

**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. ĩ 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) ĩ 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 ĩUn-Priced BidĒ is also to be enclosed in Part-I Bid. b) Price Bid (Part-II) ĩ 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 "Lumpsum" 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

(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. -90G2100233 dated 05.10.2020

	S.No.	Description of Item	HSN Code	Unit	Quantity	Unit Price	Total Ex-Works (Rs.)	GST @__on Ex Works	Unit Freight & Insurance	Total Freight & Insurance	GST @__ on Freight & Insurance	TOTAL (FOR Destination) PRICE (Rs.)	M- FACTOR (For PVC calculation)
						Ex-works (Rs.)							
	1	SUPPLY- LOW VOLTAGE CABLE : XLPE INSULATED ALUMINIUM CONDUCTOR 3.5 CORE X 300SQMM ARMoured AUX POWER CABLE - FOR ITRASI		MTR	500								
	2	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 70SQMM ARMoured AUX POWER CABLE - FOR ITRASI		MTR	2600								
	3	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 35SQMM ARMoured AUX POWER CABLE - FOR ITRASI		MTR	500								
	4	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 16SQMM ARMoured AUX POWER CABLE - FOR ITRASI		MTR	4500								
	5	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR ITRASI		MTR	500								
	6	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 2 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR ITRASI		MTR	500								
	7	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 5 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR ITRASI		MTR	3600								
	8	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 7 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR ITRASI		MTR	500								
	9	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 10 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR ITRASI		MTR	2700								
	10	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 14 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR ITRASI		MTR	2100								
	11	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 19 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR ITRASI		MTR	3500								
	12	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 27 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR ITRASI		MTR	500								
	13	SUPPLY- LOW VOLTAGE CABLE : XLPE INSULATED ALUMINIUM CONDUCTOR 3.5 CORE X 300SQMM ARMoured AUX POWER CABLE - FOR JABALPUR		MTR	500								
	14	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 70SQMM ARMoured AUX POWER CABLE - FOR JABALPUR		MTR	500								

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

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15	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 35SQMM ARMoured AUX POWER CABLE - FOR JABALPUR	MTR	500								
16	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 16SQMM ARMoured AUX POWER CABLE - FOR JABALPUR	MTR	500								
17	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR JABALPUR	MTR	500								
18	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 2 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR JABALPUR	MTR	500								
19	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 5 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR JABALPUR	MTR	11500								
20	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 7 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR JABALPUR	MTR	1600								
21	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 10 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR JABALPUR	MTR	500								
22	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 14 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR JABALPUR	MTR	2000								
23	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 19 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR JABALPUR	MTR	500								
24	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 27 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR JABALPUR	MTR	3000								
25	SUPPLY- LOW VOLTAGE CABLE : XLPE INSULATED ALUMINIUM CONDUCTOR 3.5 CORE X 300SQMM ARMoured AUX POWER CABLE - FOR CHAMPA	MTR	500								
26	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 70SQMM ARMoured AUX POWER CABLE - FOR CHAMPA	MTR	1700								
27	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 35SQMM ARMoured AUX POWER CABLE - FOR CHAMPA	MTR	500								
28	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 16SQMM ARMoured AUX POWER CABLE - FOR CHAMPA	MTR	500								
29	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR CHAMPA	MTR	500								
30	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 2 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR CHAMPA	MTR	500								

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

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31	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 5 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR CHAMPA	MTR	1400								
32	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 7 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR CHAMPA	MTR	500								
33	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 10 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR CHAMPA	MTR	500								
34	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 14 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR CHAMPA	MTR	1500								
35	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 19 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR CHAMPA	MTR	500								
36	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 27 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR CHAMPA	MTR	1000								
37	SUPPLY- LOW VOLTAGE CABLE : XLPE INSULATED ALUMINIUM CONDUCTOR 3.5 CORE X 300SQMM ARMoured AUX POWER CABLE - FOR RAJGARH	MTR	500								
38	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 70SQMM ARMoured AUX POWER CABLE - FOR RAJGARH	MTR	1000								
39	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 35SQMM ARMoured AUX POWER CABLE - FOR RAJGARH	MTR	500								
40	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 16SQMM ARMoured AUX POWER CABLE - FOR RAJGARH	MTR	1300								
41	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR RAJGARH	MTR	500								
42	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 2 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR RAJGARH	MTR	500								
43	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 5 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR RAJGARH	MTR	1000								
44	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 7 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR RAJGARH	MTR	500								
45	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 10 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR RAJGARH	MTR	500								
46	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 14 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR RAJGARH	MTR	1000								

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

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ENQUIRY No. -90G2100233 dated 05.10.2020

47	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 19 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR RAJGARH	MTR	500								
48	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 27 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR RAJGARH	MTR	600								
49	SUPPLY- LOW VOLTAGE CABLE : XLPE INSULATED ALUMINIUM CONDUCTOR 3.5 CORE X 300SQMM ARMoured AUX POWER CABLE - FOR KHANDWA	MTR	600								
50	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 70SQMM ARMoured AUX POWER CABLE - FOR KHANDWA	MTR	2000								
51	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 35SQMM ARMoured AUX POWER CABLE - FOR KHANDWA	MTR	600								
52	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 16SQMM ARMoured AUX POWER CABLE - FOR KHANDWA	MTR	1000								
53	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR KHANDWA	MTR	500								
54	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 2 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR KHANDWA	MTR	500								
55	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 5 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR KHANDWA	MTR	3700								
56	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 7 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR KHANDWA	MTR	1500								
57	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 10 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR KHANDWA	MTR	500								
58	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 14 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR KHANDWA	MTR	3700								
59	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 19 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR KHANDWA	MTR	500								
60	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 27 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR KHANDWA	MTR	3300								
61	SUPPLY- LOW VOLTAGE CABLE : XLPE INSULATED ALUMINIUM CONDUCTOR 3.5 CORE X 300SQMM ARMoured AUX POWER CABLE - FOR AURANGABAD	MTR	1600								
62	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 70SQMM ARMoured AUX POWER CABLE - FOR AURANGABAD	MTR	4400								

As per
Annexure- 1
enclosed as per
IFFMA

(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. -90G2100233 dated 05.10.2020

63	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 35SQMM ARMoured AUX POWER CABLE - FOR AURANGABAD	MTR	500								
64	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 16SQMM ARMoured AUX POWER CABLE - FOR AURANGABAD	MTR	5400								
65	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR AURANGABAD	MTR	1700								
66	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 2 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR AURANGABAD	MTR	500								
67	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 5 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR AURANGABAD	MTR	3000								
68	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 7 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR AURANGABAD	MTR	1500								
69	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 10 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR AURANGABAD	MTR	800								
70	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 14 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR AURANGABAD	MTR	3700								
71	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 19 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR AURANGABAD	MTR	500								
72	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 27 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR AURANGABAD	MTR	2600								
73	SUPPLY- LOW VOLTAGE CABLE : XLPE INSULATED ALUMINIUM CONDUCTOR 3.5 CORE X 300SQMM ARMoured AUX POWER CABLE - FOR SLOARPUR	MTR	1000								
74	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 70SQMM ARMoured AUX POWER CABLE - FOR SLOARPUR	MTR	2400								
75	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 35SQMM ARMoured AUX POWER CABLE - FOR SLOARPUR	MTR	500								
76	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 16SQMM ARMoured AUX POWER CABLE - FOR SLOARPUR	MTR	3400								
77	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR SLOARPUR	MTR	1000								
78	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 2 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR SLOARPUR	MTR	500								

(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. -90G2100233 dated 05.10.2020

79	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 5 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR SLOARPUR	MTR	3000								
80	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 7 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR SLOARPUR	MTR	1500								
81	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 10 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR SLOARPUR	MTR	800								
82	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 14 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR SLOARPUR	MTR	4000								
83	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 19 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR SLOARPUR	MTR	500								
84	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 27 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR SLOARPUR	MTR	2500								
85	SUPPLY- LOW VOLTAGE CABLE : XLPE INSULATED ALUMINIUM CONDUCTOR 3.5 CORE X 300SQMM ARMoured AUX POWER CABLE - FOR WARDHA	MTR	600								
86	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 70SQMM ARMoured AUX POWER CABLE - FOR WARDHA	MTR	2400								
87	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 35SQMM ARMoured AUX POWER CABLE - FOR WARDHA	MTR	500								
88	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 16SQMM ARMoured AUX POWER CABLE - FOR WARDHA	MTR	3400								
89	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR WARDHA	MTR	1200								
90	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 2 CORE X 6SQMM ARMoured AUX POWER CABLE - FOR WARDHA	MTR	500								
91	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 5 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR WARDHA	MTR	3000								
92	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 7 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR WARDHA	MTR	1500								
93	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 10 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR WARDHA	MTR	800								
94	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 14 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR WARDHA	MTR	3700								

SCHEDULE OF PRICE (Part III) (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. -90G2100233 dated 05.10.2020

95	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 19 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR WARDHA		MTR	500							
96	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 27 CORE X 2.5SQMM ARMoured CONTROL CABLE - FOR WARDHA		MTR	2700							
	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 BUSINESS ENGINEERING MANAGEMENT

DOCUMENT No.	TB 408 510 011	Rev 00	Prepared	Checked	Approved
TYPE OF DOC.	TECHNICAL SPECIFICATION	NAME	YLK	SKS	AG
TITLE 1.1 kV Aux Power & Control Cables		SIGN			
		DATE	28.09.20	28.09.20	28.09.20
		GROUP	TBEM	W.O. No	
CUSTOMER	Power Grid Corporation of India Ltd.				
PROJECT	SUBSTATION PACKAGE SS-19				

CONTENTS		
Sec. No.	Description	No. of Sheets
1.	Scope, Specific Technical Requirement and Quantities	05
2.	Equipment Specification	12
3.	Project Details & General Technical Requirements	34
4.	Standard Technical Data Sheet	03
5.	Annexure-1&2	02

Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS			
Distribution			To Copies	TBTS	O/C	TBMM	TBQM	TBCM
				-	1	-	-	1

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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 the 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 Corporation of India Ltd.

Name of the Project : SUBSTATION PACKAGE SS-19

Refer Section – 2 : Equipment Specification.

Section – 3 : Project Details and General Specifications.

Section – 4: Standard Technical Data Sheet.

Section – 5 : Checklist

2.0 SPECIFIC TECHNICAL PARTICULARS

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.

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**	Round 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 insulated cable shall be of FR type conforming to IS: 7098 (Part-I) and its amendments.

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 aprovals , more stringent requirement has to be followed.

