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

## NOTICE INVITING TENDER

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| **Subject:** | **Tender for supply of wavetraps for various Powergrid projects.** |
| **Project:** | **1. Substation Package SS-01 for (i) 765/400/220kV Bikaner-III Pooling Station including 400kV class Bus Reactor at Bikaner-II S/s; (ii) Extension of 765kV Neemrana-II S/s for termination of 765 kV D/c line Neemrana-II–Bikaner-III T/L and (iii) Extension of 400kV Bikaner-II S/s for termination of 400kV Bikaner-II Bikaner-III T/L under "Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) (Bikaner Complex)**<br><br>**2. Substation Package SS01 for (a) Extn. of 765kV Sikar-II Substation, (b) Extn. of 765kV Khetri Substation; associated with "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III-Part D"** |
| **Customer** | **Powergrid Corporation of India Limited** |

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

## SPECIAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

**THIS IS TO BE SUBMITTED DULY SIGNED AND STAMPED BY BIDDER. 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.**

| SL. NO. | Additional instructions to bidder: |
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| 1. | **Instruction to bidders (Refer clause 1 of GTC)** |
| | Offer Submission Time: Till 11:00 Hrs IST on due date of opening.<br>Offer Opening Date & Time: 16:00 Hrs IST on due date of opening.<br><br>Address of tender Issuing Authority: -<br>BHARAT HEAVY ELECTRICALS LIMITED, Transmission Business Group, 5th Floor, BHEL Sadan, Plot No. 25, Sector-16a, Noida – 201301 (U.P.)<br><br>For any technical clarification, kindly contact: **Mr. Rajat, Manager(TBEM)**<br>Phone: +91 (0) 0120- 6748524, E-mail: rajat.kumar@bhel.in<br><br>For any commercial clarification, kindly contact: **Mr. Manish Jain, Sr. Manager (TBMM)**;<br>Phone: +91 (0) 0120- 6748484, E-mail: manish.jain@bhel.in |
| | |
| 2. | **Terms of Payment (Refer clause 3 of GTC)** |
| | 100% of payment along with 100% GST & F&I shall be made within 45 days for MSE (Micro & Small Enterprises) / within 60 days for Medium Enterprises / within 90 days for non MSME suppliers from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows:<br>• LR / GR duly endorsed by BHEL Site Official.<br>• Material Receipt Certificate issued by BHEL Site Official<br>• GST Compliant Tax Invoice<br>• Packing List (Case-wise)<br>• Copy of Transit Insurance Certificate from underwriters. |



Signature of Bidder (Authorized Signatory) with Date & Seal

## SPECIAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

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| | • Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management<br>• Guarantee Certificate<br>• Performance Security<br><br>Supplier has to submit invoice(s) as per PO along with billing checklist (Annexure-III).<br><br>**RXIL (TReDS) Platform:** TBG is registered with RXIL (TReDS) platform. MSME bidders are requested to get registered with RXIL (TReDS) platform to avail the facility as per GoI guidelines. |
| | |
| **3.** | **Guarantee (Refer clause 5 of GTC)** |
| | The contractor shall guarantee that the equipment being supplied under this contract shall be new and of first quality workmanship and 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<br>i. For 765KV, Twenty Four (24) months from the date of Taking Over/Completion of Facilities, whichever is later.<br>ii. For other than 765KV, Twelve (12) months from the date of Taking Over/Completion of Facilities, whichever is later.<br><br>For purpose of guarantee, date of taking over/ completion of facilities is fixed as 21 months from date of PO for Bikaner-II & III, Neemrana-II and 15 months from date of PO for Sikar-II & Khetri.<br><br>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.<br><br>In the event of the supplier / contractor failing to replace the defective equipment / material / component within the time period mentioned above, the same shall be considered as breach of the contract and BHEL may proceed as per provision mentioned in this NIT without prejudice to any other rights under the contract. |
| | |
| **4.** | **PERFORMANCE SECURITY (Refer clause 7 of GTC)** |
| | Performance security of 10% of Total Ex-works value shall be submitted by the vendor within 14 days from the date of award of PO. Performance security shall be submitted separately for each PO. Ex-works PO value (excl. Supervision charges) at the time of placement of PO shall be considered for calculation of the performance security amount. |



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## SPECIAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

"Bidder agrees to submit performance security required for execution of the contract within the time period mentioned. In case of delay in submission of performance security, enhanced performance security which would include interest (SBI rate + 6%) for the delayed period, shall be submitted by the bidder. Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered as per terms and conditions defined in NIT / Contract, from the bills along with due interest."

**(A) Modes of deposit:**

Performance security may be furnished in the following forms:

(i) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/Demand Draft/ Electronic Fund Transfer in favour of BHEL -TBG, Noida. Bank Account details for EFT mode is mentioned in EMD clause.

Bank Account details for submission of performance security through EFT mode.

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| NAME OF THE COMPANY | BHARAT HEAVY ELECTRICALS LTD |
| ADDRESS OF THE COMPANY | TRANSMISSION BUSINESS GROUP, 5TH FLOOR, BHEL SADAN, PLOT NO. 25, SECTOR-16A, NOIDA – 201301 (U.P.) |
| NAME OF BANK | STATE BANK OF INDIA |
| NAME OF BANK BRANCH | CAG-II NEW DELHI (17313) |
| CITY | NEW DELHI |
| ACCOUNT NUMBER | 00000030206227732 |
| ACCOUNT TYPE | CASH CREDIT |
| IFSC CODE | SBIN0017313 |

(ii) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. Bank Guarantee shall be submitted as per BHEL format.

(iii) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the vendor, a/c BHEL).

(iv) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of vendor furnishing the security and duly endorsed/ hypothecated/pledged, as applicable, in favour of BHEL).

(v) Insurance Surety Bond.

**(B) <u>Forfeiture of performance security</u>**



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## SPECIAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

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| | **The performance security will be forfeited and credited to BHEL's account in the event of a breach of contract by the vendor.**<br><br>**Important Notes:**<br><br>(1) The performance security should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty/Guarantee obligations.<br><br>(2) Performance security shall be refunded to the vendor without interest, after he duly performs and completes the contract in all respects but not later than 60(sixty) days of completion of all such obligations including the warranty under the contract.<br><br>(3) BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.<br><br>(4) The Performance Security shall not carry any interest.<br><br>(5) Value of the Bank Guarantee shall remain unchanged for any subsequent variations in Purchase Order value up to ± 30%. Beyond this variation of ± 30%, the Supplier shall arrange to enhance or may reduce the value of the Bank Guarantee accordingly for the total variation promptly.<br><br>(6) The Bank Guarantee shall be from any bank as per Annexure-XIV for List of Banks. The original BG should be sent by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida.<br><br>(7) Extension of validity of the BG 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 BG.<br><br>(8) Non–submission BG / Deposit, as applicable, shall be considered as breach of contract as per terms of the NIT and BHEL reserves the right to impose Suspension of Business Dealings with the Supplier / Contractor.<br><br>(9) 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. |
| | |
| **5.** | **Submission of drawings/documents for approval (Refer clause 8 of GTC) & Inspection (Refer clause 10 of GTC)** |
| | Timeline shall be as per activity chart. |
| | |
| **6.** | **Delivery Period (Refer clause 12 of GTC)** |
| | Proposed delivery Plan: 30 Sept '2024.<br>Supplier to submit Activity schedule (Annexure-A). Early Delivery is acceptable.<br>**Note:** In case, BHEL's delivery requirement is not met by vendor(s), then a chance may be given to all such vendors to review their quoted delivery schedule in line with BHEL's delivery requirement. However, if vendor fails to meet the requisite delivery plan, then BHEL reserves the right not to consider the offer of |



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## SPECIAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

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| | such vendor(s). **Note:** LR / GR date or invoice date (whichever is later) shall be considered as delivery date. |
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| **7.** | **LIQUIDATED DAMAGES FOR DELAYED DELIVERY (refer clause 13 of GTC)** |
| | In case of delay in supply of material beyond the contractual delivery time allotted for supply, an amount of 0.5% of the total Purchase Order value* per week of delay or part thereof subject to a maximum of 5% of the total Purchase Order value* shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD.<br><br>Note:<br>1) LD shall be calculated as per activity schedule of NIT.<br>2) **'*'**Total Purchase Order Value for considering Liquidity Damages (LD)= (Total Ex-works +F&I +Total Service charges excluding GST<br>**Note:**<br>**i)** In case of any amendment / revision in P.O, the LD shall be linked to the amended / revised Purchase Order / Contract value and delivery / completion time / schedule, if applicable.<br>**ii)** LR / GR date or invoice date (whichever is later) shall be treated as the date of dispatch for levying LD as above.<br>**iii)** However, 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 up to 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.<br>**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 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. |
| | |
| **8.** | **DEVIATION (refer clause 16 of GTC)** |
| | Technical Deviation: No Technical Deviation is envisaged.<br>Commercial Deviation: No Commercial Deviation envisaged except defined in GTC.<br><br>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.<br><br>**Clause-wise deviations and / or additional conditions / clarifications, if any, are to be brought out clearly in "Schedule of Commercial Deviation" and "Schedule of Technical Deviation" If any. Deviations and / or additional conditions / clarifications, if any, mentioned elsewhere in the bid / offer, shall not be considered.** |



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# SPECIAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

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| **9.** | **TENDER EVALUATION (refer clause 17 of GTC)** |
| | Evaluation shall be done on total cost basis and not based on site/destination. |
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| **10.** | **Arbitration (refer clause 19 of GTC)** |
| | To be read in addendum to Annexure IV. |
| | |
| **11.** | **Risk Purchase (refer clause 22 of GTC) and Recovery (refer clause 23 of GTC)** |
| | Deleted. |
| | |
| **12.** | **Variation of contract value/quantity variation (refer clause 39 of GTC)** |
| | BHEL shall have the right to variation in quantities of items within ± 25% 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. |
| | |
| **13.** | **VALIDITY OF PURCHASE ORDER:** |
| | The purchase order(s) shall be valid for two years from date of PO. |
| | |
| **14.** | **BREACH OF CONTRACT, REMEDIES AND TERMINATION** |
| | **(A) <u>Breach of contract and Termination:</u>**<br>Following conditions shall be considered as breach of contract:<br>i) Non-supply of material/ non-completion of work by the vendor within scheduled delivery/ completion period as per contract or as extended from time to time.<br>ii) The vendor 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.<br>iii) The vendor delivers equipment/ material not of the contracted quality.<br>iv) The vendor fails to replace the defective equipment/ material/ component as per guarantee clause. |



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## SPECIAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

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| | v) Withdrawal from or abandonment of the work by the vendor before completion as per contract.<br>vi) Assignment, transfer, subletting of Contract without BHEL's written permission resulting in termination of Contract or part thereof by BHEL.<br>vii) Non-compliance to any contractual condition or any other default attributable to Contractor/ Vendor.<br>viii) Termination of Contract on account of any other reason(s) attributable to Vendor.<br><br>In case of breach of contract, BHEL reserve the right to terminate the Purchase Order/ Contract either in whole or in part thereof without compensation to the vendor.<br><br>**(B) <u>Remedies for breach of contract:</u>**<br><br>In case of Breach of Contract, BHEL shall recover 10% amount of the contract value from the vendor in following manners:<br>i) Forfeiture/ encashment of Security instruments (Performance security, EMD etc.) available against the said contract.<br>ii) In case the value of security instruments available is less than 10% of the contract value, the balance amount shall be recovered from other financial remedies (i.e. available bills of the vendor, retention amount etc. with BHEL TBG or any other units of BHEL.<br>iii) Demand notice for deposit of balance recovery amount shall sent to the vendor, if security instruments or financial remedies are insufficient to affect the complete recovery.<br>iv) In case recovery is not possible from security instruments or from financial remedies mentioned above, legal remedies shall be pursued.<br><br>**Important Notes:** Further, levy of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract. |
| | |
| **15** | **Splitting of Contract** |
| | Splitting of contract not applicable for this tender. |
| | |
| **16** | **Make in India** |
| | 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.<br>"Bidder to specify the percentage of local content as per the format of self-declaration for local content" as per Annexure-V." |



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## SPECIAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

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| | "This tender is not a global tender and only Class-I suppliers as defined under the DPIIT order no. P-45021/2/2017-PP (BE-II) dated 16.09.2020 and subsequent orders are eligible to bid in this tender. Bids received from Non-Local & class II suppliers shall be rejected."<br>As per MOP order no A-1/2021-FSC-Part(5) dt 16.11.21 minimum local content to qualify as local class-I supplier is 60%. |
| | |
| **17.** | **COMPLIANCE TO GOI ORDER FOR RESTRICTIONS UNDER RULE 144 (XI) OF GENERAL FINANCIAL RULES (GFRS), 2017** |
| | Refer Clause at **Annexure-VI** and Certification at **Annexure-VII / Annexure-VIII** (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. |
| | |
| **18.** | **COMPLIANCE TO ORDER NO. 25-111612018-PG, DATED 02.07.2020 OF MINISTRY OF POWER, GOI:** |
| | Refer clause at **Annexure-IX** and Certification at **Annexure-X** regarding compliance to the MOP circular dated 02-07-2020. Bidder to comply the clause and submit the certification. Non-compliance/ Non-submission will lead to rejection of Offer. (Not Applicable for cases where local content is 100%) |
| | |
| **19.** | **GeM Seller ID** |
| | GeM seller ID is mandatory for the bidders and must be mentioned in their offer. In case at the time of submission of offer GeM seller ID is not available with bidder, then successful tenderer should ensure to have GeM Seller ID prior to award of contract. Department of Expenditure (DOE) OM no. 6/9/2020-PPD dated 24.08.2020 may be referred in this regard. |
| | |
| **20.** | **PREVENTION FOR CARTEL FORMATION** |
| | The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines |
| | |
| **21.** | **Bill to address** |
| | BHEL-Transmission Business Group, Plot No-25, Sector-16A,Noida UP-201301.<br>**GSTN-**09AAACB4146P2ZC |
| | |
| **22.** | **IMPORTATNT NOTE:** |
| | **BHEL shall place, substation wise, separate purchase order for each project. In addition, two purchase orders shall be placed against Bikaner-III (one for 765KV and second for rest of the ratings). Accordingly, Delivery period, Guarantee Period, Performance security, Liquidated Damage etc. shall be dealt separately as per project specific PO.** |



Signature of Bidder (Authorized Signatory) with Date & Seal

## SPECIAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

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| | **Documents to be submitted by supplier: Signed STC, annexure A(activity chart),B(contact detail),C(Unprice bid), Schedule of commercial deviation, Schedule of technical deviation, GFR compliance, MOP compliance, Integrity pact and local content certificate and any other document mentioned in technical specification.** |

**Enclosures:**

| Sl. No. | |
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| 1. | General Terms and conditions |
| 2. | Technical Specifications |
| 3. | Annexure-A (activity chart) |
| 4. | Annexure-B (contact detail) |
| 5. | Annexure-C (Unprice bid); Schedule of commercial deviation, Schedule of technical deviation |
| 6. | Annexure-III Check List-For Bill |
| 7. | Annexure-IV Arbitration & Conciliation |
| 8. | Annexure-V- Self-Certification for Local Content |
| 9. | Annexure-VI- Restrictions under Rule 144 (xi) of General Financial Rules (GFRs), 2017 |
| 10. | Annexure-VII-Bidders certification regarding compliance to Rule 144 (xi) of General Financial Rules (GFRs), 2017 |
| 11. | Annexure-VIII-Bidders certification regarding compliance to Rule 144 (xi) of General Financial Rules (GFRs), 2017 |
| 12. | Annexure-IX-Order No. 25-111612018-PG, Dated 02.07.2020-MOP |
| 13. | Annexure-X-Bidder certification regarding compliance to MOP circular |
| 14. | Annexure-XI-Implementation of Integrity Pact IP in BHEL |
| 15. | Annexure-XIV-Format of Security cum Performance BG |
| 16. | Annexure-XV-List of Banks for the Submission of Security cum Performance Bank Guarantee |
| 17. | Material receipt certificate Format |
| 18. | Inspection call format |



Signature of Bidder (Authorized Signatory) with Date & Seal

**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.**

| Sr. No. | |
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| 1. | **INSTRUCTION TO BIDDERS :**<br><br>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.<br><br>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 :-<br><br>Tender Box,<br>Materials Management,<br>Transmission Business Group,<br>Bharat Heavy Electricals Limited,<br>5th Floor, Tower-A,<br>Advant Navis IT Business Park,<br>Plot-7, Sector-142,<br>Noida Expressway, Noida,<br>Dist. G. B. Nagar, U. P. ï 201305<br><br>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).<br><br>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.<br><br>1.5 Bids are to be submitted duly signed with seal in two parts :-<br><br>a) **Techno-commercial Bid (Part-I**) ï 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** ñUn-Priced Bidò is also to be enclosed in Part-I Bid.<br><br>b) **Price Bid (Part-II)** ï 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.<br><br>1.6 The Part-I and Part-II Bids are to be sealed in separate envelopes and marked |

| Sr. No. | |
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| | as ñTechno-commercial Bid (Part-I)ò and ñPrice Bid (Part-II)ò respectively. Both the envelopes are to be kept in another common envelope and marked as ñBIDò. Each envelope should be sealed and super scribed with tender enquiry no., item / package name, project name and due date of opening. Bidderôs name and address shall also be mentioned on each envelope.<br><br>1.7 For any technical clarification, please contact official mentioned in the tender enquiry / NIT.<br><br>1.8 For any commercial clarification please contact official issuing tender enquiry / NIT.<br><br>1.9 Price bid (Part-II) should not contain any additional information / description other than given in ñUn-Priced Bidò submitted with ñTechno-commercial Bid (Part-I)ò except prices, otherwise bid is liable for rejection.<br><br>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.<br><br>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.<br><br>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.<br><br>1.13 Non-conformities / errors / discrepancies in quoted prices in price bids shall be dealt as follows :-<br><br>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.<br><br>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.<br><br>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.<br><br>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.<br><br>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 ñBHEL/TBG/GTC-ETC/2016 Rev. 01ò 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.<br><br>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.<br><br>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.<br><br>Note :<br>Representative / official deputed by the bidder to witness tender opening must produce authorization letter for the same. |
| **2.** | **PRICES :**<br><br>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.<br><br>2.2 Unless specifically indicated in the NIT, the prices shall be on INR basis.<br><br>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 :-<br><br>a) **Ex-works Price**: Ex-works price including packing & forwarding charges.<br><br>b) **Freight**: Freight for door delivery up to destination / site / store are to be quoted separately.<br><br>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.<br><br>e) **Charges for Supervision of Erection, Testing & Commissioning (ETC) at Site**: To be quoted separately if specified in NIT/Price Schedule.<br><br>f) **Charges for Testing & Commissioning at Site**: To be quoted separately if specified in NIT/Price Schedule.<br><br>g) **Charges for Erection, Testing & Commissioning at Site**: To be quoted separately if specified in NIT/Price Schedule.<br><br>h) Training Charges: To be quoted separately if specified in NIT/Price Schedule.<br><br>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.<br>Note :<br>i) Unless otherwise specified in the NIT, the purchase order shall be placed on Ex-works basis for Indian bidders.<br>ii) Prices quoted by Indian bidders shall be in Indian Rupees only.<br><br>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.<br><br>iv) Unless otherwise specified in the NIT, Unloading at Site / Destination shall not be in the scope of the supplier.<br>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 :**<br><br>3.1 **For Supply only in scope of the supplier**<br><br>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 :<br><br>· LR / GR duly endorsed by BHEL Site Official.<br>· Material Receipt Certificate issued by BHEL Site Official.<br>. GST Compliant Tax Invoice<br>· Packing List (Case-wise)<br>· Copy of Transit Insurance Certificate from underwriters.<br>· Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management<br>· Guarantee Certificate<br>· Copy of Performance Bank Guarantee (PBG)<br>· Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order.<br><br>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 :<br>· LR / GR duly endorsed by BHEL Site Official.<br>· Material Receipt Certificate issued by BHEL Site Official.<br>. GST Compliant Tax Invoice<br>· Packing List (Case-wise)<br>· Copy of Transit Insurance Certificate from underwriters.<br>· Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management<br>· Guarantee Certificate<br>· Copy of Performance Bank Guarantee (PBG)<br>· Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order.<br><br>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 :<br>· 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.<br>· Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management<br><br>3.3 **For Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier**<br><br>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 :<br><br>· LR / GR duly endorsed by BHEL Site Official.<br>· Material Receipt Certificate issued by BHEL Site Official.<br>· GST Compliant Tax Invoice<br>· Packing List (Case-wise)<br>· Copy of Transit Insurance Certificate from underwriters.<br>· Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management<br>· Guarantee Certificate<br>· Copy of Performance Bank Guarantee (PBG)<br>· Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order<br><br>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 :<br>· Certificate of successful completion of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management<br>· Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management<br><br>3.4 For Type Test Charges<br><br>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.<br><br>3.5 For Charges for Supervision of Erection, Testing & Commissioning at Site<br><br>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).<br><br>3.6 For Charges for Testing & Commissioning at Site<br><br>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).<br><br>3.7 For Training Charges<br><br>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).<br><br>Note :<br><br>i) Supplier has to submit invoice(s) as per PO or approved billing break-up of prices (if applicable as per NIT).<br><br>ii) In case of supplies for overseas project, Material Receipt Certificate issued by BHEL Authorized Representative shall also be acceptable.<br><br>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.<br><br>iv) Supplier has to ensure commencement of transit insurance from the date not later than LR / GR date.<br><br>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<br><br>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.<br><br>vii) Supplier has to submit PBG (as per BHEL format) & Guarantee Certificate as per PO terms.<br><br>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.<br><br>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.<br><br>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.<br><br>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 :**<br>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 :**<br>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.<br><br>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.<br><br>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.<br><br>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.<br><br>Note :<br>i) In case of Illumination System, items viz. Lamps, Tubes, Ballast, Starters, Capacitors & Fuses will not be under Guarantee after commissioning.<br><br>ii) In addition to the above guarantee period, Extended Guarantee / Warranty, if any, shall be as per NIT / Technical Specifications.<br><br>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 :**<br>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) :**<br>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 :-<br><br>Option ñAò<br>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.<br>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.<br><br>Option ñBò<br>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.<br><br>Option ñCò<br>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 ñBharat Heavy Electricals Limitedò 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.<br><br>Note :<br>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.<br>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.<br>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.<br>v) In case of nonï 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.<br>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.<br>vii) Value of the Bank Guarantee (at the time of submission) shall remain unchanged for any subsequent variations in Purchase Order value up to ± 20%. Beyond this variation of ± 20%, the Supplier shall arrange to enhance or may reduce the value of the Bank Guarantee accordingly for the total variation promptly.<br>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 :**<br>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.<br>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 :**<br>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 :**<br>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.<br><br>Supplier shall send inspection call on prescribed format / web site only, with an advance notice of 15 days.<br><br>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.<br><br>BHEL representative is authorised to carry out audits along with Third Party Inspection Agency at vendorâs / supplierâs works before clearing the items for despatch. |
| **11.** | **DESPATCH DOCUMENTS :**<br>Despatch documents to be immediately sent to BHEL on despatch are as follows :-<br>• Copy of Invoice<br>• Copy of LR / GR in case of Indian suppliers or BL / AWB in case of foreign suppliers<br>• Copy of Packing List (Case-wise)<br>• Copy of Transit Insurance Certificate from underwriters<br>• Copy of Guarantee Certificate |
| **12.** | **DELIVERY PERIOD :**<br>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.<br>Time required for type test, if applicable, is to be separately indicated.<br>Note :<br><br>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**:<br>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.<br><br>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.<br><br>Note :<br>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.<br>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.<br>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.<br>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 :**<br>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).<br>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 :**<br>BHEL reserve the right to reject in full or part, any or all tender without assigning any reason thereof.<br>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.<br><br>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 :**<br>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 :**<br>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.<br>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.<br><br>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 :**<br>List of permissible deviations & loading criteria thereof are as follows :-<br><br>a) Payment Terms<br>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.<br><br>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).<br><br>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 :-<br>i) Port handling / clearing charges: @ 1% of CIF value to arrive at Customs Assessable Value.<br>ii) Custom Duty (including CVD & SAD) as per NIT prevailing on date of price bid opening.<br>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.<br><br>Note :<br>Additional deviations (if considered acceptable by BHEL) & the loading criteria shall be communicated to all the qualified bidders before price bid opening. |
| **19.** | **ARBITRATION :**<br>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 ñThe Arbitration and Conciliation Act, 1996ò 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.<br>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.<br>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 :**<br>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 :**<br>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.<br><br>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 Supplierôs / Contractorôs firm on account of cancellation of the Purchase Order / Contract.<br>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.<br><br>Terms and Conditions shall not get affected in case of de-merger / amalgamation / taking-over / re-constitution etc. |
| **22.** | **RISK PURCHASE :**<br>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.<br><br>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.<br><br>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 :**<br>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 :**<br>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.<br><br>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 |

