

**BHARAT HEAVY ELECTRICALS LTD.
(TRANSMISSION BUSINESS GROUP)**

GENERAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

This is to be submitted duly signed by bidder in original. Clause-wise deviations and / or additional conditions / clarifications, if any, are to be brought out clearly in “Schedule of Commercial Deviation”. Deviations and / or additional conditions / clarifications, if any, mentioned elsewhere in the bid / offer, shall not be considered.

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1.	INSTRUCTION TO BIDDERS : 1.1 Sealed bids are invited for the items mentioned in the tender enquiry conforming to the NIT including Technical Specifications. Bids should be typed and free from overwriting and erasures. Corrections or additions / deletions, if any, must be clearly written and attested, otherwise offer may be rejected. 1.2 Bidder must ensure that their bid is submitted / dropped in the tender box on or before 14-00 Hrs. IST on the due date of opening, unless otherwise specified in the NIT, at the address as follows :- Tender Box, Materials Management, Transmission Business Group, Bharat Heavy Electricals Limited, 5th Floor, Tower-A, Advant Navis IT Business Park, Plot-7, Sector-142, Noida Expressway, Noida, Dist. G. B. Nagar, U. P. ñ 201305 1.3 In case tender enquiry is floated though the e-procurement system, offer / bid has to be submitted through the e-procurement system ONLY as per instructions given in the e-procurement portal (https://bheleps.buyjunction.in). 1.4 The bids shall be opened at 14-30 Hrs. IST on the due date of opening, in the presence of participating bidders who may like to be present, unless otherwise specified in the NIT. Bids received late are liable for rejection. Bidders sending bids by courier or post will have to ensure that it is timely delivered at the above address. 1.5 Bids are to be submitted duly signed with seal in two parts :- a) Techno-commercial Bid (Part-I) ñ To be submitted in 2 sets (original + copy). A copy of Price Bid (Part-II) clearly mentioning all the necessary information as per format without prices ðUn-Priced Bidð is also to be enclosed in Part-I Bid. b) Price Bid (Part-II) ñ To be submitted only in one set in a separate sealed envelope. This should not contain any Technical and / or Commercial Terms and Conditions. The rates should be quoted both in figures and words. 1.6 The Part-I and Part-II Bids are to be sealed in separate envelopes and marked

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	as "Techno-commercial Bid (Part-I)" and "Price Bid (Part-II)" respectively. Both the envelopes are to be kept in another common envelope and marked as "BID". Each envelope should be sealed and super scribed with tender enquiry no., item / package name, project name and due date of opening. Bidder's name and address shall also be mentioned on each envelope. 1.7 For any technical clarification, please contact official mentioned in the tender enquiry / NIT. 1.8 For any commercial clarification please contact official issuing tender enquiry / NIT. 1.9 Price bid (Part-II) should not contain any additional information / description other than given in "Un-Priced Bid" submitted with "Techno-commercial Bid (Part-I)" except prices, otherwise bid is liable for rejection. 1.10 Price Bid submitted along with the bid shall remain valid up to validity of offer. Any discount / revised offer submitted by the bidder on its own shall be accepted provided it is received before the due date and time of offer submission (i.e. Part-I Bid). The discount shall be applied on pro-rata basis to all items including optional items, if any, unless specified otherwise by the bidder. Discount offered shall be valid for full duration of validity of the offer including extension of validity, if any. Unsolicited Supplementary / Revised Price Bid submitted after the due date and time of offer submission (i.e. Part-I Bid), during validity period of offer, unless asked by BHEL, shall not be considered. Withdrawal of quotation by the bidder, at any stage after its opening, may entail suitable action against such bidder by BHEL. 1.11 The consultants / firm (and any of its affiliates) shall not be eligible to participate against tender enquiry for the related goods or works or services for the same project, if they were engaged by BHEL-TBG for the consultancy services. 1.12 In case any Foreign OEM / Foreign Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer / supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer / supplier or the manufacturer / supplier could bid directly but not both. In case bids are received from the manufacturer / supplier and the agent, bid received from the agent shall be ignored. 1.13 Non-conformities / errors / discrepancies in quoted prices in price bids shall be dealt as follows :- a) If, in the price structure quoted for the required goods / services / works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of BHEL there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly. b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected. c) If there is a discrepancy between words and figures, the amount in

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	words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above. d) If there is such discrepancy in an offer as mentioned in (a), (b) & (c) above, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the BHEL, the bid is liable to be ignored. 1.14 In case the scope of the successful bidder / supplier against this tender enquiry includes Erection, Testing and Commissioning (ETC) of the equipment / material at site in addition to Supply, Purchase Order shall be placed for Supply Portion and Contract shall be separately awarded for ETC at Site Portion. General Terms and Conditions for Tender Enquiry / Contract mentioned herein shall be applicable for both Supply & ETC at Site. Additional Terms and Conditions for Tender Enquiry / Contract for Erection, Testing and Commissioning at Site @BHEL/TBG/GTC-ETC/2016 Rev. 01 shall be applicable for ETC at Site only which is to be read in conjunction with General Terms and Conditions for Tender Enquiry / Contract mentioned herein. However, any breach of either the Purchase Order or the Contract shall be deemed to be breach of the other. 1.15 Taxes and Duties payable extra as per Clause No. 2.3 in NIT, if not specified/quoted clearly as extra shall be considered as included in Ex-works Price and therefore shall not be reimbursed. Taxes and duties not payable extra as per NIT shall be deemed to be included in Ex-works Price. 1.16 If the rates for taxes and duties in respect of the quoted materials and / or services assumed by the Supplier are less than the tariff prevailing at the time of tendering, Supplier will be responsible for such under quotations. However if the rates assumed are higher than the correct rates prevailing at the time tendering, the difference will be to the credit of BHEL. Note : Representative / official deputed by the bidder to witness tender opening must produce authorization letter for the same.
2.	PRICES : 2.1 Unless specifically indicated in the NIT, all prices shall be FIRM. No enhancement of rate for whatsoever reasons unless and until asked by BHEL shall be allowed. 2.2 Unless specifically indicated in the NIT, the prices shall be on INR basis. 2.3 Unless specifically indicated in the NIT, the prices are to be quoted on FOR (Site / Destination) basis excluding GST. The break-up of prices shall be as under :- a) Ex-works Price: Ex-works price including packing & forwarding charges. b) Freight: Freight for door delivery up to destination / site / store are to be quoted separately. c) Insurance: Insurance for door delivery up to destination / site / store are to be quoted separately.

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	d) Type Test Charges: If asked in the technical specification, it is to be quoted separately for each test. e) Charges for Supervision of Erection, Testing & Commissioning (ETC) at Site: To be quoted separately if specified in NIT/Price Schedule. f) Charges for Testing & Commissioning at Site: To be quoted separately if specified in NIT/Price Schedule. g) Charges for Erection, Testing & Commissioning at Site: To be quoted separately if specified in NIT/Price Schedule. h) Training Charges: To be quoted separately if specified in NIT/Price Schedule. 2.4 GST rates along with HSN/SAC code as applicable on Sr No (a) to (h) above is to be mentioned separately in percentage in both un-priced bid and price bid. Note : i) Unless otherwise specified in the NIT, the purchase order shall be placed on Ex-works basis for Indian bidders. ii) Prices quoted by Indian bidders shall be in Indian Rupees only. iii) In case Supervision of Erection, Testing & Commissioning (ETC) at Site or Testing & Commissioning at Site or Erection, Testing & Commissioning at Site is also in scope of the bidder along with supply, bidder has to ensure that prices quoted for such services also are in line with special terms & conditions of the NIT, if any. iv) Unless otherwise specified in the NIT, Unloading at Site / Destination shall not be in the scope of the supplier. v) Prices in respect of Sr No (a) to Sr No (h) of Clause 2.3 above are to be quoted inclusive of all taxes & Duties, charges. Levies, royalty etc. if any, excluding GST.
3.	TERMS OF PAYMENT : 3.1 For Supply only in scope of the supplier 100% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. · GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order. 3.2 For Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier or Supply where Testing & Commissioning at Site is in scope of the supplier

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	a) 95% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. · GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order. b) 5% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · Certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site if it is in the scope of the supplier or Certificate of successful completion of Testing & Commissioning at Site if it is in the scope of the supplier. · Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management 3.3 For Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier a) 90% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. · GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order b) 10% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · Certificate of successful completion of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management · Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management 3.4 For Type Test Charges 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with copy of Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management in 3 sets (original + 2 copies) on completion of delivery (at site, if F&I is in scope of

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	supplier) of main supplies (excluding spares) for which Type Tests are applicable. List of main supplies (excluding spares) for which Type Tests are applicable shall be certified by BHEL Engineering Management. 3.5 For Charges for Supervision of Erection, Testing & Commissioning at Site 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original + 2 copies). 3.6 For Charges for Testing & Commissioning at Site 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of successful completion of Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original + 2 copies). 3.7 For Training Charges 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of completion of training issued by BHEL Engineering Management in 3 sets (original + 2 copies). Note : i) Supplier has to submit invoice(s) as per PO or approved billing break-up of prices (if applicable as per NIT). ii) In case of supplies for overseas project, Material Receipt Certificate issued by BHEL Authorized Representative shall also be acceptable. iii) In case of Transit Insurance under Open Insurance Policy, Intimation / Declaration of Transit Insurance as per terms of the relevant Open Insurance Policy along with copy of Open Insurance Policy from underwriters shall also be acceptable. iv) Supplier has to ensure commencement of transit insurance from the date not later than LR / GR date. v) Supplier has to submit Tax Invoice(s). Supplier should ensure that Tax Invoice should comply all statutory requirements under GST Law to enable BHEL to avail input credit vi) MSMED Act, 2006 and the rules made thereunder as amended from time to time shall be applicable for release of payment to suppliers qualified & registered as Micro & Small Enterprises based on documents mentioned in the NIT for MSME. vii) Supplier has to submit PBG (as per BHEL format) & Guarantee Certificate as per PO terms. viii) In case any shortages and / or damages in supplies, an amount calculated

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	based on comments against Material Receipt Certificate issued by the BHEL Site Official shall be withheld from the supply payment against 3.1(a) or 3.2(a) above to be deemed fit by BHEL subject to a minimum of 10% of the total ex-works value of the invoice corresponding to the LR / GR against which any shortages and / or damages are reported. The withheld amount shall be released after the shortages and / or damages in supplies are supplied / replenished against Certification by BHEL Site Official. ix) Payment of GST component shall be made only if vendor has deposited the Tax and credit for the same is reflected in GSTN (GST Network). In case credit of the same is not reflected in GSTN , vendor may alternatively furnish BG of GST Amount for a period valid for not less than 1 month .In case of disallowance of credit /non reflection of credit in GSTN , amount will be recovered from supplier along with applicable Interest , penalty etc from any of his dues. x) If GST is payable by BHEL on reverse Charge Mechanism basis, vendor should ensure the submission of GST compliant Tax invoice immediately on dispatch/ performance of service. In case of non-compliance any additional charges towards interest, penalty etc, will be to vendors account. xi) TDS under GST Act, if applicable, shall be deducted unless Exemption Certificate If applicable, from the appropriate authority is furnished to BHEL along with Invoice.
4.	INTEREST LIABILITY : In case of any delay in payment due to any reason, BHEL shall not pay any interest on delayed payment. Also, no interest shall be payable by BHEL on the bank guarantee / deposit amount or balance payment or any other money which may become due owing to difference or misunderstanding or any dispute before any quasi judicial authority between BHEL and the Supplier / Contractor.
5.	GUARANTEE : The equipment / material supplied and services rendered (if applicable) shall be guaranteed to be free from all defects and faults in design & engineering, material, workmanship & manufacture and in full conformity with the Purchase Order / Contract, Technical Specifications & approved drawings / data sheets, if any, for 18 months from the date of last delivery or 12 months from the date of commissioning, whichever is earlier. Wherever Erection, Testing & Commissioning at Site are also in the scope of the Supplier, the guarantee period shall be 18 months from the date of last delivery or 12 months from the date of commissioning, whichever is later. The defective equipment / material / component shall be replaced free of cost at site. Freight & Insurance during transit shall also be in the scope of the supplier / contractor. Any expenditure for dismantling and re-erection of the replaced equipment / material / component shall be to supplier's / contractor's account. All replacements during the guarantee period shall be delivered at site promptly and satisfactorily within a period not more than 45 days from the date of reporting the defect / rejection etc. In the event of the supplier / contractor failing to replace the defective equipment / material / component within the time period mentioned above, BHEL may proceed to undertake the replacement of such defective equipment / material / component at the risk and cost of the supplier / contractor without prejudice to any other rights under the contract and recover the same from PBG / other dues of this Purchase

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	Order / Contract or any other Purchase Order / Contract executed by the supplier / contractor. Note : i) In case of Illumination System, items viz. Lamps, Tubes, Ballast, Starters, Capacitors & Fuses will not be under Guarantee after commissioning. ii) In addition to the above guarantee period, Extended Guarantee / Warranty, if any, shall be as per NIT / Technical Specifications. iii) In case offer of agent of Foreign OEM / Foreign Principal is considered, as per Clause No. 1.12 above, Guarantee as mentioned above has to be provided by the Foreign OEM / Foreign Principal also.
6.	LATENT DEFECT : Liability for latent defects shall be for defects inherently lying within material or arising out of design deficiency which does not manifest itself during guarantee period but later and shall be limited to five years from the expiry of the guarantee period.
7.	PERFORMANCE BANK GUARANTEE (PBG) : Supplier shall arrange to submit Performance BG / Deposit on a non-judicial stamp paper of appropriate value along with first invoice or within 60 days from placement of Purchase Order (PO) whichever is earlier, in line with one of the applicable options as follows :- <u>Option A</u> A single rolling PBG for Rs. 50 Lakhs initially valid for 18 months with claim period of 3 months extra over and above 18 months for all the Purchase Orders being executed for Transmission Business Group, BHEL. However, validity of the PBG shall be extended till 18 months from the date of last delivery with 3 months claim period extra over and above 18 months. Single Rolling PBG option shall not be applicable in case Ex-works value of the PO at the time of placement of PO exceeds Rs. One Crore. <u>Option B</u> PBG for 10% of the total Ex-works PO value, valid for 18 months from the date of last delivery with claim period of 3 months extra over and above 18 months. Ex-works PO value at the time of placement of PO shall be considered for calculation of the PBG amount. <u>Option C</u> In case the total Ex-works PO value at the time of placement of PO does not exceed Rs. Ten Lakhs, interest free Deposit of 10% of the total Ex-works PO value at the time of placement of PO in form of Demand Draft favouring Bharat Heavy Electricals Limited and payable at New Delhi / Delhi / Noida shall also be acceptable to BHEL in lieu of PBG, which shall be released after expiry of 21 months from the date of last delivery after deduction, if any, within 60 days from receipt of invoice in 3 sets (original + 2 copies) to be submitted by the supplier. Note : i) The Bank Guarantee shall be from any bank as per Annexure for List of Banks (32 Nos.). The original PBG should be sent by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida. ii) Extension of validity of the PBG in original, as per above clause, should be sent by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida at least 45 days before expiry of validity of the PBG. iii) Unless otherwise specified in the NIT, deviation taken for non-submission of PBG / Deposit, as applicable, shall not be accepted.

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	iv) Supplier has to confirm one of the applicable options for submission of PBG / Deposit before placement of PO. v) In case of non submission PBG / Deposit, as applicable, BHEL reserve the right for Risk Purchase as per terms of the NIT and impose Suspension of Business Dealings with the Supplier / Contractor. vi) BHEL reserve the right to encash the Bank Guarantee and forfeit the amount in the event of any default, failure or neglect on part of the Supplier in fulfilment of performance of the Purchase Order. vii) Value of the Bank Guarantee (at the time of submission) shall remain unchanged for any subsequent variations in Purchase Order value up to $\pm 20\%$. Beyond this variation of $\pm 20\%$, the Supplier shall arrange to enhance or may reduce the value of the Bank Guarantee accordingly for the total variation promptly. viii) Vendor to ensure submission of Certificate of Final Documentation / Confirmation regarding Non applicability of Final Documentation, as the case may be, as referred in clause No 9 regarding Final Documentation. BG shall be released only after submission of the same to BHEL TBMM.
8.	SUBMISSION OF DRAWINGS / DOCUMENTS FOR APPROVAL : Supplier shall submit the master document list within 7 days from date of Purchase Order / Contract, unless otherwise specified in the NIT, with planned dates for submission which shall be in line with activity schedule as per Purchase Order / Contract and shall be finalized with BHEL Engineering Management. Date of first submission of drawings / documents shall be certified by BHEL Engineering Management after the receipt of applicable drawings / documents (e.g. project specific cover sheet, GTP, OGA drawings, schemes, type test reports etc.) by BHEL. During detailed engineering stage, necessary hard copies of the engineering drawings / documents shall also be submitted by the supplier as per the Purchase Order / Contract requirement. The supplier shall also submit the packing drawings as per technical specifications. In case item(s) offered require any interface details of other item (not in the scope of supplier & required for operating the equipment), the supplier has to submit interfaces schedule along with submission of engineering drawings / documents. It shall be responsibility of the supplier to get the details of the interfaced item from BHEL before manufacturing to avoid any mismatch at site.
9.	FINAL DOCUMENTATION : Final documentation as called in the Technical /contract specification is to be submitted within 3 months from the date of first delivery of respective equipment, item/material. After submission of Final Documentation, BHEL Engineering Management (TBEM) will issue a Certificate of Completion of Final Documentation. Wherever Final Documentation is not applicable, BHEL Engineering Management (TBEM) will issue confirmation regarding the same, Vendor to submit the Certificate of Final Documentation / Confirmation regarding Non applicability of Final Documentation, as the case may be, to BHEL TBMM. In case of Non Submission of Certificate of Final Documentation / Confirmation regarding Non applicability of Final Documentation, BG will be liable for encashment.
10.	INSPECTION : BHEL / customer / third party shall inspect equipment / material before despatch. Stage inspection during manufacturing may also be carried out. Material to be despatched only after getting Material Despatch Clearance Certificate (MDCC) / MICC issued by BHEL. Supplier shall send inspection call on prescribed format / web site only, with an advance notice of 15 days. Supplier to ensure submission of all routine / acceptance test reports, inspection

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	reports and all other documents related to inspection, immediately to BHEL. BHEL representative is authorised to carry out audits along with Third Party Inspection Agency at vendor's / supplier's works before clearing the items for despatch.
11.	DESPATCH DOCUMENTS : Despatch documents to be immediately sent to BHEL on despatch are as follows :- • Copy of Invoice • Copy of LR / GR in case of Indian suppliers or BL / AWB in case of foreign suppliers • Copy of Packing List (Case-wise) • Copy of Transit Insurance Certificate from underwriters • Copy of Guarantee Certificate
12.	DELIVERY PERIOD : Delivery / Completion requirement shall be mentioned in the NIT. Bidder to specify best delivery / completion period possible in weeks from the date of LOI / PO as per activity schedule for consideration by BHEL. Time required for type test, if applicable, is to be separately indicated. Note : LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) contracts shall be considered as delivery date.
13.	LIQUIDATED DAMAGES FOR DELAYED DELIVERY: In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of the total Purchase Order value for supply (incl. taxes and duties, freight & insurance as applicable) per week of delay or part thereof subject to a maximum of 10% of the total Purchase Order value for supply (incl. taxes and duties, freight & insurance as applicable) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. However, in case of staggered (lot-wise) contractual delivery schedule, an amount of 0.5% of the total Purchase Order value for supply (incl. taxes, duties, freight & insurance as applicable) of delayed lot per week of delay or part thereof subject to maximum of 10% of the total Purchase Order value. (Incl taxes, duties, Freight & Insurance as applicable) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. Note : i) In case of any amendment / revision in PO /WO, the LD shall be linked to the amended / revised Purchase Order / Contract value and delivery / completion time / schedule, if applicable. ii) LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) for imported supplies shall be treated as the date of dispatch for levying LD as above. iii) However, for indigenous supply, if time period between date of receipt of material at site / destination by Site Official & the date of LR / GR or invoice (whichever is later) is more than 30 days, where distance from place of despatch as per LR / GR is upto 1000 Kms or if time period between date of receipt of material at site / destination by Site Official & the date of LR / GR or invoice (whichever is later) is more than 45 days, where distance from place of despatch as per LR / GR is more than 1000 Kms, such excess period shall also be considered for LD purpose. iv) If, as per supplier, delay is not attributable to the supplier, delay analysis with documentary evidence may be submitted by the supplier at the earliest but not

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	later than six months from the end of the financial year in which the payment is withheld. Based on the above details / documents submitted by the supplier, BHEL shall take final decision and if considered appropriate by BHEL, withheld amount (full or part as the case may be) shall be released, otherwise, full or balance withheld amount shall be treated as deduction of Liquidated Damages (LD) towards delayed delivery.
14.	VALIDITY OF OFFER : The offer shall be valid for 120 days from the due date of opening of tender (i.e. techno-commercial bid unless otherwise specified in the NIT). Prices of Spares, wherever they optional items, shall be valid till two years from the date of placement of PO.
15.	ACCEPTANCE / REJECTION OF TENDER : BHEL reserve the right to reject in full or part, any or all tender without assigning any reason thereof. BHEL also reserve right to vary the quantities as mentioned in the NIT. Acceptance of offer is subject to vendor approval by customer before opening of price bid. BHEL shall not be bound by any power of attorney granted by tenderer or by changes in composition of the firm made subsequent to award of order / contract. BHEL may however recognize such power of attorney and changes after obtaining proper legal advice, cost of which will be chargeable to the seller / contractor concerned. If the tenderer deliberately gives wrong information, BHEL reserves the right to reject such an offer at any stage or cancel the order / contract, if awarded, and forfeit the security deposit and bank guarantee.
16.	DEVIATION : The bids having deviation(s) w.r.t. tender are liable for rejection. However, BHEL, at its discretion, may load the prices for evaluation of offer with prior intimation to bidder.
17.	TENDER EVALUATION : Comparative statement shall be prepared and evaluated on total cost basis at destination/site (as per terms of NIT) considering overall quantity indicated in NIT unless contrary to same is specifically mentioned in the tender enquiry / NIT. Total cost for this purpose shall include cost of scope of work as mentioned in NIT along with applicable taxes & duties, and other services etc. (if applicable). GST input credit available to BHEL shall be reduced from prices while determining L1 status. In case all bidders are foreign & Port of Import (destination port) is same for all the bidders, evaluation of offers shall be done on CIF (Port of Import) basis. Otherwise, evaluation of offers shall be done on the basis of delivered cost at site /destination to BHEL. Further, in case of foreign bidders, marine freight & insurance are to be quoted separately & the purchase order may be placed on FOB basis with an option for delivery on CIF / CFR basis, if required, later. In case of foreign bidders, Exchange Rate (TT selling rate of State Bank of India) as on date of tender opening (Part-I Bid in case of two part bid) shall be considered. If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken for tender evaluation.
18.	LOADING CRITERIA : List of permissible deviations & loading criteria thereof are as follows :- a) Payment Terms Base rate of SBI (as applicable on the date of bid opening / techno-commercial bid opening in case of two part bids) + 6% shall be considered for loading for the period of relaxation sought by bidder(s) against terms of payment in the NIT. b) Liquidated Damages (LD) for Delayed Delivery