3.0 BILL OF QUANTITY:

The cable type, size and length requirement shall be as per tables below. *Total PO value may vary by $\pm 30\%$, however individual items can vary to any extent. Cable sizes shall be offered/manufactured in accordance with parameters specified in standard technical data sheet (Refer Section-4).*

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 . However, to avoid cable wastage and cable jointing at site, non-standard lengths of each size of power & control cable may also be acceptable subject to maximum length of 1000m (+5% tolerance) . 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%

3.1 PVC/XLPE insulated 1.1kV Aux Power Cables :

S. No.	Description	Unit	765KV SOLAPUR S/S	765KV WARDHA S/S	765KV AURANGABAD S/S	400KV KHANDWA S/S	400KV RAJGARH S/S	400KV CHAMPA S/S	400 & 220KV JABALPUR S/S	400/220KV V ITARSI S/S (GIS)
			Length	Length	Length	Length	Length	Length	Length	Length
1	3.5C x 300 sq mm XLPE/ Al. Aux Power Cable	m	1000	600	1600	600	500	500	500	500
2	3.5C x 70 sq mm PVC/ Al. Aux Power Cable	m	2400	2400	4400	2000	1000	1700	500	2600
3	3.5C x 35 sq mm PVC/Al. Aux Power Cable	m	500	500	500	600	500	500	500	500
4	4C x 16 sq mm PVC/ Al. Aux Power Cable	m	3400	3400	5400	1000	1300	500	500	4500
5	4C x 6 sq mm PVC/ Al. Aux Power Cable	m	1000	1200	1700	500	500	500	500	500
6	2C x 6 sq mm PVC/ Al. Aux Power Cable	m	500	500	500	500	500	500	500	500

3.2 PVC insulated 1.1kV Control Cables:

S. No.	Description	Unit	765KV SOLAPUR S/S	765KV WARDHA S/S	765KV AURANGABAD S/S	400KV KHANDWA S/S	400KV RAJGARH S/S	400KV CHAMPA S/S	400 & 220KV JABALPUR S/S	400/220KV V ITARSI S/S (GIS)
			Length	Length	Length	Length	Length	Length	Length	Length
1	5C x 2.5 sq mm PVC/ Cu. Control Cable	m	3000	3000	3000	3700	1000	1400	11500	3600
2	7C x 2.5 sq mm PVC/ Cu. Control Cable	m	1500	1500	1500	1500	500	500	1600	500
3	10C x 2.5 sq mm PVC/ Cu. Control Cable	m	800	800	800	500	500	500	500	2700
4	14C x 2.5 sq mm PVC/ Cu. Control Cable	m	4000	3700	3700	3700	1000	1500	2000	2100
5	19C x 2.5 sq mm PVC/ Cu. Control Cable	m	500	500	500	500	500	500	500	3500
6	27C x 2.5 sq mm PVC/ Cu. Control Cable	m	2500	2700	2600	3300	600	1000	3000	500

4.0 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.

5.0 DRAWINGS APPROVAL:

The successful bidder shall have to extend all possible support 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's approval. Submission of standard technical data sheets for these cables sizes are not required for approval. Only extension of the already approved drawings shall be given by Powergrid. In case of new vendor, then all the drawings/documents like GTP, drum & cross sectional drawing etc. shall be submitted for approval. Date of Submission of first lot of drawings will be counted only from the date of submission of reasonably correct drawings.

Approval of the following drawings will be required for technical clearance of manufacturing for each type of cable:

- GTP
- Cross sectional Drawing
- Drum drawing

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.

ANNEXURE- A

TECHNICAL PRE QUALIFICATION REQUIREMENT (TQR)

Name of Project :- SUBSTATION PACKAGE PGCIL SS-19

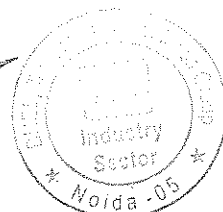
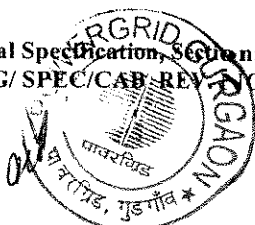
Name Of Item :- LT POWER & CONTROL CABLES

PQR Sr. No	PQR Description	Supporting Document to be attached
01	Qualifying Requirements for LT Control Cables: The manufacturers, whose PVC control cables are offered, should have designed, manufactured, tested and supplied in a single contract at least 100 Kms of 1.1 KV grade PVC insulated control cables as on the date of NOA (29-07-2019). Further the manufacturer should also have designed, manufactured, tested and supplied at least 1 km of 27C x 2.5 Sq.mm or higher size as on the date of NOA (29-07-2019).	PO Copy / Inspection/ dispatch clearance/LR details
02	Qualifying Requirement for LT PVC Power Cables The manufacturer, whose PVC Power Cables are offered, should have designed, manufactured, tested and supplied in a single contract atleast 100 Kms of 1.1 KV or higher grade PVC insulated power cables as on the date of NOA (29-07-2019). Further the manufacturer should also have designed, manufactured, tested and supplied at least 1 km of 1C x 150 Sq. mm or higher size as on the date of NOA (29-07-2019).	PO Copy/Inspection/ dispatch clearance/LR details
03	Qualifying Requirement for LT XLPE Power Cables The Manufacturer, whose XLPE Power cables are offered, should have designed,manufactured, tested and supplied in a single contract atleast 25 Kms of 1.1 KV or higher grade XLPE insulated power cables as on the date of NOA (29-07-2019). Further the manufacturer should also have designed, manufactured, tested and supplied at least 1 km of 1C x 630 Sq. mm or higher size as on the date of NOA (29-07-2019).	PO Copy/Inspection/ dispatch clearance/ LR details

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SECTION: POWER AND CONTROL CABLE**Table of contents**

SN	DESCRIPTION	PAGE NO.
1	POWER & CONTROL CABLES [FOR WORKING VOLTAGES UP TO AND INCLUDING 1100V]	2
2	HV POWER CABLES [FOR WORKING VOLTAGES FROM 3.3KV AND INCLUDING 33KV]	7
3	EHV XLPE POWER CABLES [FOR WORKING VOLTAGES FROM 66KV UP TO AND INCLUDING 500KV]	8
4	CABLE DRUMS	9
5	TYPE TESTS	10
	STANDARD TECHNICAL DATASHEETS [UP TO AND INCLUDING 1100V]	
	XPPE INSULATED POWER CABLE	Sheet 1 of 3
	PVC INSULATED POWER CABLE	Sheet 2 of 3
	PVC INSULATED CONTROL CABLE	Sheet 3 of 3



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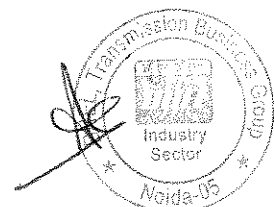
SECTION: POWER & CONTROL CABLES

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

CRITERIA FOR SELECTION OF POWER & CONTROL CABLES

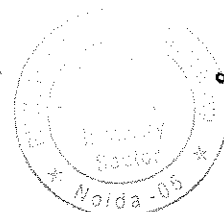
- 1.1.1. Aluminium conductor XLPE insulated armoured cables shall be used for main power supply purpose from LT Aux. Transformers to control room, between distribution boards, **supply to oil filtration units, DG supply to AC distribution board** and for supply for colony lighting from control room.
- 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



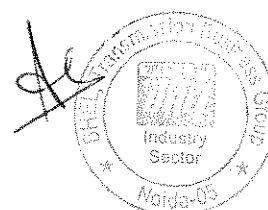
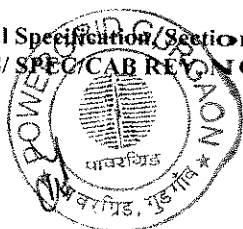
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5.	Main Switch Board	HVW pump LCP	1-3½C X 300 mm ²	XLPE
6.	Main Switch Board	Main Lighting distribution board	1-3½C X 300 mm ²	XLPE
7.	AC Distribution Board	D.G. Set AMF Panel	2-3½C X 300 mm ²	XLPE
8.	AC Distribution Board	Emergency Lighting distribution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



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- 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.***

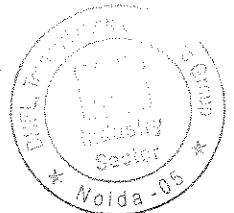
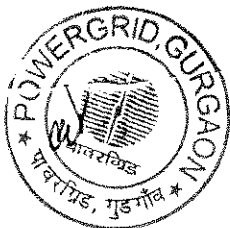


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1.2. TECHNICAL REQUIREMENTS

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-hygroscopic, 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)



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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.

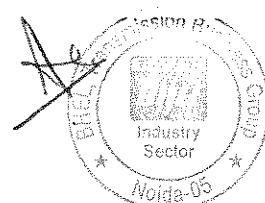
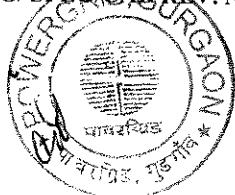
1.2.3. PVC Power Cables

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



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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**

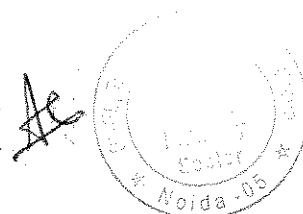
- (a) The HV cable of 1Cx185 mm² (Aluminium Conductor) or 1Cx120mm² (Copper Conductor) of voltage class as specified for 630 kVA **and 800 kVA** LT transformer for interconnecting 630kVA **and 800 kVA** LT transformer to the SEB feeder shall be, XLPE insulated, armoured cable conforming to IS 7098 (Part-II) 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



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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.

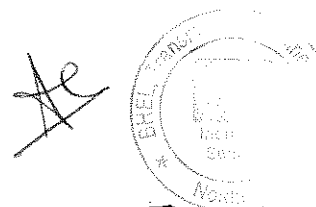
3. **EHV XLPE POWER CABLE [FOR WORKING VOLTAGES FROM 66 kV UP TO AND INCLUDING 500 kV]**

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.

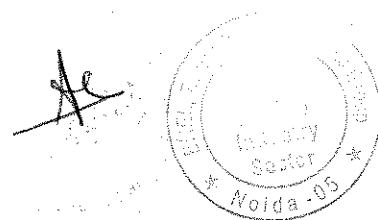


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- 3.4 The conductors screen (non-metallic semi-conductive) shall be extruded in a single one-time process to ensure homogeneity and absence of voids.
- 3.5 They shall be designed to withstand all mechanical, electrical and thermal stresses under steady 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.



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- 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-

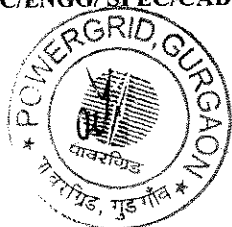
- a) Water absorption (gravimetric) test.
- b) Ageing in air oven
- c) Loss of mass in air oven
- d) Short time current test on power cables of sizes 240 sqmm and above on
 - i) Conductors.
 - ii) Armours.
- e) Test for armouring wires/strips.
- f) Oxygen and Temperature Index test.
- g) Flammability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

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

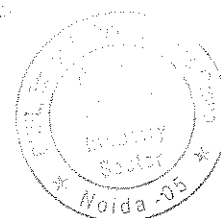


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- 5.3.1 Following type tests (on one size in a contract) as per IS: 1554 (Part 1) - 1988 including its amendments shall be carried out as a part of acceptance tests on PVC insulated power & control cables for working voltages up to and including 1100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



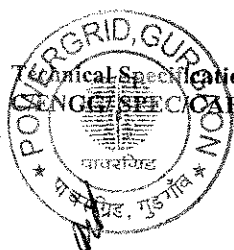
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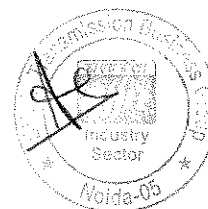
5.6 **TERMINATING & JOINTING ACCESSORIES-**

- 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.



