



BHARAT HEAVY ELECTRICALS LIMITED भारत हैवी इलेक्ट्रिकल्स लिमिटेड
(A GOVT. OF INDIA UNDERTAKING) (भारत सरकार का उपक्रम)
PROJECT ENGINEERING MANAGEMENT परियोजना अभियांत्रिकी प्रबंधन

निविदा आमंत्रण सूचना
NOTICE INVITING TENDER (NIT)

Enquiry No- 77/24/6082/SEE

Date-13-Mar-25

BHEL invites offers from reputed Suppliers as per following terms and conditions -

1. Tender Type	Open Tender (Domestic-Indian)		
2. Package	SCREENED CONTROL CABLES		
3. Project	Framework Agreement (Rate Contract) of SCREENED CONTROL CABLES		
4. Executing Agency	BHEL-PEM		
5. Mode of Enquiry	E - PROCUREMENT		
6. Nature of Package (Divisible/Non-Divisible)	Divisible		
7. Numbers of Part bid	2-Part bid (Techno-commercial and Price bid)		
8. Due Date & Time	For offer submission	24.03.2025	12:00 IST
	For P-1 bid opening	24.03.2025	16:00 IST
9. Earnest Money Deposit (EMD)	Not Applicable	EMD Amount	NA
10. Tender Cost	NIL		
11. Numbers of Part bid	2-Part bid (Techno-Commercial and Price Bid)		
12. Eligibility of Local Supplier as per MII	Only Class I Supplier (with local content 60% and above)		
13. Technical Scope	As per Technical specification No.: PE-TS-999-507-E005		
14. Pre-bid Clarification	Suppliers to contact BHEL-PEM (over phone/ mail/ visit-BHEL-PEM) for any clarification (Technical or Commercial) at least 05 days before the due date of Tender opening & get it clarified well before the due date, so that offers by the Suppliers may be submitted within the due date & time.		
15. Prequalification Requirements	Financial PQR- YES		Technical PQR- YES
16. Delivery terms for Supply	FOR Despatch Station		
17. Delivery Schedule:			
A. Main Supply & Commissioning Spares (if any)	150 days from the date of PO.		

Notes:

- Supplier to start manufacturing/supply only after getting the applicable Primary engineering Drgs. /docs approved from BHEL/End Customer.
- Drawings /documents submission/re-submission schedule shall be as per Technical specification (PE-TS-999-507-E005) which shall be used for progress monitoring purpose and required course correction, if any.
- The delivery date specified is for completion of the deliveries. Deliveries to start progressively so as to meet the completion schedule.



- d. The delivery conditions specified are for contractual purposes. However, to meet project requirement, BHEL may ask for early deliveries without any compensation thereof.

2.0 Validity of contract placed on basis of Framework Agreement (Rate Contract) for individual projects (PO rates, terms and conditions):

Vendor has to make supply of goods/services as per the delivery time mentioned above. However, due to unavoidable circumstances if delay happens in providing inputs/ clearances (inputs, Engineering approvals, deputing inspector for inspection, issuance of MDCC and any hold imposed owing to site issues etc.) for which delivery time extension is admissible as per point no.3, in such situation it shall be obligatory at vendor part to execute the contract at PO rates, terms and conditions where inputs/ clearances has been accorded within validity of contract. Validity period for various activities shall be as defined below or as mentioned in the NIT.

2.1 Contract for main supply shall be valid for 210 ('C') days from the PO date. In case of more than 2 units, validity period will be increased by supply time considered for subsequent units. However, delay at vendor's end (if any) shall be added to the validity period and contract validity shall get extended by the delay period at vendor's end.

For example: Original Delivery period for main supply: A (in days)

Delay at vendor's end: B (in days beyond "A" days)

Contract validity: C+B (in days)

Notes:

- B is the Vendor delay days beyond original contractual delivery period for main supply /extended delivery period owing to time taken by BHEL.
- Main supply, applicable in the contract released/ cleared for manufacturing within contractual validity period, to be supplied by vendor/supplier at PO rates, terms and conditions.
- Execution of the contract quantities released beyond contract validity period shall be decided on mutual consent basis at PO rates, terms and conditions.

3.0 Delivery Extension: Extension of contractual delivery time:

Delivery time mentioned in the NIT includes Engineering completion time (time for drawing/document submission/resubmission by the vendor and review/approval of the same by the BHEL/End customer), manufacturing, inspection, Packing and dispatch time. Due diligence is to be observed by the vendor to ensure timely completion of engineering and supply.

During the execution of the contract, time loss occurred owing to the reason attributable to BHEL besides force majeure shall be considered for delivery time extension to the vendor as given below: -

- Any Delay in providing comments/ approval on Primary drawing/documents beyond the stipulated time as specified in NIT.
- Time Loss in approval of the drawing/document as a result of increase in the iteration not attributable to the vendor (i.e. resubmission owing to end customer comments) as certified by BHEL. Time extension equivalent to the resubmission time noted in the tech. spec and consequential increase in the approval time in lieu of increase in iteration shall be applicable. However, for incomplete re- submission time loss shall be in vendor account.
- Delay in providing engineering input/material by BHEL.
- Delay in deputing inspector for inspection and delay in release of MDCC in line with GCC
- Any hold put by BHEL for whatever reasons during execution of contract (within contract validity period), time extension equivalent to hold period shall be admissible. However, in the event hold period continues for more than 30 days then, an additional fifteen days for the purposes of mobilization and demobilization of resources shall also be admissible.

Note: Extension in delivery period if any with or without imposition of LD shall be considered after detailed delay analysis based on provisions given above. However, no delay analysis will be applicable if supply is completed within delivery schedule as specified in Purchase order.





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18. Liquidated Damages (LD):

a) **Liquidated Damages (For Main Supply):** Buyer reserves the right to recover from the Supplier, as agreed liquidated damages and not by way of penalty, a sum equivalent to half (½) percent of the undelivered portion of main contract price excluding GST per week or part thereof, subject to a maximum of ten (10) percent of total of contract price excluding GST, if the Supplier fails to deliver any part of the ordered goods/stores within the period stipulated in the Order/ Contract.

All other terms and conditions of LD shall be as per GCC Rev 07, Corrigendum 01 and to Corrigendum 02 GCC Rev-07.

19. Guarantee Terms: As per Clause No-12.0 except Clause no 12.2 (b) of General Commercial Terms & Condition of GCC Rev 07.

20. Validity of offer shall be as per Clause no. 7 (Instruction to Suppliers) of GCC Rev 07.

21. PVC (Price Variation Clause) : PVC (Price Variation Clause) shall be applicable as per enclosed PVC Annexure to NIT. Base date for initial prices for this tender shall be one month prior to date of NIT. All Suppliers shall quote as per the Price Variation Formulae provided in NIT.

22. CIF Content

Not Available

23. Integrity Pact Applicability

Yes,
Following Independent External Monitors (IEMs) have been appointed by BHEL -
Shri Otem Dai, IAS (Retd.) (iem1@bhel.in)
Shri Bishwamitra Pandey, IRAS (Retd.) (iem2@bhel.in)
Shri Mukesh Mittal, IRS (Retd.) (iem3@bhel.in)

24. Tender Evaluation - Price will be finalized through RA. The evaluation currency for this tender shall be INR. Evaluation will be done on overall L1 (Total Package Price including Freight excluding taxes) basis with necessary loading as applicable.

In the course of evaluation, if more than one Supplier happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 Suppliers.

In case more than one Supplier happens to occupy the L-1 status even after soliciting discounts, the L-1 Supplier shall be decided by a toss/ draw of lots, in the presence of the respective L-1 Supplier (s) or their representative(s). Ranking will be done accordingly. BHEL's decision in such situations shall be final & binding.

25. Payment terms:

As per clause No. 9.1 of General Commercial Terms and Conditions of GCC, Rev 07 i.e.

Payment of basic price of supplied materials (as per PO/ approved billing schedule) along with freight and taxes and duties (as applicable), shall be paid against receipt of material (receipted LR) at site on pro-rata basis. 10% of basic price of materials supplied will be retained as security deposit which will be released on pro – rata basis as below:

On receipt of Material Receipt Certificate (MRC) from project site engineer of owner/purchaser and on submission of certificate of submission of all the final documents for the package (as per Annexure IX(A) of GCC Rev 07), duly certified by Engineering Department of Purchaser.

Note:

Payment will be released within days as mentioned below after submission of complete documents:

a. 90 days for non MSME as per MSMED Act

b. 45 days for vendors qualified and registered as Micro and Small Enterprises MSEs as per MSMED Act

c. 60 days for vendors qualified as Medium Enterprises as per MSMED Act.





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26. Clause no 9.6 (excluding Notes) of GCTC of GCC Rev. 07 shall be read as-

"Suppliers shall submit billing documents for payment directly to BHEL. Payment will be released within days as mentioned below after submission of complete documents as per clause no 9.7.2 - 9.7.5:

- 90 days for non-MSME as per MSMED Act.
- 45 days for Suppliers qualified and registered as Micro and Small Enterprises MSEs as per MSMED Act.
- 60 days for Suppliers qualified as Medium Enterprises as per MSMED Act.

27. GST shall be payable extra at actual as per the HSN code finalized for the items during detailed BBU.

28. Reverse Auction:

BHEL shall be resorting to Reverse Auction (RA) (Guidelines for Reverse Auction – 2024, as available on www.bhel.com on "Supplier registration page") for this tender. RA shall be conducted among all the Techno-Commercially qualified Suppliers.

Price Bids of all the Techno-Commercially qualified Suppliers shall be opened and same shall be considered as initial bids of Suppliers in RA. In case any Supplier(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.

"The Suppliers has to quote the Single Price (i.e. Total Cost to BHEL) in Reverse Auction. Prices are to be inclusive of Packing & Forwarding charges, all as per tender scope, Freight as applicable, including loading (if any) but excluding GST. De-loading (if any) shall be done in line with NIT terms."

29. Supplier to note that this is an Open Tender enquiry & Reverse Auction participation shall be subject to following condition:

- Qualifying Technical Pre-Qualification Requirement.
- Techno-Commercial acceptance of offer by BHEL-PEM.
- Registration in BHEL-PEM for the Tender package
- Customer approval before reverse auction.

The Suppliers who are not registered with BHEL-PEM may apply for registration in BHEL-PEM through Registration Portal available at <https://supplier.bhel.in/>. All credentials and/ or documents duly signed & stamped related to registration has to be uploaded on the website & submit the application for registration. One set of hard copy filled-up SRF downloaded from Online Registration Portal duly signed & stamped has to be submitted.

29. Performance Security (PS)

PS Applicability

No Performance Security (PS) against the current enquiry for Framework Agreement (Rate Contract) for Tender package.

However, Suppliers to note that Performance Security shall be submitted for orders placed by the concerned Purchase Groups of concerned BHEL unit on the Framework Agreement (Rate Contract).

Successful Supplier/s will have to submit Performance Security for each POs (irrespective of value) which will be placed under the Framework Agreement (Rate Contract) finalized through this tender considering FA (RC) as original contract as per the format given in GCC Rev 07.

Relevant details of the PS to be submitted on the basis of Framework Agreement (Rate Contract) are as following:

I

Initially 10% of the contract value (total Ex-works price). However, 5% of the contract value (as above) will be released after completion of Main





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		Supply based on certification by Purchasing Department of BHEL unit. Balance 5% of the contract value (excluding PVC) will be released on completion of all contractual obligations, including guarantee/warranty obligations based on certification by Purchasing Department of BHEL unit.
		OR
	II	5% of the contract value (total Ex-works price). Additional 5% of the contract value will be retained from first bill & subsequent bill(s) of the same contract. The retention amount will be released after completion of main supply based on certification by Purchasing Department of BHEL unit. Balance 5% of the contract value (excluding PVC) will be released on completion of all contractual obligations, including guarantee/warranty obligations based on certification by Purchasing Department of BHEL unit.
	Validity of PS	As per clause no. 11.0 (except 11.4) of General Commercial Terms and Conditions of GCC Rev 07.
	PS Submission	PS should be in favour of concerned BHEL unit. Supplier may opt any of the following for submission of Performance Security: -
	Modes of Deposit	Performance security may be furnished in the following forms: a) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL. b) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL. c) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL). d) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL). e) Insurance Surety Bond. (Note: 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)





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		Performance Security is to be furnished within 14 days from the date of PO and it should remain valid for a period of 60 (sixty) days beyond the date of completion of all contractual obligations of the Supplier, including warranty obligations.
	Remarks for PS:	<p>a) The performance security will be forfeited and credited to BHEL's account in the event of a breach of contract by the supplier.</p> <p>b) Performance security should be refunded to the contractor 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.</p> <p>c) However, Performance Security validity is to be extended based on the actual delivery of package.</p> <p>The Performance Security shall not carry any interest.</p>
30. Breach of contract, Remedies and Termination (Tenderer to note that this clause will supersede any clause regarding recovery amount from Tenderer due to Breach on contract mentioned anywhere in GCC Rev07 and its Corrigendum)	<p>In case of Breach of Contract, BHEL shall recover 10% of the contract value from the Supplier using following instruments:</p> <p>(i) Encashment of security instruments like EMD, Performance Security with executing agency (PEM) against the said contract.</p> <p>(ii) Balance amount (if value of security instruments is less than 10% of the contract value) from other Financial remedies i.e. available bills of the Supplier, retention amount etc. with executing agency (PEM).</p> <p>(iii) Balance amount from security instruments like EMD, Performance Security and other Financial remedies i.e. available bills of the Supplier, retention amount etc. with other units of BHEL.</p> <p>(iv) If recovery is not possible then legal remedies shall be pursued.</p> <p>However, Supplier shall continue performance of the Order/ Contract, under all circumstances, to the extent not cancelled.</p>	
31. Suppliers are requested to refer clause no 26.0 (Make in India) of instructions to Supplier of GCC Rev 07. Further, following shall be taken into consideration for submitting bids by Suppliers:		
<ul style="list-style-type: none">For this procurement, the local content to categorize a supplier as a 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 19.07.2024 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 the issue of the NIT, the same shall be applicable even if issued after the issue of tis NIT, but before opening of Part-II bids against the NIT.Minimum Local Content prescribed for SCREENED CONTROL CABLES package by Nodal Ministry is 60% and hence for this procurement, as per Public Procurement (preference to make in India), order 2017 dtd. 15.06.17, 28.05.18, 29.05.19, 16.09.20 & 19.07.24 and subsequent orders issued by the nodal ministry, this package is reserved for only Class-I supplier having Minimum local Content 60%. Class-II and Non-Local suppliers are not eligible to quote for this enquiry.Suppliers are requested to go through the above-mentioned orders and submit their adherence to Public Procurement (preference to make in India), order 2017 dtd. 15.06.17, 28.05.18, 29.05.19, 16.09.20 & 19.07.24 and subsequent orders.		