| Sr. No. | |
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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.<br>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.<br>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) :**<br>Supplier to submit approved MQP in line with requirement of BHEL/customer. |
| **26.** | **SUPPLIER PERFORMANCE MONITORING AND RATING SYSTEM :**<br>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 :**<br>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 :**<br>The order of precedence shall be as follows :-<br>a) Special Terms & Conditions (STC) for Tender Enquiry / Contract, if any<br>b) 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<br>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 :**<br>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.<br>In case of shipment by sea or air, the packing shall be sea-worthy or air-worthy respectively and of international standards.<br>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.<br>Packing List shall be submitted as per standard format along with advance set of documents for claiming payment which shall also indicate :-<br>a) Case / Packing size (as applicable).<br>b) Gross weight and net weight of each package.<br>c) Detailed contents of the package with quantity of each item separately.<br><br>Project, Item / Package Description, BHELôs 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.<br><br>Note :<br><br>Foreign suppliers to furnish details to arrange inland transportation by BHEL, if applicable, as follows :-<br>i) No. of Packages<br>ii) Size with Weight (Gross & Net) of each Package<br>iii) No. of Containers with type & size required for inland transportation |

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| | iv) Type of Cargo (Break Bulk / LCL / FCL)<br>v) Customs Tariff No. |
| **30.** | **COLOUR CODING :**<br>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.<br>Tags should be of the colour as follows :-<br>a) Main equipment : Yellow or White tag<br>b) Start-up / Commissioning spares : Blue tag<br>c) Mandatory spares : Pink or Red tag<br>d) Recommended / O&M spares : Green tag |
| **31.** | **MICRO, SMALL & MEDIUM ENTERPRISES (MSME) :**<br>MSMED Act 2006 as amended from time to time & extant regulations of Govt. of India for MSME will be applicable.<br>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.<br>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 :**<br>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 ñGuidelines for Suspension of Business Dealings with Suppliers/Contractorsò. Abridged version of same is available at BHEL website (www.bhel.com) on ñSupplier Registrationò Page. |
| **33.** | **REVERSE AUCTION :**<br>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.<br>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 ñonline sealed bid in the Reverse Auction. Non-submission of ñonline 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.<br>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.<br>Abridged Version of ñCommon Guidelines for Conducting Reverse Auctionòmay also be seen at BHEL website (www.bhel.com) on ñSupplier Registrationò Page & ñTender NotificationsòPage. |
| **34.** | **INTEGRITY PACT :**<br>Bidders shall have to enter into Integrity Pact with BHEL, duly signed with seal in original, if specified in NIT / RFQ failing which bidderôs offer shall be liable for rejection. |
| **35.** | **TERMINATION OF CONTRACT :**<br>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.<br><br>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 Supplierôs / Contractor' compensation claim shall be settled mutually.<br><br>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 :**<br>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 :**<br>Notwithstanding any other provisions, except in cases of wilful misconduct and / or criminal negligence / acts,<br><br>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<br><br>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 :**<br>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 :<br><br>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.<br><br>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.<br><br>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 :**<br>BHEL shall have the right to variation in quantities of items within ± 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 ñLumpsumò 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 :**<br>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.<br><br>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.<br><br>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.<br><br>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 :**<br>Payment shall be made directly to the Supplier / Contractor by BHEL through NEFT / RTGS. |
| **42.** | **CONFIDENTIALITY :**<br>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 :**<br>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 :**<br>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.<br>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.<br>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 :**<br>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.<br>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 :**<br>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.<br>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 :**<br>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

# BHARAT HEAVY ELECTRICALS LIMITED

TRANSMISSION BUSINESS HVDC ENGINEERING & SYSTEMS

| DOCUMENT No. | TB-424-510-001 | Rev .No. | 00 | Prepared | Checked | Approved |
|---|---|---|---|---|---|---|
| TYPE OF DOC. | TECHNICAL SPECIFICATION | | SIGN | | | |
| TITLE | | | NAME | RK | NK | SKS |
| 3150A, 765kV, 50kA 1.0mH Wave Trap<br>3150A, 400kV, 63kA 0.5mH Wave Trap<br>1600A, 220kV, 50kA 0.5mH Wave Trap | | | DATE | 08/02/24 | 08/02/24 | 08/02/24 |
| | | | GROUP | TBEM | W.O. No | Awaited |

| | |
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| CUSTOMER | **POWERGRID** |
| **PROJECT** | **1. Substation Package SS-01** for (i) 765/400/220kV Bikaner-III Pooling Station including 400kV class Bus Reactor at Bikaner-II S/s; (ii) Extension of 765kV Neemrana-II S/s for termination of 765 kV D/c line Neemrana-II–Bikaner-III T/L and (iii) Extension of 400kV Bikaner-II S/s for termination of 400kV Bikaner-II Bikaner-III T/L under "Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) (Bikaner Complex)<br><br>**2. Substation Package SS01** for (a) Extn. of 765kV Sikar-II Substation, (b) Extn. of 765kV Khetri Substation; associated with "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III-Part D" |
| Station | **765/400/220kV Bikaner-III S/s,765kV Neemrana-II, 400kV Bikaner-II S/s Rajasthan Extension of 765kV Sikar- Khetri S/s, Rajasthan** |

**CONTENTS**



| Rev No. | Date | Altered | Checked | Approved | REVISION DETAILS |
|---|---|---|---|---|---|
| | | | | | |

| Distribution | To | HVDC | TBMM | TBQM | Vendor |
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| | Copies | 1 | 1 | 1 | 4 |

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This technical specification covers the requirements of design, manufacture, testing at works, packing and dispatch of Line Traps along with its accessories and fixing hardware as mentioned in this section and in various other sections of this specification.

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. The equipment is required for the following Projects.

Name of the customer : **POWERGRID**

**Na e of t e ro e t** : **. u station a ka e** for
(i) 765/400/220kV Bikaner-III Pooling Station including 400kV class Bus Reactor at Bikaner-II S/s;
(ii) Extension of 765kV Neemrana-II S/s for termination of 765 kV D/c line Neemrana-II–Bikaner-III T/L and
(iii) Extension of 400kV Bikaner-II S/s for termination of 400kV Bikaner-II Bikaner-III T/L under "Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) (Bikaner Complex)

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2. **u station a ka e** for (a) Extn. of 765kV Sikar-II Substation, (b) Extn. of 765kV Khetri Substation; associated with "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III-Part D"

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Refer Section - 3 for Project Details and General Specifications.

**Note e ter s use in t is s e ifi ation na e o er refers to A refers to B L ontra tor refers to su essfu Bi er refers to se tion 3 .**

**2. ( ) N AL A LA**

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|---|---|---|---|---|
| 1. | System operating voltage | 765kV | 400kV | 220kV |
| 2. | Maximum operating voltage of the system(rms). | 800kV | 420kV | 245kV |
| 3. | Rated frequency. | 50HZ | | |
| 4. | No. of phase. | 3 | | |
| 5 | Type of tuning | Broad Band | | |
| 6 | Rated Blocking bandwidth | Typically in the range 40-500 kHz | | |
| 7 | Capacitance of CVT | 4400pF / 8800pF | | |
| 8. | Max Radio Interference Voltage level | 1000 µV at 508kV(rms). | 500µV at 280kV rms | 500µV at 163kV rms |
| 9 | Min Corona extinction voltage level | 508kV(rms) | 320kV(rms) | |
| 10 | Resistive component of impedance within Carrier frequency blocking range | Not less than 450 Ohms | | Not less than 570 Ohms |
| 11. | Rated short circuit current for 1 sec. duration | 50kA | 63kA | 50kA |

**3. AL N N**

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**. B LL AN**

**or etai s refer Annexure B**

**. N N N N N N A**

a. 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 section II.

b. The reports for all type tests as per technical specification shall be furnished by the Contractor along with 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/representative authorized by POWERGRID/representative of Utility /representative of accredited test lab/ representative of The National Accreditation Board for Certification Bodies (NABCB) certified agency shall also be acceptable.

Unless otherwise specified elsewhere, the type test reports submitted shall be of the tests conducted within 10 years from 10/02/2024. In case the test reports are of the test conducted earlier than the years specified date, the Bidder shall repeat these test(s) at no extra cost to BHEL/Employer.

c. 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/BHEL.

. **AL LAN**

Bidder should have POWERGRID approved and valid quality plan at contract stage. In case bidder don't have POWERGRID approved Quality plan, it will be bidder's responsibility to get its quality plan approved directly from POWERGRID

. **A N**

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.

. **A N AN N N N N**

Date of Submission of first lot of drawings will be counted only from the date of submission of reasonably correct drawings. List of drawings required for technical clearance of manufacturing are as follows:

1. Approved GTP
2. Approved GA.
3. Approved Type Test Reports

**Annexure B**

| S. No. | Description | Unit | 22 k Bikaner (Ne ) oo in tation | xtn of k Nee rana s | xtn of k Bikaner s | xtn of k ikar s | xtn of k etri s |
|---|---|---|---|---|---|---|---|
| 1. | 765kV, 3150A,1.0mH, 50kA 1ph Line Trap | Nos. | 4 | 4 | - | 8 | 4 |
| 2. | Supply- Line Traps: 765kV, Terminal connector station side | Nos. | 4 | 4 | - | 8 | 4 |
| 3. | Supply- Line Traps: 765kV, Terminal connector Line side | Nos. | 4 | 4 | - | 8 | 4 |
| 4. | 400kV,3150A,0.5mH ,63kA 1ph Line Trap | Nos. | 12 | - | 4 | - | - |
| 5. | Supply- Line Traps: 400kV, Terminal connector station side | Nos. | 12 | - | 4 | - | - |
| 6. | Supply- Line Traps: 400kV, Terminal connector Line side | Nos. | 12 | - | 4 | - | - |
| 7. | 220kV,1600A,0.5mH ,50kA 1ph Line Trap | Nos. | 6 | - | - | - | - |
| 8. | Supply- Line Traps: 220kV, Terminal connector station side | Nos. | 6 | - | - | - | - |
| 9. | Supply- Line Traps: 220kV, Terminal connector Line side | Nos. | 6 | - | - | - | - |

**Note** -1) The final details of terminal connectors of the line traps will be furnished to the successful bidder.
2) Bidder to provide mounting hardware's along with each Line trap.
3) The Wave Trap Quantities are subject to ±25% variation.

studies wherever required and submit the frequency plan and optimum coupling details within a period of one month from the date of receipt of above data.

5.8 The 765kV/400 kV transmission lines may be transposed.

The transmission tower configuration and conductor details shall be forwarded after the award to enable the contractor to make his own computer study assessment of the carrier path based on wave propagation over transposed lines with each transposition point acting as "Modal Converter".

5.9 The parameters of the equipment quoted shall be such that the mode of wave propagation on 765kV/400 kV power line (with transpositions indicated) shall not impose any limitation on the efficient and reliable performance of information link from protection or communication point of view.

5.10 The Contractor shall have to check and prove through the results of his computer studies that attenuation due to transpositions in the EHV lines is within limits and the offered equipment will perform satisfactorily.

5.11 The Bidder shall submit curves illustrating 'incorrect tripping' and "Failure to trip" probability plotted against corona noise level, in the presence of impulse noise due to switching of isolator and circuit breaker etc. Details of field tests and laboratory tests for successful operation of his equipment, under such adverse conditions shall be furnished by the Bidder. These are to be related to end-to-end signaling and shall take into account the type of communication link e.g. account shall be taken of transpositions in the phase to phase coupled H.T. line. Details of field tests and laboratory tests for successful operation of the equipment under the above circumstances shall be submitted by the Bidder illustrating the above parameters.

## 6. L N A

6.1 Line trap shall be broad band tuned for its entire carrier frequency range. Resistive component of impedance of the line trap within its carrier frequency blocking range shall not be less than 450 ohms for 765kV/400 kV system and 570 ohms for 220kV and 132 kV systems..

6.2 Line trap shall be provided with a protective device in the form of surge arrestors which shall be designed and arranged such that neither significant alteration in its protective function nor physical damage shall result from either temperature rise or the magnetic field of the main coil at continuous rated current or rated short time current. The protective device shall neither enter into operation nor remain in operation, following transient actuation by the power frequency voltage developed across the line trap by the rated short time current.

The lightning arrestor shall be station class current limiting active gap type. Its rated discharge current shall be 10 kA. Coordination, however, shall be done by taking 20 kA at 8/20 micro-sec. discharge current into account. Bidder has to furnish full justification in case the use of gap-less metal oxide arrestor is recommended by them.

6.3 The lightning arrestor provided with the line trap of each rating shall fully comply with the requirements of IS:3070 Part-I/IEC-60099-I Part-I. It shall conform to type tests as applicable and type test certificate for the same shall be submitted by the Bidder.

6.4 The lightning arrestor provided with the line trap shall be subject to routine and acceptance tests as per IEC-60099-1 (Part-I).

6.5 The line trap on 765kV & 400 kV lines shall show no visual corona discharge at a voltage of 508kV(rms) and 320 KV (rms) power frequency falling voltage. Suitable corona rings may be incorporated in the line trap. Radio interference voltage for 420/245/132 kV shall not exceed 500 micro volts at 280/163/97 kV (rms) respectively. For 765kV, RIV shall not exceed 1000 micro volts at 508kV(rms).

6.6 Line trap shall be equipped with the bird barriers.

6.7 Line trap shall conform to IEC 60353 (latest) fulfilling all the technical requirements. The rated short time current for 1 Second shall be 31.5/40/50/63 kA as per requirement. The mH. rating shall be 0.25/0.5/1.0 mH depending on frequency plan.

6.8 The Bidder shall indicate continuous current rating of the line trap at 65 deg. C ambient.

6.9 Reports for the following type tests on each type of line trap shall be submitted as per clause 9.2 of GTR .

1. Measurement of Inductance of the main coil.
2. Measurement of temperature rise.
3. Insulation test.
4. Short time current test.
5. Corona Extinction Voltage test (procedure for this shall be mutually agreed ).
6. Radio Interference Voltage measurement test (procedure for this shall be mutually agreed ).

6.10 The Bidder must enclose with his bid the reports of type and routine tests conducted on similar equipment earlier as per IEC-60353.

6.11 Welding

All the welding included in the manufacture of line traps shall be performed by personnel and procedure qualified in accordance with ASME-IX and all the critical welds shall be subject to NDT as applicable.

6.12 Line Trap Mounting

6.12.1 The Line Trap shall be suitable for outdoor pedestal or suspension mounting and shall be mechanically strong enough to withstand the stresses due to maximum wind pressure of 260 kg/square meter.

6.12.2 For pedestal mounting, each line trap shall be mounted on a tripod structure formed by three insulator stacks arranged in a triangular form. All the accessories and hardware, mounting stool including bolts for fixing the line trap on insulators shall be of non-magnetic material and shall be supplied by the Contractor.

6.12.3 For suspension mounting, Contractor shall be required to coordinate the mounting arrangement with the existing arrangement. Non-magnetic suspension hook/link of adequate length and tensile strength to provide necessary magnetic clearance between the line trap and suspension hardware shall be supplied by the Contractor.

6.13 Terminal Connectors

6.13.1 The line traps shall be suitable for connecting to 4" IPS Aluminium tube or 3" IPS Al. tube or ACSR single/twin/Quad bundle conductor with horizontal or vertical take off. Necessary connector shall be supplied by the Contractor.

6.13.2 Terminal Connectors shall conform to IS:5561.

6.13.3 No part of clamp or connector (including hardware) shall be of magnetic material.

6.13.4 Clamps and connectors shall be designed corona controlled. Visual Corona extinction voltage shall not be less than 508kV(rms) & 320kV(rms) for 765kV and 420kV respectively. All nuts and bolts shall be suitably shrouded.

6.13.5 Radio interference Voltage for 420/245/132 kV shall not exceed 500 microvolts at 280/163/97 kV (rms) respectively. For 765kV, RIV shall not exceed 1000 micro volts at 508kV(rms).

6.13.6 Clamps/connectors shall be designed for the same current ratings as line trap and temperature rise shall not exceed 35 deg. C over 50 deg. C ambient. No current carrying part shall be less than 10 mm thick.

6.13.7 Clamps/connectors shall conform to type test as per IS:5561. Type Test reports shall also be submitted for following additional type tests :

a) Visual Corona Extinction Test
b) Radio Interference Voltage Measurement

6.13.8 Bidders are required to submit alongwith their bid typical drawings clearly indicating the above mentioned features of the line traps, line trap mounting arrangement and terminal connectors. For suspension mounted line traps, Bidder shall submit drawings showing single point as well as multipoint (normally 3 point) suspension arrangements.