Technical Specification, Section 11: Power and Control Cable
ENGG/SPEC/CAB REV. NO: 6

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SECTION-3

PROJECT DETAILS & GENERAL SPECIFICATION

SITE INFORMATION

SITE INFORMATION																																								
Sl	Particular	Details																																						
a)	Owner	POWERGRID																																						
b)	Customer	POWERGRID																																						
c)	Project Title	Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)																																						
d)	Location																																							
<table><tr><td>SL</td><td>Name of Substation</td><td>Name of State</td><td>Nearest Rail / Road Head</td></tr><tr><td>1</td><td>Solapur</td><td>Maharashtra</td><td>Solapur</td></tr><tr><td>2</td><td>Aurangabad</td><td>Maharashtra</td><td>Aurangabad</td></tr><tr><td>3</td><td>Wardha</td><td>Maharashtra</td><td>Wardha</td></tr><tr><td>4</td><td>Khandwa</td><td>M.P.</td><td>Khandwa</td></tr><tr><td>5</td><td>Rajgarh</td><td>M.P</td><td>Rajgarh</td></tr><tr><td>6</td><td>Champa</td><td>Chhattisgarh</td><td>Champa</td></tr><tr><td>7</td><td>Jabalpur</td><td>M.P.</td><td>Jabalpur</td></tr><tr><td>8</td><td>Itarsi</td><td>M.P.</td><td>Itarsi</td></tr></table>					SL	Name of Substation	Name of State	Nearest Rail / Road Head	1	Solapur	Maharashtra	Solapur	2	Aurangabad	Maharashtra	Aurangabad	3	Wardha	Maharashtra	Wardha	4	Khandwa	M.P.	Khandwa	5	Rajgarh	M.P	Rajgarh	6	Champa	Chhattisgarh	Champa	7	Jabalpur	M.P.	Jabalpur	8	Itarsi	M.P.	Itarsi
SL	Name of Substation	Name of State	Nearest Rail / Road Head																																					
1	Solapur	Maharashtra	Solapur																																					
2	Aurangabad	Maharashtra	Aurangabad																																					
3	Wardha	Maharashtra	Wardha																																					
4	Khandwa	M.P.	Khandwa																																					
5	Rajgarh	M.P	Rajgarh																																					
6	Champa	Chhattisgarh	Champa																																					
7	Jabalpur	M.P.	Jabalpur																																					
8	Itarsi	M.P.	Itarsi																																					
e)	Transport Facilities	As above																																						
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	1.2kW/sqmtr																											
h)	Atmospheric UV radiation	High																											
i)	Altitude above sea level	Less than 1000meter																											
j)	Pollution Severity	Normal 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	As per IS																											
	Average No. of thunderstorm days per annum	As per IS																											
	Main Electrical Parameters:																												
	Fault Levels:																												
	<table border="1"> <thead> <tr> <th>SL</th><th>Name of Substation</th><th>Fault level</th></tr> </thead> <tbody> <tr> <td>1</td><td>765kV Solapur</td><td>40kA for 1sec</td></tr> <tr> <td>2</td><td>765kV Aurangabad</td><td>40kA for 1sec</td></tr> <tr> <td>3</td><td>765kV Wardha</td><td>40kA for 1sec</td></tr> <tr> <td>4</td><td>400kV Khandwa</td><td>40kA for 1sec</td></tr> <tr> <td>5</td><td>400kV Rajgarh</td><td>40kA for 1sec</td></tr> <tr> <td>6</td><td>400kV Champa</td><td>50kA for 1sec</td></tr> <tr> <td>7</td><td>400/220kV Jabalpur</td><td>40kA for 1sec</td></tr> <tr> <td>8</td><td>400/220kV Itarsi</td><td>40kA for 1sec</td></tr> </tbody> </table>		SL	Name of Substation	Fault level	1	765kV Solapur	40kA for 1sec	2	765kV Aurangabad	40kA for 1sec	3	765kV Wardha	40kA for 1sec	4	400kV Khandwa	40kA for 1sec	5	400kV Rajgarh	40kA for 1sec	6	400kV Champa	50kA for 1sec	7	400/220kV Jabalpur	40kA for 1sec	8	400/220kV Itarsi	40kA for 1sec
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7	400/220kV Jabalpur	40kA for 1sec																											
8	400/220kV Itarsi	40kA for 1sec																											
	Minimum Creepage Distance	25mm/kV for all equipments i.e. BPI / Bushing, CB, Isolator, CT, CVT, LA, NCT etc. 31mm/kV. For string insulators																											

ENCLOSED – "SECTION-GTR (GENERAL TECHNICAL REQUIREMENT) REV.14"
FOR DETAILS OF GENERAL TECHNICAL SPECIFICATION.

PLEASE READ TERMINOLOGY AS FOLLOWS -

1. Read "GTR" as "Section-3 of technical specification"
2. Read "Powergrid" as "BHEL/Powergrid".
3. Read "Employer" as "Powergrid".
4. Read "Contractor" as bidder

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**1.0 FOREWORD**

The provisions under this section are intended to supplement requirements for the materials, equipments and services covered under other sections of tender documents and are not exclusive.

2.0 GENERAL REQUIREMENT

2.1 The contractor shall furnish catalogues, engineering data, technical information, design documents, drawings etc., fully in conformity with the technical specification during detailed engineering.

2.2 It is recognised that the Contractor may have standardised on the use of certain components, materials, processes or procedures different from those specified herein. Alternate proposals offering similar equipment based on the manufacturer's standard practice will also be considered provided such proposals meet the specified designs, standard and performance requirements and are acceptable to Employer.

2.3 Wherever a material or article is specified or defined 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.

2.4 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 though they may not have been specifically detailed in the Technical Specifications unless included in the list of exclusions. Materials and components which are minor in nature and incidental to the requirement but not specifically stated in the specification and bid price schedule, which are necessary for commissioning and satisfactory operation of the switchyard/ substation unless specifically excluded shall be deemed to be included in the scope of the specification and shall be supplied without any extra cost. All similar standard components/parts of similar standard equipment provided, shall be inter-changeable with one another.

~~2.5 The Contractor shall also be responsible for the overall co-ordination with internal /external agencies; Supplier of Employer's supplied equipments, project management, training of Employer's manpower, loading, unloading, handling, insurance, moving to final destination for successful erection, testing and commissioning of the substation /switchyard.~~

~~2.6 The bidder shall be responsible for safety of human and equipment during the working. It will be the responsibility of the Contractor to co-ordinate and obtain Electrical Inspector's clearance before commissioning. Any additional items, modification due to observation of such statutory authorities shall be provided by the Contractor at no extra cost to the Employer.~~

3.0 STANDARDS

3.1 The works covered by the specification shall be designed, engineered, manufactured, built, tested and commissioned in accordance with the Acts, Rules, Laws and Regulations of India.

3.2 The equipment to be furnished under this specification shall conform to latest issue with all amendments (as on the originally scheduled date of bid opening) of standard specified under Annexure-C of this section, unless specifically mentioned in the specification.

3.3 The Bidder shall note that standards mentioned in the specification are not mutually exclusive or complete in themselves, but intended to compliment each other.

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)

- 3.4 The Contractor 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.
- 3.5 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.
- 3.6 Other internationally accepted standards which ensure equivalent or better performance than that specified in the standards specified under Annexure-C/ individual sections for various equipments shall also, be accepted, however the salient points of difference shall be clearly brought out during detailed engineering along with English language version of such standard. The equipment conforming to standards other than specified under Annexure-C/individual sections for various equipments shall be subject to Employer's approval.

4.0 SERVICES TO BE PERFORMED BY THE EQUIPMENT BEING FURNISHED

- 4.1 The 800kV and 420kV system is being designed to limit the switching surge over voltage of 1.9 p.u. and 2.5 p.u., respectively and the power frequency over voltage of 1.4 p.u. and 1.5 p.u., respectively. In case of the 420kV system, the initial value of the temporary overvoltages could be 2.0 p.u. for 1-2 cycles. The equipment furnished under this specification shall perform all its functions and operate satisfactorily without showing undue strain, restrike etc under such over voltage conditions.
- 4.2 All equipments shall also perform satisfactorily under various other electrical, electromechanical and meteorological conditions of the site of installation.
- 4.3 All equipment shall be able to withstand all external and internal mechanical, thermal and electromechanical forces due to various factors like wind load, temperature variation, ice & snow, (wherever applicable) short circuit etc for the equipment.
- 4.4 The bidder shall design terminal connectors of the equipment taking into account various forces that are required to withstand.
- 4.5 The equipment shall also comply to the following:
- a) To facilitate erection of equipment, all items to be assembled at site shall be "match marked".
 - b) All piping, if any between equipment control cabinet/operating mechanism to marshalling box of the equipment, shall bear proper identification to facilitate the connection at site.

4.6 System Parameter

765kV, 400kV & 220kV System

SL No	Description of parameters	765kV System	400kV System	220kV System
1.	System operating voltage	765kV	400kV	220kV
2.	Maximum operating voltage of the system (rms)	800kV	420kV	245kV
3.	Rated frequency	50HZ	50Hz	50Hz
4.	No. of phase	3	3	3
5.	Rated Insulation levels			

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SL No	Description of parameters	765kV System	400kV System	220kV System
i)	Full wave impulse withstand voltage (1.2/50 microsec.)	2100kVp	1550kVp	1050 kVp
ii)	Switching impulse withstand voltage (250/2500 micro sec.) dry and wet	1550kVp	1050kVp	-
iii)	One minute power frequency dry withstand voltage (rms)	830kV	630kV	-
iv)	One minute power frequency dry and wet withstand voltage (rms)	-	-	460kV
6.	Corona extinction voltage	508 kV	320kV	-
7.	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz	2500 μV at 508 kV rms	1000 μV at 266kV rms	1000 μV at 156kV rms
8.	Minimum creepage distance - for Equipment other than Insulator string	20000 mm (24800 mm for coastal area)	10500 mm (13020 mm for coastal area)	6125 mm (7595 mm for coastal area)
	Minimum creepage distance - for Insulator String	As specified in Section-Switchyard Erection		
9.	Min. clearances			
i.	Phase to phase	7600mm (for conductor-conductor configuration) 9400mm (for rod-conductor configuration)	4000mm (for conductor-conductor configuration) 4200mm (for rod -conductor configuration)	2100 mm
ii.	Phase to earth	4900mm (for conductor-structure) 6400mm (for rod- structure)	3500 mm	2100 mm
iii)	Sectional clearances	10300 mm	6500 mm	5000 mm
10.	Rated short circuit current for 1 sec. duration	40kA/50kA (as applicable)	40kA/50kA/ 63 kA (as applicable)	40kA/ 50kA(as applicable)
11.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**132kV, 66kV, 33kV & 11kV System**

SL No	Description of parameters	132 kV System	66kV System	33 kV System	11kV System
1.	System operating voltage	132kV	66kV	33kV	11kV
2.	Maximum operating voltage of the system(rms)	145kV	72.5kV	36kV	12kV
3.	Rated frequency	50Hz	50Hz	50Hz	50Hz
4.	No. of phase	3	3	3	3
5.	Rated Insulation levels				
i)	Full wave impulse withstand voltage (1.2/50 microsec.)	650 kVp	325 kVp	170 kVp	75 kVp
ii)	One minute power frequency dry and wet withstand voltage (rms)	275kV	140kV	70kV	28kV
6.	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz	500 μ V at 92kV rms	-	-	-
7.	Minimum creepage distance	3625 mm (4495mm for coastal area)	1813 mm (2248mm for coastal area)	900 mm (1116mm for coastal area)	300 mm (372mm for coastal area)
8.	Min. clearances				
i.	Phase to phase	1300 mm	750 mm	320 mm	280 mm
ii.	Phase to earth	1300 mm	630 mm	320 mm	140 mm
iii.	Sectional clearances	4000 mm	3000 mm	2800 mm	2800 mm
9.	Rated short circuit current	40kA/ 31.5 kA (as applicable) for 1 sec	31.5 kA for 3 sec	25 kA for 3 sec	25 kA for 3 sec
10.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed	Effectively earthed

Notes:

1. The above parameters are applicable for installations up to an altitude of 1000m above mean sea level. For altitude exceeding 1000m, necessary altitude correction factor shall be applicable as per relevant IEC.
2. The insulation and RIV levels of the equipments shall be as per values given in the Technical Specification of respective equipment.
3. Corona and radio interference voltage test and seismic withstand test procedures for equipments shall be in line with the procedure given at **Annexure-A** and **Annexure-B** respectively.