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32. Purchase preference to MSE Supplier: Yes.

33. Framework Agreement (Rate Contract) Order Splitting

- a. Framework Agreement (Rate contract) is proposed for Two (02) years from placement of Framework Agreement (Rate contract) Purchase Order with a provision for further extension after review on mutual consent.
- b. Framework Agreement (Rate contract) is to be done with 3 suppliers in ratio of 45:30:25 value wise at L1 FOR site price (Ex-works + freight) for this package. However, Purchase orders placed for a project on the basis of Rate Contract shall not be split. Details of Framework Agreement (Rate contract) order splitting shall be as per following:
- GOI circular dated 18.05.2023 for Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017 shall be applicable for order splitting (in the ratio of 45:30:25) and order finalization.
 - L1 Rates (Ex works + Freight) shall be counteroffered to all techno-commercially qualified Suppliers and order splitting in ratio of 45:30:25 shall be done in line with GOI circular dated 18.05.2023 for Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017.
 - In case acceptance of counteroffer is received from more than two Suppliers then acceptance shall be considered as per FINAL Reverse Auction Ranking (as applicable).
 - In case acceptance of counteroffer is received from only one Supplier then splitting shall be done in the ratio of 70:30 between L1 vendor and the supplier who accepts L1 vendor rates.
 - If none of the Supplier accepts counter-offered L1 rates, then contract shall be awarded to L1 vendor for 100% value.
- c. Framework Agreement (Rate Contract) will be finalized on total lump sum basis instead of item wise evaluation so that the complete requirement against one project is not split amongst various Suppliers to minimize operational difficulty.

34. GOI circular dated 18.05.2023 for Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017 shall be applicable for order splitting and order finalization.

35. The quantities indicated in the tender are tentative quantities. No minimum quantity is guaranteed by BHEL.

36. Overall (%) quantity variation: The variation on overall package value shall be limited to +/-30% of the contract value.

37. Suppliers shall Quote for the entire Scope. Partial scope is not acceptable.

38. Suppliers to ensure that Third party/ Customer issued certificates being submitted as proof of PQR qualification should have verifiable details of document/ certificate issuing authority such as name & designation of Issuing Authority and its organization contact number and e - mail Id etc. Offer of only those Suppliers shall be considered further, who meets the PQR criteria. Suppliers to furnish latest verification details for checking veracity of document(s) by BHEL. In case the same found not available, Purchaser has right to reject such document from evaluation. Format for the same is below: -

Sl. No.	Project Name	Customer Name, Contact Address, Phone No. & Email ID	Contract/ Order No.	Value of Contract/ Order	Brief of Work	Completion Date





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39. Suppliers who fulfil Technical & Financial Pre-Qualification Requirement Criteria are eligible to participate in this tender. Bids of only those Suppliers shall be evaluated who meet the Technical as well as Financial Pre-Qualifying requirements.

Note: This item/Package falls under the list of items defined in Para 3 of Ministry guideline ref no.F.20/2/214-PPD(Pt.) dated 20-09-2016 (in respect of procurement of items related to public safety, health, critical security operations and equipment's, etc.) & hence no relaxation of PQR for start-up/MSME vendors is envisaged for the NIT items/Package.

40. All corrigenda, addenda, amendments, time extensions, clarifications, etc. to the tender will be hosted on BHEL website (www.bhel.com) & BHEL-PEM website (www.pem.bhel.com) and GePNIC portal. Suppliers should regularly visit websites to keep themselves updated.

41. If Supplier mentions Not Applicable / Not required / Not Quoted in BHEL price format, the same to be substantiated by the Supplier. If such item is required to be supplied for system completion in future, same will be supplied free of cost.

42. GeM Seller ID shall be mandatory before placement of order/award of contract to the successful Supplier.

43. Supplier to quote non-zero freight charges in percentage (%) of their quoted Total Ex-Works prices of supply.

44. All Suppliers to comply Govt. of India, Ministry of Power, order no-25-111612018-PG dtd 02/07/2020 regarding mandatory testing of all the imported items/equipment's/components.

45. Self-declarations/ Auditor's/ Accountant's Certificates submitted by the manufacturer/ supplier may be verified randomly by the committee constituted as per MoP Order 28-07-2020. In case of false documents/misrepresentation of the facts requisite action against such manufacturer/ supplier will be taken based on the recommendation of the Committee.

46. All Suppliers to declare that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Supplier(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 Supplier is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.

47. The offers of the Suppliers who are under suspension as also the offers of the Suppliers, who engage the services of the firms debarred across BHEL, shall be rejected. The list of firms debarred across BHEL is available on BHEL web site www.bhel.com.

1.0 Integrity commitment, performance of the contract and punitive action thereof:

1.1 Commitment by BHEL: BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Supplier(s) in a transparent and fair manner, and with equity.

1.2 Commitment by Supplier/ Supplier/ Contractor:

1.2.1 The Supplier/ supplier/ contractor commits to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

1.2.2 The Supplier/ supplier/ contractor 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 and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

1.2.3 The Supplier/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

If any Supplier/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in malpractices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action





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may be taken against such Supplier/ supplier/ contractor as per extant guidelines of the company available on www.bhel.com and/or under applicable legal provisions".

48. A Supplier shall not have conflict of interest with other Suppliers. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. The Supplier found to have a conflict of interest shall be disqualified. A Supplier may be considered to have a conflict of interest with one or more parties in this bidding process, if:

- a) they have controlling partner (s) in common;' or
- b) they receive or have received any direct or indirect subsidy/ financial stake from any of them; or
- c) they have the same legal representative/agent for purposes of this bid; or
- d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Supplier; or
- e) Supplier participates in more than one bid in this bidding process. Participation by a Supplier in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid, or
- f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorize only one agent/dealer. There can be only one bid from the following:
 1. The principal manufacturer directly or through one Indian agent on his behalf; and
 2. Indian/foreign agent on behalf of only one principal,'or
- g) A Supplier or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid, or
- h) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Suppliers must proactively declare such sister/ common business/ management units in same/ similar line of business. "

49. All the above terms and conditions, post-bid agreements/MoMs (during Techno- Commercial evaluation) shall automatically become a part of the Order/Contract after its finalisation.

50. Suppliers to note that offers shall be submitted strictly in accordance with the requirements of tender documents. Suppliers shall upload their complete offer meeting the requirements of the tender documents on e-procurement portal <https://eprocurebhel.co.in/nicgep/app>.

Following documents need to be uploaded:

- Offer forwarding/ covering letter with Un-price bid, Deviation Sheet (Cost of Withdrawal)
- Documents required for meeting Technical PQRs (Part of Tech. Spec.)
- Documents required for meeting Financial PQR
- NTPC Main Contractor's Proposal Cum Evaluation Report
- NTPC Sub Vendor Questionnaire
- Participation code details.
- Bank Guarantee Format
- Local Content Certificate in line with Make in India circular
- Land Border Certificate
- Integrity Pact
- Price Bid on e-procurement portal - <https://eprocurebhel.co.in/nicgep/app>

51. It shall be the responsibility of the Supplier to ensure that the tender complete in all respects is uploaded on or before the due date and time. Incomplete/late offers shall not be considered.





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All other correspondence thereof shall be addressed to the undersigned by name & designation and sent at the following address:

Vijay Pratap Chauhan /Addl.Engr. GrII- CMM
M/s Bharat Heavy Electricals Ltd.,
Project Engineering Management,
Power Project Engineering Institute,
HRD & ESI Complex,
Plot No 25, Sector-16 A, Noida-201301
E-mail: vpchauhan@bhel.in
Contact No.: 7827435728

Seema Khatri / Sr. Manager- CMM
M/s Bharat Heavy Electricals Ltd.,
Project Engineering Management,
Power Project Engineering Institute,
HRD & ESI Complex,
Plot No 25, Sector-16 A, Noida-201301
E-mail: seemakhatri@bhel.in
Contact No.: 0120-4368656

52. . Schedule of Pre-Bid discussion Date of Meeting: 19.03.2025, Time :15:00 hrs Place: Bharat Heavy Electricals Limited, Power Sector - Project Engineering Management, 3rd Floor, BHEL Sadan, Plot No.25, Sector-16A, Noida-201301, Uttar Pradesh, India Interested bidders are requested to confirm their participation for Pre-Bid Discussion (PBD) meeting either by physical meeting at above mentioned place or through Video Conferencing (VC). VC Link is given below: Through: Microsoft Teams Meeting ID and Passcode shall be shared through corrigendum

53. Terms & Conditions: - The Terms & Conditions shall be as per enclosed Special Conditions of the Contract (copy enclosed), GCC Rev 07 & Corrigendum 01 and Corrigendum 02 to GCC Rev-07 which is available on www.pem.bhel.com and other Terms and Conditions included in this Enquiry Letter

54. All other terms and conditions shall be as per Special Conditions of Framework Agreement (Rate Contract), and GCC Rev 07 & Corrigenda-01 and Corrigenda-02 to GCC Rev 07.
In the event of any contradiction in the terms and conditions mentioned, the order of preference shall be as mentioned in clause no. 36 of GCTC of GCC Rev 07.

Note - In case you are not making an offer against this enquiry, you are requested to send a regret letter so as to reach us on or before the due date

Thanking You.
For and on behalf of BHEL

Seema Khatri
Sr. Manager/ CMM/ PEM Noida



PRICE SCHEDULE OF SCREENED CONTROL CABLES FOR FRAMEWORK AGREEMENT (RATE CONTRACT)													Annexure - Price Schedule	
Supplier Name:														
Sr. No.	Item code	Item description	Unit	Order Quantity (metres)	Drum Length (Meters)	UNIT PRICE (EX-WORKS) (Rs)	TOTAL PRICE (EX-WORKS) (Rs)	Freight Charges (excluding GST) @ _____ % of Total Ex-Works	Freight Charges (excluding GST) (Rs)	Applicable GST Rate @ _____ % (on "Total Ex-Works + Freight")	GST (Rs)	TOTAL F.O.R. SITE PRICE (Rs)		
A MAIN SUPPLY														
1.0 Individual & Overall Screened Cable (Type-F) UnArmoured														
(i)	507-0310081-00-A	225V TYPE F(10) 2P - 0.5 SQMM UNARMoured	MTR	9,65,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(ii)	507-0310046-00-A	225V TYPE F(10) 4P - 0.5 SQMM UNARMoured	MTR	23,75,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(iii)	507-0310050-00-A	225V TYPE F(10) 8P - 0.5 SQMM UNARMoured	MTR	10,45,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(iv)	507-0310038-00-A	225V TYPE F(10) 12P - 0.5 SQMM UNARMoured	MTR	3,25,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(v)	507-0310135-00-A	225V TYPE F(10) 16P - 0.5 SQMM UNARMoured	MTR	1,70,000	500	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
2.0 Overall Screened Cable (Type-G) UnArmoured														
(i)	507-0310062-00-A	225V TYPE G(10) 2P - 0.5 SQMM UNARMoured	MTR	4,35,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(ii)	507-0310066-00-A	225V TYPE G(10) 4P - 0.5 SQMM UNARMoured	MTR	33,45,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(iii)	507-0310070-00-A	225V TYPE G(10) 8P - 0.5 SQMM UNARMoured	MTR	15,70,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(iv)	507-0310054-00-A	225V TYPE G(10) 12P - 0.5 SQMM UNARMoured	MTR	6,20,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(v)	507-0310058-00-A	225V TYPE G(10) 16P - 0.5 SQMM UNARMoured	MTR	75,000	500	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
3.0 Individual & Overall Screened Cable (Type-F) Armoured														
(i)	507-0310082-00-A	225V TYPE F(10) 2P - 0.5 SQMM ARMoured	MTR	24,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(ii)	507-0310045-00-A	225V TYPE F(10) 4P - 0.5 SQMM ARMoured	MTR	39,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(iii)	507-0310049-00-A	225V TYPE F(10) 8P - 0.5 SQMM ARMoured	MTR	13,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
4.0 Overall Screened Cable (Type-G) Armoured														
(i)	507-0310061-00-A	225V TYPE G(10) 2P - 0.5 SQMM ARMoured	MTR	10,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(ii)	507-0310065-00-A	225V TYPE G(10) 4P - 0.5 SQMM ARMoured	MTR	30,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(iii)	507-0310069-00-A	225V TYPE G(10) 8P - 0.5 SQMM ARMoured	MTR	34,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(iv)	507-0310053-00-A	225V TYPE G(10) 12P - 0.5 SQMM ARMoured	MTR	50,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(v)	507-0310057-00-A	225V TYPE G(10) 16P - 0.5 SQMM ARMoured	MTR	8,000	500	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
5.0 Individual & Overall Screened Cable (Type-F) UnArmoured														
(i)	507-0310136-00-A	225V TYPE F(10) 2P - 1 SQMM UNARMoured	MTR	35,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
(ii)	507-0340042-00-A	225V TYPE F(10) 2P - 1.5 SQMM UNARMoured	MTR	10,80,000	1000	#VALUE!	#VALUE!		#VALUE!		#VALUE!	#VALUE!		
GRAND TOTAL (Rs)							X		#VALUE!		#VALUE!	#VALUE!		

