that commissioning of the capacitor bank is ensured within **NINE MONTHS** from the date of issue of order. The period for designing drawing approvals is included in this period. The tenderer should submit the schedule of supply and commissioning of the capacitor bank sub-station wise within 15 days from the date of issue of order to this office.

(b) Civil works:-

The Civil works should be completed in such a manner so as to ensure commissioning of capacitor banks within a period of **NINE MONTHS** from date of order. The CSPTCL will give line out approval in presence of contractor's representative on receipt of intimation from contractor to expedite the work. The lineout will be given on the basis of approved layout drawing which may be got approved after issue of L.O.I.

(c) Erection, testing & commissioning works:-

The Erection, Testing and Commissioning of the equipments should be completed within **NINE MONTHS** from date of order

On completion of erection work of capacitor bank the tenderer shall intimate the Engineer-in-charge. If capacitor bank is not ready for commissioning due to reasons not attributable to the contractor than taking over certificate shall be issued within 15 days from date of readiness of the capacitor bay.

The time for and date of delivery of the stores stipulated in the order shall be deemed to be the essence of the contract. In case of delay in execution of the order, the Board shall either:-

i. Recover from the supplier as agreed Penalty / liquidated damages at the rate mentioned in "Penalty" clause.

ii. Purchase elsewhere on account and at the risk of the supplier, the stores not delivered or other of similar description or;

iii. Cancel the contract.

6. CONTRACTOR'S DEFAULT LIABILITIES:

The CSPTCL may upon written notice of default to the contractor terminate the contract in circumstances detailed here under:-

(I) If, in the judgement of CSPTCL, the contractor fails to

(i) complete the contractual formalities within the time specified in the contract agreement or within the period for which extension has been granted by CSPTCL to the contractor

and / or

(ii) comply with any of the provisions of this contract.

In such case(s) CSPTCL under the provisions of this contract shall take one or more of the following penal actions:-

(a) Terminate the contract
(b) Forfeiture of security deposit, if available or EMD.
(c) Debar the firm for future business with CSPTCL for a period of two years from the date of issue of letter to this effect.
(d) This debarring may be applicable in respect of other Chhattisgarh State Power Companies also as may be decided by their management.

(II) In case the contractor fails to commence the work within the reasonable period as decided by CSPTCL or fails to complete the works within the contractual completion period or the progress is not commensurate with the time period provided for completion of entire capacitor bay or within a period for which extension has been granted by CSPTCL, one or more of following penal actions may be taken by CSPTCL against the contractor.

(a) Terminate the contract.
(b) Forfeiture of security deposit, if available.
(c) Debar the firm for future business with CSPTCL for a period of two years from the date of issue of letter to this effect.
(d) This debarring may be applicable in respect of other Chhattisgarh State Power Companies also as may be decided by their management.
(e) The payment of pending RA bills of the instant contract shall be withheld.
(f) The payment of pending RA bills of the other running contracts shall also be withheld.

(III) In case the work included in the tender is not completed in accordance to relevant clause of the tender "completion of work" and CSPTCL does not terminate the contract, the contractor shall continue to execute the work, in which case he shall liable to CSPTCL for deduction of liquidated damages for delay as per relevant clause of this contract until the Project is completed.

7. FORCE MAJEURE:

The contractor shall not be liable for any liquidated damages penalty for delay or for failure to perform the contract for reasons of FORCE MAJEURE such as acts of God, acts of public enemy, act of Government, cyclones, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes etc provided that the contractor shall within 10 (ten) days from the beginning of such delay notify CSPTCL in writing, the cause of delay. CSPTCL shall verify the facts and grant such extension as facts justify.

8. REJECTION OF WORKS:

In the event of any of the material supplied/work done by the contractor is found defective in material or workmanship or otherwise not in conformity with the requirement of this contract specification, CSPTCL shall either reject the material and/ or work and request the contractor to rectify the same. The contractor on receipt of such notices rectify or replace

the defective material and rectifies the work, free of cost. If the contractor fails to do so the CSPTCL may:

a) At its option replace or rectify such defective materials and/or works and recover the extra cost so involved from the contractor plus fifteen percent from the contractor and/or terminate the contract for balance work/supplies with enforcement of penalty as per contract.
b) Defective materials/workmanship will not be accepted under any conditions and shall be out-rightly rejected without compensation. The contractor shall be liable for any loss/damage sustained by CSPTCL.

9. EXTENSION OF TIME:

If the completion of the sub-station is delayed due to reason beyond the control of the contractor, the contractor shall without delay give notice/intimation to CSPTCL in writing of his claim for an extension of time. CSPTCL on receipt of such notice/ intimation may agree to extend the contract delivery date of the sub-station with or without levy of liquidated damages as may be reasonable but without prejudice to other terms and conditions of the contract.

10. GUARANTEE PERIOD:-

10.1(a) The work done, material/ equipment supplied by the contractor as per the contract specification should be guaranteed for satisfactory operation and against any defect in material and workmanship **for a period of 24 (Twenty Four) months from the date on which the sub-station is taken over.** Any defect noticed during this period should be rectified by the contractor on free of cost basis upon written notice. CSPTCL will arrange 33 KV supply to sub-station within one month from the date of completion of capacitor bay. **If the capacitor bay is taken over in un-energised condition due to non-completion of 33 KV bus then guarantee will be for 30 (Thirty) months from the date of taking over or 24 (Twenty Four) months from the date of energization of capacitor bay whichever is earlier.**

(b) Equipments offered and associated accessories covered under the tender shall be guaranteed for performance and quality for a period of 30 months from the date of receipt at site or 24 months from date of commissioning whichever is earlier.

In case any defect in the equipment / material is found within guarantee period, the same will be replaced / repaired by you on free of cost basis. The replacement / repairing will have to be organized by you expeditiously and preferably within one month's time.

If for the purpose of replacement / repairs, the equipment / material is required to be dispatched to your works, all charges towards transportation / insurance / packing / forwarding will have to be paid by you for to and fro dispatches.

In this connection, please note that the following additional conditions will also be applicable in case any damages / defects are noticed in the equipments or its accessories supplied by you.

i. If the material develops defect within guarantee period after installation at site, for the purpose of replacement / repairs, the same will have to be dismantled and taken out by us. In such cases actual cost of dismantling and replacement of the equipment / material will also be recoverable from you.

ii. In case it is observed that replacement / repairs of equipments or its accessories is not being provided to us within reasonable period and proper response is not received from you, then apart from operating clause of penalty (which provides for imposition of penalty / liquidated damages, risk purchase at your cost and

cancellation of contract) the CSPTCL may also take suitable penal action against the bidder which may include debarring from all future business with the CSPTCL for a period which will be at the discretion of the CSPTCL.

11. PERFORMANCE GUARANTEE:

11.1 After completion of work in all respect and commissioning of capacitor bay and before issue of final taking over certificate by the engineer-in-charge of CSPTCL, contractor shall furnish CSPTCL, following performance bank guarantee from a nationalised/Scheduled Bank in the approved proforma of the CSPTCL for value equivalent to 5% of the contract price (i.e., Supply+Civil+ETC).

11.2 These bank guarantee shall be executed in a stamp paper worth Rs.250/- or any other amount as per the CG state stamp duty act and shall be kept valid for a period exceeding 90 days from completion of original/extended guarantee period of particular equipment as specified in foregoing clause-10 (Guarantee Period) plus six months claim period.

11.3 The bank guarantee mentioned at 11.1 shall be released after successful completion of original/extended guarantee period of particular equipment as specified in foregoing clause-10 (Guarantee Period) and issue of no liability certificate from the Engineer-in-charge of work.

11.4 No interest shall be paid by CSPTCL for the aforesaid Bank Guarantee.
In case of non-performance of the equipment as per the contract specification, the performance Bank Guarantee shall be forfeited.

12. TERMS OF PAYMENT:

12.1 ***After completion of the work, the contractor shall submit its bill within three months from its completion positively.***

The payment on running bills will be allowed in the following manner to relieve the contractor from financial hardship, if any, so as to facilitate him for timely completion of the work.

(A) **SUPPLY:** - The payment against supply of equipments /materials shall be released in the following manner.

i) 70% of the value of equipments/materials supplied, duly verified by Engineer-in-charge at accepted rates shall be paid normally within a month from the date of presentation of bill with required documents stipulated at clause (D) below. The contractor shall present the bill as soon as the equipments/material is supplied, for verification & processing to the Engineer-in-Charge.

ii) 20% of value of equipments/materials shall be released after erection of the corresponding equipment/material normally within a fortnight from the date of presentation of bill, complete in all respect for erection of equipment/material & its due verification by Engineer-in-Charge.

iii) Balance 10% retention amount of the value of equipments/materials shall be released after successful completion of work in all respect and taking over of sub-station by CSPTCL.

(B) **CIVIL**:- The contractor shall present at the end of each calendar month, a bill for the completed civil works during the month. On the basis of accepted rates, 90% of cost of completed civil works duly verified by the Engineer-in-charge shall be released normally within a month from presentation of bill, complete in all respect. Balance 10% retention amount shall be released after successful completion of work and taking over of sub-station by CSPTCL.

(C) **ERECTION, TESTING & COMMISSIONING**: -

The contractor shall present at the end of each calendar month, a bill for the completed Erection, Testing & Commissioning works etc. during the month. On the basis of accepted rates, 90% of cost of completed works duly verified by the Engineer-in-charge shall be released normally within month from presentation of bill, complete in all respect. Balance 10% retention amount shall be released after successful completion of work and taking over of sub-station by CSPTCL.

(D) The contractor shall furnish following documents for claiming the payments:-

(i) Original invoice.
(ii) Material inspection report.
(iii) DI (Dispatch Instruction) issued by ED/CE(Planning & Projects) CSPTCL.
(iv) Original packing list/Delivery challan.

The invoices raised by the vendor should be in the name of contractor and A/c (Name of EHV S/s) CSPTCL.

(E) The payments shall be made through RTGS/NEFT. Please furnish following details :-

(i) Name of Bank and its address.
(ii) Bank A/c Number.
(iii) Bank IFSC Number.
(iv) e-mail ID & mobile number of Principal officer.

(F) The contractor shall also furnish following documents with the first RA bill (Supply or Civil) for claiming the payment:-

(i) Copy of the letter issued by order placing authority, conveying acceptance of indemnity bond towards safe custody of various material/equipments as per **Annexure A-18**.
(ii) Copy of the letter issued by order placing authority, conveying acceptance of PERT chart.

12.2 **ADVANCE PAYMENT**: - If requested by the contractor, CSPTCL may at its option grant an advance payment of maximum 10% of contract value after obtaining approval of competent authority. "The advance shall attract interest at the rate notified by PFC for capital projects of STU's in category under which CSPTCL falls plus a margin of 2%. The interest shall be charged monthly outstanding advance. Presently, CSPTCL is rated as 'A+' by PFC. Accordingly interest shall be charged on monthly outstanding advanced at a rate notified by PFC for capital works of 'A+' category STUS as for CSPTCL at the time of sanction of advance.Separate order shall be issued to this effect. The contractor will furnish an unconditional and irrevocable Bank Guarantee from a Nationalized/Scheduled Bank in favour of CSPTCL for an amount equal to the advance granted plus interest upto the completion period calculated on it. The bank guarantee shall be initially valid till six months (180 days) after expiry of completion period and shall be extended from time to time 180 days as required. This B.G. may be reduced on pro-rata on quarterly basis based on contractor's request. The advance, if granted, shall be recovered from the running bills along with accrued interest as per CSPTCL's terms and conditions which shall be brought in the order for advance payment. The Bank guarantee shall be released on recovery of entire amount of advance granted plus interest.

Procedure for reduction in the Advance Payment Security Guarantee:-

The BG furnished towards advance payment may be considered to be reduced in every three months in case the validity of bank guarantee is more than one year. It should be clearly under stood that reduction in value of advance Bank Guarantee shall not in any way dilute the contractor's responsibilities under the contract including in respect of the facilities for which reduction in the value of securities is allowed.

12.3 **DEDUCTION OF ADVANCE PAYMENT: -** The advance payment with interest accrued on the advance made to the contractor will be adjusted against their running bills. The adjustment of advance will be done from the running bills of the contract

proportionately to the extent of 20% in supply of materials, 20% of civil works and 20% on ETC charges only till the total advance plus interest gets adjusted.

13. LIQUIDATED DAMAGE FOR DELAY IN COMPLETION OF CONTRACT:

13.1 If the contractor fails to perform the work covered under the project, within the completion period specified in the work order or any extension granted thereto, CSPTCL shall recover from the contractor as liquidated damages, a sum of (0.5%) of the total price of Capacitor Bay (Supply, Civil works & ETC works) for each calendar week (or part thereof) for delay of the work covered under the project of this tender. For this purpose, the date of taking over by CSPTCL Engineer-in-charge of EHT works shall be reckoned as the date of completion.

The liquidated damages shall not exceed 5% (FIVE percent) of the total price for completed and uncompleted portion of the Capacitor Bay (supply, Civil & ETC work) of the project.

The payment or deduction of such damages shall not relieve the contractor from obligations to complete the work or from any of other obligations and liability under the contract.

13.2 **Pending rectification works** : The OIC of the work shall intimate the contractor all the defects/ short comings noticed in the capacitor bank within 15 days of the commissioning. The rectification work shall be completed by contractor within three months of issue of such letter. In case of noncompliance of the observations in this time frame by the contractor, the pending works shall be got completed/executed by CSPTCL from other agency(ies) and deduction shall be made from contractor's bill as decided by a committee of officers of CSPTCL.

14. SECURITY DEPOSIT: (Separately for all orders**)**

a. The contractor shall furnish a bank guarantee from a nationalized/scheduled bank for an amount of 10% (ten percent) of the cost of the contract (including GST) as a contract security. This bank guarantee shall be submitted within 30 days of receipt of individual orders and shall be kept valid for a period exceeding the scheduled completion date by two months with claim period of six months

b. In case the project is delayed (running beyond schedule) on any account, the contractor will be required to extend the validity of BG well in advance for atleast for six months or period of expected delay plus six months claim period, whichever is more. This extension in validity will be at contractor's cost only. The validity of the bank guarantee shall be extended on stamp paper worth Rs. 250/- or as per the prevailing legal requirements. Any other amount as per the C.G. State Stamp Duty Act shall be from a Nationalised/ Scheduled Bank in the prescribed form of CSPTCL. No interest shall be paid by CSPTCL on the security deposit. In case of non-fulfilment of contractual obligations by the contractor, the security deposit shall be forfeited.

c. The security deposit will be released only after completion of entire works, issue of No dues certificate from the Executive Engineer in charge of work and after submission of performance B.G.

15. INSURANCE:

15.1 The contractor shall arrange insurance coverage for the materials at his custody and capacitor bay under execution as per the conditions laid down in the relevant clause of the technical specification.

15.2 The contractor shall take up insurance or such other measures of his work force which covers the claim for damage arising under workmen's compensation Act and other applicable State/Central laws. CSPTCL shall not bear any responsibility on this account. The contractor shall insure the entire sub-station during construction and shall kept it insured against loss by theft, destruction or damage by fire, flood, riot, civil commotion,

sabotage or rebellion for the full value of the sub-station from the time of delivery until the S/S is taken over.

The contractor shall ensure following insurances also :-

Workmen compensation insurance	:	This shall protect against claims applicable against workmen's Compensation Act, 1948 (Govt. of India)
Workmen's compensation	:	As per statutory provisions
Employees liability	:	As per statutory provisions

16. INSPECTION OF EQUIPMENTS:-

The pre despatch inspection of the equipments / materials shall be carried out at the works of the manufacturer in accordance with the inspection Plan/schedule, placed at **Annexure A-21** of tender document. The equipment/ material in the scope of CSPTCL shall be inspected by Company's authorised engineer/ agency. The expenses of CSPTCL Engineers for inspection shall be borne by CSPTCL.

The turnkey contractor shall ensure that pre-dispatch inspection for materials are intimated only when the material is completely ready for inspection. On due date of inspection, if it is found that materials are not ready in required quantities or the inspection could not be carried out due to non-availability of requisite calibrated certificate of instrument with the manufacturer, closing of works on scheduled date of inspection, non-availability of sufficient testing material/ handling staff at manufacturer works, etc., all expenditures incurred on deployment of various inspecting official along with a fine of Rs. 50,000/- (Fifty thousand) shall be recovered from the bills of the contractor.

17. DISPATCH INSTRUCTIONS:-

After inspection, the equipment / material shall be despatched to the site only on issue of Despatch Clearance from O/o ED/CE (Planning & Project). **The contractor should ensure that the material is delivered at site stores within 21 days of despatch clearance. In case material is not received within 21 days from date of issue of Dispatch instructions, the material is liable for re-inspection at the cost of contractor**.

The despatch clearance of equipments, structures, C&R panels shall be given on the basis of readiness at site.

i) **Structure :-** D.I. will be issued after completion of respective foundations.

ii) **Equipments :-**D.I. will be issued after the readiness of foundations and structural erection is under progress.

The DIs in respect of equipments which are supplied along with the structures and foundation bolts viz. circuit breaker, capacitor banks etc. shall be issued during process of laying of foundation.

However, ED/CE (Planning & Project) may issue dispatch clearance of various equipments/materials based on the assessment of the works, looking to its pace and review of progress of work, various site conditions, urgency of work and other factors like time required for transportation, loading and unloading etc.

TRANSPORTATION: - The contractor shall ensure that all the equipments/ materials required for the project are dispatched to site through vehicles, within their permissible load carrying capacity, sanctioned by Transport Department of state where vehicle is registered

18. PAYMENT DUE FROM THE CONTRACTOR:

All costs of damages for which the contractor is liable to the CSPTCL will be deducted by the CSPTCL from any amount due to the contractor under the contract.

19. JURISDICTION OF THE HIGH COURT OF BILASPUR:

Suit, if any, arising out of this contract shall be filed by either party in a Court of Law at Raipur within the jurisdiction of the High Court of Bilaspur.

20. CONTRACTOR'S RESPONSIBILITY:

Notwithstanding anything mentioned in the specification or subsequent approval or acceptance of the capacitor bay by CSPTCL, the ultimate responsibility for satisfactory performance of the capacitor bank bay shall rest with the contractor.

21. RESPONSIBILITY TO RECTIFY THE LOSS AND DAMAGE:

If any loss or damage happens to the work or any part thereof or materials/ plant/equipments during storage, construction, erection & commissioning, the contractor shall be responsible for the damage / loss and he shall at his own cost shall rectify / repair or replace the same for which the contract may arrange necessary insurance cover at his cost.

22. NON-ASSIGNMENTS:

The contractor shall not assign or transfer the work orders issued as per this contract or any part thereof.

The contractor for ease and expeditious completion of the assigned works, may appoint various agencies/sub-vendors. The intimation for appointment of such agencies/ sub-vendors should be furnished to order placing authorities.

CSPTCL shall not be responsible for payment of any dues to these agencies / sub-vendors appointed by the contractor and also default of any statutory requirement.

23. CERTIFICATES NOT TO AFFECT RIGHTS OF CSPTCL:

The issuance of any certificate by CSPTCL or any extension of time granted by CSPTCL shall not prejudice the rights of CSPTCL in terms of the contract nor shall this relieve the contractor of his obligations for due performance of the contract.

24. SETTLEMENT OF DISPUTES:

24.1 Except as otherwise specifically provided in the contract, all disputes concerning question of fact arising under the contract shall be decided by CSPTCL provided a written appeal by the contractor is made to CSPTCL. The decision of CSPTCL shall be final to the parties hereto.

24.2 Any disputes or difference including those considered as such by only one of the parties arising out of or in connection with this contract shall be to the extent possible be settled amicably between parties. If amicable settlement cannot be reached then all disputes/issues shall be settled by Arbitration as provided in this contract.

25. ARBITRATION:

i. No dispute or difference arising between the contractor and CSPTCL under or relating to or in connection with the Contract shall be referred to Arbitration unless an attempt has first been made to settle the same amicably.

ii. Where any dispute is not resolved amicably then such dispute shall be referred to & settled by Arbitration under and in accordance with the provisions of Arbitration and Conciliation Act 1996 and any statutory modification thereof, by three Arbitrators. One to be appointed by each party and the third to be appointed by the two Arbitrators appointed by the parties at the commencement of Arbitration proceedings and failing agreement between them, in accordance with said Act, the third Arbitrator so appointed shall act as the presiding arbitrator. The award shall be final and binding upon the parties. The venue of Arbitration shall be Raipur.

iii. The language of the arbitration proceedings and of all documents and communications between the parties shall be English. Arbitration award shall be speaking, final and binding.

iv. Not withstanding anything to the contrary contained herein the work under the Contract shall continue during the pendency of any disputes or differences in Arbitration proceedings and no payment due from CSPTCL shall be withheld on account of such proceedings except to the extent which may be in dispute and CSPTCL shall be entitled to make recoveries of amounts, if any, due from the Contactor, as per the provisions of the Contract.

26. LAWS GOVERNING CONTRACT:

The contract shall be governed according to and subject to the Laws of India and jurisdiction of the High Court of Bilaspur & Civil Court at Raipur.

27. LANGUAGE AND MEASURES:

All documents pertaining to the Contract including specifications, Annexures / schedules, notice correspondence, operating and maintenance instructions, drawings or any other writings shall be written in English language. The metric system of measurement shall be used exclusively in this contract.

28 CORRESPONDENCE:

28.1 Any notice to the contractor under the terms of the contract shall be served by registered mail or by hand to the authorised local representative of the contractor and copy by post to the contractor's place of business.

28.2 Any notice to CSPTCL shall be served to the Chief Engineer (P&P), CSPTCL, Dangania, Raipur in same manner.

29. SECRECY:

The contractor shall treat the details of the specification and other documents as private and confidential and they shall not be reproduced without written authorisation from CSPTCL.

30. AGREEMENT:

The successful bidder shall have to enter into an agreement with the ED/C.E. (Planning & Project) in the approved contract agreement form latest within 15 days of the receipt of the work order for contruction of 132KV S/s and Transmission line (hereby reffered as project).

31. TIME SCHEDULE & CLARIFICATIONS: -

a) It is necessary that the tender documents are read by Bidders carefully and clarifications, if any, required before furnishing of tenders is promptly obtained. For any delay in this regard, Company will not be responsible and any request for extension of due date will not be entertained.

b) In case, the specification for the same item/material/work are noticed to be different in two schedules, the contractor should ask clarification before submitting the tender, otherwise whatever is beneficial to CSPTCL shall be considered and decision of CSPTCL shall be final in this regard.

32. SAFETY PRECAUTIONS:

The contractor shall strictly follow, at all stages of erection of steel structures, the stipulations contained in the latest editions of IS-7205 "Indian Standard Safety code for erection of structural steel work".

33. ENGAGEMENT OF WORKERS BY CONTRACTOR:-

a) The contractor shall at his own expense provide or arrange for the provision of footwear for labour doing cement mixing work which the contractor has undertaken to execute under this contract to the satisfaction of Engineer-in-charge.

b) The contractor shall submit a statement to the Engineer-in-charge showing:-
   1. Number of Labours employed by him on the work
   2. Their working hours
   3. The wages paid to them, and
   4. The accidents that occurred during the working period of which information required stating the circumstances under which they occurred and the extent of damage and injury caused by them. The contractor should intimate all concerned about any accident & take immediate actions as governed by Rules.

   Failure to supply such information or supplying materially incorrect statements may amount to breach of contract. The decision of the Engineer-in-charge shall be determining whether a breach has taken place.

c) In respect of all labourers employed in the works, the contractor shall comply-with all the rules framed by the Government from time to time for the protection of Health and Sanitary arrangement of the workers.

d) The contractor who is awarded the work should engage maximum number of labour belonging of CG State. Further, for skilled working in EHV S/S and transmission lines viz; erection of structures, stringing work etc. Contractor should arrange training of the labours engaged from CG state from time to time to ensure skill development in them. Intimation regarding total number of labours engaged for various works & number of labours from CG state should be given to OIC & order placing authority every month.

34. NATURE OF CONTRACT:-

Notwithstanding anything stated elsewhere in the bid document, the contract to be entered will be treated as divisible in Supply, Civil works and Erection, Testing & Commissioning contract award shall be placed on successful bidder as follows:-

1. Supply of 33 K.V. substation equipments, C&R Panels, conductors, hardware etc. & other accessories, Supply of G.I. steel structures.
2. Civil Works.
3. Erection of equipments & structure, Testing & commissioning charges.

All the 3 contracts will contain interlinking cross fall breach clause specifying that breach of one contract will constitute breach of other contracts also. The tender will be considered as In-divisible composite Works Contract in totality.

35. PRICES:-

35.1 The quoted price should be kept valid till the completion of the project. Bidders are requested to quote price only in the prescribed formats showing Ex-works price/unit rate and GST.

The prices for the following equipments shall be variable on the basis of Price Variation formula prescribed by IEEMA as per latest IEEMA circular, with base indices as issued by IEEMA in its circular one month prior to the due date of opening of TC bid. In case of extension of due date, the base date for working out the price variation shall be calculated as per the original due date of opening of TC bid.

(i) 33 KV Current Transformer.
(ii) 33 KV Isolators.
(iii) 33 KV LA
(iv) 33 KV VCB
(v) All GI structures.

For all other equipments / materials prices should be offered on FIRM basis.
The prevailing price variation formulas prescribed by IEEMA for instrument transformer, isolators & switchgear, Lighting arrestor , GI structures are enclosed in the Annexure PV-1 to PV-4.
In case IEEMA notifies either modification in prevailing formula or new formula for these equipments within contractual completion period, the price variation shall be applicable as per revised IEEMA PV Formula and guidelines issued by IEEMA in this regard.
The payment shall initially be done on the basis of base rate offered by bidder subject to price adjustment to reflect changes in the cost. **Price variation shall be applicable for ex-works component only.**
The price adjustment shall be invoked by either party subject to the following further conditions:-

a. For calculation of Price adjustment, date of notification regarding readiness of equipment/material for inspection at the works of the manufacturer, shall be reckoned as the "date of delivery". In case of delay of project beyond the scheduled date of completion, price variation up to scheduled completion period or actual date of delivery, whichever is advantageous to CSPTCL, shall be considered. CSPTCL shall be entitled to any decrease in the price which may be caused due to lower price adjustment amount in case of delivery beyond scheduled completion period, therefore, in case of delivery of equipments beyond the scheduled completion period, the liability of CSPTCL shall be limited to the lower of the price adjustment amount which may be worked out either on scheduled completion date or actual date of delivery (inspection).

b. If price adjustment works out to be positive the same is payable to the contractor by CSPTCL and if it works out to be negative, the same is to be recovered by CSPTCL from the contractor.

c. The contractor shall submit price adjustment invoices for supplies **positively within 6 (Six) months from date of supply of equipment/material**, whether positive or negative. The price adjustment bills for supply of equipment/material submitted after six months (from the date of supply) shall not be entertained. However, negative variations shall be recoverable.

   The invoices should be supported with calculation of price variation along with documentary evidence of different indices applicable for price adjustment. Payment of price adjustment invoices shall be made after due verification, as follows:-

   (i) 90% of the price adjustment for respective equipment shall be paid after verification of invoices & receipt of material.

   (ii) Balance 10% amount shall be paid after successful commissioning and handing over of capacitor bank bay.

35.2 The quoted prices should be clearly mentioning Ex-Works Price and GST making total unit price chargeable for the items quoted. Packing, forwarding & Freight charges (inclusive of insurance) should be quoted separately in the relevant columns. The freight shall be on FIRM basis irrespective of whether the ex-works prices are firm or variable. The total F.O.R. destination price should also be quoted in relevant column.

It may please be noted that statutory variations due to Govt. Regulation in the rate of GST shall be permitted by CSPTCL only within contractual completion period. In case supplies against the contract are affected late i.e. beyond contractual completion period and rate of GST undergoes upward revision, the payment will continue to be made only on the basis of rates prevailing during the contractual completion period. However, in case the rate of

statutory levies undergoes downwards revision than the delayed supplies beyond contractual completion period will attract reduced rate of levies/ GST.

35.3 The prices of standard and reputed manufacturer items in accordance with vendor list shall be quoted so that quality assurance and performance of equipments are guaranteed in future.

36. DESIGN OF CAPACITOR BANK :-

The contractor is required to submit the design & plan layout for 36 KV capacitor bay as per existing sub-station adjoining bay equipment arrangements of the substation and SLD as per tender specification. All steel structures of 33 KV equipment structure except capacitor bank & VCB shall be as per design & drawing of CSPTCL. The weight of steel structure shall be as per tender document. The successful bidder shall be provided two sets of CSPTCL approved drawing of structures for above purpose. Equipment & structures should be offered according to the tentative layout. The layout should take into consideration the Indian Electricity Rules, incorporating latest amendments, regarding ground clearances, sectional clearances and inter-phase clearances. Civil foundation, Equipment & structure should be offered accordingly to approved layout requirements.

37. LOSSES FOR CAPACITOR BANK :-

i For comparison of offers, capitalization on account of differential losses of capacitor bank quoted by the bidder in their offer shall be done @ Rs. **5**,**08,908** /- per KW & evaluation shall be on the basis of differential prices. The permissible losses in Kilowatt at rated voltage and rated frequency shall be between 0.18 W/KVAR to 0.2 W/KVAR. The minimum value (0.18 W/KVAR) shall be taken as base value and the difference between base value & that quoted by a particular bidder shall be considered as differential loss. Capacitor bank losses at 50º Celsius should be offered.

In case losses higher than the upper limit of 0.2W/KVAR is offered, the bid shall be outrightly rejected without any further correspondance in the matter.

ii. The losses in kilowatts at rated voltage & rated frequency shall be guaranteed under penalty for each capacitor unit & series reactor. For the purpose of penalty computation, the test figures of losses will be compared with the corresponding guaranteed figures.

iii. The penalties shall be separately evaluated from the excess of the test figures of losses in KW. Over the corresponding guaranteed value. No tolerance shall be permitted over the test figures of the losses.

iv. The penalties shall be calculated for the excess of losses at the rate of Rs. **5,08,908 /-**per KW. For the fraction of kilowatt, the penalty shall be applied pro-rata. If the test figures of losses are less than the guaranteed values, no bonus will be allowed,

v. If the losses in the capacitor and series reactor obtained during testing is more than the values as specified permitted in the specification then the equipments are liable to be rejected

vi. CSPTCL's decision in such cases shall be final.

38. **ISSUE OF STRUCTURAL DRAWINGS:-** The structural drawings shall be issued to L-1 bidder by ED/CE (Planning & Projects). Since designing is in the scope of contractor, it is the sole responsibility of the contractor for –

i) Observing all the required clearances (phase to phase, phase to earth, sectional clearances & ground clearances) as per tender specifications.

ii) Calculation of force at all the joints/sections and their load carrying capacity as per the tender specification.

iii) In case the structures do not comply with points (i & ii) given above, the contractor shall have to modify/replace the structure as the case may be and acceptable to CSPTCL without any cost implication.
If any modification required the same should be submitted for prior approval from this office.

39.(a) **VARIATION IN QUANTITY OF STRUCTURES/ WEIGHT OF EARTH FLATS ETC**:-
Since the weight of flats for earthing have been worked out by CSPTCL and unit rates have been quoted by the bidder; if during actual execution the weight of earth flats varies, the bidder will be paid the extra charges/ less charges due to increase/decrease in weight.
Since the design of structures are being provided by CSPTCL & the quantity of the structures with standard weight have been worked out by CSPTCL and unit rates have been quoted by the bidder; if during actual execution the weight of any structure varies, the bidder will be paid on the basis of actual weight subject to maximum weight of the structures as per standard weight (with tolerance of 2%) as stipulated in clause 9.3, of this tender specification.

(b) **VARIATION IN QUANTITY OF EQUIPMENTS:** - In the event of revision of *quantity* on completion of project, total ordered value of supply of material, civil works and erection charges of Capacitor bay for complete project under this tender shall be worked out with the unit rates of L-2 bidder. In case the total value when calculated with unit rate of L-2 bidder is found lower than the revised value of order value, the total payment shall be limited to the lower of the two. This condition may be kept in view while quoting the rates.

40. ENGAGEMENT OF SUB-VENDORS – CLEARANCE OF THEIR DUES AND OBSERVANCE OF INDUSTRIAL/ LABOUR LAW.

1) The contractor shall furnish list of various agencies/sub-vendors proposed to be engaged for execution of different type of works under scope of this contract to the ED/CE (C&LM), CE (Civil) CSPTCL, Raipur and concerned Engineer-in-charge.

2) Wages and fringe benefits according to the Labour Law / Industrial Law and fixed by concerned District Collectorate as in force during the execution of the work shall have to be paid by contractor or his appointed sub-vendor. It shall be the sole responsibility of the main contractor for observing the prevailing laws and contractor shall be abided for such statutory requirements absolving CSPTCL fully in case of any dispute, if so arises. Notwithstanding above, CSPTCL reserves the right to make direct payment to the sub-vendors/sub-contractor in case of failure of the main contractor to do so within a reasonable time period on whatever ground and deduct from the bills due to the Contractor under this contract or any other contract with CSPTCL including his amount of performance / security for adjusting the aforesaid payment.

3) The termination/completion of the sub-vendor's job shall be informed to CSPTCL promptly. The contractor shall furnish a statement to the effect that all the dues of all sub-vendors/other agencies engaged by him for the execution of the contract have been fully cleared. The B.G. shall be released only after submission of the aforesaid statement to CSPTCL.

4) The contractor shall observe Labour Law/Industrial Law and Wages Law strictly with regard to payment and fringe benefits to be delivered to the labourers/workers engaged by the Contractor or his sub-vendor. It shall be the sole responsibility of main contractor for arranging due insurance of personnel / materials to meet out any exigencies. It shall be the sole responsibility of main contractor for observing all the prevailing Laws and CSPTCL shall not be held responsible for any liability / disputes or claim in any way if arises due to

non-observance of such Laws. However, the decision of Honourable District Court / appropriate court of law shall be final and binding on CSPTCL, Contractor and sub-vendor in case of any dispute.

41. POWER & WATER SUPPLY FOR CONSTRUCTION WORK:

For providing power supply required for construction, erection, testing & commissioning work, CSPTCL shall extend supply. However, the connection required for availing supply shall be arranged by the contractor at its own cost.

42. AWARD OF CONTRACT:-

The contract will be awarded to the successful bidder, (also referred as L-1 bidder), whose bid has been evaluated to be the lowest. However, CSPTCL reserves its right to accept or reject any or all the offers, in part or full, without assigning any reason whatsoever.

43. (A) STORAGE, SHIPMENT OF EQUIPMENT/MATERIAL:-

The indoor equipments received at site for the work under execution has to be stored under a temporary shed in proper manner so as to avoid entry of rain water, flood water and safe from theft & fire hazards etc. The outdoor equipments can be stored in open space free from water logging and fire hazard The Executing Division of the work to ensure that the bill raised by the contractor is passed only after storage of the equipments in proper manner. The site of the store shall be selected in consultation with engineer in charge of the work, in no way the store area shall create obstacles for construction of main switch yard. DI of materials shall be issued by this office only after getting confirmation of construction of storage shed from engineer-in-charge.

Materials /equipment has to be transported in proper manner with suitable package /cartoon to protect the equipment from damages due to injury during transportation.

(B) SUBMISSION OF INDEMNITY BOND TOWARDS SAFE CUSTODY OF EQUIPMENT/ MATERIAL:-

The contractor shall submit indemnity bond (as per **Annexure A-18**) towards safe custody of various material/equipments equivalent to cost of material provided in price schedule of supply order, indemnifying CSPTCL towards loss and damages if any. This bond shall be valid till contractual completion period or actual completion period whichever is later.