~~7.~~ ~~L N~~

~~7.1~~ ~~The coupling devices shall be interposed between the capacitor voltage transformer and coaxial line to the PLC transmitter/receiver, and in conjunction with the capacitor voltage transformer shall ensure :~~

~~a) Efficient transmission of carrier frequency signals between the carrier frequency connection and the power line.~~

~~b) Safety of personnel and protection of the low voltage parts and installation, against the effects of power frequency voltage and transient over voltages.~~

~~7.2~~ ~~The coupling device, in conjunction with the CVT shall from an electric filter of band pass type :~~

~~a) It shall match characteristic impedance of H.T. line to impedance of the carrier frequency connection.~~

~~b) Galvanic isolation between primary and secondary terminals of the coupling device shall be performed by the above mentioned transformer.~~

~~c) Power frequency currents derived by the CVT may be drained to the earth by a separate inductance termed drain coil of suitable rating.~~

~~d) Voltage surges coming from the power line at the terminals of the coupling device shall be limited by a non-linear surge arrestor of suitable rating in the primary side. Requirement of a gas type voltage arrestor in secondary side of the coupling device shall have to be fully justified, but~~

# e o -3

P ea e efe e e a e a e e e o e o -424-316-000 Rev00

**BHARAT HEAVY ELECTRICALS LIMITED**

**TRANSMISSION BUSINESS ENGINEERING MANAGEMENT**



| DOCUMENT No. | **TB-424-316-000** | Rev. No. | **00** | | Prepared | Checked | Approved |
|---|---|---|---|---|---|---|---|
| TYPE OF DOC. | **TECHNICAL SPECIFICATION** | | | SIGN | | | |
| TITLE | **GENERAL TECHNICAL REQUIREMENTS-SECTION 3** | | | NAME | DM | NK | SKS |
| | | | | DATE | | | |
| | | | | GROUP | TBEM | W.O. | **Awaited** |

| | |
|---|---|
| CUSTOMER | **Power Grid Corporation of India Limited** (POWERGRID) |
| Station | **Bikaner-III/Bikaner-II Neemrana, Rajasthan** |
| | |
| | **Sikar - II / Khetri, Rajasthan** |



| RevNo. | Date | Altered | Checked | Approved | REVISION DETAILS |
|---|---|---|---|---|---|
| | | | | | |

| Distribution | To | TBEM | TBMM | TBQM | Supplier |
|---|---|---|---|---|---|
| | Copies | 1 | 1 | 1 | 4 |

# Site Information -1

| S.No. | Particular | Details |
|---|---|---|
| a) | Owner | Power Grid Corporation of India Limited (POWERGRID) |
| b) | Customer | Power Grid Corporation of India Limited (POWERGRID) |
| c) | Project Title | **Substation Package SS-01 for (i) 765/400/220kV Bikaner-III Pooling Station including 400kV class Bus Reactor at Bikaner-II S/s; (ii) Extension of 765kV Neemrana-II S/s for termination of 765 kV D/c line Neemrana-II–Bikaner-III T/L and (iii) Extension of 400kV Bikaner-II S/s for termination of 400kV Bikaner-II Bikaner-III T/L under "Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) (Bikaner Complex)** |
| d) | Location | **Bikaner & Neemrana, Rajasthan** |
| e) | Transport Facilities | Road/Train<br>Nearest Rail Head For **Bikaner-III -**Bikaner<br>Nearest Rail Head For **Bikaner-II -** Bikaner<br>Nearest Rail Head For **Neemrana -II -** Alwar |
| | SITE CONDITIONS | |
| f) | Max. ambient air temp. | 50°C |
| g) | Min. ambient air temp. | 0°C |
| h) | Max. design ambient temp. | 50°C |
| i) | Costal area consideration | No |
| j) | Altitude above sea level | Less than 1000 meter above mean sea level (MSL) |
| k) | Seismic Zone | NBC2016 |
| l) | Wind Zone | NBC2016 |
| m) | Snow fall | NIL |
| | | |
| | Main Electrical Parameters: | |
| n) | Fault Levels: | 765kV: 50kA for 1 Sec<br>400kV: 63kA for 1 Sec<br>220kV: 50kA for 1 sec |
| o) | Creepage Distance | 25mm/kV for All Equipment i.e BPI/Bushings, CB, Isolator, CT, CVT, LA, WT, NCT etc. and for insulator string/ long rod insulators/ outdoor bushings - 31 mm/kV |

# Site Information -2

| S.No. | Particular | Details |
|---|---|---|
| a) | Owner | Power Grid Corporation of India Limited (POWERGRID) |
| b) | Customer | Power Grid Corporation of India Limited (POWERGRID) |
| c) | Project Title | ***Substation Package SS01 for (a) Extn. of 765kV Sikar-II Substation, (b) Extn. of 765kV Khetri Substation; associated with "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III-Part D" through tariff based competitive bidding (TBCB) route prior to RfP bid submission by POWERGRID to BPC."*** |
| d) | Location | Sikar - II and Khetri, Rajasthan |
| e) | Transport Facilities | Road/Train<br>Nearest Rail Head for **Sikar-II** project-Sikar<br>Nearest Rail Head for **Khetri** project- Khetri |
| | SITE CONDITIONS | |
| f) | Max. ambient air temp. | 50°C |
| g) | Min. ambient air temp. | 0°C |
| h) | Max. design ambient temp. | 50°C |
| i) | Costal area consideration | No |
| j) | Altitude above sea level | Less than 1000 meter above mean sea level (MSL) |
| k) | Pollution Severity | High Pollution level |
| l) | Seismic Zone | As per IS – 1893 |
| m) | Wind Zone | As per National Building Code (NBC) 2016 |
| n) | Snow fall | NIL |
| | Main Electrical Parameters: | |
| o) | Fault Levels: | 765kV: 50kA for 1 s |
| p) | Creepage Distance | 25mm/kV for All Equipment i.e BPI, CB, Isolator, CT, CVT, LA, WT, NCT etc. and 31 mm/kV for insulator string/ long rod insulators/ bushings. |

# GENERAL TECHNICAL REQUIREMENTS - SECTION 3

## 1.0 FOREWORD

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

The Supplier shall note that the standards mentioned herein are not mutually exclusive or complete in themselves, but are intended to complement each other, with minimum repetition, to define the requirements of the Specification. In the event of a conflict between requirements of any two clauses of the Specification/ documents or requirements of different codes/ standards specified, the more stringent requirement as per the interpretation of the owner shall apply, unless confirmed otherwise by the owner in writing based on a written request from the Supplier.

In case of conflicting requirements between this document (General Technical Requirement Section 3) and equipment specification (Section 1 & Section 2), equipment specification shall prevail.

When specific requirements stipulated in the Specification exceed or change those required by the applicable standards, the stipulations of the Specification shall take precedence.

Unless specifically agreed to by the Purchaser prior to Award of Contract, the Work shall be in accordance with the standards indicated and the requirements of the Specification. The Supplier shall be held responsible for any deviation.

In case of conflict between the various standards, the decision of owner shall be binding & final.

The following words and expressions shall have the meanings hereby assigned to them throughout this document

"Employer/Owner" means Power Grid Corporation of India Ltd.

"Purchaser" means Bharat Heavy Electricals Limited.

"Supplier/Manufacturer/Bidder" means the person or persons, firm or company assigned to execute the works as defined by the scope of supply, described here.

"Specification" refers to this document.

The supplier should be approved by Power Grid. If not, it is the responsibility of the vendor to be assessed and approved by Power Grid, before placement of order by BHEL. Any cost involved in vendor assessment/approval must be borne by the vendor himself.

## 2.0 GENERAL REQUIREMENT

2.1 a) All equipment/materials/items, as applicable under present scope of works, shall be supplied by domestic manufacturers only with **minimum Local Content for individual items as listed annexure-K (rev.01)**

Any imported equipment/material/item/parts/component (comprising of embedded systems) to be supplied under the contract shall be tested in the certified laboratories to check for any kind of embedded malware/trojans/cyber threats and for adherence to Indian Standards as per the directions issued by Ministry of Power/Govt. of India from time to time. In case of such import from specified "prior reference" countries, the requirement of prior permission from the Govt. of India

including protocol for testing in certified and designated laboratories by Ministry of Power/Govt. of India shall also be complied with by the Bidder.

The bidder/contractor shall list out the products and components producing Toxic e-waste under the contract and shall furnish to the Employer the procedure of safe disposal at the time of closing of the contract.

2.1 b) The Supplier/Manufacturer 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 Bidder 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, 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 Deleted.

2.6 Deleted.

## 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 offered by the Bidder shall at least conform to the requirements specified under relevant IS standard. In case of discrepancy between IS and other international standard, provisions of IS shall prevail. The Bidder shall also note that the list of standards presented in Annexure-C is not complete. Whenever necessary, the list of standards shall be considered in conjunction with specific IS. If the IS standard is not available for an equipment/material, then other applicable International standard (IEC/Equivalent), as per the specification, shall be accepted.

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

3.4 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.

3.5 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 Switching surge over voltage and power frequency over voltage is specified in the system parameters below. In case of the 400kV 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 as above at Sl.No.4.3 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 | | | |
| 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 | 508kV | 320kV | - |

| | | | | |
|---|---|---|---|---|
| 7. | Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz | 2500 µV at 508kV rms | 1000 µV at 266kV rms | 1000 µV at 156kV rms |
| 8. | Minimum creepage distance - for Equipment other than Insulator string | 20000 mm | 10500 mm | 6125 mm |
| | Minimum creepage distance - for Insulator String | 24800 mm | 13020 mm | 7595 mm |
| 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 | 50kA | 63 kA | 50kA |
| 11. | System neutral earthing | Effectively earthed | Effectively earthed | Effectively earthed |

**66kV, 52kV and 33kV System**

| SL No | Description of parameters | 66kV System | 52 kV System | 33 kV System |
|---|---|---|---|---|
| 1. | System operating voltage | 66kV | 52kV | 33kV |
| 2. | Maximum operating voltage of the system(rms) | 72.5kV | 52kV | 36kV |
| 3. | Rated frequency | 50Hz | 50Hz | 50Hz |
| 4. | No. of phase | 3 | 3 | 3 |
| 5. | Rated Insulation levels | | | |
| i) | Full wave impulse withstand voltage (1.2/50 microsec.) | 325 kVp | 250 kVp | 170 kVp |
| ii) | One minute power frequency dry and wet withstand voltage (rms) | 140kV | 95kV | 70kV |
| 6. | Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz | - | - | - |

| | | | | |
|---|---|---|---|---|
| 7. | Minimum creepage distance | 1813 mm (2248mm for coastal area) | 1300mm (1612 mm for coastal area) | 900 mm (1116m m for coastal area) |
| 8. | Min. Clearance | | | |
| i. | Phase to phase | 750 mm | 530mm | 320 mm |
| ii. | Phase to earth | 630 mm | 480mm | 320 mm |
| iii. | Sectional clearances | 3100 mm | 3100mm | 2800 mm |
| 9. | Rated short circuit current | 25kA for 3 Sec* | 25kA for 1 Sec | 25 kA for 3 sec |
| 10. | System neutral earthing | 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/IS.
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.
4. "*" For tertiary loading Equipment's fault level shall be 25kA for 3 Sec.

## 5.0 ENGINEERING DATA AND DRAWINGS

5.1 Deleted.

5.2 Deleted.

### 5.3 Drawings

5.3.1 All drawings submitted by the Bidder 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 Bidder 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 Bidder's risk. The Bidder 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 Bidder's drawing or work by the Employer shall not relieve the bidder of any of his responsibilities and liabilities under the Contract.

5.6 All engineering data submitted by the Bidder 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 | 15 days |
| ii) | Resubmission (whenever required) | Within 3 (three) weeks from date of comments |
| iii) | Approval or comments | Within 3 (three) weeks of receipt of resubmission |
| iv) | Furnishing of distribution copies (2 hard copies to each substation and one scanned copy (pdf format) | Within 3 (three) weeks of receipt of resubmission |
| v) | Furnishing of distribution copies of test reports | |
| | a) Type test reports (one scanned softcopy in pdf format to each substation plus one for corporate centre & one hardcopy per substation) | 2 weeks from the date of final approval |
| | b) Routine Test Reports (one copy for each substation) | -do- |

| | | |
|---|---|---|
| vi) | Furnishing of instruction/ operation manuals (2 copies per substation and one softcopy (pdf format) for corporate centre & per substation) | On completion of Engineering |
| vii) | As built drawings (two sets of hardcopy per substation & one softcopy (pdf format) for corporate centre & per substation) | On completion of entire works |

**NOTE :**

(1) The bidder may please note that all resubmissions must incorporate all comments given in the earlier submission by the Employer or adequate justification for not incorporating the same must be submitted failing which the submission of documents is likely to be returned.

(2) Deleted.

(3) The instruction Manuals shall contain full details of drawings of all equipment being supplied under this contract, their exploded diagrams with complete instructions for storage, handling, erection, commissioning, testing, operation, trouble shooting, servicing and overhauling procedures.

(4) If after the commissioning and initial operation of the substation, the instruction manuals require any modifications/additions/changes, the same shall be incorporated and the updated final instruction manuals shall be submitted by the Contractor to the Employer.

(5) The Bidder shall furnish to the Employer catalogues of spare parts.

(6) Deleted.

5.8 Deleted.

## 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 Bidder.

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 fulfil 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 Deleted.

6.1.6 The Bidder 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 Bidder shall apply all operational lubricants to the equipment installed by him.

6.1.7 All oil, grease and other consumables used in the Works/Equipment shall be purchased in India unless the Bidder 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 source of oil/grease /other consumables in the GTP/Drawings, 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. Onoff 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/IEC60947; IS/IEC/60529 . Type test report for of relevant 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, Customer Name, year of manufacture, equipment name, type or serial number together with details of the loading conditions under which the item of substation in question has been designed to operate, and such diagram plates as may be required by the Employer. The rating plate of each equipment shall be according to IS/ 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 Bidder unless specifically excluded under the exclusions in these specifications and documents.

## 7.0 DESIGN IMPROVEMENTS / COORDINATION

7.1 Deleted.

7.2 Deleted.

7.3 The Bidder 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 Bidder has to coordinate designs and terminations with the agencies (if any) who are Consultants/Bidder for the Employer. The names of agencies shall be intimated to the successful bidders.

7.5 The Bidder 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 Bidder 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 Bidder's Works or at his Sub-Bidder'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.

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-Bidder'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 Bidder/his vendor's quality management and control activities.

8.2 **Quality Assurance Documents**

The Bidder 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.

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 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.
Bidder 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**: Bidder 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.

**Level – II**: Bidder 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
Bidder and CIP/MICC will be issued by POWERGRID. Else, Bidder would submit their test reports/certificates to POWERGRID. CIP/MICC will be issued by POWERGRID based on review of test reports/ certificates.

**Level - III**: Bidder 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 Bidder and CIP will be issued by POWERGRID. Else, Bidder 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**: Bidder 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 Bidder 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, Bidder 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 Bidder'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 Bidder shall obtain for the Employer and for his duly authorised representative permission to inspect as if the works were manufactured or assembled on the Bidder'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 Bidder 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 Bidder shall give the Employer/Inspector Twenty one (21) days written notice of any material being ready for testing for each stage of 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 Bidder'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 Bidder 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. Bidder 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 Bidder 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 Bidder 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 Bidder shall minimize the number of inspection calls by offering optimum quantities in each inspection call at the respective manufacturer's works.

8.3.8 Bidder 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 Bidder 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 Bidder, 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 Bidder 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 Bidder's or Sub-Bidder'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 Bidder/manufacturer but if the tests are not witnessed by the Employer/IE, the certificate shall be issued within fifteen (15) days of receipt of the Bidder's Test certificate by the Employer/IE. Bidder shall, on completion of all tests, submit test 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 Bidder or of any Sub-Bidder, the Bidder, 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. Bidder 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 Bidder 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 Bidder shall ensure that all possible steps are taken to avoid damages to the equipment during transport, storage and erection.

8.3.20 Deleted.

8.3.21 Bidder 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 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 Bidder's Works or at his Sub-Bidder's premises or at the Employer's site or at any other place of Work based on performance of Bidder/sub-bidder.

## 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 along with 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/representative authorized by POWERGRID/representative of Utility /representative of accredited test lab/ representative of The National Accreditation Board for Certification Bodies (NABCB) certified agency shall also be acceptable.

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

| S.No | Name of Equipment | Validity of type test (in years ) |
|---|---|---|
| 1 | Power Transformer | 5 |
| 2 | LT Transformer | 5 |
| 3 | Shunt Reactor | 5 |
| 4 | OLTC | 10 |
| 5 | Bushing of Power Transformers/Reactors | 7 |
| 6 | Fittings and accessories for Power transformers & Reactors | 10 |
| 7 | Circuit Breaker | 10 |
| 8 | Isolator | 10 |
| 9 | Lighting Arrester | 10 |
| 10 | Wave Trap | 10 |
| 11 | Instrument transformer | 7 |
| 12 | GIS & Hybrid GIS | 10 |

| | | |
|---|---|---|
| 13 | LT Switchgear | 10 |
| 14 | Cable and associated accessories | 10 |
| 15 | Relays | 7 |
| 16 | Capacitors | 10 |
| 17 | Battery & Battery Charger | 7 |
| 18 | Conductor & Earth wire | 10 |
| 19 | Insulators ( Porcelain/Glass) | 10 |
| 20 | Composite Insulators | 5 |
| 21 | PLCC | 5 |

Note :
For all other equipment's validity of type test shall be 10 years from date of NOA.

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 waival, test charges for the same shall not be payable.

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 except in the case of re-deputation if any, necessitated due to no fault of the Employer.

9.5 The list of makes of various items, for which Type test reports are not required to be submitted are specified at Annexure-J.

## 10.0 Deleted.

## 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 Bidder 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 Bidder 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/BHEL 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. For items lower than 6mm thickness requirement of coating thickness shall be as per relevant ASTM. For surface which shall be embedded in concrete, the zinc coating shall be 610 gm/sq.m minimum.

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

12.2.3 After galvanizing, no drilling or welding shall be performed on the galvanized parts of the equipment excepting that nuts may be threaded after galvanizing. Sodium dichromate 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
- 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 IS6005 “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 Hot Phosphating shall be done for phosphating process under pretreatment of sheets 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 |
|---|---|---|---|
| **Fire Protection System** | | | |
| 1 | Hydrant and Emulsifier system pipeline/NIFPS | FIRE RED | - |
| 2 | Emulsifier system detection line – water | FIRE RED | Sea Green |
| 3 | Emulsifier system detection line –Air | FIRE RED | Sky Blue |
| 4 | Pylon support pipes | FIRE RED | |
| **Air Conditioning Plant** | | | |
| 5 | Refrigerant gas pipeline – at compressor suction | Canary Yellow | - |
| 6 | Refrigerant gas pipeline – at compressor discharge | Canary Yellow | Red |
| 7 | Refrigerant liquid pipeline | Dark Admiralty Green | - |
| 8 | Chilled water pipeline | Sea Green | - |
| 9 | Condenser water pipeline | Sea Green | Dark Blue |

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.

12.3.8 Band colour is required for Emulsifier system detection line only if both water and air detection lines are present at the same substation. Further, band colour shall be applied at an interval of 2 meters approx. along the length and minimum width of band shall be 25mm.

**13.0** Deleted.

**14.0 TOOLS**

**14.1 Deleted.**

**14.2 SPECIAL TOOLS AND TACKLES**

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

## 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%.

15.2 Pickup value of binary input modules of Intelligent Electronic Devices, Digital protection couplers, Analog protection couplers shall not be less than 50% of the specified rated station auxiliary DC supply voltage level.

## 16.0 SUPPORT STRUCTURE (ONLY OF CIRCUIT BREAKER)

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/polymer part of the bushing, porcelain/polymer 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 (For Lightning Arrester & Wave Trap only)

17.1 All power clamps and connectors shall conform to IS:5561 or other equivalent international standard and shall be made of materials listed below :

| Sl. No. | Description | Materials |
|---|---|---|
| a) | For connecting ACSR conductors/AAC conductors/ Aluminium tube | Aluminum alloy casting, conforming to designation **4600** of IS:617 and all test shall conform to IS:617 |
| b) | For connecting equipment terminals mad of copper with ACSR conductors/AAC conductors/ Aluminium tube | Bimetallic connectors made from aluminum alloy casting, conforming to designation **4600** of IS:617 with 2mm thick bimetallic liner/strip and all test shall conform to IS:617 |
| c) | For connecting G.I | Galvanised mild steel shield wire |
| d) | Bolts, nuts & plain washers | Electro-galvanised for sizes below M12, for others hot dip galvanised. |
| e) | Spring washers | Electro-galvanised mild steel suitable for atleast service condition-3 as per IS:1573 |

17.2 Necessary clamps and connectors shall be supplied for all equipment and connections. If corona rings are required to meet these requirements they shall be considered as part of that equipment and included in the scope of work.

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

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

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

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

17.7 Flexible connectors, braids or laminated straps made for the terminal clamps for bus posts shall be suitable for both expansion or through (fixed/sliding) type connection of IPS AL tube as required. In both the cases the clamp height (top of the mounting pad to centre line of the tube) should be same.

17.8 Current carrying parts (500A and above) of the clamp/connector shall be provided with minimum four numbers of bolts preferably for 132kV and above.

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

17.10 Power Clamps and connectors shall be designed to control corona as per requirement.

**17.11 Tests**

Clamps and connectors should be type tested on minimum three samples as per IS:5561 and shall also be subjected to routine tests as per IS:5561. Following type test reports shall be submitted for approval. Type test once conducted shall hold good. The requirement of test conducted within last ten years, shall not be applicable.

i) Temperature rise test (maximum temperature rise allowed is 35°C over 50°C ambient)

ii) Short time current test

iii) Corona (dry) and RIV (dry) test [for 132kV and above voltage level clamps]

iv) Resistance test and Pullout strength test

v) Cantilever Strength test on bus support clamps & connectors

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

18.1 All types of boxes, cabinets etc. shall generally conform to & be tested in accordance with IS/IEC 61439-0, as applicable, and the clauses given below:

18.2 Control cabinets, junction boxes, Marshalling boxes & terminal boxes, Out door ACDB cum DCDB panels shall be made of stainless steel of atleast 1.5 mm thick or aluminum enclosure of atleast 1.6 mm thick and shall be dust, water and vermin proof. Stainless steel used shall be of grade SS304 (SS316 for coastal area) or better. The box shall be properly braced to prevent wobbling. There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation. In case of aluminum enclosed box the thickness of aluminum shall be such that it provides adequate rigidity and long life as comparable with sheet steel of specified thickness.

Control cabinets, junction boxes, marshalling boxes & terminal boxes, out-door ACDB cum DCDB panels shall have adequate space/clearance as per guidelines/technical specifications to access/replace any component. Necessary component labelling to be also done on non-conducting sheet.

For CONTROL CABINETS, JUNCTION BOXES, TERMINAL BOXES MARSHALLING BOXES

FOR OUTDOOR EQUIPMENT Junction Box, wire should be as per IS or equivalent IEC with FRLS grade.

Machine laid PU Foam gasket may be permitted for use in Control Cabinets etc.

18.3 A canopy and sealing arrangements for operating rods shall be provided in marshalling boxes / Control cabinets to prevent ingress of rain water.

18.4 Cabinet/boxes with width more than 700 mm shall be provided with double hinged doors with padlocking arrangements. The distance between two hinges shall be adequate to ensure uniform sealing pressure against atmosphere.

18.5 All doors, removable covers and plates shall be gasketed all around with suitably profiled EPDM/Neoprene/PU gaskets. The gasket shall be tested in accordance with approved quality plan, IS:11149 and IS:3400. Ventilating Louvers, if provided, shall have screen and filters. The screen shall be fine wire mesh made of brass.

Further, the gasketing arrangement shall be such that gaskets are pasted in slots (in door fabrication/gasket itself) in order to prevent ingression of dust and moisture inside the panels so that no internal rusting occurs in panels during the operation of the equipment.

18.6 All boxes/cabinets shall be designed for the entry of cables by means of weather proof and dust-proof connections. Boxes and cabinets shall be designed with generous clearances to avoid interference between the wiring entering from below and any terminal blocks or accessories

mounted within the box or cabinet. Suitable cable gland plate above the base of the marshalling kiosk/box shall be provided for this purpose along with the proper blanking plates. Necessary number of cable glands shall be supplied and fitted on this gland plate. Gland plate shall have provision for some future glands to be provided later, if required. The Nickel plated glands shall be dust proof, screw on & double compression type and made of brass. The gland shall have provision for securing armour of the cable separately and shall be provided with earthing tag. The glands shall conform to BS:6121.

18.7 A 240V, single phase, 50 Hz, 15 amp AC plug and socket shall be provided in the cabinet with ON-OFF switch for connection of hand lamps. Plug and socket shall be of industrial grade.

18.8 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/IEC60947 including application of 1kV rms for 1 (one) minute, after IP-55 test.

## 19.0 Deleted.

## 20.0 TERMINAL BLOCKS AND WIRING

20.1 Control and instrument leads from the switchboards or from other equipment will be brought to terminal boxes or control cabinets in conduits. All interphase and external connections to equipment or to control cubicles will be made through terminal blocks.