[illegible]



PRE - QUALIFYING REQUIREMENTS

PROJECT:

RATE CONTRACT

PACKAGE:

SCREENED CONTROL CABLES

CRITERIA FOR EVALUATION - FINANCIAL :

	Amount (in Rs.)
Average annual financial turnover value during any three out of last six Financial Years as on tender due date should not be less than	19,98,00,000.00

Rs.Nineteen Crore Ninety Eight Lakh only

Notes:-

a) The bidder has to submit financial accounts (audited, if applicable comprising of Audit report, Balance Sheet, Profit & Loss A/c Statement and Notes/Schedules pertaining to Turnover/Sales/Revenue), for any three out of last six Financial Years (or from the date of incorporation, whichever is less) as on tender due date to review the above criteria. In case the incorporation of vendor is less than 3 years, average annual financial turnover shall be calculated based on available information as below:-

i) If the accounts are available for ≤ 1 Financial Year, the Average Annual Turnover shall be calculated based on available information divided by 1 (One).

ii) If the accounts are available for >1 but ≤ 2 Financial Years, the Average Annual Turnover shall be calculated based on available information divided by 2 (Two).

iii) If the accounts are available for >2 but ≤ 3 Financial Years, the Average Annual Turnover shall be calculated based on available information divided by 3 (Three).

b) Foreign bidder is to submit a latest report from reputed third party business rating agency like Dun & Bradstreet, Credit reform etc. in addition to the documents mentioned at point (a) above for review of above criteria.

c) Other Income shall not be considered for arriving at Annual Turnover/Sales. For evaluation purpose, turnover figure excluding taxes shall be considered.

d) For evaluation of foreign bidder, exchange rate (TT selling rate of SBI) as on scheduled date of tender opening (Part-I bid in case of two part bid) shall be considered.

e) Bidder who is 50% or above subsidiary of any other company including those registered outside India and does not meet any of the above Financial Criteria, such bidder may be qualified based on credentials of its holding company provided such holding company meets the above PQR criteria. In such case, the Bidder would be required to furnish a Letter of Support from its Holding Company, pledging unconditional and irrevocable financial support for the execution of the Contract by the Bidder in case of award.

f) In cases where audited results for the last financial year as on the date of Techno Commercial bid opening are not available, a Certificate would be required from CEO/CFO stating that the financial results of the Company are under audit as on the date of Techno-commercial bid opening and are not available.



BHEL / PEM / CMM

SPECIAL CONDITIONS OF CONTRACT OF FRAMEWORK AGREEMENT (RATE CONTRACT) FOR SCREENED CONTROL CABLES

1. This tender is issued by BHEL PEM for Framework Agreement (Rate Contract) of SCREENED CONTROL CABLES required at various BHEL project sites on behalf of various BHEL units. Framework Agreement (Rate Contract) validity for ordering shall be two years from the purchase order for Rate Contract.
2. Framework Agreement (Rate Contract) shall be finalized only with suppliers who are registered with BHEL-PEM. Suppliers who are not registered with BHEL-PEM (suppliers already registered with other BHEL Units shall also be required to apply registration in BHEL PEM) needs to apply & get registered for subject package with PEM before Reverse Auction & hence they need to apply online for registration on PEM web portal & have to enclose acknowledgement with the bid documents else their bid may not be considered for evaluation.

The Suppliers who are not registered with BHEL-PEM may apply for registration in BHEL-PEM through Registration Portal available at <https://bhel.com/supplier-registration>.

All credentials and/ or documents duly signed & stamped related to registration has to be uploaded on the website & submit the application for registration. One set of hard copy filled-up SRF downloaded from Online Registration Portal duly signed & stamped has to be submitted.

3. Framework Agreement (Rate contract) is proposed to be done with 3 suppliers in ratio of 45:30:25 value wise at L1 F.O.R. Site Price (Ex-works + freight) for this package. However, order for a project shall not be split.
4. Quantity variation shall be applicable as +/- 30 % of the contract value. Suppliers shall be informed that the quantities indicated in the tender are tentative quantities. No minimum quantity is guaranteed by BHEL.
5. This tender is issued by BHEL PEM for Framework Agreement (Rate Contract) of SCREENED CONTROL CABLES required at various BHEL project sites on behalf of various BHEL units. All Suppliers shall note the following: –

a) As and when requirement arises, the concerned Purchase Department of respective BHEL unit will place order directly on the Supplier against the Framework Agreement (Rate Contract).

b) The drawings/ documents submission & approval, submission of Performance Security/ Performance Bank Guarantee, submission of invoices, processing and release of payment after supply of material, contractual dispute & commercial matters shall be dealt as per Framework Agreement (Rate Contract) contract terms & conditions directly by Purchase Department of respective BHEL unit, who has placed the Purchase Order against the Rate Contract.

6. Details of consignee and project site information for dispatch of material shall be intimated at the time of placement of PO for specific project after finalization of RC.
7. The items will be required against respective projects. Exact quantities and Project information shall be intimated while placing Purchase Order for a specific project based on the Rate Contract.
8. Price Variation shall be not applicable for the subject package.
9. Inspection of materials shall be carried out by BHEL/ CQA and or by Customer or by an Authorized Agency at manufacture's works before dispatch, if required. Dispatch of material to be done, only after receipt of BHEL/ Customer MDCC. It is responsibility of Supplier to obtain Material Dispatch Clearance Certificate (MDCC) from BHEL or Customer as required before dispatch of material.
10. Supplier shall give inspection call on BHEL-CQS web site to applicable inspection agency with a copy of inspection call to BHEL for arranging Customer participation (if applicable) in inspection / Joint inspection on the proposed date with an advance notice of 15 working days. Inspection charges shall be paid by BHEL.



BHEL / PEM / CMM

SPECIAL CONDITIONS OF CONTRACT OF FRAMEWORK AGREEMENT (RATE CONTRACT) FOR SCREENED CONTROL CABLES

11. Items have to be manufactured as per the specification and supplied strictly in accordance with the approved BHEL/ Customer's Drawings & Quality Plan. The items/ test certificate of items, which for any reason are not acceptable to BHEL/ Customer, shall be required to be retested. No extra charge shall be payable on those account by BHEL.
12. Other terms and conditions shall be as per Standard Technical Specification no. PE-TS-999-507-E005, GCC Rev. 07, Corrigenda 01 & Corrigenda 02 to GCC Rev 07 and Enquiry Letter.
13. This Enquiry is subject to Conditions/ limits if any imposed in BHEL-PEM PMD/ Supplier registration.
14. Tentative quantity is given in the Enquiry.
15. Suppliers to submit offer for RC of said items ONLINE via BHEL-GePNIC Portal only. Suppliers to upload tender documents complete in all respects duly signed & stamped on each and every page by the authorized signatory of the Supplier as a token of acceptance of all the terms and conditions of tender.
16. The Supplier along with its associate/ collaborators/ sub-contractors/ sub-Supplier/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL web site <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud as soon as it comes to their notice.

Provide below details for recording your bid participation:

1.	PAN number:	
2.	Company Name:	
3.	Registered address:	
4.	Contact person name:	
5.	Contact person number:	
6.	Contact person email:	

Tentative List of Projects for Framework Agreement (Rate Contract) of SCREENED CONTROL CABLES

- 1) 2X800 MW LARA
- 2) 2X800 MW SINGRAULI
- 3) 2X800 MW KODERMA
- 4) 1X800 MW SIPAT
- 5) 1X800 MW DARLIPALI
- 6) 3X800 MW TELANGANA BTG.
- 7) 2X660 MW Talcher

To be given on Letter head of Bidder

Ref:

Date:

To,

Bharat Heavy Electricals Limited
PEM, PPEI Building,
Plot No 25, Sector -16A
Noida (U.P)-201301

Reference:

Order no-F6/18/2019-PPD dated 23.07.2020 issued by Ministry of Finance.

Tender Enquiry No-.....

Offer No-.....

Name of Package:

Dear Sir,

I have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India. I hereby certify that Company name, is not from such a country and is eligible to be considered.

Thanking You,

Yours faithfully,

(Company director seal and signature)

Format for Local Content Certificate as per MII order

Ref:

Date:

To,

Bharat Heavy Electricals Limited

PEM, PPEI Building,

Plot No 25, Sector -16A

Noida (U.P)-201301

Reference: Tender Enquiry No-.....

Name of Package:

Dear Sir,

We hereby certify that items of(Package name)

for.....(Project Name) offered by M/s(bidder's name)

having its works/office at has local content of%. Further,

it is also certified that the local content percentage (%) certified above is in line with definition of local content given in point no 2 of Public Procurement (Preference to Make in India), Order 2017- revision, having ref. no. P-45021/2/2017-PP(BE-II)-Part(4) Vol.II dated 04.06.2020 & 19.07.2024 an

M/s..... qualifies as Class-I local supplier.

Further, cost of locally imported items (inclusive of taxes) sourced locally from resellers/ distributors

is Rs and cost of licence/royalty paid/technical expertise cost etc. source from outside of India

is Rs.....

Details of the location(s) at which the local value addition-

Yours very truly

..... (Signing Authority Name & Sign)

..... (Firm Name)

Delivery Schedule: - SCREENED CONTROL CABLES	
Engineering	Drawing/ documents submission & re-submission schedule shall be as per Technical Specification: PE-TS-999-507-E005
Main Supply ("A")	<ul style="list-style-type: none"> 150 days from the date of PO
Mandatory Spares	NA
<p>Notes:</p> <p>a. Supplier to start manufacturing/supply only after getting the applicable Primary engineering Drgs. /docs approved from BHEL/End Customer.</p> <p>b. Drawings /documents submission/re-submission schedule shall be as per Technical specification (PE-TS-999-507-E005) which shall be used for progress monitoring purpose and required course correction, if any.</p> <p>c. The delivery date specified is for completion of the deliveries. Deliveries to start progressively so as to meet the completion schedule.</p> <p>d. The delivery conditions specified are for contractual purposes. However, to meet project requirement, BHEL may ask for early deliveries without any compensation thereof.</p>	
<p>2.0 Validity of contract placed on basis of Framework Agreement (Rate Contract) for individual projects (PO rates, terms and conditions):</p> <p>Vendor has to make supply of goods/services as per the delivery time mentioned above. However, due to unavoidable circumstances if delay happens in providing inputs/ clearances (inputs, Engineering approvals, deputing inspector for inspection, issuance of MDCC and any hold imposed owing to site issues etc.) for which delivery time extension is admissible as per point no.3, in such situation it shall be obligatory at vendor part to execute the contract at PO rates, terms and conditions where inputs/ clearances has been accorded within validity of contract. Validity period for various activities shall be as defined below or as mentioned in the NIT.</p> <p>2.1 Contract for main supply shall be valid for 210 ('C') days from the PO date. However, delay at vendor's end (if any) shall be added to the validity period and contract validity shall get extended by the delay period at vendor's end.</p> <p>For example: Original Delivery period for main supply: A (in days)</p> <p style="padding-left: 40px;">Delay at vendor's end: B (in days beyond "A" days)</p> <p style="padding-left: 40px;">Contract validity: C+B (in days)</p> <p>Notes:</p> <p>a. B is the Vendor delay days beyond original contractual delivery period for main supply /extended delivery period owing to time taken by BHEL.</p> <p>b. Main supply, applicable in the contract released/ cleared for manufacturing within contractual validity period, to be supplied by vendor/supplier at PO rates, terms and conditions.</p> <p>c. Execution of the contract quantities released beyond contract validity period shall be decided on mutual consent basis at PO rates, terms and conditions.</p>	
<p>3.0 Delivery Extension: Extension of contractual delivery time:</p> <p>Delivery time mentioned in the NIT includes Engineering completion time (time for drawing/document submission/resubmission by the vendor and review/approval of the same by the BHEL/End customer), manufacturing, inspection, Packing and dispatch time. Due diligence is to be observed by the vendor to ensure timely completion of engineering and supply.</p> <p>During the execution of the contract, time loss occurred owing to the reason attributable to BHEL besides force majeure shall be considered for delivery time extension to the vendor as given below: -</p>	

- i. Any Delay in providing comments/ approval on Primary drawing/documents beyond the stipulated time as specified in NIT.
- ii. Time Loss in approval of the drawing/document as a result of increase in the iteration not attributable to the vendor (i.e. resubmission owing to end customer comments) as certified by BHEL. Time extension equivalent to the resubmission time noted in the tech. spec and consequential increase in the approval time in lieu of increase in iteration shall be applicable. However, for incomplete re- submission time loss shall be in vendor account.
- iii. Delay in providing engineering input/material by BHEL.
- iv. Delay in deputing inspector for inspection and delay in release of MDCC in line with GCC
- v. Any hold put by BHEL for whatever reasons during execution of contract (within contract validity period), time extension equivalent to hold period shall be admissible. However, in the event hold period continues for more than 30 days then, an additional fifteen days for the purposes of mobilization and demobilization of resources shall also be admissible.

Note: Extension in delivery period if any with or without imposition of LD shall be considered after detailed delay analysis based on provisions given above. However, no delay analysis will be applicable if supply is completed within delivery schedule as specified in Purchase order.

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 _____

_____ (hereinafter referred to as "Contract"). 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 panel of Independent External Monitor(s) (IEMs), 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. The Bidder(s)/ Contractor(s) commits himself to observe the following principles during 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 shall 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, terminate the contract, if already awarded, exclude from future business dealings and/ 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 (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above, the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.

Section 5 - Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) 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 or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 6 - Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity 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 panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.
- 8.2 The IEMs are 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 IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs 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 IEMs the option to participate in such meetings.

- 8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a 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 or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, 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 the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs 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 Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have 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 IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact 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. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, 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 Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.
- 10.2 Changes and supplements as well as termination notices need to be made in writing.
- 10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.
- 10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact 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 Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.
- 10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of the parties shall present IEMs as witness in any Alternative Dispute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.