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	Loading on LD clause shall be to the extent to which it is not agreed to by the bidder (at offered value). c) In case of foreign bidders, if the quoted prices is on CIF basis only, it shall be loaded to arrive at total FOR (Site / Destination) price, as applicable, by factors as follows :- i) Port handling / clearing charges: @ 1% of CIF value to arrive at Customs Assessable Value. ii) Custom Duty (including CVD & SAD) as per NIT prevailing on date of price bid opening. iii) Inland Freight & Transit Insurance: @ 5% of CIF value where distance between site / destination and Port of Discharge is upto 1000 Kms or @ 7% of CIF value where distance between site / destination and Port of Discharge is more than 1000 Kms. Note : Additional deviations (if considered acceptable by BHEL) & the loading criteria shall be communicated to all the qualified bidders before price bid opening.
19.	ARBITRATION : In the event of any dispute emanating from and relating to this contract, the matter shall be referred to the sole arbitration of the person appointed by the competent authority of BHEL. Subject to aforesaid, the provisions of 'The Arbitration and Conciliation Act, 1996' and the rules made thereunder as amended from time to time in India shall apply to the arbitration proceedings. The venue of arbitration shall be in New Delhi. Further there shall be no claim for any pre-reference or pendente-lite interest on the claims and any claim for such interest made shall be void. However, in case of contract with Public Sector Enterprise / Undertaking (PSE/PSU) or Govt. Dept., the extant guidelines of Govt. of India shall be followed.
20.	LEGAL SETTLEMENT : Indian Courts at New Delhi / Delhi shall have exclusive jurisdiction to decide the dispute, if any, arising out of or in respect of the contract(s) to which these conditions are applicable. Contract, including all matters connected with contract, shall be governed by the Indian Law, both substantive and procedural, for the time being in force including modification thereto.
21.	SUB-CONTRACTING : In case further subcontracting of BHEL Purchase Order / Contract or part thereof is envisaged by supplier, the same can be done after written permission is obtained from BHEL. However it shall not absolve the Supplier / Contractor of the responsibility of fulfilling BHEL Purchase Order / Contract requirements. In case of subcontracting of Purchase Order / Contract awarded by BHEL or part thereof without such permission, BHEL reserve the right to cancel the Purchase Order / Contract and source such material / component / equipment / system from any other agency at the risk and cost of the Supplier / Contractor. If Supplier / Contractor is an individual or proprietary concern and the individual or the proprietor dies or the partnership is dissolved or substantially affected, then unless BHEL is satisfied that legal representative of individual Supplier / Contractor or proprietor of proprietary concern and surviving partners of partnership firm are capable of carrying out and completing the Purchase Order / Contract, BHEL shall be entitled to cancel the Purchase Order / Contract as to its incomplete portion and without being in any way liable to payment of any compensation to legal representative of Supplier / Contractor and / or to surviving partners of Supplier's / Contractor's firm on account of cancellation of the Purchase Order / Contract. Decision of BHEL that legal representatives of deceased Supplier / Contractor or

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	surviving partners of the Supplier's / Contractor's firm cannot carry out and complete the Purchase Order / Contract shall be final and binding on the parties hereto. Terms and Conditions shall not get affected in case of de-merger / amalgamation / taking-over / re-constitution etc.
22.	RISK PURCHASE : In case the Supplier / Contractor fails to supply or fails to comply with terms & conditions of the Purchase Order / Contract or delivers equipment / material not of the contracted quality or fails to adhere to the contract specifications or fails to perform as per the activity schedule and there are sufficient reasons even before expiry of the delivery / completion period to justify that supplies shall be inordinately delayed beyond contractual delivery / completion period, BHEL reserve the right to cancel the Purchase Order / Contract either in whole or in part thereof without compensation to Supplier / Contractor and if BHEL so desires, may procure such equipment / material / items not delivered or others of similar description where equipment / material / items exactly complying with particulars are not readily procurable in the opinion of BHEL which is final and in such manner as deemed appropriate, at the risk and cost of the Supplier / Contractor and the Supplier / Contractor shall be liable to BHEL for any excess cost to BHEL. However, the Supplier / Contractor shall continue execution of the Purchase Order / Contract to the extent not cancelled under the provisions of this clause. Recovery amount on account of purchases made by BHEL at the risk and cost of Supplier / Contractor shall be the difference of total value of new Purchase Order (PO) value and total value of old Purchase Order for applicable items, where the total value of new PO is more than total value of old PO for applicable items, plus additional 15% of the total ex-works value of new PO as overheads. The Supplier / Contractor shall on no account be entitled to any gain on such risk & cost purchase. In case the purchase order (PO) value of the new PO is less than the PO value of the old PO, 15% of the total ex-works value of the new PO shall be recovered as overheads and the difference between the PO value of the old PO and the new PO shall not be considered for calculation of the recovery amount.
23.	ADJUSTMENT OF RECOVERY : Any amount payable by the Supplier / Contractor under any of the condition of this contract shall be liable to be adjusted against any amount payable to the Supplier / Contractor under any other Purchase Order / Contract awarded to him by any BHEL unit. This is without prejudice to any other action, as may be deemed fit, by BHEL.
24.	FORCE MAJEURE CONDITION : If by reason of war, civil commotion, act of god, Government restrictions, strike, lockout which are not in control of Supplier / Contractor the deliveries / services are delayed, Supplier / Contractor shall not be held responsible. If at any time during the continuance of the Purchase Order / Contract, the performance in whole or in part by either party of any obligations under the Purchase Order / Contract is prevented or delayed by reason of any war hostilities, acts of the public enemy, restrictions by Govt. of India, civil commotion, sabotage, fires, floods, explosion, epidemics, quarantine restrictions, strike, lock-outs or acts of God (hereinafter referred to as 'event'), which are not in control of Supplier / Contractor or BHEL, then provided notice of the happening of such event is given by either party to the other within fifteen (15) days from the date of occurrence thereof, neither party shall by reason of such event be entitled to terminate the Purchase Order / Contract nor shall have any claim for damages against each other in respect of such non-performance and delay in performance. Performance under the Purchase Order / Contract shall be resumed immediately after such event has come to an end or

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	ceased to exist and decision of BHEL as to whether the deliveries have to be resumed or not shall be final, conclusive and binding on the parties hereto. In the event of the parties hereto not able to agree that a force majeure event has occurred, the parties shall submit the disputes for resolution pursuant to the provisions hereunder, provided that the burden of proof as to whether a force majeure event has occurred shall be upon the party claiming such an event. Notwithstanding above provisions, BHEL shall reserve the right to cancel the Purchase Order / Contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of delivery and other schedules.
25.	MANUFACTURING QUALITY PLAN (MQP) : Supplier to submit approved MQP in line with requirement of BHEL/customer.
26.	SUPPLIER PERFORMANCE MONITORING AND RATING SYSTEM : BHEL reserve the right for evaluation of Supplier Performance Rating as per Supplier Performance Monitoring and Rating System of BHEL for necessary action. Details are available at BHEL Website www.bhel.com for reference.
27.	DEALING WITH BANNED SUPPLIERS / CONTRACTORS IN BHEL : Offers of the bidders, who are on the banned list, as also the offers of the bidders who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website www.bhel.com for reference.
28.	ORDER OF PRECEDENCE : The order of precedence shall be as follows :- - Special Terms & Conditions (STC) for Tender Enquiry / Contract, if any - General Terms & Conditions (GTC) for Tender Enquiry / Contract & Additional General Terms & Conditions (GTC) for Tender Enquiry / Contract for Erection Testing & Commissioning (ETC) at Site, if applicable Provisions in (a) above shall prevail over (b). In case of conflict, between Technical Specifications and STC / GTC, bidder to seek necessary clarifications from BHEL concerned official as specified in NIT.
29.	PACKING : Packing shall be in conformity with specifications and shall be such as to ensure prevention of damages, corrosion, deterioration, shortages, pilferage and loss in transit or storage. In case of shipment by sea or air, the packing shall be sea-worthy or air-worthy respectively and of international standards. Different types of spares i.e. start-up / commissioning spares and initial spares (mandatory spares and recommended O&M spares) are to be packed separately. Packing List shall be submitted as per standard format along with advance set of documents for claiming payment which shall also indicate :- - Case / Packing size (as applicable). - Gross weight and net weight of each package. - Detailed contents of the package with quantity of each item separately. Project, Item / Package Description, BHEL's PO No. with date & Case / Packing Mark should also be clearly mentioned on the Case / Packing and Packing List for identification. Also, Packing List must be duly signed & should include respective Invoice No. & LR No. Note : Foreign suppliers to furnish details to arrange inland transportation by BHEL, if applicable, as follows :- - No. of Packages - Size with Weight (Gross & Net) of each Package - No. of Containers with type & size required for inland transportation

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	iv) Type of Cargo (Break Bulk / LCL / FCL) v) Customs Tariff No.
30.	COLOUR CODING : Aluminium stickers are required to be attached to large components but plastic sheet tags should be tied with small components, giving details like purchase order, description of the component, quantity etc. Tags should be of the colour as follows :- a) Main equipment : Yellow or White tag b) Start-up / Commissioning spares : Blue tag c) Mandatory spares : Pink or Red tag d) Recommended / O&M spares : Green tag
31.	MICRO, SMALL & MEDIUM ENTERPRISES (MSME) : MSMED Act 2006 as amended from time to time & extant regulations of Govt. of India for MSME will be applicable. Micro & Small Enterprises (MSE) can avail the intended benefits only if they submit along with the offer / bid, attested copies of either Acknowledgement of Entrepreneur Memorandum Part-II (EM-II certificate) having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (As per BHEL format where deemed validity of EM-II certificate of five years have expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of opening (for Techno-commercial Bid : Part-I in case of two part bid). Non-submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or arrested (in original) by a Gazetted officer. Copy of Udyog Aadhaar Memorandum with Acknowledgement of Ministry of Micro, Small & Medium Enterprises should also be furnished.
32.	BUSINESS ETHICS / SUSPENSION OF BUSINESS DEALINGS WITH SUPPLIERS / CONTRACTORS : If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution, indulges in malpractices cheating, bribery, fraud or other misconduct or formation of cartel so as to influence the bidding process or influences the price or fails to perform or is in default without any reasonable cause etc or performs any act considered objectionable as per extant guidelines, action may be taken against such bidders/supplier/contractor as per extant "Guidelines for Suspension of Business Dealings with Suppliers/Contractors" Abridged version of same is available at BHEL website (www.bhel.com) on "Supplier Registration" Page.
33.	REVERSE AUCTION : BHEL reserve the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder or price bid submitted by the bidder through e-procurement system. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA. In case BHEL decides to go for Reverse Auction, only those bidders who have given their unconditional acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit "online sealed bid" in the Reverse Auction. Non-submission of "online sealed bid" by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue. General Terms and Conditions of RA are available at Annexure. Business Rules for

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	RA shall be sent to the bidders before conducting RA. Abridged Version of ‘Common Guidelines for Conducting Reverse Auction’ may also be seen at BHEL website (www.bhel.com) on ‘Supplier Registration’ Page & ‘Tender Notifications’ Page.
34.	INTEGRITY PACT : Bidders shall have to enter into Integrity Pact with BHEL, duly signed with seal in original, if specified in NIT / RFQ failing which bidder's offer shall be liable for rejection.
35.	TERMINATION OF CONTRACT : BHEL shall have the right to cancel the Purchase Order / Contract without any financial implication to BHEL if vendor approval by end user / customer is withdrawn or in case of Suspension of Business Dealings with the Suppliers / Contractors by BHEL. BHEL shall have the right to cancel Purchase Order / Contract, wholly or in part, in case they are obliged to do so on account of any decline, diminution, curtailment or stoppage of their business and in that event, the Supplier's / Contractor's compensation claim shall be settled mutually. In case of cancellation of Purchase Order / Contract for main supply, all other associated Purchase Orders / Contracts like those for Mandatory Spares / Recommended Spares / Erection, Testing & Commissioning (ETC) / Supervision of ETC, if any, would also get cancelled.
36.	SHELF LIFE : Supplier has to inform the list of the items / sub-items which have limited shelf life like consumables or those required for the first fill and shall indicate the corresponding shelf life period in the offer. Such items / sub-items shall be manufactured / despatched only after getting formal clearance from BHEL.
37.	LIMITATION OF LIABILITY : Notwithstanding any other provisions, except in cases of wilful misconduct and / or criminal negligence / acts, a) Neither the Supplier / Contractor nor BHEL shall be liable to the other, whether in Purchase Order / Contract, tort, or otherwise, for any consequential loss or damage, loss of use, loss of production or loss of profits or interest costs, provided however that this exclusion shall not apply to any obligation of the Supplier / Contractor to pay Liquidated Damages to the BHEL and b) Notwithstanding any other provisions incorporated elsewhere in the contract, the aggregate liability of the Contractor in respect of this contract, whether under the Contract, in tort or otherwise, shall not exceed total Contract Price, provided however that this limitation shall not apply to any obligation of the Vendor to indemnify BHEL with respect to Patent Infringement or Intellectual Property Rights.
38.	SHORTAGES / DAMAGES : a) Against Supply only or Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site or Supply where Testing & Commissioning at Site is in scope of the supplier : Any shortages and / or damages in supplies shall be supplied / replenished free of cost by the supplier as early as possible but not later than 30 days from the date of intimation by BHEL to the supplier. b) Against Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier :

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	Any shortages and / or damages in supplies and during handling / storage, erection, testing and commissioning at site shall be supplied / replenished free of cost by the Supplier / Contractor, as early as possible, to meet the contractual completion time / schedule. Note: There shall not be any extension in the contractual delivery time / schedule due to any shortages and / or damages in supplies.
39.	VARIATION OF CONTRACT VALUE / QUANTITY VARIATION : BHEL shall have the right to variation in quantities of items within $\pm 30\%$ of the total Purchase Order / Contract value at the time of placement of PO or award of Contract on overall basis for all amendments together within two years from the date of original Purchase Order / Contract or completion of execution of the Purchase Order / Contract whichever is earlier but quantities of individual items may vary to any extent or may get deleted unless otherwise specified in the technical specifications. No compensation is payable due to variation in the quantities and the Supplier / Contractor shall be bound to accept the same the contracted prices / rates without any escalation. However, if the Purchase Order / Contract is on <u>Lumpsum</u> basis, no variation of Purchase Order / Contract value shall be admissible to the Supplier / Contractor within the scope of Purchase Order / Contract, as long as the inputs remain unchanged.
40.	STATUTORY VARIATION : GST rates prevailing at the time of dispatch of goods / completion of services shall be payable by BHEL. All other taxes, duties, charges, royalty, cess, other levies shall be deemed to be included in the Ex Works Prices / Charges quoted by bidders and no variations shall be payable in respect thereof. No other variations such as on customs duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the BHEL. Notwithstanding anything above, where the actual completion of the supply / services occurs beyond the period stipulated in the Purchase Order / Contract or any extension thereof, variations referred to above, will be limited to the rates prevailing on the dates of such agreed completion periods only. For variations after the agreed completion periods, the Supplier / Contractor alone shall bear the impact for the upward revisions and for downward revisions BHEL shall be given the benefit of reduction in applicable taxes /GST. This will be without prejudice to the levy of liquidated damages for delay in delivery / completion. If new tax is introduced by Central/ State Govt / Municipality becomes directly applicable on items specified in Bill of Quantities/Purchase Order/Contract, full reimbursements shall be made provided it becomes applicable on items specified in Bill of Quantities. However, any additional tax implication due to delay in delivery, beyond the Contractual Delivery, attributable to supplier shall be borne by supplier.
41.	MODE OF PAYMENT : Payment shall be made directly to the Supplier / Contractor by BHEL through NEFT / RTGS.
42.	CONFIDENTIALITY : Supplier / Contractor shall, at all times, undertake to maintain complete confidentiality of all data, information, software, drawings & documents etc. belonging to BHEL and also of systems, procedures, reports, input documents, manuals, results and any other BHEL documents discussed and / or finalized during the course of execution of Purchase Order / Contract.
43.	INDEMNIFICATION : The Supplier / Contractor shall indemnify and keep indemnified and hold harmless BHEL and its employees and officers from and against any and all claims, suits, actions or administrative proceedings, demands, losses, damages, costs and

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	expenses and any other claim of whatsoever nature in respect of the death or injury of any person or loss of or damage to any property arising during the course and out of the execution of the Purchase Order / Contract.
44.	TITLE OF GOODS : a) Ownership of the equipment / material procured in India, shall be transferred to BHEL upon loading on to the mode of transport to be used for transportation of the said equipment / material from the works to the site / destination and upon endorsement of the dispatch documents in favour of BHEL. b) Ownership of the equipment / material to be imported into the country where the site is located, if not procured in India, shall be transferred to BHEL upon loading on the mode of transport to be used for transportation of the equipment / material from the country of origin to that country / destination and upon endorsement of despatch document in favour of BHEL. c) Notwithstanding the transfer of ownership of the equipment / material, the responsibility for care and safe custody thereof together with the risk of loss or damage thereto for whatsoever reason shall remain with the Supplier.
45.	COMPLIANCE OF STATUTORY REQUIREMENTS : The vendor shall comply with all State and Central Laws / Acts, Statutory Rules, Regulations etc., as may be enacted by the Government during the tenure of the Purchase Order / Contract and having in force and applicable to the Purchase Order / Contract and nothing shall be done by the Supplier / Contractor in contravention of any Law / Act and / or Rules / Regulations, thereunder or any amendment thereof. The Supplier / Contractor shall pay all taxes, fees, licence charges / deposits, duties, tolls, royalty, commissions or other charges which may be levied on account of any of his operations connected with the Purchase Order / Contract. In case BHEL is constrained to make any of such payments, BHEL shall recover the same from the Supplier / Contractor either from moneys due to him or otherwise as deemed fit.
46.	ACCEPTANCE OF ORDER : Supplier should acknowledge and accept the Letter of Award / Purchase Order issued by BHEL within 7 days of the issue of Letter of Award / Purchase Order. In case of any discrepancy / typographical error in issue of Purchase Order / Contract, the agreed terms & conditions, scope of work, rates / prices for placement of PO / award of contract shall be applicable and BHEL reserves the right to issue amendment(s) to PO / Contract for correction of discrepancies / typographical errors in the PO / Contract at a later date.
47.	FRAUD PREVENTION POLICY : The Bidder along with its associate / collaborators / sub-contractors / sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

Signature of Bidder (Authorized Signatory) with Date & Seal

1. **Clause No. 1.3 of GTC** – Tender is invited through e-Procurement System only. The bidder shall submit his response through bid submission to the tender on e-Procurement platform at <https://bhel.abcpocure.com>
Vendors participating through this tender will necessarily have to buy Class-II/III Digital Signature Certificate (DSC) for Signing & Encryption (Required both digital signature certificate: Signing & Encryption) of bids issued by any of the valid Certifying Authorities (approved by Controller of Certifying Authorities) in India.
2. **Clause No. 1.7 of GTC** - For any technical clarification, please contact Sh. Puneet Chawla, Sr. Engineer (TBEM) / Sh. Vivek Kapil, Sr. DGM (TBEM); Contact No. 0120-06748499 / 8539; e-mail: puneet.chawla@bhel.in; vivekk@bhel.in
3. **Clause No. 1.8 of GTC** - For any commercial clarification, please contact Ms. Archana Kumari, Manager (TBMM) / Sh. A K Chowdhary, AGM (TBMM); Contact No. 0120-6748467 / 8129; e-mail: archanak@bhel.in / akchowdhary@bhel.in
4. **Clause No. 2.1 of GTC** - Prices shall be on FIRM basis.
5. **Clause No. 3 of GTC** - Payment Terms: - As per clause 3.1. Supplier bills to be enclosed with billing checklist.
6. Delivery plan – As per activity schedule.
7. Permissible Technical Deviations: No permissible Technical Deviation has been envisaged.
8. Project Status ñ Domestic. GST shall be payable as applicable.
9. **Clause No. 5 of GTC** - As per GTC.
10. **Clause No. 7 of GTC** – As per GTC. If no option is specified, by default option ñ B shall be considered for confirmation.
11. **Clause no. 13 of GTC - (Liquidated Damage)** - In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of the TOTAL PO EX-WORKS VALUE & F & I CHARGES for supply per week of delay or part thereof subject to a maximum of 10% of the TOTAL PO EX-WORKS VALUE & F & I CHARGES shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD.
12. **Clause No. – 17 of GTC** - Tender Evaluation – As per GTC.
13. **Clause No. – 19 of GTC** - Arbitration - This clause shall be read as per **Annexure-1**.
14. **Clause No. 33 for Reverse Auction of NIT shall be as follows:**

BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among all the techno-commercially qualified bidders.

Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.ô
15. **Clause No. 34 of GTC** - Integrity Pact ñ Not Applicable.
16. **Clause No. 39 of GTC** – Quantity Variation ñ (+/- 30%).
17. **Pre qualifying requirement :**

Technical: As per technical requirement of Section IV of Technical Specification enclosed.

Commercial: Vendor should be approved from customer POWERGRID as on date of original Techno – Commercial bid opening.

The Bidder must ensure that they confirm the Pre-qualifying requirement.

BHEL Reserves the Right to reject any offer from Bidder in case of Non – Compliance to the Pre-qualifying criteria.

18. The link for Online Supplier registration Portal is <https://supplier.bhel.in/>.
19. Endorsed LR is not required in GST regime.
20. Offer of techno – commercially acceptable vendors shall be considered for Price Bid Opening / RA subject to their approval from Customer.
21. Vendor to ensure for availability of valid PG SMQP.

22. **Make in India Declaration:**

For this procurement, the local content to categorize a supplier as class I local supplier / class II local supplier / Non-Local supplier and purchase preference to class I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020, issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT but before opening of part II bids against this NIT.

“Bidder to specify the percentage of local content as per the format of self-declaration for local content” as per **Annexure-2**.

“This tender is not a global tender and **only class I and ~~Class II~~** suppliers as defined under the DPIIT order no. P-45021/2/2017-PP (BE-II) dated 04.06.2020 are eligible to bid in this tender. Bids received from **Class II & Non-Local** supplier shall be rejected.”

23. Please refer Clause at **Annexure-3** and Certification at **Annexure-4 / Annexure-5** (whichever is applicable) regarding restrictions under Rule 144 (xi) of General Financial Rules (GFRs), 2017. Bidder to comply the clause and submit the certification. Non-compliance/ Non-submission of certification will lead to rejection of Offer.

Vendor to quote as per specified price format of NIT, otherwise their offer shall be liable to be rejected.

Following confirmation to be provided by vendor:

“We confirm that we have quoted as per specified price format provided along with this tender”.

IMPORTANT INSTRUCTION: -

- The Notice Inviting Tender (NIT)/ the tender requirement of BHEL will not be henceforth published in newspapers. All the concerned are hereby notified that tender enquiries of BHEL will be published on BHEL tender website (www.bhel.com) and Government’s Central Public Procurement Portal (<https://eprocure.gov.in/>).
- You are requested to kindly note and refer above website for tender of BHEL.
- Bidder to mention their works address below from where material will be supplied to Site.

Works Address- _____

ALL OTHER TERMS AND CONDITIONS SHALL BE AS PER GTC Rev-1.

(Sign and seal of Bidder)

Name:

Signature:

Stamp:

ACTIVITY SCHEDULE

SL. NO.	ACTIVITY		ACTIVITY TIME IN WEEKS	CUMULATIVE TIME IN WEEKS FROM LOI/PO DATE	REMARKS IF ANY
1.	Submission of P.O Acceptance		01	01	
2.	Submission of documents necessary for getting manufacturing clearance like Drawings, data sheet etc.		02	03	
3.	Review and Approval of documents and issue of manufacturing clearance		03	06	
4.	Manufacturing Time		08	14	
5.	Inspection		02	16	
6.	Issue of MICC / MDCC		01	17	
7.	Dispatch		01	18	

Note :

- 1) Supplier must ensure the completeness and correctness of the requisite documents before submission for approval. Delay in approval on account of incomplete / inadequate information shall be the responsibility of supplier.
- 2) Inspection call should be given in the prescribed format only. Inspection calls not in the prescribed format shall not be entertained.
- 3) Qty to be offered for inspection should be in accordance within Delivery-schedule – lot. BHEL reserves the right not to entertain multiple inspection calls for a Delivery – lot and delay on this account shall be the responsibility of Supplier.
- 4) Supplier to ensure every revised submission incorporating comments within 1 week from the date of comments. In case there are delays in submission /resubmission of drawing /documents as per above schedule, that much days would be reduced from delivery period.

Signature & Seal of
Supplier
Date:

CLAUSE NO. 19 OF GTC: ARBITRATION CLAUSE SHALL BE READ AS BELOW:

(A) CONCILIATION (MODEL CONCILIATION CLAUSE FOR CONDUCTING CONCILIATION PROCEEDINGS UNDER THE BHEL CONCILIATION SCHEME, 2018)

The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract or the Memorandum of Understanding (whichever is inapplicable), which the Parties are unable to settle mutually), arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

Notes:

1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.
2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in **Annexure-A to this GCC (Enclosed)**.