20.2 Terminal blocks shall be 650V grade and have continuous rating to carry the maximum expected current on the terminals and non-breakable type. These shall be of moulded piece, complete with insulated barriers, stud type terminals, washers, nuts and lock nuts. Screw clamp, overall insulated, insertion type, rail mounted terminals can be used in place of stud type terminals. But 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 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, nondeteriorating 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

## 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 ratings shall be such as to ensure selective clearance of sub-circuit faults. Potential circuits for relaying and metering shall be protected by HRC fuses.

21.3.2 All fuses shall be of HRC cartridge type conforming to relevant IS mounted on plug-in type fuse bases. Miniature circuit breakers with thermal protection and alarm contacts will also be accepted. All accessible live connection to fuse bases shall be adequately shrouded. Fuses shall have operation indicators for indicating blown fuse condition. Fuse carrier base shall have imprints of the fuse rating and voltage.

## 22.0 BUSHINGS, HOLLOW COLUMN INSULATORS, SUPPORT INSULATORS:

22.1 Bushings shall be manufactured and tested in accordance with IS:2099 & IEC-60137 while hollow column insulators shall be manufactured and tested in accordance with IEC-62155/IS:5621.The support insulators shall be manufactured and tested as per IS:2544/IEC-60168 and IEC-60273. The insulators shall also conform to IEC-60815 as applicable.

The bidder may also offer composite hollow insulators, conforming to IEC-61462.

22.2 Support insulators, bushings and hollow column insulators shall be manufactured from high quality porcelain. Porcelain used shall be homogeneous, free from laminations, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and shall be thoroughly vitrified tough and impervious to moisture.

22.3 Glazing of the porcelain shall be uniform brown in colour, free from blisters, burrs and similar other defects.

22.4 Support insulators/bushings/hollow column insulators shall be designed to have ample insulation, mechanical strength and rigidity for the conditions under which they will be used.

22.5 When operating at normal rated voltage there shall be no electric discharge between the conductors and bushing which would cause corrosion or injury to conductors, insulators or supports by the formation of substances produced by chemical action. No radio interference shall be caused by the insulators/bushings when operating at the normal rated voltage.

22.6 Bushing porcelain shall be robust and capable of withstanding the internal pressures likely to occur in service. The design and location of clamps and the shape and the strength of the porcelain flange securing the bushing to the tank shall be such that there is no risk of fracture. All portions of the assembled porcelain enclosures and supports other than gaskets, which may in any way be exposed to the atmosphere shall be composed of completely non hygroscopic material such as metal or glazed porcelain.

22.7 All iron parts shall be hot dip galvanised and all joints shall be air tight. Surface of joints shall be trued up porcelain parts by grinding and metal parts by machining. Insulator/bushing design shall be such as to ensure a uniform compressive pressure on the joints.

22.8 Void

22.9 Deleted.

## 23.0 MOTORS

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

### 23.1 Enclosures

a) Motors to be installed outdoor without enclosure shall have hose proof enclosure equivalent to IP-55 as per IS: 4691. For motors to be installed indoor i.e. inside a box, the motor enclosure, shall be dust proof equivalent to IP-44 as per IS: 4691.

b) Two independent earthing points shall be provided on opposite sides of the motor for bolted connection of earthing conductor.

c) Motors shall have drain plugs so located that they will drain water resulting from condensation or other causes from all pockets in the motor casing.

d) Motors weighing more than 25 Kg. shall be provided with eyebolts, lugs or other means to facilitate lifting.

**23.2 Operational Features**

a) Continuous motor rating (name plate rating) shall be at least ten (10) percent above the maximum load demand of the driven equipment at design duty point and the motor shall not be over loaded at any operating point of driven equipment that will rise in service.

b) Motor shall be capable at giving rated output without reduction in the expected life span when operated continuously in the system having the particulars as given in Clause 15.0 of this Section.

**23.3 Starting Requirements:**

a) All induction motors shall be suitable for full voltage direct-on-line starting. These shall be capable of starting and accelerating to the rated speed alongwith the driven equipment without exceeding the acceptable winding temperature even when the supply voltage drops down to 80% of the rated voltage.

b) Motors shall be capable of withstanding the electrodynamic stresses and heating imposed if it is started at a voltage of 110% of the rated value.

c) The locked rotor current shall not exceed six (6) times the rated full load current for all motors, subject to tolerance as given in IS:325.

d) Motors when started with the driven equipment imposing full starting torque under the supply voltage conditions specified under Clause 15.0 shall be capable of withstanding atleast two successive starts from cold condition at room temperature and one start from hot condition without injurious heating of winding. The motors shall also be suitable for three equally spread starts per hour under the above referred supply condition.

e) The locked rotor withstand time under hot condition at 110% of rated voltage shall be more than starting time with the driven equipment of minimum permissible voltage by at least two seconds or 15% of the accelerating time whichever is greater. In case it is not possible to meet the above requirement, the Bidder shall offer centrifugal type speed switch mounted on the motor shaft which shall remain closed for speed lower than 20% and open for speeds above 20% of the rated speed. The speed switch shall be capable of withstanding 120% of the rated speed in either direction of rotation.

**23.4 Running Requirements:**

a) The maximum permissible temperature rise over the ambient temperature of 50 degree C shall be within the limits specified in IS:325 (for 3-phase induction motors) after adjustment due to increased ambient temperature specified.

b) The double amplitude of motor vibration shall be within the limits specified in IS: 4729. Vibration shall also be within the limits specified by the relevant standard for the driven equipment when measured at the motor bearings.

c) All the induction motors shall be capable of running at 80% of rated voltage for a period of 5 minutes with rated load commencing from hot condition.

23.5 **TESTING AND COMMISSIONING**

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

(a) Insulation resistance.

(b) Phase sequence and proper direction of rotation.

(c) Any motor operating incorrectly shall be checked to determine the cause and the conditions corrected.

ANNEXURE-A

## CORONA AND RADIO INTERFERENCE VOLTAGE (RIV) TEST

**1. General**

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

**2. Test Levels:**

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

**3. Test Methods for RIV:**

3.1 RIV tests shall be made according to measuring circuit as per International Special-Committee on Radio Interference (CISPR) Publication 16-1(1993) Part -1. The measuring circuit shall preferably be tuned to frequency with 10% of 0.5 Mhz but other frequencies in the range of 0.5 MHz to 2 MHz may be used, the measuring frequency being recorded. The results shall be in microvolts.

3.2 Alternatively, RIV tests shall be carried out in accordance with relevant IEC of respective equipment or NEMA standard Publication No. 107-1964.

3.3 In measurement of, RIV, temporary additional external corona shielding may be provided. In measurements of RIV only standard fittings of identical type supplied with the equipment and a simulation of the connections as used in the actual installation will be permitted in the vicinity within 3.5 meters of terminals.

3.4 Ambient noise shall be measured before and after each series of tests to ensure that there is no variation in ambient noise level. If variation is present, the lowest ambient noise level will form basis for the measurements. RIV levels shall be measured at increasing and decreasing voltages of 85%, 100%, and 110% of the specified RIV test voltage for all equipment unless otherwise specified. The specified RIV test voltage for 765kV, 400 kV, 220 KV is listed in the detailed specification together with maximum permissible RIV level in microvolts.

3.5 The metering instruments shall be as per CISPR recommendation or equivalent device so long as it has been used by other testing authorities.

3.6 The RIV measurement may be made with a noise meter. A calibration procedure of the frequency to which noise meter shall be tuned shall establish the ratio of voltage at the high voltage terminal to voltage read by noise meter.

**4. Test Methods for Visible Corona**

The purpose of this test is to determine the corona extinction voltage of apparatus, connectors etc. The test shall be carried out in the same manner as RIV test described above with the exception that RIV measurements are not required during test and a search technique shall be used near the onset and extinction voltage, when the test voltage is raised and lowered to determine their precise values. The test voltage shall be raised to 110% of specified corona extinction voltage and maintained there for five minutes. In case corona inception does not take place at 110%, test shall be stopped,

otherwise test shall be continued and the voltage will then be decreased slowly until all visible corona disappears. The procedure shall be repeated at least 3 times with corona inception and extinction voltage recorded each time. The corona extinction voltage for purposes of determining compliance with the specification shall be the lowest of the three values at which visible corona (negative or positive polarity) disappears.

The test to determine the visible corona extinction voltage need not be carried out simultaneously with test to determine RIV levels.

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

**5. Test Records:**

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

a) Background noise before and after test.

b) Detailed procedure of application of test voltage.

c) Measurements of RIV levels expressed in micro volts at each level.

d) Results and observations with regard to location and type of interference sources detected at each step.

e) Test voltage shall be recorded when measured RIV passes through 100 microvolts in each direction.

f) Onset and extinction of visual corona for each of the four tests required shall be recorded.

## SEISMIC WITHSTAND TEST PROCEDURE

The seismic withstanding test on the complete equipment (for 400kV and above) shall be carried out along with supporting structure. Seismic Withstand Test carried out using either lattice or pipe structure is acceptable." **Seismic Calculations certified by NABL Labs shall also be acceptable**

The Bidder shall arrange to transport the structure from his Contractor's premises/ POWERGRID sites for the purpose of seismic withstand test only.

The seismic level specified shall be applied at the base of the structure. The accelerometers shall be provided at the Terminal Pad of the equipment and any other point as agreed by the Employer. The seismic test shall be carried out in all possible combinations of the equipment. The seismic test procedure shall be furnished for approval of the Employer.

The frequency range for the earthquake spectra shall be as per IEC–62271-300.

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 Hexafloride |
| 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 |

| 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 | Techniquest 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 |

| CODES | TITLE |
|---|---|
| ANSI-CG,1EEE-4 | Standard Techniques for High Voltage Testing |
| IEC 60076 | Power transformers |
| IEC 60076-1 | Part 1: General |
| IEC 60076-2 | Part 2: Temperature rise |
| IEC 60076-3 | Part 3: Insulation levels, dielectric tests and external clearances in air |
| IEC 60076-4 | Part 4: Guide to the lightning impulse and switching impulse testing - Power transformers and reactors |
| IEC 60076-3-1 | Part 3-1: Insulation Levels and Dielectric Tests –External Clearances in Air |
| IEC 60076-5 | Part 5: Ability to withstand short circuit |
| IEC 60076-6 | Part 6: Reactors |
| IEC 60076-7 | Part 7: Loading guide for oil-immersed power transformers |
| IEC 60076-8 | Part 8: Application guide |
| IEC 60076-10 | Part 10: Determination of sound levels |
| IEC 60076-10-1 | Part 10-1: Determination of sound levels - Application guide |
| IEC 60076-11 | Part 11: Dry-type transformers |
| IEC 60076-12 | Part 12: Loading guide for dry-type power transformers |
| IEC 60076-13 | Part 13: Self-protected liquid-filled transformers |
| IEC 60076-14 | Part 14: Design and application of liquid-immersed power transformers using high-temperature insulation materials |
| IEC 60076-15 | Part 15: Gas-filled power transformers |
| IEC 60076-16 | Part 16: Transformers for wind turbine applications |
| IEC 60076-18 | Part 18: Measurement of frequency response |
| IEC 60076-19 | Part 19: Rules for the determination of uncertainties in the measurement of losses in power transformers and reactors |
| IEC 60076-21 | Part 21: Standard requirements, terminology, and test code for step-voltage regulators |
| IEC 60044, BS 3938 | Current transformers |
| IEC 60050 | International Electrotechnical Vocabulary |
| IEC 60050(421) | International Electrotechnical vocabulary- Chapter 421 : Power Transformers and Reactors |
| IEC 60060 | High Voltage test techniques |
| IEC 60060-1 | General definitions and test requirements |
| IEC 60060-2 | Measuring systems |
| IEC 60071 | Insulation co-ordination |
| IEC 60071-1 | Part 1: Definitions, principles and rules |
| IEC 60071-2 | Part 2 : Application guide |
| IEC 60137 | Bushing for alternating voltage above 1000V |
| IEC 60214 | On-Load Tap changers |
| IEC 255-21-3 | Relays vibration |

| CODES | TITLE |
|---|---|
| IEC 60270 | Partial discharge measurements |
| IEC 60296 | Specification for Unused Mineral Oil for Transformers and Switchgear |
| IEC 60422 | Supervision and Maintenance guide for Mineral Insulating Oil in Electrical Equipment |
| IEC 60475 | Method of Sampling Liquid dielectrics |
| IEC 60529 | Classification of Degrees of Protection provided by Enclosures |
| IEC 60542 | Application Guide for On-Load Tap-Changers |
| IEC 60567 | Guide for the Sampling of Gases and of Oil from Oil-filled Electrical Equipment for the Analysis of Free and Dissolved Gases |
| IEC 60651 | Sound Level Meters |
| IEC 61083 | Digital Recorders and Software for High Voltage Impulse testing |
| IEC 61083-1 | Part 1: Requirements for digital recorders in high voltage impulse tests |
| IEC 61083-2 | Part 2: Evaluation of software used for the determination of the parameters of impulse waveforms |
| CISPR 16 | Specification for radio disturbance and immunity measuring apparatus |
| CISPR 16-1 | Radio disturbance and immunity measuring apparatus |
| CISPR-18 | Radio Interference Characteristics of Power Lines and High Voltage Equipment |
| ISO 9001 | Quality system-Model for Quality Assurance in Design /development |
| Cigre Publication 202 | Guidelines for conducting design reviews for transformers 100 MVA and 123 kV and above. August 2002-Cigre Working Group 12.22 |
| WG 12-15 | Guide for Customers Specifications for Transformers 100 MVA and 123 kV and above |
| WG 12 19 | Short Circuit Performance of Transformers. |
| BS-4360 | Specification for weldable structural steel |
| BS-5135 | Specification for arc welding of carbon and carbon manganese steels |
| BS-5500 | Specification for unfired fusion welded pressure vessels |
| IS-3618 | Specification for phosphate treatment of iron & steel for protection against corrosion |
| IS-6005 | Code of practice for phosphating of Iron and Steel |
| ISO-8501 | Preparation of steel surface before application of Paints and related product |
| IEC-60599 | Mineral oil impregnated electrical equipment in service – guide to the interpretation of dissolved and free gases analysis |
| IS-10593 | Method of evaluating the analysis of gases in oil filled electrical equipment in service |
| IS-2099 | Bushings for alternating voltages above 1000 volts |

| CODES | TITLE |
|---|---|
| IS-3347 Part I to 8 | Dimension for porcelain transformer bushing |
| DIN-42530 | Bushing up to 1000kV from 250A-5000A for liquid filled Transformer |
| IS-2026 Part 1 to 5 | Power transformer |
| IS-4691 | Degrees of protection provided by enclosure for rotating electrical machinery |
| IEC-60034-5 | Degrees of protection provided by integral design of rotating electrical machines(IP Code) classification |
| IS:325 / IEC -60034 | Performance of cooling fan / oil pump motor |
| IS-13947 part 1 to 5 | Specification for low voltage switchgear and control gear |
| IS:3400 | Methods of test for vulcanised rubber |
| IS:7016 part 1 to 14 | Methods of test for coated and treated fabrics |
| IS:803 | Code of practice for design, fabrication and erection of vertical mild steel cylindrical welded oil storage tanks. |
| IS:3637 | Gas operated Relays |
| IS:335 | New Insulating oils – Specification |
| IEC-62271-203 | Gas insulated metal enclosed switchgear for rated voltage above 52kV |
| IEC-61639 | Direct connection between power transformers and gas-insulated metal enclosed switchgear for rated voltages of 52.5 kV and above. |
| IS:3400 / BS 903 / IS:7016 | Air cell ( Flexible Air Separator) |
| IEC 60529 / IP : 55 | Degree of protection for cooler control cabinet , MOLG, Cooling fan , oil pump, Buchholz Relay |
| IEC 60529 / IP : 56 | Degree of protection for Pressure Relief Device |
| IEC 60529 / IP : 43 | Degree of protection for Remote tap Changer cubicle (RTCC) |
| | |
| **CIRCUIT BREAKERS** | |
| IEC-62271-100 | High-voltage switchgear and control gear - Part 100: Alternating current circuit-breakers |
| IEC-62271-101 | High-voltage switchgear and control gear - Part 101: Synthetic testing |
| IEC-62155 | Hollow pressurized and unpressurized ceramic and glass insulators for use in electrical equipment with rated voltages greater than 1000 V |
| IEC-62271-110 | High-voltage switchgear and control gear - Part 110: Inductive load switching |
| IEC-62271-109 | High-voltage switchgear and control gear - Part 110: Inductive load switching |
| **CURRENT TRANSFORMERS, VOLTAGE TRANSFORMERS AND COUPLING CAPACITOR VOLTAGE TRANSFORMERS** | |
| IS-2705- (P1 to P4) | Current Transformers |

| CODES | TITLE |
|---|---|
| IS:3156- (P1 to P4) | Voltage Transformers |
| IS-4379 | Identification of the Contents of Industrial Gas Cylinders |
| IEC-61869 (Part-1) | Instrument transformers - Part 1: General requirements |
| IEC-61869 (Part-2) | Instrument transformers - Part 2: Additional requirements for current transformers |
| IEC-61869 (Part-3) | Instrument transformers - Part 3: Additional requirements for inductive voltage transformers |
| IEC-61869 (Part-4) | Instrument transformers - Part 4: Additional requirements for combined transformers |
| IEC-61869 (Part-5) | Instrument transformers - Part 5: Additional requirements for capacitor voltage transformers |
| IEC-61869 (Part-6) | Instrument transformers - Part 6: Additional general requirements for low-power instrument transformers |
| IEC-61869 (Part-9) | Instrument transformers - Part 9: Digital interface for instrument transformers |
| IEC-61869 (Part-102) | Instrument transformers - Part 102: Ferroresonance oscillations in substations with inductive voltage transformers |
| IEC-61869 (Part-103) | Instrument transformers - The use of instrument transformers for power quality measurement |
| **BUSHING** | |
| IS-2099 | Bushings for Alternating Voltages above 1000V |
| IEC-60137 | Insulated Bushings for Alternating Voltages above 1000V |
| **SURGE ARRESTERS** | |
| IS-3070 (PART2) | Lightning arresters for alternating current systems : Metal oxide lightning arrestors without gaps |
| IEC-60099-4 | Metal oxide surge arrestors without gaps |
| IEC-60099-5 | Selection and application recommendation |
| ANSI-C62.1 | IEE Standards for S A for AC Power Circuits |
| NEMA-LA 1 | Surge Arresters |
| **CUBICLES AND PANELS & OTHER RELATED EQUIPMENTS** | |
| IS-722, IS-1248 | Electrical relays for power system |
| IS-3231, 3231 (P-3) | Protection |
| IS:5039 | Distributed pillars for Voltages not Exceeding 1000 Volts |
| IEC-60068.2.2 | Basic environmental testing procedures Part 2: Test B: Dry heat |
| IEC-60529 | Degree of Protection provided by enclosures |
| IEC-60947-4-1 | Low voltage switchgear and control gear |
| IEC-61095 | Electromechanical Contactors for household and similar purposes |
| IEC-60439 (P1 & 2) | Low Voltage Switchgear and control gear assemblies |
| ANSI-C37.20 | Switchgear Assemblies, including metal enclosed bus |
| ANSI-C37.50 | Test Procedures for Low Voltage Alternating Current Power |

| CODES | TITLE |
|---|---|
| | Circuit Breakers |
| ANSI-C39 | Electric Measuring instrument |
| ANSI-C83 | Components for Electric Equipment |
| IS: 8623: (Part I to 3) | Specification for Switchgear & Control Assemblies |
| NEMA-AB | Moulded Case Circuit and Systems |
| NEMA-CS | Industrial Controls and Systems |
| NEMA-PB-1 | Panel Boards |
| NEMA-SG-5 | Low voltage Power Circuit breakers |
| NEMA-SG-3 | Power Switchgear Assemblies |
| NEMA-SG-6 | Power switching Equipment |
| NEMA-5E-3 | Motor Control Centers |
| 1248 (P1 to P9) | Direct acting indicating analogue electrical measuring instruments & their accessories |
| **Disconnecting switches** | |
| IEC-62271-102 | High-voltage switchgear and control gear - Part 102: Alternating current disconnectors and earthing switches |
| IEC-60265 (Part 1 & 2) | High Voltage switches |
| ANSI-C37.32 | Schedule of preferred Ratings, Manufacturing Specifications and Application Guide for high voltage Air Switches, Bus supports and switch accessories |
| ANSI-C37.34 | Test Code for high voltage air switches |
| NEMA-SG6 | Power switching equipment |
| **PLCC and line traps** | |
| IS-8792 | Line traps for AC power system |
| IS-8793 | Methods of tests for line traps |
| IS-8997 | Coupling devices for PLC systems |
| IS-8998 | Methods of test for coupling devices for PLC systems |
| IEC-60353 | Line traps for A.C. power systems |
| IEC-60481 | Coupling Devices for power line carrier systems |
| IEC-60495 | Single sideboard power line carrier terminals |
| IEC-60683 | Planning of (single Side-Band) power line carrier systems |
| CIGRE | Teleprotection report by Committee 34 & 35 |
| CIGRE | Guide on power line carrier 1979 |
| CCIR | International Radio Consultative Committee |
| CCITT | International Telegraph & Telephone Consultative Committee |
| EIA | Electric Industries Association |
| **Protection and control equipment** | |
| IEC-60051: (P1 to P9) | Recommendations for Direct Acting indicating analogue electrical measuring instruments and their accessories |
| IEC-60255 (Part 1 to 23) | Electrical relays |
| IEC-60297 (P1 to P4) | Dimensions of mechanical structures of the 482.6mm (19 inches) |