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**5.0 ENGINEERING DATA AND DRAWINGS**

5.1 ~~The list of drawings/documents which are to be submitted to the Employer is enclosed in **Annexure-E**. In case any additional drawings/documents are required, the same shall also be submitted during execution of the contract.~~

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 Employer. 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 Employer, 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 Employer 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 Employer 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 Employer 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.

5.5 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 Employer. Approval of Contractor's drawing or work by the Employer shall not relieve the contractor of any of his responsibilities and liabilities under the Contract.

5.6 All engineering data submitted by the Contractor after final process including review and approval by the Employer 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 Employer in Writing.

5.7 ~~Approval Procedure~~

~~The following schedule shall be followed generally for approval and for providing final documentation.~~

- | | | |
|----|--|-------------------------------|
| i) | Approval/comments/
by Employer on initial
submission | As per L2 schedule |
|----|--|-------------------------------|

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- 5.8 The ~~list of major drawings/documents~~ to be approved to qualify for second advance as per Section SCC, shall be as per ~~Annexure D.~~

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 In case where the equipment, materials or components are indicated in the specification as “similar” to any special standard, the Employer shall decide upon the question of similarity. When required by the specification or when required by the Employer 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 is to be understood that the cost as well as the time delay associated with the rejection shall be borne by the Contractor.
- 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 Employer.
- 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.
- 6.1.6 The Contractor 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 Contractor shall apply all operational lubricants to the equipment installed by him.

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- 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. If such is the case, he shall declare in the proposal, where such oil or grease is available. He shall help Employer in establishing equivalent Indian make and Indian Contractor. The same shall be applicable to other consumables too.

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.

6.2.2 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.

6.2.4 Degree of Protection

The enclosures of the Control Cabinets, Junction boxes and Marshalling Boxes, panels etc. to be installed shall comply with following 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 IP-55 or higher degree of protection test, shall be submitted for approval.

6.3 RATING PLATES, NAME PLATES AND LABELS

- 6.3.1 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

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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 Employer. The rating plate of each equipment shall be according to IEC requirement.

- 6.3.2 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 operation, shall be furnished by the Contractor unless specifically excluded under the exclusions in these specifications and documents.~~

7.0 DESIGN IMPROVEMENTS / COORDINATION

- 7.1 The bidder shall offer the equipment meeting the requirement of the technical specification. However, the Employer or the Contractor may propose changes in the specification of the equipment or quality thereof and if the contractor & Employer 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 Contractor 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 Contractor has to coordinate designs and terminations with the agencies (if any) who are Consultants/Contractor for the Employer. The names of agencies shall be intimated to the successful bidders.
- 7.5 The Contractor will be called upon to attend design co-ordination meetings with the Engineer, other Contractor's and the Consultants of the Employer (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 Contractor's Works or at his Sub-Contractor's premises or at the Employer's site or at any other place of Work as applicable, are in accordance with the specifications, the Contractor shall ensure suitable quality assurance programme to control such activities at all points necessary. A quality assurance programme of the Contractor shall be in line with ISO requirements & shall generally cover the following:
- a) The organisation structure for the management and implementation of the proposed quality assurance programme.

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- b) System for Document and Data Control.
- c) Qualification and Experience data of 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, fabrication and assembly control.
- f) System for Control of non-conforming products including deviation dispositioning, if any and system for corrective and preventive actions based on the feedback received from the Customers and also internally documented system for Customer complaints.
- g) Inspection and test procedure both for manufacture and field activities.
- h) System for Control of calibration of testing and measuring equipment and the indication of calibration status on the instruments.
- i) System for indication and appraisal of inspection status.
- j) System of Internal Quality Audits, Management review and initiation of corrective and Preventive actions based on the above.
- k) System for authorising release of manufactured product to the Employer.
- l) System for maintenance of records.
- m) System for handling, storage and delivery.
- n) A quality plan detailing out the specific quality control measures and procedure adopted for controlling the quality characteristics relevant to each item of equipment furnished and /or service rendered.
- o) System for various field activities i.e. unloading, receipt at site, proper storage, erection, testing and commissioning of various equipment and maintenance of records. In this regard, the Employer has already prepared Standard Field Quality Plan for transmission line/substation equipments as applicable, Civil/erection Works which is required to be followed for associated works.

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

8.2 Quality Assurance Documents

The Contractor shall ensure availability of the following Quality Assurance Documents:

- i) All Non-Destructive Examination procedures, stress relief and weld repair procedure actually used during fabrication, and reports including radiography interpretation reports.
- ii) Welder and welding operator qualification certificates.
- iii) Welder's identification list, welding operator's qualification procedure and welding identification symbols.
- iv) Raw Material test reports on components as specified by the specification and in the quality plan.

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- v) The Manufacturing Quality Plan(MQP) indicating Customer Inspection Points (CIPs) at various stages of manufacturing and methods used to verify that the inspection and testing points in the quality plan were performed satisfactorily.
- vi) Factory test results for testing required as per applicable quality plan/technical specifications/GTP/Drawings etc.
- vii) Stress relief time temperature charts/oil impregnation time temperature charts, wherever applicable.

8.3 INSPECTION, TESTING & INSPECTION CERTIFICATE

- 8.3.1 Contractor shall procure bought out items from sub-vendors as per the list in "Compendium of Vendors" available on POWERGRID web-site www.powergridindia.com after ensuring compliance to the requirements/conditions mentioned therein. Contractor shall explore first the possibilities of procuring the bought out items from POWERGRID approved existing vendors. In case of their unavailability / non-response, Contractor may approach POWERGRID for additional sub-vendor approval. ~~In that case, the assessment report of proposed sub vendor by Contractor along with the enclosures as per Annexure-F shall be submitted within 60 days of the award.~~ The proposal shall be reviewed and approval will be accorded based on the verification of the document submitted and/or after the physical assessment of the works as the case may be. The physical assessment conducted by POWERGRID, if required, shall be on chargeable basis. Charges shall be as per the POWERGRID norms prevailing at that time, which shall be intimated by POWERGRID separately. If proposal for sub-vendor is submitted after 60 days, the Contractor's proposal normally will not be considered for current LOA. However, POWERGRID may process the case for developing more vendors for referred items, if found relevant. In all cases, It is the responsibility of the Contractor that Project activities do not suffer on account of delay in approval/non approval of a new sub-vendor.

The responsibility and the basis of inspection for various items & equipment is placed at **Annexure-G** along with the requirement of MQP (Manufacturing Quality Plan), ITP(Inspection & Test Plan), FAT(Factory Acceptance Test) which should be valid & POWERGRID approved and Level of inspection envisaged against each item.

Contractor shall ensure that order for items where MQP/ITP/FAT is required will be placed only on vendors having valid MQP/ITP/FAT and where the supplier's MQP/ITP/FAT is either not valid or has not been approved by POWERGRID, MQP shall be generally submitted as per POWERGRID format before placing order.

Items not covered under MQP/ITP/FAT shall be offered for inspection as per POWERGRID LOA/technical Specifications/POWERGRID approved data sheets/ POWERGRID approved drawings and relevant Indian/International standards.

Inspection Levels: For implementation of projects in a time bound manner and to avoid any delay in deputation of POWERGRID or its authorized representative, involvement of POWERGRID for inspection of various items / equipment will be based on the level below:

- Level -I:** Contractor to raise all inspection calls and review the report of tests carried out by the manufacturer, on his own, as per applicable standards/ POWERGRID specification, and submit to concerned POWERGRID inspection office/Inspection Engineer. CIP/MICC will be issued by POWERGRID based on review of test reports/certificates of manufacturers.

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Level – II: Contractor to raise all inspection calls and carry out the inspection on behalf of POWERGRID on the proposed date of inspection as per applicable standards/specification. However, in case POWERGRID wishes to associate itself during inspection, the same would be intimated to Contractor and CIP/MICC will be issued by POWERGRID. Else, Contractor would submit their test reports/certificates to POWERGRID. CIP/MICC will be issued by POWERGRID based on review of test reports/certificates.

Level - III: Contractor to raise inspection calls for both, stage (as applicable) & final inspection and carry out the stage inspections (if applicable) on behalf of POWERGRID on the proposed date of inspection as per applicable standards/specification. However, in case POWERGRID wishes to associate itself during stage inspection, the same would be intimated to Contractor and CIP will be issued by POWERGRID. Else, Contractor would submit the test reports / certificates of stage inspection after their own review and CIP will be issued by POWERGRID based on review of test reports / certificates. Final inspection will be carried out by POWERGRID and CIP/MICC will be issued by POWERGRID.

Level – IV: Contractor to raise inspection calls for both, stage (as applicable) & final inspections. POWERGRID will carry out the inspection for both stage & final inspection as per applicable standards/specification and CIP/MICC will be issued by POWERGRID.

- 8.3.2 Contractor shall ensure that to implement the above inspection levels, particularly for the quality control and inspection at sub-vendor's works, they would depute sufficient qualified & experienced manpower in their Quality Control and Inspection department. Further, to assure quality of construction, Contractor shall have a separate workforce having appropriate qualification & experience and deploy suitable tools and plant for maintaining quality requirement during construction in line with applicable Field Quality Plan (FQP).
- 8.3.3 The Employer, his duly authorised representative and/or outside inspection agency acting on behalf of the Employer shall have at all reasonable times access to the Contractor's premises or Works and shall have the power at all reasonable times to ensure that proper Quality Management practices / norms are adhered to, inspect and examine the materials & workmanship of the Works, to carry out Quality/Surveillance Audit during manufacture or erection and if part of the Works is being manufactured or assembled at other premises or works. The Contractor shall obtain for the Employer 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. The item/equipment, if found unsatisfactory with respect to workmanship or material is liable to be rejected. The observations for improvements during product/ process inspection by POWERGRID shall be recorded in Quality Improvement Register (available & maintained at works) for review & timely compliance of observations.
- 8.3.4 Contractor shall submit inspection calls over internet through POWERGRID website. The required vendor code and password to enable raising inspection call will be furnished to the main Contractor within 30 days of award of contract on submission of documents by Contractor. After raising the inspection calls, Contractor shall then proceed as per the message of that particular call which is available on the message board.
- 8.3.5 The Employer reserves the right to witness any or all type, acceptance and routine tests specified for which the Contractor shall give the Employer/Inspector Twenty one (21) days written notice of any material being ready for testing for each stage of

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testing as identified in the approved quality plan as customer inspection point(CIP) for indigenous inspections. All inspection calls for overseas material shall be given at least forty five (45) days in advance. Such tests shall be to the Contractor's account except for the expenses of the Inspection Engineer. The Employer/inspector, unless witnessing of the tests is waived by Employer, will attend such tests within Twenty one (21) days of the date of which the equipment is notified as being ready for test/inspection, failing which the Contractor may proceed with the test which shall be deemed to have been made in the Inspector's presence and he shall forthwith forward to the Inspector three copies of tests, duly certified. Contractor shall ensure, before giving notice for type test, that all drawings and quality plans have been got approved. The equipment shall be dispatched to site only after approval of Routine and Acceptance test results and Issuance of Dispatch Clearance in writing by the Employer. CIP/Material Inspection clearance certificate (MICC) shall be issued by the Employer after inspection of the equipment or review of test reports as applicable. Employer may waive off the presence of Employer's inspecting engineer. In that case test will be carried out as per approved QP and test certificate will be furnished by the supplier for approval. CIP/MICC will be issued only after review and approval of the test reports.