 For & On behalf of the Principal
 (Office Seal)

Place _____
 Date _____

SEEMA KHATRI

Digitally signed
 by SEEMA
 KHATRI
 DN: cn=SEEMA
 KHATRI, o=BHEL,
 ou=PEM,
 email=seemakha
 tri@bhel.in, c=IN
 Date: 2025.03.13
 12:00:13 +05'30'

 For & On behalf of the Bidder/ Contractor
 (Office Seal)

Witness: _____
 (Name & Address) _____

Witness: _____
 (Name & Address) _____

Clause on IP in the tender

Integrity Pact (IP)

- (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 Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

SI	IEM	Email
1.	Shri Otem Dai, IAS (Retd.)	iem1@bhel.in
2.	Shri Bishwamitra Pandey, IRAS (Retd.)	iem2@bhel.in
3.	Shri Mukesh Mittal, IRS (Retd.)	iem3@bhel.in

- (b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, 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 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 IEMs shall be done through email only.

Note:

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, 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 whose contact details are provided below:

Details of contact person(s):

(1)
Name: _____
Deptt: _____
Address: _____
Phone: (Landline/ Mobile) _____
Email: _____
Fax: _____

(2)
Name: _____
Deptt: _____
Address: _____
Phone: (Landline/ Mobile) _____
Email: _____
Fax: _____

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

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

we, (hereinafter referred to as the Bank), having registered/Head office at and inter alia a branch at being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer any sum or sums upto a maximum amount of Rs ----- (Rupees -----) without any demur, immediately on first demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

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 Vendor / Contractor / Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, 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 Vendor / Contractor / Supplier shall have no claim against us for making such payment.

We thebank 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/satisfactory completion of the performance guarantee period as per the terms of the 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.

WeBANK 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 Vendor / 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 Vendor / Contractor / Supplier and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Vendor / Contractor / Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Vendor / 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 Vendor / Contractor / Supplier and notwithstanding any security or other guarantee that the Employer may have in relation to the Vendor / Contractor / Supplier 's liabilities.

This Guarantee shall remain in force upto and including..... 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 Vendor / 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 thewe shall be discharged from all liabilities under this guarantee thereafter.

This Bank Guarantee shall be governed, construed and interpreted in accordance with the laws of India.

Courts at shall alone have exclusive jurisdiction over any matter arising out of or in connection with this Bank Guarantee

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

Notwithstanding anything to the contrary contained hereinabove:

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

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

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

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

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

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ CONTRACT VALUE

⁵ PROJECT/SUPPLY DETAILS


⁶ BG AMOUNT IN FIGURES AND WORDS

⁷ VALIDITY DATE


⁸ DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Bank Guarantee should be refunded to the contractor 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.
2. The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier /Bank issuing the guarantee.
3. From Nationalized/Public Sector / Private Sector/ Foreign Banks 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.


	CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन MAIN CONTRACTOR'S PROPOSAL CUM EVALUATION REPORT मुख्य संविदाकार प्रस्ताव सह मुल्यांकन रिपोर्ट
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Ref No: संदर्भ सं.:		Date: तिथि:	
i.	Main Contractor मुख्य संविदाकार		
ii.	Project परियोजना		
iii.	Package Name पैकेज का नाम	Package No पैकेज सं.	
iv.	Proposed Item/Scope of Sub-contracting उप-संविदा(अनुबंध) का प्रस्तावित मद/ दायरा		
v.	Item covered under निम्नलिखित के अंतर्गत शामिल मद	Schedule-1 /अनुसूची- 1 Schedule-2 अनुसूची- -2	As per contract clause No- अनुबंध के अनुसार खंड सं.-- -
vi.	If item is Schedule-1 and proposed sub-vendor is indigenous, Main Contractor to explain how the contractual provisions will be fulfilled /यदि मद अनुसूची -1 है और प्रस्तावित उप-विक्रेता स्वदेशी है, तो मुख्य संविदाकार को स्पष्ट करना होगा कि संविदा/अनुबंध के प्रावधान कैसे पूरे किए जाएंगे		
vii.	Name and Address of the proposed Sub-vendor's works /प्रस्तावित सब-वेंडर का नाम तथा पता		
viii.	PO placement date/ Start of manufacturing (if self-manufactured) as per L2 network पीओ नियोजन की तिथि / एल- 2 नेटवर्क के अनुसार विनिर्माण (यदि स्व-निर्मित है) की शुरुआत		
ix.	Item Description (Type/Size/Rating/Scope of Sub-Contracting) मद का विवरण (प्रकार / आकार / रेटिंग / उप-अनुबंध का दायरा)	Total quantity of proposed item envisaged in this package (Nos/ Running Meters/ Kgs/ Tons etc) इस पैकेज में परिकल्पित प्रस्तावित मद की कुल मात्रा (संख्या / क्रियाशील मीटर / किलोग्राम / टन आदि)	Quantity proposed to be procured from proposed sub-vendor (Nos/ Running Meters /Kgs /Tons etc) प्रस्तावित उप-विक्रेता (संख्या / क्रियाशील मीटर / किलोग्राम / टन आदि) से खरीदी जाने वाली मात्रा
	Timeline for quantity requirements as per project schedule & whether the proposed Sub-vendor equipped with adequate capacity to supply proposed order quantity in time / परियोजना समय सूची के अनुसार मात्रा आवश्यकताओं के लिए समय-सीमा और क्या प्रस्तावित उप-विक्रेता समय पर प्रस्तावित मांग की मात्रा की आपूर्ति करने में पूरी तरह से सक्षम है		
x.	Supply experience of the proposed sub-vendor (including supplies to Main Contractor, if any) for similar item/scope of sub-contracting, for last 3 years (Note:- Only relevant experience details w.r.t. proposed item/scope of subcontracting to		


	CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन MAIN CONTRACTOR'S PROPOSAL CUM EVALUATION REPORT मुख्य संविदाकार प्रस्ताव सह मुल्यांकन रिपोर्ट

<i>be brought out here)</i> पिछले 3 वर्षों के लिए उप-अनुबंध के समान मद / दायरे के लिए प्रस्तावित सब-वेंडर (मुख्य संविदाकार हेतु आपूर्ति, यदि कोई हो, सहित) का आपूर्ति अनुभव (नोट: - उप-अनुबंध के प्रस्तावित मद / दायरे के संबंध में केवल प्रासंगिक अनुभव के विवरण का उल्लेख हो									
Project/Package परियोजना/पैकेज	Customer Name ग्राहक का नाम	Supplied Item (Type/Rating/Model /Capacity/Size etc) आपूर्ति मद (प्रकार/रेटिंग /मॉडल /क्षमता/आकार आदि)	PO ref no/date पीओ संदर्भ सं. /तिथि	Supplied Quantity आपूर्ति की मात्रा	Date of Supply आपूर्ति की तिथि				
<i>We confirm that as per our assessment, the proposed sub-vendor has requisite capabilities & supply experience and is suitable for supplying the proposed item/scope of sub-contracting/हम अपने आकलन के अनुसार इस बात की पुष्टि करते हैं कि, प्रस्तावित उप-विक्रेता के पास अपेक्षित क्षमता और आपूर्ति करने का अनुभव है और उप-अनुबंध के दायरे /प्रस्तावित मद की आपूर्ति के लिए उपयुक्त है।</i>									
Name: नाम:		Desig: पद: 		Contact No: दूरभाष सं.:		Sign: हस्ताक्षर:		Date: तिथि:	
Name: नाम:		Desig: पद: 		Contact No: दूरभाष सं.:		Sign: हस्ताक्षर:		Date: तिथि:	


Company's Seal/Stamp:- कंपनी का मुहर:-

	CORPORATE QUALITY ASSURANCE/ कॉर्पोरेट गुणवत्ता आश्वासन SUB-VENDOR QUESTIONNAIRE/ सब-वेंडर प्रश्नावली
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i.	Item/Scope of Sub-contracting उप-संविदा(अनुबंध) का मद/ दायरा			
ii.	Address of the registered office पंजीकृत कार्यालय का पता 	Details of Contact Person संपर्क व्यक्ति का विवरण (Name, Designation, Mobile, Email) (नाम, पदनाम, मोबाइल, ईमेल)		
iii.	Name and Address of the proposed Sub-vendor's works where item is being manufactured प्रस्तावित उप-विक्रेता के कार्यों का नाम और पता, जहां मद का निर्माण किया जा रहा है 	Details of Contact Person: संपर्क व्यक्ति का विवरण (Name, Designation, Mobile, Email) (नाम, पदनाम, मोबाइल, ईमेल)		
iv.	Annual Production Capacity for proposed item/scope of sub-contracting उप-संविदा(अनुबंध) के प्रस्तावित मद / दायरे के लिए वार्षिक उत्पादन क्षमता			
v.	Annual production for last 3 years for proposed item/scope of sub-contracting उप-संविदा(अनुबंध) के प्रस्तावित मद / दायरे के लिए पिछले 3 वर्षों का वार्षिक उत्पादन			
vi.	Details of proposed works प्रस्तावित कार्यों का विवरण			
1.	Year of establishment of present works वर्तमान फैक्टरी की स्थापना का वर्ष			
2.	Year of commencement of manufacturing at above works उपरोक्त फैक्टरी में निर्माण कार्य शुरू होने का वर्ष			
3.	Details of change in Works address in past (if any) पूर्व में फैक्टरी स्थल में परिवर्तन का विवरण (यदि कोई हो)			
4.	Total Area कुल क्षेत्र Covered Area शामिल क्षेत्र			
5.	Factory Registration Certificate फैक्टरी पंजीकरण प्रमाण पत्र	Details attached at Annexure – F2.1 विवरण अनुलग्नक- एफ 2.1 पर संलग्न है		
6.	Design/ Research & development set-up डिजाइन / अनुसंधान और विकास सेटअप (No. of manpower, their qualification, machines & tools employed etc.) (श्रमिकों की संख्या, उनकी योग्यता, मशीन और उपलब्ध उपकरण आदि)	Applicable / Not applicable if manufacturing is as per Main Contractor/purchaser design) Details attached at Annexure – F2.2 (if applicable) लागू / लागू नहीं, अगर विनिर्माण मुख्य संविदाकार / खरीददार के डिजाइन के अनुसार है) विवरण अनुलग्नक –एफ 2.2 पर संलग्न है। (यदि लागू हो)		
7.	Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc) मैनपावर विवरण के साथ समग्र संगठन का चार्ट (डिजाइन / विनिर्माण / गुणवत्ता आदि)	Details attached at Annexure – F2.3 विवरण अनुलग्नक – F2.3 में संलग्न है।		
8.	After sales service set up in India, in case of foreign sub-vendor(Location, Contact Person, Contact details etc.) भारत	Applicable / Not applicable लागू / लागू नहीं		

	CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन SUB-VENDOR QUESTIONNAIRE/ सब-वेंडर प्रश्नावली

	में बिक्री सेवा की स्थापना के बाद, विदेशी उप-विक्रेता के मामले में (स्थल, संपर्क व्यक्ति, संपर्क विवरण आदि)	<i>Details attached at Annexure – F2.4</i> विवरण अनुलग्नक -F2.4 पर संलग्न है।			
9.	<i>Manufacturing process execution plan with flow chart indicating various stages of manufacturing from raw material to finished product including outsourced process, if any</i> फ्लोचार्ट सहित विनिर्माण प्रक्रिया निष्पादन योजना, जिसमें आउटसोर्स प्रक्रिया, यदि कोई हो, सहित कच्चे माल से तैयार उत्पाद तक विनिर्माण के विभिन्न चरणों को दर्शाया गया हो,	<i>Details attached at Annexure – F2.5</i> विवरण अनुलग्नक - F2.5में संलग्न है।			
10.	<i>Sources of Raw Material/Major Bought Out Item</i> कच्चे माल के स्रोत / खरीदे हुए मुख्य मद	<i>Details attached at Annexure – F2.6</i> विवरण अनुलग्नक - F2.6में संलग्न है।			
11.	<i>Quality Control exercised during receipt of raw material/BOI, in-process, Final Testing, packing</i> कच्चे माल / खरीदे हुए मद, प्रक्रियाबद्ध, अंतिम परीक्षण, पैकिंग करते समय गुणवत्ता नियंत्रण	<i>Details attached at Annexure – F2.7</i> विवरण अनुलग्नक - F2.7 पर संलग्न है			
12.	<i>Manufacturing facilities (List of machines, special process facilities, material handling etc.)</i> विनिर्माण सुविधा (मशीनों की सूची, विशेष प्रक्रिया सुविधाएं, सामग्री रख-रखाव आदि)	<i>Details attached at Annexure – F2.8</i> विवरण अनुलग्नक - F2.8में संलग्न है।			
13.	<i>Testing facilities (List of testing equipment)</i> परीक्षण सुविधाएं (परीक्षण उपकरण की सूची)	<i>Details attached at Annexure – F2.9</i> विवरण अनुलग्नक – F2.9 में संलग्न है।			
14.	<i>If manufacturing process involves fabrication then-</i> यदि निर्माण प्रक्रिया में फेब्रिकेशन की गई है तो- <i>List of qualified Welders</i> पात्र वेल्डर की सूची <i>List of qualified NDT personnel with area of specialization</i> विशेषज्ञता के क्षेत्र सहित पात्र एनडीटी कार्मिकों की सूची	<i>Applicable / Not applicable</i> लागू / लागू नहीं <i>Details attached at Annexure – F2.10</i> विवरण अनुलग्नक - F2.10में संलग्न है। <i>(if applicable)</i> लागू / लागू नहीं			
15.	<i>List of out-sourced manufacturing processes with Sub-Vendors' names & addresses</i> सब-वेंडर द्वारा बाह्य स्रोतों (उनके नाम और पते सहित) से करवाएं गए निर्माण प्रक्रियाओं की सूची	<i>Applicable / Not applicable</i> लागू / लागू नहीं <i>Details attached at Annexure. –F2.11</i> विवरण अनुलग्नक - F2.10में संलग्न है। <i>(if applicable)</i> (यदि लागू हो)			
16.	<i>Supply reference list including recent supplies</i> नवीनतम आपूर्ति सहित आपूर्ति संदर्भ सूची	<i>Details attached at Annexure – F2.12</i> विवरण अनुलग्नक - F2.12 में संलग्न है। <i>(as per format given below)</i> (नीचे दिए गए प्रारूप के अनुसार)			
<i>Project/ package परियोजना / पैकेज</i>	<i>Customer Name ग्राहक का नाम</i>	<i>Supplied Item (Type/Rating/Model /Capacity/Size etc) आपूर्ति की गई वस्तु (प्रकार / रेटिंग / मॉडल / क्षमता / आकार आदि)</i>	<i>PO ref no/date पीओ संदर्भ सं. / तिथि</i>	<i>Supplied Quantity आपूर्ति की मात्रा</i>	<i>Date of Supply आपूर्ति की तारीख</i>
17.	<i>Product satisfactory performance feedback letter/certificates/End User Feedback</i> उत्पाद के संतोषजनक प्रदर्शन संबंधी फीडबैक पत्र / प्रमाण पत्र / अंतिम उपयोगकर्ता फीडबैक	<i>Attached at annexure - F2.13</i> अनुलग्नक F2.3 पर संलग्न है			
18.	<i>Summary of Type Test Report (Type Test Details, Report No, Agency, Date of testing) for the proposed product</i>	<i>Applicable / Not applicable</i> लागू / लागू नहीं			

	CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन SUB-VENDOR QUESTIONNAIRE/ सब-वेंडर प्रश्नावली
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	<i>(similar or higher rating)</i> प्रस्तावित उत्पाद (एक समान या उच्च रेटिंग वाले) के लिए टाइप टेस्ट रिपोर्ट (टाइप टेस्ट विवरण, रिपोर्ट संख्या, एजेंसी, जांच की तारीख) का सारांश नोट: - रिपोर्ट प्रस्तुत करने की आवश्यकता नहीं है <i>Note:- Reports need not to be submitted</i>	<i>Details attached at Annexure – F2.14</i> विवरण अनुलग्नक - F2.1 4में संलग्न है <i>(if applicable)</i> (यदि लागू हो)
19.	<i>Statutory / mandatory certification for the proposed product</i> प्रस्तावित उत्पाद के लिए वैधानिक / अनिवार्य प्रमाणीकरण	<i>Applicable / Not applicable</i> लागू / लागू नहीं <i>Details attached at Annexure – F2.15</i> <i>(if applicable)</i> (यदि लागू हो)
20.	<i>Copy of ISO 9001 certificate</i> आईएसओ 9001 प्रमाण पत्र की प्रति <i>(if available)</i> (यदि उपलब्ध हो)	<i>Attached at Annexure – F2.16</i> अनुलग्नक में संलग्न - F2.1 6 है
21.	<i>Product technical catalogues for proposed item (if available)</i> प्रस्तावित मद के लिए उत्पाद तकनीकी कैटलॉग (यदि उपलब्ध हो)	<i>Details attached at Annexure – F2.17</i> विवरण अनुलग्नक - F2.1 7 में संलग्न है

Name: नाम:		Desig: पद:		Sign: हस्ताक्षर:		Date: तिथि:	
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Company's Seal/Stamp:- कंपनी की मुहर/ मोहर -



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NOIDA

Date-12-Mar-25

CORRIGENDUM- 01

PROJECT	:	FRAMEWORK AGREEMNT (RATE CONTRACT)
PACKAGE	:	SCREENED CONTROL CABLES
ENQUIRY NO.	:	77/24/6082/SEE dtd 12.03.2025
SUBJECT	:	Reg Pre-bid meeting

Type of Corrigendum			
Technical Corrigendum -	<input checked="" type="checkbox"/>	Commercial Corrigendum -	<input checked="" type="checkbox"/>

Pre-Bid Meeting through MS Teams for subject package & projects is schedule on 20.03.2025 @03:00 PM.

Details of meeting is as below-

Meeting ID: 448 176 101 400
Passcode: Uc3FV3bc

Bidders are requested to join the meeting for pre-bid clarification (if any) so that submission of offer can be done timely and extension due to pre-bid clarification can be avoided.

All the other terms and conditions of the tender enquiry remain unchanged. All the Suppliers are requested to quote accordingly.

**SEEMA
KHATRI**

Digitally signed by
SEEMA KHATRI
DN: cn=SEEMA
KHATRI, o=BHEL,
ou=PEM,
email=seemakhatri@b
hel.in, c=IN
Date: 2025.03.13
12:01:32 +05'30'

Yours faithfully,

For and on behalf of BHEL

Seema Khatri
Sr. Manager/CMM

RATE CONTRACT

TECHNICAL SPECIFICATION FOR SCREENED CONTROL CABLE

SPECIFICATION No. PE-TS-999-507-E005
ISSUE NO. 01
REV NO. 00



BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, INDIA



**TECHNICAL SPECIFICATION
SCREENED CONTROL CABLE
RATE CONTRACT**

PE-TS-999-507-E005


Issue No: 01

Rev. No. 00

Date : 28.02.2025

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11	Documentation Requirement	
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	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT	PE-TS-999-507-E005
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SCOPE

SCOPE OF THIS PACKAGE COVERS THE FOLLOWING:

SL.NO	PARAMETERS	REQUIREMENT
1	Supply Including Design, Engineering, Manufacturing	YES
a)	Main Supply	YES
b)	Commissioning Spares	NO
2	Painting	NO
3	Inspection & Testing	YES
4	Packing	YES
5	Transportation & Delivery To Site	YES
6	Erection & Commissioning	NO
7	Supervision of Erection & Commissioning	NO
8	Mandatory Spares	NO
9	O & M Service	NO
10	O & M Spares	NO


	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT	PE-TS-999-507-E005
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	GENERAL TECHNICAL REQUIREMENT
1	It is not the intent to specify herein all the details of design and manufacturing. Bidder shall ensure that the offered equipment confirms in all respects to high standards of design, engineering and workmanship.
2	Bidder shall also ensure that the offered equipment shall comply with all applicable statutory and regulatory requirements.
3	In the event of any conflict between the requirements of two clauses of this specification, documents or requirements of different codes and standards specified, the more stringent requirement as per the interpretation of the owner shall apply.
4	Drawing/document submission shall be through web based Document Management System(DMS) of BHEL. Bidder would be provided access to the DMS for drawing/document submission. Bidder to ensure internet connectivity of min speed of 2Mbps at their end.
5	Drawings/ documents submitted by vendor at any stage shall be complete in all respects. Any incomplete drawing submitted shall be treated as non- submission with delays attributable to vendor. For any clarification/ discussion required to complete the drawings, the bidder shall depute his personnel to BHEL / Customer's Office as per the requirement for across the table submission/ finalizations of drawings.
6	Latest codes and standards shall be complied with.
7	<p>Bidder shall furnish Type Test Certificate of specified Type Test as per quality plan which has been conducted within last 10 years from 07/10/2024 , i.e. from 08/10/2014 to 07/10/2024. These reports should be for the tests conducted on Screen Control cable identical in all respects to those proposed to be supplied under this contract and test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.</p> <p>In absence of valid Type Test report vendor to conduct the same without any commercial & delivery implication to BHEL. Type test conduction shall be as per Annexure-A to QAP.</p>
8	Bidder shall confirm compliance with the Quality Plan attached with the specification without any deviations. At contract stage, the Quality Plan as enclosed in the technical specification is to be appended with cover sheet bearing document number and description. The signed and stamped copy of the same shall be submitted to BHEL without making any changes in the contents of the document. There shall be no commercial implication to BHEL on account of minor changes in QP during contract stage.
9	Equipment must be safe, reliable and easy to maintain at all operating condition

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TECHNICAL DATA - PART - A

SL.NO	DESCRIPTION	UOM	DETAIL			
TYPE OF CABLE			0.5 SQMM U/Arm	0.5 SQMM Armoured	1 SQMM U/Arm	1.5 SQMM U/Arm
1.0	DESIGN CODES & STANDARDS (LATEST EDITIONS)					
1.1	Core identification		VDE 0815			
1.2	Construction for screened control cable		VDE 0816			
1.3	Insulating and sheathing compounds for cables		VDE 0207 , Part-4, Part-5			
1.4	Test Method for Measuring the smoke density		ASTMD-2843			
1.5	Test Method for Measuring the Minimum Oxygen Index		ASTMD-2863			
1.6	Methods of test of cables		IS-10810, VDE 0472			
1.7	Acid gas generation		IEC 754-1			
1.8	Flammability Test		IEEE-383			
1.9	Swedish Chimney Test		SEN-SS-424-1475			
2.0	DESIGN /SYSTEM PARAMETERS					
2.1	Type of Cable		FRLS SCREENED CONTROL CABLES			
2.2	Voltage Grade		225V (Peak)			
2.3	Electrical parameters					
a	High voltage test		2kV RMS for 1 min (Core – Core),0.5kV RMS for 1 min (Core- shield)			
b	Resistance to direct current test		0.22kV DC for 240 hrs/ 10 days			
2.4	C&I Parameter		(I & OS) Type-F/ (OS) Type-G		(I & OS) Type-F	
a	Mutual Capacitance (max.)at 0.8 kHz, nF/Km		120/100		120	
b	Conductor Loop Resistance (max.), Ohm/Km at 20 deg C		73.4/73.4		36.2	24.2
c	Insulation Resistance (min), M Ohm/ Km		100/100		100	
d	Cross Talk Figure (min) at 0.8kHz, dB		60/60		60	
e	Characteristic impedance, Ohms(max.)		320/340 at 1 kHz		320 at 1 kHz	230 at 1 kHz
f	Attenuation(max.)		1.2/1.2 at 1 kHz db/Km		1.2 at 1 kHz db/Km	
	Note:Cable parameters indicated above are at 20 degC (+/- 3 degC)					
3.0	CONSTRUCTION FEATURES					
3.1	CONDUCTOR					
a	Material type & Grade		Annealed bare copper & Electrolytic			
b	Standard applicable		VDE 0815			
c	Min number of strands, Dia and cross sectional area		7, 0.3 mm (nom), 0.5 sq.mm		7, 0.43 mm (nom), 1 sq.mm	7, 0.53 mm(nom), 1.5 sq.mm
d	Continuous operation suitability		70 DEG. C			
3.2	INSULATION					
a	Material		PVC as per VDE 0207 Part 4, compound Y I3			
b	Application		Extruded			
c	Insulation thickness Min./Max.		0.25/ 0.35			0.8/0.9
d	Volume Resistivity (Min.)		1x 10 ¹⁴ at 20 deg .C & 1x 10 ¹¹ at 70 deg. C in ohm-cm			

	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT	PE-TS-999-507-E005
		Issue No: 01
		Rev. No. 00
		Date : 28.02.2025


TECHNICAL DATA - PART - A

SL.NO	DESCRIPTION	UOM	DETAIL				
TYPE OF CABLE			0.5 SQMM U/Arm	0.5 SQMM Armoured	1 SQMM U/Arm	1.5 SQMM U/Arm	
3.3	LAYING OF CORES						
a	Min. number of twist per Metre for paired cables.		20				
b	Maximum lay of individual twisted pair		50 mm				
c	Cores of the pairs of a bunch provided		As per Annexure-B-I enclosed				
d	Single Layer of Binder Tape on each pair is provided		YES				
e	Unit Formation(Bunch) of four pair polyester binder tape for cables more than 4P is provided		YES				
3.4	CORE IDENTIFICATION		Band marking As per Annexure-B-I enclosed				
3.5	INDIVIDUALLY SCREENED (APPLICABLE FOR F TYPE CABLE ONLY)						
a	Material		Aluminium-Mylar tape				
b	Coverage		100%				
c	Overlap		Minimum 20%				
d	Min thickness (Micron)		28				
e	Binder		Polyester tape				
3.4	OVERALL SCREENED (APPLICABLE FOR BOTH F & G TYPE CABLE)						
a	Material		Aluminium-Mylar tape				
b	Coverage		100%				
c	Overlap		Minimum 20%				
d	Min thickness (Micron)		55				
e	Binder		Polyester tape.				
3.5	DRAIN WIRE (To be provided separately for individual pair shield (wherever applicable) and overall shield.)						
a	Material		Annealed Tin coated Electrolytic copper conductor as per VDE: 0815				
b	Min number of strands, Dia and cross sectional area		7, 0.3 mm (nom), 0.5 sq.mm				
3.6	ACCESSORIES (BEDDING, BINDER, TAPE REQ.)						
a	Material		Mylar Tape				
3.7	INNERSHEATH DETAILS			NA	Yes	NA	NA
a	Material:		-	Extruded PVC (compound YM1) as per VDE 0207 Part-5	-	-	-
b	Thickness (Min)		-	0.3 mm	-	-	-
c	Whether FRLS		-	No	-	-	-
d	Fillers		-	Acceptable	-	-	-
e	Material of fillers		-	Same as inner sheath (With moisture resistant properties & Flame retardant- as applicable)	-	-	-
f	Method of application		-	Pressure / Vacuum extruded	-	-	-

	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT	PE-TS-999-507-E005
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TECHNICAL DATA - PART - A