| CODES | TITLE |
|---|---|
| | series |
| IEC-60359 | Expression of the performance of electrical & electronic measuring equipment |
| IEC-60387 | Symbols for Alternating-Current Electricity meters |
| IEC-60447 | Man machine interface (MMI) - Actuating principles |
| IEC-60521 | Class 0.5, 1 and 2 alternating current watt hour metres |
| IEC-60547 | Modular plug-in Unit and standard 19-inch rack mounting unit based on NIM Standard (for electronic nuclear instruments) |
| ANSI-81 | Screw threads |
| ANSI-B18 | Bolts and Nuts |
| ANSI-C37.1 | Relays, Station Controls etc |
| ANSI-C37.2 | Manual and automatic station control, supervisory and associated telemetering equipment |
| ANSI-C37.2 | Relays and relay systems associated with electric power apparatus |
| ANSI-C39.1 | Requirements for electrical analog indicating instruments |
| **MOTORS** | |
| IS-325 | Three phase induction motors |
| IS-4691 | Degree of protection provided by enclosure for rotating electrical machinery |
| IEC-60034 (P1 to P19:) | Rotating electrical machines |
| IEC-Document 2 | Three phase induction motors |
| (Central Office) NEMA-MGI | Motors and Generators |
| **Electronic equipment and components** | |
| MIL-21B, MIL-833 & MIL-2750 | Environmental testing |
| EC-60068 (P1 to P5) | Printed boards |
| IEC-60326 (P1 to P2) | Material and workmanship standards |
| IS-1363 (P1 to P3) | Hexagon head bolts, screws and nuts of product grade C |
| IS-1364 (P1 to P5) | Hexagon head bolts, screws and nuts of products grades A and B |
| IS-3138 | Hexagonal Bolts and Nuts (M42 to M150) |
| ISO-898 | Fasteners: Bolts, screws and studs |
| ASTM | Specification and tests for materials |
| **Clamps & connectors** | |
| IS-5561 | Electric power connectors |
| NEMA-CC1 | Electric Power connectors for sub station |
| NEMA-CC 3 | Connectors for Use between aluminium or aluminum-Copper Overhead Conductors |
| **Bus hardware and insulators** | |
| IS: 2121 | Fittings for Aluminum and steel cored Al conductors for overhead |

| CODES | TITLE |
|---|---|
| | power lines |
| IS-731 | Porcelain insulators for overhead power lines with a nominal voltage greater than 1000 V |
| IS-2486 (P1 to P4) | Insulator fittings for overhead power lines with a nominal voltage greater than 1000 V |
| IEC-60120 | Dimensions of Ball and Socket Couplings of string insulator units |
| IEC-60137 | Insulated bushings for alternating voltages above 1000 V |
| IEC-60168 | Tests on indoor and outdoor post insulators of ceramic material or glass for Systems with Nominal Voltages Greater than 1000 V |
| IEC-62155 | Hollow pressurized and unpressurized ceramic and glass insulators for use in electrical equipment with rated voltages greater than 1 000 V |
| IEC-60273 | Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1000V |
| IEC-61462 | Pressurized and un-pressurized insulator for use in electrical equipment with rated voltage greater than 1000V – Definitions, Test methods, acceptance criteria and design recommendations |
| IEC-60305 | Insulators for overhead lines with nominal voltage above 1000V-ceramic or glass insulator units for ac systems Characteristics of String Insulator Units of the cap and pin type |
| IEC-60372 (1984) | Locking devices for ball and socket couplings of string insulator units : dimensions and tests |
| IEC-60383 (P1 and P2) | Insulators for overhead lines with a nominal voltage above 1000 V |
| IEC-60433 | Characteristics of string insulator units of the long rod type |
| IEC-60471 | Dimensions of Clevis and tongue couplings of string insulator units |
| ANSI-C29 | Wet process porcelain insulators |
| ANSI-C29.1 | Test methods for electrical power insulators |
| ANSI-C92.2 | For insulators, wet-process porcelain and toughened glass suspension type |
| ANSI-C29.8 | For wet-process porcelain insulators apparatus, post-type |
| ANSI-G.8 | Iron and steel hardware |
| CISPR-7B | Recommendations of the CISPR, tolerances of form and of Position, Part 1 |
| ASTM A-153 | Zinc Coating (Hot-Dip) on iron and steel hardware |
| | |
| **Strain and rigid bus-conductor** | |
| IS-2678 | Dimensions & tolerances for Wrought Aluminum and Aluminum Alloys drawn round tube |
| IS-5082 | Wrought Aluminum and Aluminum Alloy Bars. Rods, Tubes and Sections for Electrical purposes |
| ASTM-B 230-82 | Aluminum 1350 H19 Wire for electrical purposes |

| CODES | TITLE |
|---|---|
| ASTM-B 231-81 | Concentric - lay - stranded, aluminum 1350 conductors |
| ASTM-B 221 | Aluminum - Alloy extruded bar, road, wire, shape |
| ASTM-B 236-83 | Aluminum bars for electrical purpose (Bus-bars) |
| ASTM-B 317-83 | Aluminum-Alloy extruded bar, rod, pipe and structural shapes for electrical purposes (Bus Conductors) |
| | |
| **Batteries** | |
| IS:1651 | Stationary Cells and Batteries, Lead-Acid Type (with Tubular Positive Plates) |
| IS:1652 | Stationary Cells and Batteries, Lead-Acid Type (with Plante Positive Plates) |
| IS:1146 | Rubber and Plastic Containers for Lead-Acid Storage Batteries |
| IS:6071 | Synthetic Separators for Lead-Acid Batteries |
| IS:266 | Specification for Sulphuric Acid |
| IS:1069 | Specification for Water for Storage Batteries |
| IS:3116 | Specification for Sealing Compound for Lead-Acid Batteries |
| IS:1248 | Indicating Instruments |
| IS:10918 | Vented type nickel Cadmium Batteries |
| IEC:60896-21&22 | Lead Acid Batteries Valve Regulated types – Methods of Tests & Requirements |
| IEC: 60623 | Vented type nickel Cadmium Batteries |
| IEC:60622 | Secondary Cells & Batteries – Sealed Ni-Cd rechargeable single cell |
| IEC:60623 | Secondary Cells & Batteries – Vented Ni-Cd rechargeable single cell |
| IEC:60896-11 | Stationary Lead Acid Batteries – Vented Type – General requirements & method of tests |
| IEEE-485 | Recommended practices for sizing of Lead Acid Batteries |
| IEEE-1115 | Sizing of Ni-Cd Batteries |
| IEEE-1187 | Recommended practices for design & installation of VRLA Batteries |
| IEEE-1188 | Recommended practices for design & installation of VRLA Batteries |
| IEEE-1189 | Guide for selection of VRLA Batteries |
| | |
| **Battery Charger** | |
| IS:3895 | Mono-crystalline Semiconductor Rectifier Cells and Stacks |
| IS:4540 | Mono-crystalline Semiconductor Rectifier Assemblies and Equipment |
| IS:6619 | Safety Code for Semiconductor Rectifier Equipment |
| IS:2026 | Power Transformers |

| CODES | TITLE |
|---|---|
| IS:2959 | AC Contactors for Voltages not Exceeding 1000 Volts |
| 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<br>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 polyethyle 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 |

| CODES | TITLE |
|---|---|
| IEC-60189 (P1 to P7) | Low frequency cables and wires with PVC insulation and PVC sheath |
| 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 |

| CODES | TITLE |
|---|---|
| IS:4671 | Expanded Polystyrene for Thermal Insulation Purposes |
| IS:8183 | Bonded Mineral Wool |
| IS:3346 | Evaluation of Thermal Conductivity properties by means of 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 Galavanizing) 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 |

| CODES | TITLE |
|---|---|
| IS:5120 | Technical requirement – Rotodynamic special purpose pumps |
| API-610 | Centrifugal pumps for general services<br>Hydraulic Institutes Standards |
| BS:599 | Methods of testing pumps |
| PTC-8.2 | Power Test Codes - Centrifugal pumps |
| **DIESEL ENGINES** | |
| IS:10000 | Methods of tests for internal combustion engines |
| IS:10002 | Specification for performance requirements for constant speed compression ignition engines for general purposes (above 20 kW) |
| BS:5514 | The performance of reciprocating compression ignition (Diesel) engines, utilizing liquid fuel only, for general purposes |
| ISO:3046 | Reciprocating internal combustion engines performance |
| IS:554 | Dimensions for pipe threads where pressure tight joints are required on threads |
| ASME Power Test Code | Internal combustion engine PTC-17 |
| -- | Codes of Diesel Engine Manufacturer's Association, USA |
| **PIPING VALVES & SPECIALITIES** | |
| IS:636 | Non percolating flexible fire-fighting delivery hose |
| IS:638 | Sheet rubber jointing and rubber inserting jointing |
| IS:778 | Gun metal gate, globe and check valves for general purpose |
| IS:780 | Sluice valves for water works purposes (50 to 300 mm) |
| IS:901 | Couplings, double male and double female instantaneous pattern for fire fighting |
| IS:902 | Suction hose couplings for fire-fighting purposes |
| IS:903 | Fire hose delivery couplings branch pipe nozzles and nozzle spanner |
| IS:1538 | Cast iron fittings for pressure pipes for water, gas and sewage |
| IS:1903 | Ball valve (horizontal plunger type) including floats for water supply purposes |
| IS:2062 | SP for weldable structural steel |
| IS:2379 | Colour Code for the identification of pipelines |
| IS:2643 | Dimensions of pipe threads for fastening purposes |
| IS:2685 | Code of Practice for selection, installation and maintenance of sluice valves |
| IS:2906 | Sluice valves for water-works purposes (350 to 1200 mm size) |
| IS:3582 | Basket strainers for fire-fighting purposes (cylindrical type) |
| IS:3589 | Electrically welded steel pipes for water, gas and sewage (150 to 2000 mm nominal diameter) |
| IS:4038 | Foot valves for water works purposes |
| IS:4927 | Unlined flax canvas hose for fire fighting |

| CODES | TITLE |
|---|---|
| IS:5290 | Landing valves (internal hydrant) |
| IS:5312 (Part-I) | Swing check type reflex (non-return) valves |
| IS:5306 | Code of practice for fire extinguishing installations and equipment on premises |
| Part-I | Hydrant systems, hose reels and foam inlets |
| Part-II | Sprinkler systems |
| BS:5150 | Specification for cast iron gate valves |
| **MOTORS & ANNUNCIATION PANELS** | |
| IS:325 | Three phase induction motors |
| IS:900 | Code of practice for installation and maintenance of induction motors |
| IS:996 | Single phase small AC and universal electric motors |
| IS:1231 | Dimensions of three phase foot mounted induction motors |
| IS:2148 | Flame proof enclosure of electrical apparatus |
| IS:2223 | Dimensions of flange mounted AC induction motors |
| IS:2253 | Designations for types of construction and mounting arrangements of rotating electrical machines |
| IS:2254 | Dimensions of vertical shaft motors for pumps |
| IS:3202 | Code of practice for climate proofing of electrical equipment |
| IS:4029 | Guide for testing three phase induction motors |
| IS:4691 | Degree of protection provided by enclosure for rotating electrical machinery |
| IS:4722 | Rotating electrical machines |
| IS:4729 | Measurement and evaluation of vibration of rotating electrical machines |
| IS:5572 (Part-I) | Classification of hazardous areas for electrical installations (Areas having gases and vapours) |
| IS:6362 | Designation of methods of cooling for rotating electrical machines |
| IS:6381 | Construction and testing of electrical apparatus with type of protection 'e' |
| IS:7816 | Guide for testing insulation for rotating machine |
| IS:4064 | Air break switches |
| IEC DOCUMENT 2 (Control Office) 432 | Three Phase Induction Motor |
| VDE 0530 Part I/66 | Three Phase Induction Motor |
| IS:9224 (Part-II) | HRC Fuses |
| IS:6875 | Push Button and Control Switches |
| IS:694 | PVC Insulated cables |
| IS:1248 | Indicating instruments |
| IS:375 | Auxiliary wiring & busbar markings |

| CODES | TITLE |
|---|---|
| IS:2147 | Degree of protection |
| IS:5 | Colour Relay and timers |
| IS:2959 | Contactors |
| **PG Test Procedures** | |
| NFPA-13 | Standard for the installation of sprinkler system |
| NFPA-15 | Standard for water spray fixed system for the fire protection |
| NFPA-12A | Standard for Halong 1301 Fire Extinguishing System |
| NFPA-72E | Standard on Automatic Fire Detectors |
| -- | Fire Protection Manual by TAC (Latest Edition) |
| NFPA-12 | Standard on Carbon dioxide extinguisher systems |
| IS:3034 | Fire of industrial building |
| -- | Electrical generating and distributing stations code of practice |
| IS:2878 | CO2 (Carbon dioxide) Type Extinguisher |
| IS:2171 | DC (Dry Chemical Powder) type |
| IS:940 | Pressurised Water Type |
| **D.G. SET** | |
| IS:10002 | Specification for performance requirements for constant speed compression ignition (diesel engine) for general purposes |
| IS:10000 | Method of tests for internal combustion engines |
| IS:4722 | Rotating electrical machines-specification |
| IS:12063 | Degree of protection provided by enclosures |
| IS:12065 | Permissible limit of noise levels for rotating electrical machines |
| -- | Indian Explosive Act 1932 |
| **Steel structures** | |
| IS-228 (1992) | Method of Chemical Analysis of pig iron, cast iron and plain carbon and low alloy steels. |
| IS-802 (P1 to 3) | Code of practice for use of structural steel in overhead transmission line towers |
| IS-806 | Code of practice for use of steel tubes in general building construction |
| IS-808 | Dimensions for hot rolled steel beam, column channel and angle sections |
| IS-814 | Covered electrodes for manual arc welding of carbon of carbon manganese steel |
| IS-816 | Code of Practice for use of metal arc welding for general construction in Mild steel |
| IS-817 | Code of practice for training and testing of metal arc welders. Part 1 : Manual Metal arc welding |
| IS-875 (P1 to P4) | Code of practice for design loads (other than earthquake) for buildings and structures |
| IS-1161 | Steel tubes for structural purposes |

| CODES | TITLE |
|---|---|
| IS-1182 | Recommended practice for radiographic examination of fusion welded butt joints in steel plates |
| IS-1363 (P1 to P3) | Hexagonal head bolts, screws & nuts of products grade C |
| IS-1364 | Hexagon head bolts, screws and nuts of product grades A and B |
| IS-1367 (P1 to P18) | Technical supply condition for threaded steel fasteners |
| IS-1599 | Methods for bend test |
| IS-1608 | Method for tensile testing of steel products |
| IS-1893 | Criteria for earthquake resistant design of structures |
| IS-1978 | Line Pipe |
| IS-2062 | Steel for general structural purposes |
| IS-2595 | Code of practice for Radiographic testing |
| IS-3063 | Single coil rectangular section spring washers for bolts, nuts and screws |
| IS-3664 | Code of practice for ultrasonic pulse echo testing by contact and immersion methods |
| IS-7205 | Safety code for erection of structural steel work |
| IS-9595 | Recommendations for metal arc welding of carbon and carbon manganese steels |
| ANSI-B18.2.1 | Inch series square and Hexagonal bolts and screws |
| ANSI-B18.2.2 | Square and hexagonal nuts |
| ANSI-G8.14 | Round head bolts |
| ASTM-A6 | Specification for General Requirements for rolled steel plates, shapes, sheet piling and bars of structural use |
| ASTM-A36 | Specifications of structural steel |
| ASTM-A47 | Specification for malleable iron castings |
| ASTM-A143 | Practice for safeguarding against embilement of Hot Galvanized structural steel products and procedure for detaching embrilement |
| ASTM-A242 | Specification for high strength low alloy structural steel |
| ASTM-A283 | Specification for low and intermediate tensile strength carbon steel plates of structural quality |
| ASTM-A394 | Specification for Galvanized steel transmission tower bolts and nuts |
| ASTM-441 | Specification for High strength low alloy structural manganese vanadium steel |
| ASTM-A572 | Specification for High strength low alloy colombium-Vanadium steel of structural quality |
| AWS D1-0 | Code for welding in building construction welding inspection |
| AWS D1-1 | Structural welding code |
| AISC | American institute of steel construction |
| NEMA-CG1 | Manufactured graphite electrodes |

| CODES | TITLE |
|---|---|
| **Piping and pressure vessels** | |
| IS-1239 (Part 1 and 2) | Mild steel tubes, tubulars and other wrought steel fittings |
| IS -3589 | Seamless Electrically welded steel pipes for water, gas and sewage |
| IS-6392 | Steel pipe flanges |
| ASME | Boiler and pressure vessel code |
| ASTM-A120 | Specification for pipe steel, black and hot dipped, zinc-coated (Galvanized) welded and seamless steel pipe for ordinary use |
| ASTM-A53 | Specification for pipe, steel, black, and hot-dipped, zinc coated welded and seamless |
| ASTM-A106 | Seamless carbon steel pipe for high temperature service |
| ASTM-A284 | Low and intermediate tensile strength carbon-silicon steel plates for machine parts and general construction |
| ASTM-A234 | Pipe fittings of wrought carbon steel and alloy steel for moderate and elevated temperatures |
| ASTM-S181 | Specification for forgings, carbon steel for general purpose piping |
| ASTM-A105 | Forgings, carbon steel for piping components |
| ASTM-A307 | Carbon steel externally threated standard fasteners |
| ASTM-A193 | Alloy steel and stainless steel bolting materials for high temperature service |
| ASTM-A345 | Flat rolled electrical steel for magnetic applications |
| ASTM-A197 | Cupola malleable iron |
| ANSI-B2.1 | Pipe threads (Except dry seal) |
| ANSI-B16.1 | Cast iron pipe flangesand glanged fitting. Class 25, 125, 250 and 800 |
| ANSI-B16.1 | Malleable iron threaded fittings, class 150 and 300 |
| ANSI-B16.5 | Pipe flanges and flanged fittings, steel nickel alloy and other special alloys |
| ANSI-B16.9 | Factory-made wrought steel butt welding fittings |
| ANSI-B16.11 | Forged steel fittings, socket-welding and threaded |
| ANSI-B16.14 | Ferrous pipe plug, bushings and locknuts with piple threads |
| ANSI-B16.25 | Butt welding ends |
| ANSI-B18.1.1 | Fire hose couplings screw thread |
| ANSI-B18.2.1 | Inch series square and hexagonal bolts and screws |
| ANSI-B18.2.2 | Square and hexagonal nuts |
| NSI-B18.21.1 | Lock washers |
| ANSI-B18.21.2 | Plain washers |
| ANSI-B31.1 | Power piping |
| ANSI-B36.10 | Welded and seamless wrought steel pipe |
| ANSI-B36.9 | Stainless steel pipe |
| **Other civil works standards** | |

| CODES | TITLE |
|---|---|
| IS-269 | 33 grade ordinary portland cement |
| IS2721 | Galvanized steel chain link fence fabric |
| IS-278 | Galvanized steel barbed wire for fencing |
| IS-383 | Coarse and fine aggregates from natural sources for concrete |
| IS-432 (P1 and P2) | Mild steel and medium tensile steel bars and hard-dawn steel wire for concrete reinforcement |
| IS-456 | Code of practice for plain and reinforced concrete |
| IS-516 | Method of test for strength of concrete |
| IS-800 | Code of practice for general construction in steel |
| IS-806 | Steel tubes for structural purposes |
| IS-1172 | Basic requirements for water supply, drainage and sanitation |
| IS-1199 | Methods of sampling and analysis of concrete |
| IS-1566 | Hard-dawn steel wire fabric for concrete reinforcement |
| IS-1742 | Code of Practice for Building drainage |
| IS-1785 | Plain hard-drawn steel wire for pre-stressed concrete |
| IS-1786 | High strength deformed Steel Bars and wires for concrete reinforcement |
| IS-1811 | Methods of sampling Foundry sands |
| IS-1893 | Criteria for earthquake resistant design of structures |
| IS-2062 | Steel for general structural purposes |
| IS-2064 | Selection, installation and maintenance of sanitary appliances-code of practices |
| IS-2065 | Code of practice for water supply in buildings |
| IS-2090 | High tension steel bars used in pre-stressed concrete |
| IS-2140 | Standard Galvanized steel wire for fencing |
| IS-2470 (P1 & P2) | Code of practice for installation of septic tanks |
| IS-2514 | Concrete vibrating tables |
| IS-2645 | Integral cement waterproofing compounds |
| IS-3025 (Part 1 to Part 48) | Methods of sampling and test (Physical and chemical) for water and waste water |
| IS-4091 | Code of practice for design and construction of foundations for transmission line towers and poles |
| IS-4111 (Part 1 to P5) | Code of practice for ancillary structures in sewerage system |
| IS-4990 | Plywood for concrete shuttering work |
| IS-5600 | Sewage and drainage pumps |
| **National building code of India 1970** | |
| USBR E12 | Earth Manual by United States Department of the interior Bureau of Reclamation |
| ASTM-A392-81 | Zinc/Coated steel chain link fence fabric |
| ASTM-D1557-80 | test for moisture-density relation of soils using 10-lb (4.5 kg) |

| CODES | TITLE |
|---|---|
| | rame land 18-in. (457 mm) Drop |
| ASTM-D1586(1967) | Penetration Test and Split-Barrel Sampling of Soils |
| ASTM-D2049-69 | Test Method for Relative Density of Cohesionless Soils |
| ASTM-D2435 | Test method for Unconsolidated, (1982)<br>Undrained Strengths of Cohesive Soils in Triaxial Compression |
| BS-5075 | Specification for accelerating Part I Admixtures, Retarding Admixtures and Water Reducing Admixtures |
| CPWD | Latest CPWD specifications |
| **ACSR MOOSE CONDUCTOR** | |
| IS:6745<br>BS:443-1969 | Methods for Determination of<br>Mass of zinc coating on zinc<br>coated Iron and Steel Articles |
| IS:8263 | Methods for Radio Interference |
| IEC:437-1973<br>NEMA:107-1964<br>CISPR | Test on High Voltage Insulators |
| IS:209, BS:3436-1961 | Zinc Ingot |
| IS:398 Part - V<br>IEC:209-1966 | Aluminum Conductors for Overhead Transmission Purposes |
| BS:215(Part-II),<br>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/<br>ASTMA-472-729 | Hot dip galvanised 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:<br>A 475-72a<br>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)/<br>BS:215 (Part-II | Aluminum Conductors for overhead transmission purposes |

| CODES | TITLE |
|---|---|
| **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-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.<br>(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 |

| CODES | TITLE |
|---|---|
| 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 |
| 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 |

| CODES | TITLE |
|---|---|
| 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 |
| IS:6005 | Code of practice of phosphating iron and steel |
| IS:5082 | Wrought Aluminum and Aluminum alloys for electrical purposes |
| IS:2633 | Hot dip galvanising |

Note: If any standard is expired or does not exist anymore than other standard which has substituted it, shall be applicable.