- 8.3.6 Contractor shall generally offer material for inspection as per supply bar chart approved by POWERGRID and not before 30 days from schedule indicated in the bar chart. In case Contractor offers material(s) for inspection prior to 30 days from the scheduled date with necessary approval of POWERGRID, POWERGRID shall inspect the material and issue CIP only. However, in such an exceptional case, MICC shall be issued only as per provision of original / revised approved supply schedule.
- 8.3.7 Contractor shall minimize the number of inspection calls by offering optimum quantities in each inspection call at the respective manufacturer's works.
- 8.3.8 Contractor shall inspect the material themselves and only after they are fully convinced about the Quality, they shall offer the material for POWERGRID inspection and shall also ensure that relevant portion of LOA/NOA, approved drawing and data sheets along with applicable Quality Plans are available at the works of Contractor or their Sub-vendor before the material is offered for inspection.
- 8.3.9 Contractor shall ensure that material which has been cleared for dispatch after inspection will be dispatched within 30 days in case of domestic supplies and within 60 days in case of Off-shore supplies from the date of issuance of CIP. Material which is not dispatched within stipulated time as above will be reoffered for POWERGRID inspection or specific approval of POWERGRID QA&I shall be obtained for delayed dispatch.
- 8.3.10 The Employer or IE shall give notice in writing to the Contractor, of any objection either to conformance to any drawings or to 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 Employer/Inspection Engineer giving reasons therein, that no modifications are necessary to comply with the Contract.
- 8.3.11 All Test Reports and documents to be submitted in English during final inspection of equipment by POWERGRID or as and when required for submission.
- 8.3.12 When the factory tests have been completed at the Contractor's or Sub-Contractor's works, the Employer/Inspection Engineer(IE) shall issue a certificate to this effect within fifteen (15) days after completion of tests & submission of documents by Contractor/manufacture but if the tests are not witnessed by the Employer/IE, the certificate shall be issued within fifteen (15) days of receipt of the Contractor's Test certificate by the Employer/IE. Contractor shall, on completion of all tests, submit test

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reports within Ten (10) days to POWERGRID IE. Failure of the Employer/IE 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 Employer to accept the equipment should, it, on further tests after erection, be found not to comply with the Contract.

- 8.3.13 In all cases, where the Contract provides for tests whether at the premises or 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 Employer/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 Employer/Inspection Engineer or to his authorised representative to accomplish testing.
- 8.3.14 The inspection and acceptance by Employer 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, or if such equipment is found to be defective at a later stage.
- 8.3.15 The Employer 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.
- 8.3.16 The Employer reserves the right for getting any additional field tests conducted on the completely assembled equipment at site to satisfy that material complies with specifications.
- 8.3.17 Rework/ Re-engineering, if any, on any item/equipment shall be carried out only after mutual discussions and in accordance with mutually agreed procedure. Contractor shall submit Joint Inspection Report of equipments under Re-Work/Re-Engineering alongwith procedure for the same to POWERGRID for approval, before taking up the Re-Work/Re-Engineering, failing which POWERGRID reserves the right to reject the equipment.
- 8.3.18 Contractor may establish a field test Laboratory to execute Civil Construction testing requirements at site with the condition that all testing equipment shall be calibrated from POWERGRID approved accredited Testing laboratories, with calibration certificates kept available at site and all testing personnel employed in the Field Testing Laboratories to be qualified and experienced Engineers or testing to be carried out at POWERGRID approved Third Party Laboratories.
- 8.3.19 Contractor shall ensure that all possible steps are taken to avoid damages to the equipment during transport, storage and erection.
- 8.3.20 Contractor shall implement additional stringent quality checks and preparation during installation of GIS at site (if applicable) as per POWERGRID approved guidelines/Technical specifications.
- 8.3.21 Contractor shall ensure commissioning of all CSDs along with Circuit Breakers wherever applicable.
- 8.3.22 ~~For EHV transformers/reactors:~~**
~~Insulation oil shall be as per POWERGRID Technical specifications and same grade shall be used for impregnation of the active part & testing at the works of Transformer/Reactor Manufacturer and as well as for filling the Transformer/Reactors at site. Contractor to ensure that windings for Transformer/Reactors are made in air-conditioned environment. Core-coil assembly shall be performed in positive~~

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pressurized dust controlled environment. Dust measurements shall be monitored regularly at Transformer / Reactor Manufacturer works. Contractor shall ensure that respective civil foundations & Fire walls for Transformer/Reactors units to be commissioned, shall be made ready at concerned sites before receipt of Transformer/Reactors units. All the requisite material for Neutral & Delta Bus formation required for charging of complete bank of 765KV class 1-ph Transformer/Reactor units shall be made available at the concerned sites before receipt of the Transformer/Reactor units at site.

- 8.3.23 The Employer reserves the right to increase or decrease their involvement in inspections at Contractor's Works or at his Sub-Contractor's premises or at the Employer's site or at any other place of Work based on performance of Contractor/sub-Contractor.

9.0 TYPE TESTING & CLEARANCE 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 Contractor alongwith equipment / material drawings. However, type test reports of similar equipments/ material already accepted in POWERGRID shall be applicable for all projects 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.

Unless otherwise specified elsewhere, the type test reports submitted shall be of the tests conducted within last 10 (ten) years from the date of NOA. In case the test reports are of the test conducted earlier than 10 (ten) years from the date of NOA, the contractor shall repeat these test(s) at no extra cost to the Employer.

Further, in the event of any discrepancy in the test reports i.e. any test report not acceptable due to any design/manufacturing changes 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 Employer.

The Contractor shall intimate the Employer the detailed program about the type tests atleast two (2) weeks in advance in case of domestic supplies & six (6) weeks in advance in case of foreign supplies.

- 9.3 The Employer intends to repeat those type tests which are indicated in the price schedule and the same 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. The Employer 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.

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- 9.4 The Employer reserves the right to witness any or all the type tests. The Employer shall bear all expenses for deputation of Employer's representative(s) for witnessing the type tests.
- 9.5 **The list of makes of various items, for which Type test reports are not required to be submitted are specified in Compendium of Vendors (COV).**
- 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 Employer 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 Employer 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 arranged by the Contractor at his own cost.
- 10.2.3 The specific tests requirement on equipment have been brought out in the respective chapters of the technical specification.
- 10.3.4 **PRECOMMISSIONING, COMMISSIONING, TRIAL-RUN & COMPLETION**
- As soon as the Facilities covered by these specifications are physically completed in all respects, the Pre commissioning, Commissioning, Trial-run and Completion of the Facilities, as mentioned below, shall be attained in accordance with the procedure given in the Conditions of Contract, Vol.-I of the Bidding Documents.
- (i) Pre commissioning : As per relevant Sections
- (ii) Commissioning : Charging of the Facilities at rated voltage.
- Further, wherever appearing in these specifications, the words-'commissioning checks', 'installation checks', 'site tests', 'performance guarantee tests for fire protection system', are to be considered as 'pre commissioning checks'.
- (iii) Trial-run : Operation of the Facilities or any part thereof by the Contractor immediately after the Commissioning for a continuous period of 72 (Seventy two) hours continuously. In case of interruption due to problem/failure in the respective equipment, the contractor shall rectify the problem and after rectification, continuous 72 (Seventy two) hours period start after such rectification.
- (iv) Completion : Upon successful completion of Trial-run.
- 'Guarantee Test(s)' and/or 'Functional Guarantees' are applicable only for Substation Automation System as specified in Section-'Substation Automation System.'
- 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.

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**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 Employer, the Contractor shall also submit packing details/associated drawing for any equipment/material under his scope of supply, to facilitate the Employer 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. Employer 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. 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 **and 900 gm/sq.m for coastal area (30km from sea shore approximately) or as specified in Section-Project.** 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 **and 900 gm/sq.m for coastal area as specified in Section-Project.**
- 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 or alternate approved treatment shall be provided to avoid formation of white rust after hot dip galvanization.
- 12.2.4 The galvanized steel shall be subjected to four numbers of 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

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- 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 touch-up zinc rich paint at site shall be allowed with approval of Engineer Incharge.

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 swaf 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 be matching with the existing panels in case of extension of a substation. Each coat of 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 contractor 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 during detailed engineering for Employer'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
<u>Fire Protection System</u>			
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	
<u>Air Conditioning Plant</u>			
5	Refrigerant gas pipeline – at compressor suction	Canary Yellow	-

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S.No.	PIPE LINE	Base colour	Band colour
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

The direction of flow shall be marked by → (arrow) in black colour.



Base Colour Direction of flow Band Colour

- 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. For stainless steel surfaces, no painting is envisaged.

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 Employer 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 must ensure that the open storage platform (as per Drawing No. C-ENGG-CVL-STD-PLATFORM-01, Rev.0) is constructed for storage of outdoor type equipment/material prior to commencement of delivery at site. Outdoor equipment shall be stored on open storage platform, properly covered with waterproof and dustproof covers to protect them from water seepage and moisture ingress.

However, all indoor equipments including control & protection panels, Communication equipments and operating mechanism boxes etc. of outdoor equipments shall be stored indoors.

Storage of equipment on top of another one is not permitted if the wooden packing is used and there is possibility of equipment/packing damage. 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 Employer. 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

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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 Contractor shall be responsible for examining all the shipment and notify the Employer immediately of any damage, shortage, discrepancy etc. for the purpose of Employer's information only. The Contractor shall submit to the Employer 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 Contractor shall be fully responsible for the equipment/material until the same is handed over to the Employer 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 Employer, as well as protection of the same against theft, element of nature, corrosion, damages etc.
- 13.8 Where material / equipment is unloaded by Employer before the Contractor arrives at site or even when he is at site, Employer 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 The design and workmanship shall be in accordance with the best engineering practices to ensure satisfactory performance throughout the service life. If at any stage during the execution of the Contract, it is observed that the erected equipment(s) do not meet the above minimum clearances the Contractor shall immediately proceed to correct the discrepancy at his risks and cost.

13.13 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 Employer. 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

14.1 TOOLS & PLANTS (T&P)

The Contractor shall arrange all T&P (such as necessary supports, cranes, ladders, platforms etc.) for erection, testing & commissioning of the system at his own cost. Further, all consumables, wastage and damages shall be to the account of contractor.

All such T&P shall be taken back by the contractor after commissioning of the system.

14.2 SPECIAL TOOLS AND TACKLES

The contractor shall supply all special tools and tackles required for Operation and maintenance of equipment. The special tools and tackles shall only cover items which

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are specifically required for the equipment offered and are proprietary in nature. The list of special tools and tackles, if any, shall be finalized during detail engineering and the same shall be supplied without any additional cost implication to the Employer.