SL.NO	DESCRIPTION	UOM	DETAIL			
TYPE OF CABLE			0.5 SQMM U/Arm	0.5 SQMM Armoured	1 SQMM U/Arm	1.5 SQMM U/Arm
3.8	ARMOUR		NA		NA	NA
a	Applicable		-	YES	-	-
b	Material:	-		Galvanised Steel Round Wire, Galvanised Steel Formed Wire/Strip conforming to (i) Type 'a' / 'b' as per table -15 of VDE 816	-	-
c	Standard Applicable	-		VDE 816	-	-
d	Minimum Coverage	-		0.9	-	-
e	Gap between armour wires	-		Shall not exceed one armour wire space (No cross-over/ overriding)	-	-
f	Breaking load of joint	-		95 % of normal armour	-	-
g	Method of jointing	-		Welding	-	-
3.9	OUTERSHEATH					
a	Material		Extruded PVC (compound YM1)			
b	Standard Applicable		VDE 0207 Part-5			
c	Minimum Thickness at any point		1.8 mm			
d	Nominal Thickness at any point		>1.8 mm			
e	Application		Extruded			
f	Colour		Blue			
g	Whether FRLS		YES			
h	Other		Resistant to water, Fungus, Termite & rodent attack.			
i	Marking/ Embossing on Outer sheath					
1	At every 5 Meters		(i) Owner's Name (project specific) (ii) Manufacturer's name and trade mark (iii) Year of manufacture (iv) Type of cable and voltage class (v) Nominal cross section area of conductor and no. of cores (vi) BHEL-UNIT (Shall be informed during contract) (vii) 'FRLS' / FRLSH (viii) Drum no.			
2	At every 1 Meters		Progressive automatic on-line sequential marking of length in meters			
3	Allowable Tolerance On Overall Diameter		+/- 2 mm (maximum) over the declared value in data sheet			
4	Variation in Diameter		Not more than 1.0 mm throughout the length of cable.			
4.0	FR-LSH CHARACTERISTICS					
4.1	Oxygen index		29% Minimum as per ASTM D 2863			
4.2	Temperature index		250 deg C Minimum as per ASTM D 2863			
4.3	Acid gas generation		less than 20% by weight (As per IEC 754-1)			
4.4	Smoke density rating		Not more than 60% (As per ASTM D 2843) Defined as average area under curve when the results of smoke density plotted on a curve indicating light absorption v/s time as ASTM D 2843			
4.5	Flammability Test		IEEE-383			
4.6	Swedish Chimney Test		As SEN-SS-424-1475 Class F3			

	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT	PE-TS-999-507-E005
		Issue No: 01
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		Date : 28.02.2025

TECHNICAL DATA - PART - A

SL.NO	DESCRIPTION	UOM	DETAIL			
TYPE OF CABLE			0.5 SQMM U/Arm	0.5 SQMM Armoured	1 SQMM U/Arm	1.5 SQMM U/Arm
5.0	CABLE DRUM DETAILS					
5.1	Type		Non-returnable wooden drum or steel drum			
5.2	Standard drum length		1000 m: up to & including 12 pairs 500 m: above12 pairs For each individual cable size, one short length of not less than 250m may be accepted only in the final drum length to complete the supply			
5.3	Tolerance on drum length		(±) 5%			
5.4	Details of marking on Drum		a) Manufacturer's name or trade make. b) BHEL-UNIT (Shall be informed during contract) c) Type of cable & voltage grade. d) Year of manufacture. e) Type of insulation. f) No. of core and sizes of cables. g) Cable code - FRLS. h) Single length of cable on drum. i) Direction of rotation, by arrow. j) Approx. gross mass.			
6.0	PERFORMANCE PARAMETERS		Not Applicable			
7.0	INSPECTION/TESTING					
	Type test conduction required		Refer QP.			
	Validity of type test report		Bidder shall furnish Type Test Certificate of specified Type Test as per quality plan which has been conducted within last 10 years from 07/10/2024 , i.e. from 08/10/2014 to 07/10/2024. These reports should be for the tests conducted on Screen Control cable identical in all respects to those proposed to be supplied under this contract and test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. In absence of valid Type Test report vendor to conduct the same without any commercial & delivery implication to BHEL. Type test conduction shall be as per Annexure-A to QAP.			
	Acceptance & Routine test		All acceptance and routine tests as per Quality plan (0000-999-QOI-S-035, Rev 01)) shall be carried out. Charges for these shall be deemed to be included in the cable price.			

	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT		PE-TS-999-507-E005
			Issue No: 01
			Rev. No. 00
			Date : 28.02.2025
TECHNICAL DATA - PART - B (SUPPLIER DATA TO BE FURNISHED AFTER AWARD OF CONTRACT)			
SL.NO	DESCRIPTION	UOM	DETAIL
1.0	GENERAL		
1.1	Name & Address of Manufacturer		
2.0	CONDUCTOR		
2.1	cross sectional dia		
3.0	PVC INSULATION		
3.1	Dielectric constant		
4.0	CORE LAYING		
4.1	Min. number of twist per Metre for paired cables.		
4.2	Maximum lay of individual twisted pair		
4.3	Diameter of core		
5.0	INNERSHEATH		
5.1	Thickness (min.)		
6.0	ARMOUR		
6.1	Size/ dimensions		
6.2	Minimum no. of wires/ formed wires		
7.0	OUTERSHEATH		
7.1	Thickness of outer sheath		
7.2	Calculated dia under outer sheath		
8.0	DIAMETERS		
8.1	Diameter over laid up core		
8.2	Cable diameter under armour		
8.3	Cable diameter over armour		
8.4	Overall diameter of cable		
8.5	Tolerance of overall diameter		
8.6	Minimum bending radius		
8.7	Safe pulling force		
9.0	WEIGHTS		
9.1	Weight of cable		
9.2	Weight of conductor		
9.3	Weight of PVC/ HRPVC insulation		
9.4	Weight of PVC (Inner Sheath & Fillers)		
9.5	Weight of Round Wire / GS formed Wire (Approx)		
9.6	Weight of PVC (Outer Sheath)		
9.7	Dimension of drum (F X B X T) (Approx)		
9.8	Shipping weight (Approx)		



TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT

PE-TS-999-507-E005

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CORE IDENTIFICATION / PAIR IDENTIFICATION

ANNEXURE: B-I (A)

The cable cores shall be colour coded as mentioned below:

PAIR	CORE	COLOUR
1st	1st	Blue
1st	2nd	Red
2nd	1st	Grey
2nd	2nd	Yellow
3rd	1st	Green
3rd	2nd	Brown
4th	1st	White
4th	2nd	Black


Each four pair is laid to form one unit and wound with Mylar tape. The cores of each unit shall then be identified by colour bands for cables of more than 4-pair. Eg. All eight cores of the first unit shall have a single band of pink color (preferably rose pink).

Unit No No.	COLOUR OF BANDS	BAND MARKS
1.	PINK	= === ==
2.		= ===== ==
3.		= ===== ==
4.		= ===== ==
5.	ORANGE	= === ==
6.		= ===== ==
7.		= ===== ==
8.		= ===== ==
9.	VIOLET	= === ==
10.		= ===== ==
11.		= ===== ==
12.		= ===== ==

The dimension L (distance between the markings) shall be limited to 50 mm. The bands shall be neat and cover at least 2/3 of the periphery of the core.

Eg: A grey wire having 3 orange bands is the first core of the second pair of the Seventh unit.

Band markings shall not be easily erasable and shall also meet Bleeding and Blooming Test and colour fastness to water test requirement as per relevant standard.

	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT	PE-TS-999-507-E005
		Issue No. 01
		Rev. No. 00
		Date : 28.02.2025

QUALITY PLAN



STANDARD QUALITY PLAN


Instrument/ TC extension/ Compensating PVC FRLS Cable/High Temperature Instrumentation Cable										As Per latest standards VDE 0815,VDE 0207 part 4,5,6,VDE 0816,VDE 0472,Sen 4241475,ANSI 98.1, ASTM 2863, IEC 754-1,IS 3975, IS-8784 and IS 10810										QP No. 0000-999-QOI-S-035 Revision:01 T 24.09.2018 F 2 OF 5										Reviewed By: Chanchal Verma Alok Shrivastava S K Lal										Approved By: K K Ojha									
Sl. No	Component & Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Format of record	Agency			Remarks																																				
					M	C.N				M	C	N																																					
1	2	3	4	5	6	7	8	9	10	11																																							
E	Wooden Drums	a) Dimension	Minor	Measurement	Sample	As per Mfr std	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	-	V	COC from drum manufacturer																																					
		b) Anti termite treatment	Minor	Chemical	As per Mfr std	As per Mfr std	NTPC Tech Specification /Approved Datasheet	COC	P	V	V																																						
		c) Marking	Minor	Visual	As per Mfr std	NTPC Tech Specification /Approved Datasheet	As per Mfr std	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	-		-																																				
F	Steel Drum (if applicable)	a) Dimension	Minor	Measurement	Sample	As per Mfr std	As per Mfr std	IMR/ TC	P	-	-																																						
		b) Surface Finish	Minor	Visual	-	As per Mfr std	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	-	-																																						
		c) Marking	Minor	Visual	As per Mfr std	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	V	V																																							
II INPROCESS INSPECTION																																																	
A	Wire Drawing & Annealing	a)Size	Maj.	Dimn.	1 Sample at Start and 1 Sample at End	-	Approved Datasheet	IMR/ TC	P	-	-																																						
		b) Surface finish	Maj.	Visu.	100%	-	Surface shall be smooth	IMR/ TC	P	-	-																																						
		c) % of Elongation	Maj.	Mech.	1 Sample/ Lot	-	IS 10810	IMR/ TC	P	-	-																																						
B	Tinning (Only for Drain wire)	a) Size	Maj.	Dimn.	1 Sample/ Lot	-	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	-	-																																						
		b) Percentage of Elongation	Maj.	Mech.	1 Sample/ Lot	1 Sample/ Lot	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	V	V																																						
		a) Surface finish	Maj.	Visu.	100%	-	Surface shall be smooth & free from scratches	IMR/ TC	P	-	-																																						
C	Insulation	b) Core Diameter	Maj.	Measu.	1 Sample/ Lot	-	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	-	-																																						
		c) Radial Thickness(Min & Max)	Maj.	Measu.	1 Sample/ Lot	-	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	-	-	No Repairs are allowed on the Insulated core																																					
		d) Spark Test	Maj.	Elec.	100%	100%	IS 10810(With 3KV ac)	No Spark failure is allowed	IMR/ TC	P	V	V																																					
D	Twisting	e) Volume Resistivity/ Insulation Resistance	Maj.	Elec.	1 Sample/ Lot	1 Sample/ Lot	VDE -0207/ Approved Datasheet	IMR/ TC	P	V	V																																						
		f) Colour, Marking/ Identification	Maj.	Visual	100%	100%	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	V	-																																					
		g) TS & %Elongation	Maj.	Mech.	1 Sample/ Lot	-	IS 10810	NTPC Approved Datasheet	IMR/ TC	P	-	-																																					
		a) Lay length and Direction	Maj.	Measu. & Visual	1 Sample at Start and 1 Sample at	-	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	-	-																																						
		b) Size/ Dimension	Maj.	Measu.	1 Sample/ Lot	-	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	-	-																																					
		c) Pair Colour	Maj.	Visual	100%	-	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	IMR/ TC	P	-	-																																					
LEGEND: * RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION ** M: MANUFACTURER/ SUB-SUPPLIER, C: SUPPLIER/NOMINATED INSPECTION AGENCY, NIE: NTPC/EMPLOYER, P: PERFORM, W: WITNESS AND V: VERIFICATION APPROPRIATE CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS "W" \$-IRRESPECTIVE OF SIZE AND TYPE ADS - APPROVED DATA SHEET, SPEC. - CONTRACT SPECIFICATION, TC - TEST CERTIFICATE, COC - CERTIFICATE OF COMPLIANCE IMR - INWARD MATERIAL REGISTER, FIR - FINAL INSPECTION REPORT																																																	
FORMAT NO.: QS-01-QAI-P-071/F3														ENGINEERING DIV. QA&I																																			

ITEM : Instrumentation Cables,
SUB SYSTEM : Shielded
Instrument/ TC extension/
Compensating PVC FRLS
Cable/High Temperature
Instrumentation Cable




STANDARD QUALITY PLAN


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SI	Component & No Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Format of record	Agency	Remarks
1	2	3	4	5	M	C.N	7	8	9	M C N	10
IV ACCEPTANCE TEST											
A	Constructional Details & Dimensions of complete cable	a) Constructional Details(CONDUCTOR,DRAIN WIRE,SHEILDING ETC.)	Maj.	Visual	Samples as per IS 1554/8784	Samples as per IS 1554/8784	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		b) Shield Al-mylar thickness	Maj.	Measu.	Samples as per IS 1554/8784	Samples as per IS 1554/8784	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		c) Insulation thickness	Maj.	Measu.	Samples as per IS 1554/8784	Samples as per IS 1554/8784	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		d) Inner/ Outer sheath thickness (as applicable)	Maj.	Measu.	Samples as per IS 1554/8784	Samples as per IS 1554/8784	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	before and after ageing for insulation.
		e) Diameter over outer sheath	Maj.	Measu.	Samples as per IS 1554/8784	Samples as per IS 1554/8784	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		f) Outer sheath - Colour, Marking/ Embossing & End sealing.	Maj.	Visual	Samples as per IS 1554/8784	Samples as per IS 1554/8784	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		g) Length checking	Maj.	Measu.	1 No. of each size & type per Lot	1 No. of each size & type per Lot	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		h) Core - Band marking/ Numbering, Colour.	Maj.	Visual	1 No. of each size & type per Lot	1 No. of each size & type per Lot	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		i) Overall Coverage/overlap of shield & Continuity of drain wire.	Maj.	Visual	1 No. of each size & type per Lot	1 No. of each size & type per Lot	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	Continuity shall be checked as per Manufacturer practice.
		j) Visual & Surface Finish	Maj.	Visual	1 No. of each size & type per Lot	1 No. of each size & type per Lot	Smooth, free from visual defects #	Smooth, free from visual defects #	FIR	P W W	# Like Porosity, Burnt particles, Pimples
B	Insulation	a) Volume Resistivity (At room and Elevated Temperature)	Maj.	Elec.	1 No / Complete lot offered \$	1 No / Complete lot offered \$	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		b) IR Test	Cri.	Elec.	Samples as per IS 1554/8784	Samples as per IS 1554/8784	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		c) TS & %Elongation test of Insulation (Before & After aging)	Maj.	Mech	1 No / Complete lot offered \$	1 No / Complete lot offered \$	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		d) Thermal Stability	Maj.	Chem.	1 No. of each size & type per Lot	1 No. of each size & type per Lot	VDE 207 Part -4/5	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
C	Sheath	a) TS & %Elongation test of Sheath (Before & After aging)	Maj.	Mech	1 No / Complete lot offered \$	1 No / Complete lot offered \$	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		b) Thermal Stability	Maj.	Chem.	1 No. of each size & type per Lot	1 No. of each size & type per Lot	VDE 207 Part -4/5	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
		c) FRLS Test for outer sheath for O(Oxygen Index), TI(Temperature Index), SDR(Smoke Density Rating) & HCL Emission	Maj.	Chem	1 No / Complete lot offered \$	1 No / Complete lot offered \$	NTPC Tech Specification /Approved Datasheet	NTPC Tech Specification /Approved Datasheet	FIR	P W W	
FORMAT NO.: QS-01-QAI-P-07A/F3										ENGINEERING DIV./QA&I	