44. UNSATISFACTORY PERFORMANCE:

The bidder(s) who have been debarred/ blacklisted for future business with CSPTCL/ or any other successor power companies of erstwhile CSEB, or found to violate any provision(s) contained in the tender document during any stage of bid or during pre-contract stage, their bid shall not be considered for further evaluation and the bidder can be disqualified from tender process or the contract, if already awarded, can be terminated for such reason.

45. DRAWING & LITERATURES:-

The contractor is required to submit 06 sets of drawings for approval before execution of the work. The contractor is also required to submit 06 sets of **as built** drawings before handing over capacitor bay of the existing Sub-station to CSPTCL.

46. DISCREPANCY WITH APPROVED DRAWING:-

The suppliers are required to submit the drawings of the equipments/structures/T&P and all other materials strictly as per tender specifications. However, after approval of drawing, at a later stage, if it is detected that due to incorrect/incomplete/partially matching drawing with the tender specifications or due to any other reason the items actually supplied do not fulfil the requirements as per tender specifications the whole lot shall be liable for rejection unless the deviation is specifically approved by ED/CE (Planning & Project).

47. ELECTRICAL INSPECTOR FEE:-

All pre-commissioning tests on equipment shall be carried out by the contractor. Commissioning of the equipments shall be carried out after receipt of clearance from the engineer-in-charge and Chief Electrical Inspector. Payment of statutory Electrical Inspector Fees and filing of papers of such inspection shall be done by the contractor. All other materials required for erection, testing, and commissioning shall be supplied by the contractor at his own cost. Services of commissioning engineer wherever required would be on the contractor's account.

48. COMPLIANCE WITH REGULATIONS:-

Unless other wise specified all works shall be carried out in accordance with the Indian Electricity Rules 2003 OR revision thereof which may be issued during the period of contract.

49. FULL TIME SITE ENGINEER:-

Immediately on award of contract and handing over of the site, the contractor shall nominate one experienced site engineer having at least 3 years experience of similar work for each capacitor bank bay, who will be stationed near the substation site. The site engineer will execute all the works related to this capacitor bank bay on a full time basis. Various activities are required to be carried out including preparation of layout plan, fixing of levels etc. It is noted that some of the bidders have undertaken 2-3 projects but are carrying on with one site engineer only with the result that for achieving progress at one site, the works are delayed at other sites. Therefore, full time site engineer for each substation is a must. After award of the contract, the firm shall immediately inform CSPTCL about nomination of a full time site engineer and his contact numbers who will be approachable to CSPTCL for all works related to the capacitor bank bay at existing substation.

50. E.P.F. CODE:

The contractor shall submit EPF code allotted by EPF Commissioner to the Engineer-in-charge of the work.

51. LIST OF VENDORS:

All the equipments/materials required for construction of the of 36 KV,12 MVAR Capacitor Bays at existing EHV sub-stations shall be supplied strictly as per the "list of vendors" indicated in Section-V of this tender document TR-21/04. This vendor list can also be viewed on CSPTCL's official web-site. The vendor list as on date of issue of NIT shall be applicable for instant tender. Any deviation in the vendor list shall be permitted during execution of the project only in exceptional cases with prior approval of CSPTCL. The equipments/ materials which are not covered in this vendor list shall be of reputed make with prior approval of CSPTCL.

52. LIMITATIION OF LIABILITY

Except in cases of gross negligence or willful misconduct,

(a) the Contractor and CSPTCL shall not be liable to the other party for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Contractor to pay liquidated damages to the CSPTCL
and

(b) the aggregate liability of the Contractor to CSPTCL, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the Contractor to indemnify CSPTCL with respect to patent infringement.

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SECTION-III

Price Bid Annexures

PRICE BID ANNEXURE B-1
PRICE BID OF EQUIPMENTS FOR 1 X 12 MVAR, 36 KV CAPACITOR BANK BAY

S. No.	Particular	Unit	Qty. For total capacitor banks	Unit rate (Ex-works Price)	Package, Freight & insurance	Total Unit Rate = 5+6	GST @ 18% on Sl.No.7	Total Unit Rate (FORD) = 7+8	Total Amount = Sl. No.4x Sl.No.9
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
(A)	**SWITCH YARD EQUIPMENTS**								
1	33KV Vacuum Circuit Breaker with Structure & clamps complete.	No.	24						
2	33 KV Curent Transformer of ratio 400-200/1-1-1 Amp with terminal clamps.	Set	72						
3	33 KV Lightning Arrester with terminal clamps.	No.	72						
4	33 KV Isolator without earth Switch 1200 Amp (with insulators & clamps complete)	No.	24						
5	33 KV, 10 MVAR Capacitor Bank (72 units + 8 spare), series reactor and NCT of ratio 10-5/1-1 Amp. complete with structures, connecting strips and terminal clamp etc.	Set	24						
6	Control & Relay panel for 36 KV, 12 MVAR capacitor bank simplex type for control of single capacitor bank bay	No.	22						
7	Control & Relay panel for 36 KV, 12 MVAR capacitor bank duplex type for control of two number capacitor bank bay	No.	2						

Note :-

01. Please indicate ex-works price, Package freight & insurance and GST in respective columns
02. Cess under B&OCWA: - Applicable cess @ 1% shall be deducted from each bill.
03. ***Bidders are requested to go through the tender specification before quoting the rate***

Signature of the Bidder

PRICE BID ANNEXURE B-2
CONDUCTOR, CLAMPS, CONNECTORS & EARTHING MATERIAL
FOR 12 MVAR, 36 KV CAPACITOR BANK BAY

S. No.	Particular	Unit	Qty For total capacitor banks .	Unit rate (Ex-works Price)	Package, Freight & insurance	Total Unit Rate = 5+6	GST @ 18% on Sl.No.7	Total Unit Rate (FORD) = 7+8	Total Amount = Sl. No.4x Sl.No.9
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1	ACSR Zebra Conductor	Km	1.0						
2	Steel support for cable trays size 50x50x6mm	MT	1.0						
3	GI Cable Trays – 300 m.m. size	Mtr.	200						
4	G.I. Nuts & Bolts of assorted sizes	MT	1.0						
5	Double Zebra to Single Zebra 'T' Clamp	Nos.	60						
6	Single Zebra to Zebra 'T' Clamp	Nos.	12						
7	Earth wire bond	Nos.	24						
8	G.I. Flats of size 65 x 8 mm for earthmat	MT	19.0						
9	G.I. Flats for riser 50 x 6 mm	MT	2.5						
10	G.I. Earth Spikes-25 mm Dia./2500 mm length	Nos.	120						

Note :-

01. Please indicate ex-works price, Package freight & insurance and GST in respective columns
02. Cess under B&OCWA: - Applicable cess @ 1% shall be deducted from each bill.
03. ***Bidders are requested to go through the tender specification before quoting the rate***

Signature of the Bidder

PRICE BID ANNEXURE B-3
PRICE BID OF GI STRUCTURES, CONTROL & POWER CABLE
FOR 12 MVAR, 36 KV CAPACITOR BANK BAY

S. No.	Particular	Unit	Per structure weight (MT)	Total Weight (MT)	Unit rate (Ex-works Price)	Unit Package, Freight & insurance	Total Unit Rate = 5+6	GST @ 18% on Sl.No.7	Total Unit Rate (FORD) = 7+8	Total Amount = Sl. No.5 x Sl.No.10
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
(a)	**GI Structures (including F.B.) For**									
1	33 KV CT (T type structure for 3 phase)	MT	0.218	**5.232**						
2	33 KV LA (T type structure for 3 phase)	MT	0.262	**6.288**						
3	33 KV Isolator without earth switch	MT	0.345	**8.28**						
(b)	**Unarmoured copper Control cables with numbered core:-**									
1.	2 C, 2.5sq. mm	Km	-	8.5						
2.	4 C, 2.5 sq. Mm	Km	-	17						
3.	8 C, 2.5 sq. Mm	Km	-	17						
4.	12 C, 2.5 sq. Mm	Km	-	8.5						
5.	19 C, 2.5sq. mm	Km	-	8.5						
(c)	CT Junction Box with 24 Disconnecting type Connectors with 20% extra connector.	No.	-	24						

Note:-

01. Please indicate ex-works price, Package freight & insurance and GST in respective columns.
02. Cess under B&OCWA :- Applicable cess @ 1% shall be deducted from each bill..
03. Bidders are requested to go through the tender specification before quoting the rates

Signature of the Bidder

PRICE BID ANNEXURE C-1
PRICE BID FOR CIVIL WORKS OF CAPACITOR BANK
FOR 1 X 12 MVAR, 36 KV CAPACITOR BANK BAY

S. No.	Particular	Unit	Qty. Per capacitor bank	Qty. for total capacitor banks	Unit rate (Ex-works Price)	GST @ 18% on Sl.No.5	Total Unit Rate (FORD) = 5+6	Total Amount = Sl. No.5x Sl.No.8
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
	Switch yard works :-							
1.	Yard levelling of area concerned to capacitor bank bay for 1x10 MVAR							
(A)	Yard levelling upto required level through cutting in soil & disposal of excavated material in filling area of switch yard or as directed by Engineer in charge with all leads and lifts, with all labour, material, T&P, transportation, stacking, spreading, compaction by mechanical means, dressing etc. complete in all respect including applying approved herbicides in entire area, providing required drains etc. as per site condition specifications, direction & approval of engineer in charge of CSPTCL. (The material obtained from cutting shall be used for filling of low lying area of switchyard with proper compaction at OMC using vibratory plate compactor etc. and rates shall be quoted considering this factor).	Cu.M	10	240				
(B)	Providing, stacking, spreading and compacting with stone dust/ sand of 100 mm compacted thickness in the yard area including all transportation, loading and unloading at site all material, labour, royalty ,taxes etc. complete as per specifications, direction and approval of engineer in charge of CSPTCL.	Cu.M	15.32	367.68				
(C)	Yard metalling with 40 mm nominal single size ungraded crusher broken hard metal 100 mm thick including providing,	Cu.M	14.10	338.40				

	stacking, spreading of metal, all transportation loading and unloading, screening at site all material labour, royalty, taxes etc. complete as per specifications, direction and approval of Engineer-In-Charge of CSPTCL. Size of bay (8x -----)							
2.	Foundation of 33 KV VCB	No	1	24				
3.	Foundation of 33 KV CT	No	1	24				
4.	33KV Isolator Foundation	No	1	24				
5.	Foundation of 33 KV, 10 MVAR, Capacitor Bank including foundation of NCT & series reactor.	Set	1	24				
6.	Foundation for 33 KV L.A	No	1	24				
7.	**External cable trench**							
	Y-1 Type Buried Cable Trench							
	Width x Depth=200 mm.x 500 mm direct buried type cable trench as per tender specification and approved drawings, direction and approval of Engineer –In-Charge of CSPTCL contructed as indicated in technical specifications for civil works.	RM	07					
	Y2 type RCC branch cable trench Width x Depth=325 mm.x 305 mm with GI cable of 300 mm width supported on HDG angles at height of 150 mm from bottom of trench shall be provided . M.S. angles of min. size 50x50x6 @ 500mm c/c shall be suitable embedded into cable trench walls to support cable trays. Cable trench covers shall be doubly reinforced R.C.C. covers as per approved drawings, specifications, direction and approval of Engineer –In-Charge of CSPTCL.	RM	08					

NOTE:-

1) Please indicate Unit rate and GST in respective columns
2) Cess under B&OCWA: - Applicable cess @ 1% shall be deducted from each bill.
3) **The bidder is requested to visit the site before quoting the rates.** The rates should be offered considering all the requirements as per site conditions. Please note that no extra claim for any other work not explicitly covered in bill of quantity but required to complete the capacitor bay in all respects shall be given by CSPTCL in addition to the rates quoted in the Price Bid.
4) Rates should be quoted for each foundation separately. **Rates should not be quoted in LOT**.
5) The Quantity shown above may vary as per site conditions. The payment shall be done on actual measurement basis.
6) Standard Civil foundation drawings of 33 KV current transformer, LAand isolator for capacitor bay are enclosed in tender.
7) The soil from excavation of foundation, cable trenches etc. if used for yard levelling (with proper compaction at OMC using vibratory plate compactor) as per direction of Engineer-in-Charge, no extra payment shall be admissible. The soil so used shall be adjusted in the quantity for levelling. If the excavated material is not usable, then same shall be disposed off as per direction of Engineer-in-charge for which no extra payment shall be made.

Signature & seal of tenderer

PRICE BID ANNEXURE D-1
ERECTION CHARGES FOR CONSTRUCTION OF
1 X 12 MVAR, 36 KV CAPACITOR BANK BAY

S. No.	Particular	Unit	Qty.	Unit rate (Ex-works Price)	GST @ 18% on Sl.No.5	Total Unit Rate (FORD) = 5+6	Total Amount = Sl. No.4x Sl.No.7
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Stringing of conductor along with clamps, jumpering, spacers, droppers etc.						
	1) Single zebra ACSR	RM	1000				
2	33KV Vaccum Circuit Breaker with Structure	No	24				
3	Rate for erection of 36KV, 12MVAR Capacitor bank with its structure and associated equipments complete (capacitor+reactor+NCT)	Set	24				
4	Rate for erection of 33KV Lighting Arrestor including all accessories & making all connections etc.	No	72				
5	Rate for erection of 33KV Isolator without Earth Switch	No	24				
6	Rate for erection of 33KV Control & Relay Panel for Capacitor Bank	No	24				
7	Rate for erection of 33 KV Current Transformer & fixing of Junction Box (24 Connectors) including all accessories & making all connections etc.	No	72				
8	Installation & fitting of perforated type GI cable Trays over the steel support of min. size 50x50x6 @ 500 mm c/c suitably embedded in cable trench walls to support cable trays, accessories on cable racks in cable trenches **per capacitor bank**.	1 Job for each capacitor bank	24				
9	**Cable Installations:-** Laying of all types of control & power cables on racks/cable trays/GI conduit pipes, dressing of cables & all accessories for armoured control cables.	1 Job for each capacitor bank	24				

	Cable termination's including fixing of cable glands, lugs for control/ power cables & cable numbering tags **per capacitor bank**.						
10	**Earthing Installations:** Rates for installations including jointing equipment termination, fixing & clamping & hardware's such as saddle, clamps, cleats, plugs, nut-bolts washers & welding etc.						
	1. 25 mm X 2500 mm G.I. rods, earth electrodes directly driven in to earth including excavations as required & welding etc.	No	120				
	2. Providing Steel risers including welding to the earth mat at one end & bolting to the structures at the other end for 50 x 6 mm G.I. flats.	RM	1050				
	3. Providing earth mat of 65x8 mm GI flats duly buried in earth (min 600 mm deep) with welding with existing earth mat complete.	RM	4650				

Note	01. Please indicate Unit rate and GST in respective columns
	02. Cess under B&OCWA :- Applicable cess @ 1% shall be deducted from each bill.
	03. Earth mat of 65X8 mm GI Flats shall be extension of existing substation earth mat and welded as per existing earth mat configuration.

PRICE BID ANNEXURE D-2
TESTING & COMMISSIONING CHARGES FOR CONSTRUCTION OF 1 X 12 MVAR, 36 KV CAPACITOR BANK BAY

S. No.	Particular	Unit	Qty.	Unit rate (Ex-works Price)	GST @ 18% on Sl.No.5	Total Unit Rate (FORD) = 5+6	Total Amount = Sl. No.4x Sl.No.7
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	33 KV VCB's complete	Set	24				
2	33 KV, 10 MVAR, Capacitor Bank complete with associated equipments (Capacitor + reactor + NCT etc)	Set	24				
3	33 KV Current Transformer complete	Nos.	72				
4	33 KV Lightning Arresters complete	Nos.	72				
5	33 KV Isolator with insulator without earth switch complete	Set	24				
6	33 KV Control & Relay Panel for Capacitor bank	Set	24				

Note 01. Please indicate Unit rate and GST in respective columns
02. Cess under B&OCWA :- Applicable cess @ 1% shall be deducted from each bill.

Signature of bidder

SECTION- IV

Annexures, Schedules & Forms

ANNEXURE – A-1

GENERAL INFORMATIONS TO BE FURNISHED BY BIDDERS

The bidders shall furnish General information of their firm in the following format:-

1. Name of the Firm
2. Head Office address
3. GST Registration No.
4. Contact Person
5. Mobile No. of contact person
6. Telephone No. Office
7. Telephone No. Residence
8. Fax No.
9. E-mail:-
10. Place of incorporation / Region
11. Year of incorporation / Region

Date
Place

SIGNATURE OF BIDDER
NAME
DESIGNATION
(SEAL)

ANNEXURE – A-2

DECLARATION FORM

Tender specification No. TR-21/04

To,

Sir,

1. Having examined the above specification together with tender conditions referred to therein. I/We the undersigned hereby offer to execute the work contract covered therein complete in all respect as per the specification and general conditions, at the rates entered in the attached contract Annexure – of prices in the tender. Our offer is valid upto 180 days from the date of tender opening and the prices, which are on firm basis, will remain valid till the completion of the work.

2. I/We hereby undertake to have the works completed within the time specified in the tender.

3. I/We certify to have purchased a copy of the Specification by remitting cash demand draft and this has been acknowledged by you in your letter no. _____ dtd. _____.

4. In the event of work order being decided in my/our favour, I/We agree to furnish the Bank Guarantee in the manner acceptable to CSPTCL and for the sum as applicable to me/us as provided in the General conditions of contract (Section-II) of this specification within 30 days of issue of work order, failing which I/We clearly understand that the said work order will be liable to be withdrawn by CSPTCL.

Signed this ____ day of _____2021.

Yours faithfully,

Date SIGNATURE OF BIDDER

Place NAME

DESIGNATION

(SEAL)

(*This form should be duly filled up by the bidder & submitted along with the original copy of tender*.)

ANNEXURE – A-3

QUESTIONNAIRE

TENDER SPECIFICATION TR-21/04 FOR CONSTRUCTION OF 36 KV,12 MVAR CAPACITOR BAYS AT EXISTING EHV SUB-STATIONS OF CSPTCL ON TURNKEY BASIS

Note : The bidders may please note that submission of this questionnaire duly and properly filled in all respect is essential. While in entries against the questions given below, no reference should be made to comments entered elsewhere in the tender. All queries should be answered and these answers should be complete in themselves. Please note that none of the column should be left blank and clear reply against all columns should be furnished. **In case this is not done the offers will be liable for rejection.**

"Bidders to note this to avoid rejection of their bid" : It will be the responsibility of the bidder to make sure that all the documents required as per tender are submtitted along with bid on or before due date of tender. The bid submission date is cut-off date of submission of all the documents required as per tender and every bidder must adhere to this dead line.
However, if any short coming is observed during scrutiny of TC bid, CSPTCL reserves the right to seek required clarifications/documents from bidder by giving them only one chance to submit required documents/ clarifications/confirmations within specified time limit.
If a bidder has quoted 'NIL' deviations in Annexure A-9 (Deviation from technical specification / condition) and Annexure A-10 (Deviation from Commercial conditions of contract), this will have an overriding effect on any other conditions noted as deviations elsewhere in the bid.

1.	Name and address of tenderer. Telephone & fax No.	
2.	Mention GST registration number	
3.	i. Whether you are State or Central Govt. Undertaking/unit with 100% Govt. share. ii.If yes, whether documentary evidence in support of the above has been enclosed. (In absence of documentary evidence your claim to be State/ Central Govt. under-taking shall be ignored.)	Yes/ No
4.	Mention Earnest Money furnished 1. Amount & Bank Draft No. 2. Proof of support of EPM Region/ DGS&D/ NSIC	
5.	Mention Tender cost (amount & DD Number)	
6.	Whether dully filled in check list (Annex. A-22) is enclosed.	Yes/No
7.	Whether the offer is valid for 180 days from the date of opening of commercial/technical bid	Yes/ No
8.	For all equipments & accessories, the price shall be FIRM (except for equipments/structures specified in clause 35 (section-II) of GCC	Yes/ No
9.	a) Confirm that the Ex works price for all supply items for capacitor bays are exclusive of GST	Yes /No
	b) Confirm that the unit rate for all Civil works are exclusive of GST	Yes/ No
	c) Confirm that the unit rate for ET &C and construction works for capacitor bays are exclusive of GST	Yes/ No
	d) All Testing charges for all equipments as per specification are included in the price of equipment.	Yes/ No
10	**Terms of payment** – Whether agreeable to CSPTCL's terms or not?	Yes /No

11	Please confirm that you have noted the responsibility for payment of taxes as stipulated in Section-I of tender doc.	Yes /No
12	Schedule date of completion of work **(9 months)** – Whether agreeable to CSPTCL's terms	Yes/ No
13	Equipment/materials Guarantee Period – Whether agreeable to CSPTCL's terms	Yes/ No
14	Liquidated damages– Whether agreeable to CSPTCL's terms	Yes/ No
15	Whether agreed to guarantee/extended guarantee period clause	Yes/ No
16	Whether agreeable to submit 10% BG against SD as per clause-14 (section-II) of GCC	Yes/ No
17	Whether agree to Technical Specifications & drawings as mentioned in tender document.	Yes/ No
18	Self attested detailed order copy along with annexures containing BoQ/ scope of work in support of technical experience criteria of PQR as specified in clause-3.2 of Section-I of tender document: a) Name of the Capacitor bank commissioned at existing substation & name of order placing utility.	Enclosed or not. If Yes mention Page No.
19	Performance certificate for successful commissioning & satisfactory operation of above mentioned capacitor bank bay for a period of atleast one year (from the date of commissioning) indicating date of commencement of work and its commissioning (constructed by bidder) as on date of NIT of the instant tender. a) Name of performance certificate issuing utility.	Enclosed or not. If Yes mention Page No.
20	In support of their 'Financial Position', the Bidder must provide the relevant information, alongwith documentary evidence for the following :-	
A	Turn over Details	Yes/No
	Financial Year — **Turn over (in Cr)**	
	a) 2019-20	
	b) 2018-19	
	c) 2017-18	
	d) 2016-17	
	e) 2015-16	
B	Net worth details (with Self attested copies by authorised signatory) of the balance sheets for last 5 yrs):-	Yes/No
	Financial Year — **Net worth (in Cr)**	
	a) 2019-20	
	b) 2018-19	
	c) 2017-18	
	d) 2016-17	
	e) 2015-16	
C	**Liquid Assets**	
	Details of evidence of liquid assets(LA)	Yes/No
	Details of evidence of access to or availability of credit facilities (Bank Certificate) (Annexure A-7) for bidder **in original**	Yes/No
D	Whether self attested copies of profit and loss account statement of the balance sheet for the last 5 financial years have been furnished.	Yes/No
E	Whether certificate of CA (Annexure A-23) for bidder **in original** have been furnished.	Yes/No
21	Whether the declaration (Annexure A-24) by bidder have been furnished.	Yes/No

22	Whether self attested copy duly certified by CA, indicating Liquid assets for bidder is enclosed.	Yes/No
23	Particulars of Contractor's "A" class H.T. License:- a. Licence Number. b. Name of Person. c. Valid Upto. d. Name of state level license issuing authority.	Yes/No
24	Copy of EPF code number allotted by EPF Commissioner	Yes/No
25	Please mention losses of **10 MVAR Capacitor bank in watts /KVAR** **0.18 W/KVAR to 0.2 W/KVAR**	
26	Whether you agree for inspection by **CSPTCL**'s representative prior to despatch and bear the testing charges for all tests as per IS to be conducted on samples, drawn by **CSPTCL**'s representative.	Yes/No
27	Please confirm that you have noted & agree to submit price adjustment invoices for supplies, positively within 6 (Six) months from date of supply of equipment/ material, whether positive or negative, as stipulated in clause 35 (section-II) of GCC .	Yes/No
28	Whether testing facilities for carrying out the type, acceptance and routine tests as per relevant is specification, on the materials offered are available with the manufacturer. If so, please furnish the list of testing machines and relevant details.	Yes/No
29	Whether details of departures/ deviation from specification have been furnished in the respective schedule.	Yes/No
30	Whether details of technical manpower of head office and field organisation furnished in respective schedule.	Yes/No
31	Whether agreeable to arrange for storage cum erection insurance of substation equipments/materials as per relevant clause of the specification.	Yes/No
32	Whether agreeable to bear the cost of any octroi, duty of levy on materials provided by the contractor such as metal, sand etc.	Yes/No
33	Please indicate if use of private/forest/canal service of roads for transport of materials and constructional personnel, if required, then the charges, if any, levied by the concerned authorities will be borne by you, without any extra cost to the **CSPTCL**.	Yes/No
34	Have you furnished the power of attorney in respect of the person signing the tender on behalf of the bidder?	Yes/No
35	Whether submitted Pre – contract Integrity pact with confirmation that no addition/ deletion has been made and if, at later stage any discrepancy is found as compared to the text of integrity pact attached with the tender document, you will be bound to correct the same.	Yes/ No
36	Whether agree to supply all the equipments and materials as per our tender specification and as per "List of vendors" indicated in Section-V of tender document & displayed in CSPTCL's official website as on the date of issue of NIT and you will not seek any deviation from vendor list in the event of award of contract.	Yes/ No

Note : Bidder shall use above questionnaire sheets in original for furnishing reply alongwith this offer. However if separate sheets are used for this questionnaire, it may please be ensured that the serial order and language of questions is maintained.

Date SIGNATURE OF BIDDER

Place NAME

DESIGNATION

(SEAL)

ANNEXURE – A-4
UNDERTAKING FOR PERSONNEL CAPABILITIES

I/WE ..... (Designation) of ..... (Name of bidder) hereby undertake that we have adequate experienced personnel with necessary license/workman permit issued by the Electrical Licensing to execute the project and the details are hereunder:-

1) PERSONNEL IN MANAGERIAL POSITION

Sl. No.	Name of person with designation	Educational/Tech. Qualifications	Year of experience	Details of Licence

2) PERSONNEL IN SUPERVISORY POSITION

Sl. No.	Name of person with designation	Educational/Tech. Qualifications	Year of experience	Details of Licence

3) PERSONNEL IN WORKMEN CATEGORY

SL. No.	Name of person with designation	Educational/Tech. Qualifications	Year of experience	Details of Licence

Date
Place

SIGNATURE OF BIDDER
NAME
DESIGNATION
(SEAL)

ANNEXURE – A-5
UNDERTAKING FOR EQUIPMENT CAPABILITIES

I/WE..... (Designation) of ..... (Name of bidder) hereby undertake that we have adequate tools & plants, financial & technical resources and infrastructures backed with qualified agencies to execute the work of construction of capacitor bank bay at existing EHV Substation properly and expediciously within the specified time frame.

Date
Place

SIGNATURE OF BIDDER
NAME
DESIGNATION
(SEAL)

ANNEXURE – A-6
FINANCIAL CAPABILITIES

"Certificate issued by Chartered Accountant"

(Issued not earlier than the date of NIT)

Name & address of the bidder : M/s _____.

(The bidder is requested to complete the information in this Annexure. The information supplied should be the annual turnover duly audited by the Chartered Accountant for preceding three years of work in progress or completed.)

ANNUAL TURNOVER & NET WORTH FOR LAST FIVE FINANCIAL YEARS :

	FY	TURN OVER (in Rs.)	NET WORTH (in Rs.)
1.	2015-16		
2	2016-17		
3	2017-18		
4	2018-19		
5	2019-20		

BREAKUP OF LIQUID ASSETS (As on ....2021 (This date should not be older than the date of NIT)):

	BREAKUP OF LIQUID ASSETS (in Rs.)	
1.	Cash (and equivalents)	
2.	Bank deposits	
3.	Securities that can be freely traded	
4.	Receivables which has general certainity of getting received	
5.	Others	
	Total	

AUDITED FIGURES OF ANNUAL ACCOUNTS AS VARIFIED BY CA :

Financial information in Rupees	Actual previous three years		
	1	2	3
1. Total assets 2. Current assets 3. Total liabilities 4. Current liabilities 5. Profit before taxes			

Attach audited financial statements for the last five years.

Date **SIGNATURE OF CHARTERED ACCOUNTANT**

Place **(SEAL)**

UDIN :

ANNEXURE – A-7
FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT/FACILITIES

(Issued not earlier than three months prior to date of bid opening)

BANK CERTIFICATE

This is to certify that M/s…… *(insert Name & Address of the Contractor)* who have submitted their bid to ……..*(insert name of the Employer)*…… against their tender specification vide ref. No. …… for …… *(insert name of the project alongwith the project name)* ……. is our customer for the past …… years.
Their financial transaction with our Bank have been satisfactory. They enjoy the following fund based facilities with us against which the extent of utilization as on date is also indicated below:

Sl. No.	**Type of Facility**	**Sanctioned Limit as on Date**	**Utilisation as on Date**	**Unutilized limit / Balance as on Date**

This letter is issued at the request of M/s. _____.

Signature _____

Name of Bank _____

Name of Authorised Signatory _____

Designation _____

Phone No. _____

Address _____
Email ID: _____
Telex/ Fax: _____

DATE & SEAL OF THE BANK

ANNEXURE – A-8
EXPERIENCE RECORD

The bidder shall furnish details of work orders for similar nature for construction of capacitor bank bay received during the last three years & already completed or under execution.

SL. No.	Work order/ No. & date	Name & address of CSPTCL	Value of contract	Scheduled date of delivery/ completion of work	slippage with	Remarks

Date
Place

SIGNATURE OF BIDDER
NAME
DESIGNATION
(SEAL)

ANNEXURE – A-9

DEVIATION FROM TECHNICAL SPECIFICATION/CONDITIONS

Tender shall enter below particulars of his alternative proposals for deviation from the specification, if any. If a bidder has quoted 'NIL' deviations in the bid, this will have an overriding effect on any other conditions noted as deviations elsewhere in the bid and no correspondence will be made to withdraw such specific contradictory conditions

SL. No.	Clause No. of Specification	Particulars of deviation	Remarks

Date
Place

SIGNATURE OF BIDDER
NAME
DESIGNATION
(SEAL)

ANNEXURE – A-10
DEVIATION FROM THE COMMERCIAL CONDITION OF CONTRACT

The bidder shall enter below, departure if any, from the conditions of contract as herein. If a bidder has quoted 'NIL' deviations in the bid, this will have an overriding effect on any other conditions noted as deviations elsewhere in the bid and no correspondence will be made to withdraw such specific contradictory conditions.

SL. No.	Clause No. of Specification	Particulars of deviation	Remarks

Date
Place

SIGNATURE OF BIDDER
NAME
DESIGNATION
(SEAL)

ANNEXURE – A-11

COMPLETION SCHEDULE FOR 33 KV CAPACITOR BANK BAY

We hereby declare that following work completion schedule shall be followed by us in execution of the subject project for the period commencing from the date of handing over of site to us:

S.No.	DESCRIPTION OF WORK	Period in months from date of handing over of site		Dates calendar monthwise	
		Commencement	Completion	From	To
1.	Submission of PERT chart, sub-station layout & elevation drawings, detailed engineering equipment drawings, earthing of S/S etc.				
2.	Constn. of Civil foundation work of equipments & structure, etc.				
3.	Constn.of other switch yard civil works etc.				
4.	Supply of structure & switch yard equipment etc.				
5.	Supply of control room equipments, control cables etc.				
6.	Erection of structures /equipments/Control Panel				
7.	Testing & Commissioning of equipments/C&R etc.				

NOTE:- *Bar chart showing the commencement and completion of various activities indicated above for completion of capacitor bank bay shall be furnished alongwith this schedule with the bid.*

SIGNATURE OF BIDDER

Place NAME

DESIGNATION

(SEAL)

ANNEXURE – A -12
LITIGATION HISTORY OF THE BIDDER

Name of the bidder:

The bidder should provide detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five years. A consistent history of awards involving litigation against the bidder may result in rejection.

Year	Name of client, cause of litigation/ arbritration and matter in dispute	Details of contract and date	Award for or against bidder	Disputed amount (current value in Rs.)
1				
2				
3				
4				
5				

Date SIGNATURE OF BIDDER

Place NAME

DESIGNATION

(SEAL)

ANNEXURE – A -13
CASH FLOW REQUIREMENT

A. FINANCIAL RESOURCES

(Period starting from 6th month from the date of issue of NIT up to scheduled completion period of the proposed work)

Bidders shall provide information of their sources of financing likely available during the aforesaid period,such as liquid assets, unencumbered real assets, lines of credit except non-funded facility and other financial means (including revenues from operation) available to meet the total construction cash flow demands of the instant tender/work and his current works commitment for other contracts in the following format :-

S. No.	Source of financing	Amount (in Rs.Lakh)
(1)	**(2)**	**(3)**
1		
2		
3		
	Total (A)	

B. CURRENT CONTRACT COMMITMENTS/ WORKS IN HAND

(As on date of issue of NIT)

Bidders shall provide this information in following format for their all current commitments related to all contracts in hand – that have been awarded (excluding this instant tender), or for which a letter of inent or acceptance has been received, or for contracts approaching completion,but for which full completion certificate has yet to be issued as on date of issue of NIT:-

S. No.	**Detail work like Name, place etc**	Details of Contract - Order/LOI issued (with No/date)	Details of Order placing authority, Contact No., Address, Tel, Fax etc	Value of contract placed [In Lakh Rs]	Schedule date of Completion as per contract	Value of balance Work [In Lakh Rs]	Estimated completion date	Expected value of work to be carried out against Column7 during the period starting from 6th Month of issue of this NIT till completion period of the instant tender/work [In Rs Lakh]
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1								
2								
	Total (B)							

Note: No work in hand shall be excluded from this list-even if completion of work is expected within 9 month from date of issue of this NIT.

Declaration by the bidder: This is to undertake that no work-in hand ,has been left. All works/awards/contracts have been covered in above statement to the best of my knowledge. We/I understand that in case the avove information is found to be false/fake/misleading, the bid will be disqualified.

Note: The net availability (A-B) should not be less than Rs. 2.58 Cr.

Date:

Signature :
Name :
Designation:
Seal of the Tendering Co. :
Place:

ANNEXURE – A -14

PROFORMA FOR AGREEMENT

(To be executed on non judicial stamp paper worth Rs.300/- only with a revenue stamp of

Rs. 1/- affixed on it)

This Agreement is made this _____ day of _____ between Shri _____ _____ on behalf of the Contractor_____ _____ _____ (hereinafter called the Contractor which expression shall where the context so admits, be deemed to include his heirs, executors, administrators and representatives) of the one part, and the Chhattisgarh State Power Transmission Company Limited, Raipur being the Company constituted under Companies Act, 1956, (hereinafter called the CSPTCL which expression shall, where the context so admits, be deemed to include its successors in office and permitted assigns) of the other part.

WHEREAS in accordance with a Tender No. _____ dtd. _____ issued by Chief Engineer (P&P) of the CSPTCL, the Contractor submitted his tender dated _____ for

CONSTRUCTION OF 36 KV,12 MVAR CAPACITOR BAYS AT EXISTING EHV SUB-STATIONS OF CSPTCL ON TURNKEY BASIS

All these works on turnkey basis more particularly described, mentioned, enumerated or referred to in the general conditions, specifications, schedules, drawings etc. forming part of tender, covering letters, schedule of prices and further correspondence, a copy of which is hereto annexed and is for purposes of identification signed by the contractor _____ on behalf of the contractor and Chief Engineer (P&P) of CSPTCL and all of which shall be deemed to form part of this agreement as though separately set out herein and are included in the expression "Contract" herein used (herein after referred to as the said works).