The Annexure-A together with its appendices will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in these GCC."

(B) ARBITRATION (WITH SOLE ARBITRATOR)

- 1.1. Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the Parties, in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract, then, either Party may, by a notice in writing to the other Party refer such dispute or difference to the Sole Arbitrator and such Arbitrator appointed by Head of the BHEL Unit/Region/Division issuing the Contract.
- 1.2. The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the Parties.
- 1.3. Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) and amended in 2015 and further amendment passed in 2019 or statutory modifications or re-enactments thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceedings under this clause. The seat of arbitration shall be New Delhi. The language of arbitration shall be English and the documents shall be submitted in English.
- 1.4. The cost of arbitration shall initially be borne equally by the Parties subject to the final apportionment of the cost of the arbitration in the award of the Arbitrator.
- 1.5. Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its

CLAUSE NO. 19 OF GTC: ARBITRATION CLAUSE SHALL BE READ AS BELOW:

obligations under this Contract with due diligence and expedition in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.

1.6. **SETTLEMENT OF COMMERCIAL DISPUTES BETWEEN CPSES INTER SE AND CPSE(S) AND GOVERNMENT DEPARTMENT(S)/ ORGANISATION(S) – ADMINISTRATIVE MECHANISM FOR RESOLUTION OF CPSES DISPUTES (AMRCD) – REGARDING**

Vide Dept. of Public Enterprises OM No. F. No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22.05.2018 it has been conveyed that *"To make the mechanism more effective and binding on the disputing parties, a new mechanism namely Administrative Mechanism for resolution of CPSEs Disputes (AMRCD) having two level (tier) structure has been evolved in consultation with various stakeholders to replace the existing PMA mechanism which stands wound up from the date of issue of this OM."* Accordingly, the existing Permanent Machinery of Arbitration (PMA) stands wound up with effect from 22.05.2018 and cases relating to disputes or differences relating to the interpretation and application of the provisions of commercial contract(s) between CPSEs / Port Trust / Central or State Government Department / Organisations (excluding disputes concerning Railways, Income Tax, Customs and Excise Departments) shall be taken up by either party for its resolution through Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD).

(C) JURISDICTION AND GOVERNING LAWS

The Courts at New Delhi shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract. This Contract shall be construed as per and be governed by the Laws of India.

**ANNEXURE TO MODEL CONCILIATION CLAUSE FOR CONDUCT OF
CONCILIATION UNDER THE BHEL CONCILIATION SCHEME, 2018**

BRIEF PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS

1. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided herein:
2. The party desirous of resorting to Conciliation shall send an invitation/notice in writing to the other party to conciliate specifying all points of Disputes with details of the amount claimed. The party concerned shall not raise any new issue thereafter. Parties shall also not claim any interest on claims/counter-claims from the date of notice invoking Conciliation till the conclusion of the Conciliation proceedings.
3. The party receiving the invitation/notice for Conciliation shall within 30 days of receipt of the notice of Conciliation intimate its consent for Conciliation along with its counter-claims, if any.
4. The Conciliation in a matter involving claim or counter-claim (whichever is higher) up to Rs 5 crores shall be carried out by sole Conciliator nominated by BHEL while in a matter involving claim or counter-claim (whichever is higher) of more than Rs 5 crores Conciliation shall be carried out by 3 Conciliators nominated by BHEL.
5. The Parties shall be represented by only their duly authorized in-house executives/officers and neither Party shall be represented by a Lawyer.
6. The first meeting of the IEC shall be convened by the IEC by sending appropriate communication/notice to both the parties as soon as possible but not later than 30 days from the date of his/their appointment. The hearings in the Conciliation proceeding shall ordinarily be concluded within two (2) months and, in exceptional cases where parties have expressed willingness to settle the matter or there exists possibility of settlement in the matter, the proceedings may be extended by the IEC by a maximum of further 2 months with the consent of the Parties subject to cogent reasons being recorded in writing.
7. The IEC shall thereafter formulate recommendations for settlement of the Disputes supported by reasons at the earliest but in any case within

15 days from the date of conclusion of the last hearing. The recommendations so formulated along with the reasons shall be furnished by the IEC to both the Parties at the earliest but in any case within 1 month from the date of conclusion of the last hearing.

8. Response/modifications/suggestions of the Parties on the recommendations of the IEC are to be submitted to the IEC within time limit stipulated by the IEC but not more than 15 days from the date of receipt of the recommendations from the IEC.
9. In the event, upon consideration, further review of the recommendations is considered necessary, whether by BHEL or by the other Party, then, the matter can be remitted back to the IEC with request to reconsider the same in light of the issues projected by either/both the Parties and to submit its recommendations thereon within the following 15 days from the date of remitting of the case by either of the Parties.
10. Upon the recommendations by the Parties, with or without modifications, as considered necessary, the IEC shall be called upon to draw up the Draft Settlement Agreement in terms of the recommendations.
11. When a consensus can be arrived at between the parties only in regard to any one or some of the issues referred for Conciliation the draft Settlement Agreement shall be accordingly formulated in regard to the said Issue(s), and the said Settlement Agreement, if signed, by the parties, shall be valid only for the said issues. As regards the balance issues not settled, the parties may seek to resolve them further as per terms and conditions provided in the contract.
12. In case no settlement can be reached between the parties, the IEC shall by a written declaration, pronounce that the Conciliation between the parties has failed and is accordingly terminated.
13. Unless the Conciliation proceedings are terminated in terms of para 22 (b), (c) & (d) herein below, the IEC shall forward his/its recommendations as to possible terms of settlement within one (1) month from the date of last hearing. The date of first hearing of Conciliation shall be the starting date for calculating the period of 2 months.

14. In case of 3 members IEC, 2 members of IEC present will constitute a valid quorum for IEC and meeting can take place to proceed in the matter after seeking consent from the member who is not available. If necessary, videoconferencing may be arranged for facilitating participation of the members. However, the IEC recommendations will be signed by all members. Where there is more than one (1) Conciliator, as a general rule they shall act jointly. In the event of differences between the Members of IEC, the decision/recommendations of the majority of the Members of IEC shall prevail and be construed as the recommendation of the IEC.
15. The Draft Settlement Agreement prepared by the IEC in terms of the consensus arrived at during the Conciliation proceedings between the Parties shall be given by the IEC to both the parties for putting up for approval of their respective Competent Authority.
16. Before submitting the draft settlement agreement to BHEL's Competent Authority viz. the Board Level Committee on Alternative Dispute Resolution (BLCADR) for approval, concurrence of the other party's Competent Authority to the draft settlement agreement shall be obtained by the other party and informed to BHEL within 15 days of receipt of the final draft settlement agreement by it. Upon approval by the Competent Authority, the Settlement Agreement would thereafter be signed by the authorized representatives of both the Parties and authenticated by the members of the IEC.
17. In case the Draft Settlement Agreement is rejected by the Competent Authority of BHEL or the other Party, the Conciliation proceedings would stand terminated.
18. A Settlement Agreement shall contain a statement to the effect that each of the person(s) signing thereto (i) is fully authorized by the respective Party(ies) he/she represents, (ii) has fully understood the contents of the same and (iii) is signing on the same out of complete freewill and consent, without any pressure, undue influence.
19. The Settlement Agreement shall thereafter have the same legal status and effect as an arbitration award on agreed terms on the substance of the dispute rendered by an arbitral tribunal passed under section 30 of the Arbitration and Conciliation Act, 1996.
20. Acceptance of the Draft Settlement Agreement/recommendations of the Conciliator and/or signing of the Settlement Agreement by BHEL shall

however, be subject to withdrawal/closure of any arbitral and/or judicial proceedings initiated by the concerned Party in regard to such settled issues.

21. Unless otherwise provided for in the agreement, contract or the Memorandum of Understanding, as the case may be, in the event of likelihood of prolonged absence of the Conciliator or any member of IEC, for any reason/incapacity, the Competent Authority/Head of Unit/Division/Region/Business Group of BHEL may substitute the Conciliator or such member at any stage of the proceedings. Upon appointment of the substitute Conciliator(s), such reconstituted IEC may, with the consent of the Parties, proceed with further Conciliation into the matter either de-novo or from the stage already reached by the previous IEC before the substitution.
22. The proceedings of Conciliation under this Scheme may be terminated as follows:
- On the date of signing of the Settlement agreement by the Parties; or,
 - By a written declaration of the IEC, after consultation with the parties, to the effect that further efforts at conciliation are no longer justified, on the date of the declaration; or,
 - By a written declaration of the Parties addressed to the IEC to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
 - By a written declaration of a Party to the other Party and the IEC, if appointed, to the effect that the Conciliation proceedings are terminated, on the date of the declaration.
 - On rejection of the Draft Settlement Agreement by the Competent Authority of BHEL or the other Party.
23. The Conciliator(s) shall be entitled to following fees and facilities:

Sl No	Particulars	Amount
1	Sitting fees	Each Member shall be paid a Lump Sum fee of Rs 75,000/- for the whole case payable in terms of paragraph No. 27 herein below.
2	Towards drafting of settlement agreement	In cases involving claim and/or counter-claim of up to Rs 5crores. Rs 50,000/- (Sole Conciliator)

Sl No	Particulars	Amount
		In cases involving claim and/or counter-claim of exceeding Rs 5 crores but less than Rs 10 crores. Rs 75,000 (per Conciliator) In cases involving claim and/or counter-claim of more than Rs 10 crores. Rs 1,00,000/- (per Conciliator) Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on Signing of the Settlement Agreement after approval of the Competent Authority or Rejection of the proposed Settlement Agreement by the Competent Authority of BHEL.
3	Secretarial expenses	Rs 10,000/- (one time) for the whole case for Conciliation by a Sole Member IEC. Where Conciliation is by multi member Conciliators –Rs 30,000/- (one time)- to be paid to the IEC
4	Travel and transportation and stay at outstation i) Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL)	As per entitlement of the equivalent officer (pay scale wise) in BHEL.
	Others	As per the extant entitlement of whole time Functional Directors in BHEL.

Sl No	Particulars	Amount
		Ordinarily, the IEC Member(s) would be entitled to travel by air Economy Class.
5	Venue for meeting	Unless otherwise agreed in the agreement, contract or the Memorandum of Understanding, as the case may be, the venue/seat of proceedings shall be the location of the concerned Unit / Division / Region / Business Group of BHEL. Without prejudice to the seat/venue of the Conciliation being at the location of concerned BHEL Unit / Division / Region / Business Group, the IEC after consulting the Parties may decide to hold the proceedings at any other place/venue to facilitate the proceedings. Unless, Parties agree to conduct Conciliation at BHEL premises, the venue is to be arranged by either Party alternately.

24. The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s) on their behalf. The parties agree to rely upon documentary evidence in support of their claims and not to bring any oral evidence in IEC proceedings.
25. If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.
26. The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.
27. Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.

28. The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 3 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.
29. The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement, except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/regulatory body, as the case may be.
30. The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:
- a. Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;
 - b. admissions made by the other party in the course of the Conciliator proceedings;
 - c. proposals made by the Conciliator;
 - d. The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.
31. The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
32. None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
33. The Parties shall not initiate, during the Conciliation proceedings, any arbitral or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue

notwithstanding the commencement of the arbitral or judicial proceedings and the arbitral or judicial proceedings shall be primarily for the purpose of preserving rights including preventing expiry of period of limitation.

34. The official language of Conciliation proceedings under this Scheme shall be English unless the Parties agree to some other language.

Format 2 to BHEL Conciliation Scheme, 2018

**FORMAT FOR SEEKING CONSENT FOR REFERRING THE DISPUTES TO
CONCILIATION THROUGH IEC**

To,

M/s. (Stakeholder's name)

**Sub: Resolution of the Disputes through conciliation by Independent
Expert Committee (IEC).**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Sir,

With reference to above referred Contract/MoU/Agreement/LOI/LOA, you have raised certain Disputes/claims. Vide your letter dated_____ you have requested BHEL to refer the Disputes/claims to IEC for Conciliation.

We are enclosing herewith Format (3) for giving consent and the terms and conditions of BHEL Conciliation Scheme, 2018 governing conciliation through IEC. You are requested to give your unconditional consent to the said terms and conditions of the Scheme by returning the same duly sealed and signed on each page. On receipt of your consent, matter will be put to the Competent Authority for consideration and decision.

Please note that BHEL has also certain claims against you (if applicable). BHEL reserves its right to agree or not to agree conciliation of the said disputes through BHEL and this letter is being issued without prejudice to BHEL's rights and contentions available under the contract and law.

Yours faithfully,

Representative of BHEL

Format 3 to BHEL Conciliation Scheme, 2018
FORMAT FOR GIVING CONSENT BY
CONTRACTOR/VENDOR/CUSTOMER/COLLABORATOR/CONSORTIUM PARTNERS FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

BHEL

.....

Sub: Resolution of Disputes through Conciliation by Independent Expert Committee (IEC).

Ref: Contract/MoU/Agreement/LOI/LOA No & date ____

With reference to above referred contract, our following bills/invoices/claims submitted to BHEL are still unpaid giving rise to Disputes:

SL. no.	Claim Description	Bill submitted to BHEL (no. and date)	Amount of the bill/claim	Amount received from BHEL	Outstanding Amount

Accordingly we request you to kindly refer the Disputes in respect of above claims to IEC for Conciliation.

We hereby agree and give our unconditional consent to the terms and conditions of BHEL Conciliation Scheme, 2018 governing conciliation through IEC. We have signed the same on each page and enclosed it for your consideration.

Yours faithfully,

(Signature with stamp)

Authorized Representative of Contractor

Name, with designation

Date

Format 5 to BHEL Conciliation Scheme, 2018
STATEMENT OF CLAIMS/COUNTER CLAIMS TO BE SUBMITTED TO
THE IEC BY BOTH THE PARTIES

1. Chronology of the Disputes
2. Brief of the Contract/MoU/Agreement/LOI/LOA
3. Brief history of the Disputes:
4. Issues:
5. Details of Claim(s)/Counter Claim(s):

Sl. No.	Description of claim(s)/Counter Claim	Amount (in INR)Or currency applicable in the contract	Relevant contract clause

6. Basis/Ground of claim(s)/counter claim(s) (along with relevant clause of contract)

Note– *The Statement of Claims/Counter Claims may ideally be restricted to maximum limit of 20 pages. Relevant documents may be compiled and submitted along with the statement of Claims/Counter Claims. The statement of Claims/Counter Claims is to be submitted to all IEC members and to the other party by post as well as by email.*

Annexure-2

Item/Package Name :	LT Cable
Enquiry No.:	90Q2100260 dated 07.11.2020
Project:	PGCIL Jeerat
Type of project	TRANSMISSION
Percentage of Local Content	(Bidder to enter the applicable % of local content)

Self-certification to be submitted in INR 100/- non judicial stamp paper

Format of Self certification regarding Local Content in line with PPP-MII order, 2017 & its revision dated 04.06.2020.

Date: / /2020

I _____ S/o, D/o, W/o, _____ Resident of _____ hereby solemnly affirm and declare as under:

That I will agree to abide by the terms and conditions of the Public Procurement (Preference to Make in India) Order, 2017 (*hereinafter PPP-MII order*) of Government of India issued vide Notification No: P-45021/2/2017-BE-II dated 15/06/2017, its revision dated 04/06/2020 and any subsequent modifications/ Amendments, if any.

That the information furnished hereinafter is correct to the best of my knowledge and belief and I undertake to produce relevant records before the procuring entity/ **BHEL** or any other Government authority for the purpose of assessing the local content of goods/ services/ works supplied by me for (Enter the name of the Equipment/Item for Project).

That the local content for all inputs which constitute the said goods/ services/ works has been verified by me and I am responsible for the correctness of the claims made therein.

That the goods/ services/ works supplied by me for (Enter the name of the Equipment/Item for Project) contains.....% (mention the Local content in %age) Local Content.

That the value addition for the purpose of meeting the 'Minimum Local Content' has been made by me at (Enter the details of the location(s) at which value addition is made).

That in the event of the local content of the goods/ services/ works mentioned herein is found to be incorrect and not meeting the prescribed supplier class categorization criteria as per said order, based on the assessment of procuring agency (ies)/ **BHEL**/ Government Authorities for the purpose of assessing the local content, action shall be taken against me in line with the PPP-MII order and provisions of the Integrity pact/ Bidding Documents.

I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available for verification to any statutory authority.

i Name and details of the Local Supplier
(Registered Office, Manufacturing unit location, nature of legal entity)

ii. Date on which this certificate is issued

Annexure-2

Item/Package Name :	LT Cable
Enquiry No.:	90Q2100260 dated 07.11.2020
Project:	PGCIL Jeerat
Type of project	TRANSMISSION
Percentage of Local Content	(Bidder to enter the applicable % of local content)

Self-certification to be submitted in INR 100/- non judicial stamp paper

- iii. Goods/services/works for which the certificate is produced
- iv. Procuring entity to whom the certificate is furnished
- v. Percentage of local content claimed and whether it meets the Minimum Local Content prescribed
- vi. Name and contact details of the unit of the Local Supplier (s)
- vii. Sale Price of the product
- viii. Ex-Factory Price of the product
- ix. Freight, insurance and handling
- x. Total Bill of Material
- xi. List and total cost value of input used to manufacture the Goods/to provide services/in construction of works
- xii. List and total cost of input which are domestically sourced. Value addition certificates from suppliers, if the input is not in-house to be attached
- xiii. List and cost of inputs which are imported, directly or indirectly

For and on behalf of..... (Name of firm/entity)

Authorized signatory (To be duly authorized by the Board of Directors)

<Insert Name, Designation and Contact No.>

Clause regarding regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017 as per Government of India order OM No.6/18/2019-PPD dated 23.07.2020

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.
- II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not failing in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. "Bidder from a country which shares a land border with India" for the purpose of this Order means:
 - a. An entity Incorporated, established or registered in such a country; or
 - b. A subsidiary of an entity Incorporated, established or registered in such a country; or
 - c. An entity substantially controlled through entitles incorporated, established or registered in such a country; or
 - d. An entity whose *beneficial owner* is situated in such a country, or
 - e. An Indian (or other) agent of such an entity; or
 - f. A natural person who is a citizen of such a country; or
 - g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above
- IV. The *beneficial owner* for the purpose of (iii) above will be as under:
 1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

Explanation-

 - a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;
 - b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholder's agreements or voting agreements;
 2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
 3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of Individuals;
 4. Where no natural person is Identified under (1) or (2) or (3) above the beneficial owner is the relevant natural person who holds the position of senior managing official;
 5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
- V. An Agent is a person employed to do any act for another or to represent another in dealings with third person.

Clause regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017 as per Government of India order OM No.6/18/2019-PPD dated 23.07.2020

VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

** The above clause is not applicable to the bidders from those countries (even if sharing a land border with India) to which the GoI has extended lines of credit or in which the GoI is engaged in development projects.*

* List of countries to which lines of credit have been extended or in which development projects are undertaken are available on the Ministry of External affairs website (<https://www.mea.gov.in/>)

Annexure-4

Compliance to be submitted in INR 100/- non judicial stamp paper

Sub: Compliance to Government of India order OM No.6/18/2019-PPD dated 23.07.2020 regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017

Sl No.	Description	Bidder's confirmation
1	<i>We, M/s_____ have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; We hereby certify that we are not from such a country.</i>	<i>Agreed</i>

(Note: Non-compliance of above said GoI Order and its subsequent amendment, (if any), by any bidder(s) shall lead for commercial rejection of their bids by BHEL)

Bidder's authorized signatory with stamp & seal

Annexure-5

Compliance to be submitted in INR 100/- non judicial stamp paper

Sub: Compliance to Government of India order OM No.6/18/2019-PPD dated 23.07.2020 regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017

SI No.	Description	Bidder's confirmation
1	<i>We, M/s_____have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India. We are from such a country which shares a land border with India & have been registered with the Competent Authority as specified in above said order. We hereby certify that we fulfil all requirements in this regard and are eligible to be considered.</i> <i>Evidence of valid registration by the Competent Authority is attached.</i>	<i>Agreed</i>

(Note: Non-compliance of above said GoI Order and its subsequent amendment, (if any), by any bidder(s) shall lead for commercial rejection of their bids by BHEL)

Bidder's authorized signatory with stamp & seal

Annexure for List of Banks (32 Nos.)

Sr. No.	Name of Bank
1	Allahabad Bank
2	Andhra Bank
3	Bank of Baroda
4	Canara Bank
5	Corporation Bank
6	Central Bank
7	Indian Bank
8	Indian Overseas Bank
9	Oriental Bank of Commerce
10	Punjab National Bank
11	Punjab & Sindh Bank
12	State Bank of India
13	State Bank of Hyderabad
14	Syndicate Bank
15	State Bank of Travancore
16	UCO Bank
17	Union Bank of India
18	United Bank of India
19	Vijaya Bank
20	IDBI
21	CITI Bank N. A.
22	Deutsche Bank AG
23	The Hongkong and Shanghai Banking Corporation Limited
24	Standard Chartered Bank
25	J P Morgan
26	Axis Bank
27	The Federal Bank Limited
28	HDFC
29	Kotak Mahindra Bank
30	ICICI
31	Indusind Bank
32	Yes Bank

Annexure - 2

Certificate by Chartered Accountant on letter head

This is to Certify that M/S
(hereinafter referred to as 'company') having its registered office at
is registered under MSMED Act 2006, (Entrepreneur
Memorandum No (Part-II) dtd:.....,
Category: (Micro/Small)). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No.S.O.1722(E) dated October 5, 2006 :
Rs.....Lacs
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006:
Rs.....Lacs

(Strike off whichever is not applicable)

The above investment of Rs.....Lacs is within permissible limit of Rs.....Lacs forMicro / Small **(Strike off which is not applicable)** Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/ Small) **(Strike off which is not applicable)** and the date of graduation of such enterprise from its original category is (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant



**BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP
MATERIAL RECEIPT CERTIFICATE**

- a) Site:
b) LR No. with date:
c) Vehicle no.:
d) Date of receipt of material at site:
e) Material details (as mentioned below):

S.no.	Item Description	Type of Packages	Unit (MT/KM/NO.)	Qty as per packing list	Qty Received	Remarks

Other Remarks:

Signature with date: _____

Name & Designation: _____

(With Seal)

INSPECTION REQUEST

1. Name & Address of Supplier :
2. Project :
3. Purchase Order No., Revision No. & Date :
4. Details of equipment / Material to be Inspected

Sl. No.	Material offered for Inspection	P.O. Item No.	Total Quantity Ordered	Quantity offered for Inspection	Quantity Already Cleared	P.O. value of offered qty.

5. For structure, whether BOM & Proto Corrected Drawings approved and available at place of inspection : Yes / No
6. Whether GTP/Drgs approved in Category – 1 available at place of inspection : Yes / No
7. Whether Quality Plan approved in Category – 1 available at place of inspection : Yes / No.
8. Whether all type tests approved by Engineering :Yes / No
9. (a) Place of Inspection & Address :
9. (b) Name & contact No. of Supplier rep. for inspection :
10. Sub – supplier contact person's name & contact No. :
11. Weekly off day : 12. Working Hours :
13. Date on which inspection requested (Inspection call to be raised at least 7 days prior to inspection) :
14. No of road permits required :

It is certified that the above materials shall be completed in all respects and shall have been inspected by us before the date indicated above for inspection. You are requested to please depute your representative for inspection

Signature
Name :
Contact No. :
Date :

Distribution :

1. Material Management , BHEL, New Delhi

Note :

1. Unsigned inspection request & Inspection requests not given in this format are not accepted.
2. Drawings, Quality Plan should be approved in category – I by BHEL Transmission Business Engineering Management before the inspection date. In case inspection request is given without Category – I approved documents, supplier should be obtain from BHEL Transmission Business Engineering Management in writing to this effect and attach to inspection request.