ANNEXURE - A

CLAUSE NO.	TECHNICAL REQUIREMENTS						
3.00.00	TYPE TEST REQUIREMENT FOR OTHER C&I SYSTEMS						
	Sl. No	Item	Test Requirement	Standard	Test To Be Specifically Conducted	NTPC's Approval Req. On Test Certificate	
	2	Instrumentation Cables Twisted & Shielded*					
		-Conductor	Resistance test	VDE-0815	No	Yes	
			Diameter test	IS-10810	No	Yes	
			Tin Coating test (Persulphate test)	IS-8130	No	Yes	
		-Insulation	Loss of mass	VDE 0472	No	Yes	
			Ageing in air ovens**	VDE 0472	No	Yes	
			Tensile strength and elongation test before and after ageing**	VDE 0472	No	Yes	
			Heat shock	VDE 0472	No	Yes	
			Hot deformation	VDE 0472	No	Yes	
			Shrinkage	VDE 0472	No	Yes	
			Bleeding & blooming	IS-10810	No	Yes	
		-Inner sheath***	Loss of mass	VDE 0472	No	Yes	
			Heat shock	VDE 0472	No	Yes	
			Cold bend/cold impact test	VDE 0472	No	Yes	

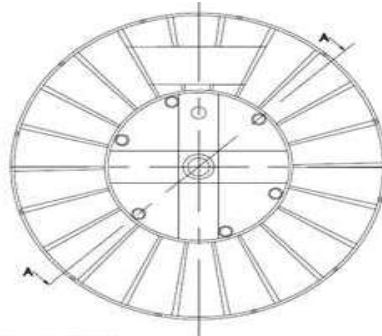
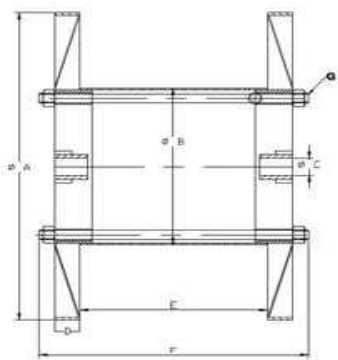
CLAUSE NO.	TECHNICAL REQUIREMENTS					<div>एनटीपीसी NTPC</div>
		Hot deformation	VDE 0472	No	Yes	
		Shrinkage	VDE 0472	No	Yes	
	-Outer sheath	Loss of mass	VDE 0472	No	Yes	
		Ageing in air ovens**	VDE 0472	No	Yes	
		Tensile strength and elongation test before and after ageing**	VDE 0472	No	Yes	
		Heat shock	VDE 0472	No	Yes	
		Hot deformation	VDE 0472	No	Yes	
		Shrinkage	VDE 0472	No	Yes	
		Bleeding & blooming	IS-10810	No	Yes	
		Colour fastness to water	IS-5831	No	Yes	
		Cold bend/ cold impact test	VDE-0472	No	Yes	
		Oxygen index test	ASTMD-2863	No	Yes	
		Smoke Density Test	ASTMD-2843	No	Yes	
		Acid gas generation test	IEC-60754-1	No	Yes	
	-fillers	Oxygen index test	ASTMD-2863	No	Yes	
		Acid gas generation test	IEC-60754-1	No	Yes	
	-AL-MYLAR shield	Continuity test		No	Yes	

CLAUSE NO.	TECHNICAL REQUIREMENTS				
	-Over all cable	Shield thickness		No	Yes
		Overlap test		No	Yes
		Flammability Test	IEEE 383	No	Yes
		Swedish Chimney Test	SEN 4241475	No	Yes
		Noise interference	IEEE Trans- actions	No	Yes
		Dimensional checks	IS 10810	No	Yes
		Cross talk	VDE-0472	No	Yes
		Mutual capacitance	VDE-0472	No	Yes
		HV test	VDE-0815	No	Yes
		Drain wire continuity		No	Yes
***Applicable for armoured cables only					

	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT	PE-TS-999-507-E005
		Issue No: 01
		Rev. No. 00
		Date : 28.02.2025

PACKING REQUIREMENT


Sl.no	DESCRIPTION
1	Type of Packing (Wood/ Steel):
	Wood (if applicable):
1.1	Item shall be fully covered with multi layered cross laminated colourless polyethylene sheet of at least 100 GSM and shall be packed inside wooden drum as per IS 10418.
1.2	Both the end of cables shall be properly sealed with heat shrinkable seal secured by 'U' nails so as to eliminate ingress of water during transportation, storage & erection.
1.3	A tag containing same information shall be attached to the leading end of the cable.
	Steel (if applicable):
1.1	Item shall be fully covered with multi layered cross laminated colourless polyethylene sheet of at least 100 GSM and shall be packed inside steel drum as per below typical drawing.
1.2	Both the end of cables shall be properly sealed with heat shrinkable seal secured by 'U' nails so as to eliminate ingress of water during transportation, storage & erection.
1.3	A tag containing same information shall be attached to the leading end of the cable.




APPROXIMATE DRUM DIMENSIONS IN MM
ALL DIMENSIONS AND VALUES ARE
TYPICAL AND ARE DEPENDENT ON
CABLE WEIGHT.

A	FLANGE
B	BARREL
C	CENTRAL HOLE
D	FLANGE
E	TRAVERSE
F	GROSS WIDTH
G	STUD SIZE

• Dwg. not to scale.
• ALL DIMENSIONS ARE IN MM.

	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT	PE-TS-999-507-E005
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2	Quality of wood:
	As per IS 10418 for wooden drums
3	Cushioning material and moisture absorber:
	Not applicable
4	Packing slip & holder:
4.1	Packing slip kept in polyethylene bag shall be placed inside the cable drum at appropriate place.
4.2	One copy of packing slip wrapped in polyethylene bag covered in galvanized iron tin sheet/ aluminium packing slip holder shall be fixed on the external surface the cable drum.


	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT		PE-TS-999-507-E005
			Issue No: 01
			Rev. No. 00
			Date : 28.02.2025

UNPRICED SCHEDULE

Sr. No.	Item code	Item description	Unit	Order Quantity (metres)	Drum Length (Meters)	UNIT PRICE (EX-WORKS) (Rs)	TOTAL PRICE (EX-WORKS) (Rs)
1.0	Individual & Overall Screened Cable (Type-F) UnArmoured						
(i)	507-0310081-00-A	225V TYPE F(IO) 2P - 0.5 SQMM UNARMoured	MTR	9,65,000	1000	0.04291*X/965000	0.04291*X
(ii)	507-0310046-00-A	225V TYPE F(IO) 4P - 0.5 SQMM UNARMoured	MTR	23,75,000	1000	0.16*X/2375000	0.16*X
(iii)	507-0310050-00-A	225V TYPE F(IO) 8P - 0.5 SQMM UNARMoured	MTR	10,45,000	1000	0.13509*X/1045000	0.13509*X
(iv)	507-0310038-00-A	225V TYPE F(IO) 12P - 0.5 SQMM UNARMoured	MTR	3,25,000	1000	0.05939*X/325000	0.05939*X
(v)	507-0310135-00-A	225V TYPE F(IO) 16P - 0.5 SQMM UNARMoured	MTR	1,70,000	500	0.04029*X/170000	0.04029*X
2.0	Overall Screened Cable (Type-G) UnArmoured						
(i)	507-0310062-00-A	225V TYPE G(O) 2P - 0.5 SQMM UNARMoured	MTR	4,35,000	1000	0.01454*X/435000	0.01454*X
(ii)	507-0310066-00-A	225V TYPE G(O) 4P - 0.5 SQMM UNARMoured	MTR	33,45,000	1000	0.1647*X/3345000	0.1647*X
(iii)	507-0310070-00-A	225V TYPE G(O) 8P - 0.5 SQMM UNARMoured	MTR	15,70,000	1000	0.14263*X/1570000	0.14263*X
(iv)	507-0310054-00-A	225V TYPE G(O) 12P - 0.5 SQMM UNARMoured	MTR	6,20,000	1000	0.07765*X/620000	0.07765*X
(v)	507-0310058-00-A	225V TYPE G(O) 16P - 0.5 SQMM UNARMoured	MTR	75,000	500	0.01215*X/75000	0.01215*X
3.0	Individual & Overall Screened Cable (Type-F) Armoured						
(i)	507-0310082-00-A	225V TYPE F(IO) 2P - 0.5 SQMM ARMoured	MTR	24,000	1000	0.00135*X/24000	0.00135*X
(ii)	507-0310045-00-A	225V TYPE F(IO) 4P - 0.5 SQMM ARMoured	MTR	39,000	1000	0.00327*X/39000	0.00327*X
(iii)	507-0310049-00-A	225V TYPE F(IO) 8P - 0.5 SQMM ARMoured	MTR	13,000	1000	0.00183*X/13000	0.00183*X
4.0	Overall Screened Cable (Type-G) Armoured						
(i)	507-0310061-00-A	225V TYPE G(O) 2P - 0.5 SQMM ARMoured	MTR	10,000	1000	0.00048*X/10000	0.00048*X
(ii)	507-0310065-00-A	225V TYPE G(O) 4P - 0.5 SQMM ARMoured	MTR	30,000	1000	0.00205*X/30000	0.00205*X
(iii)	507-0310069-00-A	225V TYPE G(O) 8P - 0.5 SQMM ARMoured	MTR	34,000	1000	0.00398*X/34000	0.00398*X
(iv)	507-0310053-00-A	225V TYPE G(O) 12P - 0.5 SQMM ARMoured	MTR	50,000	1000	0.00729*X/50000	0.00729*X
(v)	507-0310057-00-A	225V TYPE G(O) 16P - 0.5 SQMM ARMoured	MTR	8,000	500	0.00155*X/8000	0.00155*X
5.0	Individual & Overall Screened Cable (Type-F) UnArmoured						
(i)	507-0310136-00-A	225V TYPE F(IO) 2P - 1 SQMM UNARMoured	MTR	35,000	1000	0.00327*X/35000	0.00327*X
(ii)	507-0340042-00-A	225V TYPE F(IO) 2P - 1.5 SQMM UNARMoured	MTR	10,80,000	1000	0.12558*X/1080000	0.12558*X
GRAND TOTAL (Rs)							X

Notes :

1	Bidder to quote grand total value of the complete package (Rs X) only for the above mentioned BOQ. The item wise break up of total price and unit price shall be derived as per the formulae indicated above.
2	Tolerance on individual drum length shall be $\pm 5\%$.
3	Overall tolerance on total dispatched quantity of each size shall be (-) 2% and (+) 0%. Cables consumed for testing and inspection shall be to bidder's account.
4	For each individual cable size, one short length of not less than 250m may be accepted only in the final drum length to complete the project specific supply (except where the total ordered quantity is one single drum length). The overall tolerance limits stipulated above shall continue to apply (in case short lengths are accepted).
5	Unit price of cables quoted by bidder shall be inclusive of type test charges (If applicable). No separate charges shall be payable for type tests.

	TECHNICAL SPECIFICATION SCREENED CONTROL CABLE RATE CONTRACT	PE-TS-999-507-E005
		Issue No. 01
		Rev. No. 00
		Date : 28.02.2025

DOCUMENTATION REQUIREMENT

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY ALL THE BIDDERS ALONG WITH THE BID

Sl. No.	DOCUMENT TITLE
1	PQR CREDENTIALS
2	COMPLIANCE SHEET

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT ALONG WITH SUBMISSION SCHEDULE

Sl. No.	BHEL Drawing No.	Drawing Title	Vendor submission (Days)*	BHEL Comment each submission (Days)	Vendor submission (Days)#
I Primary Documents					
1	PE-V0-XXX-507-E141	DATA SHEET & CROSS SECTION DRAWINGS FOR SCREEN CONTROL CABLE	14	10	10
2	PE-V0-XXX-507-E916	QAP FOR SCREEN CONTROL CABLE	14	10	10
ii Secondary Documents					
3	PE-V0-XXX-507-E144	TYPE TEST REPORT FOR SCREEN CONTROL CABLE **	7	10	7

NOTES:

- a) * 1st submission within indicated days from date of purchase order.
b) # Submission (within indicated days) after incorporating all BHEL comments.
c) Primary documents shall be considered for Delay analysis.
d) ** Within 1 week after conduction of type test, for the type tests to be conducted on cable as per Annexure to Quality plan (If applicable).