AND WHEREAS CSPTCL has accepted the tender of the Contractor vide following work Order which have been placed by CSPTCL for construction of aforesaid works on turnkey basis for the total net price of _____ upon the terms and subject to the condition hereinafter mentioned.

NOW THEREFORE THIS AGREEMENT WITNESSES AND IT IS hereby agreed as follows:

1. The contractor shall undertake following works :
   - (i) Supply for design, supply of galvanising steel structure for equipments, bus, all switchyard & control room equipments with recommended spares, and supply of testing equipments, etc. for new capacitor bay at .....
   - (ii) The contractor shall perform civil works like construction of concrete works, RCC works, Cable trenches, excavation, back filling, yard levelling /metalling, foundations of all equipment/structures and all other works detailed in the respective work order.
   - (iii) Erection, testing & commissioning of all the equipment as detailed in the respective orders. within the time specified in and in accordance with the terms and conditions specified in the CSPTCL aforesaid Work Orders.
2. The contractor shall commence the work described in the Notice Inviting Tender No. 02-04/NIT/TR-....., dated ....., namely, the construction of 33 KV capacitor bay ----------on turn key basis and thereafter execute the work in accordance with the completion schedule submitted in the format set out in Annexure A-11 of Section IV, of the Tender Specifications No. TR-----, read with the PERT Network / Bar Chart submitted in accordance with clause 3 of the General Conditions of Contract. The Works shall be completed by the contractor on turnkey basis not later than **NINE (9) MONTHS** from the date of order for construction of the capacitor bank bay. In the event the contractor fails to undertake the works in accordance with the Schedule, the contractor may be liable for penalty at the discretion of CSPTCL in accordance with the terms of clause 06 of the General Conditions of Contract

3. In the event of a conflict or contradiction between: (a) any provision(s) in this agreement and any provision(s) in the Tender Specifications No. TR- ____, i.e. the tender document, the provision(s) of this agreement shall prevail to the extent of such conflict, and (b) two or more provisions in the tender document, the provision(s) laying down more stringent obligations on the contractor shall prevail."

4. For the work done under the scope of the CSPTCL Work Orders referred above, the CSPTCL shall pay to the Contractor a total sum of Rs. _____ (In words Rupees _____ _____ _____ _____) or such other sum as may become payable in accordance with the said work order.

5. If at any time, any question, dispute or difference whatsoever arises between CSPTCL and the contractor upon, in relation with or in connection with this contract either party may forthwith give the other party a notice in writing of the existence of such question, dispute or difference and same shall be referred to the adjudication of three Arbitrators one to be nominated by CSPTCL, the other by the Contractor and third to be appointed by the two Arbitrators nominated by the parties at the commencement of arbitration proceedings and failing agreement between them, in accordance with the Arbitration and Conciliation Act 1996, the third Arbitrator so appointed shall act as the Presiding Arbitrator. The award so passed shall be binding on both the parties. The place of arbitration shall strictly be RAIPUR CG.

6. In all matters arising under out of or in relation with this agreement, the terms and conditions contained in the aforesaid Work Orders shall apply and all such matters shall be determined accordingly.

7. This agreement shall be deemed to be entered into at Raipur and all disputes and claims, if any, out of or in respect of this Agreement are to be settled at Raipur or be subject to jurisdiction of competent court situated only at Raipur in Chhattisgarh State.

IN WITNESS whereof the parties hereto have signed this agreement on the dates and year mentioned against their respective signature.

<u>Signature of Witness :</u>	<u>Name & Signature for Contractor</u>
1. Signature : _____	Signature
Address : _____	(On behalf of the Contractor)
	Name : _____
Signature : _____	Designation : _____
Address : _____	Seal _____
<u>Signature of Witnesses :</u>	
1. _____	Signature
	(On behalf of CSPTCL)
2. _____	Name _____
	Designation _____

ANNEXURE – A- 15
PROFORMA FOR BANK GUARANTEE TOWARDS SECURITY DEPOSIT

(To be executed on non-judicial stamp paper of Rs. 250/- and Revenue stamp may be affixed on Bank Guarantee)

Bank Guarantee No…… Dated……

In consideration of the Chhattisgarh State Power Transmission Company Limited, Raipur (A successor company of Chhattisgarh State Electricity Board, Raipur hereinafter referred to as 'CSPTCL') having agreed to accept this Bank Guarantee in lieu of cash deposit by way of Security for due and faithful performance required from M/s. _____ _____ _____ _____ (herein after referred to as "Contractors", the Bank of _____ hereby agrees unequivocally and unconditionally to pay within 48 hours on demand in writing from the Chhattisgarh State Power Transmission Company Limited or any officer authorized by it in this behalf of any amount upto and not exceeding Rs……..……(in words) …… only to the said Chhattisgarh State Power Transmission Company Limited on behalf of the aforesaid M/s …….. who have tendered and contracted for the supply of materials, equipments or services to the said the Chhattisgarh State Transmission Company Ltd, against order No…….. dated……. For the order value of Rs…….

The beneficiary of this Bank Guarantee shall be Chhattisgarh State Power Transmission Company Limited, Raipur (A Successor Company of CSEB Raipur). The proceeds / encashment of this Bank Guarantee would go in the name of Chhattisgarh State Power Transmission Company Limited, Raipur (A Successor Company of CSEB Raipur).

This agreement should be valid and binding on this bank up to and including _____ 20__ or for such further period as may here under be mutually fixed from time to time in writing by the Chhattisgarh State Transmission Company Ltd. And the contractor shall not be terminable by notice or any change in the constitution of the aforesaid bank or the firm of Contractors or by any others reasons whatsoever and the Banker's liability hereunder shall not be impaired or discharged by any extension of time or variations or alteration made, given conceded or agreed to with or without the Bank knowledge or consent by or between the Chhattisgarh State Transmission Company Ltd. and contractor in the existing and / or further tenders and / or contracts.

It is agreed by the Bank with the CSPTCL that if for any reason a dispute arises concerning the Bank's liability to pay the requisite amount to the CSPTCL under the terms of this guarantee the competent court at Raipur alone shall have the jurisdiction to determine the said dispute and that this shall be without prejudice to the liability of the Bank under the terms of this guarantee being unequivocal and unconditional as mentioned above.

The liability under this guarantee is restricted to Rs…… (in words) …… only. This guarantee shall remain in force until ……. Unless a demand to enforce a claim under the guarantee is made under this Bank Guarantee by the CSPTCL to the Bank within six months from that date the rights of the Chhattisgarh State Transmission Company Ltd. Under this guarantee shall be forfeited and Bank shall be relieved and discharged from all liabilities there under.

WITNESSES:- SIGNATURES

Authorized Signatories of Bank

1. …… Signed._ _ _ _ _ _ _
2. …… for _ _ _ _ _ _ _ _ _ _ _ Bank

ANNEXURE – A- 16
PROFORMA FOR BANK GUARANTEE TOWARDS PERFORMANCE

(To be executed on non-judicial stamp paper of Rs. 250/- and
Revenue stamp may be affixed on Bank Guarantee)

Bank Guarantee No…… Dtd……

In consideration of the Chhattisgarh State Power Transmission Company Limited, Raipur (A successor company of Chhattisgarh State Electricity Board, Raipur hereinafter referred to as 'CSPTCL') having agreed to accept this Bank Guarantee in lieu of cash deposit by way of Security for due and faithful performance required from M/s. _____ _____ _____ _____ (herein after referred to as "Contractors", the Bank of _____ hereby agrees unequivocally and unconditionally to pay within 48 hours on demand in writing from the Chhattisgarh State Power Transmission Company Limited or any officer authorized by it in this behalf of any amount upto and not exceeding Rs……..……(in words) …… only to the said Chhattisgarh State Power Transmission Company Limited on behalf of the aforesaid M/s …….. who have tendered and contracted for the supply of materials, equipments or services to the said the Chhattisgarh State Transmission Company Ltd, against order No…….. dated……. For the order value of Rs…….

The beneficiary of this Bank Guarantee shall be Chhattisgarh State Power Transmission Company Limited, Raipur (A Successor Company of CSEB Raipur). The proceeds / encashment of this Bank Guarantee would go in the name of Chhattisgarh State Power Transmission Company Limited, Raipur (A Successor Company of CSEB Raipur).

This agreement should be valid and binding on this bank upto and including _____ 20____ of for such further period as may hereunder be mutually fixed from time to time in writing by the Chhattisgarh State Transmission Company Ltd. And the contractor and shall not be terminable by notice or any change in the constitution of the aforesaid bank or the firm of Contractors or by any others reasons whatsoever and the Banker's liability hereunder shall not be impaired or discharged by any extension of time or variations or alteration made, given conceded or agreed to with or without the Bank knowledge or consent by or between the Chhattisgarh State Transmission Company Ltd. and contractor in the existing and / or further tenders and / or contracts.

It is agreed by the Bank with the CSPTCL that if for any reason a dispute arises concerning the Bank's liability to pay the requisite amount to the CSPTCL under the terms of this guarantee the competent court at Raipur alone shall have the jurisdiction to determine the said dispute and that this shall be without prejudice to the liability of the Bank under the terms of this guarantee being unequivocal and unconditional as mentioned above.

The liability under this guarantee is restricted to Rs…… (in words) …… only. This guarantee shall remain in force until ……. Unless a demand to enforce a claim under the guarantee is made under this Bank Guarantee by the CSPTCL to the Bank within six months from that date the rights of the Chhattisgarh State Transmission Company Ltd. Under this guarantee shall be forfeited and Bank shall be relieved and discharged from all liabilities there under.

WITNESSES:- SIGNATURES

Authorized Signatories of Bank

1. …… Signed._ _ _ _ _ _ _
2. …… for _ _ _ _ _ _ _ _ _ _ _ Bank

ANNEXURE – A- 17
PROFORMA FOR BANK GUARANTEE FOR LOSS/DAMAGE TO CSPTCL

NOTE FOR BIDDERS: (Not to be typed in the Bank Guarantee) To be furnished in non-judicial stamp paper of Rs. 250 applicable as per MP/ Chhattisgarh Duty Act from any Nationalised /Scheduled Bank with a revenue stamp worth Rs.1/- affixed thereon).

In consideration of the Chhattisgarh State Power Transmission Company Limited, (herein after called "CSPTCL") having agreed to exempt Ms. _____ _____ _____ _____ _____ (herein after called "the said Contractors") from the demand under the terms and conditions of an agreement No. _____ Dated _____ made between _____ And _____ for _____ _____ _____ _____ _____ (herein after called "the said agreement") of security deposit for satisfactory performance of materials (as detailed in the said agreement) and for the due fulfilment by the said Contractor(s) of the terms and conditions contained in the said agreement, on production of a Bank Guarantee for Rs. _____ ____ ____ ____ ___ (Rs._____ _____ _____ _____ _____ Only).

1. We_____ _____ _____ Bank (herein after referred to as "the Bank") at the request of _____ _____ contractor(s) do hereby undertake unequivocally and unconditionally to pay to CSPTCL, an amount not exceeding Rs. _____ (Rs. _____ _____ _____ _____ _____ Only) against any loss or damage caused to or suffered or would be caused to or suffered or would be caused to or suffered by CSPTCL by reason of any breach by the said Contractors(s) of any of the terms or conditions contained in the said agreement.

2. We_____ (indicate the name of the bank) Bank do hereby undertake to pay the amounts due and payable under this guarantee without any lemur, merely on a demand from CSPTCL stating that the amount claimed is due by way of loss or damage caused to or would cause to or suffered by CSPTCL by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said agreement or by reasons of the Contractor(s).

3. We, the _____ (indicate the name of the bank) do hereby further undertake unequivocally and unconditionally pay the amount due and payable under this Guarantee without demure, merely on demand from CSPTCL stating that the amount claimed is due by was of loss or damage caused to or would be caused to or suffered by CSPTCL by reason of each breach by the said Contractor(s) of any of the terms or conditions and failure to perform said Bid. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____.

4. We, the _____ (indicate the name of the bank) further agree that the guarantee herein contained shall remain in full force and effect during the aforesaid period of _____ days _____ and it shall continue to be so enforceable till all the dues of the CSPTCL under or by virtue of the said Bid have been fully paid and its claims satisfied or discharged or till Chief Engineer (P&P), CSPTCL certifies that the terms and conditions of the said Bid have been fully and properly carried out by the said Contractor(s) and accordingly discharge this guarantee. Unless a demand or claim under this discharges from all liability under this guarantee thereafter.

5. We, the _____ (indicate the name of the bank)further agree with the CSPTCL that CSPTCL shall have be fullest liberty without our consent and without affecting in any manner our obligations here under to vary any of the terms and conditions

of the said Bid or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time only of the powers exercisable by CSPTCL against the said Contractor(s) and to forebear or enforce any of the terms and conditions relating to the said Bid and we shall not be relieved from our liability by reason of any such variation postpone or extension being granted to the said Contractor or for any forbearance, act or omission on the part of CSPTCL or any indulgence by CSPTCL to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. The beneficiary of this Bank Guarantee shall be Chhattisgarh State Power Transmission Company Limited, Raipur (A Successor Company of erstwhile CSEB Raipur). The proceeds / encashment of this Bank Guarantee would go in the name of Chhattisgarh State Power Transmission Company Limited, Raipur (A Successor company of erstwhile CSEB Raipur).

7. It is agreed to by the Bank with the CSPTCL that if for any reason a dispute arises concerning the Bank Liability to pay the requisite amount to the CSPTCL under the terms of this guarantee the competent court at Raipur alone shall have the jurisdiction to determine the said dispute and that this shall be without prejudice to the liability of the Bank under the terms of this guarantee being unequivocal and unconditional. The beneficiary of this Bank Guarantee shall be Chhattisgarh State Power Transmission Company Limited, Raipur (A Successor Company of erstwhile CSEB Raipur).

8. We, the _____ (indicate the name of the bank) lastly undertake not to revoke this Guarantee during its currency except with the previous consent of CSPTCL in writing.

Dated, the _____ days of _____ _____.

WITNESS (SIGNATURE WITH NAME & ADDRESS)

1.

2.

For _____

(Indicate name of Bank)

ANNEXURE – A- 18

PROFORMA FOR INDEMNITY BOND

(To be executed on non-judicial stamp paper worth Rs.250/- with a revenue stamp worth Rs.1/- affixed thereon).

THIS INDEMNITY BOND is made this ……..day of …….20….....
By M/s. ……, a company registered under the Companies Act (hereinafter called as 'Contractor' or 'Obligator' which expression shall include its successors and permitted assigns) in favour of Chhattisgarh State Power Transmission Company Limited, Raipur being the Company constituted under Companies Act, 1956, (hereinafter called the CSPTCL) and its project forsupply of galvanising steel structure for equipments etc. for supply of all switchyard & control room equipments with recommended spares, and supply of testing equipments, etc. and complete erection/commissioning thereof ……(hereinafter called "Employer" which expression shall include its successors and assigns):

WHEREAS EMPLOYER has awarded to the 'Contractor' a Contract forsupply of galvanising steel structure for equipments, etc. for supply of all switchyard & control room equipments with recommended spares, and supply of testing equipments, etc. and complete erection/commissioning thereof for ……sub-station vide Order No…… dtd……. And Amendment No…….(applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which Employer is required to hand over various Material to the 'Contractor' for execution of the Contract.

And WHEREAS by virtue of Clause No…….. of tender specification No……, the 'Contractor' is required to execute an Indemnity Bond in favour of Employer for the Material handed over to it by Employer for the purpose of performance of the Contract/Erection portion of the Contract (hereinafter called the 'Materials').

Now THEREFORE, This Indemnity Bond witnessed as follows:

1. That in consideration of various Material like Galvanised steel structures, switchyard and control room equipments, testing equipments etc. as mentioned in the Supply Order of S/s & line No…….. dated. ……. At clause No……., Valued at (Amount in figures) Rs…….. (amount in words) (Rupees ……..) handed over to the 'Contractor' in instalments from time to time for the purpose of performance of the Contract, the 'Contractor' hereby undertakes to indemnify and shall keep Employer indemnified for the full value of the Material. The 'Contractor' hereby acknowledges receipt of the initial instalment of the Material as per details in the schedule appended hereto. Further, the 'Contractor' agrees to acknowledge receipt of the subsequent instalments of the Material as required by Employer in the form of Schedules consecutively numbered which shall be attached to this Indemnity Bond so as to form integral parts of this Bond. It is expressly understood by the 'Contractor' that handing over of the dispatch title documents in respect of the said Materials duly endorsed by Employer in favour of the 'Contractor' shall be construed as handing over of the Material purposed to be covered by such title documents and the 'Contractor' shall hold such Material in trust as a Trustee for an on behalf of Employer.
2. That the 'Contractor' is obliged and shall remain absolutely responsible for the safe transit/protection and custody of the Material at Employer project Site against all risks whatsoever till the Material are duly used/erected in accordance with the terms of the Contract and the Plant/Package duly erected and commissioned in accordance with the terms of the Contract, is taken over the Employer. The 'Contractor' undertakes to keep Employer harmless against any loss or damage that may be caused to the Material.
3. The 'Contractor' undertakes that the Material shall be used exclusively for the performance/execution of the Contract strictly in accordance with its terms and conditions and no part of the Material shall be utilized for any other work or purpose whatsoever. It is clearly understood by the 'Contractor' that non-observance of the obligations under this Indemnity Bond by the 'Contractor' shall interalia constitute a criminal breach of trust on the part of the 'Contractor' for all intents and purpose including legal/penal consequences.
4. That Employer is and shall remain the exclusive Purchaser of the Material free from all encumbrances, charges or liens of any kind, whatsoever. The Material shall at all times be open to inspection and checking by the Purchaser's Representative or other employees/Agents authorized in this regard. Further, Employer shall always be free at all times to take possession of the Materials in whatever form the Materials may be,

if in its opinion, the Materials are likely to be endangered, mis-utilized or converted to uses other than those specified in the contract by any acts of omission or commission on the part of the 'Contractor' or any other person or on account of any reason whatsoever and the 'Contractor' binds himself and undertakes to comply with the directions of demand of EMPLOYER to return the Material without any demur or reservation.

5. That this Indemnity Bond is irrevocable. If at any time any loss or damage occurs to the Material or the same or any part thereof is mis-utilized in any manner whatsoever, then the 'Contractor' hereby agrees that the decision of the Purchaser's Representative as to assessment of loss or damage to the Material shall be final and binding on the 'Contractor'. The 'Contractor' binds itself and undertakes to replace the lost and/or damaged Material at its own cost and/or shall pay the amount of loss to Employer without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to Employer against the 'Contractor' under the Contract and under this Indemnity Bond.

6. NOW THE CONDITION of this Bond is that if the 'Contractor' shall duly and punctually comply with the terms and conditions of this Bond to the satisfaction of Employer, THEN, the above Bond shall be void, but otherwise, it shall remain in full force and virtue.

IN WITNESS WHEREOF, the 'Contractor' has hereunto set its hand through its authorized representative under the common seal of the Company, the day, month and year first above mentioned.

For and on behalf of

M/s._____

WITNESS

1. 1. Signature ……. Signature…….
   2. Name ……. Name ……..
   3. Address ……. Designation ……..

Authorized representative

2. 1. Signature …….
   2. Name …….

(Common Seal)

   3. Address …….

(In case of Company)

1) Indemnity Bonds are to be executed by the authorized person having the Power of Attorney issued under common seal of the company with authority to execute Indemnity Bonds. The Original Power of Attorney if it is specifically for this Contract or a Photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to Indemnity Bond.

ANNEXURE – A-19

PROFORMA FOR DEED OF EXTENSION OF BANK GUARANTEE
(To be executed on N.J. Stamp Rs. 250/-+One Revenue Stamp worth Rs. 1/-)

Extension Deed No_____
Date_____

B.G. No. _____Date_____
C.S. Power Trasmission Company Ltd.

Sub: - The Extension of Bank Guarantee No. _____Dated_____for the Rs_____Favouring yourself expiring on _____.

i. At the request of our client M/s _____we hereby extend our Guarantee No._____dtd._____given on their behalf for the further period from_____to _____.

ii. The beneficiary of this Bank Guarantee shall be Chhattisgarh State Power Transmission Company Ltd (A Successor Company of CSEB).

iii. Our liability under this guarantee is restricted to Rs_____ (Rupees _____). This guarantee shall remain in force up to _____. Unless a demand to enforce a claim is made under this Bank Guarantee by the CSPTCL to the Bank within six months from the date i.e. up to _____the rights of the CSPTCL under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liability hereunder.

Witness:- Signed for Bank

1)

2)

ANNEXURE-A-20
PRE-CONTRACT INTEGRITY PACT

(To be executed on non judicial stamp paper worth Rs 300/-)

1. GENERAL

1.1 This pre-bid contract Agreement (hereinafter called the Integrity Pact) is made on.....day of the month .....20..., between the CSPTCL acting through Shri.....CE (P&P) (hereinafter called the "BUYER", which expression shall mean and include, unless the context otherwise requires, his successors in the office and assigns) and the First Party, proposes to procure (name of the Stores/Equipment/Work/Service) and M/s. .... represented by Shri.....Chief Executive Officer (hereinafter called the "BIDDER/Seller", which expression shall mean and include, unless the context otherwise requires, his successors on permitted assigns) and the Second Party, is willing to offer/has offered.

1.2 WHEREAS the BIDDER is a Private Company/Public Company/ Government undertaking/Partnership/Registered Export Agency, constituted in accordance with the relevant law in the matter and the BUYER is a power company an undertaking of Govt. of CG, performing its function on behalf of the Government of Chhattisgarh.

2. OBJECTIVES

2.1 NOW, THEREFORE, the BUYER and the BIDDER agree to enter into this pre-contract agreement, hereinafter referred to as Integrity Pact, to avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the Contract to be entered into with a view to:-

2.2 Enabling the BUYER to obtain the desired Stores/Equipment/Work/Service at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

2.3 Enabling BIDDERs to abstain from bribing or indulging in any corrupt practices in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing any corrupt practices and the BUYER will commit to prevent corruption, in any form, by its official by following transparent procedures.

3. COMMITMENTS OF THE BUYER

The BUYER commits itself to the following:-

3.1 The BUYER undertakes that no official of the BUYER, connected directly or indirectly with the contract, will demand, take promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the BIDDER, either for themselves of for any person, organization or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation, contracting of implementation process related to contract.

3.2 The BUYER will, during the pre-contract stage, treat BIDDERs alike, and will provide to all BIDDERs the same information and will not provide any such information to any particular BIDDER which could afford an advantage to that particular BIDDER in comparison to the other BIDDERs.

3.3 All the officials of the BUYER will report the appropriate Government office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.

In case any such preceding misconduct on the part of such official(s) is reported by the BIDDER to the BUYER with the full and verifiable facts and the same prima facie found to be correct by the BUYER, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the BUYER and such a person shall be debarred from further dealings related to the contract process. In such a case while an enquiry is being conducted by the BUYER the proceedings under the contract would not be stalled.

4. COMMITMENTS OF BIDDERS

The BIDDER commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any pre-contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commit itself to the following:-

4.1. The BIDDER will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BUYER, connected directly or indirectly with the biding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the contract.

4.2. The BIDDER further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage, or inducement to any official of the BUYER or otherwise in procuring the Contract of forbearing to do or having done any act in relation to the obtaining or execution of the contract or any other contract with the CSPTCL for showing or forbearing to show favour or disfavour to any person in relation to the contract or any other contract with the CSPTCL.

4.3. The BIDDER further confirms and declares to the BUYER that the BIDDER in the original Manufacture/Integrator/Authorized government sponsored export entity of the stores and has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the BUYER or any of its functionaries, whether officially or unofficially to the award of the contract to the BIDDER, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.

4.4. The BIDDER, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose any payment he has made, is committed to or intends to make to officials of the BUYER or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.

4.5. The BIDDER will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.

4.6. The BIDDER will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

4.7. The BIDDER shall not use improperly, for purpose of competition or personal gain, or pass on to others, any information provided by the BUYER as part of the business relationship, regarding plans, technical proposal and business details, including information contained in any electronic data carrier. The BIDDER also undertakes to exercise due and adequate care lest any such information is divulged.

4.8. The BIDDER commits to refrain from giving any compliant directly or through any other manner without supporting it with full and verifiable facts.

4.9. The BIDDER shall not instigate or cause to instigate any third person to commit any of the acts mentioned above.

5. PREVIOUS TRANSGRESSION

5.1. The BIDDER declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or any Government Department in India that could justify BIDDER's exclusion from the tender process.

5.2. If the BIDDER makes incorrect statement on this subject, BIDDER can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

6. EARNEST MONEY (SECURITY DEPOSIT)

6.1. Every BIDDER while submitting commercial bid, shall deposit an amount as specified in RFP as Earnest Money/Security Deposit, with the BUYER through any of the following instruments:

(i) Bank Draft or Pay Order in favour of.....

(ii) A confirmed guarantee by an Indian Nationalised Bank, promising payment of the guarantee sum to the .....(BUYER).....on demand within three working days without any demur whatsoever and without seeking any reasons whatsoever. The demand for payment by the BUYER shall be treated as conclusive proof of payment.

(iii) Any other mode or through any other instrument (to be specified in the RFP).

6.2. The Security Deposit shall be valid up to complete conclusion of the contractual obligations to the complete satisfaction of both the BIDDER and BUYER, including warranty period, whichever is later.

6.3. In the case of successful BIDDER a clause would also be incorporated in the Article pertaining to Performance Bond in the Purchase Contract that the provisions of Sanctions for violation shall be applicable for forfeiture of Performance Bond in case of a decision by the BUYER to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

6.4. No interest shall be payable by the BUYER to the BIDDER on Earnest Money/Security Deposit for the period of its currency.

7. SANCTIONS FOR VIOLATIONS

7.1. Any breach of the aforesaid provisions by the BIDDER or any one employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER) shall entitle the BUYER to take all or any one of the following actions, wherever required:-

(i) To immediately call off the pre contract negotiations without assigning any reason or giving any compensation to the BIDDER. However, the proceedings with the other BIDDER(s) would continue.

(ii) To forfeit fully or partially the Earnest Money Deposit (in pre-contract stage) and/or Security Deposit/Performance Bond (after the contract is signed), as decided by the BUYER and the BUYER shall not be required to assign any reason therefore.

(iii) To immediately cancel the contract, if already signed, without giving any compensation to the BIDDER.

(iv) To recover all sum already paid by the BUYER, and in case of the Indian BIDDER with interest thereon at 2% higher than the prevailing Prime Lending Rate while in case of a BIDDER from a country other than India with Interest thereon at 2% higher than the LIBOR. If any outstanding payment is due to the BIDDER from the BUYER in connection with any other contract such outstanding payment could also be utilized to recover the aforesaid sum and interest.

(v) To encash the advance bank guarantee and performance bond/warranty bond, if furnished by the BIDDER, in order to recover the payments, already made by the BUYER, along with interest.

(vi) To cancel all or any other contracts with the BIDDER and the BIDDER shall be liable to pay compensation for any loss or damage to the BUYER resulting from such cancellation/rescission and the BUYER shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER.

(vii) To debar the BIDDER from participating in future bidding processes of the CSPTCL for a minimum period of five years, which may be further extended at the discretion of the BUYER.

(viii) To recover all sum paid in violation of this Pact by BIDDER(s) to any middlemen or agent or broken with a view to securing the contract.

(ix) In cases where irrevocable Letters of Credit have been received in respect of any contract signed by the BUYER with the BIDDER, the same shall not be opened.

(x) If the BIDDER or any employee of the BIDDER or any person action on behalf of the BIDDER, either directly or indirectly, is closely related to any of the officers of the BUYER, or alternatively, if any close relative of an officer of the BUYER has financial interest/stake in the BIDDER's firm, the same shall be disclosed by the BIDDER at the time of filling of tender. Any failure to disclose the interest involved shall entitle the BUYER to rescind the contract without payment of any compensation to the BIDDER.

The term 'close relative' for this purpose would mean spouse whether residing with the Government servant or not, but not include a spouse separated from the Government servant by a decree or order of a competent court; son or daughter or step son or step daughter and wholly dependent upon Government servant, but does not include a child or step child who is no longer in any way dependent upon the Government servant or of whose custody the Government servant has been deprived of by or under any law; any other person related, whether by blood or marriage, to the Government servant or to the Government servant's wife or husband and wholly dependant upon Government servant.

(xi) The BIDDER shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the BUYER, and if he does so, the BUYER shall be entitled forthwith to rescind the contract and all other contracts with the BIDDER. The BIDDER shall be liable to pay compensation for any loss or damage to the BUYER resulting from such rescission and the BUYER shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER.

7.2.1. The decision of the BUYER to the effect that a breach of the provisions of this pact has been committed by the BIDDER shall be final and conclusive on the BIDDER. However, the BIDDER can approach the Monitor(s) appointed for the purpose of this Pact.

8. INDEPENDENT MONITORS

8.1. The BUYER will appoint Independent Monitors (hereinafter referred to as Monitors) for this Pact.

8.2. The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.

8.3. The Monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.

8.4. Both the parties accept that the Monitors have the right to access all the documents relating to the project/ procurement, including minutes of meetings. The Monitor shall be under contractual obligation to treat the information and documents of the BIDDER/ Subcontractor(s) with confidentiality.

8.5. As soon as the Monitor notices, or has reason to believe, a violation of this Pact, he will so inform the Authority designated by the BUYER.

8.6. The Monitor will submit a written report to the designated authority of BUYER/Secretary in the department/within 8 to 10 weeks from the date of reference or intimation to him by the BUYER /BIDDER and, should the occasion arise, submit proposal for correcting problematic situations.

9. FACILITATION OF INVESTIGATION

In case of any allegation of violation of any provision of this fact or payment of commission, the BUYER or its agencies shall be entitled to examine all the documents including the books of Account of the BIDDER and the BIDDER shall provide necessary information of the relevant documents and shall extend all possible help for the purpose of such examination.

10. LAW AND PLACE OF JURISDICTION

This pact is subject to Indian Law, the place of performance and jurisdiction shall be the seat of the BUYER.

11. OTHER LEGAL ACTIONS

The actions stipulated in this integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of any other law in force relating to any civil are criminal proceeding.

12. VALIDITY

12.1 The validity of this integrity Pact shall be from the date of its signing and extend up to 2 years or the complete execution of the contract to the satisfaction of both the BUYER and the BIDDER/Seller whichever is later. In case BIDDER is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the contract.

12.2. If one or several provision of this pact turn out to be invalid; the reminder of this pact shall remain valid. In such case, the parties will strive to come to an agreement to their original intention.

13. The parties hereby sign this integrity Pact at .....on.....

BUYER	BIDDER
Name of Officer Destination Department/PSU	CHIEF EXECUTIVE OFFICER
Witness	Witness
1).....	1) .....
2).....	2) .....

ANNEXURE- A- 21

I N S P E C T I O N P L A N F O R E Q U I P M E N T S

S.N.	Particular	CSPTCL Inspection	Contractor Inspection
1.	33KV Vacuum Circuit Breaker with Structure	Yes	
2.	33 KV Current Transformer	Yes	
3.	33KV Lightning Arrestor (30 KV)	Yes	
4.	33 KV Isolator with insulators	Yes	
5.	36 KV, 12 MVAR Capacitor Bank (72 units + 8 spare), complete	Yes	
6.	33 KV control & relay panel	Yes	
7.	Zebra ACSR Conductor		Yes
8.	G.I. Flats / pipes/ rods for earthing		Yes
9.	Nuts & Bolts of Assorted Sizes		Yes
10.	Disc Insulators		Yes
11.	Clamps, connectors & Hardwares	Yes	
12.	Armoured/Unarmoured copper cable	Yes	
13.	Power Cables	Yes	
14.	GI Cable trays of various size		Yes
15.	G.I. Structure	Yes	

ANNEXURE A-22
CHECK LIST
(To be kept in Envelope-II)

S. No.	Items	Reference	Declaration (Strike-out whichever is not applicable)	Page No.
1.	Duly & properly filled Questionnaire	Annexure-A-3	Yes/No	
2.	Upload scanned copy of only price bid schedules duly filled in and signed with seal of firm in the specified folder along with the duly filled excel sheets of price schedules	--	Yes/No	--
3.	Self-attested copies of audited balance sheets and profit & loss account statement of bidder for last 5 financial years (i.e., FY 2015-16 to FY 2019-20).	--	Yes/No	
4.	A Self-attested certificate issued by chartered accountant showing 'Annual Turnover' for the last five financial years (FY 2015-16, 2016-17, 2017-18, 2018-19 & 2019-20) & 'Net worth' including assets and liability of the bidder for the last three financial years (FY 2017-18, 2018-19 & 2019-20).	Annexure-A-6	Yes/No	
5.	A Self-attested certificate of Chartered Accountant indicating details (break-up) of available 'Liquid assets' (LA) for bidder.	--	Yes/No	
6.	Evidence of access to or availability of credit/facilities *(To be furnished for bidder **in original**)*	Annexure-A-7	Yes/No	
7.	Cash flow requirement	Annexure A-13	Yes/No	
8.	Certificate issued by Chartered Accountant	Annexure A-23	Yes/No	
9.	Declaration by the bidder	Annexure A-24	Yes/No	
10.	Self attested detailed order copy along with annexures containing BoQ/ scope of work in support of technical experience criteria of PQR as specified in clause-3.2 of Section-I of tender document: a) Name of capacitor bay at existing substation commissioned & name of order placing utility	-	Yes/No	
11.	Self attested copy of Performance certificate for successful commissioning & satisfactory operation of above mentioned capacitor bay for a period of atleast one year (from the date of commissioning) indicating date of commencement of work and its commissioning (constructed by bidder)as on date of NIT of the instant tender.	--	Yes/No	

12.	Copy of Valid 'A' class Electrical Contractor License issued by CG anugyapanMandal/ CG state licensing board in the name of bidder **or** an undertaking to submit 'A' class electrical contractor license issued by C.G. AnugyapanMandal / CG State licensing Board within 30 days after issue of LOA, by the bidder.	--	Yes/No	
13.	Copy of EPF code number/ EPF registration No. allotted by EPF Commissioner in the name of the bidder .	--	Yes/No	
14.	GST registration certificate.	--	Yes/No	
15.	Pre-contract Integrity pact in prescribed format	Annexure A-20	Yes/No	
16.	Deviation from technical specification/ conditions	Annexure A-9	Yes/No	
17.	Deviation from the commercial condition of contract	Annexure A-10	Yes/No	
18.	Undertaking for Personnel Capabilities	Annexure A-4	Yes/No	
19.	Undertaking for Equipment Capabilities	Annexure A-5	Yes/No	
20.	Power of attorney issued to legally authorised signatory	--	Yes/No	
21.	Litigation History of the Bidder	Annexure A-12	Yes/No	
22.	Certification by the Bidder as per order no. F.No.6/18/2019-PPD dated 23/07/2020 read with amended order No.18/37/2020-PPD dtd.08.02.2021 issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India (DoE Order)	Annexure A-25	Yes/No	

Date SIGNATURE OF BIDDER

Place NAME

DESIGNATION

(SEAL)

ANNEXURE – A-23

CERTIFICATE ISSUED BY CHARTERED ACCOUNTANT

*(To be furnished for bidder **in original**)*

(Please ensure the language of the formate is maintained to avoid bid rejection)

Name of the bidder :

a) All payment obligations (principal / Interest) on outstanding debentures (i.e. debentures which have not yet been redeemed) have been discharged and no such payment as on **30.09.2021** is outstanding / overdue.

b) The bidding company is presently not in default in payment of any bank loan or interest thereon for more than three months or any loan account of the bidder has not been classified as NPA (Non performing assets) by the creditor/ lending bank as on date of issue of NIT.

c) The bidding company is not going through the process of insolvency or liquidation as on the date of issue of NIT. Even, if at a later date up to placement of order against the instant tender, it comes to the notice of CSPTCL that the bidder has been going through the process of insolvency or liquidation, their bid will be rejected.