14.3 FACILITIES TO BE PROVIDED BY THE EMPLOYER

- 14.3.1 Employer shall make available the auxiliary supplies at a single point in the substation on chargeable basis. The prevailing energy rates of the state shall be applicable. All further distribution from the same for construction supply shall be made by the contractor. However, in case of failure of power due to any unavoidable circumstances, the contractor shall make his own necessary arrangements like diesel generator sets etc. at his own cost so that progress of work is not affected and Employer shall in no case be responsible for any delay in works because of non-availability of power.
- 14.3.2 Employer shall make available construction water supply at a single point in the substation. All further distribution for the same shall be made by the Contractor. In case of non-availability or inadequate availability of water for construction work, the contractor shall make his own arrangement at his own cost and the Employer shall in no case be responsible for any delay in works because of non-availability or inadequate availability of water.

15.0 AUXILIARY SUPPLY

- 15.1 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 table:

Normal Voltage	Variation in Voltage	Frequency in HZ	Phase/Wire	Neutral connection
415V	± 10%	50 ± 5%	3/4 Wire	Solidly Earthed.
240V	± 10%	50 ± 5%	1/2 Wire	Solidly Earthed.
220V	190V to 240V	DC	Isolated 2 wire System	-
110V	95V to 120V	DC	Isolated 2 wire System	-
48V	--	DC	2 wire system (+) earthed	-

Combined variation of voltage and frequency shall be limited to ± 10%.

16.0 SUPPORT STRUCTURE

- 16.1 The equipment support structures shall be suitable for equipment connections at the first level i.e 14.0 meter, 8.0 meter, 5.9 meter and 4.6 meter from plinth level for 765kV, 400kV, 220kV and 132kV 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 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

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)

- 18.8 LED based illumination of minimum 9 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 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/feruling by pasting the same on the inside of the door.
- 18.12 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
- 18.13 The enclosure of bay marshalling kiosk, junction box, terminal box and control cabinets shall conform to IP-55 as per IS:13947 including application of 2KV rms for 1 (one) minute, insulation resistance and functional test after IP-55 test.
- 19.0 DISPOSAL OF PACKING MATERIAL & WASTE FROM CONSTRUCTION SITE**
After completion of the work, Contractor shall dispose-off all the packing & waste materials including empty conductor drums, cable drums, wooden containers, oil drums, gas cylinders and other waste/scrapped materials from construction site at his own cost and shall make the substation area properly cleaned.
- 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 the terminal blocks shall be non-disconnecting stud type except for the secondary junction boxes of Current Transformer and Voltage Transformer.
- 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, multilayer terminal arrangement is not allowed in any junction box (Common MB, Individual MB, JB etc.). There should be

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sufficient space at both sides of terminals so that ferrule number of wires / TB numbers are clearly visible during wire removal or insertion.

- 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 mm copper flexible. |
| b) | All CT/PT circuits | Minimum of 4 nos. of 2.5 sq mm 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 Contractor 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 Lamps & Sockets~~**

~~All lamps shall use a socket base as per IS-1258, except in the case of signal lamps.~~

~~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, signaling, lighting and space heater circuits. The incoming and sub-circuits shall be separately provided with miniature circuit breaker / switch fuse units. Selection of the main and Sub-circuit fuse~~

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**ANNEXURE-C****LIST OF GENERAL STANDARDS AND CODES**

CODES	TITLE
--	India Electricity Rules
--	Indian Electricity Act
--	Indian Electricity (Supply) Act
--	Indian Factories Act
IS-5	Colors for Ready Mixed Paints and Enamels
IS-335	New Insulating Oils
IS-617	Aluminium and Aluminium Alloy Ingots and Castings for General Engineering Purposes
IS-1448 (P1 to P 145)	Methods of Test for Petroleum and its Products
IS-2071 (P1 to P3)	Methods of High Voltage Testing
IS-12063	Classification of degrees of protection provided by enclosures of electrical equipment
IS-2165 ; P1:1997, P2:1983	Insulation Coordination
IS-3043	Code of Practice for Earthing
IS-6103	Method of Test for Specific Resistance (Resistivity) of Electrical Insulating Liquids
IS-6104	Method of Test for Interfacial Tension of Oil against Water by the Ring Method
IS-6262	Method of test for Power factor & Dielectric Constant of Electrical Insulating Liquids
IS-6792	Method for determination of electric strength of insulating oils
IS-5578	Guide for marking of insulated conductors
IS-11353	Guide for uniform system of marking & identification of conductors & apparatus terminals.
IS-8263	Methods for Radio Interference Test on High voltage Insulators
IS-9224 (Part 1,2&4)	Low Voltage Fuses
IEC-60060 (Part 1 to P4)	High Voltage Test Techniques
IEC 60068	Environmental Test
IEC-60117	Graphical Symbols
IEC-60156	Method for the Determination of the Electrical Strength of Insulation Oils
IEC-60270	Partial Discharge Measurements
IEC-60376	Specification and Acceptance of New Sulphur Hexafluoride
IEC-60437	Radio Interference Test on High Voltage Insulators
IEC-60507	Artificial Pollution Tests on High Voltage Insulators to be used on AC Systems
IEC-62271-1	Common Specification for High Voltage Switchgear & Control gear Standards
IEC-60815	Guide for the Selection of Insulators in respect of Polluted Conditions

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CODES	TITLE
IEC-60865 (P1 & P2)	Short Circuit Current - Calculation of effects
ANSI-C.1/NFPA.70	National Electrical Code
ANSI-C37.90A	Guide for Surge Withstand Capability (SWC) Tests
ANSI-C63.21, C63.3	Specification for Electromagnetic Noise and Field Strength Instrumentation 10 KHz to 1 GHZ
C36.4ANSI-C68.1	Technique for Dielectric Tests
ANSI-C76.1/EEE21	Standard General Requirements and Test Procedure for Outdoor Apparatus Bushings
ANSI-SI-4	Specification for Sound Level Meters
ANSI-Y32-2/C337.2	Drawing Symbols
ANSI-Z55.11	Gray Finishes for Industrial Apparatus and Equipment No. 61 Light Gray
NEMA-107T	Methods of Measurements of RIV of High Voltage Apparatus
NEMA-ICS-II	General Standards for Industrial Control and Systems Part ICSI-109
CISPR-1	Specification for CISPR Radio Interference Measuring Apparatus for the frequency range 0.15 MHz to 30 MHz
CSA-Z299.1-1978h	Quality Assurance Program Requirements
CSA-Z299.2-1979h	Quality Control Program Requirements
CSA-Z299.3-1979h	Quality Verification Program Requirements
CSA-Z299.4-1979h	Inspection Program Requirements
TRANSFORMERS AND REACTORS	
IS:10028 (Part 2 & 3)	Code of practice for selection, installation & maintenance of Transformers (P1:1993), (P2:1991), (P3:1991)
IS-2026 (P1 to P4)	Power Transformers
IS-3347 (part 1 to Part 8)	Dimensions for Porcelain transformer Bushings for use in lightly polluted atmospheres
IS-3639	Fittings and Accessories for Power Transformers
IS-6600	Guide for Loading of oil immersed Transformers
IEC-60076 (Part 1 to 5)	Power Transformers
IEC-60214	On-Load Tap-Changers
IEC-60289	Reactors
IEC- 60354	Loading Guide for Oil - Immersed power transformers
IEC-60076-10	Determination of Transformer and Reactor Sound Levels
ANSI-C571280	General requirements for Distribution, Power and Regulating Transformers
ANSI-C571290	Test Code for Distribution, Power and Regulation Transformers
ANSI-C5716	Terminology & Test Code for Current Limiting Reactors
ANSI-C5721	Requirements, Terminology and Test Code for Shunt Reactors Rated Over 500 KVA
ANSI-C5792	Guide for Loading Oil-Immersed Power Transformers upto and including 100 MVA with 55 deg C or 65 deg C Winding Rise

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**ANNEXURE-C**

CODES	TITLE
IS:1248	Indicating Instruments
IS:2208	HRC Fuses
IS:13947 (Part-3)	Air break switches, air break disconnectors & fuse combination units for voltage not exceeding 1000V AC or 1200V DC
IS:2147	Degree of protection provided by enclosures for low voltage switchgear and control gear
IS:6005	Code of practice for phosphating of Iron and Steel
IS:3231	Electrical relays for power system protection
IS:3842	Electrical relay for AC Systems
IS:5	Colours for ready mix paint
IEEE-484	Recommended Design for installation design and installation of large lead storage batteries for generating stations and substations
IEEE-485	Sizing large lead storage batteries for generating stations and substations
Wires and cables	
ASTMD-2863	Measuring the minimum oxygen concentration to support candle like combustion of plastics (oxygen index)
IS-694	PVC insulated cables for working voltages upto and including 1100 Volts
IS-1255	Code of practice for installation and maintenance of power cables, upto and including 33 kV rating
IS-1554 (P1 and P2)	PVC insulated (heavy duty) electric cables (part 1) for working voltage upto and including 1100 V Part (2) for working voltage from 3.3 kV upto and including 11kV
IS:1753	Aluminium conductor for insulated cables
IS:2982	Copper Conductor in insulated cables
IS-3961 (P1 to P5)	Recommended current ratings for cables
IS-3975	Mild steel wires, formed wires and tapes for armouring of cables
IS-5831	PVC insulating and sheath of electric cables
IS-6380	Elastometric insulating and sheath of electric cables
IS-7098	Cross linked polyethylene insulated PVC sheathed cables for working voltage upto and including 1100 volts
IS-7098	Cross-linked polyethylene insulated PVC sheathed cables for working voltage from 3.3kV upto and including 33 kV
IS-8130	Conductors for insulated electrical cables and flexible cords
IS-1753	Aluminum Conductors for insulated cables
IS-10418	Specification for drums for electric cables
IEC-60096 (part 0 to p4)	Radio Frequency cables
IEC-60183	Guide to the Selection of High Voltage Cables
IEC-60189 (P1 to P7)	Low frequency cables and wires with PVC insulation and PVC sheath

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**ANNEXURE-C**

CODES	TITLE
IEC-60227 (P1 to P7)	Polyvinyl Chloride insulated cables of rated voltages up to and including 450/750V
IEC-60228	Conductors of insulated cables
IEC-60230	Impulse tests on cables and their accessories
IEC-60287 (P1 to P3)	Calculation of the continuous current rating of cables (100% load factor)
IEC-60304	Standard colours for insulation for low-frequency cables and wires
IEC-60331	Fire resisting characteristics of Electric cables
IEC-60332 (P1 to P3)	Tests on electric cables under fire conditions
IEC-60502	Extruded solid dielectric insulated power cables for rated voltages from 1 kV upto to 30 kV
IEC-754 (P1 and P2)	Tests on gases evolved during combustion of electric cables
AIR conditioning and ventilation	
IS-659	Safety code for air conditioning
IS-660	Safety code for Mechanical Refrigeration
ARI:520	Standard for Positive Displacement Refrigeration Compressor and Condensing Units
IS:4503	Shell and tube type heat exchanger
ASHRAE-24	Method of testing for rating of liquid coolers
ANSI-B-31.5	Refrigeration Piping
IS:2062	Steel for general structural purposes
IS:655	Specification for Metal Air Dust
IS:277	Specification for Galvanised Steel Sheets
IS-737	Specification for Wrought Aluminium and Aluminium Sheet & Strip
IS-1079	Hot rolled cast steel sheet & strip
IS-3588	Specification for Electrical Axial Flow Fans
IS-2312	Propeller Type AC Ventilation Fans
BS-848	Methods of Performance Test for Fans
BS-6540 Part-I	Air Filters used in Air Conditioning and General Ventilation
BS-3928	Sodium Flame Test for Air Filters (Other than for Air Supply to I.C. Engines and Compressors)
US-PED-2098	Method of cold DOP & hot DOP test
MIL-STD-282	DOP smoke penetration method
ASHRAE-52	Air cleaning device used in general ventilation for removing particle matter
IS:3069	Glossary of Terms, Symbols and Units Relating to Thermal Insulation Materials
IS:4671	Expanded Polystyrene for Thermal Insulation Purposes
IS:8183	Bonded Mineral Wool
IS:3346	Evaluation of Thermal Conductivity properties by means of