**Annexure-G**

## MQP & INSPECTION LEVEL REQUIREMENT

| Sl. No | Item / Equipment | Reference document for inspection | Inspection Level |
|---|---|---|---|
| A.01 | LT Transformer /Power Transformer/ Reactor/ Converter Transformer/ Filter Reactor | MQP/ITP | IV |
| A.02 | Bushing | MQP | IV |
| A.03 | Insulating Oil | POWERGRID TS | III |
| A.04 | Oil storage tank for transformers | MQP | III |
| A.05 | Nitrogen injection based explosion prevention system | FAT/ITP | III |
| A.06 | On Line oil drying system for transformers | POWERGRID TS | II** |
| A.07 | On Line DGA and moisture monitoring system | POWERGRID TS | II** |
| A.08 | Flow sensitive conservator isolation valve | POWERGRID TS | II** |
| A.09 | Oil Filtration Machine | MQP | III |
| B.01 | Circuit Breakers | MQP | IV |
| B.02 | Current Transformers | MQP/ITP | IV |
| B.03 | CVT/PT/IVT | MQP | IV |
| B.04 | Isolators | MQP/ITP | IV |
| B.05 | Surge Arrestors | MQP/ITP | III |
| B.06 | Line Trap & Air Core Reactor | MQP/ITP | III |
| B.07 | Point On switching device (CSD) for Circuit Breaker (wherever required) | FAT/ITP | IV |
| C.01 | STATCOM including Valve, valve base electronics, DC capacitor, series reactor and all accessories | ITP | IV |
| C.02 | Mechanically switched Reactor bank (3-ph) including all accessories (MSR Branches) | ITP | IV |
| C.03 | Mechanically switched Capacitor bank (3-ph) including all accessories (MSC Branches) | ITP | IV |
| C.04 | Harmonic Pass filters | ITP | IV |
| C.05 | HT Capacitor | MQP | IV |
| D.01 | Thyristor Valve | FAT/ITP | III |
| D.02 | PLC Capacitors for HVDC | FAT/ITP | III |
| D.03 | Valve Cooling system for | FAT/ITP | III |

**Annexure-G**

| Sl. No | Item / Equipment | Reference document for inspection | Inspection Level |
|---|---|---|---|
| | HVDC | | |
| D.04 | AC/DC Filter Resistors | ITP | III |
| D.05 | DC Current and Voltage measuring device for HVDC | FAT/ITP | III |
| D.06 | Maintenance platform for valve hall | POWERGRID TS | II |
| D.07 | Optical signal column for FSC | FAT/ITP | II |
| E.01 | GIS including spares | MQP/ITP | IV |
| E.02 | Dew Point Meter for GIS | POWERGRID TS | I* |
| E.03 | Portable Partial Discharge monitoring system for GIS | POWERGRID TS | I* |
| E.04 | Partial Discharge Monitoring System (Online) for GIS | ITP | III |
| E.05 | PEB Structure and Puf Panels | MQP | III |
| F.01 | Substation Automation system | FAT/MQP | III |
| F.02 | Event Logger | POWERGRID TS | III |
| F.03 | PLCC equipment Viz PLCC Terminal ,Carrier equipment, Protection Coupler , Coupling Device but excluding EPAX / HF Cable | MQP | III |
| F.04 | Control & Relay Panels | MQP | III |
| G.01 | EHV Cables | MQP/ITP | III |
| G.02 | Power Cables & Control Cables | MQP | III |
| G.03 | Cable Joints (11 kV and above) | POWERGRID TS | II |
| G.04 | Cable Lugs & Glands / Clamps/Terminations | POWERGRID TS | I |
| H.01 | LT Switchgear & ACDB/DCDB/MLDB/ELDB | MQP | III |
| H.02 | Battery | POWERGRID TS | II |
| H.03 | Battery Charger | MQP | III |
| H.04 | UPS & Voltage Stablizer | MQP/FAT | III |
| H.05 | D. G. Set | FAT/ITP | III |
| H.06 | Lighting Panel | POWERGRID TS | II |
| H.07 | Lighting Poles | POWERGRID TS | II |
| H.08.1 | Lighting Fixtures, Lighting Earthwire, Switches / sockets, Conduits, Lamps & fans including exhaust fans | POWERGRID TS | I |
| H.8.2 | Solar based LEDs System including street light/pole solar panel, Inverter controller/LED fixture | FAT | III |
| H.09 | MS/GI /PVC Pipes for cable | POWERGRID TS | I |

**Annexure-G**

| Sl. No | Item / Equipment | Reference document for inspection | Inspection Level |
|---|---|---|---|
| | trenches and lighting | | |
| H.10 | Outdoor Receptacle | POWERGRID TS | I |
| H.11 | Split A.C/window A.C./ precision AC/ Kiosk AC/ Cascade AC/ Tower AC | POWERGRID TS | I |
| H.12 | Occupancy sensors for control of lighting | POWERGRID TS | I |
| H.13 | Solar based street lighting pole including Solar Panel, Inverter, Controller, etc. | POWERGRID TS | III |
| H.14 | Junction Box / Lighting Switch Boards / Bay MB / Portable Flood Light Panel | POWERGRID TS | II |
| H.15 | Lighting transformer | POWERGRID TS | II |
| I.01 | SF6 gas processing unit, SF6 gas Leakage detector, SF6 gas Analyzer | POWERGRID TS | I* |
| I.02 | SF6 Gas | POWERGRID TS | I |
| I.03 | Spark Gap | FAT/ITP | III |
| I.04 | Time synchronizing Equipment (GPS Clock) | POWERGRID TS | I |
| I.05 | Galvanized Cable trays | POWERGRID TS | II |
| I.06 | Video Monitoring System | FAT/ITP | I |
| I.07 | Public Address System (All Components) | POWERGRID TS | I |
| I.08 | Building Management System (All components) | POWERGRID TS | I |
| I.09 | Access Control System (All Components) | POWERGRID TS | I |
| I.10 | Video Display system/ Video Projection system | POWERGRID TS | I |
| I.11 | VESDA (smoke detector) | POWERGRID TS | I |
| I.12 | High Mast Pole | MQP | III |
| J.01 | Aluminium ladder | POWERGRID TS | I |
| J.02 | Hume Pipes | POWERGRID TS | I |
| J.03 | Castle Key | POWERGRID TS | I |
| J.04 | Water Treatment plant (All components). | POWERGRID TS | I |
| J.05 | Furniture | POWERGRID TS | I |
| J.06 | DOL Starter | POWERGRID TS | I |
| J.07 | Oil Sample Bottles and Syringe | POWERGRID TS | I |
| J.08 | Test & Measuring Equipment, T&P | POWERGRID TS | I* |
| K.01 | EOT Crane | POWERGRID TS | II |

**Annexure-G**

| Sl. No | Item / Equipment | Reference document for inspection | Inspection Level |
|---|---|---|---|
| K.02 | Boom Crane/Golf Cart/Platform Truck/Man Lift/ Fork Lift/ Lifts | POWERGRID TS | II |
| L.00 | Fire Protection System | | |
| L.001 | Panels, Hydro pneumatic tank for fire protection system. | POWERGRID TS | III |
| L.002 | Deluge valve, Strainers, MS/GI pipes, Pumps, motors, air compressor, and other valves, Diesel Engines | POWERGRID TS | II |
| L.003 | Others | POWERGRID TS | I |
| M.00 | HVAC SYSTEM | | |
| M.001 | Air Cooled Chiller | POWERGRID TS | III |
| M.002 | Pump | POWERGRID TS | II |
| M.003 | Air Handling Unit | POWERGRID TS | II |
| M.004 | Fan Filter Unit With Centrifugal Blower | POWERGRID TS | II |
| M.005 | Axial Flow Fan | POWERGRID TS | II |
| M.006 | Main Climate Control Unit (Dehumidifier) | POWERGRID TS | I |
| M.007 | Dampers | POWERGRID TS | II |
| M.008 | Fire Dampers | POWERGRID TS | II |
| M.009 | Pressure Gauge, Thermometers, Other Instruments / Sensors | POWERGRID TS | I |
| M.010 | Grill, Diffuser, Jet Nozzle, Louvers etc | POWERGRID TS | I |
| M.011 | Ducting | POWERGRID TS | III |
| M.012 | M S Pipe | POWERGRID TS | II |
| M.013 | Pipe Insulation Material | POWERGRID TS | I |
| M.014 | Duct Insulation Material | POWERGRID TS | I |
| M.015 | Underdeck Insulation Material | POWERGRID TS | I |
| M.016 | Gate Valve & Non Return valve | POWERGRID TS | I |
| M.017 | Y Strainer | POWERGRID TS | II |
| M.018 | Ball Valve/ Motorised Butterfly Valve/ Balancing Valve | POWERGRID TS | I |
| M.019 | Closed Expansion Tank | POWERGRID TS | II |
| M.020 | Air Separator | POWERGRID TS | I |
| M.021 | MCC /PLC /Electrical Panels | POWERGRID TS | III |
| M.022 | Propeller Fan/ Conduit | POWERGRID TS | II |
| M.023 | Air Filter/ Mixing Valve with Thermostat | POWERGRID TS | I |

**Annexure-G**

| Sl. No | Item / Equipment | Reference document for inspection | Inspection Level |
|---|---|---|---|
| N.01 | SDH Equipment | FAT/ITP | IV |
| N.02 | Termination Equipment Primary/ DI Multiplexer | FAT/ITP | IV |
| N.03 | DACS | FAT/ITP | IV |
| N.04 | Optical Amplifier | FAT/ITP | IV |
| N.05 | FODP including pigtail, Joint Box, FDMS | FAT/ITP | II |
| N.06 | IMPS | FAT/ITP | IV |
| N.07 | Optical bypass switch | FAT/ITP | IV |
| N.08 | Air Purifier | FAT/ITP | I |
| N.09 | Patch cord & connector | FAT/ITP | I |
| N.10 | NMS | FAT/ITP | IV |
| N.11 | OPGW Cable | MQP/ITP/FAT | III |
| N.12 | Hardware Fittings for OPGW cable | MQP/ITP | III |
| N.13 | DCPS | FAT/ITP | III |
| N.14 | Radio Links | FAT/ITP | III |
| N.15 | SMPS based DC Power Supply (DCPS) system | FAT/ITP | III |
| N.16 | WAMS (PMU & Accessories) | FAT/ITP | III |
| N.17 | PUF Shelter | FAT/ITP | III |
| N.18 | Aerial OFC/UGOFC/ADSS/FO Cable | FAT/ITP | III |
| N.19 | DWDM | FAT/ITP | III |
| N.20 | OTN | FAT/ITP | III |
| N.21 | MPLS-TP Equipment | FAT/ITP | III |
| N.22 | L2 Switch | FAT/ITP | III |
| N.23 | IP-MPLS Router | FAT/ITP | III |
| N.24 | HDPE Pipes | POWERGRID TS | II |
| N.25 | Equipment Cabinets | POWERGRID TS | II |
| N.26 | Main Distribution Frame | POWERGRID TS | I |
| N.27 | Telephone system, EPAX, Telephone wires, Telephone sockets | POWERGRID TS | I |
| N.28 | Fibre Optic Cable | MQP | III |
| N.29 | Hardware Fittings for Fibre Optic cable | MQP | III |
| O.01 | Re-rollers of MS/HT Angle Section and galvanized tower parts. | MQP | IV |
| O.02 | Conductor | MQP | IV |
| O.03 | Hardware fittings and Conductor & Earthwire Accessories | MQP | IV |
| O.04 | Earth wire | MQP | IV |

**Annexure-G**

| Sl. No | Item / Equipment | Reference document for inspection | Inspection Level |
|---|---|---|---|
| O.05 | Insulator | MQP | IV |
| O.06 | Bolts & Nuts of Gr 8.8 / 8 | MQP | IV |
| O.07 | Mono Pole | MQP | IV |
| O.08 | Foundation Bolts & Anchor Bolts | POWERGRID TS | III |
| O.09 | D-shackle/ Hanger / Links and associated Special bolt/nuts | MQP | III |
| O.10 | Span Marker, Obstruction lights and Wind Measuring Equipment | POWERGRID TS | III |
| O.11 | MS ROD rolled by Approved Re-roller of POWERGRID | MQP | III |
| O.12 | MS ROD rolled by Approved steel producers of POWERGRID | POWERGRID TS | I |
| O.13 | Spring Washers & Pack washers | POWERGRID TS | II |
| O.14 | Bolts & Nuts Gr up to 5.6/5 | POWERGRID TS | II |
| O.15 | ACD & Barbed wire for ACD/Bird guard | POWERGRID TS | II |
| O.16 | Danger Plate /Phase Plate / Number Plate / Circuit plate | POWERGRID TS | I |
| O.17 | Sub Station Structure (lattice/pipe type) | MQP | III |
| O.18 | Clamps & Connecters (including equipment connectors) | MQP | III |
| O.19 | MS/ GI Flat, rod type, pipe type and other earthing material. | POWERGRID TS | II |
| O.20 | Aluminium Tube & Busbar materials | POWERGRID TS | II |
| O.21 | Pipe Type & Counter Poise Earthing | POWERGRID TS | II |
| O.22 | DTS System | POWERGRID TS | II |

For Equipment where requirement of MQP is envisaged, ITP/FAT will be followed If sourced from off shore. For items required in S/S or T/L or TELECOM/LD&C , same inspection level as specified shall be followed for all the cases.

*MICC for test and measuring equipment (inspection level I or II) shall be issued only after actual verification/ demonstration of satisfactory performance at site.

** Though level-2 items, CIP/MICC can be issued also on review of TCs and visual inspection of these item.

**ANNEXURE-J**

**LIST OF THE MAKES FOR WHICH TYPE TEST REPORTS NOT REQUIRED TO BE SUBMITTED**

| Sl. No. | ITEM DESCRIPTION | MAKE |
|---|---|---|
| ***A.*** | ***Substation Accessories [Type Testing is not envisaged]*** | |
| 1. | Out door receptacles | CGL/B&C/BCH/Sakti, Chennai/Indo Asian/AVAIDS |
| 2. | Trefoil clamp | Moulded Fibre Glass Products, Calcutta |
| 3. | Diesel Engine | Cummins/Ruston & Hornsby/Greaves Cotton/Kirloskar/Mahindra/Ashok Leyland |
| 4. | Alternator | AVK/KIRLOSKAR/STAMFORD/ Leroy Somer |
| 5. | Motors | KEC/Siemens/NGEF/Crompton/ABB |
| 6. | Cable Glands | Sunil & Co./Arup/ Comet/QPIE |
| 7. | Junction Box | Sarvana/ECS/C&S/Vikas/ Maktel/Unilac/Jasper/ Amara raja/AVAIDS |
| 8. | EPAX | MATRIX, BPL |
| 9. | ACSR Conductor (Bersimis/Moose/Zebra) | Sterlite/Apar/HVPL/Sharavathy/Hiren Aluminium Ltd./Smita/Deepak Cables/Polycab wires/Cabcon/JSK |
| 10. | AAC Conductor (BULL) | Sterlite/Cabcon /JSK |
| 11. | G.S. Earthwire | Sharavathy/Bharat Wire Ropes/Ramswarup |
| 12. | Lighting Fixtures | Phillips/CGL/Bajaj /Havels |
| 13. | Lighting Transformer | Gujarat-Plug-In |
| 14. | Lighting Panels | Vikas/Makel/Nitya/AVAIDS |
| 15. | MCCB/ACB/Protective relays of LT Switchgear Boards | All approved makes as per Compendium of Vendors |
| 16. | EOT Crane | Reva |
| ***B.*** | ***ACCESSORIES FOR TRANSFORMER & REACTOR [Earlier approved type test reports is applicable and not required to be submitted]*** | |
| 17. | BUCHHOLZ RELAY *[Upto 765kV Transformer & Reactor]* | (i) M/S CEDESPE, ITLAY [Model Type-EE 3 (Plug & Socket type)]/<br>(ii) M/s VIAT INSTRUMENTS PVT. LTD.KOLKATA [Model type-GOR-3M (Plug & Socket type)] |
| 18. | PRESSURE RELIEF DEVICE *[Upto 765kV Transformer & Reactor]* | (i) M/S SUKRUT UDYOG, Pune [Model type-T-6-MS-15-SHB-PS (Plug & Socket type)] / |
| 19. | MAGNETIC OIL LEVEL GAUGE *[Upto 765kV Transformer & Reactor]* | (i) M/S SUKRUT UDYOG PUNE [Model type-SO-HE-10-M-ATMS-PS (Plug & Socket type)], [Model Type:- SO-6-M-P-PS (Plug & Socket type)]/ |
| 20. | AIR CELL (FLEXIBLE AIR SEPARATOR) *[Upto 765kV Transformer & Reactor]* | Type test of following makes are not to be submitted<br>(i) M/S PRONAL FRANCE /<br>(ii) FUJIKURA,JAPAN /<br>(iii) PRONAL ASIA, MALAYSIYA /<br>(iv) SHENYANG HONGDA GENERAL RUBBER FACTORY / |

**ANNEXURE-J**

**LIST OF THE MAKES FOR WHICH TYPE TEST REPORTS NOT REQUIRED TO BE SUBMITTED**

| Sl. No. | ITEM DESCRIPTION | MAKE |
|---|---|---|
| | | (v) BAODING XINKE RUBBER PRODUCT INSTITUTE, CHINA /<br>(vi) M/S ZENITH INDUSTRIAL RUBBER PRODUCTS PVT. LTD. THANE/<br>(vii) M/S UNIRUB TECHNO PUNE |
| 21. | OTI & WTI<br>*[Upto 765kV Transformer & Reactor]* | (i) M/S PRESIMEASURE BANGALORE [Model type-1005A |
| 22. | OIL PUMP<br>*[Upto 765kV Transformer & Reactor]* | (i) FLOWWELL PUMPS & METERS, BANGALORE [Model type-1220D, 1250D |
| 23. | COOLING FAN AND MOTOR ASSEMBLY *[Upto 765kV Transformer & Reactor]* | (i) M/S MARATHON LTD KOLKATA [Model Type:-36M/K75-P8, 0.7kW, 725RPM, 22J/K37-P6, 0.25kW, 940RPM,AFF 915103, 0.625kW, 550RPM] |
| 24. | Sudden Pressure Relay<br>*[Upto 765kV Transformer & Reactor]* | (i) Qualitrol [Model/Drawing No.900-003-02 CS-46518, 900-003-32 CS-46369] /<br>(ii) Shenyang KEQI Electrical Equipment Co. Ltd. [Model/Drawing No.SYJ9-50-25TH] |
| 25. | BUCHHOLZ RELAY<br>*[Upto 400kV Transformer & Reactor]* | (i) M/S CEDASPE, ITALY [Model type-EE3 (Plug & Socket type)]/<br>(ii) VIAT INSTRUMENTS [Model type-GOR-3M (Plug & Socket type)] |
| 26. | PRESSURE RELIEF DEVICE<br>*[Upto 400kV Transformer & Reactor]* | (i) M/S SKURUT UDYOG, PUNE [Model type-T-6-MS-15-SHB-PS (Plug & Socket type)] |
| 27. | MAGNETIC OIL LEVEL GAUGE<br>*[Upto 400kV Transformer & Reactor]* | (i) M/S SUKRUT UDYOG PUNE [Model type-SO-HE-10-M-ATMS-PS (Plug & Socket type)], [Model Type: SO-6-M-P-PS (Plug & Socket type)]/<br>(ii) M/S YOGYA ENTERPRISES, JHANSI [Model type-SO-10 (Plug & Socket type)] |
| 28. | AIR CELL (FLEXIBLE AIR SEPARATOR)<br>*[Upto 400kV Transformer & Reactor]* | Type test of following makes are not to be submitted<br>(i) M/S THE RUBBER PRODUCTS MUMBAI /<br>(ii) M/S UNIRUB TECHNO PUNE /<br>(iii) M/S PRONAL FRANCE/<br>(iv) M/S ZENITH INDUSTRIAL RUBBER PRODUCTS PVT. LTD. THANE /<br>(v) SHENYANG HONGDA GENERAL RUBBER FACTORY, CHINA |
| 29. | Sudden Pressure Relay<br>*[Upto 400kV Transformer & Reactor]* | (i) Qualitrol [Model/Drawing No.900-003-02 CS-46518, 900-003-32 CS-46369] /<br>(ii) VIAT INSTRUMENTS [Model/Drawing No.950 /<br>(iii) Shenyang KEQI Electrical Equipment Co. Ltd. [Model/Drawing No.SYJ9-50-25TH] |
| 30. | RIP Bushing (52kV, 3150A) | ABB Micafil, Switzerland [Model/Drawing No. 1ZCD073617 (Rev F)] |
| 31. | RIP Bushing (420kV, 1250A) | ABB, SWEDEN [Model/Drawing No.1ZSC005378A0001 REV. K] |
| 32. | RIP Bushing (245kV, 1250A) | ABB, SWEDEN [Model/Drawing No.1ZSC005416A0001 (Rev. D)] |
| 33. | RIP Bushing (245kV, 2000A) | ABB, SWEDEN [Model/Drawing No.1ZSC005373A0001 |