Date	SIGNATURE OF CHARTERED ACCOUNTANT
Place	NAME
	(SEAL)

UDIN :-

ANNEXURE – A-24

DECLARATION BY THE BIDDER

(Please ensure the language of the formate is maintained to avoid bid rejection)

Name of the bidder :

1) (Name of the bidder) M/s ..... is not debarred/ blacklisted by Bank/State Govt/Central Govt/State PSU/CPSU/SEB/ public utility as on date of issue of NIT.

2) All the documents/ statements/ attachments/ information submitted by (Name of the bidder) M/s..... in proof of the qualifying requirements are authentic / genuine /correct and in case, any of the said documents / statements / attachments / information is found to be false / fake / misleading, the bid will be disqualified and action will be taken as per relavent provisions of the tender.

Date SIGNATURE OF BIDDER

Place NAME

DESIGNATION

(SEAL)

ANNEXURE-25

Certification by the Bidder as per order no. F.No.6/18/2019-PPD dated 23/07/2020 read with amended order No.18/37/2020-PPD dtd.08.02.2021 issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India (DoE Order)

Bidder"s Name and Address:
Name:…….
Address:……..……

To:
Executive Director (Planning & Projects),
Chhattisgarh State Power Transmission Co. Ltd.
Third Floor, SLDC Building, CSEB Campus
Dangania, Raipur (C.G.)-492013

Dear Sir,

We have read and understood the provisions of Order no. F.No.6/18/2019-PPD (Order Public Procurement no.1) dated 23/07/2020 regarding "Restriction under Rule 144(xi) of General Financial Rules" and F.No.6/18/2019-PPD (Order Public Procurement no.2) dated 23/07/2020 regarding "Exclusion from Restrictions under Rule 144(xi) of the General Financial Rules" issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India [hereinafter collectively referred as "**DoE Order**""] and any subsequent modifications/Amendments, if any.

Particularly, we, the Bidder, have read the clause regarding restrictions on procurement from a „Bidder of a country which shares a land border with India" and on sub-contracting to contractors from such countries.

☐ We certify that we, the bidder is/are not from such a country and will not subcontract any work to a subcontractor/sub vendor from such countries and is eligible to be considered.

Or

☐ We certify that we, the bidder and/or our subcontractor/sub vendor is/are from such a country which shares a land border with India, as brought out in the aforementioned orders. We are registered with the competent authority as defined in the Ministry of Finance, Govt. of India vide order mentioned above & a self-attested copy of registration certificate issued by the competent authority is enclosed along with the bid.

Tick (√) in the box (☐) as applicable

We further declare that any misrepresentation or submission of false/ forged document/ information in this regard shall be dealt with as per the provisions of Integrity Pact and/or Bidding Documents and/or CSPTCL"s policy and procedures.

Date: Name:

Place: Designation

SECTION -V

LIST OF VENDORS

VENDOR LIST:

The equipments for the capacitor bank bay should be of CSPTCL's approved vendor make only. The vendors for various equipments / materials are as mentioned here under:

Sl. No.	Particulars		Approved make
1	33KV Capacitor Bank	1	M/s Shreem Electrical Ltd.
		2	M/s ABB
		3	M/s BHEL
		4	M/s Mehar
		5	M/s Havells
		6	M/s Universal Cables Ltd,Satna
		7	M/s Madhav Capacitors, Pune
2	33KV VCB	1	M/s CGL
		2	M/s Siemens
		3	M/s BHEL
		4	M/s Areva / Alstom
		5	Ms Schneider Electric
3	33KV Isolator	1	M/s S & S Power Switchgear,Chennai
		2	M/s Hivelm, Chennai
		3	M/s GR Power, Hyderabad
		4	M/s Siemens
		5	M/s ABB
		6	M/s Areva / Alstom
		7	M/s Power line Accessories, Raipur
		8	M/s Danke Elect.Switchgears, Vdr
		9	M/s. Elektrolites (Power) Pvt Ltd, Jaipur
		10	M/s GK Electricals Bhopal
		11	M/s Universal Isolators
		12	M/s Wigman
		13	M/s High tension Howrah
		14	M/s Versatec
		15	M/s Engineers Enterprises , Jaipur
4	33KV CT & NCT	1	M/s CGL
		2	M/s Laxmi Engineering
		3	M/s SCT, Gaziabad
		4	M/s Vidyut Control
		5	M/s Universal Magno Flux,Indore
		6	M/s Heptacare Power Ind,Meerut
		7	M/s Hivoltrans Elect.
		8	M/s Mehru Elect & Mech, Bhiwadi
		9	M/s Epitrans(for CT only)
		10	M/s Kapco(for PT only)
		11	M/s GYRO
		12	M/s Ambarnath
5	33KV LAs	1	M/s CGL
		2	M/s Oblum, Hyderabad
		3	M/s Elpro
		4	M/s Elektrolite power pvt Ltd Jaipur
6	Control & Relay Panel	1	M/s Areva / Alstom
		2	M/s Siemens

	(without relays)	3	M/s ABB
		4	M/s GE
		5	M/s ERL
		6	M/s Danish , Jaipur
		7	M/s Amara Raja, Tirupati
		8	M/s System Electronics Ltd.
		9	M/s Maktel Control,Vadodara
		10	M/s Venson, Bangalore
		11	M/s Enpro Industrial Automation, Chennai
		12	M/s Hertz Electronics
		13	Ms Schneider Electric
7	Protection Relays		Areva, Siemens, ABB, Easun Reyrolle, SEL
8	Annunciation Relays	1	M/s Alan
		2	M/s Bhrani
		3	M/s Minilec
		4	M/s JVS
9	Insulators		WS, BHEL, Birla NGK, IEC, Modern Insulators
10	33 KV Post Insulators	1	M/s WS Insulators, Chennai
		2	M/s BHEL
		3	M/s Aditya/NGK Birla,Kolkata
		4	M/s Modern Insulator
		5	M/s Insulators & Electricals
		6	M/s Sarvana Global Energy Ltd.
11	Hardwares/ Clamps & connectors	1	M/s Rashtra Udyog
		2	M/s IAC Electrical, Kolkata
		3	M/s Electromech & Transtech, Kolkata
		4	M/s Klemmen
		5	M/s International Trasmission Product
		6	M/s Burma Electro
		7	M/s Aarpee & Associates, Kolkata
		8	M/s AK Power Industries Pvt. Ltd.
		9	M/s Supreme & Co. Kolkata
		10	M/s EMI Transmission Ltd., Thane
		11	M/s Modern Malleable
		12	M/s Tag Corporation, Chennai
		13	M/s Star Iron
		14	M/s Tyco
		15	M/s DAC
		16	M/s Eritech
		17	M/s Vinay industries, Rajnandgaon
		18	M/s NIKE Energy manufacturing, Varanasi
12	EHV Cables	1	M/s Poly cab
		2	M/s Havells
		3	M/s KEI
		4	M/s Universal
13	LT Power & Control Cable (Armoured and Unarmoured)	1	M/s Universal Cables Ltd,Satna
		2	M/s Finolex
		3	M/s Torrent cables.
		4	M/s Fort Gloster
		5	M/s Ravin cables, Mumbai

		6	M/s KEI Industries
		7	M/s KEC International
		8	M/s Unisef cables Ghaziabad
		9	M/s Maharaja cables New Delhi
		10	M/s RK Electrical Industries
		11	M/s Balaji Cables
		12	M/s Alpha Communication
		13	M/s Nakoda
		14	M/s Capcab India Ltd.
		15	M/s Deco Industries
		16	M/s Insucon Cables
		17	M/s Pasondia Cables
		18	M/s Scot Innovation (Ekta Cables)
		19	M/s Dashmesh Cables, Mumbai
		20	M/s Omega
		21	M/s NICCO
14	Steel Structure for equipment support structure	1	M/s KSK
		2	M/s Vijay Transmission
		3	M/s Shri Ashutosh Engineering Industries, Raipur
		4	M/s Shreem Electrical Ltd. Jaisinghpur
		5	M/s Indo East Corporation Pvt. Kolkata
		6	M/s Nandan Steel & Power Ltd, Raipur
		7	M/s Ratna Engineering Works, Raipur
		8	M/s IVRCL TLT Ltd, Nagpur
		9	M/s B K Infrastructure Pvt Ltd Raipur
		10	M/s. R.R. Ispat, Raipur
		11	M/s R.S. Infraprojects Pvt. Ltd., New Delhi
15	ACSR Zebra conductor	1	M/s Sterlite Technologies Ltd.
		2	M/s Gammon India Silvasa
		3	M/s Lumino Ind.Ltd Howrah
		4	M/s Smita Conductor Khanvel
		5	M/s Prem Conductors, Silvasa
		6	M/s Galaxy Transmission Ind. Sangali
		7	M/s Gupta Power infrastructure Ltd.
		8	M/s North East conductor
		9	M/s Apar Industries
		10	M/s Unity Conductors
		11	M/s Omega
		12	M/s Pioneer
		13	M/s Venkateshwara wires Jaipur
		14	M/s Rajputana cables and conductor Korba
		15	M/s Mahavir Transmission Ltd Dehradun
		16	M/s KJV Alloys Conductor Pvt. Ltd., Nagpur

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SECTION – VI

TECHNICAL SPECIFICATION FOR CONSTRUCTION OF 33 KV CAPACITOR BANK BAY WITH ASSOCIATED EQUIPMENTS

TECHNICAL SPECIFICATION FOR 36 KV 12 MVAR CAPACITOR BANK WITH ASSOCIATED EQUIPMENTS

1.0 SCOPE:

1.1 <u>This specification is intended to cover the design, manufacture, assembly, supply testing and commissioning of 36 KV 12 MVAR shunt capacitor banks with associated equipments such as circuit breakers, instrument transformers, isolators, NCTs, LAs, series reactor, control and relay panels etc..The scope also covers civil foundation works and supply G.I. structures and their erection at the existing EHV sub-stations.</u>

1.2 Each Capacitor Bank shall be individually protected by an Internal Fuses in series with each element in the unit.

2.0 STANDARDS:

2.1 36 KV 12 MVAR Capacitor Banks shall confirm in all respects to the following relevant ISS with latest editions and amendments at the time of supply:

Sr. No.	Standard Reference No.	Title
1	IS-13925 (I)	Shunt Capacitor for power systems
2	IS-13118	Circuit Breakers/High voltage Alternating current circuit breaker.
3	IS-2705	Current transformers.
4	IS-9921	Alternating current isolators (disconnects) and earthing switches.
5	IS-12672/89	Fuses (Internal)
6	IS-3842	Protection relays.
7	IS-2099	Bushing for alternating voltage above 1000V
8	IS-5561	Terminal Connectors.
9	IS-5553	Reactors.

2.2 Capacitor banks meeting any other national or international standards which ensure equal or better quality than the standard mentioned above will also be acceptable but in such cases, a copy of standard (English version) adopted, should be enclosed with the tender.

3.0 CLIMATIC CONDITIONS:

The Capacitor banks shall be suitable for continuous satisfactory operation under climatic conditions listed below:

1	Maximum ambient Air Temperature in shade (deg.C)	50 Deg.C
2	Minimum Ambient Air Temperature in shade (deg.C)	4 Deg. C
3	Maximum relative humidity (%)	95 %
4	Min. relative humidity	10 %
5	Height above main sea level	less than 1000 M
6	Average No. of dust storm days / annum	30 days
7	Average No. of thunder storm days / annum	40 days
8	Average annual rainfall (mm)	125 cm
9	Average No. of months of tropical monsoon condition.	4
10	Maximum wind pressure	150 kg/ sq mtr.

4.0 PRINCIPAL PARAMETERS:

4.1 SYSTEM PARAMETERS:

1	Nominal System voltage	33 KV
2	Highest System voltage	36 KV
3	System Frequency	50 Hz
4	No. of Phases	3
5	System grounding	Effectively earthed
6	Auxiliary Power supply:	
	a) A. C. Supply	230V, 1 Ph.2 Wire 50 Hz 415V, 3 Ph.4 Wire 50 Hz
	b) D. C. Supply	220V/110V 2 Wire

1. TECHNICAL SPECIFICATIONS FOR 33 KV VACUUM CIRCUIT BREAKERS

1.1 **SCOPE**: This Specification covers design, Manufacturing, testing, and supply of 33 KV Vacuum Circuit Breakers complete with all accessories required for its satisfactory operation in the system.

1.2 TYPE AND RATING: The circuit breaker shall be suitable for outdoor operation under the climatic conditions, as specified in Tender specification, without any protection from sun and rain.

The circuit breaker shall have the following rating:-

S.No.	Particulars	33 KV VCB
i)	Number of poles	3 Nos.
ii)	Frequency	50 Hz
iii)	Nominal system voltage	33KV
iv)	Highest system voltage(Rated)	36 KV
v)	Interrupting capacity at nominal system voltage	1500 MVA
vi)	Rated continuous current (RMS)	1600 Amps.
vii)	Basic insulation level	170 KV Peak
viii)	Power frequency withstand voltage for one minute	70 KV
ix)	Total break-time for any current up to the rated breaking current.	3 Cycles (Max 60 MS)
x)	Control circuit voltage	110 V DC
xi)	Operating duty for gang operation	0-0.3Sec-CO-3 Min-C0
xii)	The VCB shall be suitable for one reclosing followed by one delayed reclosing and lock out.	
xiii)	Minimum clearances:-	
	(a)Between phases	360 mm
	(b)Between live parts & ground	3700 mm
	(d) Creepage distance	900 mm or more
xiv)	IR value live part to earth	50 G ohm
xv)	Fault level for 1 Sec.	25 KA
xvi)	Mounting Structural Details	Hot dip galvanised lattice steel support structure to be supplied for all VCB
		One platform with steps shall be provided of such height that operator can easily operate the VCB climbing this platform.
xvii)	Centre to Centre distance between two structure foundation for supporting the complete CB assembly	**1500 mm**

The above are our minimum requirement. The suppliers may offer their standard design, keeping in view our minimum requirements.

1.3 STANDARDS:-

The circuit breakers shall comply with the requirements of IEC 56 or IS-13118 (1991) with latest amendment thereof except wherein specified otherwise. Equipment, meeting any other authoritative standard, which ensures equal or better quality then the standards mentioned above, will also be acceptable. The contractors shall clearly indicate the applicable standards to which their equipment complies-with. A copy of such standard, may also be enclosed.

1.4 GENERAL:-

The circuit breaker shall be of porcelain clad vacuum type. The breaker, complete in all respect, shall be supplied with all accessories in place and all internal wiring installed and terminated in the mechanism housing and the equipment shall be complete in all respects.

The circuit breaker shall provide rapid and smooth interruption of current under all conditions, completely suppressing all undesirable phenomena, even under the most severe and persistent short-circuit conditions or when interrupting small current or leading/lagging reactive currents. The details of any device incorporated to limit or control the rate of rise of restriking voltage across the circuit breaker contacts shall be stated. The over voltage caused by the circuit breaker switching on inductive or capacitive load shall not exceed 3.2 times the normal phase to neutral voltage. The total break-time for the circuit breaker, throughout the range of breaker operating duty, shall be stated in the tender and shall be guaranteed. The breaker shall be fit for capacitor switching (breaking) capacity atleast 400 Amps for Single Capacitor Bank breaking current.The breakers shall be provided with trip free mechanism.

Circuit breakers shall be suitable for mounting on steel structures. The cost of necessary frames for mounting the circuit breakers shall be included in the offered prices. All the structures shall be hot dip galvanized with 3 dips. Please note that cantilever type supports for mechanism box are not acceptable. The mechanism box shall have firm supports from bottom. This is necessary to minimize vibration of mechanism box, which in turn may disturb various settings.

The mechanism box shall be centrally mounted in front of the middle pole, Breaker with mechanism box mounted by the side of one of the extreme poles is not acceptable.

The CSPTCL intends to operate the rural 33 KV feeders with automatic reclosing scheme, the arrangement envisaged is as under:-

On the occurrence of a fault the concerned protective relay will open the circuit breaker as per its own characteristic. Thereafter, the breaker shall reclose but after pre-set time delay, which shall be adjustable (say range 4-10 sec. or near about).There shall be no further automatic reclosing. A simple type of reclosing relay (reputed make) for this purpose shall be provided under this kind of operation. It is also necessary that the breaker shall be suitable for this reclosing duty.

1.5 SPECIFICATION FOR CIRCUIT BREAKER:-

The circuit breakers shall consist of three identical phase units with a common operating mechanism. While offering the circuit breaker, the following details should be confirmed and furnished:-

Complete construction details of the equipment offered. It should be noted that the breakers should be suitable for outdoor duty, indoor breakers accommodated in outdoor kiosks are not acceptable.

Type, Make & source of vacuum bottles with relevant details shall be indicated in the offer, clearly.

The capacity of breaker to interrupt inductive and capacitive currents shall be indicated in the offer (rating of capacitor bank should be stated and type test report shall be furnished).

1.6 **VACUUM INTERRUPTER:-**

The design of the vacuum interrupter shall be such that it gives trouble free operation under normal load and fault conditions throughout the life of the equipment. As the efficiency of the breaker depends on the degree of vacuum inside the interrupter manufacturer shall ensure that the same is maintained consistently during service. To know the Residual life of vacuum interrupter, an indicator to indicate the status of contact erosion shall be provided.

The insulating ceramic body of the interrupter should have high mechanical strength and it should be capable of withstanding high temperature without any significant deterioration in its mechanical and electrical properties.

The metal/alloy used for the fixed and moving contacts shall have very low resistivity and low gas content. They should be resistant to arc erosion and the contact should have no tendency to get cold-welded under the high vacuum in the interrupter.

The interrupter design should ensure rapid denomination of the gas so that normal electrical strength of the gap is restored instantaneously.

The metallic below or any other similar vacuum sealing arrangement should be provided at the moving contact and should have a long fatigue life.

Manufacturers catalogue on vacuum bottle, indicating all the details shall essentially be submitted with the tender.

1.7 **TEMPERATURE RISE**:-

The maximum temperature attained by any part of the equipment, when in service, at site, under continuous full load conditions, exposed to the direct rays of the sun, shall not exceed 45 degree centigrade, above ambient temperature. The limits of temperature rise shall be as per relevant standards. The corrections proposed shall be stated in the tender and shall be subject to approval of the CSPTCL.

1.8 **INSULATION OF THE CIRCUIT BREAKER**:- The insulation to ground, the insulation between open contacts and the insulation between phases of the completely assembled circuit breaker shall be capable of withstanding satisfactorily di-electric test voltage corresponding to specified basic insulation level in the standard.

1.9 **INSULATORS:-** The basic insulation level of the Insulator and insulating porcelains shall be as specified and porcelain shall be homogenous and free from cavities and other flaws. They shall be designed to have ample insulation, mechanical strength and rigidity for satisfactory operation under conditions specified above. All insulators of identical ratings shall be interchangeable. The puncture strength of the insulators shall be greater than the flash over value. The insulators shall be type tested from independent Govt. Lab. as per relevant standards.

1.10. **OPERATING MECHANISM**:-

1.10.1 ***The circuit breaker shall be designed for remote control from the control room and in addition there shall be provision for manual operation of circuit breakers during maintenance and for local tripping and closing by the normal means***.

1.10.2 The circuit breakers shall have operation control and mechanical open closed indicator in addition to facilities for remote electrical indication.

1.10.3 The operating mechanism shall be of the spring charging type by electric control under normal operation. The mechanism shall be trip free electrically and mechanically. The

mechanism shall be capable of performing satisfactorily, the reclosing duty cycles indicated above, within the time specified. All working parts in the mechanism shall be of corrosion resistant material and all bearings which require greasing shall be equipped with pressured grease fittings. The mechanism shall be strong quick in action and shall be removable without disturbing the other parts of the circuit breaker.The mechanism and breaker shall be such that the failure of any spring will not prevent tripping and at the same time will not cause any false tripping or closing. The operating mechanism should be motor operated spring charged type preferably without chain drive. The motor for spring charging shall be suitable for operation on 230 volt AC supply.The AC Motor should have overload protection. Provision should also be made for Mounting of Mechanism Box at an adequate height and gear ratios shall be so chosen that one man should be able to charge the spring, without any additional efforts. **Please note that providing DC motor with rectifier is not acceptable**.

1.10.4 **CONTROL CUBICLE**:-

A common control cubicle shall be provided to house electrical, Controls, monitor devices and all other accessories except those which must be located on individual poles. The cubicle shall be IP 55 class protection and shall have weatherproof construction fabricated from sheet steel of minimum 2.5 mm. Thickness. The type test report on degree of protection test (IP--55) shall also be furnished.

The cubicle shall have front access door with lock and keys, Space heater, internal illumination lamp, 3 pin 5A socket with individual ON-OFF switches shall be provided in the cubicle.

For local operation following shall be provided:-

LOCAL/REMOTE selector switch

TRIP/NORMAL/CLOSE control switches with pistol grip handle.

1.10.5 The control circuits shall be designed to operate on 110 V DC & it shall be possible to adopt to work on other voltages by simply changing the operating coils. The closing and tripping coils shall be designed to operate satisfactorily at any control voltage from 70% to 110% of the specified normal DC voltage.

1.10.6 AC Power supply for auxiliaries will be available at 230 volt single phase 50 C/s.

1.10.7 Necessary cable glands for the cables of the operating mechanism shall be provided. The cables used for operation are all un-armoured 2.5 sq. mm copper control cables of 1100 V grade. The cable glands shall be suitable for 1 no. 8 core and 2 nos. 4 core cables.

1.10.8 The Circuit breaker shall be provided with trip free Mechanism so that tripping instructions could over-ride the closing instructions. An additional tripping coil shall also be provided in the trip circuit. The second coil shall have separate tripping level arrangement in the mechanism so as to avail advantages of second trip coil. Two trip coil shall be arranged separately for the operation of two different DC sources. Separate DC fuse circuit and electrically wired for schematic connection such that the healthiness of both trip coils could be checked individually.

1.10.9 The circuit diagram of Control circuit of VCB along with operating instructions (DO'S/DON'T) shall be embossed on metallic plate duly laminated and the same shall be fixed on the rear door of the Control cubicle from inside.

1.10.10 **WIRING**:-Wiring shall be completed in all respects to ensure proper functioning of the control, protection, monitoring and interlocking schemes.

a. All the wiring shall be carried out with 1100 V grade, PVC insulated stranded copper conductor of 2.5 Sq.mm.

b. Each wire shall be identified at both ends with permanent markers bearing wire numbers as per wiring diagram.

c. Wire termination shall be done with crimping type connectors with insulating sleeves. Wires shall not be spliced between terminals.

d. All spare contacts of auxiliary switches etc. shall be wired upto terminal blocks in the control cubicle.

1.10.11 **TERMINAL BLOCKS:-**

Stud type Terminal blocks shall be of 1100 V grade box clamp type ELMEX 10 Sq mm or approved equivalent, not more than two wires shall be connected in one terminal, Spare terminals equal in number to 20% of active terminals shall be provided. All the terminals should be of stud type only.

Terminal block shall be such located as to allow easy access. Wiring shall be so arranged that individual wires of an external can be connected to consecutive terminals.

1.10.12 **TERMINAL CONNECTORS**:-

6 Nos Terminal connector suitable for Zebra conductor shall be supplied with each breaker. The terminal connectors shall also meet the following requirements:

i) Terminal connectors shall be manufactured and tested as per IS: 5561.

ii) Terminal connector shall be tested for short circuit current capability test, temperature rise test, corona test etc. The terminal connectors should be manufactured by gravity die-casting process only.Bushing terminals shall be provided with terminal connectors of approved type and size for connection to external parts. Terminal connectors must have been successfully type tested strictly as per IS: 5561. The drawing of terminal connector offered shall have to be got approved by CSPTCL

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

iv) No part of a clamp shall be less than 12 mm thick.

v) Minimum conductor coverage on the clamp shall be 100mm. Minimum bushing terminal coverage in the clamp shall be 100mm and minimum pad overlap in the clamp shall be 100 x 100 mm.

vi) The nut, bolts & washers used in current carrying path shall be hot dip galvanized.

vii) For bimetallic connectors, copper alloy liner of minimum thickness of 4 mm (2 mm cu and 2 mm Al) shall be integral with aluminium body.

viii) Flexible connectors shall be made from tinned copper/aluminium sheets.

ix) All current carrying parts shall be designed and manufactured to have minimum contact resistance. The connectors shall be designed for minimum 120% of the maximum current carrying capacity of the ACSR conductor and the temperature rise under these conditions shall not be more than 50% of that of the main conductor.

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

Two numbers grounding terminals for connection with station earth mat shall be provided on each circuit breaker. Size of the earthing pad shall be suitable for 50 x 8 mm or 60 x 8 mm GI flat.

1.10.13 **AUXILIARY CONTACTS**:-

Eight numbers each of auxiliary contacts both of the normally open and normally closed types shall be provided in each circuit breaker for use in the remote indication and control scheme of the circuit breaker and for providing safety interlocking. Special contacts for use

with trip coils which permit for relative adjustment with respect to the travel of the circuit breaker contact shall also be provided, wherever required. There shall be provision to add more auxiliary contacts at a later date. If required.

1.10.14 **ACCESSORIES:-**

The vacuum circuit breaker shall be supplied as a complete unit with internal wiring installed and terminated in mechanism box and equipped with the following accessories:-

S.NO.	PARTICULARS	QTY.
1.	Motor operated spring charged mechanism Motor voltage- 230 V AC)	1 No.
2.	Trip coils suitable for 110 V DC:	2 Nos.
3.	Closing coil suitable for 110 V DC:	1 No.
4.	Pistol grip C.B, Control switch having trip/ Normal/ Close position:	1 No.
5.	Local/Remote selector switch	1 No.
6.	Mechanical Spring Charged indicator	1No.
7.	Manual operating handle for maintenance	1 No
8.	Facility for manual charging of spring	1 No.
9.	Operation counter	1 No.
10.	Auxiliary contacts 8 NO - 8 NC	1 Set
11.	Anti pumping device suitable for 110V DC	1 No.
12.	Terminal connectors suitable for connecting Zebra conductor	6 Nos.
13.	Cubical illuminating lamp with cage & switch	1 No.
14.	MCB for both AC and DC supply	1 No. each
15.	Spare terminal connectors	20% of total terminals
16.	Mechanical ON /OFF indicator	1 No
17.	Space Heater with thermostat and ON /OFF switch	1 No
18.	Power Type 3 PIN socket with ON /OFF switch (5A)	1Set
19.	Earthing terminals	2 Nos.
20.	Duly laminated metallic Plate embossed with Circuit Diagram of control circuit of VCB along with Operating Instructions	1 No.
21	Lamp (LED) ON /OFF and spring charge indicator (Red lamp for ON,Green Lamp for OFF and Blue for Spring charge)	3 Nos

1.11 Other standard accessories which are not specifically mentioned above, but are required for efficient and trouble free operation of breaker, should also be provided, without any extra cost.

1.12 **TYPE TESTS**:-

1. Type test certificates on VCB for the following tests as per IS 13118 with latest amendment there of from any of the Govt. of independent Govt. approved Laboratory shall invariably be furnished:-
   (i) Short circuit duty test.
   (i) Short time current rating test.

(ii) Mechanical endurance test.
(iv) Temperature rise test.
(iii) Lightning impulse voltage withstand test.
(iv) Capacitor switching off duty test for single bank of atleast 400 Amps for Single capacitor bank breaking current.
vi) Power Frequency with stand voltage test dry and wet
vii) Degree of protection IP 55 for the Control Cubicle

1.12.2 The above type test certificates must accompany drawings of type tested equipment duly signed by type testing authority.

1.12.3 The above tests must not have been conducted on the equipment earlier than 10 years from the last date of submission of bid.

1.12.4 In case of any change in design of Breaker already type tested and the one offered against this specification the CSPTCL reserves the right to demand repetition of tests, without any extra cost.

1.13. **ACCEPTANCE AND ROUTINE TESTS:-**

1.13.1 All acceptance and routine tests as stipulated in relevant standards shall be carried out by the supplier in presence of CSPTCL representative.

1.13.2 Immediately after finalisation of the programme of type testing, the suppliers shall give fifteen days advance intimation to the CSPTCL, to enable him depute his representative for witnessing the tests.

1.14 **RATING PLATES:-**

The detailed rating plate shall be as per IS and in addition, shall indicate serial number of the equipment manufacturer's name our order number and date.

1.15 **SCHEDULE OF IMPORTANT TECHNICAL SPECIFICATION / REQUIREMENT FOR 33 KV VCBs TO BE ORDERED AGAINST THIS TENDER**

Certain important technical specification requirements have been described hereunder. The requirement may please be studied and incorporated carefully in the equipment.

1) Please note that support structure shall be hot dip galvanized and this should be incorporated on OGA Drawing. Ensure furnishing details of loading on the structure both vertical and horizontal in normal condition as well as in broken wire condition at plinth level to develop foundation design of your make VCBs. This information should be indicated in general arrangement drawing.

2) Please note that all breakers shall be provided with trip free mechanism. In order to ensure full proof trip free operation of circuit breaker the design should ensure that the stored energy is definitely available for tripping operation before closing operation of circuit breaker is performed. In the absence of stored tripping energy closing operation is to be prevented.

3) In order to improve reliability, circuit breaker shall be provided with double trip coil. However, as far as possible efforts should be made to provide both trip coils at different locations to actuate individual trip latch. Independent DC circuit may be provided for the two trip coils and a separate DC circuit for the closing coil. These two trip coils shall be electrically wired upto control cubicle so that healthiness of both trip coils could be checked individually.

4) The circuit breaker shall be designed for remote control from the control room and in addition there shall be provision for manual operation of circuit breakers during

maintenance and for local tripping and closing. In addition there shall be provision for mechanical arrangement for emergency trip.

5) The circuit breakers shall have a mechanical "Open" / "Close" indicator in addition to electrical indication. It shall be visible to operating personnel standing on the ground level.

6) An operation counter shall be provided with the operating mechanism.

7) The terminal connector for connection of conductor should be suitable for Zebra conductor with Universal take off arrangement. In case if required one "L" shaped clamp may be provided to facilitate horizontal as well as vertical take off arrangement. Terminal connector shall be manufactured out of Aluminium alloy grade LM 6 or LM 25 as per IS and by gravity die casting process only and should have six bolts to hold the conductor and conductor hold length shall be 100 mm approximately.

   All nuts and bolts shall be stainless steel and no part of the terminal connector clamps shall be less than 12 mm thick.

8) For bimetallic connector bimetallic strips of electrical grade copper of adequate thickness well amalgamated surface to surface with aluminium sheet should be provided.

9) Following drawings are required to be submitted on priority for scrutiny and approval incorporating above observations / requirement positively:-

   i) General arrangement drawing indicating location of control cubicle, mechanical ON-OFF indicator, operation counter, device for manual / emergency trip upper and lower terminal connector, and bushing creepage distance (at least 900 mm for 33 KV).

   ii) Detailed structure drawing clearly indicating the foundation details, details of loading on the structure as explained above, various dimensions details of various members of structure and weight of circuit breaker etc.

   iii) Schematic diagram indicating details of auxiliary contacts, ON, OFF healthy trip and spring charge indication, double trip coil arrangement, antipumping and trip free mechanism feature etc.

   iv) Wiring diagram for above schematic diagram.

   v) Details of auxiliary contacts utilized for various internal scheme and details of auxiliary contacts available for customer use.

   vi) Packing details drawing indicating total number of package and content of each package.

   vii) The name (rating) plate shall be engraved / anodise in which apart from basic details following information may also be incorporated.

   Capacitor bank switching off capacity in MVA,
   Applicable standard IES/ IS,
   Interrupting capacity of the breaker in MVA

   viii) Engraved electrical wiring diagram could be permanent / refixed on the rear of front door of the control cubicle. Details required for casting of foundation may also be engraved / refixed by the side of electrical / diagram or this purpose, the various schematic drawing may be condense and one separate drawing may be submitted to us for our approval.

10) All wirings in the cabinet shall be done neatly and accommodated in plastic channels with sliding cover. Practice of colour coding / feruling / bunching etc. shall be followed to present a neat installation. All glands / cable entry points shall be provided with suitable blanking plates to prevent entry of moisture / vulture. At least 20% spare terminals shall be provided. Three-pin power plug shall be of control panel grade with removable lid.

11) Backup mechanical tripping arrangement should be provided to facilitate tripping of circuit breaker for the condition when DC is not available or tripping coil is burnt and other similar emergencies. Suitable lever device may be provided for trip operation under these conditions.

12) Please ensure that no wire / cable is left exposed to atmosphere directly. In case if any connection is required from circuit breaker operating box to control cubicle etc, these connections should be taken through cable but through proper guided channel with sliding covers rigidly fixed on support structure. Please note that both ends of this connecting cable shall be properly sealed to prevent ingress of rain water / moisture.

13) The support structure should have proper Earthing arrangement and this should be indicated in the drawing.

14) In case if cementing of porcelain bushing is required, please ensure that proper cementing process has been adopted.

15) The auxiliary switches shall be properly designed wherein change of contacts takes place by snap action and change of status of contact is visible physically.

16) Identification mark may be done on the each breaker pole to co-relate the serial number of bottles engraved on breaker poles with that of circuit breaker Sl. No.

17) For spring charging operating through operating handle it is desired that mechanism box may be mounted at adequate height and gear ratio shall be so chosen that one man is able to charge the spring without any additional efforts. Suitable latching arrangement shall be provided such that during manual charging operation, if power supply gets restored, jerk to operating personnel is avoided. The handle shall be either at normal operable height or otherwise a suitable foldable ladder shall be provided to facilitate manual charging of spring. Suitable arrangement for storage of handle in the box shall be provided.

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2. TECHNICAL SPECIFICATION FOR CURRENT TRANSFORMERS

2.1 SCOPE

This specification provides for design, manufacture, stage testing, inspection and testing before despatch, packing and delivery of outdoor current transformer for protection/metering .

2.2 STANDARDS

The rating as well as performance and testing of the current transformers shall conform but not limited to the latest revision and amendments available of all the relevant standards as listed hereunder.

Sl. No.	STANDARD No.	TITLE
1	IS 2165	Insulation co-ordination for equipment of 100 KV and above
2	IS2705 (I – IV)	Current transformers
3	IS 2099	High voltage porcelain bushings
4	IS 3347	Dimensions of porcelain transformer bushings
5	IS 2071	Method of high voltage testing
6	IS 335	Insulating oil for transformers and switchgears
7	IS 2147	Degree of protection provided by enclosures for low voltage switchgear and control
8	IEC 185	Current transformers
9	IEC 270	Partial discharge measurement
10	IEC 44 (4)	Current transformer measurement for P.D.s
11	IEC 171	Insulation co-ordination
12	IEC 60	High voltage testing techniques
13	IEC 8263	Method of R.I.V. test on high voltage insulators
14	IS 3156 (Part IV)	Capacitor voltage transformers
15	IEC 186	Voltage transformers
16	IEC 186 A	First supplement of IEC publication 186
17		Indian electricity rules 1956.