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**ANNEXURE-C**

CODES	TITLE
	guarded hot plate method
ASTM-C-591-69	Standard specification for rigid preformed cellular urethane thermal insulation
IS:4894	Centrifugal Fans
BS:848	Method of Performance Test for Centrifugal Fans
IS:325	Induction motors, three-phase
IS:4722	Rotating electrical machines
IS:1231	Three phase foot mounted Induction motors, dimensions of
IS:2233	Designations of types of construction and mounting arrangements of rotating electrical machines
IS:2254	Vertical shaft motors for pumps, dimensions of
IS:7816	Guide for testing insulation resistance of rotating machines
IS:4029	Guide for testing three phase induction motors
IS: 4729	Rotating electrical machines, vibration of, Measurement and evaluation of
IS:4691	Degree of protection provided by enclosures for rotating electrical machinery
IS:7572	Guide for testing single-phase ac motors
IS:2148	Flame proof enclosure for electrical apparatus
BS:4999(Part-51)	Noise levels
Galvanizing	
IS-209	Zinc Ingot
IS-2629	Recommended Practice for Hot-Dip galvanizing on iron and steel
IS-2633	Methods for testing uniformity of coating of zinc coated articles
ASTM-A-123	Specification for zinc (Hot Galvanizing) Coatings, on products Fabricated from rolled, pressed and forged steel shapes, plates, bars and strips
ASTM-A-121-77	Zinc-coated (Galvanized) steel barbed wire
Painting	
IS-6005	Code of practice for phosphating of iron and steel
ANSI-Z551	Gray finishes for industrial apparatus and equipment
SSPEC	Steel structure painting council
Fire protection system	
--	Fire protection manual issued by tariff advisory committee (TAC) of India
HORIZONTAL CENTRIFUGAL PUMPS	
IS:1520	Horizontal centrifugal pumps for clear, cold and fresh water
IS:9137	Code for acceptance test for centrifugal & axial pumps
IS:5120	Technical requirement – Rotodynamic special purpose pumps
API-610	Centrifugal pumps for general services Hydraulic Institutes Standards

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**ANNEXURE-C**

CODES	TITLE
CPWD	Latest CPWD specifications
ACSR MOOSE CONDUCTOR	
IS:6745 BS:443-1969	Methods for Determination of Mass of zinc coating on zinc coated Iron and Steel Articles
IS:8263	Methods for Radio Interference
IEC:437-1973 NEMA:107-1964 CISPR	Test on High Voltage Insulators
IS:209, BS:3436-1961	Zinc Ingot
IS:398 Part - V IEC:209-1966	Aluminum Conductors for Overhead Transmission Purposes
BS:215(Part-II), IEC:209-1966	Aluminium Conductors galvanized steel reinforced extra high voltage (400 kV and above)
IS:1778, BS:1559-1949	Reels and Drums for Bare Conductors
IS:1521, ISO/R89-1959	Method for Tensile Testing of steel wire
IS:2629	Recommended practice for Hot dip Galvanising on Iron and Steel
IS:2633	Method for Testing Uniformity of coating of zinc Coated Articles
IS:4826/ ASTMA-472-729	Hot dip galvanized coatings on round steel wires
GALVANISED STEEL EARTHWIRE	
IS:1521, ISO/R:89-1959	Method for Tensile Testing of Steel Wire
IS:1778	Reels and Drums for Bare Conductors
IS:2629	Recommended practice for Hot Dip Galvanising on Iron and Steel
IS:2633	Methods for testing Uniformity of Coating of Zinc Coated Articles
IS:4826/ ASTM: A 475-72a BS:443-1969	Hot dip Galvanised Coatings on Round Steel Wires
IS:6745/ BS:443-1969	Method for Determination of mass of Zinc Coating on Zinc coated Iron and Steel Articles.
IS:209/ BS:3463-1961	Zinc ingot
IS:398 (Pt. I to P5:1992)/ BS:215 (Part-II	Aluminum Conductors for overhead transmission purposes
Lighting Fixtures and Accessories	
IS:1913	General and safety requirements for electric lighting fittings
IS:3528	Water proof electric lighting fittings
IS:4012	Dust proof electric lighting fittings
IS:4013	Dust tight proof electric lighting fittings
IS:10322	Industrial lighting fittings with metal reflectors
IS:10322	Industrial lighting fittings with plastic reflectors
IS:2206	Well glass lighting fittings for use under ground in mines (non-

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**ANNEXURE-C**

CODES	TITLE
	flameproof type)
IS:10322	Specification for flood light
IS:10322	Specification for decorative lighting outfits
IS:10322	Luminaries for street lighting
IS:2418	Tubular fluorescent lamps
IS:9900	High pressure mercury vapour lamps
IS:1258	Specification for Bayonet lamp fluorescent lamp
IS:3323	Bi-pin lamp holder tubular fluorescent lamps
IS:1534	Ballasts for use in fluorescent lighting fittings. (Part-I)
IS:1569	Capacitors for use in fluorescent lighting fittings
IS:2215	Starters for fluorescent lamps
IS:3324	Holders for starters for tubular fluorescent lamps
IS:418	GLS lamps
IS:3553	Water tight electric fittings
IS:2713	Tubular steel poles
IS:280	MS wire for general engg. Purposes
Conduits, Accessories and Junction Boxes	
IS:9537	Rigid steel conduits for electrical wiring
IS:3480	Flexible steel conduits for electrical wiring
IS:2667	Fittings for rigid steel conduits for electrical wiring
IS:3837	Accessories for rigid steel conduits for electrical wiring
IS:4649	Adaptors for flexible steel conduits
IS:5133	Steel and Cast Iron Boxes
IS:2629	Hot dip galvanising of Iron & Steel
Lighting Panels	
IS:13947	LV Switchgear and Control gear(Part 1 to 5)
IS:8828	Circuit breakers for over current protection for house hold and similar installations
IS:5	Ready mix paints
IS:2551	Danger notice plates
IS:2705	Current transformers
IS:9224	HRC Cartridge fuse links for voltage above 650V(Part-2)
IS:5082	Wrought aluminium and Al. alloys, bars, rods, tubes and sections for electrical purposes
IS:8623	Factory built Assemblies of Switchgear and Control Gear for voltages upto and including 1000V AC and 1200V DC
IS:1248	Direct Acting electrical indicating instruments
Electrical Installation	
IS:1293	3 pin plug
IS:371	Two to three ceiling roses

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**ANNEXURE-C**

CODES	TITLE
IS:3854	Switches for domestic and similar purposes
IS:5216	Guide for safety procedures and practices in electrical work
IS:732	Code of practice for electrical wiring installation (system voltage not exceeding 650 Volts.)
IS:3043	Code of practice for earthing
IS:3646	Code of practice of interior illumination part II & III
IS:1944	Code of practice for lighting of public through fares
IS:5571	Guide for selection of electrical equipment for hazardous areas
IS:800	Code of practice for use of structural steel in general building construction
IS:2633	Methods of Testing uniformity of coating on zinc coated articles
IS:6005	Code of practice for phosphating iron and steel
	INDIAN ELECTRICITY ACT
	INDIAN ELECTRICITY RULES
LT SWITCHGEAR	
IS:8623 (Part-I)	Specification for low voltage switchgear and control gear assemblies
IS:13947 (Part-I)	Specification for low voltage switchgear and control gear, Part 1 General Rules
IS:13947 (part-2)	Specification for low voltage switchgear and control gear, Part 2 circuit breakers
IS:13947 (part-3)	Specification for low voltage switchgear and control gear. Part 3 Switches, Disconnectors, Switch-disconnectors and fuse combination units
IS:13947 (part-4)	Specification for low voltage switchgear and control gear. Part 4 Contactors and motors starters
IS:13947 (part-5)	Specification for low voltage switchgear and control gear. Part 5 Control-circuit devices and switching elements
IS:13947 (part-6)	Specification for low voltage switchgear and control gear. Part 6 Multiple function switching devices
IS:13947 (part-7)	Specification for low voltage switchgear and control gear. Part 7 Ancillary equipments
IS:12063	Degree of protection provided by enclosures
IS:2705	Current Transformers
IS:3156	Voltage Transformers
IS:3231	Electrical relays for power system protection
IS:1248	Electrical indicating instruments
IS:722	AC Electricity meters
IS:5578	Guide for Marking of insulated conductors of apparatus terminals
IS:13703 (part 1)	Low voltage fuses for voltage not exceeding 1000V AC or 1500V DC Part 1 General Requirements
IS:13703 (part 2)	Low voltage fuses for voltage not exceeding 1000V AC or 1500V DC Part 2 Fuses for use of authorized persons

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)**Annexure-G****MQP & INSPECTION LEVEL REQUIREMENT**

Sl. No.	Item / Equipment	Requirement of MQP/ITP/FAT	Inspection Level
1 A	Transformer /Reactor	Yes	IV
1 B	Circuit Breakers	Yes	IV
2	Current transformer	Yes	IV
3	Capacitive voltage transformers/Potential transformer	Yes	IV
4	Isolators	Yes	IV
5	Lightening Arrestors	Yes	III
6	Line Trap	Yes	III
7	Control & Relay Panels	Yes	III
8	Power Cables	Yes	III
9	Control Cables	Yes	III
10	LT Switchgear & ACDB/DCDB/MLDB/ELDB/ Lighting Panels	Yes	III
11	Fire protection system		
11-A	Panels, Deluge valve, Hydro pneumatic tank.	No	III
11-B	Strainers, extinguishers, MS/GI pipes, Pumps, motors, air compressor, and other valves, Diesel Engines	No	II
11-C	Others	No	I
12	Insulator (Disc, Long Rod, Solid Core)	Yes	IV
13	Conductor	Yes	IV
14	Clamps & Connectors (including equipment connectors)	Yes	III
15	Junction Box / Lighting Switch Boards / Bay MB/Telecom Equipment Cabinet	No	II
16	Cable lugs	No	I
17	Lighting Fixtures ,Lamps & fans	No	I
18	Switches	No	I
19	Conduits	No	I
20	Lighting Poles	No	II
21	MS/GI /PVC Pipes for cable trenches and lighting	No	I
22	Hume Pipes	No	I
23	Galvanized Cable trays	No	II
24	MS/ GI Flat and earthing material	No	II
25	MS Round for Earthmat (40mm dia)	No	I
26	Lighting Earthwire	No	I
27	Aluminium Tube & Busbar materials	No	II
28	Outdoor Receptacle	No	I
29	Nut / Bolts / Spring Washers (Gr 5.6/5)	No	II
30	LT Transformer	Yes	III
31	Battery	No	II
32	Battery Charger	Yes	III