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the Bharat Heavy Electricals Limited ¹ (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____ through its Unit at _____ (name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) having its registered office at _____ ² hereinafter referred to as the 'Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No _____ dated _____ ³ valued at Rs _____ ⁴ (Rupees -----)/FC _____ (in words _____) for _____ ⁵ (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Performance Guarantee, equivalent to _____ % (_____ . Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we, _____, (hereinafter referred to as the Bank), having registered/Head office at _____ and inter alia a branch at _____ being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer a maximum amount Rs ----- (Rupees -----) without any demur, immediately on a demand from the Employer, .

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. _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor/ Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the contractors/supplier shall have no claim against us for making such payment.

We the _____ bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We _____ BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Contractor/Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Contractor/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor/Supplier 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.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall remain in force upto and including _____⁶ and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor/Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the _____⁷ we shall be discharged from all liabilities under this guarantee thereafter.

We, _____ BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed _____⁸
- b) This Guarantee shall be valid up to _____⁹
- c) Unless the Bank is served a written claim or demand on or before _____¹⁰ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Dated _____ .

Place of Issue _____ .

¹ NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited

² NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ PROJECT/SUPPLY DETAILS

⁵ BG AMOUNT IN FIGURES AND WORDS

⁶ VALIDITY DATE

⁷ DATE OF EXPIRY OF CLAIM PERIOD

⁸ BG AMOUNT IN FIGURES AND WORDS.

⁹ VALIDITY DATE

¹⁰ DATE OF EXPIRY OF CLAIM PERIOD

Check List for Supply bills

Name Of the Project							
Package Description							
Invoice No. & Date							
PO No. & date							
Sr. No	Documents Required	Copies	Check Points	Page no.	Vendor Remarks (Y/N/NA)	Verification by MM (Y/N/NA)	Verification by Fin (Y/N/NA)
1	Original for Buyer Invoice - GST compliant invoice	1 Original+2 Copy	1. Please ensure GST complaint invoice in original 2. Consignee address : BHEL C/o followed by site address 3. Item description and unit of quantity are matched with PO 4. Buyer address and GSTN No as required (TBG Noida or Nodal 5. PO No and date, LR No and date, Vehicle No and Project name are 6. Invoiced quantity are not more than th PO quantity and MICC 7. Ex works unit rate , Taxes and F&I rates are same as per PO 8. Signed and stamped by vendor				
2	Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes	1Original+2 Copy	1. Consignee address : BHEL C/o followed by Site address 2. In case of material purchased from sub vendor , Consignee address Vendor's name C/o BHEL C/o Site address 3. Vendor's Invoice no and Vehicle No are mentioned 4. No of boxes/No of packages are same as per Packing list 5. In case of and adverse remark on LR (Like shortages/damages/broken etc) , clarification from site/TBMM/TBCM is needed 6. LR is readable 7. In case of photo copy, LR is verified by TBMM 8. LR date is after the date of MICC/(MDCC if issued) or same date				
3	Packing List - showing number of packages, and gross weight/net Weight (if applicable)	1Original+2 Copy	1. PO No and date, LR No and date, Invoice No and date, Site Name and address, Consignor and consignee address are mentioned 2. Item description and quantity are matched with Invoice and PO 3. Signed and stamped by vendor 4. No of packages/ Item descriptions are matched with MRC and LR				
4	MICC from BHEL	1Original+2C opy	1. BHEL MICC has been issued prior to the date of dispatch or on same date 2. In case where MICC date is after the date of dispatch then MDCC date is same or prior to the date of dispatch 3. Project Name, PO,Po Date, Vendor's name and address is correct 4. Item description, Quantity and unit of quantity are same as per PO 5. All hold point in MICC , if any, have been resolved before submission of bill 6. Signed and stamped by BHEL Executive 7. MICC and MDCC quantity are not less than Invoice quantity and cover all invoiced items.				
5	Guarantee Certificate	1 Original+2 Copy	1. Project Name, PO No., Invoice No , LR No and date are mentioned 2. Guarantee Certificate is strictly matched with PO T&C 3. Signed and stamped by vendor				
6	Bank Guarantee	1 Copy	1. Ensure submission of BG directly from Bank before supply of material so that BG confirmation may be arranged before processing 2. Bill can be processed only after receipt of BG confirmation directly from bank 3. It should be in the name of BHEL , TBG Noida with registered office address Siri Fort, New Delhi 4. It should be in prescribed format. 5. BG value and validity plus claim period should be minimum as specified in PO / RC. Please check before supply , If BG extension is required please arrange the same 6. Vendor's name address should be same as per PO 7. Po No / RC No and date should be correct				
7	Insurance Certificate	1 Original+2 Copy	1. Invoice No and date, Vendor's Name,Place from Consignor to Consignee are mentioned 2. It has not been issued later than the LR date 3. Insured value is not less than the Invoice value 4. Signed and stamped by Insurance Company 5. In case of Open Insurance Policy, declaration has been submitted to Insurance Company as per declaration clause of Open policy and 6. In case of any discrepancy , consent of TBCM is required for processing the bill and amount will be deducted for invalid Insurance				
8	PVC (If applicable) Invoice is submitted along with the Despatch Invoice	1Original+2C opy	PVC (If applicable) Invoice is submitted along with the Despatch Invoice 1. PVC invoice is attched along with supply Invoice 2. Calculation sheet and applicable PVC indices are also enclosed 3. If delay in delivery, then PVC indicies are as per PO conditions.				
9	Material receipt Certificate		1. LR No and date, Invoice No and date, Vehicle No and date , Site Name an address are mentioned 2. Date of receipt of material 3. Item description and quantity are same as per Invoice / Packing List 4. It is signed and stamped by Site executive 5. In case of any shortages / damages / adverse remark , clarification is needed				
10	Other Documents		To be seen as per specific requirement of PO.				

SCHEDULE OF PRICE (Part II) (UNPRICED COPY)

(BIDDER TO STRICTLY ENSURE SUBMITTING THE PRICE BIDS IN THIS FORMAT)

VENDOR NAME / OFFER REF:

MENTION THE WORKS FROM WHICH MATERIAL SHALL BE SUPPLIED -

ENQUIRY No. -90Q2100260 dated 07.11.2020

	S.No.	Description of Item	HSN Code	Unit	Quantity	Unit Price	Total	GST @__on Ex Works	Unit Freight & Insurance	Total Freight & Insurance	GST @__ on Freight & Insurance	TOTAL (FOR Destination) PRICE (Rs.)
						Ex-works (Rs.)	Ex-Works (Rs.)					
	1	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 2 CORE X 2.5SQMM ARMoured CONTROL CABLE		MTR	6500							
	2	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 5 CORE X 2.5SQMM ARMoured CONTROL CABLE		MTR	12000							
	3	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 7 CORE X 2.5SQMM ARMoured CONTROL CABLE		MTR	9500							
	4	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 10 CORE X 2.5SQMM ARMoured CONTROL CABLE		MTR	20500							
	5	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 14 CORE X 2.5SQMM ARMoured CONTROL CABLE		MTR	10000							
	6	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 19 CORE X 2.5SQMM ARMoured CONTROL CABLE		MTR	12000							
	7	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 27 CORE X 2.5SQMM ARMoured CONTROL CABLE		MTR	6500							
	8	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 16SQMM ARMoured AUX POWER CABLE		MTR	9000							
	9	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 1 CORE X 150SQMM ARMoured AUX POWER CABLE		MTR	500							

SCHEDULE OF PRICE (Part II) (UNPRICED COPY)

(BIDDER TO STRICTLY ENSURE SUBMITTING THE PRICE BIDS IN THIS FORMAT)

VENDOR NAME / OFFER REF:

MENTION THE WORKS FROM WHICH MATERIAL SHALL BE SUPPLIED -

ENQUIRY No. -90Q2100260 dated 07.11.2020

	10	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 2 CORE X 6SQMM ARMOURED AUX POWER CABLE		MTR	6500							
	11	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 35SQMM ARMOURED AUX POWER CABLE		MTR	2000							
		Total cost to BHEL (in figures)										
		Total cost to BHEL (in words)										

1. It is certified that M/s _____ have quoted as per the specified price format of the tender, otherwise offer shall be liable for rejection.
2. PLEASE NOTE THAT UNPRICED COPY OF PRICE BID (i.e. WITH ALL PRICE BLANKED) SHALL BE FURNISHED ALONGWITH TECHNO-COMMERCIAL BID.
3. Vendor to mention the word "QUOTED" against each item in UNPRICED SCHEDULE.

SEAL & SIGNATURE OF TENDERER

BHARAT HEAVY ELECTRICALS LIMITED

TRANSMISSION PROJECTS ENGINEERING MANAGEMENT

DOCUMENT No.	TB-395-510-024	Rev. No.	00		Prepared	Checked	Approved
TYPE OF DOC.	TECHNICAL SPECIFICATION			NAME	PC	RD	VK
TITLE	1.1kV AUXILIARY POWER & CONTROL CABLE			SIGN			
				DATE			
				GROUP	TBEM	W.O. No	87003/ 87002
CUSTOMER	POWERGRID MEDINIPUR-JEERAT TRANSMISSION LIMITED						
PROJECTS	765/400kV Substations at Jeerat & Medinipur (New) & Extension of 400kV Jeerat S/s Project code : 395						

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Section	Description	No. of Sheets
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2.	DETAILED TECHNICAL REQUIREMENTS – EQUIPMENT SPECIFICATION	15
3.	PROJECT DETAILS AND GENERAL SPECIFICATION	27
4.	CHECK LIST (To be filled at Tender stage)	4

Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS			
				Distribution	TBMM	TBQM	TBCM	TBTS
				Copies	2	-	-	-

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SECTION 1

SCOPE, SPECIFIC TECHNICAL REQUIREMENTS AND QUANTITIES

1.0 SCOPE

This technical specification covers the requirements of design, manufacture, testing at works, packing and dispatch of 1.1kV Control & Aux. Power Cables. This section covers the specific technical requirements of cables.

In case of any conflict between the technical details mentioned in this section and the remaining sections of this document, then Section-1 shall prevail and is to be considered as binding requirement.

1.1 The equipment is required for the following Project:-

Name of Customer : Power Grid Medinipur-Jeerat Transmission Limited

Name of the Project: 765/400kV Substations at Jeerat & Medinipur (New) & Extension of 400kV Jeerat S/s

Refer Section-II for equipment specification
 Section-III for Project Details and General Specifications.
 Section-IV for Standard Technical Data sheet
 Section-V for Checklist

Note: The terms used in this specification namely, “Employer/Purchaser” refers to Powergrid, “Contractor” refers to BHEL & “Sub-contractor” refers to successful bidder.

2.0 SPECIFIC TECHNICAL PARTICULARS

Bidder shall follow Technical Parameters as specified in Powergrid GTP for Power & Control Cables as attached under Annexure of Section-II of this Specification.

2.1 PVC Insulated 1.1kV Control and Aux. Power cable:

The PVC (70°C) insulated 1100V grade Control & Aux. Power cables shall be of FR type, C1 category conforming to IS: 1554 (Part-I) and its amendments read along with this specification and shall be suitable for a steady conductor temperature of 70°C.

S.No	Parameters	Control Cable	Aux. Power Cable
1.	Voltage grade of cable	1100 Volts	
2.	Material of conductor	Plain annealed, High conductivity, Stranded Copper Conductor Grade EC	Stranded Aluminium, Grade H2
3.	Strands	As per standard technical data sheet attached as Section-4	
4.	Conductor insulation.	Extruded PVC compound Type A as per IS 5831	
5.	Filler (If required)	Non-hygroscopic, fire retardant.	
6.	Inner Sheath	Extruded PVC. Type ST-1 as per IS 5831 Non-hygroscopic, fire retardant.	
7.	Armour**	GS wire for Multi-core cables as per IS 1554 (Part I)	Aluminium wire (H4 grade) for Single core as per IS and Galvanised

			Steel wire/Strip for Multi-core cables as per IS 1554 (Part I)
8.	Overall sheathing	PVC Extruded, FR. Type ST-1 as per IS 5831, C1 Category as per IS 1554 Oxygen Index > 29, Temperature Index > 250°C	

(**) Strip armouring method (a) mentioned in Table 5, Page-6 of IS: 1554 (Part 1) - 1988 shall not be accepted for any of the cables

2.2 ~~XLPE insulated Aux. Power cable:~~

The XLPE (90°C) insulated cable shall be of FR type, C1 category conforming to IS: 7098 (Part I) and its amendments read along with this specification.

S.No	Parameters	Aux. Power cables
1.	Voltage grade of cable	1100 Volts
2.	Material of conductor	Stranded Aluminium; Grade H2; Circular/ Sector shaped and compacted
3.	Strands	As per standard technical data sheet attached as Section 4
4.	Conductor insulation.	Extruded XLPE as per IS 7098 Part I
5.	Filler (If required)	Non hygroscopic, fire retardant.
6.	Inner Sheath	Extruded PVC. Type ST 2 as per IS 5831 Non hygroscopic, fire retardant.
7.	Armour ^{^^}	Aluminium wire for Single core as per IS and Galvanised Steel wire/Strip for Multi core cables as per IS 7098 Part I with short circuit capacity as per Section II of Technical Specification
8.	Overall sheathing	PVC Extruded, FR, Type ST 2 as per IS 5831, Category C1 as per IS 7098, Oxygen Index >29, Temp. Index >250degree Celsius

(^^) Strip armouring method (a) mentioned in Table 6, Page-6 of IS: 7098 (Part 1) - 1988 shall not be accepted for any of the cables

2.3 Bidder to follow applicable standard Powergrid approved documents (GTP, MQP etc.). In case of discrepancy between the Technical Specification and standard Powergrid approvals, more stringent requirement has to be followed.

3.0 QUALIFYING REQUIREMENTS:

3.1 Applicable for PVC Control Cable:

The manufacturer(s), whose PVC control cables are offered, must have designed, manufactured, tested and supplied in a single contract at least 100 Kms of 1.1 KV grade PVC insulated control cable. Further the manufacturer must also have designed, manufactured, tested and supplied at least 1 km of 27C x 2.5 Sq.mm or higher size.

3.2 Applicable for PVC Power Cable:

The manufacturer(s), whose PVC Power Cables are offered, must have designed, manufactured, tested and supplied in a single contract atleast 100 Kms of 1.1 KV or higher grade PVC insulated power cables. Further the manufacturer must also have designed, manufactured, tested and supplied at least 1 km of 1C x 150 Sq. mm or higher size.

3.3 Applicable for XLPE Power Cables

The manufacturer(s), whose XLPE Power cables are offered, must have designed, manufactured, tested and supplied in a single contract atleast 25 Kms of 1.1 KV or higher grade XLPE insulated power cables. Further the manufacturer must also have designed, manufactured, tested and supplied at least 1 km of 1C x 630 Sq. mm or higher size.

4.0 BILL OF QUANTITY:

The cable type, size and length requirement shall be as per tables below. *However, the length of each cable type procured may be subject to a change of +/- 30% at contract stage.*

*Standard Lengths for each size of Power & Control Cable shall be 1000m, unless otherwise specified. Power cable with conductor cross sectional area 300sqmm and above may be supplied in 500m drums. Cut lengths for cable marked as (**) below shall be informed during detailed engineering stage. The cable length per drum shall be subject to a tolerance of +/-5% of the standard drum length. The owner shall have the option of rejecting cable drums with shorter lengths. However, the total quantity of cables after taking into consideration of all cable drums for each size shall be within the tolerance of +/-2%.*

4.1 PVC insulated 1.1kV Aux Power Cables:

S. No.	Description	Unit	Length
1.	4C x 16 sq. mm PVC/ Al. Aux Power Cable	m	9000
2.	1C x 150 sq. mm PVC/ Al. Aux Power Cable	m	500
3.	2C x 6 sq. mm PVC/ Al. Aux Power Cable	m	6500
4.	3.5C x 35 sq. mm PVC/ Al. Aux Power Cable	m	2000

4.2 PVC insulated 1.1kV Control Cables:

S. No.	Description	Unit	Length
1.	2C x 2.5 sq mm PVC/ Cu. Control Cable	m	6500
2.	5C x 2.5 sq mm PVC/ Cu. Control Cable	m	12000
3.	7C x 2.5 sq mm PVC/ Cu. Control Cable	m	9500
4.	10C x 2.5 sq mm PVC/ Cu. Control Cable	m	20500
5.	14C x 2.5 sq mm PVC/ Cu. Control Cable	m	10000
6.	19C x 2.5 sq mm PVC/ Cu. Control Cable	m	12000
7.	27 x 2.5 sq mm PVC/ Cu. Control Cable	m	6500

5.0 TESTS:

All cables to be supplied of type tested quality. Cables shall conform to type tests including additional type tests as per technical specification and shall be subject to routine & acceptance tests in accordance with requirements stipulated under respective sections. Any other test as per manufacturers standard quality plan (MQP) approved by Powergrid is deemed to be included.

The type, acceptance and routine tests may be witnessed by purchaser/ purchaser's representative.

The prices for conducting all tests are deemed to be included in respective cable prices.

6.0 DEVIATIONS:

The bidder shall list all the deviation from the specification separately. Offers without specific deviation will be deemed to be totally in compliance with the specification and NO DEVIATION on any account will be entertained at a later date.

7.0 APPROVAL CRITERION:

- (a) The successful bidder shall have to extend all possible supports like timely submission/re-submission of drawings, visit to end customer to facilitate documents approval without any commercial implications to BHEL. Acceptance of bidder's documents shall be subject to end customer approval.
- (b) The items offered shall be of approved make and model from POWERGRID and is working satisfactorily in their projects.

8.0 INSPECTION, TESTING & ACCEPTANCE

Bidder has to follow Technical specification and POWERGRID approved Manufacturing Quality Plan of Power Grid Corporation of India Ltd.

9.0 DOCUMENTATION:

The drawings / documents submitted shall be project and product specific and shall incorporate all project details and title block of the customer as detailed in Section 2 & 3.

" Date of Submission of first lot of drawings will be counted only from the date of submission of reasonably correct drawings"

The drawings/ documents, as follows shall be used for providing engineering manufacturing clearance and furthermore, these shall be used for delay analysis, if any from the bidder. The schedule for submission and resubmission shall be in line with details provided in Section-3

List of Documents/Drawings

1 GTP

2 Type Test Reports

3 Quality Assurance Plan & Inspection Test Schedule

Final Documentation (after approval) shall be separate for each Substation

SECTION-II: POWER AND CONTROL CABLE

Table of contents

SN	DESCRIPTION	PAGE NO.
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	STANDARD TECHNICAL DATASHEETS [UP TO AND INCLUDING 1100V	
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	PVC INSULATED CONTROL CABLE	Sheet 3 of 3

SECTION-II: POWER & CONTROL CABLES

1. POWER & CONTROL CABLES[FOR WORKING VOLTAGES UP TO AND INCLUDING 1100 V]

CRITERIA FOR SELECTION OF POWER & CONTROL CABLES

- 1.1.1. Aluminium conductor XLPE insulated armoured cables shall be used for main power supply purpose from LT Aux. Transformers to control room, between distribution boards, **supply to oil filtration units, DG supply to AC distribution board** and for supply for colony lighting from control room.
- 1.1.2 Aluminium conductor PVC insulated armoured power cables shall be used for various other applications in switchyard area/control room except for control/protection purposes.
- 1.1.3 For all control/protection purposes, PVC insulated armoured control cables of minimum 2.5 sq. mm. size with stranded Copper conductors shall be used.
- 1.1.4 POWERGRID has standardised the sizes of power cables for various feeders. Bidders are to estimate the quantity of cables and quote accordingly. The sizes of power cables to be used per feeder in different application shall be as follows:

S.No.	From	To	Cable size	Cable type
1.	Main Switch Board	LT Transformer	2-1C X 630 mm ² per phase 1-1C X 630 mm ² for neutral	XLPE
2.	Main Switch Board	AC Distribution Board	2-3½C X 300 mm ²	XLPE
3.	Main Switch Board	Oil Filtration Unit & looping to other oil filtration units.	1-3½C X 300 mm ²	XLPE
4.	Main Switch Board	Colony Lighting	1-3½C X 300 mm ²	XLPE

5.	Main Switch Board	H/VW pump LCP	1-3½C X 300 mm²	XLPE
6.	Main Switch Board	Main Lighting distribution board	1-3½C X 300 mm²	XLPE
7.	AC Distribution Board	D.G. Set AMF Panel	2-3½C X 300 mm²	XLPE
8.	AC Distribution Board	Emergency Lighting distribution board	1-3½C X 70 mm²	PVC
9.	AC Distribution Board	ICT MB	1-3½C X 70 mm²	PVC
10.	AC Distribution Board	Bay MB	1-3½C X 70 mm²	PVC
11.	Bay MB	AC Kiosk	1- 3 ½ x 35 mm²	PVC
12.	AC Distribution Board	Battery Charger	1-3½C X 70 mm²	PVC
13.	DCDB	Battery	2-1C X 150 mm²	PVC
14.	DCDB	Battery Charger	2-1C X 150 mm²	PVC
15.	DCDB	Protection/PLCC panel	1-4C X 16 mm²	PVC
16.	Main Lighting DB	Lighting panels(Indoor)	1-3½C X 35 mm²	PVC
17.	Main Lighting DB	Lighting panels (outdoor)	1-3½C X 70 mm²	PVC
18.	Main Lighting DB	Receptacles (Indoor)	1-3½C X 35 mm²	PVC
19.	Main Lighting DB	Receptacles (Outdoor)	1-3½C X 70 mm²	PVC
20.	Lighting Panel	Sub lighting panels	1-4C X 16 mm²	PVC
21.	Lighting Panel	Street Lighting Poles	1-4C X 16 mm²	PVC
22.	Lighting Panel/ Sub lighting panels	Lighting Fixtures (Outdoor)	1-2C X 6 mm²	PVC
23.	Bay MB	Equipments	1-4C X 16 mm² /1-4C X 6 mm² /1-2C X 6 mm²	PVC

- 1.1.5 Bidder may offer sizes other than the sizes specified in clause 1.1.4. In such case and for other application where sizes of cables have not been indicated in the specification, sizing of power cables shall be done keeping in view continuous current (***including future bays/load requirement***), voltage drop & short-circuit consideration of the system. Relevant calculations shall be submitted by bidder during detailed engineering for purchaser's approval. **The entire power and control cables & special cables (if any) required shall be executed by contractor for completion of present scope of work.**
- 1.1.6 Cables shall be laid conforming to IS : 1255.
- 1.1.7 While preparing cable schedules for control/protection purpose, following shall be ensured:
- 1.1.7.1 Separate cables shall be used for AC & DC.
- 1.1.7.2 Separate cables shall be used for DC1 & DC2.
- 1.1.8 For different cores of CT & CVT separate cable shall be used
- 1.1.9 At least one (1) cores shall be kept as spare in each copper control cable of 4C, 5C or 7C size whereas minimum no. of spare cores shall be two (2) for control cables of 10 core or higher size.
- 1.1.10 For control cabling, including CT/VT circuits, 2.5 sq.mm. size copper cables shall be used per connection. However, if required from voltage drop/VA burden consideration, additional cores shall be used. Further for potential circuits of energy meters, separate connections by 2 cores of 2.5 sq.mm. size shall be provided.
- 1.1.11 Standard technical data sheets for cable sizes up to and including 1100V are enclosed at Annexure. Cable sizes shall be offered/manufactured in accordance with parameters specified in standard technical data sheets. Technical data sheet for any other cores/sizes required during detailed engineering shall be separately offered for owner's approval by the contractor/supplier. ***Submission of standard technical data sheets for these cable sizes are not required for approval. Contractor/supplier shall intimate name of proposed approved cable manufacturer along with cable sizes, its quantity required during detailed engineering for purchaser's information and acceptance.***