2.3 BASIC DESIGN FOR CURRENT TRANSFORMERS:-

The Current Transformers for solidly grounded system shall be outdoor type. Single-phase oil immersed and self cooled type suitable for services indicated as above complete in all respect, conforming to modern practices of design and manufacture.

As stated, all CTs shall be paper-insulated oil filled. After providing paper insulation they shall be housed in the tank containing oil. Please note epoxy casting in primary & secondary cores is not acceptable. Compound filled CTs are also not acceptable.

2.3.1 The insulation as per IS: 4800 of the current transformers shall be so designed that the internal insulation shall have higher electrical withstand capability than the external insulation. The designed dielectric withstands values of external and internal insulations shall be clearly brought out in the guaranteed technical particulars. The dielectric withstand values specified in this specification are meant for fully assembled current transformers.

2.3.2 The Current transformers should be designed using single Porcelain housing. The OIP insulation in porcelain portion is to be provided with condenser grading. Details like number of grading foils, the method of insertion of grading tools in insulation, method to ensure grading foil location during manufacturing may be furnished.

2.3.3 No joints shall be provided in the porcelain. The housing shall be made of homogeneous, vitreous porcelain of high mechanical and dielectric strength, glazing of porcelain shall be of uniform brown or dark brown colour with a smooth surface arranged to shed away rain water or condensed water particles, (fog). The profile of porcelain shall be aerodynamic type as per IEC-815. To make the current transformer leak proof a metallic flange should be cemented to the porcelain.

2.3.4 Special precaution will have to be taken towards selection of material for the metal tank and the following will have to be ensured.

i) Material for metal tank should be minimum 3 mm thick.

ii) Welded joints have to be minimized to avoid possibility of oil leakage. In any case welding in horizontal plane shall be avoided.

2.3.5 Prevention of Oil leakages and Entry of Moisture**:-**

The sealing of CTs shall be properly achieved. The following should be properly taken care of & arrangement provided by the manufacturer shall be described:

i) Locations of emergence of primary and secondary terminals.

ii) Interface between porcelain housing and metal tank/s.

iii) Cover of the secondary terminal box.

iv) Oil level indicator should be provided with leak proof Teflon sealing arrangement and wide area visible indication and a float to indicate the oil level. The oil level shall be visible from ground level. Projected type oil level indicator welded into main metal tank shall be preferred to avoid oil leakage.

2.3.6 While forming the OIP Insulation, the Insulating Paper has to be procured from Reputed Paper Manufacturers. The list of original paper suppliers is required to be submitted along with the tender. The new insulating oil is required to be used for impregnation of paper insulation and CT filling. Use of reclaimed or once used oil is prohibited.

2.3.7 The Insulating Oil used for impregnation and flooding is to be processed before use. The processing includes drying and degassing. Stainless steel bellows shall be used for volumetric compensation of oil.

2.3.8 All the sealing locations have to be provided with Moulded Rubber "O" Rings/ flat Gaskets. CT Designs with Cork Sheet as the sealing material are not acceptable. In case the gasket sealing surface is provided on mild steel material, details have to be provided regarding corrosion protection treatment provided on such surfaces. Also a description has to be provided on how the compression of the"O" Ring or Gasket is limited & controlled.

2.3.9 During inspection, each CTs will be subjected to pressure test at 0.7 kg /cm^2 for 8hrs.

2.3.10 The CTs should be provided with pressure relief diaphragm.

2.3.11 The secondary terminals shall be brought out in a weather proof terminal box. Firstly the connections will be terminated on internal board and then the same shall be brought out in the Secondary terminal box. The terminal box shall be provided with removable gland plate and gland/s suitable for 1100 volts grade, PVC insulated, PVC sheathed multi core 4 or 6 sq.mm for CT.

The terminal box shall be dust and vermin proof. Suitable arrangement shall be made for drying of air inside the secondary terminal box. The dimensions of the terminal box and its openings shall be adequate to enable easy access and working space with use of normal tools. The outer cover of secondary terminal box shall have provision for sealing by way of insertion of wire in the bolt hole.

2.3.12 Polarity shall be invariably marked on each primary & secondary terminals. All marking shall be engraved or through anodised plate to be fixed firmly.

2.3.13 The Current transformers shall be provided with a rating plate with dimensions and markings as per IS:2705. The markings shall be punched / engraved and not painted. This rating plate shall also contain CSPTCL's work order No. and date.

2.3.14 The current transformer shall be vacuum filled with oil after processing and thereafter hermetically sealed to eliminate breathing and to prevent air and moisture from entering the tanks. Provision of oil sampling is required for each CT with proper sealing arrangement. The construction details and method to sample oil should be provided. Manufacturer shall provide limits of BDV Tan delta, moisture content and DGA to be followed for evaluation on oil samples at the time of routine testing.

2.3.15 The castings of base, collar etc. shall be die-cast and tested before assembly to detect cracks and voids if any.

2.3.16 The instrument security factor of metering core shall be low enough and not greater than 5. This shall be demonstrated on all the ratios of the metering core, in accordance with procedure specified in IEC-816 or IS:2705.

2.3.17 Current transformer shall be provided with two separate earthing terminals for bolted connection to 50 x 8 mm MS flat to be provided by the Purchase for connection to station earth-mat.

2.3.18 Current transformer shall be provided with suitable lifting arrangement, to lift the entire unit. The lifting arrangement shall be clearly shown in the general arrangement drawing. Lifting arrangement (lifting eye) shall be positioned in such a way as to avoid any damage to the porcelain housing or the tanks during lifting for installation/transport. Necessary string guides shall be offered which shall be of removable type.

2.4 **PRIMARY WINDINGS**:-

2.4.1 Primary winding shall be made out of electrolytic grade 99.9% conductivity copper. The primary winding shall be housed in rigid metallic shell. Joints in the primary winding shall not be provided.

2.4.2 It is desired that from the point of view of adequate mechanical strength in the normal course and also during short circuit, proper precaution should be taken as under :-

i) The primary winding should be housed in rigid metallic shell.

ii) The winding assembly should be held firmly and for this purpose suitable clamping arrangement at the bottom shall be provided and explained through suitable sketch. Firm clamping arrangement is a must and <u>holding of winding using nylon rope etc. shall not be acceptable.</u>

2.4.3 The primary winding current density shall not exceed 1.5 A/sq.mm. The design density for short circuit current as well as conductivity of the metal used for primary windings of CTs shall meet the requirement of IS:2705. The manufacturer shall submit the detailed calculation for selection of winding cross sections. The selected Amp turns for the CT shall be justified on the basis of Type test reports.

2.5. **SECONDARY WINDINGS**:-

Suitably insulated copper wire of 99.9% conductivity electrolytic grade shall be used for secondary windings. The exciting current of the CTs shall be as low as possible. The magnetization curve for all the cores of CTs should be submitted with the offer.

2.6 **PRIMARY TERMINALS**:-

Current Transformer's primary terminal shall be made of HDEC.The primary terminal on either side of the tank shall be of not less than 100 mm clear length (i.e. after bolts/washers/check-nuts) to accommodate terminal connector. For CTs the dia /size of the primary terminal shall be 30mm diameter copper.

The primary terminals shall be of heavily tinned electrolytic copper. The minimum thickness of tinning shall be 15 microns.

2.7 **SECONDARY TERMINALS**:-

Secondary terminal studs shall be provided with at least three nuts and adequate plain and spring washers for fixing the leads. The studs, nuts and washers shall be of brass, duly nickel plated. The minimum out side diameter of the studs shall be 10 mm. The length of at least 15 mm shall be available on the studs for inserting the leads. The horizontal spacing between centers of the adjacent studs shall be at least 1.5 times the outside circum dia of the nuts. The arrangement should be shown through suitable sketch.

2.8 **CORE**:-

The grade M4 toroidal core shall be of high-grade non-ageing electrical silicon laminated steel of low hysterics loss and high permeability to ensure high accuracy.

The current transformer core to be used for metering shall be of accuracy class specified or appropriate class suitable for commercial and industrial metering.

Enamel, if used for conductor insulation, shall be either polyvinyl acetate type or amide type and shall meet the requirements of IS:4800. Polyester enamel shall not be used.

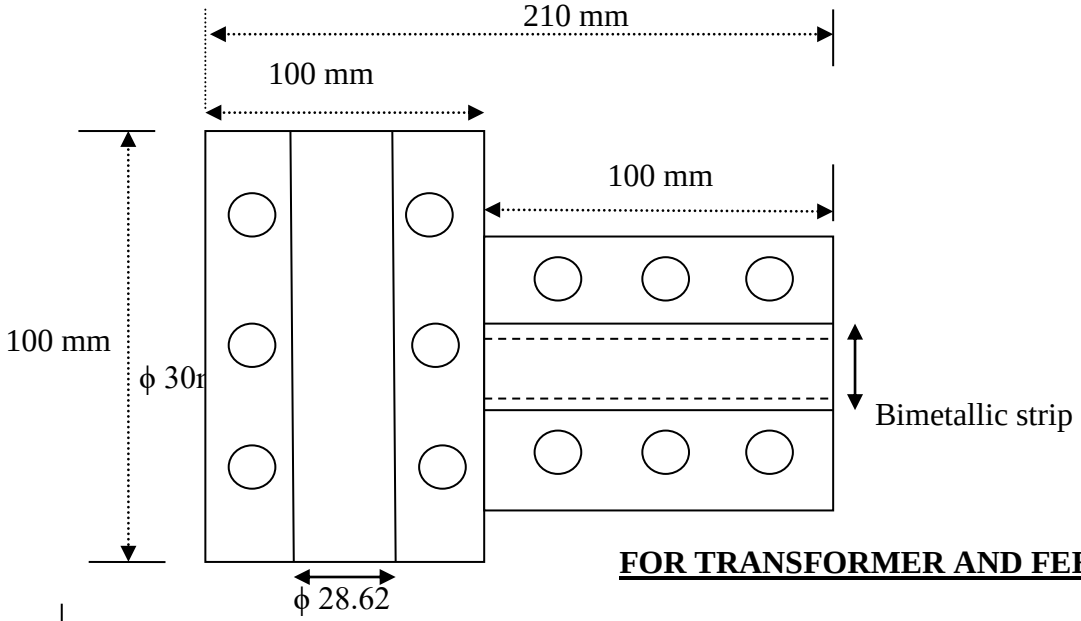
In case of CTs the saturation factor of the metering core shall be low enough not to cause any damage to measuring instruments in the event of maximum short circuit current. As far as PS class core is concerned all precautions shall be taken in design to achieve KPV & magnetization curve for the same shall be furnished with the drawings. It may please be noted that additional devices / components such as condenser/ resisters/ inductor should not be used internally or externally to achieve the accuracy class/ ISF of CTs.

2.9 **SURFACE FINISH**:-

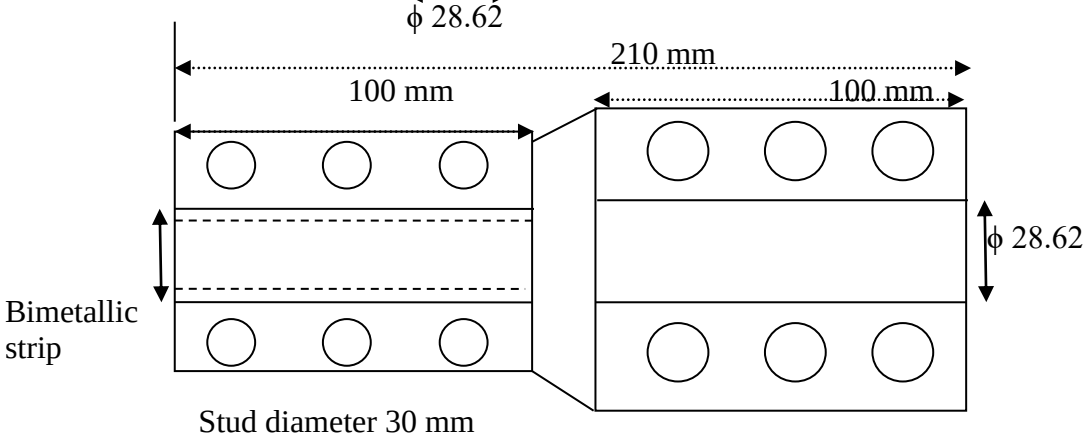
The metal tanks & all the ferrous parts/hardware, exposed to atmosphere, shall be hot dip galvanised conforming to IS; 2633. All other fixing nuts, bolts, washers shall be made out of galvanized steel.

2.10 TERMINAL CONNECTORS;-

The terminal connector for primary terminal shall be designed with min. thickness of 12 mm having 100 mm coverage of conductor and CT stud with six bolts of M10 size,having bimetallic strip of 2 mm (1mm Cu+1 mm Al) as per the drawing furnished below.



FOR TRANSFORMER AND FEEDER



FOR TRANSFER BUS BAY

2.11 The Current transformer shall be suitable for mounting on steel structure of CSPTCL design.

2.12 The Capacitance and Tan Delta Measuring Terminal is to be provided on each CT.

2.13 The height of centre of primary terminal to base shall be 2300±100mm. This is necessary to ensure ease of replacement of CTS.

2.14 TEMPERATURE RISE -

The current transformers shall be designed to limit the temperature of winding and other parts as specified in the standards, when corrected for the difference between the temperature prevailing at site and temperature as per GTP. The temperature rise at 1.25 times rated primary current as specified when applied continuously at rated frequency and at rated burden shall not exceed the limits specified above .

2.15 TESTS :-

All acceptance and routine tests as stipulated in the relevant standards shall be carried out in the presence of CSPTCL's representative:-

(i) Verification of terminal marking.

(ii) Measurment of Tan Delta value at 27deg centigrade.

(iii) Power frequency withstand test on primary and secondary winding
(iv) Partial discharge measurement (as per clause 8.2.2 of IEC 44-1)
(v) Power frequency withstand tests between section (as per clause 8.3of IEC 44-1)
(vi) Inter turn voltage tests per clause 8.4 of IEC 44-1)
(vii) Determination of errors.

Note: - The 33 KV CTs should have been type tested as per relevant IS & IEC in a NABL accredited lab and Type Test Certificate should be submitted. The type tests should not be older than seven years from the last date of submission of bid.

2.16 Other design features & Acceptance criteria for Current Transformer :-

i) The current density of primary winding of CTs at rated current shall not exceed 1.5 Amp per Sq mm.
ii) The CT should be completely leak proof. Even the slightest oil seepage from any part shall not be accepted.
iii) Type test report from NABL accredited lab may be submitted for acceptance for all the equipments.
iv) All ferrous parts shall be Hot Dipped Galvanised as per relevant IS

2.17 PRINCIPAL TECHNICAL PARAMETERS OF CURRENT TRANSFORMERS.

S.N	ITEM	Specification for 33 KV CT
1	Type of C.T. / installation	Single phase, Oil filled, Hermetically sealed / Out door type.
2	Type of mounting	Pedestal type
3	Suitable for system frequency	50 Hz.
4	Highest system voltage (KV rms.)	36
5	Current ratio (A/A)	400-200/1-1-1 A
6	Ratio Taps	-
7	No. of Cores	3
8	Class of accuracy (winding I/II/III/IV)	PS/0.5s/0.2s
9	Burden in VA	--/30/15 VA
10	Knee point voltage	P.S > 600 V
11	Method of earthing the system	Solidly earthed
12	Rated continuous thermal current (A)	125%
13	Acceptable partial discharge level at 1.1 times the rated voltage	
14	Maximum radio interference voltage at 1.1 times the rated voltage	
15	1.2 / 50 micro second lightening impulse withstand voltage (KVp)	170
16	One minute dry power frequency withstand requirement for secondary winding (KV rms.) for one second	70
17	Power frequency over voltage withstand requirement for secondary winding (KV rms.) for one second	3 KV
18	Minimum creepage distance of porcelain housing (mm)	900 mm
19	Rated short time withstand current for one second duration (KA rms.)	25 KA/sec

S.N	ITEM	Specification for 33 KV CT
20	Rated dynamic withstand current (KAp)	62.5 KAp
21	Seismic acceleration	0.3 g
22	Temperature Rise with permissible overloading	
23	Total weight of CT with oil	>120 Kg
24	Total quantity of oil	>20 Ltr.
25	Bushing creepage factor	< 4
26	Primary to earth insulation resistence at 30° C	> 50 G ohm
27	Flux density at knee point voltage for CT.	1.4 Tesla
28	Cross section of primary winding	For 400 A CT-275 sqmm
29	Current density of primary winding of CTs at rated current	shall not exceed 1.5 Amp per Sq mm
30	Dielectric dissipation factor (Tan delta) at $1/\sqrt{3}$ rated voltage & ambient temperature (10 deg C. to 40 deg C.)	--
31	Material of primary winding	99.9% electrolytic copper
32	Material of secondary winding	99.9% electrolytic copper
33	Earthing terminal arrangements.	2 terminal for bolted connection to 50x6mm MS flat.
34	Grade of oil	EHV Gr.-I as per IS:335
35	Instrument security factor for metering core	Max 5
36	Material of Gasket used	Nitrite butyl rubber/ Neoprine
37	Core material used	Grade M4 toroidal core of high grade non ageing electrical silicon or better grade
38	Material of enamel used	Polyvinyl acetate or amide type
39	CT top / bottom Gasket mounting surface	Gasket mounting surface shall be smooth laser cutting finish
40	Secondary lead out connection	2.5 Sqmm flexible copper wire

TERMINAL CONNECTORS :

The terminal connectors shall meet the following requirements:

i) Terminal connectors shall be manufactured and tested as per IS: 5561.

ii) Terminal connector shall be tested for short circuit current capability test, temperature rise test, corona test etc. The terminal connectors should be manufactured by gravity die-casting process only. Bushing terminals shall be provided with terminal connectors of approved type and size for connection to external parts. Terminal connectors must have been successfully type tested strictly as per IS: 5561. The drawing of terminal connector offered shall have to be got approved by CSPTCL

iii) All castings shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges and corners shall be blurred and rounded off. Compression type of clamps should be supplied.

iv) No part of a clamp shall be less than 12 mm thick.

v) Minimum conductor coverage on the clamp shall be 100mm. Minimum bushing terminal coverage in the clamp shall be 100mm and minimum pad overlap in the clamp shall be 100*100 mm

vi) The nut, bolts & washers used in current carrying path shall be hot dip galvanized.

vii) For bimetallic connectors, copper alloy liner of minimum thickness of 4 mm(2 mm Cu and 2 mm Al) shall be integral with aluminium body.

viii) Flexible connectors shall be made from tinned copper/ aluminium sheets.

ix) All current carrying parts shall be designed and manufactured to have minimum contact resistance. The connectors shall be designed for minimum 120% of the maximum current carrying capacity of the ACSR conductor and the temperature rise under these conditions shall not be more than 50% of that of the main conductor.

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

xi) All connections with ACSR conductors shall be bolted type.

Two numbers grounding terminals for connection with sub-station earth mat shall be provided on each CT. Size of the earthing pad shall be suitable for 50 x 6 or 65 x 8 mm Earth flat.

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3. TECHNICAL SPECIFICATION FOR 10 MVAR, 33 K.V. CAPACITOR BANK

3.1 **SCOPE**:-This specification provides for design, manufacture, stage testing, inspection and testing before dispatch, packing and delivery of 33 KV 10 MVAR capacitor bank.

3.2 **Technical Specifications for 10 MVAR 33 KV Capacitor Bank.**

S.N	PARTICULARS	VALUES	UNITS
1.	Nominal System Voltage	33	KV
2.	KVAR capacity at nominal system voltage	10,000	KVAR
3.	Rated Voltage of Capacitor Banks	36	KV
4.	Rated output of capacitor Bank at rated Voltage	12,000	KVAR
5.	Connection of capacitor Bank having unit protected with external fuses / internal fuse	Double Star	
6.	Rating of capacitor Unit	6.93	KV
7.	Basic insulation level	170	KVp
8.	P.F. withstand voltage	70	KV
9.	Rating of capacitor Unit	166.67	KVAR.
10.	No. of capacitor units per Bank	72 + 8 spare	Nos.
11.	Capacitor KVAR available at nominal system voltage	10000	KVAR
12.	Creepage distance	25	mm per KV
13.	Power Loss	Permissible losses should be between 0.18 watt per KVAR to 0.2 watt per KVAR including losses in fuse subject to tolerance as per I.S.S	
14.	NCT	10-5/1-1A, 15VA for both core, CL 1.0 for core 1 & 5P20 for core 2	
15.	Rated capacitance of capacitor unit	11.05 µfd	

COMPLETENESS OF EQUIPMENT:

33 KV, 10 MVAR, 3 phase 50 Hz double star connected capacitor bank is required complete with the following accessories:-

1) Each 10 MVAR bank will comprise of 72 capacitor units of 166.67 KVAR, 6.93 KV rating.
2) Each 10 MVAR capacitor bank will be organized in double star formation i.e. with 36 units in each star and the two stars of 10 MVAR capacitor bank will be protected through neutral current transformer.
3) 36 units in each star of the bank will be mounted in 3 series groups such that each series group will have four units of 166.67 KVAR, 6.93KV rating in parallel.
4) On the body of each Capacitor Unit rated voltage, rated KVAR rating, rated capacitance, S.No. (in the manner CSPTCL / SNo.), make and year of manufacture shall be engraved / inscribed.
5) One No. galvanized mounting structure, of minimum height of 3200mm, the drawings of which shall be approved by CSPTCL.
6) All interconnections, mounting arrangement, terminations, earthing arrangement, mounting racks, base insulator, terminal connector, nuts/bolts, required quantity of conductor/ strip for formation of neutral point and making connections to NCT and all

other required accessories for completing the bank in a neat manner. The terminal connector shall be suitable for Zebra ACSR.

7) Foundation bolts of 20 mm diameter for bolted type hot dip galvanized steel support structure.
8) One complete set of 2 mm thick MS sheet foundation templates for structure of each 10 MVAR capacitor bank, to be delivered in advance along with foundation bolts.
9) 8 Nos. spare capacitor units of rating 166.67 KVAR, 6.93 KV as per description furnished above.
10) 6 Nos. series reactor as per tender specification shall be provided, the design/ drawings of which shall be approved by CSPTCL.

3.3 **Specification of Series Reactor :-** Reactor should be copper wound.

S.N	PARTICULARS	VALUES	UNIT
1	Rated KVAR	4	KVAR
2	Rated voltage	36	KV
3	Rated current	96.22	Amp
4	Max. continuous current	130% of rated current	
5	Impedance / PH	0.432	Ohm

3.4 **TEST :-**The capacitor units will be tested at the manufacturers work as per IS: 2834 and IS:13925 for the following test:

A) TYPE TEST:-

The contractor shall furnish a certificate of the following type test. The type tests should not be older than ten years from the last date of submission of bid. CSPTCL may at its option call for these tests to be performed on one capacitor unit of each rating to be selected at random.

a) Test for dielectric loss angle(power factor)
b) Test for capacitor loss
c) Stability test
d) Impulse voltage test between terminals and container
e) Short circuit test
f) Endurance test as per IS: 13925 (Part – II)

All the equipments offered, shall be fully type tested as per the relevant standards. The bidder must furnish one set of type test reports along with bid, in respect of the equipment (of the type and design offered) type tested in an independent Govt./ Govt. approved test laboratory.

B) ROUTINE TESTS:-

a) Tests for output and / or capacitance
b) Voltage test between terminals
c) Voltage tests between terminals and container.
d) Voltage tests between terminals and earth.
e) Insulation resistance test.
f) Test for efficiency of discharge device.
g) Measurement of tangent of dielectric loss angle and capacitor loss.

The routine/acceptance tests as per relevant ISS shall be conducted at sub contractor works on each unit of Circuit Breaker, Isolator, Current Transformer, NCTs, LAs, C & R Panel and Series Reactor

3.5 TOLERANCE ON TEST RESULTS:

Since Indian Standard IS:13925 or IEC publication allow certain tolerance for the acceptance of losses for capacitors and series reactor respectively. The bidders are requested to indicate whether the figures given for guaranteed losses in schedule of Guaranteed Technical Particulars are with or without such tolerance. If the tolerances are applicable, the limit for the same should be indicated. In absence of any information to this effect, the figures for losses will be increased by 10% in case of shunt capacitors & 15% in case of series reactors. Any change in the figures assigned for the losses will not be permitted after opening of bids & the bid evaluation will be carried out on the basis of information made available at the time of bid opening.

3.6 TESTS AT SITE:

The purchaser reserves the right to conduct all test on Capacitors, Capacitor fuses, Circuit Breaker, Isolators, Current Transformer, NCTs etc. after arrival at site and the contractor shall guarantee test certificate figures under actual service.

3.7 INSPECTION:

All the tests as per relevant ISS shall be carried out at the works of manufacturer. The purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.

The inspection may be carried out by the purchaser at any stage of manufacture / before despatch as per relevant standard.

Inspection and acceptance of any material under the specification by the purchaser shall not relieve the accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective. The Bidder shall keep the purchaser informed in advance about manufacturing programme so that arrangements can be made for inspection.

The Bidders shall give 15 days advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests.

The bidder should intimate CSPTCL regarding readiness of following equipments at the manufacturer's works:

(i) Capacitor bank
(ii) 33KV VCB
(iii) 33KV CTs & NCTs
(iv) 33KV LAs
(v) C&R Panels
(vi) Series Reactors
(vii) GI structures

Inspection of full quantity of equipments for all the sub-stations should be offered in one lot so that inspection can be done by one inspecting officer only.

3.8 The successful tenderers shall within 15 days of placement of order, submit following information to the purchaser:

i) List of bought out items and the names of sub suppliers selected for raw material should be furnished along with offer.
ii) Type test certificates of the raw materials and bought out accessories.
iii) 3 sets of drawings of each equipment for approval along with elevating structure drawing.

3.9 DRAWING :-The contractor shall provide general outline drawing and GTP of capacitor banks, neutral current transformer.

TECHNICAL SPECIFICATION FOR 33 KV AIR BREAK DISCONNECTOR (ISOLATOR):

4.1. **SCOPE**:-This specification is provided for design, manufacture, stage testing, inspection & testing before despatch, packing and delivery of 33 KV class isolators double break type, and support / post rotating type insulator

STANDARDS:-

S. N.	Standard No.	Title
1.	IS:9921	Alternating current isolators (dis-connectors) and earthing switches.
2.	IEC:129	---- do ----
3.	IS:2544	Insulators
4.	IS:2147	Degree of protection provided by enclosures.
5.	IS:4691	---- do ----
6.	IS:325	Three phase induction motor
7.	IS:4722	Rotating electrical machines
8.	IS:2629	Recommended practice for hot dip galvanising of iron and steel.
9.	IS:4759	Hot dip galvanisation coating on structural steel.
10.	IS:2633	Method of testing, weight, thickness & uniformity of coating on fasteners
11.	IS:1573	Electroplated coating of zinc on iron & steel
12.	IS:3033	Spring Washers
13.	IS:2016	Plain Washers

PRINCIPAL PARAMETERS (ISOLATORS):-

The contractor should clearly note that tandem isolators shall not be accepted. The isolator should be provided with 02 Nos horizontal GI operating pipes. Current density for Copper current carrying parts should be less than 1.5 Amp per Sq mm. The isolator moving contact and fix contact shall have copper material only. The isolators for 33KV shall be manually operated only. The isolators provided with double bearing bushes shall not be accepted. The bearing sizes shall be minimum 40 mm for 33 KV isolator and 75 mm for 132 KV isolator. The equipment's covered in this specification shall meet the technical requirement listed below:-

4.1.1 **TYPE & RATING:-**

Isolators shall have three posts per phase triple pole single throw, gang operated out-door type silver-plated contacts with horizontal operating blade and isolators posts arranged vertically. The isolators will be double break type. Isolators should be of rotating blade feature of banging type only. **Please note that turn & Twist arrangement is not acceptable.** The arrangement shall be described in detail along-with the offer.

All isolators shall operate through 90 degree from their fully closed position to fully open position so that the break is distinct and clearly visible from the ground level.

4.1.2 1200 Amp rms suitable for continuous service at the system voltages specified herein. The isolators are not required to operate under load but they must be called upon to handle magnetization currents of the power transformers and capacitive currents of bushings, busbar connections, very short lengths of cables, & current of voltage transformers.

4.1.3 The rated insulation strength of the equipment shall not be lower than the levels specified in IS-9921 IEC Publication No. 129. The isolators should meet the following Principal parameters:-

Sr.	Technical Parameter	Requirement
1	Rated Frequency	50 HZ
2	System earthing	Effectively earthed
3	No. of phases(poles)	3
4	Safe duration of overload	
	a) 150% of rated current	5 minutes
	b) 120% of rated current	30 minutes
5	Rated voltage	36 KV RMS
6	Type of disconnect (AB)	Double Break
7	Rated Normal current (Amp RMS)	1200
8	Rated short time withstand current for 3 secs (KA RMS) of main & E/S	30
9	Rated peak current of main switch & E/S(KA peak)	75
10	Rated short time making current of E/S(KA peak)	63
11	Standard withstand positive KV peak	
	a) across isolating distance	195
	b) To earth & between poles	170
12	One minute Power Freq. Withstand voltage KV(rms)	
	a) across isolating distance	80
	b) To earth & between poles	70
13	Minimum creepage distance(mm)	900
14	Rated magnetising current/ capacitive current make & break(A rms)	0.7
15	Minimum clearances	
	a) phase to earth (mm)	430
	b) phase to phase (mm)	1400
16	Phase to phase spacing for installation	1400
17	Height of lowest live point above ground level (mm)	3700
18	PCD of insulators to be used Top Bottom	 76 mm 76 mm

4.1.4 The 33 KV Isolators are required with insulators of solid core type and mounting structures. The isolators shall be supplied with base channels alongwith fixing nuts, bolts and washers for mounting on the structure.

4.1.5 TEMPERATURE RISE: - (as per IS:9921)

The maximum temperature attained by any part of the equipment when in service at site under continuous, full load conditions and exposed to the direct rays of sun shall not exceed 45 degree centigrade above ambient. The limit of temperature shall not be

exceeded when corrected for the difference between ambient temperature at site and the ambient temperature specified in the approved specifications.

4.1.6 ISOLATOR INSULATION:

Insulation to ground, insulation between open contacts and the insulation between phases of the completely assembled isolating switch shall be capable of withstanding the dielectric test voltage specified in clause 7.5.3 above.

4.1.7 MAIN CONTACTS

(i) Fixed Contact: All isolators shall have heavy-duty self-aligning and high pressure line type fixed contact of modern design and made of hard drawn electrolytic copper. The fixed contact should be of reverse loop type. The various parts shall be accordingly reverse loop type. The various parts shall be accordingly finished to ensure inter-changability of similar components. The spring of fixed contact shall have housing to hold in place. This spring shall be made of stainless steel with adequate thickness. The pad for connection of terminal connector shall be of copper with thickness not less than 12 mm for isolators with current rating of, 1200 Amp.

(ii) Moving blades: The switch blades forming the moving contacts shall be made from tubular section of hard drawn electrolytic copper. The Outer & Inner diameter of the blade shall be sufficient to fulfill the requirements mentioned from (a) to (f) below. These contacts shall be liberally dimensioned so as to withstand safely the highest short circuit and over voltage that may be encountered during service. The surfaces of the contacts shall be rendered smooth and silver plated. In nut shell, the male and female contacts assemblies shall be of robust construction and design of these assemblies shall ensure the following:

(a) Electro-dynamic withstand ability during short circuit without any risk of repulsion of contacts.
(b) The current density in the Copper parts shall not be more than 1.5 A/sq.mm.
(c) Thermal withstand ability during short circuit.
(d) Constant contact pressure even when the live parts of the insulator stacks are subjected to tensile stresses due to liner expansion of connected busbar of flexible conductors either because of temperature variations or strong winds.
(e) Wiping action during closing and opening.
(f) Self alignment assuring closing of the switch without minute adjustment.

The earthing switch each shall be provided with three sets of suitable type of fixed contacts below the fixed contacts assemblies of the main switch on the incoming supply side and the sets of moving contacts having ganged operation. These contacts shall be fabricated out of electrolytic copper for 33 KV Isolators with earth switch and dimensioned to withstand current on the line. The earthing switch shall have the same short time current rating as that of main switch.

4.1.8 ARCING CONTACTS/HORN:-

Arcing contacts are not required.

4.1.9 AUXILIARY SWITCHES:--

The operating mechanism of main switch shall be equipped with four nos. each of NO & NC contacts exclusively for purchasers interlocking & protective schemes. The aux switches should be rated to carry a current of 10 amps continuously. The operation of Auxiliary switches should be as per clause 8.3 of IS:9921 (part III). The Aux. switches should be actuated by a cam or similar arrangement mounted on the isolator shaft without any intermediate levers, linkages etc. to ensure fool-proof operation.

4.1.10 CONNECTORS:-

The connectors for isolators shall be suitable for Zebra ACSR conductor with horizontal and vertical take off arrangement. The details in regard to dimensions, the number of bolts to be provided, material and manufacture shall be furnished. The groove provided in the connector should be able to accommodate conductor size mentioned above smoothly. The design of clamp shall be subject to CSPTCL's approval. The clamps to be offered should be manufactured by gravity die-casting method only and not by sand casting process.

It is necessary that suitable clamps are offered along with the isolator and also it is obligatory to give complete technical particulars of clamps along with the drawing, as per details given above and also as per following details:-

a) The terminal connector shall be manufactured and tested as per IS-5561.
b) All castings shall; be free from blow holes, surface blistors, cracks and cavities.
c) All the sharp edges shall be blurred and rounded off.
d) No part of the clamp shall be less than **12 mm thick**.
e) All current carrying parts shall be designed and manufactured to have minimum contact resistance.
f) Connectors shall be designed to be corona free in accordance with the requirement of IS-5561.
g) The nut, bolts & washers used in current carrying path shall be hot dip galvanized.
h) Bimetallic sleeve/liner shall be **4 mm thick**. (2mm copper and 2mm aluminium)
Wherever necessary bimetallic strip of standard quality and adequate dimension shall be used.

4.1.11 SPECIFICATION FOR POST INSULATOR:

33 KV solid core post insulators shall be of approved vendor as per vendor list enclosed with this tender.The solid core insulators shall conform to the latest applicable Indian or IEC standard and in particulars to the IS:2544 & 5354/IEC 168 specification for porcelain post insulators. The porcelain used to manufacture or solid core insulators shall be homogeneous, free from flaws or imperfections that might affect the mechanical or dielectric quality. They shall be thoroughly vitrified, tough and impervious to moisture. The glazing of the porcelain shall be uniform brown colour, free from blisters, burns and other similar defects. Insulators of the same rating and type shall be interchangeable.

The porcelain and metal parts shall be assembled in such a manner that any thermal expansion difference between the metal and the porcelain parts throughout the range of temperature variation shall not loosen the parts or create undue internal stresses which may affect the electrical or mechanical strength and rigidity. Each cap and base shall be of high-grade cast steel or malleable steel casting and they shall be machine faced and smoothly galvanized. The cap and base of the insulators shall be interchangeable with each other.