**ANNEXURE-J**

**LIST OF THE MAKES FOR WHICH TYPE TEST REPORTS NOT REQUIRED TO BE SUBMITTED**

| Sl. No. | ITEM DESCRIPTION | MAKE |
|---|---|---|
| | | (Rev. C)] |
| 34. | RIP Bushing (420kV, 1250A) | HSP Germany [Model/Drawing No.327470] |
| 35. | RIP Bushing (245kV, 2000A) | HSP Germany [Model/Drawing No.329260] |
| 36. | RIP Bushing (52kV, 3150A) | HSP Germany [Model/Drawing No.329280] |
| 37. | RIP Bushing (420kV, 1250A) | Izolyator, Russia [Model/Drawing No.686354.603] |
| 38. | RIP Bushing (245kV, 2000A) | Izolyator, Russia [Model/Drawing No.686353.602] |
| 39. | RIP Bushing (52kV, 3150A) | Izolyator, Russia [Model/Drawing No.686351.601] |
| 40. | RIP Bushing (145kV, 1250A) | Izolyator, Russia [Model/Drawing No.686352.604] |
| 41. | RIP Bushing (420kV, 1250A) | TRENCH, CHINA [Model/Drawing No.ECT 707 (C2)] |
| 42. | RIP Bushing (245kV, 2000A) | TRENCH, CHINA [Model/Drawing No.ECT 617 (C3)] |
| 43. | RIP Bushing (245kV, 1250A) | TRENCH, CHINA [Model/Drawing No.ECT 616 (C3)] |
| 44. | RIP Bushing (145kV, 1250A) | TRENCH, CHINA [Model/Drawing No.ECT 516 (C3)] |
| 45. | RIP Bushing (52kV, 1250A) | TRENCH, CHINA [Model/Drawing No.ECT 415 (C3)] |
| 46. | RIP Bushing (52kV, 3150A) | TRENCH, CHINA [Model/Drawing No.ECT 419 (C3)] |
| 47. | RIP Bushing (420kV, 1250A) | Xian China [Model/Drawing No.75706 (Rev 09)] |
| 48. | RIP Bushing (245kV,2000A) | Xian China [Model/Drawing No.75618 (Rev 09)] |
| 49. | RIP Bushing (52kV, 3150A) | Xian China [Model/Drawing No.75366 (Rev 03)] |
| 50. | RIP Bushing (52kV, 3150A) | Xian China [Model/Drawing No.75332 (Rev 08)] |
| 51. | OIP Bushing (800kV, 2500A) | ABB, SWEDEN [Model / Drawing No. GOE-2550-1600-2500-0.6-B, 1ZSC026186-AAM REV. H] |
| 52. | OIP Bushing (420kV, 2500A) | ABB, SWEDEN [Model / Drawing No.GOE-1425-1150-2500-0.6, 1ZSC026186-AAL REV. F] |
| 53. | OIP Bushing (800kV, 2500A) | TBEA, CHINA [Model / Drawing No.TBEA-500-765T-A0035-01, REV. 02] |
| 54. | OIP Bushing (420kV, 2500A) | TBEA, CHINA [Model / Drawing No.TBEA-500-765T-A0035-02, REV. 02] |
| 55. | OIP Bushing (420kV, 2500A) | TRENCH, CHINA<br>[Model / Drawing No.OT-738-1 (C 5)] |
| 56. | OLTC (500MVA, 765kV ICT) | MR Germany [Model/Drawing No.<br>MI 1503 72.5/RC- 12231WR] |
| 57. | OLTC (500MVA, 400kV ICT) | Easun MR, Chennai [Model/Drawing No.<br>3 x MI 1200 300/D 10.19.3W] |
| 58. | OLTC (220kV & below rating transformer) | BHEL, Bhopal [Model/Drawing No.MIII 600 110/C 10.19.3W] |
| ***C.*** | ***TESTING EQUIPMENT FOR TRANSFORMER & REACTOR*** | |
| 59. | Oil BDV Test Kit | Baur [Model/Drawing No.DTA 100C] |
| 60. | Oil BDV Test Kit | Megger [Model/Drawing No.OTS 100AF] |

**ANNEXURE-J**

**LIST OF THE MAKES FOR WHICH TYPE TEST REPORTS NOT REQUIRED TO BE SUBMITTED**

| Sl. No. | ITEM DESCRIPTION | MAKE |
|---|---|---|
| 61. | Online Dissolved Gas (Multi-gas) and Moisture Analyser | A Eberle GmbH & Co. KG [Model/Drawing No.HYDROCAL 1008] |
| 62. | Online Dissolved Gas (Multi-gas) and Moisture Analyser | Ningbo Ligong Online Monitoring Technology Co. LTD [Model/Drawing No.MGA2000] |
| 63. | Online Dissolved Gas (Multi-gas) and Moisture Analyser | GE Energy [Model/Drawing No.KELMAN TRANSFIX] |
| 64. | Online Dissolved Gas (Multi-gas) and Moisture Analyser | Qualitrol Company LLC [Model/Drawing No.SERVERON TM 8] |
| 65. | On line Insulating Oil Drying System | CEE DEE Vacuum Equipment Pvt. Ltd. [Model/Drawing No.TRANSDRY CD-002] |
| 66. | On line Insulating Oil Drying System | PTSS [Model/Drawing No.PTSS-TDS1GA6XS] |
| 67. | Portable Dissolved Gas Analysis of Insulating Oil | GE Energy [Model/Drawing No. KELMAN TRANSPORT X] |

**NOTES:-**

**1.** For sub-station accessories mentioned at Sr. No. A above, model specific separate approval of type test report is not required.

**2.** For Transformer/Reactor accessories & testing equipment mentioned at Sr. No. B & C above, wherever, model/drawing no. is specified separate approval of type test report and drawing/documents is not required, thus requirement of type test report validity of 10 years is not applicable.

| Sl. No. | Power System Equipment | Minimum Local Content (%) |
|---|---|---|
| | | |
| 1 | Power Transformers (up to 765 kV, including Generator Transformers) | 60 |
| 2 | Instrument Transformer (up to 765 kV) | 60 |
| 3 | Transformer Oil Dry Out System (TODOS) | 60 |
| 4 | Reactors up to 765 kV | 60 |
| 5 | Oil Impregnated Bushing (Up to 400kV) | 60 |
| 6 | Resin Insulated Paper (RIP) bushings (up to 145 kV) | 50 |
| 7 | Circuit Breakers (up to 765kV AC-Alternating Current) | 60 |
| 8 | Disconnectors, Isolators (up to 765kV AC) | 60 |
| 9 | Wave Trap (up to 765kV AC) | 60 |
| 10 | Oil Filled Distribution Transformers up to & including 33kV [Cold Rolled Grain Oriented (CRGO)/Amorphous, Aluminium/Copper wound] | 60 |
| 11 | Dry type Distribution Transformers up to & including 33kV (CRGO/Amorphous, Aluminium/Copper wound) | 60 |
| 12 | Conventional conductor | 60 |
| 13 | Accessories for conventional conductors | 60 |
| 14 | High Temperature/High Temperature Low Sag (HTLS) conductors (such as Composite core, GAP, ACSS, INVAR, AL59) and accessories | 60 |
| 15 | Optical ground wire (OPGW)- all designs | 60 |
| 16 | Fiber Optic Terminal Equipment (FOTE) for OPGW | 50 |
| 17 | OPGW related Hardware and accessories | 60 |
| 18 | Remote Terminal Unit (RTU) | 50 |
| 19 | Power Cables and accessories up to 33kV | 60 |
| 20 | Control cables including accessories | 60 |
| 21 | XLPE cables up to 220kV | 60 |
| 22 | Substation Structures | 60 |
| 23 | Transmission Line Towers | 60 |
| 24 | Porcelain (Disc/Long Rod) Insulators | 60 |
| 25 | Bus Post Insulators (Porcelain) | 60 |
| 26 | Porcelain Disc Insulators with Room Temperature Vulcanisation (RTV) coating | 50 |
| 27 | Porcelain Long Rod Insulators with Room temperature Vulcanisation (RTV) coating | 50 |
| 28 | Hardware Fittings for porcelain Insulators | 60 |
| 29 | Composite/Polymeric Long Rod Insulators | 60 |
| 30 | Hardware Fittings for Polymer Insulators | 60 |
| 31 | Bird Flight Diverter (BFD) | 60 |
| 32 | Power Line Carrier Communication (PLCC) system (up to 800kV) | 60 |
| 33 | Gas Insulated Switchgear (up to 400kV AC) | 60 |
| 34 | Gas Insulated Switchgear (above 400kV AC) | 50 |
| 35 | Surge/Lightning Arrester (up to 765kV AC) | 60 |
| 36 | Power Capacitors | 60 |
| 37 | Packaged Sub-station (6.6kV to 33kV) | 60 |
| 38 | Ring Main Unit (RMU) (up to 33kV) | 60 |

| | | |
|---|---|---|
| 39 | Medium Voltage (MV) GIS panels (up to 33kV) | 60 |
| 40 | Automation and Control system/Supervisory Control and Data Acquisition (SCADA) system in Power system | 50 |
| 41 | Control and Relay panel (including Digital/Numerical relays) | 50 |
| 42 | Electrical motors 0.37kW to 1MW | 60 |
| 43 | Energy meters excluding smart meters | 50 |
| 44 | Control and Power cables and accessories (up to 1.1kV) | 60 |
| 45 | Diesel Generating (DG) set | 60 |
| 46 | DC system (DC Battery & Battery Charger) | 60 |
| 47 | AC and DC Distribution board | 60 |
| 48 | Indoor Air Insulated Switchgear (AIS) up to 33kV | 60 |
| 49 | Poles (PCC, PSCC, Rolled Steel Joist, Rail Pole, Spun, Steel Tubular) | 60 |
| 50 | Material for Grounding/earthing system | 60 |
| 51 | Illumination system | 60 |
| 52 | Overhead Fault Sensing Indicator (FSI) | 50 |
| 53 | Power Quality Meters | 50 |
| 54 | Auxiliary Relays | 50 |
| 55 | Load Break Switch | 50 |
| 56 | Cranes, EOT cranes, gantry crane & chain pulley blocks, etc | 60 |
| 57 | Elevator | 60 |
| Fire Protection and Detection system | | |
| 58 | Motor driven fire water pumps | 60 |
| 59 | Diesel engine driven fire water pumps | 60 |
| 60 | Hydrant system | 60 |
| 61 | High velocity water spray system | 60 |
| 62 | Medium velocity water spray system | 60 |
| 63 | Foam Protection system | 60 |
| 64 | Inert gas flooding system | 60 |
| 65 | Fire tenders | 60 |
| 66 | Portable fire-extinguishers | 60 |

**METHODOLOGY FOR SUPPLY, INSTALLATION & SIZING OF CABLES**

**Supply of 1.1kV grade Cables:**

- The quantities of various type of 1.1kV grade power and control cables shall be assessed by POWERGRID. The Sizes of 1.1 kV grade Control cables to be adopted for installation is enclosed at Appendix I . For Sizes of Power Cable, Clause 1.1.4 of Section Power and control Cable rev 06 is amended at Appendix-II

  For Applications in addition to those specified, appropriate cable size shall be considered by the contractor with prior approval of Employer during execution stage

- Supply of 1.1kV grade power and control cables of various sizes shall be as per unit quantities mentioned in BPS.

- The Cables from Control Room/SPR/ACDB/DCDB/BMK to Equipment Marshalling box (MB)/Local control Cubical (LCC) shall be considered under the BPS item for supply of cables.

- The Interpole cables between AIS Instrument Transformer (CT/CVT), Surge Arrester and associated Junction Box shall be as per unit quantities mentioned in BPS.

- The Interpole cables between Circuit Breaker, Isolator and associated Marshalling box shall be deemed to be included in price of Equipment.

**Installation of 1.1kV grade Cables:**

- The quantity of Installation of cables is to be assessed by the contractor for the complete scope of work specified in Section project.

- The installation of 1.1kV grade power and control cables (including interpole cable of Equipment & illumination cables) shall be quoted in "LOT" basis.

- Supply and installation of Cable accessories like lugs, glands etc. for entire cabling work shall be deemed to be included in Installation charges of cables quoted by contractor in Bid price schedule.

- No variation shall be admissible on account of Installation of Cables/supply and installation of associated accessories, irrespective of variation (either positive or negative) in supply quantity of Cable specified in BPS.

**Extra Consumption of 1.1 kV Power and control cables.**

The Contractor shall make every effort to minimise wastage of the cables during installation. The Permitted Overall scarp/wastage shall be limited to 0.50% of actual supplied quantity for each size of cables. Any wastage more than the above limit shall be recovered from the contractor. All balance unused cables shall be returned to the employer by rewinding in separate drums for each size with discrete markings on drums.

Cut pieces of Cables having length less than following shall be considered for Scrap. The Contractor shall dispose of the scrap (if any), at their own cost :

1.) **Length less than 20 M**
   - **a)** Control Cable ( 3C, 5C, 7C & 10 Core)
   - **b)** Power Cable(2CX 6Sqmm,4CX6Sqmm, 4CX16Sqmm)

2.) **Length less than 50 M**
   - **a)** Control Cable having more than 10 Cores
   - **b)** Power Cable of sizes above 16 Sq mm

For Illumination purpose, ACP's shall be supplied as per BPS. From ACP to luminous all the required cables, accessories( including lugs and gland for cables between MLDB & ACP) , SLP/JB etc as required shall be assessed and supplied by the contractor. The price of these items shall be deemed to be included in price of luminaries.

## Appendix-I: Control Cable Sizes

| S.No. | From | To | Proposed Cable size |
|---|---|---|---|
| 1. | CB MB | CRP panels | i) 10CX2.5Sq mm<br>ii) 19CX1.5 Sq mm<br>iii) 27CX 1.5 Sq mm |
| 2. | CB MB | Earth switch MB | i) 3CX 2.5 Sqmm<br>ii) 5C X2.5 Sq mm |
| 3. | Isolator MB | Earth switch MB | 10CX2.5Sq mm |
| 4. | Isolator MB | CRP panels | 19CX1.5 Sq mm |
| 5. | CT | CT JB | i) 5C X2.5 Sq mm<br>ii) 10C X2.5 Sq mm |
| 6. | CT JB | CRP panels | i) 5C X2.5 Sq mm<br>ii) 10C X2.5 Sq mm |
| 7. | CVT | CVT JB | i) 5C X2.5 Sq mm<br>ii) 10C X2.5 Sq mm |
| 8. | CVT JB | CRP panels | i) 5C X2.5 Sq mm<br>ii) 10C X2.5 Sq mm |
| 9. | LA | LA JB | 3C X2.5 Sq mm |
| 10. | LA JB | CRP panels | 5C X2.5 Sq mm |
| 11. | Reactor MB/CMB ( for 1-Ph) | CRP panels | i) 3CX2.5Sq mm<br>ii) 5CX2.5 Sq mm<br>iii) 19CX 1.5 Sq mm<br>iv) 27CX 1.5 Sq mm<br>v) Paired Cables |
| 12. | ICT MB/CMB ( for 1-Ph) | CRP panels | i) 3CX2.5Sq mm<br>ii) 5CX2.5 Sq mm<br>iii) 19CX 1.5 Sq mm<br>iv) 27CX 1.5 Sq mm<br>v) Paired Cables |

Note:

i) For Applications in addition to those specified, appropriate cable size shall be considered by the contractor with prior approval of Employer during execution stage.

ii) GTP of 1.5 Sq mm Cable shall be submitted during detailed engineering stage for employers approval.

iii) In case, more nos. of runs or larger sizes of cables are required between two points based on design calculations, same shall deemed to be included in the scope of bidder.

**Appendix-II Power cable sizes.**

| S.No. | From | To | Existing<br>Cable size | Cable type |
|---|---|---|---|---|
| 1. | Main Switch Board | LT Transformer | 2-1C X 630 $mm^2$ :For each phase<br>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 | 1-3½C X 300 $mm^2$ | XLPE |
| 4. | Main Switch Board | Colony Lighting | 1-3½C X 300 mm2 | XLPE |
| 5. | Main Switch Board | HVW pump LCP | 1-3½C X 300 mm2 | XLPE |
| 6. | Main Switch Board | Main Lighting distribution board | 2-3½C X 300 mm2 | XLPE |
| 7. | AC Distribution Board | D.G. Set AMF Panel | For 500 kVA DG set:<br>2-3½C X 300 mm2<br>For 250 kVA DG set:<br>1-3½C X 300 mm2 | XLPE |
| 8. | AC Distribution Board | Emergency Lighting distribution board | 3½C X 70mm2 :For 765/400kV S/s<br>3½C X 35mm2 :For 400/220kV S/s | PVC |
| 9. | AC Distribution Board | ICT MB | 3½C X 70mm2 :For 765/400kV S/s<br>3½C X 35mm2 :For 400/220kV S/s | PVC |
| 10. | AC Distribution Board | Bay MB | 3½C X 70mm2 :For 765/400kV S/s<br>3½C X 35mm2 For 400/220kV S/s | PVC |
| 11. | Bay MB | AC Kiosk | 1-4C X 16 mm2 | PVC |
| 12. | AC Distribution Board | Battery Charger<br>220 V | 1-3½C X 70 mm2 | PVC |

| | | | | |
|---|---|---|---|---|
| 13. | AC Distribution Board | Battery Charger<br>48 V | 1-3½C X 35 mm | PVC |
| 14. | DCDB | Battery | 2-1C X 150 mm2 | PVC |
| 15. | DCDB | Battery Charger | 2-1C X 150 mm2 | PVC |
| 16. | DCDB | Protection/PLCC panel | 1-4C X 16 mm2 : 765/400kV S/s<br>1-4C X 6 mm2: 400/220kV S/s | PVC |
| 17. | Main Lighting DB | Lighting panels(Indoor) | 1-3½C X 35 mm2 | PVC |
| 18. | Main Lighting DB | Lighting panels (outdoor) | 1-3½C X 70 mm2 | PVC |
| 19. | Main Lighting DB | Receptacles (Indoor) | 1-3½C X 35 mm2 | PVC |
| 20. | Main Lighting DB | Receptacles (Outdoor) | 1-3½C X 70 mm2 | PVC |
| 21. | Lighting Panel | Sub lighting panels | These Cables shall be included in Price of item for Lighting fixture | PVC |
| 22. | Lighting Panel | Street Lighting Poles | These Cables shall be included in Price of item for Lighting fixture | PVC |
| 23. | Lighting Panel/ Sub lighting panels | Lighting Fixtures (Outdoor) | These Cables shall be included in Price of item for Lighting fixture | PVC |
| 24. | Bay MB | Equipment | 1-4C X 16 $mm^2$ : For CB<br>1-4C X 6 $mm^{2:}$ For Isolator/earths switch<br>1-2C X 6 : For CT/CVT | PVC |
| 25. | ELDB | Lighting panel | 3½C X 70$mm^2$ :For 765/400kV S/s<br>3½C X 35mm2 :For 400/220kV S/s | |

## SECTION-4
## GUARANTEED TECHNICAL PARTICULARS

| | | |
|---|---|---|
| | **LINE TRAPS** | : |
| 1 | Name of manufacturer and country | : |
| 2 | Type Model and Catalogue No | : |
| 3 | System Voltage Rating | : |
| 4 | Continuous current rating at $50^{o}$ C ambient | : |
| 5 | Continuous current rating at $65^{o}$ C ambient | : |
| 6 | Maximum Symmetrical short circuit current rating for 1 sec Duration | : |
| 7 | Asymmetric peak value of first half wave of rated short time current | : |
| 8 | Rated Inductance | : |
| 9 | Blocking Range | : |
| 10 | Minimum Guaranteed Resistive Component in Blocking frequency range | : |
| 11 | Type of Tuning | : |
| 12 | Variation in 50Hz Impedance per Degree Centigrade variation in ambient temperture | : |
| 13 | Variation in Resonant frequency band per degree centigrade variation in ambient temperature | : |
| 14 | Details of protection of capacitors and coils against voltage surges indicate type of protective device. | : |
| 15 | Basic Insulation level | : |
| 16 | Standard Nominal Discharge Current of Protective Device for 8/20 Micro second wave impulse | : |
| 17 | Rated voltage of the Arrestor (Protective device) | : |
| 18 | Min. value of power frequency sparkover voltage (Dry and wet) of protective devices | : |
| 19 | Maximum 1.2/50 usec Impulse Sparkover voltage of protective device | : |

**GUARANTEED TECHNICAL PARTICULARS**

| | | |
|---|---|---|
| 20 | Virtual steepness and max front of wave impulse sparkover voltage of protective device | : |
| 21 | Max. residual discharge voltage of protective device for 8/20 usec impulse discharge current of | |
| | (a) 5000 Amps | : |
| | (b) 10000 Amps | : |
| 22 | Class of Insulation of line traps as per table - 1 of IEC 353 | : |
| 23 | Temperture Rise in line trap under rated continuous current | : |
| 24 | Visual corona Extinction voltage | : |
| 25 | Radio Interference voltage | : |
| 26 | Type of incoming and outgoing terminals | : |
| 27 | Visual corona Extinction voltage for terminal concurrence | : |
| 28 | Radio interference voltage in terminal connectors | : |
| 29 | Continuous current rating of terminal connector at $50^{o}$ C ambient | : |
| 30 | Short time current rating of terminals connectors | : |
| 31 | Temperature rise in terminal connector under rated continuous current over $50^{o}$ C ambient | : |
| 32 | Type of Mounting | : |
| 33 | Maximum working stress | : |
| 34 | Ultimate tensile strength | : |
| 35 | Material of main coil | : |
| 36 | Material of terminal connector | : |
| 37 | Material of pedestal | : |
| 38 | Material of mounting hardware | : |
| 39 | Net weight (Approx) | : |
| 40 | Whether corona rings are provided | : |
| 41 | Whether Bird Barries are provided | : |
| 42 | Overall Dimensions provided | |
| | (a) Diameter | : |
| | (b) Height | : |
| 43 | Any other feature | : |
| 44 | No of turns in theline trap main coil | : |

**GUARANTEED TECHNICAL PARTICULARS**

| | | |
|---|---|---|
| 45 | Type of conductor whether solid or standard | : |
| 46 | Overall conductor size | : |
| 47 | Cross sectional area of conductor of one layer | : |
| 48 | Type of construction (no of coils and whether open type or covered with insulating material | : |

SCHEDULE OF DEVIATIONS

Certified that the following are only deviations from the specification (for the equipment and systems being offered)

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

Date :

Signature :

Name:

Designation :

# TECHNICAL QUALIFICATION REQUIREMENT

**Name of Project:**

1. **Substation Package SS-01** for (i) 765/400/220kV Bikaner-III Pooling Station including 400kV class Bus Reactor at Bikaner-II S/s; (ii) Extension of 765kV Neemrana-II S/s for termination of 765 kV D/c line Neemrana-II–Bikaner-III T/L and (iii) Extension of 400kV Bikaner-II S/s for termination of 400kV Bikaner-II Bikaner-III T/L under "Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) (Bikaner Complex)

2. **Substation Package SS01** for (a) Extn. of 765kV Sikar-II Substation, (b) Extn. of 765kV Khetri Substation; associated with "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III-Part D"

**Name of Customer:** POWERGRID

**Name of Item:** 765/400/220kV WAVE TRAP

| TECHNICAL QUALIFICATION REQUIREMENT |
|---|
| **Technical requirements for Wave Trap:**<br><br>(i) The manufacturer whose 765/400/220/132kV* equipment(s) are offered, must have manufactured, type tested (as per IS/IEC or equivalent standard) and supplied 715/345/220/132kV* or higher voltage class equipment(s), which are in satisfactory operation# for at least two (2) years as on 10/02/2024.<br><br>OR<br><br>(ii) The manufacturer, who have established manufacturing and testing facilities in India for the offered equipment(s) and not meeting the requirement stipulated in (i) above, can also be considered provided that:<br><br>a) 715/345/220/132kV* or higher Voltage class equipment(s) must have been manufactured in the above Indian works & type tested (as per IS/IEC standard) as on 10/02/2024<br><br>b) Manufacturer has manufactured, type tested (as per IS/IEC or equivalent standard) and supplied equipment(s) of 345kV or above voltage class (applicable for 765kV* Equipment)/220kV or above voltage class (applicable for 400kV* equipment) /132kV or above voltage class (applicable for 220kV* equipment) / 66kV or higher voltage class (applicable for 132kV* equipment), which are in satisfactory operation# for at least two (2) years as on 10/02/2024. |

PREPARED BY

REVIEWED BY

09.02.2024

NEERAJ KUMAR

APPROVED BY

c) Warranty obligations for additional warranty of two (2) years over & above the warranty period as specified in the bidding documents shall be applicable for the entire quantity of the offered equipment(s) to be supplied under the contract. Further, contractor shall furnish performance guarantee for an amount of 10% of the ex-works cost of the equipment(s)* for the additional warranty period in addition to the contract Performance guarantee to be submitted by the contractor.