1.2. TECHNICAL REQUIREMENTS

1.2.1. General

- 1.2.1.1. The cables shall be suitable for laying in racks, ducts, trenches, conduits and underground buried installation with uncontrolled back fill and chances of flooding by water.
- 1.2.1.2. They shall be designed to withstand all mechanical, electrical and thermal stresses under steady state and transient operating conditions. The XLPE /PVC insulated L.T. power cables of sizes 240 sq. mm. and above shall withstand without damage a 3 phase fault current of at least 45 kA for at least 0.12 second, with an initial peak of 105 kA in one of the phases at rated conductor temperature (70 degC for PVC insulated cables and 90 degC for XLPE insulated cables). The armour for these power cables shall be capable of carrying 45 kA for at least 0.12 seconds without exceeding the maximum allowable temperature of PVC outer sheath.
- 1.2.1.3. The XLPE insulated cables shall be capable of withstanding a conductor temperature of 250°C during a short circuit without any damage. The PVC insulated cables shall be capable of withstanding a conductor temperature of 160°C during a short circuit.
- 1.2.1.4. The Aluminium/Copper wires used for manufacturing the cables shall be true circular in shape before stranding and shall be uniformly good quality, free from defects. All Aluminium used in the cables for conductors shall be of H2 grade. In case of single core cables armours shall be of H4 grade Aluminium.
- 1.2.1.5. The fillers and inner sheath shall be of non-hygrosopic, fire retardant material, shall be softer than insulation and outer sheath shall be suitable for the operating temperature of the cable.
- 1.2.1.6. Progressive sequential marking of the length of cable in metres at every one metre shall be provided on the outer sheath of all cables.
- 1.2.1.7. Strip wire armouring method (a) mentioned in Table 5, Page-6 of IS : 1554 (Part 1) – 1988 shall not be accepted for any of the cables. For control cables only round wire armouring shall be used.
- 1.2.1.8. The cables shall have outer sheath of a material with an oxygen index of not less than 29 and a temperature index of not less than 250°C.
- 1.2.1.9. All the cables shall pass fire resistance test as per IS:1554 (Part-I)

- 1.2.1.10. The normal current rating of all PVC insulated cables shall be as per IS:3961.
- 1.2.1.11. Repaired cables shall not be accepted.
- 1.2.1.12. Allowable tolerance on the overall diameter of the cables shall be plus or minus 2 mm.
- 1.2.2. **XLPE Power Cables**
- 1.2.2.1. The XLPE (90°C) insulated cables shall be of FR type, C1 category conforming to IS:7098 (Part-I) and its amendments read alongwith this specification. The conductor shall be stranded aluminium circular/sector shaped and compacted. In multicore cables, the core shall be identified by red, yellow, blue and black coloured strips or colouring of insulation. A distinct inner sheath shall be provided in all multicore cables. For XLPE cables, the inner sheath shall be of extruded PVC of type ST-2 of IS:5831. **All cables shall be of armoured type.** For single core cables, the **armouring** shall consist of aluminium wires/strips. The outer sheath shall be extruded PVC of Type ST-2 of IS:5831 for all XLPE cables.
- 1.2.3. **PVC Power Cables**
- 1.2.3.1. The PVC (70°C) insulated power cables shall be of FR type, C1 category, conforming to IS: 1554 (Part-I) and its amendments read alongwith this specification and shall be suitable for a steady conductor temperature of 70°C. The conductor shall be stranded aluminium. The Insulation shall be extruded PVC to type-A of IS: 5831. A distinct inner sheath shall be provided in all multicore cables. **All cables shall be of armoured type.** For multicore armoured cables, the inner sheath shall be of extruded PVC. The outer sheath shall be extruded PVC to Type ST-1 of IS: 5831 for all cables.
- 1.2.4. **PVC Control Cables**
- 1.2.4.1. The PVC (70°C) insulated control cables shall be of FR type C1 category conforming to IS: 1554 (Part-1) and its amendments, read alongwith this specification. The conductor shall be stranded copper. The insulation shall be extruded PVC to type A of IS: 5831. A distinct inner sheath shall be provided in all cables. **All cables shall be of armoured type.** The over sheath shall be extruded PVC to type ST-1 of IS: 5831 and shall be grey in colour.
- 1.2.4.2. Cores shall be identified as per IS: 1554 (Part-1) for the cables up to five (5) cores and for cables with more than five (5) cores the identification of

cores shall be done by printing legible Hindu Arabic Numerals on all cores as per clause 10.3 of IS 1554 (Part-1).

2. ~~HV POWER CABLES[FOR WORKING VOLTAGES FROM 3.3 kV AND INCLUDING 33 kV]~~

2.1. ~~HV POWER CABLE FOR AUXILIARY POWER SUPPLY~~

(a) ~~The HV cable of 1Cx185 mm² (Aluminium Conductor) or 1Cx120mm² (Copper Conductor) of voltage class as specified for 630 kVA **and 800 kVA** LT transformer for interconnecting 630kVA **and 800 kVA** LT transformer to the SEB feeder shall be, XLPE insulated, armoured cable conforming to IS 7098 (Part-II) or IEC 60502-2 1998. Terminating accessories shall conform to IS 17573-1992 or IEC 61442-1997/IEC60502-4 1998.~~

(b) ~~The HV cable of 3Cx95 mm² (Aluminium Conductor) or 3Cx70mm² (Copper Conductor) of voltage class as specified for 250kVA LT transformer for interconnecting 250kVA LT transformer to the SEB feeder shall be, XLPE insulated, armoured cable conforming to IS 7098 (Part-II) or IEC 60502-2 1998. Terminating accessories shall conform to IS 17573-1992 or IEC 61442-1997/IEC60502-4 1998.~~

2.2. ~~Only overhead connection has been foreseen for interconnecting **630 kVA and** 800 kVA, LT transformer to the tertiary of the ICT. However, HV cable connections in place of overhead connection, if necessary shall also be in the scope of contractor. In this case contractor shall provide 1C x 185 mm² (Aluminium Conductor) or 1Cx120mm² (Copper Conductor), 38/66kV HV cable along with necessary terminating accessories. The construction of XLPE insulated, armoured HV cable shall be generally conforming to IS 7098 (Part-III). Terminating accessories shall conform to IEC60840 1999.~~

2.3. ~~Bidder may offer sizes other than the sizes specified in clause 2.1 and 2.2. In such case sizing of power cables shall be done keeping in view continuous current, voltage drop & short-circuit consideration of the system. Relevant calculations shall be submitted by bidder during detailed engineering for purchaser's approval.~~

2.4. ~~Constructional Requirements~~

~~Cable shall have compacted circular Aluminium conductor, Conductor screened with extruded semi conducting compound, XLPE insulated, insulation screened with extruded semi conducting compound, **distinct extruded PVC inner sheath (Type ST-2) with FR properties**, armoured~~

~~with non-magnetic material **for single core cables and galvanized steel wire/strip for multicore cables** , followed by extruded PVC outer sheath(Type ST-2), with FR properties . **The armour shall be capable of withstanding rated short time current of conductor.**~~

- ~~2.5 Progressive sequential marking of the length of cable in metres at every one metre shall be provided on the outer sheath of the cable.~~
- ~~2.6 The cables shall have outer sheath of a material with an Oxygen Index of not less than 29 and a Temperature index of not less than 250°C.~~
- ~~2.7 Allowable tolerance on the overall diameter of the cables shall be plus or minus 2 mm.~~

~~3. **EHV XLPE POWER CABLE [FOR WORKING VOLTAGES FROM 66 kV UP TO AND INCLUDING 500 kV]**~~

~~3.1 TECHNICAL REQUIREMENTS~~

~~The XLPE insulated, EHV cable shall conform to the requirements of IEC 60502-2 (applicable clauses only) for construction and IEC 60840/ IEC62067 (as applicable) for testing. The terminating accessories shall conform to IEC 60840 / IEC62067 (as applicable).~~

- ~~3.2 The cable shall be of specified EHV grade, single core, unarmoured, stranded compacted Copper conductor, core screening by a layer of semiconducting tape followed by a layer of semiconducting compound, cross linked polyethylene (XLPE) dry cured insulation, insulation screening with semiconducting compound extruded directly over the insulation, longitudinal sealing by a layer of non woven tape with water swellable absorbent over insulation screen, followed by radial sealing (Metal sheath of Lead alloy 'E'), metallic screening by concentric layer of plain copper wire followed by an open helix of copper & overall **HDPE** sheathed & graphite coated and conforming to the technical particulars of specification.~~

- ~~3.3 The construction of cable shall generally conform to the description mentioned in above mentioned clause of the specification. Bidder may offer necessary layers such as separation tape, binder tapes etc additionally as per their manufacturing practices for meeting required performance of the offered cable. The bidder shall enclose with the bid, drawing showing cross section of the cable. The conductors screen (non-metallic semi-conductive) shall be extruded in a single one-time process to ensure homogeneity and absence of voids.~~

- ~~3.4 The conductors screen (non-metallic semi-conductive) shall be extruded in a single one-time process to ensure homogeneity and absence of voids.~~
- ~~3.5 They shall be designed to withstand all mechanical, electrical and thermal stresses under steady state and transient operating conditions.~~
- ~~3.6 Progressive sequential marking of the length of cable in metres at every one metre shall be provided on the outer sheath of the cable.~~
- ~~3.7 The cables shall have outer sheath of a HDPE material.~~
- ~~3.8 Repaired cables shall not be accepted.~~
- ~~3.9 Allowable tolerance on the overall diameter of the cables shall be plus or minus 2 mm.~~

4 CABLE DRUMS

- 4.1 Cables shall be supplied in returnable wooden or steel drums of heavy construction. Wooden drum shall be properly seasoned sound and free from defects. Wood preservative shall be applied to the entire drum. ***Drums offered shall conform to relevant standards. Drum drawings are not required to be submitted for approval.***
- 4.2 Standard lengths for each size of power and control cables shall be 500/1000 meters. The cable length per drum shall be subject to a tolerance of plus or minus 5% of the standard drum length. The owner shall have the option of rejecting cable drums with shorter lengths. Maximum, One (1) number non standard length of cable size(s) may be supplied in drums for completion of project.
- 4.3 A layer of water proof paper shall be applied to the surface of the drums and over the outer most cable layer.
- 4.4 A clear space of at least 40 mm shall be left between the cables and the lagging.
- 4.5 Each drum shall carry the manufacturer's name, the purchaser's name, address and contract number and type, size and length of the cable, net and gross weight stencilled on both sides of drum. A tag containing the same information shall be attached to the leading end of the cable. An arrow and suitable accompanying wording shall be marked on one end of the reel indicating the direction in which it should be rolled.

- 4.6 Packing shall be sturdy and adequate to protect the cables, from any injury due to mishandling or other conditions encountered during transportation, handling and storage. Both cable ends shall be sealed with PVC/Rubber caps so as to eliminate ingress of water during transportation and erection.

5 TYPE TESTS

- 5.1 All cables shall conform to all type, routine and acceptance tests listed in the relevant IS.

5.2 ***XLPE INSULATED POWER CABLES (For working voltages up to and including 1100V):-***

- 5.2.1 Following type tests (on one size in a contract) as per IS: 7098 (Part 1) – 1988 including its amendments shall be carried out as a part of acceptance tests on XLPE insulated power cables for working voltages up to and including 1100 V:

- a) Physical tests for insulation
 - i) Hot set test
 - ii) Shrinkage test
- b) Physical tests for outer sheath
 - i) Shrinkage test
 - ii) Hot deformation
 - iii) Heat shock test
 - iv) Thermal stability

- 5.2.2 Contractor shall submit type test reports as per clause no. 9.2 of Technical Specification, Section: GTR for the following tests-

- a) Water absorption (gravimetric) test.
- b) Ageing in air oven
- c) Loss of mass in air oven
- d) Short time current test on power cables of sizes 240 sqmm and above on
 - i) Conductors.
 - ii) Armours.
- e) Test for armouring wires/strips.
- f) Oxygen and Temperature Index test.
- g) Flammability test.

5.3 ***PVC INSULATED POWER & CONTROL CABLES (For working voltages up to and including 1100V)-***

5.3.1 Following type tests (on one size in a contract) as per IS: 1554 (Part 1) - 1988 including its amendments shall be carried out as a part of acceptance tests on PVC insulated power & control cables for working voltages up to and including 1100 V:

- a) Physical tests for insulation and outer sheath
 - i) Shrinkage test
 - ii) Hot deformation
 - iii) Heat shock test
 - iv) Thermal stability
- b) High voltage test (water immersion test only a.c. test as per clause no. 16.3.1).

5.3.2 Contractor shall submit type test reports as per clause no. 9.2 of Technical Specification, Section: GTR for the following-

- a) High voltage test (water immersion d.c. test as per clause no. 16.3.2 of IS: 1554 (Part 1) - 1988).
- b) Ageing in air oven.
- c) Loss of mass in air oven.
- d) Short time current test on power cables of sizes 240 sqmm and above on
 - i) Conductors.
 - ii) Armours.
- e) Test for armouring wires/strips.
- f) Oxygen and Temperature Index test.
- g) Flammability test.

5.4 ~~**XLPE INSULATED HV POWER CABLES(For working voltages from 3.3 kV and including 33 kV)-**~~

5.4.1 ~~Contractor shall submit type test reports as per clause no. 9.2 of Technical Specification, Section: GTR for XLPE insulated HV power cables (as per IS 7098 Part-II including its amendment or as per IEC).~~

5.5 ~~**XLPE INSULATED EHV POWER CABLES (For working voltages from 66kV up to and including 500 kV)-**~~

5.5.1 ~~Contractor shall submit type test reports as per clause no. 9.2 of Technical Specification, Section: GTR for XLPE insulated EHV cables (as per IEC60840 for cables up to 150 kV & IEC 62067 for cables above 150 kV).~~

5.6 ~~**TERMINATING & JOINTING ACCESSORIES**~~

- ~~5.6.1 Contractor shall submit type test reports as per clause no. 9.2 of Technical Specification, Section: GTR for Terminating/jointing accessories as per IS 17573:1992/ IEC 60840:1999/ IEC62067.~~

**STANDARD TECHNICAL DATA SHEET
(1.1 kV GRADE LPE POWER CABLES)**

SN	CUSTOMER :	POWERGRID CORPORATION OF INDIA LIMITED	
	Name of manufacturer :	As per approved list	
	Cable Sizes	1 C x 630	3 C x 300
1	Manufacturer's type designation	A2 WaY	A2 WY
2	Applicable standard	IS: 7098/PT-II/1988 & its referred specifications	
3	Rated Voltage(volts)	1100 V grade	
4	Type & Category	FR & C1	FR & C1
5	Suitable for earthed or unearthed system	for both	
6	Continuous current rating when laid in air in a ambient temp. of 50°C and for maximum conductor temp. of 70 °C of PVC Cables For information only	732	410
7	Rating factors applicable to the current ratings for various conditions of installation:	As per IS-3961-Pt-II-67	
8	Short circuit Capacity		
	a) Guranteed Short Circuit Amp. (rms)KA for 0.12 sec duration at rated conductor temperature of 90 degree C, with an initial peak of 105 KA.	45 KA	45 KA
	b) Maximum Conductor temp. allowed for the short circuit duty (deg C.) as stated above.	250 °C	
9	Conductor		
	a) Material	Stranded Aluminium as per Class 2 of IS : 8130	
	b) Grade	H 2 (Electrolytic grade)	
	c) Cross Section area (Sq.mm.)	630	300/150
	d) Number of wires(No.)minimum	53	30/15
	e) Form of Conductor	Stranded and compacted circular	Stranded compacted circular/sector shaped
	f) Direction of lay of stranded layers	Outermost layer shall be R.H lay & opposite in successive layers	
10	Conductor resistance (DC) at 20 °C per km-maximum	0.0469	0.1 / 0.206
11	Insulation		
	a) Composition of insulation	Extruded LPE as per IS-7098 Part(1)	
	b) Nominal thickness of insulation(mm)	2.8	1.8/1.4
	c) Minimum thickness of insulation	2.42	1.52/1.16
12	Inner Sheath		
	a) Material	Extruded PVC type ST-2 as per IS-5831-84	
	b) Calculated diameter over the laid up cores.(mm)	NA	52
	c) Thickness of Sheath (minimum)mm	N.A	0.6
	d) Method of extrusion	NA	Pressure/Vacuum extrusion
13	Armour		
	a) Type and material of armour	Al. Wire H4 grade	Gal. Steel wire
	b) Direction of armouring	left hand	
	c) Calculated diameter of cable over inner sheath (under armour), mm	33.9	53.2
	d)Nominal diameter of round armour wire (minimum)	2	2.5
	e)Guranteed Short circuit capacity of the armour for 0.12 sec at room temperature.	45 KA	45 KA
	f) DC resistance at 20 °C (Ω/Km)		0.577
14	Outer Sheath		
	a) Material (PVC Type)	ST-2& FR	ST-2& FR
	b) Calculated diameter under the sheath	38.3	59.50
	c) Min.thickness of sheath(mm)	1.72	2.36
	d) Guaranteed value of minimum oxygen index of outer sheath at 27 °C	Min 29.0	Min 29.0
	e) Guranteed value of minimum temperature index at 21 oxygen index	Min 250	Min 250
	f) colour of sheath	Black	Black
15	a) Nominal Overall diameter of cable		
	b) Tolerance on overall diameter (mm)	+2/-2 mm	
16	Cable Drums	shall conform to IS 10418 and technical specification	
	a) Max./ Standard length per drum for each size of cable (single length) with 5% Tolerance (mtrs)	1000/500	1000/500
	b) Non standard drum lengths	: Maximum one(1) non standard lengths of each cable size may be supplied in drums only over & above the standard lengths as specified above.(if required for completion of project).	
17	Whether progressive sequential marking on outer sheath provided at 1 meter interval	YES	
18	Identification of cores		
	a) colour of cores	As per IS 7098 Part(1)	
	b) Numbering	N.A	
19	Whether Cables offered are ISI marked	YES	
20	Whether Cables offered are suitable for laying as per IS 1255	YES	

- As per manufacturer design data

**STANDARD TECHNICAL DATA SHEET
(1.1 kV GRADE PVC POWER CABLES)**

	CUSTOMER :	POWERGRID CORPORATION OF INDIA LIMITED					
SN	Name of manufacturer :	As per approved list					
	Cable Si es	1 c x 150	3.5 cx 70	3.5 cx 35	4 c x 16	4c x 6	2 c x 6
1	Manufacturer s type designation	: AYWaY	AYFY	AYFY	AYFY	AYWY	AYWY
2	Applicable standard	: -----IS: 1554/PT-I/1988 & its referred standards-----					
3	Rated Voltage(volts)	: -----1100 V grade-----					
4	Type & Category	: FR & C1	FR & C1	FR & C1	FR & C1	FR & C1	FR & C1
5	Suitable for earthed or unearthed system	: -----for both-----					
6	Continuous current rating when laid in air in a ambient temp. of 50°C and for maximum conductor temp. of 70 °C of PVC Cables For information only	: 202	105	70	41	24	28
7	Rating factors applicable to the current ratings for various conditions of installation:	: x-----As per IS-3961-PI-II-67-----					
8	Short circuit Capacity						
	a) Short Circuit Amp. (rms)KA for 1 sec duration	: 11.2	5.22	2.61	1.19	0.448	0.448
	b) Conductor temp. allowed for the short circuit duty (deg C.)	: -----160 °C-----					
9	Conductor						
	a) Material	: -----STRANDED ALUMINIUM -----					
	b) Grade	: -----H 2 (Electrolytic grade) -----					
	c) Cross Section area (Sq.mm.)	: 150	M-70 N-35	M-35 N-16	16	6	6
	d) Number of wires(No.)	: -----as per Table 2 of IS 8130 -----					
	e) Form of Conductor	Non-compacted Standed circular	shaped conductor	shaped conductor	shaped conductor	Non-compacted Standed circular	Non-compacted Standed circular
	f) Direction of lay of stranded layers	: ----- Outermost layer shall be R.H lay & opposite in successive layers -----					
10	Conductor resistance (DC) at 20 °C per km-maximum	: 0.206	0.443/ 0.868	0.868/ 1.91	1.91	4.61	4.61
11	Insulation						
	a) Composition of insulation	: -----Extruded PVC type A as per IS-5831-84-----					
	b) Nominal thickness of insulation(mm)	: 2.1	1.4/1.2	1.2/1.0	1.0	1.0	1.0
	c) Minimum thickness of insulation	: 1.79	1.16/0.98	0.98/0.8	0.8	0.8	0.8
12	Inner Sheath						
	a) Material	: -----Extruded PVC type ST-I as per IS-5831-84-----					
	b) Calculated diameter over the laid up cores.(mm)	: N.A	27.6	20.4	15.7	11.6	9.6
	c) Thickness of Sheath (minimum)mm	: N.A	0.4	0.3	0.3	0.3	0.3
13	Armour	: ----- as per IS 3975/88 -----					
	a) Type and material of armour	: Al. Wire H4 grade	Gal.steel strip	Gal.steel strip	Gal.steel strip	Gal. Steel wire	Gal. Steel wire
	b) Direction of armouring	: -----left hand-----					
	c) Calculated diameter of cable over inner sheath (under armour), mm	: 18	28.4	21	16.3	12.2	10.2
	d) Nominal diameter of round armour wire/strip	: 1.6	4 x 0.8	4 x 0.8	4 x 0.8	1.4	1.4
	e) Number of armour wires/strips	: -----Armouring shall be as close as practicable-----					
	f) Short circuit capacity of the armour along for 1 sec-for info only	: --K x A ^{1/2} (K Amp)(where A total area of armour in mm ² & t time in seconds), K 0.091 for Al & 0.05 for steel					
	g) DC resistance at 20 °C (Ω/Km)	: 0.44	2.57	3.38	3.99	3.76	4.4
14	Outer Sheath						
	a) Material (PVC Type)	: ST-1& FR	ST-1& FR	ST-1& FR	ST-1& FR	ST-1& FR	ST-1& FR
	b) Calculated diameter under the sheath	: 21.2	30.1	22.6	17.9	15	13
	c) Min.thickness of sheath(mm)	: 1.4	1.56	1.4	1.4	1.4	1.24
	d) Guaranteed value of minimum oxygen index of outer sheath at 27°C	: Min 29.0	Min 29.0	Min 29.0	Min 29.0	Min 29.0	Min 29.0
	e) Guranteed value of minimum temperature index at 21 oxygen index	: Min 250	Min 250	Min 250	Min 250	Min 250	Min 250
	f) colour of sheath	: Black	Black	Black	Black	Black	Black
15	a) Overall diameter of cable	: -----+2/-2 mm-----					
	b) Tolerance on overall diameter (mm)	: -----+2/-2 mm-----					
16	Cable Drums	: ----- shall conform to IS 10418 and technical specification -----					
	a) Max./ Standard length per drum for each si e of cable (single length) with 5% Tolerance (mtrs)	: 1000/500	1000/500	1000/500	1000/500	1000/500	1000/500
	b) Non standard drum lengths	: Maximum one(1) non standard lengths of each cable si e may be supplied in drums only over & above the standard lengths as specified above.(if required for completion of project).					
17	Whether progressive sequential marking on outer sheath provided	: ----- YES -----					
18	Identification of cores						
	a) colour of cores	: Red	R,Y,BI &Bk	R,Y,BI &Bk	R,Y,BI &Bk	R,Y,BI &Bk	Red & Bk
	b) Numbering	: ----- N.A -----					
19	Whether Cables offered are ISI marked	: ----- YES -----					
20	Whether Cables offered are suitable for laying as per IS 1255	: ----- YES -----					

- As per manufacturer design data

TECHNICAL DATA SHEET
(1.1 kV GRADE PVC CONTROL CABLES)