The contractors shall invariably enclose with the offer, the type test certificates and other relevant technical guaranteed particulars of insulators offered by them.
33 KV solid core insulators used in the isolators should have technical particulars as detailed below:-

1. Nominal system voltage KV (rms)	33
2. Highest system voltage KV(rms)	36
3. Dry. P.F. One minute withstand KV(rms)	75
4. Wet P.F. One minsute withstand KV(rms)	75
5. P.F. Puncture withstand test voltage KV	1.3 times the actual dry flash over voltage of the unit.
6. Impulse voltage withstand test KV (Peak)	170
7. Power frequency withstand KV(rms)	75

8. Visible discharge test KV voltage	27 rms
9. Creepage distance mm (min)	900
10. Tensile strength in kN	50 KN
11. Torsional strength	2 KNM
11. Bending strength	4 KN
12. Compression strength	100 KN
13. Height	508 mm.
14. PCD Top/bottom	76 mm

4.2 OPERATING MECHANISM FOR 33 KV ISOLATOR

All Isolators and earthing switches shall have separate dependent manual operation. The isolator should be provided with padlocking arrangements for locking in both the end position to avoid unintentional operation. For this purpose padlocks with three keys shall be provided. The isolating distances should be visible for isolators.

The isolators inclusive of their operating mechanism should be such that they cannot come out of their open or closed position by gravity wind pressure, vibrations reasonable shocks or accidental touching of connecting rods of the operating mechanism. Isolators should be capable of resisting in closed position, the dynamic and thermal effects of maximum possible short circuit current at the installation point. They shall be so constructed that they do not open under the influence of the short circuit current. The operating mechanism should be robust construction, easy to operate by a single person and conveniently located for local operation in the switchyard.

4.3 PIPES

The isolators should have two Tandem pipes one on each side with a minimum internal diameter of 25 mm & class-B. The operating pipe shall also be class B with internal diameter of at least **50 mm** for 33 KV Isolators.
The pipe shall be terminated into suitable universal type joints between the insulator bottom bearing and operating mechanism.

4.4 BASE CHANNELS;-

The isolator shall be mounted on a base fabricated from steel channel section of adequate size not less than **100x50 mm** to withstand total weight of isolator and insulators and also all the forces that may be encountered by the isolator during service. Suitable holes shall be provided on this base channel to facilitate its mounting on our standard structures. The steel channel in each phase shall be mounted in horizontal position and over it two mounting plates at least 8 mm thick with suitable nuts and bolts shall be provided for minor adjustment at site.

4.5 CLEARANCES:-

We have adopted the following minimum clearances for isolators in our system. The contractors should therefore keep the same in view while submitting their offers.

Description	Centre distance between poles (centre to centre) i.e. ph to ph clearance	Distance between centre lines of outer posts on same pole
33KV Isolators	1400 mm	960 mm

4.6 INTERLOCKS:-

For the purpose of making the operation of the isolator depending upon the position of associated circuit breaker, mechanical interlocks may be required. The contractor shall ensure that the design of equipment will facilitate provision of such interlock.

All shafts, couplings etc. shall be galvanised. Flexible copper connectors of at least 50 sq. mm cross-section shall be provided between the rotating shafts and the frame works

4.7 BEARINGS:-

The design and construction of the various bearings shall embody all the features required to withstand climatic conditions specified, so as to ensure dependable and effective operation even after long periods of inaction of these isolators. Bearing housings should be weatherproof. Facilities should be provided for lubrication of bearings. The location and number of bearings provided for reducing friction shall be clearly intimated alongwith suitable drawings.

The bearing housing shall be made of gravity die-cast aluminum with smooth surface suitably machined for sealing the bearings. Each bearing assembly shall have two nos. (thrust and ball) bearing adequate shaft diameter. Suitable distance between thrust and ball bearings shall be provided. All other friction locations shall be provided with suitable bearings/stainless steel or brass bushes. The bearings shall be of at least 50 mm shaft diameter. Complete details of arrangement shall be offered at the time of detailed engineering.

4.8 TESTS:-

4.8.1 Type Tests:-

All the isolators offered shall be fully type tested as per the relevant standards.
Each Isolator and earth switch shall strictly comply with the requirements of all the type tests and shall be subjected to all routine tests stipulated in the relevant standard. All tests shall be made prior to dispatch in the presence of the CSPTCL's representative.

Copies of the following type tests already performed on similar type of Isolators must be submitted to judge the merits of the equipment offered by the contractor.

The type test certificate should not be older than ten years from the last date of submission of bid. The type test should be performed in Govt. Laboratory preferably in CPRI or equivalent.

4.8.2 ACCEPTANCE & ROUTINE TESTS

All acceptance and routine tests are stipulated in the relevant standards shall be carried out in presence of CSPTCL's representative.
Mechanical operation tests (Routine tests) shall be conducted on dis-connects (main switch and earth switch).

4.8.3 SPECIAL TESTS:-

Special tests listed as under shall be carried out in presence of CSPTCL's representative.

S. No.	Name of the Test	Standard to which it Conforms
1.	Tests on insulators	IS: 2544, IEC: 168
2.	Tests on terminal connectors	IS:5561
3.	Test on Galvanised component	IS:2633

4.8.4 DRAWINGS & LITERATURES:

All the dimensioned drawings along with illustrated and descriptive literature for 33 KV isolators of various rating shall be submitted at the time of detailed engineering. The following drawings shall be submitted.

(a) The drawing showing the outline dimensions of the isolator.
(b) Drawing showing details of main contacts.
(c) Drawings showing arrangement of mechanical interlock.
(d) Drawing showing the details of fixed and moving contacts and the arrangement of pressure relief.
(e) Drawing showing bearing assembly.
(f) Drawings for terminal connectors shall be as per drawing shown in 7.3.9
(g) Name plate to be provided.

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4.9 NEUTRAL CURRENT TRANSFORMER:

1	Rated voltage (KV)	36
2	Type	Single phase, out door oil cooled
3	No. of cores	2
4	Ratio	10-5/1-1 Amp
5	Primary rated current (Amp)	10-5
6	Secondary rated current	1-1 Amp
7	Rated burden (VA)	
	(a) Core-I	15
	(b) Core - II	15
8	Accuracy class	
	(a) Core-I	5 P
	(b) Core - II	0.5
9	Accuracy limit factor core. I.	Not less than 10
10	Over current factor	100 times the rated current for 3 secs.
11	Insulation level:	
	a) Lightning impulse withstand voltage (KVP)	170
	b) Power frequency withstand voltage (KVP)	70
12	Min. Creepage distance	900 mm

5.0 TECHNICAL SPECIFICATION FOR LIGHTNING ARRESTORS (SURGE ARRESTORS)

5.1 **SCOPE:-**

This specification provides for the design, manufacture, stage testing, inspection & testing before despatch, packing and delivery of Metal Oxide (gapless) surge arrestors insulating base and other accessories.

5.2 **STANDARDS**:- The surge arrestors shall conform to the latest editions and amendments available of the standards listed hereunder:-

S. No.	Standard reference No.	TITLE
1	IEC: 99-4	Specification For Metal Oxide Surge Arrestors Without Gap For AC Systems.
2	IS: 3070 (Part-I & III)	Specification For Lightning Arrestors For A C System
3	IS: 4759	Hot Dip Zinc Coating On Structural Steel And Allied Products
4	IS: 2633	Method For Testing Uniformity Of coating on Zinc Coated Articles.
5	IS: 5621	Specification For Large Hollow Porcelain For Use In Electrical Installations
6	IS: 2147	Degree Of Protection Provided By Enclosures For Low Voltage Switchgear & Control.
7.	-	Indian Electricity Rules - 1956
8.	IS: 5561	Specification for Electric Power Connector
9.	IS: 2629	Recommended Practice For Hot Dip Galvanisation of Iron & Steel

5.3 **PRINCIPAL PARAMETERS**: The equipment offered under this specification shall conform to the following parameters given below:

S. No.	Particulars	Voltage 33 KV
1	Nominal system voltage KV (rms.)	33
2	Highest system voltage KV (rms.)	36
3	1.2 / 50 Micro second impulse withstand level	170 KVp
4	One minute power frequency withstand voltage(KV rms)	70
5	Anticipated levels of temperature over voltage and its duration. a. Voltage (P.U.) b. Duration (Seconds.)	------- 1.5/1.2 ------ --------- 1/10 -----
6	Neutral grounding	Solidly earthed
7	Rated arrestor voltage	30
8	M.C.O.V.(KV rms.)	25

S. No.	Particulars	Voltage 33 KV
9	Installation	------ Out door------
10	Class	-- Station Class --
11	Type of construction	Single Column, Single Phase
12	Nominal discharge current corresponding to 8 /20 micro seconds wave shape.	----- 10 KA -----
13	Type of mounting	Please Specify
14	Connection	
15	Long Duration discharge class	3
16	Ratio switching impulse residual voltage to rated voltage of arrestor.	--
17	Minimum prospective symmetrical fault current for pressure relief test	25 KA
18	Voltage corona extinction (KV rms.)	Rated Voltage
19	Maximum radio interference voltage when energised at MCOV (micro volts)	----- 2500 -----
20	Minimum creepage distance of arrestor housing (mm)	900
21	High current impulse withstand value in KA (peak)	100
22	Partial discharge	Less than 10 PC

5.4 **TESTS:**

Lightning arrestors shall conform to the type tests and shall be subject to routine tests in accordance with IEC-99. The type tests should not be older than ten years from the last date of submission of bid.

5.5 **ACCEPTANCE AND ROUTINE TESTS:**

All acceptance and routine tests as stipulated in the relevant standards shall be carried out in presence of CSPTCL's representative.

i) Acceptance tests wherever possible, shall be conducted on the complete arrestor unit.
ii) The artificial pollution test shall be carried out as per applicable standards.
iii) The special thermal stability test shall be carried out as acceptance test.
iv) The acceptance test shall include the galvanisation test on metal parts.
v) The functional (operational) acceptance test shall be carried out on the surge counter.

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6. TECHNICAL SPECIFICATIONS FOR INDOOR CONTROL AND RELAY PANELS.

6.1 SCOPE:-

This section contains the technical specifications for the indoor control, indication, relay and metering panels associated with the outdoor switch gear for the sub-station. The various control and relay panels shall be complete in themselves with all main and auxiliary relays, fuses, link switches wherever necessary, wiring, labels, terminal boards, earthing terminals, foundation bolts etc. All the main numerical relays such as O/C and E/F Relay, LBB Relay shall comply to IEC 61850 protocol. The DC Control voltage should be 110V DC. The supplier of C&R panel should ensure to supply all the relays from the approved vendor list.

6.2 STANDARD SPECIFICATION:-

6.2.1 Panel finish and Colour :-

The CSPTCL has standardised the colour finish and this shall be opaline green as per colour no. 275 of B.S.271-C: 1948, equivalent colour as per relevant Indian Standards or any other standard shall be accepted. This colour finish shall be applied on the exterior steel works of the panels.

6.2.2 Protective Relays & Instruments :-

The protective relays shall be manufactured tested and supplied with guaranteed particulars generally confirming to the latest issue of following Indian standards Specifications.

IS-3842 (Part I to V)	Application guides for electric relays for AC system
IS-3231	Electric relays for power system protection.
IS-1885 (Part I to II)	Electric technical vocabulary electrical relay And Electrical power system protection.
IS-1248	Indicating instruments
IS-722	Energy meters, control switches (LV switching devices for control & auxiliary circuits.)
IS-2715	Current transformer
IS-3156	Voltage transformer
IS-4237	General requirements for switch gear & Control gear for voltage not exceeding 1KV
IS-375	Marking & arrangement for switch gear bus bars, main connection & auxiliary wiring.
IS-8686	Specification for static relays.

6.3 CONTROL & RELAY PANELS:-The panels shall be required for 33 KV capacitor bank. The panels shall be of simplex type for 33 KV. Simplex type panels consist of equipments mounted on the front side of the panel and having wiring access from the rear. Double leaf door with lift off hinges shall be provided at the back of the simplex panels. The control panels have a floor mounting type.

6.3.1 PANEL CUT OUT AND DIMENSIONS:

i) The panels shall be fabricated of not less than 14 SWG sheet steel free from all surface defects. The panels shall have sufficient structural reinforcement to ensure a plain surface to limit vibration and to provide rigidity during despatch and installation.

ii) The control panels shall be floor mounting dead front sheets steel assemblies of unitized design.

iii) The panels shall be made in suitable sections as described elsewhere in the specification so that while mounting, the panels can be located side by side bolted together to form a compact unit.

iv) Design material selection and workmanship shall be such as to present a peak appearance, outside and inside with no works of welds, reverts, screw or bolts head apparent from the exterior surfaced of the control boards.

v) The control panels shall be placed over the cable trench supported by channel of not less than 100x100mm size.

6.3.2 **PANEL LIGHTING**:-

a. In each control and relay panel for interior illumination one tube light 20 W operating at 230 V 50 cycle with door operated switch shall be provided in the corridor. The tube light shall be located at the ceiling and guarded with a protective cage. In addition to corridor tube light, two incandescent lamp one each on front and rear panel with switch shall also be provided.

b. One 15 A, 3 pin socket with plug and switch shall be provided for each of the control board of duplex type C&R panels. The third pin of the socket shall be effectively earthed through the metallic structure. The socket shall be industrial grade control panel type complete with protective metallic cover.

c. A test lamp 230V AC 18 W CFL with 3 M lead and holder with a controllable 5 A switch is to be mounted at the top inside each panel.

6.3.3 AUXILIARY SUPPLY:- For each group of control boards, the CSPTCL will arrange to provide at one point only the following:

i. (415 V + 10% to –25% 4 wire, 3 phase 4 wire 50 C/s, neutral grounded AC supply. The contractor shall arrange for providing proper looping of these power supplies to the different panels of the control board group.

ii. H.R.C. fuses shall be provided at each panel for both the AC and DC power supplies. Distribution and wiring of the same shall be utilised through fuses and links in such a way so that isolation of respective system unit is possible without affecting the rest of the system or unit.

iii. All H.R.C. fuses and links shall be with holder, and the same shall be mounted on slant support and with identification labels.

iv. For each control and relay panel, the contractor will arrange to provide a separate cable from DCDB for 110/220 V DC supply.

v. The H.R.C. fuses as per following details shall be provided:

S. No.	CIRCUIT	FUSE RATING
1.	Circuit breaker closing circuit.	10A
2.	Trip circuit I & II	16 A
3.	Main protection	10 A
4.	Back up protection	10 A
5	Indication	4A
6	Annunciation	4A
7	P.T. Circuit	4 A

6.3.4 CONTROL WIRING:

i) Wiring shall be done with flexible heat resistant multi strand wires, PVC insulated with standard copper conductor. The conductor size shall be equivalent to 2.5 mm square for CT and LV AC and 1.5 mm square for control circuit unless otherwise specified in this tender.

ii) Coloured wires shall be used for wiring as per latest revision of IS-375 viz; red, yellow, blue and black for R,Y,B, phases and neutral respectively, green for earthing , grey for annunciation & control circuits & white for trip circuit.

iii) Each wire shall be identified at both ends with wire designation number by plastic ferrule as per wiring diagram based on latest revision of IS-375 to denote the different circuit functions. The contractor shall take approval for the system of wire numbering.

iv) All wires termination shall be made with compression type connectors. Wires shall not be tapped or spliced between terminal points. All wire shall have crimp type termination and direct connection at any place is not at all required.

v) All series connected devices and equipment shall be wired up in sequence. Loop-in Loop out system of wiring shall be avoided as far as possible and the common buses shall normally be made through the terminal block for better reliability of testing and maintenance.

vi) Fuses and links shall be provided for isolation of individual circuit from bus bars without disturbing other circuits and equipments.

vii) The DC trip and DC voltage supplies and wiring to main protective gear shall be segregated from those for special purposes. Each such group shall be fed through separate fuses, either direct from main supply fuses or the bus wires.

viii) Since a number of wires will run from one point to another, it is desired that the support arrangement should be adequate and neat. The conventional method of bunching of wires should not be adopted since the same creates problems in case any wire is to be removed. The wires should be accommodated in a suitable plastic channels with sliding plastic cover, which may be mounted inside the panels suitably. Inspection/removal of wires should be possible by sliding the covers.

ix) Blank plastic channels should be provided by the sides of the panels to accommodate the incoming cables from switchyard through the cable glands.

6.3.5 TERMINAL BLOCKS:

i) Multi-way stud type 10 A current carrying capacity terminal blocks complete with necessary binding nut and bolt , washers for wire connection and making strip for circuit identification shall be furnished for terminating the panel wiring and outgoing cables. The terminal block shall be suitable for receiving at least 2x7/0.737 mm standard copper or aluminium conductor wire per terminal. It may also be noted that the current rating shall be double the current rating of 2x7/0.737 non-stranded copper wire and the terminal shall be suitable to receive 2 x 2.5 sq. mm/ 2x4 sq. mm copper conductor of copper control cables.

ii) Terminal blocks shall have shorting and disconnection facilities. The Board side and outgoing wires can be disconnected just by opening the disconnecting links which slides up or down without lodging the wires from their position. 'ASEA' type sliding links shall be provided. However, disconnecting type terminal connectors may be limited to CT circuits only. All other terminals should be of bolted type.

iii) Highly reliable terminal blocks with facilities of shorting and easy removal of connection shall be provided for CT circuits. Instrument transformer wires shall be terminated through suitably mounted test terminal blocks for site testing facility.

iv) The terminal blocks shall be grouped according to the circuit functions and each terminal block group shall have at least 20% spare terminals.

v) Not more than two wires shall be connected to any terminal or either side of the terminal block. If necessary, a number of terminals shall be jumpered together to provide the wiring points.

vi) Each terminal point shall be marked with designation obtained from the CSPTCL's schematic drawings.

vii) Adjacent rows of terminal blocks shall be spaced not less than 100 mm apart. They shall be mounted vertically at the sides of the cubicle and set obliquely towards the rear doors to give easy access to terminating end to enable ferrule number to be read without difficulty.

viii) The bottom of terminal blocks shall be spaced at least 200 mm above the cable trench incoming multicore cables.

ix) Separate test terminal block should be provided for the KWH meters to facilitate the testing and calibration of energy meters without disturbing the other circuits such as ammeter/MW meters. The TTBs should be 3 phase, 4 wire with screw type CT shorting arrangement.

x) Stud type terminal connectors rated for not less than 10 Amps shall be used in the CRP panel.

6.3.6 CABLE ENTRY:-

i) The control board shall have provision of cable entry from the bottom. Necessary cable glands should also be provided. The CSPTCL will arrange for necessary floor opening below the panels to suit the cable trench design of CSPTCL's requirement.

ii) The wiring through the terminal blocks shall be so located so as to be convenient for floor openings.

iii) The control board shall have provisions for fixing the multi-core cable glands which shall be included by the contractor in scope of supply. For fixing these cable glands, detachable gland plates of 4 mm thickness shall be mounted.

iv) Gland plate shall be supplied with factory made gland holes with suitable blanking arrangement for un used gland holes. The gland plate and doors shall be properly gasketted.

v) Rigid supports shall be provided along with terminal block for holding plastic channel. Suitable clamps may also be provided in plastic channel for holding cables.

vi) The following quantities of cable glands with blanking plate shall be supplied fitted along with each panel:-

i)	For 2 core x 2.5 sq. mm 1.1 kV control cable	3 Nos
ii)	For 8 core x 2.5 sq. mm 1.1 kV control cable	3 Nos.
iii)	For 4 core x 2.5 Sq. mm 1.1 KV Control cable	4 Nos.
iv)	For 12 core x 2.5 sq. mm 1.1 KV Control cable	2 Nos.
v)	For 19 core x 2.5 sq. mm 1.1 KV Control cable	2 Nos.

6.3.7 GROUNDING:-

i) 25 mm x 6 mm copper ground bus shall be providing for each control boards extending along with entire length of the board and effectively grounding all metal structures.

ii) Each continuous length of ground bus shall have provision of two terminals at two separate points for connection to main ground grid of the substation.

iii) Whenever a circuit is shown grounded on the drawings a single wire for the circuit shall be run independently to the ground bus and connected to it.

6.3.8 Invariably for all the panels end doors with suitable lock and handle on both the sides should be included in the offered prices. As per our standardisation end doors should be of full size without requiring any end sheets on the sides.

6.3.9 ANNUNCIATION SYTEM:

Alarm annunciation system shall be provided for the control board by means of visual and audible alarm in order to draw the attention of the operator to the abnormal operating conditions or the operation of some protective devices. The annunciation equipment shall be suitable for operation on the voltages specified in this specification.

6.3.10 The annunciation shall be of visual and audible type. The visual annunciation shall be provided by annunciation facia, mounted flush on the top of the control panels. The audible alarm shall be provided by alarm hooter or bell .The annunciator facia shall be provided with translucent plastic window for alarm point with minimum size of 35 mm x 50 mm. The facia plates shall be engraved in black lettering with respective inscriptions which will be furnished to the contractor by CSPTCL. Alarm inscriptions

shall be engraved on each window in not more than three lines and size of the lettering shall not be less than 5 mm.

6.3.11 Each annunciation window shall be provided with two white lamps in parallel to provide safety against lamp failure. Long-life lamps shall be used. The lamp circuit shall include series resistor of adequate rating. The cover plate of the facia windows shall be flush with the panel and shall be capable of easy removal to facilitate replacement of lamps. The transparency of cover plates and wattage of the lamps provided in the facia windows shall be adequate to ensure clear visibility of the inscriptions in the control room having high illumination intensity (500 Lux) from the location of the operator's desk.

6.3.12 RELAYS: **All protective relays shall be of numerical type and communication protocol IEC 61850 compliant. All main relays shall have Ethernet/RJ45 ports. Further, the test levels of EMI as indicated in IEC 61850 shall be applicable to these. The exact model of all the relays shall be finalised by CSPTCL at the time of engineering and that shall be binding on the contractor. All the Numerical Relays shall have 20 % spare input and output contacts over what has been utilised in the scheme. The Numerical Relays shall have freely configurable input and output contacts. All the Numerical relays shall have self monitoring feature. The Numerical relays shall have event logger, trip value recorder and oscillographic Disturbance Recorder and on initiation of event, it shall automatically be downloaded at the workstation of S/S.**

6.4 33 KV CONTROL & RELAY PANELS

6.4.1 33 KV Capacitor Bank C & R panel

The C&R panel shall be provided with the following;

a) 1 No. 3 O/C + 1 E/F back up IDMT numerical relay with high set feature. The relay should be IEC61850 compliant. It shall have same features as described for 33 KV transformer panels.

b) The relay model shall be Micom P141/Siemens 7SJ6611/Schneider P141 or higher version or equivalent model of approved make of relay.
However, the exact model of the offered relay shall be finalised by the CSPTCL at the time of the engineering based on the requirement of protection scheme and it shall be binding on the contractor.

c) Single phase over voltage and under voltage relay with time delay settable.

d) Numerical LBB Relay – shall have same features as in 132 KV panels

e) 2 No. Master Trip relay & CB status indicating lamps, semaphores, annunciator & CB TNC switches.

f) The C&R panels should be provided with digital Ammeter, digital Voltmeter, MVAR meter (Export-Import type) and SEMS make import – export tri vector energy meter (3ϕ,4W).

g) The panel also should be provided with two nos TCH relays and one no DC monitoring relay.

h) The panel shall be provided with Timer for closing circuit.

i) The panel shall have Numerical Unbalance Current relay with a Neutral CT arrangement. The Numerical Unbalance Current relay shall have disturbance recording, event logging and self-monitoring features. It shall have facility for display of instantaneous current values on its HMI.

6.4.2 PANEL CUT OUT AND DIMENSIONS:

i) The panels shall be fabricated of not less than 14 SWG sheet steel free from all surface defects. The panels shall have sufficient structural reinforcement to ensure a plain surface to limit vibration and to provide rigidity during despatch and installation.

ii) **The 33 KV Panels shall have the following dimensions:**

Type	**33 KV Simplex Panel**
Height	2250 mm
Depth	500 mm.
Width	Min 660 mm.

iii) The panels shall be made in suitable sections as described elsewhere in the specification so that while mounting, the panels can be located side by side bolted together to form a compact unit.

iv) Design material selection and workmanship shall be such as to present a good appearance, outside and inside with no works of welds, reverts, screw or bolts head apparent from the exterior surfaced of the control boards.

v) The mimic diagram offered shall be at the eye level to indicate the position of each breaker, isolating and grounding switch. Other equipments such as transformer, voltage transformers etc., shall be represented by suitable symbols. The arrangement shall be of over laid design. Painted type mimic diagram is not acceptable.

vi) The mimic diagram offered shall be of Azure blue shade 104 of IS-5.

vii) Rotating disc type semaphore shall be used to indicate the position of each breaker. The position of the circuit breaker whether closed or open shall be indicated by semaphore indicator to be provided for this purpose.

viii) It may be noted that the circuit breaker will have two trip coils in parallel and since their DC source of supply is one at present, necessary arrangement shall be made in the panel circuitry. For this purpose contact multiplication will not be involved but the rating of the control switch should be adequate to handle; the burden of two trip coils. Along with pistol grip type control switches red and green indicating lamps for ON/OFF indication shall be provided.

ix) Other requirements regarding indicating meters, control wiring, energy meters, switches, position indicators etc shall be same as for 132 KV Panels.

x) **SEMS** make 0.2S class, electronic 4 quadrant, import-export, 3phase 4wire, tri-vector energy meters shall be provided with suitable TTB on the front panel. The energy meters shall indicate instantaneous parameters like KW, KVA, KVAR, pf, current, voltage etc. The energy meter shall have 15 minutes load survey for KW & KVA for a minimum period of 35 days. The meter shall be suitable to CT ratio 400/1A and PT ratio 33KV/110V, and without any external M.F. The meter should have RS485 port for data communication on Modbus protocol. Meter shall have front optical port for the purpose of extraction of data through MRI.

6.5 TESTS:

Relay and control panels shall be subjected to following tests:

a. Mechanical operation test.
b. Verification of Degree of protection as per IS: 2147
c. High voltage test as per IS or IEC as may be applicable
d. Electrical control, interlock and sequential operation tests
e. Verification of wiring as per approved schematic diagram.
f. Type tests and routine tests shall be carried out on all associated Equipment as per relevant Indian Standards or IEC. The type tests should not be older than seven years from the last date of submission of bid.

g. Certified copies of all type and Routine test certification shall be submitted for Company's approval before dispatch in the control relay panel.

6.6 Multi-Functional Transducer (MFT):

1 No. MFT shall be provided for each panel. The MFT should be accommodated in respective feeder/ transformer panel and output signal of MFT shall be taken to RTU panel through 1.5 Sq mm multi strand copper wire (screened cable). The analog parameters of all feeders, transformers, bus voltages and frequency shall be measured through MFT and Breaker ON/ OFF indications shall be double point indication and isolator indication shall be single point indication and will be coupled to RTU through OPTO isolator print. The wiring of digital indication shall be done by 1.5 sq mm multi strand copper wire, Bus PT voltage and frequency signal shall be terminated to RTU panel. The MFT should have accuracy class of 0.2, 3 ph-4wire type with 2 no digital & 4 no.20mA analog outputs, should have USB & RS485 ports for communication and operating voltage 40-276V AC/DC. Necessary software interface shall also be provided.

6.7 The details of relays and other facilities required in each panel is mentioned below :-

S. No.	Protection Schemes	33KV Capacitor Bank
1	Numerical Over voltage Protection	1 No.
2	Under voltage Protection	1 No.
3	Trip circuit supervision relay	2 Nos.
4	DC Auxiliary 110 V supply voltage monitoring relay	2 Nos.
5	Numerical Local Breaker back up relay	1 No
6	Numerical Neutral displacement current relay	1 No.
7	Numerical directional IDMT relay with high set (3 O/C + 1 E/F)	1 No.
8	Master trip relay	2 Nos.
9	LBB Trip relay	1 No.
10	MVAR Meter	1 No.
11	Digital Ampere meter (with selection switch where necessary)	3 Nos.
12	Digital Volt meter (with selection switch where necessary)	1 No.
13	Annunciator relay	1 Set
14	TNC switch	1 No.
15	Multifunction Transducer	1 No.
16	Digital Multifunction Energy Meter	1 No.
17	Indicating LEDs, semaphores	As per requirements

7.0 GUARANTEED TECHNICAL PARTICULARS OF UN-ARMOURED COPPER CONTROL CABLES

1	Name of manufacturer						
2	Standard applicable	IS:1554 (Part-I)-1988 with latest amendments					
3	Rated Voltage	1100 volts					
4	Suitable for earthed or unearthed system	Both					
5	Permissible voltage & frequency variation for satisfactory operation.						
	a. Voltage	±10% than rated voltage at power frequency					
	b. Frequency	50 Hz					
6(a)	Continuous current rating of 2.5 Sq mm when laid in air & for Max. conductor temp. 70 ºC .	Un-armoured number of core	2C	4C	10C	12C	19C
		Amp.	27	24	15	14	12
6(b)	Continuous current rating of 4 Sq mm when laid in air & for Max conductor temp. 70 ºC .	Un-armoured number of core	4C				
			24				
7	Rating factor for variation in ambient air temperature.(for cables laid direct in ground)						
	Air temp. in deg C	25	30	35	40	45	50
	Rating factor	1.25	1.16	1.09	1	0.9	0.8
8	Rating factor for variation in ground temp.(for cables laid direct in ground)						
	Ground temp. in deg C	15	20	25	30	35	40	45
	Rating factor (As per IS:3961: part-II)	1.17	1.12	1.06	1	0.94	0.87	0.79
9	Depth of laying for cables laid directly in this round.	750 mm rating factor 1.00					
10	Rating factor for variation in thermal resistivity of the soil (As per IS:3961-II-1967, Table-8)	Soil thermal resistivity in °C (cm/w) 100 120 150 200 250 300 1.10 1.05 1.00 0.92 0.86 0.81					
11	Current carrying capacity:						
	(a) Short circuit Amp. (RMS)	0.288 KAmps					
	(b) Duration of short circuit	1 sec					
	(c) Conductor temperature allowed for short circuit duty (70 Deg, Centigrade)	160 ºC					
12	Loss tangent at normal frequency	Please furnish					
13	Dielectric constant at normal frequency	Please furnish					
14	Conductor:						
	a. Material	Annealed Copper Class-II					
	b. Normal cross sectional area	2.5 sq.mm / 4 Sq.mm					
	c. Number and diameter of wires	Please furnish					
	d. Received from (Supplier's name)						
15	Insulation:						
	a. Composition of insulation	Type-A:PVC (General purpose) IS:5831-1984					
	b. Thickness of insulation	0.9 mm for 2.5 sqmm, 1.0 mm for 4 sqmm					
	c. Tolerance on thickness of insulation	0.1mm + 0.1 t1 (nominal thickness)					
	d. Approximate diameter of sheath	As per IS					

	e. Specific insulation resistance at 60°C	Please furnish
	f. Received from (Supplier's name)	Please furnish with drawing
16	Colour scheme for identification	As per IS
17	Inner sheath	
	a. Material	Unvulcanised Rubber/Thermoplastic material/proofed tape
	b. Extruded or wrapped	wrapped/extruded PVC
	c. Thickness of inner sheath	As per table 4 of IS: 1554 Part-I
	d. Tolerance of thickness of inner sheath	No tolerance
	e. Received from (Supplier's name)	
18	Outer sheath:	
	a. Material	Type ST 1 PVC compound as per IS: 5831-1984.
	b. Calculated diameter over the inner sheath	
	c. Thickness of the outer sheath	As per table 7 column 3 of IS: 1554 Part-I
	d. Tolerance of thickness of outer sheath	As per table 7 column 4 of IS: 1554 Part-I
	Received from (Supplier's name)	Please furnish with drawing
	Note :- In addition to manufacturers identification of cable following marking shall also be embossed over outer sheath (i) ISI marked with registration (ii) Cable size and voltage grade (iii) Word "CSPTCL" and name of manufacturer at every meter length. The embossing shall be impressive automatic in line and marking shall be legible.	
19	Overall diameter of cable over the outer sheath	12 14 16.3 19.5 20.9 24.2
20	Net weight of cable (Kg./Km.)	220 275 485 540 660 950
21	Conductor resistance at 20 º C per Km.	7.41 Ohm/Km. max. for 2.5 sq.mm. 4.61 Ohm/Km. max. for 4 sq.mm
22	Reactance at 50 Hz per Km.	0.107 for 2.5 Sq mm
23	Capacitance at 50 Hz per Km.	1.19 Mfds/Km
24	Insulation resistance at in M ohm Km.	
	i) at 27 deg	$1x10^{13}$
	ii) at maximum operating temperature	$1x10^{10}$
25	volume resistivity in ohm-Cm	
	i) at 27 deg	$1x10^{13}$
	ii) at maximum operating temperature	$1x10^{10}$
26	Conductor temperature corresponding to maximum continuous current	$70^{o}C$
27	Test Voltage	
	a. High voltage test	AC 3 KV (rms) or DC 7.2 KV for five minutes at room temp.
	b. After immersion test voltage	3 KV (rms) raised to 6 KV (rms) within 10 sec. For 5 minutes at temp. 60+3oC & 1.2 KV D.C. for 240 hours.
28	Recommended minimum installation radius	15XD
29	Safe pulling force when pulled by pulling eye	50 N/mm^2
30	Cable drum	2C 4C 10C 12 C 19C
	a. The dimension of the cable drum	42x20x12 38x20x10 42x20x12 38x20x10 52x24x14
	b. The approximate weight of the drum	60 40 60 40 75
	c. Maximum length per drum for each size of cable	500 M ±5% for each drum. Tolerance for total ordered quantity is ±2%.

SPECIFICATION FOR LT POWER ALUMINIUM XLPE ARMOURED POWER CABLES

1. 3.5 CORE ALUMINIUM XLPE ARMOURED POWER CABLES

No. of cores & cross sectional area	Min. no Of Wires	Thickness of insulation min Nom	Min.Thickness of inner sheath (mm)	Nominal Dimensions of armour Wire(mm)	Min.Thickness of Outer sheathe Wire Armour (mm)	Overall Diameter (Approx.) Wire Armour	(Approx. Net Wt. of Cable Wire Armour (kg/km)	Max.D.C.Resistance at 20 degree C	Max.A.C. Resistance at 70 degree C	Approx reactance at 50 Hz ohms/km	APPROX. Capacitance Mfd/Km	CURRENT RATINGS	
												Direct in Ground	In Air
												A	A
3.5 C x 120	15/12	1.2/1.1	0.4	4*0.8	1.72	38	2280	0.253	0.33	0.07	0.29	223	257
3.5 C x 240	30/15	1.7/1.2	0.6	4*0.8	2.2	52	4035	0.125	0.16	0.07	0.31	326	399

2. 1 CORE ALUMINIUM XLPE ARMOURED POWER CABLES

No. of cores & cross sectional area	Min. No. of Wires	ARMOURED					Max.D.C.Resistance at 20 Ohms/Km	Max.A.C.Resistance at 70 Ohms/Km	ARMOURED		CURRENT RATINGS	
		Thickness of PVC Insulation (Nom.) (mm)	Nominal Dimensions of Armour Wire (mm)	Min.Thickness of PVC Outer sheath (mm)	Overall Diameter (Approx.) Wire Armour	Approx. Net Wt. of Cable (kg/km)			Approx. Reactance at 50Hz Ohms/Km	Approx. Capaci-tance mFd/Km	Direct in Ground	In Air
1C x 240	30	2	1.6	1.4	28.9	1179	0.13	0.162	0.09	0.72	332	433
1C x 300	30	2.1	1.6	1.56	31.5	1421	0.1	0.13	0.09	0.75	376	501

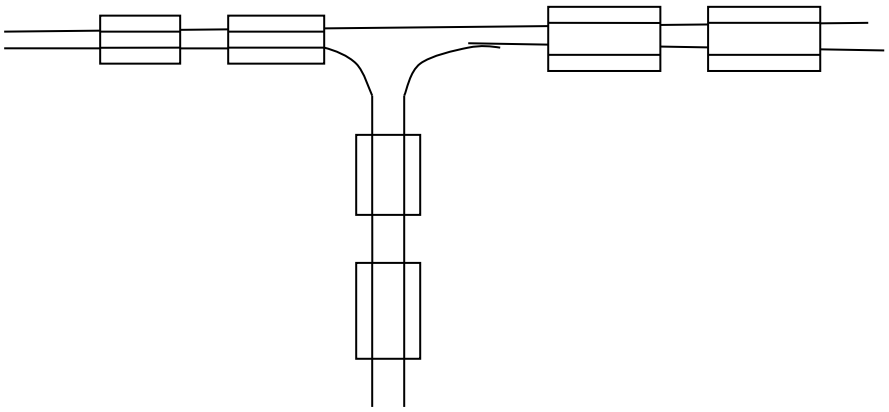
3. 4 CORE ALUMINIUM XLPE ARMOURED POWER CABLES

No. of cores & cross sectional area	Min. of Wires	Thickness of insulation (min.)	Min.Thickness of innersheath (mm)	Nominal Dimensions of Armour Wire (mm)	Min.Thickness of Outer sheathe Wire Armour (mm)	Overall Diameter (Approx.) Wire Armour (mm)	(Approx. Net Wt. of Cable Wire Armour (kg/km)	Max.DC. Resistance at 20 C Ohms/Km	Max.AC. Resistance at 90 C Ohms/Km	CURRENT RATINGS	
										Direct in Ground Amps	In Air Amps
4 C x 16	6	0.7	0.3	1.6	1.4	22.5	862	1.91	2.45	73	70

***

8.0 TECHNICAL SPECIFICATIONS OF CLAMPS, CONNECTORS AND HARDWARES:

8.1 CLAMPS & CONNECTORS :-The drawing & Samples of Clamps, Connectors & Spacers shall be approved by CSPTCL before use in the substation. In the switchyard only ZEBRA conductor has been provided. It should be noted that the requirement is for a minimum of 100 mm coverage of the conductor inside the clamp for all clamps. The pad clamp shall have six bolts and T clamp shall have 12 bolts. For all types of clamps, the drawings shall be approved by the CSPTCL.