OR

(iii) The manufacturer, who have established manufacturing and testing facilities in India for the offered equipment(s) based on technological support of a parent company or collaborator and not meeting the requirement stipulated in (i) above, can also be considered provided that:

a) 715/345/220/132kV* or higher Voltage class equipment(s) must have been manufactured in the above Indian works & type tested (as per IS/IEC standard) as on the date 10/02/2024.

b) The parent company or collaborator meets the qualifying requirements stipulated under (i) given above.

A valid collaboration agreement for technology transfer / license to design, manufacture, test and supply the 765/400/220/132kV* Air Insulated Switchgear (AIS) Equipment(s)* in India, shall be submitted.
c) The parent company/collaborator shall furnish performance guarantee for an amount of 10% of the ex-works cost of such equipment(s) and this performance guarantee shall be in addition to contract performance guarantee to be submitted by the contractor

Legend:
* : voltage class of respective equipment as applicable.
#: satisfactory operation means certificate issued by the Employer/Utility certifying the operation without any adverse remark.

| SUPPORTING DOCUMENTS TO BE SUBMITTED BY BIDDER ALONG WITH TECHNICAL BID | | |
|---|---|---|
| **Sr** | **Required Criteria** | **Supporting Documents** |
| 1 | Manufacturing | Approved Drawings / GTP / Approved Quality Plan / Factory Inspection Test Report etc. establishing bidder as manufacturer of offered item in line with TQR |
| 2 | Supply | PO / Dispatch clearance / LR / Material Receipt certificate at site / installation or commissioning certificate etc. establishing bidder as proven supplier of offered item in line with TQR |
| 3 | Type Test | TTR approval from customer / Type Test Report etc. establishing successful type tested design in line with TQR |
| 4 | Successful operation | Successful operation means certificate issued by employer/end-customer or main contractor (along with chain of document from employer/end-customer) stating successful operation without any adverse remark. |

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| | | |
|---|---|---|
| 5 | Any other document if specifically called in TQR | Any other document if specifically called in TQR |

**NOTES:**

1. Bidder to please note that the submitted bid shall be liable to rejection in the absence of submission of valid Technical TQR documents along with technical bid.
2. Consideration of offer shall be subject to customer's approval of bidder's, if applicable.
3. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self- attested English translated document should also be submitted.
4. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
5. After satisfactory fulfilment of all the above criteria / requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.

Rajat

PREPARED BY

Rajat Kumar
Dy. Mgr. (TBEM)

09.02.2024

REVIEWED BY

(NEERAJ KUMAR)

APPROVED BY

# Annexure A - Activity Schedule

**Project** **PGCIL Bikaner,Neemarana,Sikar&Khetri**
**Item** **Wave Trap**

| SN | Activity | Activity Time (in weeks) | Scope |
|---|---|---|---|
| 1 | Input to Vendor from BHEL | 1 | BY BHEL |
| 2 | Submission of Documents necessary for getting manufacturing clearance like Drawings, Data sheet, MQP etc. | 2 | BY SUPPLIER |
| 3 | Manufacturing Clearance & CAT-A approval to Vendor after drawing submission | 1 | BY BHEL |
| 4 | Manufacturing time after CAT-A approval & Manufacturing Clearance till proposed inspection date(Including time of raising Inspection Call as mentioned in note#1). | 14 | BY SUPPLIER |
| 5 | BHEL/Customer Inspection & Dispatch Clearance | 1 | BHEL SCOPE |
| 6 | Dispatch | 1 | BY SUPPLIER |
| | Total | 20 | weeks |

Notes:

1. Inspection call to be issued 2 weeks in advance.
2. Supplier must ensure the completeness and correctness of the requisite documents before submission for approval. Delay in approval on account of incomplete / inadequate information shall be the responsibility of supplier.
3. Vendor to ensure resubmission of drawings/documents within 1 week from the date of comment from BHEL. Any delay in resubmissions w.r.t 1 week shall be reduced from Activity No.4 as above.
4. Count of resubmissions shall be certified by TBEM and same shall be compensated in schedule by adding certified time or number for resubmissions.
5. Qty. to be offered for inspection should be in accordance within Delivery-schedule – lot. BHEL reserves the right not to entertain multiple inspection calls for a Delivery – lot and delay on this account shall be the responsibility of Supplier.

Signature & Seal of supplier

## Annexure B - Contact details of supplier

**Project** **PGCIL Bikaner,Neemarana,Sikar&Khetri**
**Item** **Wave Trap**

| | |
|---|---|
| Work Address | |
| Communication address | |
| **Details of contact person for clarification regarding bid:** | |
| Contact Person Name: | |
| Designation: | |
| Email Id.: | |
| Mobile No.: | |
| Landline No.: | |

Signature & Seal of supplier

# Annexure C-UNPRICED BID

**Project** **PGCIL Bikaner,Neemarana,Sikar&Khetri**
**Item** **Wave Trap**

| Item number | Item Description | Item quantity | Unit of measurement | Unit Price (inclusive of Tax) | GST % applicable |
|---|---|---|---|---|---|
| 1 | PGCIL Bikaner-3 new - 765KV, 1MH, 50KA FOR 1S, 3150A SINGLE PHASE WAVE TRAP | 4 | NO | Mention as "Quoted" | Mention GST % |
| 2 | PGCIL Bikaner-3 new - 765KV TERMINAL CONNECTOR STATION SIDE | 4 | NO | Mention as "Quoted" | Mention GST % |
| 3 | PGCIL Bikaner-3 new - 765KV TERMINAL CONNECTOR LINE SIDE | 4 | NO | Mention as "Quoted" | Mention GST % |
| 4 | PGCIL Bikaner-3 new - 400KV, 0.5MH, 63KA FOR 1S, 3150A SINGLE PHASE WAVE TRAP | 12 | NO | Mention as "Quoted" | Mention GST % |
| 5 | PGCIL Bikaner-3 new - 400KV TERMINAL CONNECTOR STATION SIDE | 12 | NO | Mention as "Quoted" | Mention GST % |
| 6 | PGCIL Bikaner-3 new - 400KV TERMINAL CONNECTOR LINE SIDE | 12 | NO | Mention as "Quoted" | Mention GST % |
| 7 | PGCIL Bikaner-3 new - 220KV, 0.5MH, 50KA FOR 1S, 1600A SINGLE PHASE WAVE TRAP | 6 | NO | Mention as "Quoted" | Mention GST % |
| 8 | PGCIL Bikaner-3 new - 220KV TERMINAL CONNECTOR STATION SIDE | 6 | NO | Mention as "Quoted" | Mention GST % |
| 9 | PGCIL Bikaner-3 new - 220KV TERMINAL CONNECTOR LINE SIDE | 6 | NO | Mention as "Quoted" | Mention GST % |
| 10 | PGCIL Neemrana-2 - 765KV, 1MH, 50KA FOR 1S, 3150A SINGLE PHASE WAVE TRAP | 4 | NO | Mention as "Quoted" | Mention GST % |
| 11 | PGCIL Neemrana-2 - 765KV TERMINAL CONNECTOR STATION SIDE | 4 | NO | Mention as "Quoted" | Mention GST % |
| 12 | PGCIL Neemrana-2 - 765KV TERMINAL CONNECTOR LINE SIDE | 4 | NO | Mention as "Quoted" | Mention GST % |
| 13 | PGCIL Bikaner-2 - 400KV, 0.5MH, 63KA FOR 1S, 3150A SINGLE PHASE WAVE TRAP | 4 | NO | Mention as "Quoted" | Mention GST % |
| 14 | PGCIL Bikaner-2 - 400KV TERMINAL CONNECTOR STATION SIDE | 4 | NO | Mention as "Quoted" | Mention GST % |
| 15 | PGCIL Bikaner-2 - 400KV TERMINAL CONNECTOR LINE SIDE | 4 | NO | Mention as "Quoted" | Mention GST % |
| 16 | PGCIL Sikar-II - 765KV, 1MH, 50KA FOR 1S, 3150A SINGLE PHASE WAVE TRAP | 8 | NO | Mention as "Quoted" | Mention GST % |
| 17 | PGCIL Sikar-II - 765KV TERMINAL CONNECTOR STATION SIDE | 8 | NO | Mention as "Quoted" | Mention GST % |
| 18 | PGCIL Sikar-II - 765KV TERMINAL CONNECTOR LINE SIDE | 8 | NO | Mention as "Quoted" | Mention GST % |
| 19 | PGCIL Khetri - 765KV, 1MH, 50KA FOR 1S, 3150A SINGLE PHASE WAVE TRAP | 4 | NO | Mention as "Quoted" | Mention GST % |
| 20 | PGCIL Khetri - 765KV TERMINAL CONNECTOR STATION SIDE | 4 | NO | Mention as "Quoted" | Mention GST % |
| 21 | PGCIL Khetri - 765KV TERMINAL CONNECTOR LINE SIDE | 4 | NO | Mention as "Quoted" | Mention GST % |

Signature & Seal of supplier

**Project PGCIL Bikaner,Neemarana,Sikar&Khetri**
**Items Wave Trap**

## SCHEDULE OF TECHNICAL DEVIATION

The following are the deviations/ variations exception from the Specification:

| SL. No. | CLAUSE NO. OF GENERAL TERMS AND CONDITION | STATEMENT OF DEVIATION/ VARIATIONS/EXCEPTIONS |
|---|---|---|
| | | |

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 & 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 scheduled.Deviation mentioned in this scheduled shall only be considered.

**SIGNATURE & SEAL OF SUPPLIER**

**Project PGCIL Bikaner,Neemarana,Sikar&Khetri**
**Items Wave Trap**

## SCHEDULE OF COMMERCIAL DEVIATION

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

| SL. No. | CLAUSE NO. OF GENERAL TERMS AND CONDITION | 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 scheduled.Deviation mentioned in this scheduled shall only be considered.

**SIGNATURE & SEAL OF SUPPLIER**

# Annexure-III- Check List for Supply bills

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

# Check List for Supply bills

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Name Of the Project | | | | | | | |
| Package Description | | | | | | | |
| Invoice No. & Date | | | | | | | |
| PO No. & date | | | | | | | |
| Sr. No | Documents Required | Copies | Check Points | Page no. | Vendor Remarks | Verification by MM | Verification by Fin |
| | | | | | (Y/N/NA) | (Y/N/NA) | (Y/N/NA) |
| | Material receipt Certificate | | 3. Item description and quantity are same as per Invoice / Packing List | | | | |
| | | | 4. It is signed and stamped by Site executive | | | | |
| | | | 5. In case of any shortages / damages / adverse remark , clarification is needed | | | | |
| 10 | Other Documents | | To be seen as per specific requirement of PO. | | | | |
| **To be filled by BHEL (MM) only** | | | | | | | |
| 10 | Date Of Submission of Last Billing Document | | Date to be mentioned | | Not to be filled by vendor | | |
| 11 | LD Calculation, if applicable, as per PO. | | Calculation Sheet of LD due to delay in delivery is attached | | | | |
| 12 | Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes | 1 Copy | Damages if any mentioned in the Receipted LR have been accounted for. Withhel amount if any_____ | | | | |
| 13 | Packing List - showing number of packages and gross weight & net Weight (If applicable) | 1 Original | If Packing list does not match with Purchase order (with ref to sl 4 above), Engg/MM acceptance as to the completeness is enclosed. | | | | |
| 14 | PO copy | 1 Copy | PO copy with original seal and signature is attached along with amendment if any | | | | |
| 15 | Dan | 1 copy | Relevant DANs are attached duly signed by TBMM representative. | | | | |
| Note* | Every Field to be ticked. If some document is not applicable, same should be mentioned, All Pages to be numbered upward from the bottom Page | | | | | | |
| | Invoice control No | | | | Vendor Signature | MM Signature | Finance Signature |
| | | | | | Date: | Date: | Date: |
| | | | | | | | |

**Annexure-IV**

**(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 it's 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 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:
    a. On the date of signing of the Settlement agreement by the Parties; or,
    b. 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,
    c. 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,
    d. 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.
    e. 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.<br>Rs 75,000 (per Conciliator)<br>In cases involving claim and/or counter-claim of more than Rs 10 crores.<br>Rs 1,00,000/- (per Conciliator)<br>Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on<br>Signing of the Settlement Agreement after approval of the Competent Authority or<br>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.<br><br>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<br>i) Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL) | As per entitlement of the equivalent officer (pay scale wise) in BHEL. |
| | Others | As per the extant entitlement of whole time Functional Directors in BHEL. |

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

24. The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s)on their behalf. The parties agree to rely upon documentary evidence in support of their claims and not to bring any oral evidence in IEC proceedings.

25. If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.

26. The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.

27. Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.

28. The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 3 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.

29. The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement, except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/ regulatory body, as the case may be.

30. The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:
    a. Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;
    b. admissions made by the other party in the course of the Conciliator proceedings;
    c. proposals made by the Conciliator;
    d. The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.

31. The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.

32. None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.

33. The Parties shall not initiate, during the Conciliation proceedings, any arbitral or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue

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

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

**Format 2 to BHEL Conciliation Scheme, 2018**

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

To,

M/s. (Stakeholder's name)

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

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

Sir,

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

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

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

Yours faithfully,

**Representative of BHEL**

**Format 3 to BHEL Conciliation Scheme, 2018**

**FORMAT FOR GIVING CONSENT BY CONTRACTOR/VENDOR/CUSTOMER/COLLABORATOR/CONSORTIUM 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 Clam(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.*

| | |
|---|---|
| **Item/Package Name :** | |
| **Enquiry No.:** | |
| **Project:** | |
| **Type of project** | |
| **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:……..**

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

| | |
|---|---|
| **Item/Package Name :** | |
| **Enquiry No.:** | |
| **Project:** | |
| **Type of project** | |
| **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.>

Annexure-VI

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

I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.

II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not failing in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

III. "Bidder from a country which shares a land border with India" for the purpose of this Order means:

a. An entity Incorporated, established or registered in such a country; or
b. A subsidiary of an entity Incorporated, established or registered in such a country; or
c. An entity substantially controlled through entitles incorporated, established or registered in such a country; or
d. An entity whose *beneficial owner* is situated in such a country, or
e. An Indian (or other) agent of such an entity; or
f. A natural person who is a citizen of such a country; or
g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

IV. The *beneficial owner* for the purpose of (iii) above will be as under:

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

V. An Agent is a person employed to do any act for another or to represent another in dealings with third person.

Annexure-VI

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

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 affaires website (https://www.mea.gov.in/)

**Annexure-VII**

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

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

| Sl No. | Description | Bidder's confirmation |
|---|---|---|
| *1* | *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.* | *Agreed* |

(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-VIII**

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

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

| Sl No. | Description | Bidder's confirmation |
|---|---|---|
| *1* | *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.*<br><br>***Evidence of valid registration by the Competent Authority is attached.*** | *Agreed* |

(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-IX

No.25-111612018-PG

Government of India

Ministry of Power

Shram Shakti Bhawan, Rafi Marg, New Delhi • — 110001

Tele Fax: 011-23730264

Dated 02/07/2020

ORDER

Power Supply System is a sensitive and critical infrastructure that supports not only our national defence, vital emergency services including health, disaster response, critical national infrastructure including classified data & communication services, defence installations and manufacturing establishments, logistics services but also the entire economy and the day-today life of the citizens of the country. Any danger or threat to Power Supply System can have catastrophic effects and has the potential to cripple the entire country. Therefore, the Power Sector is a strategic and critical sector.

The vulnerabilities in the Power Supply System & Network mainly arise out of the possibilities of cyber attacks through malware / Trojans etc. embedded in imported equipment. Hence, to protect the security, integrity and reliability of the strategically important and critical Power Supply System & Network in the country, the following directions are hereby issued:-

1. All equipment, components, and parts imported for use in the Power Supply System and Network shall be tested in the country to check for any kind of embedded malware/trojans/cyber threat and for adherence to Indian Standards.
2. All such testings shall be done in certified laboratories that will be designated by the Ministry of Power (MOP).
3. Any import of equipment/components/parts from "prior reference" countries as specified or by persons owned by, controlled by, or subject to the jurisdiction or the directions of these "prior reference" countries will require prior permission of the Government of India
4. Where the equipment/components/parts are imported from "prior reference" countries, with special permission, the protocol for testing in certified and designated laboratories shall be approved by the Ministry of Power (MOP).

This order shall apply to any item imported for end use or to be used as a component, or as a part in manufacturing, assembling of any equipment or to be used in power supply system or any activity directly or indirectly related to power supply system.

This issues with the approval of Hon'ble Minister of State for Power and New & Renewable Energy (Independent Charge).

(Goutam Ghosh)

Director Tel: 011-23716674 To:

1. All Ministries/Departments of Government of India (As per list)
2. Secretary (Coordination),Cabinet Secretariat
3. Vice Chairman, NITI Aayog

सेवा भवन, आर. के. पुरम-I, नई दिल्ली-110066 टेली: 011-26732257 ईमेल: ce-rndcea@nic.in वेबसाइट: www.cea.nic.in

Sewa Bhawan, R.K Puram-I, New Delhi - 110066 Tele: 011-26732257 Email: ce-rndcea@nic.in Website: www.cea.nic.in

**Annexure-** x

# Vendor Compliance format in bidder letter head

In view of order No. 25-111612018-PG, Dated 02.07.2020 of Ministry of Power, GOI

**En uiry No/ PO No & Date :**
**Pro ect :**
**Name of items/Package :**

This is to certify that all equipment, components, and parts imported for use in the Power Supply System and Network are in strict compliance to directions issued by Ministry of Power, Govt. of India vide order No. 25-111612018-PG dated 02.07.2020. The imported component(s), part or assembly item(s) does not carry any malware/Trojan etc.

**Note: Non-compliance of MoP Order and its subse uent amendment(s), (if any), by vendor shall lead to re ection of their offer or cancellation of contract, which is awarded by BHEL.**

**Bidder's authorized signatory**

**with stamp & seal**

## Annexure-XI

**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.

(a) IP is a tool to ensure that activities and transactions between the company and its bidders/contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitor (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

**Details of IEM for this tender is furnished below**
**Name: Shri Arun Chandra Verma, IPS (Retd.)**
**Email: acverma1@gmail.com**

**Name: Shri Virendra Bahadur Singh, IPS (Retd.)**
**E-mail: vbsinghips@gmail.com**

(b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-1, in case of Two/three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this pact would be a preliminary qualification.

(c)Please refer section -8 of the IP for Role and responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEM shall be done through e-mail only.

Note: No routine correspondence shall be addressed to the IEM (Phone/post/email) regarding the clarification, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/issues shall be addressed directly to the tender issuing (procurement) department's officials as mentioned on Point 2 & 3.

Annexure-1

# INTEGRITY PACT

**Between**

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

**and**

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

## Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for _____

_____

_____ . The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

## Section 1- Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions:

## Section 2 - Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and will await their decision in the matter.

## Section 3 - Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

## Section 4 - Compensation for Damages

4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/ Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to

demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

## Section 5 - Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

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

## Section 6 - Equal treatment of all Bidders/ Contractors / Sub-contractors

6.1 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain responsible for any default by his sub-contractors.

6.2 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

## Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

## Section 8 - Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality in line with Non- disclosure agreement.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.

8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.

8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious irregularities requiring legal/ administrative action. IEMs will tender their advice on the complaints within 10 days as far as possible.

8.8 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.9 IEM should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the organization should be looked into by the CVO of the concerned organisation.

8.10 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code/ Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.11 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.12 The word `Monitor' would include both singular and plural.

## Section 9 - Pact Duration

9.1 This Pact shall be operative from the date IP is signed by both the parties till the final completion of contract for successful bidder and for all other bidders 6 months after the contract has been awarded. Issues like warranty / guarantee etc. should be outside the purview of IEMs.

9.2 If any claim is made/ lodged during currency of IP, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

## Section 10 - Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders / contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

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For & On behalf of the Principal

(Office Seal)

---

For & On behalf of the Bidder/

Contractor

(Office Seal)

Place----------

Date----------

Witness:_____

(Name & Address) _____

_____

Witness:_____

(Name & Address) _____

_____

Annexure-XIV

# 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 BHEL House Siri Fort New Delhi-110049 through its Unit at BHEL, TBG, Noida 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 PO No.é é é é é é é é dated é é é é é é é é é é é é é .[3] valued at Rsé é é é [4] ( Rupees ----------)/FCé é é é é é (in wordsé é é ..) for é é é é é é é é é é [5] (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Performance Guarantee, equivalent to é é % (é . Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we, é é é é é é é , (hereinafter referred to as the Bank), having registered/Head office at é é é é é . and inter alia a branch at é é é é 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 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 includingé 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 .[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 exceedé 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)

Datedé é é é é é .
Place of Issueé é é é é é .

*Instruction for BG*

*[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*

**Note:**

1. **Units are advised that expiry of claim period may be kept 2/3 months after validity date.**

2. **In Case of Bank Guarantees submitted by Foreign Vendors-**

   a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

   b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**

   **b.1** In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.

   **b.2** **In case, Foreign Vendors intend to provide BG from** Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.

   **b.3** The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.

   **b.4** The BG should clearly specify that the demand or other document can be presented in electronic form.

Ref. BHEL/TBG/GTC/2016

**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 |

# BHARAT HEAVY ELECTRICALS LIMITED
## TRANSMISSION BUSINESSS 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.