CUSTOMER :		POWERGRID CORPORATION OF INDIA LIMITED							
SN	Name of manufacturer :	As per approved list							
	Cable Sizes	2c x 2.5	3c x 2.5	5c x 2.5	7c x 2.5	10c x 2.5	14c x 2.5	19c x 2.5	27c x 2.5
1	Manufacturer's type designation	YWY	YWY	YWY	YWY	YWY	YWY	YWY	YWY
2	Applicable standard	IS: 1554/PT-I/1988 & its referred standards							
3	Rated Voltage(volts)	1100							
4	Type & Category	FR & C1							
5	Suitable for earthed or unearthed system	for both							
6	Continuous current rating when laid in air in a ambient temp. of 50°C and for maximum conductor temp. of 70°C of PVC Cables For information only	22	19	19	14	12	10.5	9.7	8
7	Rating factors applicable to the current ratings for various conditions of installation:	As per IS-3961-Pt-II-67							
8	Short circuit Capacity								
	a) Short Circuit Amp. (rms)KA for 1 sec-for information only	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
	b) Conductor temp. allowed for the short circuit duty (deg C.)	160 °C							
9	Conductor								
	a) Material	Plain annealed High Conductivity stranded Copper (as per IS 8130/84)							
	b) Grade	Electrolytic							
	c) Cross Section area (Sq.mm.)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	d) Number of wires(No.)	as per Table 2 of IS 8130							
	e) Form of Conductor	Non-Compacted stranded circular conductor							
	f) Direction of lay of stranded layers	Outermost layer shall be R.H lay							
10	Conductor resistance (DC) at 20 °C per km(maxm)	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41
11	Insulation								
	a) Composition of insulation	Extruded PVC type A as per IS-5831-84							
	b) Nominal thickness of insulation(mm)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	c) Minimum thickness of insulation	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
12	Inner Sheath								
	a) Material	Extruded PVC type ST-I as per IS-5831-84							
	b) Calculated diameter over the laid up cores.(mm)	7.2	7.8	9.7	10.8	14.4	15.9	18	22.1
	c) Thickness of Sheath (minimum)mm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
13	Armour	as per IS 3975/99							
	a) Type and material of armour	Gal. Steel wire	Gal. Steel wire	Gal. Steel wire	Gal. Steel wire	Gal. Steel wire	Gal. Steel wire	Gal. Steel wire	Gal. Steel wire
	b) Direction of armouring	left hand							
	c) Calculated diameter of cable over inner sheath (under armour), mm	7.8	8.4	10.3	11.4	15	16.5	18.6	22.7
	d) Nominal diameter of round armour wire / dimensions of armour strip	1.4	1.4	1.4	1.4	1.6	1.6	1.6	1.6
	e) Number of armour wires	Armouring shall be as close as practicable							
	f) Short circuit capacity of the armour and duration-for info only	-0.05 x A√t (K Amp)(where A total area of armour in mm² & t time in seconds)							
	g) DC resistance at 20 °C (Ω/Km) & Resistivity of armour	As per IS 1554 Part(1), wherever applicable & IS 3975-1999							
14	Outer Sheath								
	a) Material (PVC Type)	ST-1& FR ST-1& FR ST-1& FR ST-1& FR ST-1& FR ST-1& FR ST-1& FR							
	b) Calculated diameter under the sheath	10.6	11.2	13.1	14.2	18.2	19.7	21.8	25.9
	c) Min.thickness of sheath(mm)	1.24	1.24	1.24	1.24	1.4	1.4	1.4	1.56
	d) Guaranteed value of minimum oxygen index of outer sheath	Min 29.0	Min 29.0	Min 29.0	Min 29.0	Min 29.0	Min 29.0	Min 29.0	Min 29.0
	e) Guaranteed value of minimum temperature index at 21 oxygen index	Min 250	Min 250	Min 250	Min 250	Min 250	Min 250	Min 250	Min 250
	f) colour of sheath	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
15	a) Overall diameter of cable								
	b) Tolerance on overall diameter (mm)	+2/-2 mm							
16	Cable Drums	shall conform to IS 10418 and technical specification							
	a) Max./ Standard length per drum for each size of cable (single length) with 5% Tolerance (mtrs)	1000/500	1000/500	1000/500	1000/500	1000/500	1000/500	1000/500	1000/500
	b) Non standard drum lengths	Maximum one(1) non standard lengths of each cable size may be supplied in drums only over & above the standard lengths as specified above.(if required for completion of project).							
17	Whether progressive sequential marking on outer sheath provided	YES							
18	Identification of cores								
	a) colour of cores	R & Bk	R,Y & Bk	Y,Bk & R	Grey	Grey	Grey	Grey	Grey
	b) Numbering	N.A.	N.A.	N.A.	Numerals in black ink	Numerals in black ink	Numerals in black ink	Numerals in black ink	Numerals in black ink
19	Whether Cables offered are ISI marked	YES							
20	Whether Cables offered are suitable for laying as per IS 1255	YES							

- As per manufacturer design data

SECTION-III

PROJECT DETAILS & GENERAL SPECIFICATION

SITE INFORMATION

	Particular	Details	
a)	Owner	POWERGRID	
b)	Customer	POWERGRID	
c)	Project Title	765/400kV Switchyard at Medinipur & Jeerat	
d)	Location	Medinipur	Jeerat (new)
		West Bengal	West Bengal
e)	Transport Facilities	Nearest rail head - Medinipur	Nearest rail head - Kolkata
SITE CONDITIONS			
a)	Max. ambient air temp.	50°C	
b)	Min. ambient air temp.	0°C	
c)	Max. design ambient emp.	50°C	
d)	Design reference temp.	50°C	
e)	Average Humidity	Max. 100%	
f)	Special corrosion conditions	No	
g)	Solar Radiation		
h)	Atmospheric UV radiation	High	
i)	Altitude above sea level	Less than 1000meter	
j)	Pollution Severity	High Pollution level	
k)	Seismic Zone	As per the seismic zone defined in the relevant BIS / IEC-62271-300 but not less than 0.3g horizontal	
WIND DATA			
	Wind velocity	50m/s	
	Average No. of thunderstorm days per annum	As per IS	

	Main Electrical Parameters:	
	Fault Levels:	765kV: 50kA for 1 sec 400kV: 63kA for 1 sec 66kV : 25kA for 3 sec
	Creepage Distance	31mm/kV for string insulator hardware and 25mm/kV for Equipment

1.0 GENERAL

This Chapter covers Technical Requirements and requirements of auxiliary items.

- a) Equipment furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/or needed for erection, completion and safe operation of the equipment as required by applicable codes unless included in the list of exclusions.
- b) Material and components not specifically stated in this specification but which are necessary for satisfactory operation of the equipment and accessories specified in this specification shall be deemed to be included unless specifically excluded and shall be supplied at no extra cost.
- c) Whenever a material or article is specified or described by the name of a particular brand, manufacturer or vendor, the specific name mentioned shall be understood as establishing type, function and quality and not as limiting competition.
- d) In case any Deviation Schedule, Bid Proposal Sheet, Schedule of Data Requirements (DRS), test reports or any other document/information are not furnished along-with the bid, the bid is liable to be rejected. Unless brought out clearly, the Bid will be deemed to conform to the specification scrupulously. All deviations from the specification shall be clearly brought out in the respective deviation schedule.
- f) The Bidder shall clearly indicate in the bid, the specific standards in accordance with which the works will be carried out.
- g) The equipment must be new, of highest grade, the best quality of their kind, to best engineering practice and latest state of art, and in accordance with purpose for which they are intended and ensure satisfactory performance throughout the service life.
- h) All similar parts of the equipment shall be made to gauge and shall be interchangeable with and shall be made of same materials and workmanship as the corresponding parts of the equipment. Where feasible, common components, units shall be employed in different pieces of equipment in order to optimize the spare part stock-up and utilization.

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- i) The requirement regarding external RIV as specified for equipment shall include the terminal fittings and the equipment shall have been tested preferably with fittings, if any.

2.0 SERVICES TO BE PERFORMED BY THE EQUIPMENT BEING FURNISHED

- a) The equipment furnished under this specification shall perform all its functions and operate satisfactorily without showing undue strain, restrike etc.
- b) The equipment shall be able to withstand forces due to wind load, short circuit, system over voltages, fluctuations, frequency variations etc., all forces considered together.

3.0 SUPPORT STRUCTURES (If in the scope of Bidder)

- a) The support structures should be hot dip galvanised with minimum **610 gm/sq-m** net of zinc.
- b) The design calculations taking into account the environmental conditions of the substations shall be furnished for sizing of the structures.

4.0 STANDARDS

- a) The equipment to be furnished under this specification shall conform to latest issue with all amendments of standard specified under respective Chapters of this Specification. The Bidder shall note that standards mentioned in the specification are not mutually exclusive or complete in themselves, but intended to compliment each other. The bidder shall also note that list of standards presented in this specification is not complete. Whenever necessary the list of standards shall be considered in conjunction with specific IS/IEC. When the specific requirements stipulated in the specifications exceed or differ than those required by the applicable standards, the stipulation of the specification shall take precedence.
- b) Other internationally accepted standards which ensure equivalent or better performance than that specified in the standards referred shall also be accepted.
- c) In case governing standards for the equipment is different from IS or IEC, the salient points of difference shall be clearly brought out in additional information schedule alongwith English language version of standard or relevant extract of the same. The equipment conforming to standards other than IS/IEC shall be subject to POWERGRID's approval.

5.0 ENGINEERING DATA AND DRAWINGS

- 5.1 The list of drawings/documents which are to be submitted to the Purchaser shall be discussed and finalised by the Purchaser at the time of award. The supplier shall necessarily submit all the drawings/ documents unless anything is waived.
- 5.2 The Contractor shall submit 4 (four) sets of drawings/ design documents /data / detailed bill of quantity and 1 (one) set of test reports for the approval of the Purchaser. The contractor shall also submit the softcopy of the above documents in addition to hardcopy.

5.3 Drawings

- 5.3.1 All drawings submitted by the Contractor shall be in sufficient detail to indicate the type, size, arrangement, material description, Bill of Materials, weight of each component, break-up for packing and shipment, dimensions, internal & the external connections, fixing arrangement required and any other information specifically requested in the specifications.
- 5.3.2 Drawings submitted by the Contractor shall be clearly marked with the name of the Purchaser, the unit designation, the specifications title, the specification number and the name of the Project. POWERGRID has standardized a large number of drawings/documents of various make including type test reports which can be used for all projects having similar requirements and in such cases no project specific approval (except for list of applicable drawings alongwith type test reports) is required. However, distribution copies of standard drawings/documents shall be submitted as per provision of the contract. All titles, noting, markings and writings on the drawing shall be in English. All the dimensions should be in SI units.
- 5.3.3 The review of these data by the Purchaser will cover only general conformance of the data to the specifications and documents, interfaces with the equipment provided under the specifications, external connections and of the dimensions which might affect substation layout. This review by the Purchaser may not indicate a thorough review of all dimensions, quantities and details of the equipment, materials, any devices or items indicated or the accuracy of the information submitted. This review and/or approval by the Purchaser shall not be considered by the Contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications and documents.
- 5.4 All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawings shall be at the Contractor's risk. The Contractor may make any changes in the design which are necessary to make the equipment conform to the provisions and intent of the Contract and such changes will again be subject to approval by the Purchaser. Approval of Contractor's drawing or work by the Purchaser shall not relieve the contractor of any of his responsibilities and liabilities under the Contract.
- 5.5 All engineering data submitted by the Contractor after final process including review and approval by the Purchaser shall form part of the Contract Document and the entire works performed under these specifications shall be performed in strict conformity, unless otherwise expressly requested by the Purchaser in Writing.

5.7 Approval Procedure

The scheduled dates for the submission of the drawings as well as for, any data/information to be furnished by the Purchaser would be discussed and finalised at the time of award. The following schedule shall be followed generally for approval and for providing final documentation.

- | | | |
|-----|--|---|
| i) | Approval/comments/
Purchaser on initial | As per agreed by
schedule submission |
| ii) | Resubmission | Within 3 (three) weeks |

	(whenever required)	from date of comments
iii)	Approval or comments	Within 3 (three) weeks of receipt of resubmission.
iv)	Furnishing of distribution copies (5 hard copies per substation and one scanned copy (pdf format) for Corporate Centre)	2 weeks from the date of approval
v)	Furnishing of distribution copies of test reports	
(a)	Type test reports (one scanned softcopy in pdf format per substation plus one for corporate centre & one hardcopy per substation)	2 weeks from the date of final approval
(b)	Routine Test Reports (one copy for each substation)	-do-
vi)	Furnishing of instruction/ manuals (2 copies per substation and one softcopy (pdf format) for corporate centre & per substation)	As per agreed schedule operation
vii)	As built drawings (two sets of hardcopy per substation & one softcopy (pdf format) for corporate centre & per substation)	On completion of entire works

NOTE :

- (1) The supplier may please note that all resubmissions must incorporate all comments given in the earlier submission by BHEL/POWERGRID or adequate justification for not incorporating the same must be submitted failing which the submission of documents is likely to be returned.
- (2) All drawings should be submitted in softcopy form, however substation design drawings like SLD, GA, all layouts etc. shall also be submitted in AutoCAD Version. SLD, GA & layout drawings shall be submitted for the entire substation in case of substation extension also.
- (3) The instruction Manuals shall contain full details of drawings of all equipment being supplied under this contract, their exploded diagrams with complete instructions for storage, handling, erection, commissioning, testing, operation, trouble shooting, servicing and overhauling procedures.
- (4) If after the commissioning and initial operation of the substation, the instruction manuals require any modifications/ additions/changes, the same shall be incorporated and the updated final instruction manuals shall be submitted by the supplier to BHEL/POWERGRID.
- (5) The manufacturer shall furnish to the Purchaser catalogues of spare parts.
- (6) All As-built drawings/documents shall be certified by site indicating the changes before final submission.

6.0 MATERIAL WORKMANSHIP

6.1 General Requirement

- 6.1.1 Where the specification does not contain references to workmanship, equipment, materials and components of the covered equipment, it is essential that the same must be new, of highest grade of the best quality of their kind, conforming to best engineering practice and suitable for the purpose for which they are intended.
- 6.1.2 Incase where the equipment, materials or components are indicated in the specification as “similar” to any special standard, the Purchaser shall decide upon the question of similarity. When required by the specification or when required by the Purchaser the Contractor shall submit, for approval, all the information concerning the materials or components to be used in manufacture. Machinery, equipment, materials and components supplied, installed or used without such approval shall run the risk of subsequent rejection, it being understood that the cost as well as the time delay associated with the rejection shall be borne by the supplier.
- 6.1.3 The design of the Works shall be such that installation, future expansions, replacements and general maintenance may be undertaken with a minimum of time and expenses. Each component shall be designed to be consistent with its duty and suitable factors of safety, subject to mutual agreements. All joints and fastenings shall be devised, constructed and documented so that the component parts shall be accurately positioned and restrained to fulfill their required function. In general, screw threads shall be standard metric threads. The use of other thread forms will only be permitted when prior approval has been obtained from the BHEL/POWERGRID.
- 6.1.4 Whenever possible, all similar part of the Works shall be made to gauge and shall also be made interchangeable with similar parts. All spare parts shall also be interchangeable and shall be made of the same materials and workmanship as the corresponding parts of the Equipment supplied under the Specification. Where feasible, common component units shall be employed in different pieces of equipment in order to minimize spare parts stocking requirements. All equipment of the same type and rating shall be physically and electrically interchangeable.
- 6.1.5 All materials and equipment shall be installed in strict accordance with the manufacturer’s recommendation(s). Only first-class work in accordance with the best modern practices will be accepted. Installation shall be considered as being the erection of equipment at its permanent location. This, unless otherwise specified, shall include unpacking, cleaning and lifting into position, grouting, levelling, aligning, coupling of or bolting down to previously installed equipment bases/foundations, performing the alignment check and final adjustment prior to initial operation, testing and commissioning in accordance with the manufacturer’s tolerances, instructions and the Specification. All factory assembled rotating machinery shall be checked for alignment and adjustments made as necessary to re-establish the manufacturer’s limits suitable guards shall be provided for the protection of personnel on all exposed rotating and / or moving machine parts and shall be designed for easy installation and removal for maintenance purposes. The spare equipment(s) shall be installed at designated locations and tested for healthiness.

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- 6.1.6 The supplier shall apply oil and grease of the proper specification to suit the machinery, as is necessary for the installation of the equipment. Lubricants used for installation purposes shall be drained out and the system flushed through where necessary for applying the lubricant required for operation. The supplier shall apply all operational lubricants to the equipment installed by him.
 - 6.1.7 All oil, grease and other consumables used in the Works/ Equipment shall be purchased in India unless the Contractor has any special requirement for the specific application of a type of oil or grease not available in India. In such is the case he shall declare in the proposal, where such oil or grease is available. He shall help POWERGRID in establishing equivalent Indian make and Indian Contractor. The same shall be applicable to other consumables too.
 - 6.1.8 Corona and radio interference voltage test and seismic withstand test (for 132kV and above voltage level) procedures for equipments shall be in line with the procedure given at Annexure-A and B respectively.

6.2 Provisions For Exposure to Hot and Humid climate

Outdoor equipment supplied under the specification shall be suitable for service and storage under tropical conditions of high temperature, high humidity, heavy rainfall and environment favourable to the growth of fungi and mildew. The indoor equipments located in non-air conditioned areas shall also be of same type.

6.2.1 Space Heaters

- 6.2.1.1 The heaters shall be suitable for continuous operation at 240V as supply voltage. On-off switch and fuse shall be provided.
- 6.2.1.2 One or more adequately rated thermostatically connected heaters shall be supplied to prevent condensation in any compartment. The heaters shall be installed in the compartment and electrical connections shall be made sufficiently away from below the heaters to minimize deterioration of supply wire insulation. The heaters shall be suitable to maintain the compartment temperature to prevent condensation.
- 6.2.1.3 Suitable anti condensation heaters with the provision of thermostat shall be provided.

6.2.2 FUNGI STATIC VARNISH

Besides the space heaters, special moisture and fungus resistant varnish shall be applied on parts which may be subjected or predisposed to the formation of fungi due to the presence or deposit of nutrient substances. The varnish shall not be applied to any surface of part where the treatment will interfere with the operation or performance of the equipment. Such surfaces or parts shall be protected against the application of the varnish.

6.2.3 Ventilation opening

Wherever ventilation is provided, the compartments shall have ventilation openings with fine wire mesh of brass to prevent the entry of insects and to reduce to a minimum the entry of dirt and dust. Outdoor compartment openings shall be provided with shutter type blinds and suitable provision shall be made so as to avoid any communication of air / dust with any part in the enclosures of the Control Cabinets, Junction boxes and Marshalling Boxes, panels etc.

6.2.4 Degree of Protection

The enclosures of the Control Cabinets, Junction boxes and Marshalling Boxes, panels etc. to be installed shall provide degree of protection as detailed here under:

- a) Installed out door: IP- 55
- b) Installed indoor in air conditioned area: IP-31
- c) Installed in covered area: IP-52
- d) Installed indoor in non air conditioned area where possibility of entry of water is limited: IP-41.
- e) For LT Switchgear (AC & DC distribution Boards) : IP-52

The degree of protection shall be in accordance with IS:13947 (Part-I) / IEC-60947(Part-I) / IS 12063 / IEC-60529. Type test report for degree of protection test, shall be submitted for approval.

6.3 RATING PLATES, NAME PLATES AND LABELS

Each main and auxiliary item of substation is to have permanently attached to it in a conspicuous position a rating plate of non-corrosive material upon which is to be engraved manufacturer's name, year of manufacture, equipment name, type or serial number together with details of the loading conditions under which the item of substation in question has been designed to operate, and such diagram plates as may be required by the Purchaser. The rating plate of each equipment shall be according to IEC requirement.

All such nameplates, instruction plates, rating plates of transformers, reactors, CB, CT, CVT, SA, Isolators, C & R panels and PLCC equipments shall be bilingual with Hindi inscription first followed by English. Alternatively two separate plates one with Hindi and the other with English inscriptions may be provided.

6.4 FIRST FILL OF CONSUMABLES, OIL AND LUBRICANTS

All the first fill of consumables such as oils, lubricants, filling compounds, touch up paints, soldering/brazing material for all copper piping of circuit breakers and essential chemicals etc. which will be required to put the equipment covered under the scope of the specifications, into successful Operation, shall be furnished by the supplier unless specifically excluded under the exclusions in these specifications and documents.

7.0 DESIGN IMPROVEMENTS / COORDINATION

- 7.1 The bidder shall note that the equipment offered by him in the bid only shall be accepted for supply. However, the Purchaser or the Contractor may propose changes in the specification of the equipment or quality thereof and if the Purchaser & contractor agree upon any such changes, the specification shall be modified accordingly.
- 7.2 If any such agreed upon change is such that it affects the price and schedule of completion, the parties shall agree in writing as to the extent of any change in the price and/or schedule of completion before the Contractor proceeds with the change. Following such agreement, the provision thereof, shall be deemed to have been amended accordingly.
- 7.3 The supplier shall be responsible for the selection and design of appropriate equipments to provide the best co-ordinated performance of

the entire system. The basic design requirements are detailed out in this Specification. The design of various components, sub-assemblies and assemblies shall be so done that it facilitates easy field assembly and maintenance.

7.4 The supplier has to coordinate designs and terminations with the agencies (if any) who are Consultants/Contractor for the Purchaser. The names of agencies shall be intimated to the successful bidders.

7.5 The supplier will be called upon to attend design co-ordination meetings with the Engineer, other Contractor's and the Consultants of the Purchaser (if any) during the period of Contract. The Contractor shall attend such meetings at his own cost at POWERGRID Corporate Centre, Gurgaon (Haryana) or at mutually agreed venue as and when required and fully cooperate with such persons and agencies involved during those discussions.

8.0 QUALITY ASSURANCE PROGRAMME

8.1 To ensure that the equipment and services under the scope of this Contract whether manufactured or performed within the supplier's Works or at his Sub-contractor's premises or at the Purchaser's site or at any other place of Work are in accordance with the specifications, the supplier shall adopt suitable quality assurance programme to control such activities at all points necessary. The detailed programme shall be submitted by the contractor after the award for reference. A quality assurance programme of the supplier shall generally cover the following:

- (a) His organization structure for the management and implementation of the proposed quality assurance programme;
- (b) Documentation control system;
- (c) Qualification data for bidder's key personnel;
- (d) The procedure for purchases of materials, parts components and selection of sub-Contractor's services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchases etc.
- (e) System for shop manufacturing and site erection controls including process controls and fabrication and assembly control;
- (f) Control of non-conforming items and system for corrective actions;
- (g) Inspection and test procedure both for manufacture and field activities.
- (h) Control of calibration and testing of measuring instruments and field activities;
- (i) System for indication and appraisal of inspection status;
- (j) System for quality audits;
- (k) System for authorising release of manufactured product to the Purchaser.
- (l) System for maintenance of records;
- (m) System for handling storage and delivery; and
- (n) A quality plan detailing out the specific quality control measures and procedures adopted for controlling the quality characteristics relevant to

each item of equipment furnished and/or services rendered.

POWERGRID/BHEL or his duly authorised representative reserves the right to carry out quality audit and quality surveillance of the system and procedure of the supplier/his vendor's quality management and control activities.

8.2 Quality Assurance Documents

The supplier would be required to submit all the Quality Assurance Documents as stipulated in the Quality Plan at the time of POWERGRID/BHEL inspection of equipment/material

9.0 TYPE TESTING, INSPECTION, TESTING & INSPECTION CERTIFICATE

9.1 All equipment being supplied shall conform to type tests as per technical specification and shall be subject to routine tests in accordance with requirements stipulated under respective sections.

9.2 The reports for all type tests as per technical specification shall be furnished by the supplier alongwith equipment / material drawings. However, type test reports of similar equipments/ material already accepted in POWERGRID shall be applicable for all project with similar requirement. The type tests conducted earlier should have either been conducted in accredited laboratory (accredited based on ISO / IEC Guide 25 / 17025 or EN 45001 by the national accreditation body of the country where laboratory is located) or witnessed by POWERGRID or representative authorized by POWERGRID or Utility or representative of accredited test lab or reputed consultant.

The test reports submitted shall be of the tests conducted within last 10 (ten) years prior to the date of bid opening i.e. **23.11.16**. In case the test reports are of the test conducted earlier than 10 (ten) years prior to the date of bid opening, the contractor shall repeat these test(s) at no extra cost to BHEL.

However, in case of instrument transformers, the following type tests should have been conducted within 5 (five) years prior to the date of bid opening.