The nuts & bolts used in the clamps shall be fine machined screws of reputed make, so that the screws do not become loose during service. Nuts & bolts should be hot dipped galvanized.

A factor of safety of 1.5 shall be used i.e. clamp for 400 Ampere conductor shall have thickness and area for current at least 600 Amperes.

8.1.1 CLAMP MATERIALS:-

The clamps and the connectors shall be made of materials listed below:-

a) For connection ACSR conductors Aluminium alloy casting conforming to designation LM-6 of IS-617. Sand casting is not permitted.

b) For connecting equipment terminals made of Copper or Brass & ACSR conductor, Bi-metallic connectors made from Aluminium Alloy casting conforming to designation A6 of IS 617 with 4 mm thick cast copper liner (2 mm Cu and 2 mm Al) shall be used (for C.T. & P.T. clamps). Clamps for connecting GI shield shall be of malleable Iron casting. Nuts & bolts should be hot dipped galvanized.

8.1.2 TERMINAL CONNECTORS :

The terminal connectors shall meet the following requirements:

i) Terminal connectors shall be manufactured and tested as per IS: 5561.

ii) Terminal connector shall be tested for short circuit current capability test, temperature rise test, corona test etc. The terminal connectors should be manufactured by gravity die-casting process only.Bushing terminals shall be provided with terminal connectors of approved type and size for connection to external parts. Terminal connectors must have been successfully type tested strictly as per IS: 5561. The drawing of terminal connector offered shall have to be got approved by CSPTCL

iii) All castings shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges and corners shall be blurred and rounded off. Compression type of clamps should be supplied.

iv) No part of a clamp shall be less than 12 mm thick.

v) Minimum conductor coverage on the clamp shall be 100mm. Minimum bushing terminal coverage in the clamp shall be 100mm and minimum pad overlap in the clamp shall be 100*100 mm

vi) The nut, bolts & washers used in current carrying path shall be hot dip galvanized.

vii) For bimetallic connectors, copper alloy liner of minimum thickness of 4 mm(2 mm Cu and 2 mm Al) shall be integral with aluminium body.

viii) Flexible connectors shall be made from tinned copper/ aluminium sheets.

ix) All current carrying parts shall be designed and manufactured to have minimum contact resistance. The connectors shall be designed for minimum 120% of the maximum current carrying capacity of the ACSR conductor and the temperature rise under these conditions shall not be more than 50% of that of the main conductor.

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

xi) All connections with ACSR conductors shall be bolted type.

8.1.3 TESTS:

Type Tests :

It is essential to furnish following type test reports in respect of Clamps as stipulated in latest version of IS: 5561:

i. Tensile Test
ii. Resistance Test
iii. Temperature rise Test
iv. Short time current Test
v. Dimensional Check
vi. Galvanizing Test, if applicable

Acceptance and Routine Tests :

For Clamps & Connectors following Acceptance & Routine tests shall be conducted:

(A) Acceptance test :

i. Visual check
ii. Tensile Test
iii. Resistance Test
iv. Dimensional Check
v. Galvanizing Test, if applicable

(B) Routine Test :

i. Visual inspection
ii. Dimensional Check.

8.2 SUBSTATION TYPE HARDWARE:-

8.2.1 REQUIRED GUARANTEED STRENGTH OF HARDWARE OF INSULATOR STRINGS:-

The Hardwares and Clamps of 132kV single suspension and double suspension strings suitable for Zebra ACSR and all types of suspension and tension strings suitable for sub-station shall have the ultimate breaking strength of not less than 7,000 kgs. The slipping strength of the suspension clamp shall not be less than 15% and more than 20% of the Conductor strength with which it is to be used. Each individual Hardware component of double suspension and double tension strings such as ball-clevis, socket clevis etc. shall have minimum breaking strength as specified for respective single suspension and tension string respectively.

8.2.2 PARTICULARS OF HARDWARE FITTINGS:

Each capacitor bank bay Hardware fitting shall be complete in all respect and the contractor shall furnish complete drawings and technical particulars of the Hardware fittings comprising items as under: -

i) Single Suspension Hardware Fittings For Zebra/Twin-Zebra for Sub Station:-

The 132KV sub-stations Hardware fittings shall comprise of one Ball Hook, one Socket Clevis Eye Horn holder, one Arcing Horn and one Suspension Clamp suitable for ACSR Zebra Conductor. The Socket Eye and Ball Clevis shall be made of forged steel.

ii) Double Tension Hardware for for Zebra/Twin Zebra ACSR Zebra for capacitor bank bay:-

Double Tension Hardware shall comprise of U Clevis, one Ball Link, Socket Clevis, Yoke Plate, two Clevis Eyes and two Tension Clamps of bolted type suitable for ACSR Zebra. U Clevis shall be made of forged steel complete with galvanised steel rivets washer and Phosphorus Bronze/Stainless Steel pins. The Ball fittings shall be made of forged steel in one piece.

iii) Ground wire Assemblies:

The Ground wire tension assembly shall have minimum breaking strength equal to that of the Ground Wire. The slipping strength of the Compression Clamp shall not be less than 95% of the breaking strength of Ground Wire. The Ground wire tension assembly for capacitor bank bay shall comprise of one bolted type Clamp and one `D' Shackle complete with minor accessories such as bolts, nuts pins etc. The assembly shall be hot dip galvanized and made inherently resistant to the atmosphere corrosion.

iv) Ball and Socket Dimensions:

The Ball and Socket for Hardware fittings shall necessarily conform to the dimensions as stipulated in the Indian Standards. The Ball and Socket dimensions of the Hardware sets to be used with 7000 kg and 9100 kg Electro Mechanical strength Disc Insulators shall conform to designation 16mm/16mm-B in accordance with IS:2486(Part-II) or equivalent International Standard.

The minimum breaking and slipping strength of single tension Hardware fitting shall not be less than 7000 kgs. One set of additional nuts (as check nuts) should be provided alongwith the bolts and nuts to fix the tension clamp with the conductor so as to avoid the possibility of relative/looseness due to vibration of strings.

8.2.3 Dimensions & Tolerances:

The dimensions and tolerances of pin balls and socket ends shall conform to IS 2486 Part-II/IEC-120 and shall be checked by the gauge therein after galvanizing.

The bearing surfaces of balls and machined sockets, before galvanizing shall not have surface roughness more than 250 micro inches.

The bearing surface of socket ends shall be uniform about the entire circumference without depressions or high spots. The internal contour of the socket ends shall be concentric with the axis

of fittings. The axis of the bearing surface of socket ends shall be coaxial with the axis of fittings with no appreciable tilting.

(i) Socket Fittings:

Socket fittings shall be made of clause IV steel as per IS:2004 or steel of equivalent grade and shall be forged in one piece. They shall be normalized to achieve the minimum breaking strength specified on the respective drawings.

(ii) Security clip for Socket fittings:

Socket fittings shall be provided with R-shaped security clip in accordance with IS:2486 (Part-III) to provide positive locking against unintentional disengagement of socket from the ball of the insulator. The security clip shall be humped to maintain the clip in the locked position and shall have both prongs spread to prevent complete withdrawal from the socket. The clip end shall not project outside the recess of socket when the clip is in locked position.

The hole for the security clip shall be on the side of the socket opposite to the socket opening. The hole for the clip shall be counter sunk. The force required to pull the clip to its unlocked position shall not be less than 50 N or more than 500N. The security clip shall be made of stainless steel of type AISI 302 or 304 or phosphor bronze as per IS:7814.

(iii) Clevis-Eye:

These shall be forged steel of malleable cast iron and shall be complete with galvanised pin with flat washer and split pin of Phosphorus Bronze/Stainless Steel.

(iv) Yoke Plate:

The yoke plates/link plate shall be made of mild steel plate as per IS:226 or equivalent standards. Shearing/cutting of the plates shall be clean without drawn or ragged edges. If the
plates are flame cut, mechanical guides shall be used.

Holes shall be cylindrical clean cut and perpendicular to the plane of the material. The periphery of the holes shall be free from burrs and all the corners and edges should be rounded off with a radius of at least 3mm.

(v) Sag Adjustment Device

The sag adjustment devices to be provided with double tension hardware fittings shall be of three plate type. The sag adjustment device shall be provided with a safety locking arrangement.

Sag adjuster plates shall be made from high qualify mild steel plate as per IS:226. The grain flow shall not be in a direction transverse to the tensile load. Cutting/shearing and drilling of holes shall be similar to those for yoke plate.

The maximum length of the sag adjustment plate from the connecting part of the rest of the hardware fittings shall be 520 mm. The details of the minimum and maximum adjustment possible and the steps of adjustment shall be clearly indicated in the drawing. An adjustment of 150mm maximum at the interval of 6mm shall be possible with the sag adjustment plate.

8.2.4 IMPORTANT CONDITIONS:

a) All Hardware items shall be complete with minor items such as security clip, bolts, nuts, washer, split pins and inners etc.

b) All ferrous fittings shall be hot dip galvanized, after all machining and fitting has been completed, in accordance with relevant Indian Standard. All Hardware items (other than clamps) and those specified otherwise should be made of Drop Forged Steel. Socket items in forged steel must be forged. The items like Yoke Plate, Arcing Horn, Bolts and Nuts shall be of mild steel and rest of the items shall be of forged steel.

c) All Bolts, Nuts and Screw heads shall have only wide worth standard thread .Bolts head and Nuts shall be hexagonal. The thread in Nuts shall be over tapped after galvanizing and shall be cut before galvanizing. The threads shall not be under cut. The Nuts should be tapped such that they are fit on the bolt threads i.e. these should not have loose fitting.

8.2.5 GALVANISING:

Hot dip galvanizing shall conform to Indian Standard specification IS-2633 or equivalent International Standard. Galvanising shall be uniform, free from blisters, and shall not peel off due

to abrasion, Zinc coating shall be thick enough to withstand 6 one minute dips in Copper Sulphate solution (precee test) for all ferrous parts except for threaded portions which shall withstand atleast 4 one minute dips.

8.2.6 TESTS

The following Type Tests, Stage Tests, Routine Tests and Acceptance Test shall be carried out on power Conductor & Ground wire Hardware fittings.

i) Type Tests

The material offered shall be fully Type Tested as per relevant specification and the contractor shall furnish a set of Type Test reports along with the drawings. These tests must not have been conducted earlier than seven years as on last date of submission of bid.

ii) Stage Tests:

Stage Tests during manufacturing shall mean those test required to be carried out during the process of manufacturing to ensure quality control such that last product is of the designed quality conforming to the intent of this specification.

iii) Routine Tests:

Routine Tests are those tests, which required to be carried out on each and every finished product so as to check with requirements that are likely to vary during production.

iv) Acceptance Tests:

Acceptance Tests shall mean those tests, which required to be carried out on samples taken from each lot offered for pre-despatch inspection for purposes of acceptance of that lot.

8.2.7 DRAWING AND LITERATURE:

The detailed drawings of each component assembly drawings and descriptive literature of the Hardware assembly shall be submitted. The detailed dimension drawings for each and all-individual Hardware items such as clamps, U Clevis, Socket Eye, Yoke Plate and Socket Clevis etc. shall also be submitted. Test certificates for different tests conducted as per relevant ISS, for all the offered items must also be submitted essentially.

8.2.8 MATERIALS AND WORKMANSHIP:

All the materials shall be of the latest design and conform to the best modern practice adopted in the extra high voltage field.

The design, manufacturing process and quality control of all the materials shall be such as to give maximum factor of safety, maximum possible working load, highest mobility, elimination of sharp edges and corners, best resistance to corrosion and a good finish.

All ferrous parts shall be hot dip galvanised, after all machining has been completed.

Fasteners shall withstand four dips while spring washers shall be guaranteed to withstand at least six dips each lasting one minute under the standard precee test for galvanising. The Zinc coating shall be perfectly adhere, of uniform thickness, smooth, reasonably bright, continuous and free from imperfections such as flux, ash, rust stains, bulky while deposits and blisters. The Zinc used for galvanising shall be grade Zn. 99.95 as per IS: 209-1966 or equivalent International Standard. In case of castings, the same shall be free from all internal defects like shrinkage, inclusion, blowholes, cracks etc. All current carrying parts shall be so designed and manufactured that contact resistance is reduced to minimum. No item which would produce high electrical and mechanical stresses in normal working shall have sharp ends or edges, abrasions or projections and shall not cause any damage to the Conductor in any way during erection or during continuous operation. The design of adjacent metal parts and mating surfaces shall be such as to prevent corrosion of the contact surface and no maintain good electrical contact under service conditions. Particular care shall be taken during manufacturing and subsequent handling to ensure smooth surface free from abrasion or dents. The fasteners shall conform to the requirement of IS: 6639-1972 or equivalent International Standard. All fasteners and clamps shall have locking arrangements to guard against vibration loosening.

8.2.9 INSPECTION:

CSPTCL or its representatives shall at all times be entitled to have access to the works and to all places of manufacturing and the successful Contractor/Supplier shall afford all facilities to them

for unrestricted inspection of the works, inspection of material, inspection of manufacturing process and for conducting necessary tests as specified herein.
The acceptance of any quantity of material shall in no way relieve the successful Contractor of his responsibility for meeting all the requirement of this specification and shall not prevent subsequent rejection, if such materials are later found to be defective.

8.2.10 DOCUMENTATION & LIST OF DRAWINGS FOR CLAMPS, CONNECTORS, SPACERS AND HARDWARES:

The contractor shall furnish full description, illustrated catalogues and dimensional drawings. The drawing shall include the following information:-

(i) General outline & assembly drawings of all the items /material covered in the specification.
(ii) Dimensions, unit spacings
(iii) Unit mechanical and electrical characteristics as also for the complete assembly/set.
(iv) Weight of each component.
(v) Identification mark.
(vi) Material designation used for different components with reference to Standards.
(vii) Fabrication details such as welds, finishes and coatings
(viii) Manufacturer's catalogue number.
(ix) Brief installation instructions.
(x) Reference of type testing.
(xi) Relevant technical details of significance

Each Clamps & Connectors / Spacers and hardwares shall be marked with the trade mark of the manufacturer and year of manufacturing. Marks shall be forged or stamped with a steel die before galvanizing. The mark shall be distinct, durable and conspicuous

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9.0 SPECIFICATION FOR SUPPLY OF GALVANISED STEEL STRUCTURES AND EARTHING STEEL, INSTALLATION AND ERECTION OF EQUIPMENTS

9.1 GALVANISED STEEL STRUCTURES

9.1.1 SCOPE.

This specification covers following works.

a) Engineering and supply of galvanised fabricated steel structures for gantry and equipments for sub-station as per CSPTCL design & drawing and associated bay work design engineering & supply of earthing steel for Earth mat.

b) Erection of gantry, bus bar, and equipment's structures, stringing of gantry, bus bar and shielding wires, installation of out door / in-door equipments, inter equipment connections using Panther / Zebra ACSR conductors.

c) Installation of cable trays in trenches, laying of control and power cables, construction of earth mat, earthing pits, grounding electrodes and risers.

Note:- The contractor shall have to supply steel structures required for construction of 33 KV capacitor bank bays at existing sub-station where ever required. These structures should match standards in all respects.

9.1.2 STANDARDS.

The steel structures shall conform to the latest edition of the standard as stated hereunder.

a) I.S. 2062 / 226 Specification for structural steel and quality steel.
b) I.S. 802. Use of structural steel in over head transmission line.
c) I.S 806 Code of practice for use of steel tubes.
d) I.S. 808 Specification of rolled steel, channel, beam and angle sections.

9.2 DESIGN REQUIREMENTS:

Following general guide lines shall be followed for verification of design:-

a. For design of steel structures loads such as dead loads, live loads, wind loads etc. shall be based on IS 875 Part IV as per CSPTCL drawings.

b. For materials & permissible stresses, IS 802 Part I Section 2 shall be followed in general.

c. Maximum slenderness ratios of leg members, other stressed members and redundant members for compressive force shall be as per IS 802.

d. In order to facilitate inspection & maintenance the structures shall be provided with step bolts not less than 16 mm diameter & 175 mm long spaced not more than 450 mm apart, staggered on faces on one leg extending from about 0.5 metre above ground level to top of the tower. The step bolts shall conform to IS: 10238.

e. All Structures shall be designed for worst condition of dead loads, live loads wind loads etc. as per IS 875 Seismic forces as per IS: 1893, importance factor of 1.5, loads due to deviation of conductor, loads due to un-balanced vertical and horizontal forces, erection loads, short circuit forces. Short Circuit forces shall be calculated considering a fault level of 31.5 KA IEC: 865 may be followed for evaluation of short circuit forces.

f. The contractor shall furnish design, drawing, Bill of Material (BoM) of structures on award of contract. The design drawing should clearly indicate sections numbers and sizes of the bolts & details of typical joints, member wise weights & total weight of the structure.

As designing is in the scope of contractor, supply/approval of design & drawing shall not relieve the contractor from his responsibility for :–

i**)** Observing all the required clearances (phase to phase, phase to earth, sectional clearances & ground clearances) as per tender specifications.

ii) Calculation of force at all the joints/sections and their load carrying capacity shall be as per details of design requirements (e) given above.

iii) In case, the structures not complies with points (i & ii) given above, the contractor shall have to modify/replace the structure as the case may be and agreeable to CSPTCL without any cost implication.

9.3 DETAILS OF STEEL STRUCTURE (33KV SIDE STRUCTURE)

Sl. No	**Particulars**	**Type**	**Height of structure from FL in mm**	**Width of beam in mm**	**Approx. Weight of each structure with Foundation bolts (in Kg)**	**Wt. of nut & bolts & washers (in Kg)**
1	Isolator i) with E/sw (3 phase)	3ISOM Lattice bolted	2952	-	380	13
	ii) without E/sw (3 phase)				365	
2	VCB	-	-	-	-	-
6	Current transformer (T type structure for three phase)	BB Lattice bolted	2510	-	218	11
8	Lightning arrester (T type structure for 3 phase)	AB Lattice bolted	3075	-	262	9

9.4 TECHNICAL SPECIFICATION FOR MARSHALLING/JUNCTION BOXES.

9.4.1 SCOPE.

Suitable size Junction/marshalling boxes shall be provided for the termination of CT, PT, secondary connections. The boxes shall be suitable for outdoor use and tested for IP55. The size should be able to accommodate incoming & out going cables properly. Necessary arrangement shall also be made for the single phase AC supply connection with 1 No. lighting arrangement plus 1 No. 15A plug.

9.4.2 CONSTRUCTION.

Junction (Marshalling) boxes shall be made of MS sheet steel of thickness 2.5 m.m. with suitable rubber beading and gaskets to make the box completely water proof and suitable for outdoor installation. Quality gaskets shall be utilized to prevent ingress of rain water inside the box. Suitable mounting arrangements shall be provided for these boxes

i) Boxes shall be suitable for outdoor mounting as stated above and shall be provided with knock-outs both in top and bottom plated for cable/conduit connectors. The box cover should be hinged at one end in addition nuts/bolts shall be provided in all four corners for tightening the box cover. All hardwares used in junction boxes shall be zinc passivated. Junction (Marshalling) boxes shall be of 48 ways (24 terminal blocks) with a dimension (H x W x D) not exceeding 350 x 450 x 250 (H x W x D).

ii) Junction (Marshalling) boxes shall be provided with two earthing terminals and shall be complete with end plate, end clamps, fixing channels (vertically mounted), flange, covers and brass cable glands etc.

iii) Box shall be painted in accordance with the pre-treatment and painting process as per clause '3.0'. . Each box shall be given a coat of read lead primer, one coat of oil primer, followed by two finishing coats of shade 631 of I.S.5 (Light Grey) for exterior and glossy white for the interior surfaces.

iv) Moulded barriers of suitable size shall be provided between terminals to prevent flashover. The terminals shall have a voltage withstand capability of at least 5KV between phase to earth as well as between two adjacent blocks for one minute. Each junction (marshalling) box shall have provision of addition of one more row terminal blocks in future and each row shall have provision for 5 to 10 terminal blocks, if required.

v) Terminal blocks shall be Elmex/connectwell make and shall be of the disconnectable type only. Please note that non disconnecting type terminal blocks are not required and all such Boxes shall not be accepted. Terminal blocks shall be mounted in 2 rows of 24 ways.

vi) All terminals shall be complete with insulated barriers, terminals, studs, washers, nuts, lock nuts & identification strips and shall have facility for measurement of voltage/current using banana pins

9.4.3 IMPORTANT DESIGN REQUIREMENTS.

i) The terminal blocks should necessarily be of disconnecting type only.

ii) The cover of the box should cover the complete surface of the box, so that installation may be water proof. A stopper should be provided so that at the times of opening full load may not come on the hinges.

iii) A small copper strip measuring 450x25x3mm with five nuts should be provided inside the box, so that earthing of five star points of CT secondary could be possible without any difficulty.

iv) Terminal blocks should be numbered serially.

v) Double compression type Brass cable glands, rubber gaskets and Elemex make terminal blocks should be of best quality. Suitable handle type locking arrangement shall be provided for the box. A small circular plate should be provided with each of the cable gland, so that the gland not in use may be closed properly, so as to avoid entry of rain water in the box.

vi) Each type of box shall however have a provision for one additional row of terminals blocks to be added in future. The slotted steel channels of 14 SWG size and each row shall have provision for addition of 10 to 15 terminals blocks if required.

9.4.4 **CABLE ENTRY AND GLANDS.**

In all marshalling boxes cable entry shall be from bottom. The marshalling box shall have **brass** cable glands suitable for different cores, 2.5 mm^2. Copper control cables, which are to be used to connect equipments with control or relay panels. No any cable whether control or power cables should be terminated without using proper size copper lugs of different sizes & should be crimped with correct size crimping tools.

9.4.5 Contractor shall furnish one set of following drawings/data:-

i. Complete assembly drawings of the Junction boxes showing plan, elevation and typical sectional views and locations of terminal blocks for external wiring connections.
ii. Foundation plan showing location of channels sills, anchor bolts etc.
iii. General arrangement drawing of Junction box showing the terminal connectivity mounted.
iv. Itemised bill of material listing all devices mounted or otherwise furnished indicating manufacturers type.

BAY MARSHALLING KIOSKS (BMK):

The bay marshalling kiosk shall have three distinct compartments for the following purpose:-

(i) To receive two incoming 415V, 3 phase, 63Amps, AC supply with auto changeover and MCB unit and distribution of 1 No. 63A for lighting and to distribute minimum six outgoing 415V, 3 phase, 16 Amps AC supplies controlled by MCB.

(ii) To distribute minimum ten outgoing 240V, 10 Amps single phase supplies to be controlled by MCB to be drawn from above 3 phase incomers.

(iii) 50 Nos.terminal blocks in vertical formation as spare.

(iv) CFL illumination and spaceheater in the kiosk

9.5 INSTALLATION AND ERECTION OF EQUIPMENTS

a) Switch gear and control panel shall be installed in accordance with IS 3072 as per manufacturer's instruction.
b) Induction motor, where ever applicable, shall be installed and commissioned as per IS 900.
c) Installation of GI cable trays in trenches and laying of cable shall be carried out as per IS 1255 and as per relevant standards.
d) The earthing system shall be installed as per designed drawing including welding/brazing/ bolting.

9.6 EARTHING OF CAPACITOR BAY:-

9.6.1 (a) The Earthing shall be done in accordance with requirements given hereunder. The earth mat design shall be done by the contractor as per IEEE – 80 for the safe step and touch potential. Earthing system installation shall be in strict accordance with the latest editions of Indian Electricity Rules, relevant Indian Standards & Codes of Practice & Regulations existing in the locality where the system is installed.

a) Code of Practice for Earthing IS: 3043
b) Code of Practice for the protection of building & allied structures against lightning IS: 2309
c) Indian Electricity Rules 1956 with latest amendments.
d) National Electricity Safety Code IEEE – 80.

9.6.1 (b) The Earthing shall be done in accordance with requirements given hereunder. The earth mat is to be constructed by using 65 x 8 mm GI flats with spacing between the flats as per existing substation earth mat configuration. This earthing mat is to be properly welded with the existing earth mat of the sub-station.

9.6.2 **EARTHING CONDUCTOR LAYOUT:-**

a. Earthing Conductors in outdoor areas shall be buried at least 600 m.m. below finished ground level unless stated other wise.

b. Whenever earthing conductor crosses cable trenches, under ground service ducts, pipes, tunnels, railway tracks etc., it shall be laid minimum 300 m.m. below them and shall be circumvented in case it fouls with equipment / structure foundations.

c. Tap connectors from the earthing grid to the equipment / structure to be earthed, shall be terminated on the earthing terminals of the equipment / structure.

d. Earthing conductors or leads along their run on cable trench, ladder, walls etc. shall be supported by suitable welding / cleating at intervals of 750 m.m. wherever it passes through walls, floors etc. galvanised steel sleeves shall be provided for the passage of the conductor and both ends of the sleeve shall be sealed to prevent the passage of water through the sleeves.

e. Earthing conductors crossing the road shall be laid 300 m.m. below road or at greater depth to suit the site conditions.

9.6.3 EQUIPMENT & STRUCTURE EARTHING:-

a. Earthing pads shall be provided for the apparatus / equipment at accessible position. The connection between earthing pads and the earthing grid shall be made by two short earthing leads (one direct and another through the support structure.) free from kinks and splices.

b. Metallic pipes, conduits and GI cable tray sections for cable installation shall be bonded to ensure electrical continuity and connected to earthing conductors at regular interval. Apart from intermediate connections, beginning points shall also be connected to earthing system.

c. Metallic conduits shall not be used as earth continuity conductors.

d. Light poles, junction boxes on poles, cable and cable boxes / glands, lock out switches etc, shall be connected to the earthing conductor running alongwith the supply cable which in turn shall be connected to earthing grid conductor at a minimum two points.

e. All lighting panels, junction boxes, receptable fixtures, conduits etc. shall be grounded in compliance with provisions of I.E. Rules.

9.6.4 SPECIFIC REQUIREMENTS FOR EARTHING SYSTEMS:-

Auxiliary earthing mat comprising of 65 x 8 m.m. G.I. Flats closely spaced (300 m.m. x 300 m.m.) conductors shall be provided at depth of 300 m.m. from ground level below the operating handles of the M.O.M. Box of the Isolators. M.O.M. Boxes shall be directly connected to auxiliary earthing mat.

S. No.	Item	Size of Earthing	Material
1	Main Earthing conductor buried in ground at minimum 600 m.m. below finished ground level	65 x 8 m.m. Flat (as per existing earthing configuration.	Galvanised Steel
2	Earth Spikes	25 m.m. Diameter 2500 m.m. long,	Galvanised Steel
3	Earthing of equipment and structure	G.I flat 50x6 mm	Galvanised Steel

There shall be a GI earth mat designed with 25mm diameter 2500mm long GI Earth Spikes & 65 x 8 mm GI Flats. All the earth spikes & earth mat shall be interconnected. The spacing of the earth mat grid conductor shall be as per the existing earth mat of the substation.

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10.0 TECHNICAL SPECIFICATION FOR ACSR "ZEBRA" CONDUCTOR

10.1 Details of Conductor

The ACSR Conductor shall generally conform to IS: 398 PART-II, 1996 with latest Amendment except where otherwise specified herein.

The salient parameters of the ACSR Conductor are indicated below.

SN	Particulars	ACSR "ZEBRA" Conductor
a)	Stranding and wire diameter	54/3.18 mm Al +7/3.18 mm steel
b)	Number of Strands	
	Steel core	1
	1st steel layer	6
	1st Aluminium layer	12
	2nd Aluminium layer	18
	3 rd Aluminium layer	24
c)	Sectional area of Aluminium/steel	428.9/ 55.61 sq. mm
d)	Total sectional area	484.50 sq.mm
e)	Overall diameter (mm)	28.62

10.2 Workmanship

All the Aluminium and steel strands shall be smooth, uniform and free from all imperfections, such as spills and splits, die marks, scratches, abrasions, etc., after drawing and also after stranding.

The finished conductor shall be smooth, compact, uniform and free from all imperfections including kinks (protusion of wires), wire cross over, over riding, looseness (wire being dislocated by finger/hand pressure and/or unusual bangle noise on tapping), material inclusions, white rust, powder formation or black spot (on account of reaction with trapped rain water etc.), dirt, grit etc.

The steel strands shall be hot dip galvanized and shall have a minimum zinc coating as indicated in the STP. The zinc coating shall be smooth, continuous, of uniform thickness, free from imperfections and shall withstand number of dips in standard Preece test as indicated in STP. The steel wire rods shall be of such quality and purity that, when drawn to the size of the strands specified and coated with zinc, the finished strands and the individual wires shall be of uniform quality and have the same properties and characteristics as prescribed in IEC: 888.

The steel strands shall be pre formed and post formed in order to prevent spreading of strands in the event of cutting of composite core wire. Care shall be taken to avoid, damages to galvanization during pre-forming and post-forming operation.

10.3 Joints in Wires

AluminiumWires

During stranding, no aluminium wire welds shall be made for the purpose of achieving the required conductor length.

No joints shall be permitted in the individual wires in the outer most layer of the finished conductor. However joints are permitted in the inner layer of the conductor unavoidably broken during stranding provided such breaks are not associated with either inherently defective wire or with the use of short lengths of aluminium wires. Such joints shall not be

more than four (4) per conductor length and shall not be closer than 15 meters from joint in the same wire or in any other aluminium wire of the completed conductor.

Joints shall be made by cold pressure butt welding and shall withstand a stress of not less than the breaking strength of individual strand guaranteed.

Steel Wires

There shall be no joint of any kind in the finished wire entering into the manufacture of the strand. There shall also be no strand joints or strand splices in any length of the completed stranded steel core of the conductor.

10.4 Tolerances

The manufacturing tolerances to the extent indicated in the STP shall be permitted in the diameter of individual aluminium and steel strands and lay-ratio of the conductor.

10.5 Materials

Physical constant of hard- drawn Aluminium

a) **Resistivity: -** Theresistivity of the aluminium depends upon its purity and its physical condition. However as per the specified value of purity of this specification the maximum value permitted is 0.028264 Ohm.Sq.mm/ meter at 20 ^{0} C and this value has been used for calculation of maximum permissible values of resistance.

b) **Density:-** At a temperature 20 ^{0} C the density of hard drawn aluminium shall be 2.703 g/ cm3.

c) **Constant –Mass temperature Co- efficient of Resistance:-** At a temperature of 20 ^{0} C the constant-mass temperature co-efficient of resistance of hard drawn aluminium measured between two potential points rigidly fixed to the wire, the metal being allowed to expand freely, has been taken as 0.004 per degree Celsius.

d) **Co-efficient of linear expansion**:- The co-efficient of linear expansion of hard drawn aluminum at 0 ^{0} C has been taken as 23.0 x10 $^{-6}$

Hard- drawn Galvanised Steel Wire:-

a) Density:- At a temperature 20 ^{0} C the density of Galvanised Steel wire shall be 7.8 g/ cm3.

b) Co-efficient of linear expansion:- In order to obtain infirmity in calculations a value of 11.5x10 -6 per degree C. may be taken for galvanized steel wire used in ACSR Conductor.

Aluminium

The aluminium strands shall be hard drawn from electrolytic aluminium rods having purity not less than 99.5% and a copper content not exceeding 0.04%. They shall have the same properties and characteristics as prescribed in ISS, BSS/IEC: 889.

Steel

The steel wire strands shall be drawn from high carbon steel wire rods produced by either the acid or the basic open-hearth process, the electric furnace process, or the basic oxygen process and shall conform to the chemical composition indicated in the STP and to the relevant standard.

The Steel wire strands shall have the same properties and characteristics as prescribed for regular strength steel wire in IEC: 888.

Zinc

The zinc used for galvanizing shall be electrolytic High Grade Zinc of 99.95% purity as per IS:209. It shall conform to and satisfy all the requirements of IS: 209. Galvanizing has to be done hot dip galvanizing process. Natural grease may be applied between the layer of wires (Lithium soap grease corresponding to the Gr.II of IS:7623-1974 its suitable for such application.

10.6 TESTS AND STANDARDS

Type Tests, Routine and Acceptance tests on ACSR Conductor shall be conducted as per latest relevant standard & tender specification. The type tests should not be older than ten years from the last date of submission of bid.

STANDARDS

The conductor shall conform to the following Indian/International Standards, which shall mean latest revisions, with amendments/changes adopted and published, unless specifically stated otherwise in the Specification.