SECTION-GENERAL TECHNICAL REQUIREMENTS (GTR)Annexure-G

Sl. No.	Item / Equipment	Requirement of MQP/ITP/FAT	Inspection Level
71	Span Marker & Obstruction Light	No	III
72	GIS including spares	Yes	IV
73	GIS Bus Duct	Yes	IV
74	GIS Bushing	Yes	IV
75	SF6 Gas processing Unit	No	II
76	Partial Discharge Monitoring System	No	II
77	STATCOM including Valve, valve base electronics, DC capacitor, series reactor and all accessories	Yes	IV
78	Mechanically switched Reactor bank (3-ph) including all accessories (MSR Branches)	Yes	IV
80	Mechanically switched Capacitor bank (3-ph) including all accessories (MSC Branches)	Yes	IV
81	Pass Harmonic filters	Yes	IV
82	Valve cooling system	Yes	III
	FODP including pigtail	No	II
	Radio link Telecom	Yes	III
	Hardware Fittings for Fibre Optic approach cable	Yes	III
	SDH Equipments (ADM), PDH, Primary Multiplexer	Yes	IV
	Drop & Insert Multiplexer	Yes	IV
	DACS	Yes	IV
	Main Distribution Frame	No	I
	HDPE Pipe	No	II
	NMS, TMN	Yes	IV
	Synchronization Equipment	No	Level-I
93	HT Capacitor	Yes	IV
94	PLC Capacitor	Yes	III
95	48V DCPS	Yes	III
96	Nitrogen Injection system	Yes	III
97	Foundation/Anchor bolts	Yes	III
98	EOT crane/Lift	No	II
99	Optical Signal Column	No	II
100	Maintenance Platform	No	II
101	Spark Gap	Yes	II
102	Thyristor Valve	Yes	III
103	DC current & voltage measuring device	ITP	III
104	Furniture	No	I

Note:

- * MICC for test and measuring equipment shall be issued only after actual verification/demonstration of satisfactory performance at site.
- ** Though level-2 items, CIP can be issued also on review of TCs and visual inspection of these items.

**STANDARD TECHNICAL DATA SHEET
(1.1 KV GRADE XLPE POWER CABLES)**

CUSTOMER :		POWERGRID CORPORATION OF INDIA LIMITED	
SN	Name of manufacturer :	As per approved list	
	Cable Sizes	1 C x 630	3/4 C x 300
1	Manufacturer's type designation	A2XW4Y	A2XWY
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 systems	for both	
6	Continuous current rating when laid in a 3x 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-3981-Part-II-67	
8	Short circuit Capacity		
	a) Guaranteed Short Circuit Amp. (rms)KA. for 0.12 sec duration at rated conductor temperature of 90 degree C, with an initial peak of 165 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 XLPE 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	NA	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 wires (minimum)	2	2.5
	e) Guaranteed 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) Guaranteed 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)

1108

CUSTOMER :		POWERGRID CORPORATION OF INDIA LIMITED					
SN Name of manufacturer :		As per approved list					
Cable Sizes		1 c x 150	3.5 c x 70	3.5 c x 35	4 c x 18	4c x 6	2 c x 6
1 Manufacturer's type designation		AYWY	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:		As per IS-3981-Pl-II-67					
8 Short circuit Capacity							
a) Short Circuit Amp. (mms)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	M-35	18	6	6
d) Number of wires(No.)		as per Table 2 of IS 8130					
e) Form of Conductor		Non-compacted Stranded circular	shaped conductor	shaped conductor	shaped conductor	Non-compacted Stranded circular	Non-compacted Stranded 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 tape cores.(mm)		N.A	27.6	20.4	15.7	11.6	9.6
c) Thickness of Sheath (minimum)(mms)		N.A	0.4	0.3	0.3	0.3	0.3
13 Armour		as per IS 3976/88					
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) Guaranteed 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		\$					
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
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		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)

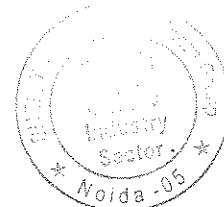
1109

CUSTOMER :		POWERGRID CORPORATION OF INDIA LIMITED							
N	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-II/1988 & its referred standards							
3	Rated Voltage(volts)	1100							
4	Type & Category	FR & C1							
5	Suitable for earthed or un-earthed 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. (mva) 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 (S-cq.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 mm ² & 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	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 & G	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



Handwritten signature/initials.



ANNEXURE-1**COMPLIANCE CERTIFICATE OF TECHNICAL SPECIFICATION**

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same.
2. There are no deviation(s) with respect to specification other than those furnished in the 'schedule of deviations'.
3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.
4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in 'BOQ' of the specification shall not be considered (i.e., technical description & quantities as per the specification shall prevail).

Date:

Bidder's Stamp & Signature

ANNEXURE - 2**SCHEDULE OF TECHNICAL DEVIATIONS**

Bidder shall list below all technical deviation clause wise w.r.t. tender specifications:

S.No.	Section/ Page No.	Clause No.	Deviation	Reason / Justification
-------	-------------------	------------	-----------	------------------------

Any deviation not specifically brought out in this section shall not be admissible for any commercial implication at later stage. Except to the technical deviations listed in this schedule, bidder's offer shall be considered in full compliance to the tender specifications irrespective of any such deviation indicated / taken elsewhere in the submitted offer.

Date:

Tenderer's Stamp & Signature

SCHEDULE OF COMMERCIAL DEVIATION

TENDER ENQUIRY NO. -90G2100233 dated 05.10.2020

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: é é é é é é
Date : é é é é é é .

Signature of the authorised representative of

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

SCHEDULE OF TECHNICAL DEVIATION

TENDER ENQUIRY NO. -90G2100233 dated 05.10.2020

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: é é é é é é é
Date : é é é é é é é .

Signature of the authorised representative of

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

1. **Clause No. 1.3 of GTC** – The 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.abcpurchase.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 Ms. Y. Latha Kumari, Sr. Manager (TBEM) / Sh. S K Shukla, Sr. DGM (TBEM); Contact No. 0120-06748536 / 8531; e-mail: mlatha@bhel.in; skshukla@bhel.in
3. **Clause No. 1.8 of GTC** - For any commercial clarification, please contact Ms. Archana Kumari, Dy. 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 PVC basis as per latest formula mentioned below as per IEEMA circular:
Copper conductor PVC insulated 1.1 kV control cables
 $P = Po + CuF(Cu - Cu_o) + CCFCu(PVCc - PVCco) + FeF(Fe - Fe_o)$
For unarmoured cables; $FeF = 0$
Table references:
CUC (Copper conductor)
P5 (PVC Compound)
P6 (Steel armour)
Aluminium conductor PVC insulated 1.1 kV power cables
 $P = Po + AlF(AL - Al_o) + CCFAI(PVCc - PVCco) + FeF(Fe - Fe_o)$
For unarmoured multicore cables (without steel armour); $FeF = 0$
Table references:
ALP (Aluminium conductor in single core unarmoured & multicore cables)
P1 (Aluminium conductor aluminium armour in single core armoured cables)
P2 (PVC Compound)
P3 (Steel armour)
Aluminium conductor XLPE insulated 1.1 kV power cable
 $P = Po + AlF(AL - Al_o) + XLFAL(CC - Cco) + CCFAI(PVCc - PVCco) + FeF(Fe - Fe_o)$
For unarmoured multicore cables (without steel armour); $FeF = 0$
Table references:
ALP (Aluminium conductor in single core unarmoured & multicore cables).
P1 (Aluminium conductor aluminium armour in single core armoured cables).
P2 (PVC compound)
P3 (Steel armour)
XL1 (XLPE compound)

The date of delivery shall be PO delivery date or date of actual dispatch, whichever is earlier.
The total adjustment shall be subject to a ceiling of $\pm 20\%$ (plus or minus twenty percent).
The base indices in the formula shall be of first notification of IEEMA of the **Sep 2020**.
Vendor to mention the applicable indices in **Annexure – 1**.
5. **Clause No. 3 of GTC - Payment Terms: - As per clause 3.1.**

6. Delivery plan – **Dec 2020**. Bidder to mention best delivery plan in the activity schedule.
7. Permissible Technical Deviations: No permissible Technical Deviation has been envisaged.
8. Project Status i Domestic. GST shall be payable as applicable.
9. **Clause No. 5 of GTC** - **Guarantee period is required 18 months from the date of last delivery or up to 31/07/2022 whichever is later.**
10. **Clause No. 7 of GTC** - **Option – B shall be considered. Validity period of BG is required as per Guarantee Clause mentioned above with claim period of 3 months extra over and above.**
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 - Comparative statement shall be prepared and evaluated on total cost basis at destination /site (combining all requirements for different sites) on package basis. However, purchase orders shall be placed separately for each substation, i.e. separate order for 765kV Solapur Ss, 765kV Aurangabad Ss, 765kV Wardha Ss, 400kV Khandwa Ss, 400kV Rajgarh Ss, 400kV Champa Ss, 400/220kV Jabalpur Ss and 400/220kV Itarsi Ss as per quantity required at each sites.**
13. **Clause No. – 19 of GTC** - **Arbitration** - This clause shall be read as per **Annexure-2**.
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.
15. **Clause No. 34 of GTC** - Integrity Pact i Not Applicable.
16. **Clause No. 39 of GTC** – Quantity Variation i (+/- 30%).
17. **Pre qualifying requirement :**

Technical: As per Annexure – A 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 MQP.
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-3**.

“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-4** and Certification at **Annexure-5 / Annexure-6** (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:

Stamp:

ANNEXURE - 1

SN	Description	ALF	CCFAI	FeF	XLFAL
1	SUPPLY- LOW VOLTAGE CABLE : XLPE INSULATED ALUMINIUM CONDUCTOR 3.5 CORE X 300SQMM ARMOURED AUX POWER CABLE				
		ALF	CCFAI	FeF	
2	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 70SQMM ARMOURED AUX POWER CABLE				
3	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 3.5 CORE X 35SQMM ARMOURED AUX POWER CABLE				
4	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 16SQMM ARMOURED AUX POWER CABLE				
5	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 4 CORE X 6SQMM ARMOURED AUX POWER CABLE				
6	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, ALUMINIUM CONDUCTOR, 2 CORE X 6SQMM ARMOURED AUX POWER CABLE				
		CUF	CCFCU	FeF	
7	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 5 CORE X 2.5SQMM ARMOURED CONTROL CABLE				
8	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 7 CORE X 2.5SQMM ARMOURED CONTROL CABLE				
9	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 10 CORE X 2.5SQMM ARMOURED CONTROL CABLE				
10	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 14 CORE X 2.5SQMM ARMOURED CONTROL CABLE				
11	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 19 CORE X 2.5SQMM ARMOURED CONTROL CABLE				
12	SUPPLY- LOW VOLTAGE CABLE : PVC INSULATED, COPPER (PLAIN) CONDUCTOR, 27 CORE X 2.5SQMM ARMOURED CONTROL CABLE				

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/CONSORTI
UM PARTNERSFOR 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-3

Item/Package Name :	LT Cable
Enquiry No.:	90G2100233 dated 05.10.2020
Project:	PGCIL SS 19
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-3

Item/Package Name :	LT Cable
Enquiry No.:	90G2100233 dated 05.10.2020
Project:	PGCIL SS 19
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 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 entities 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-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 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-6

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 é é é é é é é é 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 é é é é é .. 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 é é é é é é é é é .. 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 é é é é é é é é é é é .. ⁷ we shall be discharged from all liabilities under this guarantee thereafter.

We, é é é é é 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 é é é é é é é é é ⁸
- b) This Guarantee shall be valid up to é é é é é é 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