- i) Lightning Impulse Test
- ii) Switching Impulse Test
- iii) Multiple Chopped Impulse Test (For CT)
- iv) Chopped Impulse Test (For CVT)

In case the test reports are of these tests (for instrument transformers) as mentioned above are conducted earlier than 5 (five) years prior to the date of bid opening i.e. **23.11.16**, the contractor shall repeat these test(s) at no extra cost to the purchaser.

Further, in the event of any discrepancy in the test reports i.e. any test report not acceptable due to any design/manufacturing changes (including substitution of components) or due to non-compliance with the requirement stipulated in the Technical Specification or any/all type tests not carried out, same shall be carried out without any additional cost implication to the Purchaser.

The supplier shall intimate the BHEL/POWERGRID the detailed program about the tests atleast two (2) weeks in advance in case of domestic supplies & six (6) weeks in advance in case of foreign supplies.

Further, in case type tests are required to be conducted/repeated and the deputation of Inspector/Purchaser's representative is required, then all the expenses shall be borne by the supplier.

- 9.3 The Purchaser intends to repeat the type tests on Power Transformer and Shunt Reactor except Dynamic short circuit tests on transformers, for which test charges shall be payable as per provision of contract. The price of conducting type tests shall be included in Bid price and break up of these shall be given in the relevant schedule of Bid Proposal Sheets. These Type test charges would be considered in bid evaluation. In case Bidder does not indicate charges for any of the type tests or does not mention the name of any test in the price schedules, it will be presumed that the particular test has been offered free of charge. Further, in case any Bidder indicates that he shall not carry out a particular test, his offer shall be considered incomplete and shall be liable to be rejected. BHEL/POWERGRID reserves the right to witness any or all the type tests. The BHEL/POWERGRID also reserves the right to waive the repeating of type tests partly or fully and in case of waiver, test charges for the same shall not be payable.

The Purchaser shall bear all expenses for deputation of purchaser's representative(s) for witnessing the type tests under this clause except in the case of re-deputation if any, necessitated due to no fault of the purchaser.

For outdoor receptacles, trefoil clamps, diesel engine, alternator, motors, cable glands, lighting fixtures, ACSR/AAC conductor, IPS aluminum tube and junction boxes, type test reports are not required to be submitted for the makes indicated at Annexure-E /POWERGRID approved list of subvendors. For the new makes(other than those indicated at Annexure-E / POWERGRID approved list of subvendors), type test reports as per relevant standard shall be submitted for POWERGRID's approval.

- 9.4 The Purchaser, his duly authorised representative and/or outside inspection agency acting on behalf of the Purchaser shall have at all reasonable times free access to the Contractor's/sub-vendors premises or Works and shall have the power at all reasonable times to inspect and examine the materials and workmanship of the Works during its manufacture or erection if part of the Works is being manufactured or assembled at other premises or works, the Contractor shall obtain for the Engineer and for his duly authorised representative permission to inspect as if the works were manufactured or assembled on the Contractor's own premises or works. Inspection may be made at any stage of manufacture, despatch or at site at the option of the Purchaser and the equipment if found unsatisfactory due to bad workmanship or quality, material is liable to be rejected.
- 9.5 The supplier shall give the Purchaser /Inspector fifteen (15) days written notice for on-shore and six (6) weeks notice for off-shore material being ready for joint testing including contractor and POWERGRID. Such tests shall be to the Contractor's account except for the expenses of the Inspector. The Purchaser/inspector, unless witnessing of the tests is virtually waived, will attend such tests within fifteen (15) days of the date of which the equipment is notified as being ready for test/inspection, failing which the Contractor may proceed alone with the test which shall be deemed to have been made in the

Inspector's presence and he shall forthwith forward to the Inspector duly certified copies of tests in triplicate.

9.6 The Purchaser or Inspector shall, within fifteen (15) days from the date of inspection as defined herein give notice in writing to the Contractor, of any objection to any drawings and all or any equipment and workmanship which in his opinion is not in accordance with the Contract. The Contractor shall give due consideration to such objections and shall either make the modifications that may be necessary to meet the said objections or shall confirm in writing to the Purchaser /Inspector giving reasons therein, that no modifications are necessary to comply with the Contract.

9.7 When the factory tests have been completed at the Contractor's or Sub- Contractor's works, the Purchaser/inspector shall issue a certificate to this effect within fifteen (15) days after completion of tests but if the tests are not witnessed by the Purchaser /Inspector, the certificate shall be issued within fifteen (15) days of receipt of the Contractor's Test certificate by the Engineer/Inspector. Failure of the Purchaser /Inspector to issue such a certificate shall not prevent the Contractor from proceeding with the Works. The completion of these tests or the issue of the certificate shall not bind the Purchaser to accept the equipment should, it, on further tests after erection, be found not to comply with the Contract. The equipment shall be dispatched to site only after approval of test reports and issuance of CIP by the Purchaser.

9.8 In all cases where the Contract provides for tests whether at the premises or at the works of the Contractor or of any Sub-Contractor, the Contractor except where otherwise specified shall provide free of charge such items as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the Purchaser /Inspector or his authorised representative to carry out effectively such tests of the equipment in accordance with the Contract and shall give facilities to the Purchaser /Inspector or to his authorised representative to accomplish testing.

9.9 The inspection by Purchaser and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the Contractor in respect of the agreed quality assurance programme forming a part of the Contract.

9.10 The Purchaser will have the right of having at his own expenses any other test(s) of reasonable nature carried out at Contractor's premises or at site or in any other place in addition of aforesaid type and routine tests, to satisfy that the material comply with the specification.

9.11 The Purchaser reserves the right for getting any field tests not specified in respective sections of the technical specification conducted on the completely assembled equipment at site. The testing equipments for these tests shall be provided by the Purchaser.

10.0 TESTS

10.1 Pre-commissioning Tests

On completion of erection of the equipment and before charging, each item of the equipment shall be thoroughly cleaned and then inspected jointly by the Purchaser and the Contractor for correctness and completeness of

installation and acceptability for charging, leading to initial pre-commissioning tests at Site. The list of pre-commissioning tests to be performed are given in respective chapters and shall be included in the Contractor's quality assurance programme.

10.2 Commissioning Tests

10.2.1 The available instrumentation and control equipment will to be used during such tests and the Purchaser will calibrate, all such measuring equipment and devices as far as practicable.

10.2.2 Any special equipment, tools and tackles required for the successful completion of the Commissioning Tests shall be provided by the Contractor, free of cost.

10.2.3 The specific tests requirement on equipment have been brought out in the respective chapters of the technical specification.

10.3 The Contractor shall be responsible for obtaining statutory clearances from the concerned authorities for commissioning the equipment and the switchyard. However necessary fee shall be reimbursed by POWERGRID on production of requisite documents.

11.0 PACKAGING & PROTECTION

11.1 All the equipments shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at Site till the time of erection. On request of the Purchaser, the Contractor shall also submit packing details/associated drawing for any equipment/material under his scope of supply, to facilitate the Purchaser to repack any equipment/material at a later date, in case the need arises. While packing all the materials, the limitation from the point of view of availability of Railway wagon sizes in India should be taken into account. The Contractor shall be responsible for any loss or damage during transportation, handling and storage due to improper packing. Any demurrage, wharfage and other such charges claimed by the transporters, railways etc. shall be to the account of the Contractor. Purchaser takes no responsibility of the availability of the wagons.

11.2 All coated surfaces shall be protected against abrasion, impact, discolouration and any other damages. All exposed threaded portions shall be suitably protected with either a metallic or a non-metallic protecting device. All ends of all valves and pipings and conduit equipment connections shall be properly sealed with suitable devices to protect them from damage.

12.0 FINISHING OF METAL SURFACES

12.1 All metal surfaces shall be subjected to treatment for anti-corrosion protection. All ferrous surfaces for external use unless otherwise stated elsewhere in the specification or specifically agreed, shall be hot-dip galvanized after fabrication. High tensile steel nuts & bolts and spring washers shall be electro galvanized to service condition 4. All steel conductors including those used for earthing/grounding (above ground level) shall also be galvanized according to IS:2629.

12.2 HOT DIP GALVANISING

12.2.1 The minimum weight of the zinc coating shall be 610 gm/sq.m and minimum average thickness of coating shall be 86 microns for all items having thickness 6mm and above. For items lower than 6mm thickness

requirement of coating thickness shall be as per relevant ASTM. For surface which shall be embedded in concrete, the zinc coating shall be 610 gm/sq. m minimum.

12.2.2 The galvanized surfaces shall consist of a continuous and uniform thick coating of zinc, firmly adhering to the surface of steel. The finished surface shall be clean and smooth and shall be free from defects like discoloured patches, bare spots, unevenness of coating, spelter which is loosely attached to the steel globules, spiky deposits, blistered surface, flaking or peeling off, etc. The presence of any of these defects noticed on visual or microscopic inspection shall render the material liable to rejection.

12.2.3 After galvanizing, no drilling or welding shall be performed on the galvanized parts of the equipment excepting that nuts may be threaded after galvanizing. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization.

12.2.4 The galvanized steel shall be subjected to six one minute dips in copper sulphate solution as per IS-2633.

12.2.5 Sharp edges with radii less than 2.5 mm shall be able to withstand four immersions of the Standard Preece test. All other coatings shall withstand six immersions. The following galvanizing tests should essentially be performed as per relevant Indian Standards.

- Coating thickness
- Uniformity of zinc
- Adhesion test
- Mass of zinc coating

12.2.6 Galvanised material must be transported properly to ensure that galvanised surfaces are not damaged during transit. Application of zinc rich paint at site shall not be allowed.

12.3 PAINTING

12.3.1 All sheet steel work shall be degreased, pickled, phosphated in accordance with the IS-6005 "Code of practice for phosphating iron and sheet". All surfaces, which will not be easily accessible after shop assembly, shall beforehand be treated and protected for the life of the equipment. The surfaces, which are to be finished painted after installation or require corrosion protection until installation, shall be shop painted with at least two coats of primer. Oil, grease, dirt and swarf shall be thoroughly removed by emulsion cleaning. Rust and scale shall be removed by pickling with dilute acid followed by washing with running water, rinsing with slightly alkaline hot water and drying.

12.3.2 After phosphating, thorough rinsing shall be carried out with clean water followed by final rinsing with dilute dichromate solution and oven drying. The phosphate coating shall be sealed with application of two coats of ready mixed, stoving type zinc chromate primer. The first coat may be "flash dried" while the second coat shall be stoved.

12.3.3 After application of the primer, two coats of finishing synthetic enamel paint shall be applied, each coat followed by stoving. The second finishing coat shall be applied after inspection of first coat of painting.

12.3.4 The exterior and interior colour of the paint in case of new substations shall preferably be RAL 7032 for all equipment, marshalling boxes, junction boxes, control cabinets, panels etc. unless specifically mentioned under respective sections of the equipments. Glossy white colour inside the equipments /boards/panels/junction boxes is also acceptable. The exterior colour for panels shall bematching with the existing panels in case of extension of a substation. Each coatof primer and finishing paint shall be of slightly different shade to enable inspection of the painting. A small quantity of finishing paint shall be supplied for minor touching up required at site after installation of the equipments.

12.3.5 In case the Bidder proposes to follow his own standard surface finish and protection procedures or any other established painting procedures, like electrostatic painting etc., the procedure shall be submitted alongwith the Bids for Purchaser's review & approval.

12.3.6 The colour scheme as given below shall be followed for Fire Protection and Air Conditioning systems

S.No.	PIPE LINE	Base colour	Band colour
Fire Protection System			
1	Hydrant and Emulsifier system pipeline	FIRE RED	-
2	Emulsifier system detection line – water	FIRE RED	Sea Green
3	Emulsifier system detection line – Air	FIRE RED	Sky Blue
4	Pylon support pipes	FIRE RED	
Air Conditioning System			
5	Refrigerant gas pipeline – at compressor suction	Canary Yellow	-
6	Refrigerant gas pipeline – at compressor discharge	Canary Yellow	Red
7	Refrigerant liquid pipeline	Dark Admiralty Green	-
8	Chilled water pipeline	Sea Green	-
9	Condenser water pipeline	Sea Green	Dark Blue

12.3.7 For aluminium casted surfaces, the surface shall be with smooth finish. Further, in case of aluminium enclosures the surface shall be coated with powder (coating thickness of 60 microns) after surface preparation for painting.

13.0 HANDLING, STORING AND INSTALLATION

13.1 In accordance with the specific installation instructions as shown on manufacturer's drawings or as directed by the Purchaser or his representative, the Contractor shall unload, store, erect, install, wire, test and place into commercial use all the equipment included in the contract. Equipment shall be installed in a neat, workmanlike manner so that it is level, plumb, square and properly aligned and oriented. Commercial use of switchyard equipment means completion of all site tests specified and energisation at rated voltage.

-
- 13.2 Contractor may engage manufacturer's Engineers to supervise the unloading, transportation to site, storing, testing and commissioning of the various equipment being procured by them separately. Contractor shall unload, transport, store, erect, test and commission the equipment as per instructions of the manufacturer's supervisory Engineer(s) and shall extend full cooperation to them.
- 13.3 The contractor shall have to ensure that the hard and flat indoor and outdoor storage areas are in place prior to commencement of delivery of material at site. Contractor shall also ensure availability of proper unloading and material handling equipment like cranes etc. and polyester/nylon ropes of suitable capacity to avoid damage during unloading and handling of material at site. All indoor equipments shall be stored indoors. Outdoor equipment may be stored outdoors but on a hard and flat raised area properly covered with waterproof and dustproof covers to protect them from water seepage and moisture ingress. However, all associated control panels, marshalling boxes operating boxes etc. of outdoor equipments are to be stored indoors only. Storage of equipment on top of another one is not permitted if the wooden packing is used. Material opened for joint inspection shall be repacked properly as per manufacturer's recommendations. During storage of material regular periodic monitoring of important parameters like oil level / leakage, SF6 / Nitrogen pressure etc. shall be ensured by the contractor.
- 13.4 In case of any doubt/misunderstanding as to the correct interpretation of manufacturer's drawings or instructions, necessary clarifications shall be obtained from the Purchaser. Contractor shall be held responsible for any damage to the equipment consequent to not following manufacturer's drawings/instructions correctly.
- 13.5 Where assemblies are supplied in more than one section, Contractor shall make all necessary mechanical and electrical connections between sections including the connection between buses. Contractor shall also do necessary adjustments/alignments necessary for proper operation of circuit breakers, isolators and their operating mechanisms. All components shall be protected against damage during unloading, transportation, storage, installation, testing and commissioning. Any equipment damaged due to negligence or carelessness or otherwise shall be replaced by the Contractor at his own expense.
- 13.6 Supplier shall be responsible for examining all the shipment and notify the Purchaser immediately of any damage, shortage, discrepancy etc. for the purpose of Purchaser's information only. The Contractor shall submit to the Purchaser every week a report detailing all the receipts during the weeks. However, the Contractor shall be solely responsible for any shortages or damages in transit, handling and/or in storage and erection of the equipment at Site. Any demurrage, wharfage and other such charges claimed by the transporters, railways etc. shall be to the account of the Contractor.
- 13.7 The supplier shall be fully responsible for the equipment/material until the same is handed over to the Purchaser in an operating condition after commissioning. Contractor shall be responsible for the maintenance of the equipment/material while in storage as well as after erection until taken over by
-

Purchaser, as well as protection of the same against theft, element of nature, corrosion, damages etc.

13.8 Where material / equipment is unloaded by Purchaser before the Contractor arrives at site or even when he is at site, Purchaser by right can hand over the same to Contractor and there upon it will be the responsibility of Contractor to store the material in an orderly and proper manner.

13.9 The Contractor shall be responsible for making suitable indoor storage facilities, to store all equipment which requires indoor storage.

13.10 The words 'erection' and 'installation' used in the specification are synonymous.

13.11 Exposed live parts shall be placed high enough above ground to meet the requirements of electrical and other statutory safety codes.

13.12 Equipment Bases

A cast iron or welded steel base plate shall be provided for all rotating equipment which is to be installed on a concrete base unless otherwise agreed to by the Purchaser. Each base plate shall support the unit and its drive assembly, shall be of a neat design with pads for anchoring the units, shall have a raised lip all around, and shall have threaded drain connections.

14.0 TOOLS AND TACKLES

The Contractor shall supply with the equipment one complete set of all special tools and tackles for the erection, assembly, dis-assembly and maintenance of the equipment. However, these tools and tackles shall be separately, packed and brought on to Site.

15.0 AUXILIARY SUPPLY

15.1 The sub-station auxiliary supply is normally met through a system indicated under section "Electrical & Mechanical Auxiliaries" having the following parameters. The auxiliary power for station supply, including the equipment drive, cooling system of any equipment, air-conditioning, lighting etc shall be designed for the specified Parameters as under. The DC supply for the instrumentation and PLCC system shall also conform the parameters as indicated in the following.

Normal Voltage	Variation in Voltage	Frequency in HZ	Phase/Wire	Neutral connection
415V	$\pm 10\%$	$50 \pm 5\%$	3/4 Wire	Solidly Earthed.
240V	$\pm 10\%$	$50 \pm 5\%$	1/2 Wire	Solidly Earthed.
220V	190V to 240V	DC	-	Isolated 2 wire System
48V	—	DC	—	2 wire system (+) earthed

Combined variation of voltage and frequency shall be limited to $\pm 10\%$.

16.0 SUPPORT STRUCTURE (If in the scope of supplier)

16.1 The equipment support structures shall be suitable for equipment connections at the first level i.e 14.0 meter, 8.0 meter and 5.9 meter from plinth level for 765

kV,420 kV and 245 kV substations respectively. All equipment support structures shall be supplied alongwith brackets, angles, stools etc. for attaching the operating mechanism, control cabinets & marshalling box (wherever applicable) etc.

16.2 Support structure shall meet the following mandatory requirements:

16.2.1 The minimum vertical distance from the bottom of the lowest porcelain part of the bushing, porcelain enclosures or supporting insulators to the bottom of the equipment base, where it rests on the foundation pad shall be 2.55 metres.

17.0 CLAMPS AND CONNECTORS INCLUDING TERMINAL CONNECTORS

17.1 All power clamps and connectors shall conform to IS:5561 & NEMA CC1 and shall be made of materials listed below :

- | | | |
|----|--|--|
| a) | For connecting
ACSR conductors | Aluminum alloy casting,
conforming to designation A6
of IS:617 and all test shall
conform to IS:617 |
| b) | For connecting
equipment ter-
minals made of
copper with
ACSR conductors | Bimetallic connectors made
from aluminum alloy casting,
conforming to designation A6
of IS:617 with 2mm thick
bimetallic liner and all test
shall conform to IS:617 |
| c) | For connecting G.I | Galvanised mild steel shield |
| d) | i) Bolts, nuts &
Plain, washers | i) Electrogalvanised for sizes
below M12, for others hot dip
galvanised. |
| | ii) Spring washers
items
'a' to 'c' | ii) Electro-galvanised mild for
steel suitable for atleast
service condition-3 as per
IS:1573 |

17.2 Necessary clamps and connectors shall be supplied for all equipment and connections. The requirement regarding external corona and RIV as specified for any equipment shall include its terminal fittings. If corona rings are required to meet these requirements they shall be considered as part of that equipment and included in the scope of work.

17.3 Where copper to aluminum connections are required, bi-metallic clamps shall be used, which shall be properly designed to ensure that any deterioration of the connection is kept to a minimum and restricted to parts which are not current carrying or subjected to stress.

17.4 Low voltage connectors, grounding connectors and accessories for grounding allequipment as specified in each particular case, are also included in the scope of Work.

17.5 No current carrying part of any clamp shall be less than 10 mm thick. All ferrous parts shall be hot dip galvanised. Copper alloy liner of minimum 2 mm thickness shall be cast integral with aluminum body or 2 mm thick bi-metallic strips shall be provided for Bi-metallic clamps.

17.6 All casting shall be free from blow holes, surface blisters, cracks and cavities.

All sharp edges and corners shall be blurred and rounded off.

- 17.7 Flexible connectors, braids or laminated straps made for the terminal clamps for bus posts shall be suitable for both expansion or through (fixed/sliding) type connection of 4" IPS AL. tube as required. In both the cases the clamp height (top of the mounting pad to centre line of the tube) should be same.
- 17.8 Clamp shall be designed to carry the same current as the conductor and the temperature rise shall be equal or less than that of the conductor at the specified ambient temperature. The rated current for which the clamp/connector is designed with respect to the specified reference ambient temperature, shall also be indelibly marked on each component of the clamp/connector, except on the hardware.
- 17.9 All current carrying parts shall be designed and manufactured to have minimum contact resistance.
- 17.10 Clamps and connectors shall be designed to be corona controlled.

17.11 Tests

- 17.11.1 Clamps and connectors should be type tested as per IS:5561 and shall also be subjected to routine tests as per IS:5561. Following type test reports shall be submitted for approval as per clause 9.2 above except for sl. no.(ii) & (iii) for which type test once conducted shall be applicable (i.e. the requirement of test conducted within last ten years shall not be applicable).
- i) Temperature rise test (maximum temperature rise allowed is 35°C over 50°C ambient)
 - ii) Short time current test
 - iii) Corona (dry) and RIV (dry) test (for 220 KV and above voltage level clamps)
 - iv) Resistance test and tensile test

18.0 CONTROL CABINETS, JUNCTION BOXES, TERMINAL BOXES & MARSHALLING BOXES FOR OUTDOOR EQUIPMENT

- 18.1 All types of boxes, cabinets etc. shall generally conform to & be tested in accordance with IS-5039/IS-8623, IEC-60439, as applicable, and the clauses given below:
- 18.2 Control cabinets, junction boxes, Marshalling boxes & terminal boxes shall be made of sheet steel or aluminum enclosure and shall be dust, water and vermin proof. Sheet steel used shall be atleast 2.0 mm thick cold rolled or 2.5 mm hot rolled or alternately 1.6 mm thick stainless steel can also be used. The box shall be properly braced to prevent wobbling. There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation. In case of aluminum enclosed box the thickness of aluminum shall be such that it provides adequate rigidity and long life as comparable with sheet steel of specified thickness.
- 18.3 A canopy and sealing arrangements for operating rods shall be provided in marshalling boxes / Control cabinets to prevent ingress of rain water.

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- 18.4 Cabinet/boxes shall be provided with double hinged doors with padlocking arrangements. The distance between two hinges shall be adequate to ensure uniform sealing pressure against atmosphere. The quality of the gasket shall be such that it does not get damaged/cracked during the operation of the equipment.
- 18.5 All doors, removable covers and plates shall be gasketed all around with suitably profiled EPDM/Neoprene gaskets. The gasket shall be tested in accordance with approved quality plan, IS:11149 and IS:3400. Ventilating Louvers, if provided, shall have screen and filters. The screen shall be fine wire mesh made of brass.
- 18.6 All boxes/cabinets shall be designed for the entry of cables from bottom by means of weather proof and dust-proof connections. Boxes and cabinets shall be designed with generous clearances to avoid interference between the wiring entering from below and any terminal blocks or accessories mounted within the box or cabinet. Suitable cable gland plate above the base of the marshalling kiosk/box shall be provided for this purpose along with the proper blanking plates. Necessary number of cable glands shall be supplied and fitted on this gland plate. Gland plate shall have provision for some future glands to be provided later, if required. The Nickel plated glands shall be dust proof, screw on & double compression type and made of brass. The gland shall have provision for securing armour of the cable separately and shall be provided with earthing tag. The glands shall conform to BS:6121.
- 18.7 A 240V, single phase, 50 Hz, 15 amp AC plug and socket shall be provided in the cabinet with ON-OFF switch for connection of hand lamps. Plug and socket shall be of industrial grade.
- 18.8 For illumination, a fluorescent tube or CFL of approximately 9 to 15 watts shall be provided. The switching of the fittings shall be controlled by the door switch. .
For junction boxes of smaller sizes such as lighting junction box, manual operated earth switch mechanism box etc., plug socket, heater and illumination is not required to be provided.
- 18.9 All control switches shall be of MCB/rotary switch type and Toggle/piano switches shall not be accepted.
- 18.10 Positive earthing of the cabinet shall be ensured by providing two separate earthing pads. The earth wire shall be terminated on to the earthing pad and secured by the use of self etching washer. Earthing of hinged door shall be done by using a separate earth wire.
- 18.11 The bay marshalling kiosks shall be provided with danger plate and a diagram showing the numbering/connection/earthing by pasting the same on the inside of the door.
- 18.12 a) The following routine tests alongwith the routine tests as per IS:5039 shall also be conducted:
i) Check for wiring
ii) Visual and dimension check
b) The enclosure of bay marshalling kiosk, junction box, terminal box shall conform to IP-55 as per IS:13947 including application of, 2.5 KV rms for 1 (one) minute, insulation resistance and functional test after IP-55 test.
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19.0 Deleted.