Sl. No.	Indian Standard	Title	International Standard
1.	IS: 209-1992	Specification for zinc	BS:3436-1986
2.	IS: 398 Part-I - 1996	Specification for Aluminium Conductors for Overhead Transmission Purposes	IEC:1089-1991 BS:215-1970
3.	IS:398 Part-II - 1996	Aluminum Conductor Galvanized Steel Reinforced	BS;215-1970 IEC:1089-1991
4.	IS:398 Part-V - 1992	Aluminum Conductor Galvanized Steel- Reinforced For Extra High Voltage (400 KV) and above	IEC:1089-1991 BS:215-1970
5.	IS : 1778-1980	Reels and Drums for Bare Conductors	BS:1559-1949
6.	IS : 1521-1991	Method of Tensile Testing of Steel Wire	ISO 6892-1984
7.	IS : 2629-1990	Recommended Practice for Hot Dip Galvanising of Iron and Steel	
8.	IS : 2633-1992	Method of Testing Uniformity of Coating on Zinc Coated Articles	
9.	IS : 4826-1992	Galvanized Coating on Round Steel Wires	IEC : 888-1987 BS:443-1969
10.	IS : 6745-1990	Methods of Determination of Weight of Zinc Coating of Zinc Coated Iron and Steel Articles	BS:433-1969 ISO 1460- 1973
11.	IS : 8263-1990	Method of Radio Interference Tests on High Voltage Insulators	IEC:437-1973 NEMA:107-1964 CISPR
12.		Zinc Coated steel wires for stranded Conductors	IEC : 888-1987
13.		Hard drawn Aluminium wire for overhead line conductors	IEC : 889-1987

10.7 STANDARD TECHNICAL PARTICULARS OF ACSR "ZEBRA" CONDUCTOR

The ACSR ZEBRA CONDUCTOR to be supplied should conform to IS:398 (Part-2) with all the amendments made till to-day. However, important parameters are given below:-

Sl.	Description	Unit	Guaranteed Values
1.0	Raw Materials		
1.1	Steel Wire / Rods		
1.1	Aluminium		
a)	Minimum purity of Aluminium	%	99.50

b)	Maximum copper content	%	0.04	
1.2	Steel wires/ rods			
a)	Carbon	%	0.50 to 0.85	
b)	Manganese	%	0.50 to 1.10	
c)	Phosphorous	%	Not more than 0.035	
d)	Sulphur	%	Not more than 0.045	
e)	Silicon	%	0.10 to 0.35 (Max.)	
1.3	Zinc			
	Minimum purity of Zinc	.%	99.95	
2.0 a)	No. of strands Alu./Steel	No.	54/7	
b)	Cross section area Alu/Steel. Strands Whole Alu./Steel Whole conductor	Sq. mm	 7.942/7.942 428.90/55.6 484.50	
c)	Over all diameter of conductor	mm	28.62	
d)	Laying of strand		Alu	Steel
	Center	No.	NA	1
	First layer	No.	NA	6
	Second layer	No.	12	NA
	Third layer	No.	18	NA
	Fourth layer	No.	24	NA
2.1	Aluminum strands after stranding		54/3.18 mm	
	Diameter			
a)	Nominal	mm	3.18	
b)	Maximum	mm	3.21	
c)	Minimum	mm	3.15	
2.2	Minimum breaking load of strand			
a)	Before stranding	KN	1.29	
b)	After stranding	KN	1.23	
2.3	Maximum resistance of strand at 20 deg. C.	Ohm. per KM.	3.626	
3.0	**Steel strand after stranding**		7/3.18 mm	
3.1	Diameter			
a)	Nominal	mm	3.18	
b)	Maximum	mm	3.24	
c)	Minimum	mm	3.12	
3.2	Minimum breaking load of strand			
a)	Before stranding	KN	10.43	
b)	After stranding	KN	9.91	

3.3	Galvanizing			
a)	Minimum weight of zinc coating per sq.m.	gm	260	
b)	Minimum number of dips that the galvanized strand can withstand in the standard preece test	Nos.	3 dips of one minute	
c)	Min. No. of twists in gauge length equal 100 times the dia. of wire which the strand can withstand in the torsion test (after stranding)	Nos	18	
4.	**Stranded Conductor**			
4.1	UTS of the conductor	kN	130.32 (Min.)	
4.2	Lay length of outer layer	mm	Max	Min
a)	Outer Steel layer	mm	28	13
b)	First Aluminium layer	mm	17	10
c)	Second Aluminium layer	mm	16	10
d)	Third layer	mm	14	10
4.3	DC resistance of the conductor at 20°C when corrected at standard weight Ohm-km whole conductor Strand	ohm/km	0.06868 3.626	
4.4	Standard length of the conductor	mtr	1500	
4.5	Tolerance on Standard length	%	(+/-) 5	
4.6	Direction of lay of outer layer		Right Hand	
4.7	Linear mass of the conductor			
	Aluminium	kg/km	1185	
	Steel	kg/km	436	
a)	Total Standard	kg/km	1621	
5.0	Coefficient of linear expansion of complete Conductor per degree celcius	per degree celcius	19.3×10^{-6}	
5.1	Calculated final Modulus of elasticity kg/ cm2	GN/ Sq.m	69	
5.2	Temp. Variation	0 Deg. / 75 Deg. C		
5.3	Current carrying capacity. at 40 deg. Cent. Ambient and 30 deg. Rise	Amp	740	
5.4	Elongation before /after stranding steel strand	%	4/3.5	

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SECTION – VII

G.T.P. OF EQUIPMENTS

SCHEDULE (I-A)

GUARANTEED AND OTHER TECHNICAL PARTICULARS

(A) GUARANTEED TECHNICAL PARTICULARS FOR SHUNT CAPACITORS

1.	Name of manufacturer and country	
2.	Applicable Standard	IS 13925/1998 (Part – I) with its latest amendments
3.	**CAPACITOR UNITS :**	
i.	Rated Voltage	**KV**
ii.	Max. permissible continuous over voltage as on percentage of rated voltage.	
iii.	Short time over voltage.	
	a) For 30 minutes.	
	b) For 1 minute.	
	c) For 1 Second.	
	d) For 3 cycles.	
iv.	a) Nominal capacitance at 25 & 50 °C	μF
	b) Manufacturing tolerance on capacitance value.	
v.	a) Rated output at rated voltage and 50 Hz.	KVAR
	b) Maximum output	
vi.	a) No. of series group per unit.	
	b) No. of parallel elements per series in a unit.	
	c) Capacitance of an element in a unit.	
vii.	a) Type of impregnant used.	
	b) Characteristics of impregnant used.	
viii.	Type of fusing used.	
ix.	Temperature category as per IS	
x.	Discharge resistor value.	Ohm

xi.	Discharge time for 50 volts.	
xii,	Bushings.	
	a) Number of bushings per unit & type.	
	b) Rated voltage.	KV
	c) Rated insulation level.	
	d) Total creepage distance.	mm
	e) Type of jointing of bushings with case /container .	
xiii.	a) Type of dielectric used.	
	b) Voltage stress for dielectric.	
	c) Thickness of dielectric.	
xiv.	a) 10 seconds test voltages.	
	b) Lightning impulse test voltage.	KV (Peak) ……
xv.	a) Capacitor tank material	
	b) Finish / paint details	
	c) Type of welding.	
xvi	Fuses :	
	a) Type (Internal / External HRC fuses)	
	b) Number per unit.	
	c) Max. energy which fuse carrier can withstand without bursting.	
	d) Max. continuous rating of fuse without deterioration as a percentage of capacitor unit nominal current.	
	e) Max. recovery voltage at which fuse can operate.	
	f) ISS/IEC to which fuses confirms.	
xvii	Overall dimensions in mm (Approx.).	
xviii	Weight per unit. Kgs (Approx.)	
xix	Losses under stabilised condition (after 48 Hrs. of energisation) .	
4.	**CAPACITOR BANK**	

i.	Rated voltage	KV.
ii.	Max. continuous over voltage rating as a percentage of rated voltage.	
iii.	Nominal capacitance at 25°C.	μF ……..
iv.	Manufacturing tolerance on nominal capacitance value.	
v.	Variation of capacitance due to ambient temperature and load.	
	a) 4 °C to 27 °C	
	b) 27°C to 50 °C	
vi.	Variation of capacitance due to loss of units / elements.	
	a) At alarm stage.	
	b) At trip stage.	
vii.	Number of units in parallel per phase per series section.	
viii.	Number of series sections per phase.	
ix.	Connection symbol.	
x.	Rated output (MVAR)	
xi.	Rated Current per Phase.	Amp
xii	Withstand voltage of Capacitors bank while switching ON/OFF.	
xiii	Power frequency withstand voltage.	KV (rms)
xiv	Creepage distance (mm)	mm/KV
xv.	Current flow in the neutral (amp) connection of capacitor bank.	
	a) Under normal condition	
	b) One Capacitor unit is out in a section.	
	c) Two capacitor units are out in a section.	
vi.	Guaranteed losses corrected at 50°C at rated voltage and frequency for capacitor bank to be used for capatilisation of losses (KW)	KW
xvii	Max. residual voltage at de-energisation.	
xviii	Time taken in attaining the residual voltage.	

xix	Annual failure rate.	
xx)	Whether the interstack & base insulators and terminal connectors for bank shall be included in the scope of supply.	
xxi	Whether galvanised super structure and stack rack for the capacitor bank shall be included in the scope of supply.	
xxii	Whether galvanised elevating structure and mounting structure for the capacitor bank shall be included in the scope of supply as per common foundation design attached.	
xxiii	Over all dimensions of capacitor banks	
xxiv	Total weight of capacitor unit and Bank (Kgs). (Approx.)	

SCHEDULE (I-B)

GUARANTEED TECHNICAL PARTICULARS OF CIRCUIT BREAKER.

1.	Name of manufacturer and country	
2.	Manufacturer's type & designation.	
3.	Reference standard	IEC-56 / IS 13118
4.	IS CB restrike free	
5.	Rated voltage	KV
6.	Rated current	Amps.
7.	Rise of temp. over ambient.	
8.	Rated breaking current	
	a) Symmetrical KA	KA
	b) Asymmetrical KA	KA
9.	Rated making current KA	KA(peak)
10.	Over voltage for switching off capacitive current corresponding to bank rating as specified.	
11.	Total break time.	ms
12.	Operating sequence	
13.	Power frequency withstand test voltage.	KV (rms)
14.	Lightning impulse withstand voltage.	KV (peak)
15.	Type of main & arcing contacts.	
16.	Material of contacts.	
	a) Main	
	b) Arcing	
17.	Type of operating mechanism.	
18.	No. of auxiliary contacts.	
19.	Control circuit voltage.	

20.	Creepage distance.	mm
21.	Total weight	Kgs.
22.	Over all dimensions.	
23.	Type of mounting & elevating structure of suitable height to be provided is included in the scope of supply.	
24.	Capacitors switching off duty for single bank in amps.	

SCHEDULE (I-C)

GUARANTEED TECHNICAL PARTICULARS OF CURRENT TRANSFORMENR.

1.	Name of manufacturer	
2.	Rated voltage	KV
3.	Type	
4.	Rated primary current (A)	
5.	Rated secondary current (Amp)	
6.	Ratio	
7.	No. of cores.	
8.	No. of primary winding	
9.	VA output at rated current	
	a) Core one	VA
	b) Core two	VA
10.	Accuracy at rated burden	
	a) Core one	
	b) Core two	
11.	Short time withstand current and duration.	
12.	Standard reference.	
13.	Withstand test values	
	a) 50 Hz dry KV (rms)	KV
	b) 50 Hz wet KV (rms)	KV
14.	50 micro second impulse (KV (Peak)	
15.	Creepage distance (mm)	
16.	Total weight	
17.	Overall dimensions.	
18.	Accuracy limit factor core one.	
19.	Instrument security factor core-2	
20.	Whether galvanised mounting and elevating structure of suitable height is included in the scope of supply.	

SCHEDULE (I-D)

GUARANTEED TECHNICAL PARTICULARS OF SERIES REACTOR.

1.	Name of manufacturer	
2.	Reference Standard	IS 5553 Part – III/IEC-289
3.	a) Rated KVAR	
	b) Inductance (Henry)	
4.	Rated voltage	KV
5.	Rated frequency	Hz
6.	No. of phases	
7.	Linear characteristic.	
8.	Type of cooling.	
9.	Rated continuous current (A)	
10.	Resistance / phase (ohms)	
11.	Maximum permissible continuous current.	
12.	Power frequency withstand voltage.	KV (rms)
13.	Lightning impulse withstand voltage.	KV (Peak)
14.	Total losses corrected to 75°C.	
15.	Creepage distance (mm)	
16.	Short time current rating.	
17.	Total weight (Kgs) (Approx.)	
18.	Overall dimensions. In mm (Approx.)	
19.	Whether galvanised mounting and elevating structure of suitable height is included in the scope of supply.	

SCHEDULE (I-E)

GUARANTEED TECHNICAL PARTICULARS OF ISOLATOR

1.	Name of manufacturer	
2.	Type	
3.	Reference standard.	IS : 9921
4.	Rated Voltage	KV
5.	No. of Poles	
6.	Rated normal current (A)	
7.	Rated peak withstand current.	KA (peak)
8.	Rated short time current for 1 second.	
	i) 1.2/50 micro second impulse withstand voltage with +ve & - ve polarity. a) Across the isolating distance. b) To earth and between poles.	 KV (peak) KV (peak)
	ii) One minute power frequency withstand voltage. a) Across the isolating distance. b) To earth and between poles.	 KV (rms) KV (rms)
9.	Type of Isolator.	
10.	Creepage distance (mm)	
11.	Weight of complete isolator.	
12.	Type of operating mechanism.	
13.	No. of auxiliary contact provided.	
14.	Total weight.	
15.	Overall dimensions.	
16.	Whether galvanised mounting and elevating structure of suitable height is included in the scope of supply.	
17.	Phase to phase clearance in mm	
18.	Top & bottom PCD of insulators in mm	

SCHEDULE (I-F)

GUARANTEED TECHNICAL PARTICULARS OF CONTROL & RELAY PANELS

	Make	
1.	Dimensions of control & relay panels.	
2.	Dimensions of supporting channels.	
3.	Thickness of steel plates proposed for use of panels.	
4.	Control switches for circuit breakers.	
	a) Make	
	b) Type	
	c) Type of handle provided	
	d) No. of positions.	
	f) No. of contacts	
	i) Normally closed.	
	ii) Normally open	
5.	Indicating lamps.	
	a) Make	
	b) Type	
	a) Operating voltage.	
	b) Size of lamps.	
	c) Wattage of lamps.	
	d) Colour of lamps.	
6.	Switch Board wiring.	
(a)	Insulation of wires	
(b)	Size of wiring conductor for the following	
	i) PT Circuits	
	ii) CT circuits	
	iii) DC supply circuits	
	iv) Other circuits.	
(c)	b) Size of earthing bar for safety Earthing.	
(d)	Type of terminals provided on wiring.	
(e)	Wiring conductor material.	

7.	Indicating Meters (To be furnished for each type of meter)		
	a) Type of Instrument		
	b) Size		
	c) Whether magnetically shielded or not.		
	d) Limits of error in the effective range.		
	e) Max. scale length		
	f) Whether tropicalised.		
	g) Short time over load capacity		
	h) VA burden.		
	i) Temp. at which the instruments are calibrated.		
	j) Maker's name and country.		
	k) Description leaflets / references submitted.		
8. I	**Protective Relays :**		
	a) Make		
	b) Type		
	c) Current coil rating		
	d) Tap range IDMTL		
	e) VA burden i)Highest tap ii) Lowest tap		
	f) Power consumption		
	I)Highest tap ii) Lowest tap		
	g)Time of operation of max. time setting at		
	i) 5 times tap setting current.		
	ii) 10 times tap setting current.		
	h) Type of characteristics.		
	i) Trip contact rating		
	j) Whether seal in contact provided or not.		
	k) Description of leaflet reference submitted.		

l.		Unbalance Voltage Relay	Over voltage Relay	No volt Relay
a)	Name			
b)	Type			
c)	Current coil rating.			
d)	Tap range.			
e)	VA Burden			
	i) Highest tap } ii) Lowest tap }			
f)	Power consumption			
	i)Highest tap } ii) Lowest tap. }			
g)	Type of characteristics.			
h)	Trip contact rating.			
j)	Whether seal in contact provided or not.			
k)	Description of leaflet reference submitted.			
09.	Space heaters in control cubicle.			
	a) Rated voltage.			
	b) Power consumption at rated voltage.			
10.	Enclosures			
(i).	Whether relevant drawings for all the equipments enclosed.			
(ii).	Whether all the type test reports for all the equipments enclosed.			
(iii).	Whether descriptive technical features for all the equipments. enclosed.			
11.	Attach separate sheet and write in details the write up on protection scheme.			

Schedule I-G

NEUTRAL CURRENT TRANSFORMER:

Sr. No.	Description	Details
01	Name of manufacturer	
02.	Manufacturers type and designation	
03.	Rated Voltage	
04.	Maximum operating voltage	
05	Rated Frequency	
06	Transformation ratio	
07.	Rated burden	
08.	Class of accuracy	
09.	Saturation factor	
10.	Knee point voltage	
11.	Maximum excitation current corresponding to knee point voltage	
12.	Maximum secondary winding resistance	
13.	Short time current rating for 1 sec.	
14.	1 Minute Power frequency withstand test voltage	
	(i) Dry	
	(ii) Wet	
15.	1.2/50 micro sec.Impulse voltage withstand test voltage	
16.	1 Minute Power frequency withstand voltage on secondary.	
17.	Total weight	
18.	Weight of oil	
19.	Overall dimension	
	(i) Referance of G. A. Drg.	
	(ii)Total Height	
20	Mounting details	
	i) Reference of of GA Drawing	
	ii) Suitable for mounting on UPSEB structure as per Drg. No. W-04747.	
21.	Creepage distance of bushing	
	i) Total	
	ii) Protective	
22.	Accuracy Limit Factor	
23.	Instrument security factor	
24.	Applicable standard	
25.	Bimetallic terminal connectors	
	i) Current rating	
	ii) ACSR Conductor for which suitable	

Schedule I-H

GUARANTEED TECHNICAL PARTICULARS FOR ZINC OXIDE (GAPLESS) TYPE LIGHTNING ARRESSTORS.

1. Maker's Name and place of Manufacture :	
2. Manufacturer's type & Model No. :	
3. Reference standard :	
4. Rated Voltage :	
5. Maximum continuous operating Voltage (MCOV) (KV). :	
6. Power frequency withstand voltage :	
7. Minimum discharge capability :	
8. Long duration current impulse Test	
a) Current Peak } .	
b) Virtual duration }	
9. Pressure Relief Class :	
10. Max. switching impulse residual	
voltage at	
i) 1000 Amps crest. :	
ii) 250 Amps crest. :	
11. Impulse (1.2/50 micro sec.) : .	
12. One minute power frequency :	
with stand voltage of housing	
(dry/wet) KV (RMS)	
13. Max. residual voltage	
(8/20 micro second wave) (KVp)	
a) at 5000 Amps. :	
b) at 10000 Amps. :	
c) at 20000 Amps. : .	
14. Impulse high current short	
duration discharge	
(4/10 micro second wave)	
15. Nominal discharge current	
(8/20 micro second wave)	
16. a) Leakage current at nominal voltage :	
b) Leakage current at Max. Voltage :	
17. Maximum energy discharge :	
18. Overall height of Surge Arrester (mm) :	
(Approx.)	
19. Maximum cantilever strength of spring :	
Arrester (including wind load)	
20. Total weight of arrester (Approx.) :	
21. a) Material of valve :	
b) Details of sealing	
c) Description of pressure relief system :	
d) No. of units per arrester :	
22. Creepage distance :	
23. Min. clearances	
a) Between phases :	
b) Between phase to earth :	

24. Size of grounding terminal		
25. Size of the line terminal	:	
26. Diameter of the grading ring	:	
27. Min. space required for 3 Phase installation	:	
28. OVER VOLTAGE CAPACITY		
a) 0.1 second	:	
b) 1.0 second	:	
c) 10.0 seconds	:	
29. a) Reference Voltage (KV)	:	
b) Reference Current (mA)	:	

SECTION – VIII

PRICE VARIATION FORMULAE FOR EHV SUB STATION EQUIPMENTS AND LINE MATERIALS

ANNEXURE –PV-1
PRICE VARIATION FORMULA FOR CURRENT TRANSFORMERS (BELOW 72.5 KV)

IEEMA
Your Link to Electricity

IEEMA/PVC/INST.TR (BELOW 72.5 KV)/2005 Effective from: 1st June 2005

PRICE VARIATION CLAUSE FOR INSTRUMENT TRANSFORMERS BELOW 72.5 KV
(Current and Potential Transformers designed for operation on system voltage below 72.5 KV)

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100}\left(18 + 18\frac{C}{C_0} + 20\frac{ES}{ES_0} + 10\frac{IS}{IS_0} + 12\frac{ER}{ER_0} + 09\frac{TB}{TB_0} + 13\frac{W}{W_0}\right)$$

Wherein,

P = Price payable as adjusted in accordance with the above formula.

P_0 = Price quoted/confirmed.

C_0 = Average LME settlement price of copper wire bars (refer notes)
This price is as applicable for the month, two months prior to the date of tendering.

ES_o = C&F price of CRGO Electrical Steel Sheets (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.

IS_o = Wholesale price index number for 'Iron & Steel (Base: 1993-94=100)' (refer notes)
This index number is as applicable for the week ending 1st Saturday of the month, three months prior to the date of tendering.

ER_0 = Price of Epoxy Resin (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tending.

TB_0 = Price of Transformer Oil Base Stock (refer notes)
This price is as applicable on the 1st working day of the month, two months prior to the date of tendering.

W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base 1982 = 100)
This index number is as applicable on the first working day of the month, three months prior to the date of tendering.

For example, if date of tendering falls in October 2005, the applicable prices of Copper Wire Bars (C_0) and Transformer Oil Base Stock (TB_0) should be for the month August 2005, where as the applicable price of CRGO Electrical Steel Sheets (ES_0) and Epoxy Resin (ER_0) should be as on 1st September 2005 and Wholesale price index number for 'Iron & Steel' (IS_0) should be for the week ending first Saturday of July 2005 and all India average consumer price index number (W_0) should be for the month of July 2005.

Reply to: IEEMA/PVC/INST.TR (BELOW 72.5 KV)/2005/01/03

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Indian Electrical & Electronics Manufacturers' Association
An ISO 9001 Organisation

IEEMA/PVC/INST.TR (BELOW 72.5 KV)/2005 Effective from: 1st June 2005

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/CTPT/_/_ prevailing as on first working day of the month ..... i.e., one month prior to the date of tendering.

C = Average LME settlement price of copper wire bars (refer notes)
This price is as applicable for the month, two months prior to the date of delivery.

ES = C&F price of CRGO Electrical Steel Sheets (refer note)
This price is as applicable on the 1st working day for the month, one month prior to the date of delivery.

IS = Wholesale price index number for 'Iron & Steel (Base: 1993-94=100)' (refer notes)
This index number is as applicable for the week ending 1st Saturday of the month, three months prior to the date of delivery.

ER = Price of Epoxy Resin (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of delivery.

TB = Price of Transformer Oil Base Stock (refer notes)
This price is as applicable on the 1st working day of the month, two months prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base 1982 = 100)
This index number is as applicable on the first working day of the month, three months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2005, the applicable prices of Copper Wire Bars (C) and Transformer Oil Base Stock (TB) should be for the month October 2005; where as applicable prices of CRGO Electrical Steel Sheets (ES) and Epoxy Resin (ER) should be as on 1st November 2005 and Wholesale price index number for 'Iron & Steel' (IS) should be for the week ending first Saturday of September 2005 and all India average consumer price index number (W) should be for the month of September 2005.

The date of delivery is the date on which the instrument transformer is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch note is to be considered as the date of delivery) or the contracted delivery date (including any agreed extension thereto), whichever is earlier.

Notes: (a) All prices of raw materials are exclusive of modvatable excise/CV duty amount and exclusive of any other central, state or local taxes; octroi etc. Instrument transformers manufacturers import major raw materials like Copper, CRGO Electrical Steel Sheets and TOBS etc. The landed cost of these imported raw materials includes applicable custom duty but exclusive of modvatable CVD.

(b) All prices are as on first working day of the month.

IEEMA/PVC/INST.TR (BELOW 72.5 KV)/2005/02/03

(c) The details of prices are as under:

1) The LME price of Copper Wire Bars (in Rs./MT) is the LME average settlement price of Copper Wire Bars for one month prior to the month of the circular converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the subsequent month. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.

2) The price of CRGO Electrical Steel Sheets (in Rs./MT) is the average CIF price in US $ per MT converted into Indian Rupees with applicable exchange rate prevailing as on 1st working day of the month, as quoted by primary producers. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.

3) The wholesale price index number for 'Iron & Steel' is as published by the Office of Economic Advisor, Ministry of Industry, Govt. of India, New Delhi with base 1993-94=100. This wholesale price index number is being published weekly on provisional basis. However, the same gets finalized after eight weeks and is normally available after two months. Therefore, we are considering in our calculations this final index for the first Saturday of the months two months prior to the date of which the prices of other raw materials such as Al, IM are published for the corresponding month.

4) The price of Epoxy resin is price quoted by resin manufacturer for their grade CT 5900 or its nearest equivalent.

5) The price of TOBS is C&F price (in Rs./K.Ltr) for Group II grade 70 Base Oil as published in ICIS-LOR bulletin for the 1st week of the previous month. This price is normally published in US$ per US Gallon, which is converted in Rs./K.Ltr with applicable exchange rate prevailing on 1st working day of the subsequent month. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.

Authorized Signatory

ANNEXURE –PV- 2
PRICE VARIATION FORMULA FOR ISOLATORS AND SWITCHGEARS (BELOW 36 KV)

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IEEMA/PVC/SWGR/2001 (R-1) *Effective from : 1st January, 2002*

PRICE VARIATION CLAUSE FOR SWITCHGEAR AND CONTROLGEAR

The price quoted/confirmed is based on the cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials / components and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices and Index number, the price payable shall be subject to adjustment up or down in accordance with the following formula:

$$P = \frac{P_0}{100}\left(25 + 17\,\frac{IS}{IS_0} + 18\,\frac{C}{C_0} + 10\,\frac{Al}{Al_0} + 13\,\frac{In}{In_0} + 17\,\frac{W}{W_0}\right)$$

Wherein,

P = Price payable as adjusted in accordance with above formula.

P_0 = Price quoted/confirmed.

IS_0 = Wholesale price index of 'Iron and Steel' (base: 1993-94 = 100) (refer notes).
This index is as applicable on the first week ending Saturday of the month, three months prior to the date of tendering.

C_0 = Price of electrolytic copper wire bars (refer notes).
This price is as applicable on the first working day of the month, one month prior to the date of tendering.

Al_0 = Price of busbar grade aluminium (refer notes).
This price is as applicable on the first working day of the month, one month prior to the date of tendering.

In_0 = Price of phenolic moulding powder for switchgear and controlgear of medium/lower voltage (upto 650 volts) or price of epoxy resin for HT switchgear (above 650 volts) (refer notes).
This price is as applicable on the first working day of the month, one month prior to the date of tendering.

W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base 1982 = 100).
This index number is as applicable for the month, four months prior to the date of tendering.

For example, if the date of tendering falls in May 2001, the applicable prices of electrolytic copper wire bars (C_0), busbar grade aluminium (Al_0) and insulating material (In_0) should be for the month of April 2001 and wholesale price index of 'Iron and Steel' (IS_0) should be for the first week ending Saturday of February 2001 and all India average consumer price index number (W_0) should be for the month of January 2001.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)SWGR/_/_ prevailing as on first working day of the month ..... i.e., one month prior to the date of tendering.

IS = Wholesale price index of 'Iron and Steel' (base: 1993-94 = 100) (refer notes).
This index is as applicable on the first week ending Saturday of the month, four months prior to the date of delivery.

C = Price of electrolytic copper wire bars (refer notes).
This price is as applicable on the first working day of the month, two months prior to the date of delivery.

IEEMA/PVC/SWGR/1/2

Al = Price of busbar grade aluminium (refer notes).
This price is as applicable on the first working day of the month, two months prior to the date of delivery.

In = Price of phenolic moulding powder for switchgear and controlgear of medium/lower voltage (upto 650 volts) or price of epoxy resin for HT switchgear (above 650 volts) (refer notes).
This price is as applicable on the first working day of the month, two months prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base 1982 = 100).
This index number is as applicable for the month, five months prior to the date of delivery.

For example, if the date of delivery in terms of clause given below falls in December 2001 the applicable price of raw materials viz: C, Al and In should be for the month of October 2001 and wholesale price index of 'Iron and Steel' (IS) should be for the first week ending Saturday of August 2001 all India average consumer price index number (W) should be for the month of July 2001.

The "date of delivery" is the date on which the switchgear equipment is notified as being ready for inspection/despatch. (In the absence of such notification the date of manufacturer's despatch note is to be considered as the date of delivery) or the contracted delivery date (including any agreed extension thereto), whichever is earlier.

Notes: (a) All prices of raw materials are exclusive of modvatable excise/CV duty amount and exclusive of any other central, state or local taxes, octroi etc.

(b) All prices are as on first working day of the month.

(c) The details of prices are as under:

1) The wholesale price index number for 'Iron and Steel' is as published by the office of Economic Advisor, Ministry of Industry, Govt. of India, New Delhi, with base 1993-94 = 100. This wholesale price index is being published weekly on provisional basis. However, the same gets finalised after eight weeks and is normaly available after two months. Therefore, we are considering in our calculations this final index published by Economic Advisor for the first Saturday of the months two months prior to the date of which the prices of other raw materials such as C, Al and In are published for the corresponding month.

2) The price for electrolytic copper wire bars (in Rs/MT) is ex-godown price as quoted by the primary producer of copper.

3) The price of busbar grade aluminium (in Rs/MT) is the average of ex-works price as quoted by the two primary producers for the busbar size 152.4 x 6.35 mm flat approxi mately, of grade equivalent to E91E as per IS 5082-1981 (or the latest).

4) The price of insulating material (in Rs/Kg)

is the average price of phenolic moulding powder quoted by three manufacturers. (for switchgear and controlgear of medium/lower voltage upto 650 volts). **or**

is the price of epoxy resin quoted by a resin manufacturer for their grade CT 5900 or its nearest equivalent. (for HT switchgear above 650 volts).

For Indian Electrical & Electronics Manufacturers' Association

Authorised Signatory

ANNEXURE –PV - 3

PRICE VARIATION FORMULA FOR LIGHTING ARRESTORS

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ISO 9002

IEEMA/PVC/ARSTR/2001 Effective from : 1st September 2001

PRICE VARIATION CLAUSE FOR ZINK OXIDE GAPLESS LIGHTNING ARRESTER

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below in case of any variation in these raw material prices/indices, the price payable shall be subject to adjustment up or down, in accordance with the following formula:

$$P = \frac{P_0}{100}\left[20 + 15\frac{ZN}{ZN_0} + 15\frac{CO}{CO_0} + 10\frac{BI}{BI_0} + 10\frac{BC}{BC_0} + 10\frac{FP}{FP_0} + 15\frac{W}{W_0} + 5\frac{AL}{AL_0}\right]$$

Wherein,

P = Price payable as adjustable in accordance with the above formula.

P_0 = price quoted/confirmed

ZN_o = Price of electrolytic high grade zinc (refer note).
This price is as applicable on the first working day or the month, one month prior to the date of tendering.

CO_o = Price of Cobalt (refer notes)
This price is as applicable on the first working day of the month, one month prior to the date of tendering.

BI_o = Price of Bismuth (refer notes)
This price is as applicable on the first working day of the month, one month prior to the date of tendering.

BC_o = Price of Ball Clay (refer notes)
This price is as applicable on the first working day of the month, one month prior to the date of tendering.

AL_o = Price of Aluminium Ingots (refer notes)
This price is as applicable as the 1st working day of the month, one month prior to he date of tendering.

FP_o = Wholesale price index number for fuel, power, Light & Lubricants (refer notes).
This index number is as applicable for the 1st Saturday of the month, three months prior to the date of tendering.

W_o = All India average consumer price index number for industrial workers, as published by the Labour Bureau, ministry of Labour, Govt. of India (Base 1982 = 100)
This index number is as applicable for the month, three months prior to the date of tendering.

Zn_0 = Price of Electrolytic high grade zinc (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.

W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2001 = 100) (Refer notes)
This index number is as applicable on the first working day of the month, three months prior to the date of tendering.

For example, if date of tendering falls in May 2014, the applicable prices of Steel Bloom-Retail ($SBLR_0$), Steel Billets-Retail ($SBIR_0$) and Zinc (Zn_0) should be for the month April 2014 and all India average consumer price index number (W_0) should be for the month of February 2014.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA (PVC)/TLT-2014/_/_ one month prior to the date of tendering.

SBLR = Price of Steel Bloom-Retail (refer notes)
This price is as applicable on the 1st working day of the month, two months prior to the date of delivery.

SBIR = Price of Steel Billets-Retail (refer notes)
This price is as applicable on the 1st working day of the month, two months prior to the date of delivery.

Zn = Price of Electrolytic high grade zinc (refer notes)
This price is as applicable on the 1st working day of the month, two months prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2001 = 100) (refer notes)
This index number is as applicable on the first working day of the month, four months prior to the date of delivery.

For example, if date of delivery falls in December 2014, the applicable prices of Steel Bloom-Retail (SBLR), Steel Billets-Retail (SBIR) and Zinc (Zn) should be for the month October 2014 and all India average consumer price index number (W) should be for the month of August 2014.

ANNEXURE–PV-4

PRICE VARIATION FORMULA FOR FABRICATED AND GALVANIZED TRANSMISSION LINE TOWER/ GI STRUCTURES FOR SUB-STATION

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IEEMA/PVC/TLT/2010 (R-1) **Effective from: 1st April 2014**

PRICE VARIATION CLAUSE FOR TRANSMISSION LINE TOWERS

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

(A) Transmission Line Tower with both Heavy and Light angles

$$P = \frac{P_0}{100}\left(11 + 32\,\frac{SBLR}{SBLR_0} + 25\,\frac{SBIR}{SBIR_0} + 09\,\frac{Zn}{Zn_0} + 23\,\frac{W}{W_0}\right)$$

(B) Transmission Line Tower with only Heavy angles

$$P = \frac{P_0}{100}\left(11 + 57\,\frac{SBLR}{SBLR_0} + 09\,\frac{Zn}{Zn_0} + 23\,\frac{W}{W_0}\right)$$

(C) Transmission Line Tower with only Light angles

$$P = \frac{P_0}{100}\left(11 + 57\,\frac{SBIR}{SBIR_0} + 09\,\frac{Zn}{Zn_0} + 23\,\frac{W}{W_0}\right)$$

Wherein,

P = Price payable as adjusted in accordance with the above formula.

P_0 = Price quoted/confirmed.

$SBLR_0$ = Price of Steel Blooms- Retail (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.

$SBIR_0$ = Price of Steel Billets- Retail (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.

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Zn_0 = Price of Electrolytic high grade zinc (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.

W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2001 = 100) (Refer notes)
This index number is as applicable on the first working day of the month, three months prior to the date of tendering.

For example, if date of tendering falls in May 2014, the applicable prices of Steel Bloom-Retail ($SBLR_0$), Steel Billets-Retail ($SBIR_0$) and Zinc (Zn_0) should be for the month April 2014 and all India average consumer price index number (W_0) should be for the month of February 2014.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA (PVC)/TLT-2014/_/_ one month prior to the date of tendering.

SBLR = Price of Steel Bloom-Retail (refer notes)
This price is as applicable on the 1st working day of the month, two months prior to the date of delivery.

SBIR = Price of Steel Billets-Retail (refer notes)
This price is as applicable on the 1st working day of the month, two months prior to the date of delivery.

Zn = Price of Electrolytic high grade zinc (refer notes)
This price is as applicable on the 1st working day of the month, two months prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2001 = 100) (refer notes)
This index number is as applicable on the first working day of the month, four months prior to the date of delivery.

For example, if date of delivery falls in December 2014, the applicable prices of Steel Bloom-Retail (SBLR), Steel Billets-Retail (SBIR) and Zinc (Zn) should be for the month October 2014 and all India average consumer price index number (W) should be for the month of August 2014.