20.0 TERMINAL BLOCKS AND WIRING

- 20.1 Control and instrument leads from the switchboards or from other equipment will be brought to terminal boxes or control cabinets in conduits. All interphase and external connections to equipment or to control cubicles will be made through terminal blocks.
- 20.2 Terminal blocks shall be 650V grade and have continuous rating to carry the maximum expected current on the terminals and non breakable type. These shall be of moulded piece, complete with insulated barriers, stud type terminals, washers, nuts and lock nuts. Screw clamp, overall insulated, insertion type, rail mounted terminals can be used in place of stud type terminals. But preferably the terminal blocks shall be non-disconnecting stud type of Elmex or Phoenix or Wago or equivalent make.
- 20.3 Terminal blocks for current transformer and voltage transformer secondary leads shall be provided with test links and isolating facilities. The current transformer secondary leads shall also be provided with short circuiting and earthing facilities.
- 20.4 The terminal shall be such that maximum contact area is achieved when a cable is terminated. The terminal shall have a locking characteristic to prevent cable from escaping from the terminal clamp unless it is done intentionally.
- 20.5 The conducting part in contact with cable shall preferably be tinned or silver plated however Nickel plated copper or zinc plated steel shall also be acceptable.
- 20.6 The terminal blocks shall be of extensible design.
- 20.7 The terminal blocks shall have locking arrangement to prevent its escape from the mounting rails.
- 20.8 The terminal blocks shall be fully enclosed with removable covers of transparent, non-deteriorating type plastic material. Insulating barriers shall be provided between the terminal blocks. These barriers shall not hinder the operator from carrying out the wiring without removing the barriers.
- 20.9 Unless otherwise specified terminal blocks shall be suitable for connecting the following conductors on each side.
- | | | |
|----|------------------------------------|--|
| a) | All circuits except CT/PT circuits | Minimum of two of 2.5 sq copper flexible. |
| b) | All CT/PT circuits | Minimum of 4 nos. of 2.5 sq copper flexible. |
- 20.10 The arrangements shall be in such a manner so that it is possible to safely connect or disconnect terminals on live circuits and replace fuse links when the cabinet is live.
- 20.11 Atleast 20 % spare terminals shall be provided on each panel/cubicle/box and these spare terminals shall be uniformly distributed on all terminals rows.
- 20.12 There shall be a minimum clearance of 250 mm between the First/bottom row of terminal block and the associated cable gland plate for outdoor ground mounted marshalling box and the clearance between two rows of terminal blocks shall be a minimum of 150 mm.
- 20.13 The supplier shall furnish all wire, conduits and terminals for the necessary interphase electrical connections (where applicable) as well as between phases and common terminal boxes or control cabinets. For

equipments rated for 400 kV and above the wiring required in these items shall be run in metallic ducts or shielded cables in order to avoid surge overvoltages either transferred through the equipment or due to transients induced from the EHV circuits.

- 20.14 All input and output terminals of each control cubicle shall be tested for surge withstand capability in accordance with the relevant IEC Publications, in both longitudinal and transverse modes. The Contractor shall also provide all necessary filtering, surge protection, interface relays and any other measures necessary to achieve an impulse withstand level at the cable interfaces of the equipment.

21.0 LAMPS & SOCKETS

21.1 Sockets

All sockets (convenience outlets) shall be suitable to accept both 5 Amp & 15 Amp pin round Standard Indian plugs. They shall be switched sockets with shutters.

21.2 Hand Lamp:

A 240 Volts, single Phase, 50 Hz AC plug point shall be provided in the interior of each cubicle with ON-OFF Switch for connection of hand lamps.

21.3 Switches and Fuses:

- 21.3.1 Each panel shall be provided with necessary arrangements for receiving, distributing, isolating and fusing of DC and AC supplies for various control, signalling, lighting and space heater circuits. The incoming and sub-circuits shall be separately provided with miniature circuit breaker / switchfuse units. Selection of the main and Sub-circuit fuse ratings shall be such as to ensure selective clearance of sub-circuit faults. Potential circuits for relaying and metering shall be protected by HRC fuses.
- 21.3.2 All fuses shall be of HRC cartridge type conforming to IS:9228 mounted on plug-in type fuse bases. Miniature circuit breakers with thermal protection and alarm contacts will also be accepted. All accessible live connection to fuse bases shall be adequately shrouded. Fuses shall have operation indicators for indicating blown fuse condition. Fuse carrier base shall have imprints of the fuse rating and voltage.

22.0 Bushings, Hollow Column Insulators, Support Insulators:

- 22.1 Bushings shall be manufactured and tested in accordance with IS:2099 & IEC- 60137 while hollow column insulators shall be manufactured and tested in accordance with IEC-62155/IS:5621. The support insulators shall be manufactured and tested as per IS:2544/IEC-60168 and IEC-60273. The insulators shall also conform to IEC-60815 as applicable. The bidder may also offer composite hollow insulators, conforming to IEC-61462.
- 22.2 Support insulators, bushings and hollow column insulators shall be manufactured from high quality porcelain. Porcelain used shall be homogeneous, free from laminations, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and shall be thoroughly vitrified tough and impervious to moisture.
- 22.3 Glazing of the porcelain shall be uniform brown in colour, free from blisters, burrs and similar other defects.
- 22.4 Support insulators/bushings/hollow column insulators shall be designed to

have ample insulation, mechanical strength and rigidity for the conditions under which they will be used.

- 22.5 When operating at normal rated voltage there shall be no electric discharge between the conductors and bushing which would cause corrosion or injury to conductors, insulators or supports by the formation of substances produced by chemical action. No radio interference shall be caused by the insulators/bushings when operating at the normal rated voltage.
- 22.6 Bushing porcelain shall be robust and capable of withstanding the internal pressures likely to occur in service. The design and location of clamps and the shape and the strength of the porcelain flange securing the bushing to the tank shall be such that there is no risk of fracture. All portions of the assembled porcelain enclosures and supports other than gaskets, which may in any way be exposed to the atmosphere shall be composed of completely non hygroscopic material such as metal or glazed porcelain.
- 22.7 All iron parts shall be hot dip galvanised and all joints shall be air tight. Surface of joints shall be trued up porcelain parts by grinding and metal parts by machining. Insulator/bushing design shall be such as to ensure a uniform compressive pressure on the joints.

22.8 Tests

In bushing, hollow column insulators and support insulators shall conform to type tests and shall be subjected to routine tests in accordance with IS: 2099 & IS:2544 & IS : 5621.

23.0 MOTORS

Motors shall be "Squirrel Cage" three phase induction motors of sufficient size capable of satisfactory operation for the application and duty as required for the driven equipment and shall be subjected to routine tests as per applicable standards. The motors shall be of approved make.

23.1 Enclosures

- a) Motors to be installed outdoor without enclosure shall have hose proof enclosure equivalent to IP-55 as per IS: 4691. For motors to be installed indoor i.e. inside a box, the motor enclosure, shall be dust proof equivalent to IP-44 as per IS: 4691.
- b) Two independent earthing points shall be provided on opposite sides of the motor for bolted connection of earthing conductor.
- c) Motors shall have drain plugs so located that they will drain water resulting from condensation or other causes from all pockets in the motor casing.
- d) Motors weighing more than 25 Kg. shall be provided with eyebolts, lugs or other means to facilitate lifting.

23.2 Operational Features

- a) Continuous motor rating (name plate rating) shall be at least ten (10) percent above the maximum load demand of the driven equipment at design duty point and the motor shall not be over loaded at any operating point of driven equipment that will rise in service.
- b) Motor shall be capable at giving rated output without reduction in

the expected life span when operated continuously in the system having the particulars as given in Clause 15.0 of this Section.

23.3 Starting Requirements:

- a) All induction motors shall be suitable for full voltage direct-on-line starting. These shall be capable of starting and accelerating to the rated speed alongwith the driven equipment without exceeding the acceptable winding temperature even when the supply voltage drops down to 80% of the rated voltage.
- b) Motors shall be capable of withstanding the electrodynamic stresses and heating imposed if it is started at a voltage of 110% of the rated value.
- c) The locked rotor current shall not exceed six (6) times the rated full load current for all motors, subject to tolerance as given in IS:325.
- d) Motors when started with the driven equipment imposing full starting torque under the supply voltage conditions specified under Clause 15.0 shall be capable of withstanding atleast two successive starts from cold condition at room temperature and one start from hot condition without injurious heating of winding. The motors shall also be suitable for three equally spread starts per hour under the above referred supply condition.
- e) The locked rotor withstand time under hot condition at 110% of rated voltage shall be more than starting time with the driven equipment of minimum permissible voltage by at least two seconds or 15% of the accelerating time whichever is greater. In case it is not possible to meet the above requirement, the Bidder shall offer centrifugal type speed switch mounted on the motor shaft which shall remain closed for speed lower than 20% and open for speeds above 20% of the rated speed. The speed switch shall be capable of withstanding 120% of the rated speed in either direction of rotation.

23.4 Running Requirements:

- a) The maximum permissible temperature rise over the ambient temperature of 50 degree C shall be within the limits specified in IS:325 (for 3 - phase induction motors) after adjustment due to increased ambient temperature specified.
- b) The double amplitude of motor vibration shall be within the limits specified in IS: 4729. Vibration shall also be within the limits specified by the relevant standard for the driven equipment when measured at the motor bearings.
- c) All the induction motors shall be capable of running at 80% of rated voltage for a period of 5 minutes with rated load commencing from hot condition.

23.5 TESTING AND COMMISSIONING

An indicative list of tests is given below. Contractor shall perform any additional test based on specialities of the items as per the field Q.P./Instructions of the equipment Contractor or Purchaser without any extra cost to the Purchaser. The Contractor shall arrange all instruments required for conducting these tests alongwith calibration certificates and shall furnish the list of instruments to the Purchaser for approval.

-
- (a) Insulation resistance.
 - (b) Phase sequence and proper direction of rotation.
 - (c) Any motor operating incorrectly shall be checked to determine the cause and the conditions corrected.
-

ANNEXURE-A

CORONA AND RADIO INTERFERENCE VOLTAGE (RIV) TEST

1. General

Unless otherwise stipulated, all equipment together with its associated connectors, where applicable, shall be tested for external corona (for 400kV & above) both by observing the voltage level for the extinction of visible corona under falling power frequency voltage and by measurement of radio interference voltage (RIV) for 132kV and above.

2. Test Levels:

The test voltage levels for measurement of external RIV and for corona extinction voltage are listed under the relevant clauses of the specification.

3. Test Methods for RIV:

- 3.1 RIV tests shall be made according to measuring circuit as per International Special-Committee on Radio Interference (CISPR) Publication 16-1(1993) Part -1. The measuring circuit shall preferably be tuned to frequency with 10% of 0.5 Mhz but other frequencies in the range of 0.5 MHz to 2 MHz may be used, the measuring frequency being recorded. The results shall be in microvolts.
- 3.2 Alternatively, RIV tests shall be in accordance with NEMA standard Publication No. 107-1964, except otherwise noted herein.
- 3.3 In measurement of, RIV, temporary additional external corona shielding may be provided. In measurements of RIV only standard fittings of identical type supplied with the equipment and a simulation of the connections as used in the actual installation will be permitted in the vicinity within 3.5 meters of terminals.
- 3.4 Ambient noise shall be measured before and after each series of tests to ensure that there is no variation in ambient noise level. If variation is present, the lowest ambient noise level will form basis for the measurements. RIV levels shall be measured at increasing and decreasing voltages of 85%, 100%, and 110% of the specified RIV test voltage for all equipment unless otherwise specified. The specified RIV test voltage for 765kV, 400 kV, 220 KV is listed in the detailed specification together with maximum permissible RIV level in microvolts.

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- 3.5 The metering instruments shall be as per CISPR recommendation or equivalent device so long as it has been used by other testing authorities.
- 3.6 The RIV measurement may be made with a noise meter. A calibration procedure of the frequency to which noise meter shall be tuned shall establish the ratio of voltage at the high voltage terminal to voltage read by noise meter.

4. Test Methods for Visible Corona

The purpose of this test is to determine the corona extinction voltage of apparatus, connectors etc. The test shall be carried out in the same manner as RIV test described above with the exception that RIV measurements are not required during test and a search technique shall be used near the onset and extinction voltage, when the test voltage is raised and lowered to determine their precise values. The test voltage shall be raised to 110% of specified corona extinction voltage and maintained there for five minutes. In case corona inception does not take place at 110%, test shall be stopped, otherwise test shall be continued and the voltage will then be decreased slowly until all visible corona disappears. The procedure shall be repeated at least 4 times with corona inception and extinction voltage recorded each time. The corona extinction voltage for purposes of determining compliance with the specification shall be the lowest of the four values at which visible corona (negative or positive polarity) disappears. Photographs with laboratory in complete darkness shall be taken under test conditions, at all voltage steps i.e. 85%, 100%, and 110%. Additional photographs shall be taken at corona inception and extinction voltages. At least two views shall be photographed in each case using Panchromatic film with an ASA daylight rating of 400 with an exposure of two minutes at a lens aperture of f/5.6 or equivalent. The photographic process shall be such that prints are available for inspection and comparison with conditions as determined from direct observation. Photographs shall be taken from above and below the level of connector so as to show corona on bushing, insulators and all parts of energised connectors. The photographs shall be framed such that test object essentially, fills the frame with no cut-off.

For recording purpose, modern devices utilizing UV recording methods such as image intensifier may also be used.

- 4.1 The test shall be recorded on each photograph. Additional photograph shall be taken from each camera position with lights on to show the relative position of test object to facilitate precise corona location from the photographic evidence.
- 4.2 In addition to photographs of the test object preferably four photographs shall be taken of the complete test assembly showing relative positions of all the test equipment and test objects. These four photographs shall be taken from four points equally spaced around the test arrangement to show its features from all sides. Drawings of the laboratory and test set up locations shall be provided to indicate camera positions and angles. The precise location of camera shall be approved by Purchaser's inspector, after determining the best camera locations by trial energisation of test object at a

voltage which results in corona.

- 4.3 The test to determine the visible corona extinction voltage need not be carried out simultaneously with test to determine RIV levels.
- 4.4 However, both test shall be carried out with the same test set up and as little time duration between tests as possible. No modification on treatment of the sample between tests will be allowed. Simultaneous RIV and visible corona extinction voltage testing may be permitted at the discretion of Purchaser's inspector if, in his opinion, it will not prejudice other test.

5. Test Records:

In addition to the information previously mentioned and the requirements specified as per CISPR or NEMA 107-1964 the following data shall be included in test report:

- a) Background noise before and after test.
- b) Detailed procedure of application of test voltage.
- c) Measurements of RIV levels expressed in micro volts at each level.
- d) Results and observations with regard to location and type of interference sources detected at each step.
- e) Test voltage shall be recorded when measured RIV passes through 100microvolts in each direction.
- f) Onset and extinction of visual corona for each of the four tests required shall be recorded.

ANNEXURE-B

SEISMIC WITHSTAND TEST PROCEDURE

The seismic withstanding test on the complete equipment (for 132kV and above) shall be carried out along with supporting structure.

The Bidder shall arrange to transport the structure from his Contractor's premises/POWERGRID sites for the purpose of seismic withstand test only. The seismic level specified shall be applied at the base of the structure. The accelerometers shall be provided at the Terminal Pad of the equipment and any other point as agreed by the Purchaser. The seismic test shall be carried out in all possible combinations of the equipment. The seismic test procedure shall be furnished for approval of the POWERGRID.

SECTION- IV

CHECK LIST FOR INFORMATION TO BE FURNISHED WITH OFFER RETURN THIS CHECKLIST AS PART OF THE OFFER DULY SIGNED

The offer may not be considered if the following information and this Checklist are not enclosed with the Offer.

BHEL ENQUIRY. NO:

BIDDER: OFFER REFERENCE:

A) TECHNICAL PARAMETERS-

S. No.	Parameters	Data	Confirmation	Remarks
1.	Applicable Standards	Latest IS -1554, 5831, 8130, 3975, 613, ASTM-D2843, ASTM-D2863, IEC60754, IEC60332, IS3961, IS 10418, SS4241475, NEMA WC-70, IEEE-383	Yes	
2.	Rated Voltage	1100V Grade	Yes	
2.A	Type & Category	FR & C1	Yes	
3.	Construction feature for PVC Control and Aux Power cable			
3.1	Material of Conductor for Control cables	Plain annealed, High conductivity, Stranded Copper Conductor Grade EC	Yes	
3.2	Material of Conductor for Power cables	Stranded Aluminium , Grade H2 (Electrolytic Grade)	Yes	
3.3	Conductor Insulation	Extruded PVC, Type-A	Yes	
3.4	Inner sheath	Extruded PVC, Type ST-1 as per IS 5831, Non-Hygroscopic, Fire Retardant.	Yes	
3.5	Armouring for Control Cables	Galvanized steel wire for Multi-core cables (as per IS 1554 Part I)	Yes	
3.6	Armouring for Aux Power Cables	Aluminium wire (H4 grade) for Single core And Galvanized Steel wire/strip for Multi-core cables As per Powergrid standard data sheet.	Yes	
3.7	Outer sheath	PVC extruded, FR, Type ST-1, C1 Category As per Powergrid standard data sheet.	Yes	

S. No	Parameters	Data	Confirmation	Remarks
4.	Construction feature for XLPE Aux Power cable			
4.1	Material of Conductor for Power cables	Stranded Aluminium grade H2(electrolytic Grade) Circular/ Sector shaped and compacted	Yes	
4.2	Conductor Insulation	Extruded XLPE as per IS 7098	Yes	
4.3	Inner sheath	Extruded PVC. Type ST-2 as per IS 5831, Non-Hygroscopic, Fire retardant.	Yes	
4.4	Armouring for XLPE Aux Power Cables	Aluminium wire (H4 grade) for Single core And Galvanized Steel round wire for Multi-core cables.	Yes	
4.5	Outer sheath	PVC extruded, FR, Type ST-2,(as per IS 5831) C1 category as per IS 1554. As per Powergrid standard data sheet.	Yes	
5.	FR properties of Outer sheath			
5.1	Minimum Oxygen index	29 as per IS 10810 part-58	Yes	
5.2	Minimum Temperature index	250°C	Yes	
6.	Allowable Tolerance on overall diameter	± 2mm	Yes	
8.	Standard Lengths of each Power & Control Cable (minimum cut lengths)	As per Section-I Clause-4	Yes	
9.	Tolerance on Cable Length per Drum.	+5% of the standard drum length.	Yes	
10.	Layer of water proof paper shall be applied to surface of the drums and over the outermost cable layer.	Yes	Yes	
11	Minimum bending radius for multicore cables	12 x D	Yes	
12	Core Identification / markings	By colour coding as per IS 1554 (part-I)/IS-7098 Part-I for the cables upto five (5) cores and for cables with more than five (5) cores by printing legible Hindu Arabic numerals on all cores as per Clause 10.3 of IS 1554 (part-I)	Yes	

S. No	Parameters	Data	Confirmation	Remarks
13	<i>The offered cables shall be designed to withstand conditions as per clause 1.2.1.2 & 1.2.1.3 of Section 2</i>	Yes	Yes	
14	The fillers and inner sheaths shall be of non-hygrosopic , fire retardant material, shall be softer than insulation and outer sheath shall be suitable for the operating temperature of the cable	Yes	Yes	
15	Technical Data Sheet (GTP) of the offered cables	The technical data sheet of the offered cables conforms to the standard technical data sheets attached as Section 4 of this technical Specification,	Yes	

B) TYPE TESTS

i)Whether type test reports of the following test conducted earlier on identical or similar material are available(test reports are of the test conducted not earlier than 10 (ten) years prior to the date of bid opening).
(YES)

C) TECHNICAL REQUIREMENT

Cl. No. 3.1 of Section-1 of TS (Applicable for PVC Control Cable)	ITEMS SUPPLIED TO	ORDER REFERENCE No. & DATE	ITEMS	QTY	ORDER FULLY EXECUTED YES/NO	STATUS, IF ORDER UNDER EXECUTION	Dispatch Instructions/ Material Receipt at site certificate/ Lorry Receipt details
The manufacturer (s) must have designed, manufactured, tested and supplied at least 100 Kms of 1.1kV grade PVC insulated control cables in one single contract.							
The manufacturer (s) must also have designed, manufactured, tested and supplied at least 1 km of 27C x 2.5 Sq.mm or higher size.							

Cl. No. 3.2 of Section-1 of TS (Applicable for PVC Power Cable)	ITEMS SUPPLIED TO	ORDER REFERENCE No. & DATE	ITEMS	QTY	ORDER FULLY EXECUTED YES/NO	STATUS, IF ORDER UNDER EXECUTION	Dispatch Instructions/ Material Receipt at site certificate/ Lorry Receipt details
The manufacturer (s) must have designed, manufactured, tested and supplied at least 100 Kms of 1.1kV grade PVC insulated power cables in one single contract.							
The manufacturer (s) must also have designed, manufactured, tested and supplied at least 1 km of 1C x 150 Sq.mm or higher size.							

Cl. No. 3.3 of Section-1 of TS (Applicable for XLPE Power Cable)	ITEMS SUPPLIED TO	ORDER REFERENCE No. & DATE	ITEMS	QTY	ORDER FULLY EXECUTED YES/NO	STATUS, IF ORDER UNDER EXECUTION	Dispatch Instructions/ Material Receipt at site certificate/ Lorry Receipt details
The manufacturer (s) must have designed, manufactured, tested and supplied at least 25 Kms of 1.1kV or higher grade XLPE insulated power cables in one single contract.							
The manufacturer must also have designed, manufactured, tested and supplied at least 1 km of 1C x 630 Sq.mm or higher size.							

Date:

**Signature of the authorized representative of Bidder
Company Seal**

SCHEDULE OF COMMERCIAL DEVIATION

TENDER ENQUIRY NO. -90Q2100260 dated 07.11.2020

The following are the deviations/ variations exception from the General Terms and Conditions:

SL.NO.	CLAUSE NO. OF GENERAL TERMS AND CONDITIONS	STATEMENT OF DEVIATION

In case, this schedule is not submitted, it will be presumed that the equipment /material to be supplied under this contract is deemed to be in compliance with the General Terms and Conditions.

If there is NIL deviation,even then the format to be filled as NIL DEVIATION.

Note : Continuation Sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.

All deviations must be mentioned in this format only. Deviation(s) to terms mentioned else where will not be considered.

Place: ë ë ë ë ë ë
Date : ë ë ë ë ë ë .

Signature of the authorised representative of

Bidder's name :ë ë ë ë ë ë ë ë ë ë ë ë
Designation:ë ë ë ë ë ë ë ë ë ë ë ë ..
Company Seal:ë ë ë ë ë ë ë ë ë ë ë ë

SCHEDULE OF TECHNICAL DEVIATION

TENDER ENQUIRY NO. -90Q2100260 dated 07.11.2020

The following are the deviations/ variations exception from the Technical Specifications:

SL.NO.	CLAUSE NO. OF GENERAL TERMS AND CONDITIONS	STATEMENT OF DEVIATION

In case, this schedule is not submitted, it will be presumed that the equipment /material to be supplied under this contract is deemed to be in compliance with the Technical Specifications,

If there is NIL deviation,even then the format to be filled as NIL DEVIATION.

Note : Continuation Sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.

All deviations must be mentioned in this format only. Deviation(s) to terms mentioned else where will not be considered.

Place: ě ě ě ě ě ě ě
Date : ě ě ě ě ě ě ě .

Signature of the authorised representative of

[illegible]