DRAWINGS & DOCUMENTS TO BE SUBMITTED AS FINAL/AS-BUILT DOCUMENT

Sl. No.	DOCUMENT TITLE
1	APPROVED TECHNICAL DATASHEET & GA DRAWING.
2	APPROVED QUALITY PLAN.
3	ALL TEST CERTIFICATES



**TECHNICAL SPECIFICATION
SCREENED CONTROL CABLE
RATE CONTRACT**

PE-TS-999-507-E005

Issue No. 01

Rev. No. 00

Date : 28.02.2025

COMPLIANCE CERTIFICATE


1	It is hereby confirm that the technical specification (sheet 1 to 43) has been read, understood. We confirm compliance to the tender specification including any clarification and amendments without any deviation.
2	It is hereby declared that any technical submittals which was not specifically asked for in NIT shall stand withdrawn.

Signature of authorised Representative

Name and Designation :

Name & Address of the Bidder

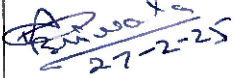



Date

	PRE-QUALIFICATION REQUIREMENTS FOR SCREENED CONTROL CABLE (NTPC VARIANT) RATE CONTRACT	PE-PQ-RC-507-E016
		REVISION NO. 00 DATE 27/02/2025
		SHEET NO. 1 OF 1

ITEMS : Screened Control Cable	
SCOPE : Supply : YES; Erection & Commissioning : NO;	
1.0	Vendor should be a manufacturer of screened/ instrumentation control cables.
2.0	Availability of test reports of tests on FRLS screened control cables to establish in-house Capability to carry out all routine, type acceptance as per relevant IS/ International Standards (except UV radiation & hydrolytic stability Test which can be conducted at Govt. Lab/ Govt. approved Independent lab).
3.0	Capacity of manufacturing 200 km of screened control cables per month.
4.0	Manufactured and supplied at least one (1) km of FRLS cables.
5.0	Manufactured and supplied screened control cables up to 20 pairs.
6.0	Manufactured and supplied at least 1000 Km of Screened Control cables in one or more orders and at least 200 Km in one single order.
7.0	Minimum two (2) nos. purchase orders for screened control cables shall be submitted which should not be more than five (5) years old from the date of techno-commercial bid opening for establishing continuity in business.

NOTES:

1. Consideration of offer shall be subject to customer's approval of bidders, if applicable.
2. 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.
3. 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.
4. After satisfactory fulfillment of all the above criteria/requirement, offer shall be considered for further evaluation as per NIT & all the other terms of the tender.
5. Attached Annexure-1 to be filled by the bidders on quality & general terms. Requisite Documents (like factory registration certificate, R&D set-up details etc.) asked in the Annexure-1, shall also be attached as Annexure-F2.1 to Annexure F2.17 along with the filled response in the Annexure-1.

PREPARED BY  ABHINAV BANSHIWALA SR. MANAGER	CHECKED BY  N.N.JAJWARE D.G.M.	REVIEWED BY  PRAVEEN DUTTA A.G.M.	APPROVED BY  DEBASISA RATH G.M.(DH-ELEC)
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PVC FORMULAE & FACTORS

CIN No. U99999MH1970GAPO14629



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Cir. No. 05/DIV/CAB/05

31 January 2023

All Members of Cable Division & All SEBs, Utilities & Listed Purchasing organisations

Sub: Revision in Price Variation Formulae for Instrumentation cable

In current applicable PV formulae of IEEMA for Instrumentation Cable effective from July 2014 there is no variation available on polymers which is having significant portion of cost of the cable.

IEEMA Cable technical committee discussed the subject and felt that there is need of revision in the PV clause by inclusion of Polymer factors and pairs up to 61. IEEMA collected the weight factors for Copper, Steel and Polymer for pair and triad instrumentation as per BSEN standard 502887 and prepared draft formulae and circulated to all stakeholders vide Cir. No. 32/DIV/CAB/05 dated 10th November 2022.

Since there are no adverse comments received; we are making these operational from 1st January 2023.

Although, these PV clauses are made effective from 1st January 2023, practically they can be incorporated in all the current new tenders/contracts starting from 1st February 2023.

We request and recommend all the users & stakeholders including Utilities, PSUs etc. to incorporate these new PV formulae in all the new tenders/contracts henceforth.

For pending contracts, for the date of delivery on or after 1st February 2023, to arrive at the final price variation, we recommend using the following two stage method, which is a standard institutionalized methodology adopted by IEEMA for change over in all IEEMA PV clauses.

1. Calculate price variation 'P' from applicable prices/indices as per your base date / date of tendering up to January 2023 i.e. considering all prices/indices published in PV circular of January 2023; using applicable IEEMA PV clause of Instrumentation cable which is effective from July 2014.
2. Treat the above calculated 'P' as 'P₀' and calculate final price variation considering all prices / indices published in PV circular of January 2023 applicable for revised PV clause of Instrumentation cables effective from 1st January 2023 as base prices/indices up to the applicable prices/indices as per the date of delivery; applicable as per revised relevant PV clause of Instrumentation Cables effective from 1st January 2023.

Director

Encl.: as above



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Material Price Variation Clause for Instrumentation Cables

The Price quoted/confirmed is based on the input cost of raw materials/components as on the date of quotation, and the same is deemed to be related to the prices of raw materials as specified in the price variation clause given below. In case of any variation in these prices, the price payable shall be subject to adjustment up or down in accordance with the formulae provided in this document.

Terms used in price variation formulae:

P Price payable as adjusted in accordance with above appropriate formula (in Rs/Km)
 P_0 Price quoted/confirmed (in Rs/Km)

COPPER

CuF Variation factor for copper

Cu Price of CC copper rods.

Cu_0 Price of CC copper rods.

STEEL

FeF Variation factor for steel

Fe Price of Steel Strips/steel wire.

Fe_0 Price of Steel Strips/steel wire.

POLYMER

POCF Variation factor for polymer

POC Price of PVC/polymer.

POC_0 Price of PVC/polymer.

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The above prices and indices are as published by IEEMA vide Circular reference IEEMA(PVC)/CABLE/--/-- for the month i.e. **ONE** month prior to the date of tendering.

The date of delivery is the date on which the instrumentation cable is notified as being ready for inspection/dispatch (in the absence of such notification, the date of manufacturer's dispatch note is to be considered as the date of delivery) or the contracted delivery date (including any agreed extension thereto), whichever is earlier.

Notes:

- (a) All prices are exclusive of GST amount and exclusive of any other central, state or local taxes etc.
- (a) All Prices are applicable for the month.
- (b) The details of prices are as under:
 1. Price of CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer.
 2. Price of galvanized steel strip / steel wire (in Rs/MT) is ex-works price as quoted by the manufacturer for Round steel Wire and Flat steel strip (the relevant price of steel strip or steel wire is to be selected depending upon the type of armouring of the cable).
 3. Price of Polymer Compound (in Rs/MT) is the ex-work price, as quoted by the manufacturer/s
 4. Price of PVC (in Rs/MT) is the ex-work price, as quoted by the manufacturer/s

Price variation formula for Instrumentation Cables

$$P = P_o + CuF (Cu - Cu_o) + FeF (Fe - Fe_o) + POCF (POC - POC_o)$$

Tables References for CuF, FeF and POCF:**For Pair Instrumentation - Over all Screen Cables**

Cu POS Copper factor
Fe POS Steel factor
POC POS Polymer factor

For Pair Instrumentation - Individual and Over all Screen Cables

Cu PIS Copper factor
Fe PIS Steel factor
POC PIS Polymer factor

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Cu TOS Copper factor
 Fe TOS Steel factor
 POC TOS Polymer factor

For Triad Instrumentation - Individual and Over all Screen Cables

Cu TIS Copper factor
 Fe TIS Steel factor
 POC TIS Polymer factor

Authorised Signatory

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Copper Factors for Instrumentation Cables - Cu POS					
Pair Instrumentation Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.0142	0.0191	0.0237	0.0330	0.0513
2	0.0236	0.0336	0.0430	0.0615	0.0986
3	0.0330	0.0481	0.0619	0.0897	0.1452
4	0.0424	0.0626	0.0810	0.1182	0.1921
5	0.0518	0.0769	0.0999	0.1464	0.2390
6	0.0614	0.0914	0.1191	0.1748	0.2859
7	0.0708	0.1062	0.1383	0.2035	0.3335
8	0.0805	0.1207	0.1576	0.2320	0.3806
9	0.0899	0.1353	0.1765	0.2605	0.4275
10	0.0992	0.1498	0.1957	0.2890	0.4744
11	0.1089	0.1643	0.2149	0.3174	0.5215
12	0.1183	0.1786	0.2339	0.3456	0.5684
13	0.1277	0.1931	0.2532	0.3741	0.6153
14	0.1371	0.2076	0.2721	0.4026	0.6624
15	0.1462	0.2216	0.2906	0.4300	0.7075
16	0.1559	0.2361	0.3095	0.4583	0.7544
17	0.1653	0.2507	0.3288	0.4867	0.8013
18	0.1746	0.2652	0.3477	0.5152	0.8482
19	0.1845	0.2802	0.3677	0.5446	0.8973
20	0.1939	0.2947	0.3869	0.5731	0.9442
21	0.2033	0.3093	0.4059	0.6016	0.9911
22	0.2130	0.3238	0.4251	0.6300	1.0382
23	0.2224	0.3383	0.4440	0.6585	1.0851
24	0.2318	0.3526	0.4633	0.6867	1.1322
25	0.2412	0.3671	0.4822	0.7152	1.1791
26	0.2508	0.3816	0.5015	0.7437	1.2260
27	0.2597	0.3954	0.5194	0.7704	1.2699
28	0.2691	0.4097	0.5384	0.7986	1.3168
29	0.2785	0.4242	0.5573	0.8271	1.3636
30	0.2879	0.4387	0.5766	0.8553	1.4105

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Copper Factors for Instrumentation Cables - Cu POS					
Pair Instrumentation Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
31	0.2980	0.4542	0.5970	0.8858	1.4609
32	0.3074	0.4687	0.6160	0.9142	1.5080
33	0.3171	0.4832	0.6352	0.9427	1.5549
34	0.3265	0.4978	0.6542	0.9711	1.6018
35	0.3358	0.5120	0.6734	0.9993	1.6489
36	0.3453	0.5266	0.6924	1.0278	1.6958
37	0.3549	0.5411	0.7116	1.0563	1.7427
38	0.3643	0.5556	0.7305	1.0847	1.7898
39	0.3729	0.5689	0.7480	1.1105	1.8325
40	0.3823	0.5834	0.7670	1.1389	1.8791
41	0.3917	0.5977	0.7862	1.1671	1.9260
42	0.4011	0.6122	0.8052	1.1956	1.9729
43	0.4115	0.6282	0.8262	1.2268	2.0247
44	0.4211	0.6427	0.8454	1.2553	2.0716
45	0.4305	0.6572	0.8643	1.2837	2.1185
46	0.4399	0.6718	0.8835	1.3119	2.1656
47	0.4493	0.6861	0.9025	1.3404	2.2125
48	0.4590	0.7006	0.9217	1.3689	2.2594
49	0.4684	0.7151	0.9407	1.3973	2.3065
50	0.4778	0.7296	0.9599	1.4258	2.3534
51	0.4874	0.7441	0.9791	1.4543	2.4005
52	0.4968	0.7587	0.9981	1.4825	2.4474
53	0.5062	0.7732	1.0173	1.5110	2.4943
54	0.5156	0.7877	1.0363	1.5394	2.5414
55	0.5240	0.8003	1.0530	1.5642	2.5821
56	0.5334	0.8147	1.0720	1.5926	2.6289
57	0.5428	0.8293	1.0912	1.6208	2.6758
58	0.5522	0.8438	1.1102	1.6493	2.7227
59	0.5630	0.8601	1.1319	1.6815	2.7763
60	0.5724	0.8746	1.1511	1.7100	2.8232
61	0.5819	0.8891	1.1700	1.7384	2.8701

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Steel Factors for Instrumentation Cables - Fe POS					
Pair Instrumentation Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.1233	0.1319	0.1375	0.1487	0.1739
2	0.1832	0.1944	0.2031	0.2148	0.2477
3	0.1866	0.1993	0.2102	0.2299	0.2733
4	0.2036	0.2188	0.2314	0.2538	0.3347
5	0.2215	0.2411	0.2538	0.2791	0.4395
6	0.2373	0.2583	0.2722	0.3306	0.4795
7	0.2373	0.2583	0.2722	0.3306	0.4795
8	0.2681	0.3210	0.3390	0.4482	0.5427
9	0.3184	0.3434	0.4388	0.4881	0.5884
10	0.3336	0.4333	0.4594	0.5114	0.6118
11	0.3376	0.4398	0.4659	0.5179	0.6183
12	0.3490	0.4511	0.4797	0.5291	0.6894
13	0.4239	0.4678	0.4993	0.5542	0.7153
14	0.4362	0.4678	0.4993	0.5542	1.3096
15	0.4503	0.4968	0.5283	0.5803	1.4666
16	0.4568	0.4968	0.5348	0.5870	1.5058
17	0.4790	0.5164	0.5570	0.6176	0.9134
18	0.4790	0.5229	0.5570	0.6176	0.9134
19	0.4855	0.5229	0.5570	0.6176	0.9134
20	0.5181	0.5609	0.6019	0.7147	0.9760
21	0.5181	0.5609	0.6019	0.7147	0.9855
22	0.5432	0.5889	0.6813	0.8479	1.0403
23	0.5432	0.5889	0.6813	0.8479	1.0403
24	0.5657	0.6608	0.7093	0.8842	1.1638
25	0.5657	0.6608	0.7093	0.8842	1.1638
26	0.5722	0.6740	0.7223	0.9037	1.1833
27	0.5806	0.6871	0.7354	0.9268	1.1996
28	0.5976	0.7075	0.7584	0.9542	1.2487
29	0.5976	0.7075	0.7584	0.9542	1.2487
30	0.5976	0.7075	0.7584	0.9542	1.2487

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Steel Factors for Instrumentation Cables - Fe POS					
Pair Instrumentation Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
31	0.6816	0.7409	0.8977	0.9996	1.4648
32	0.6816	0.7409	0.8977	0.9996	1.4648
33	0.6816	0.7409	0.8977	0.9996	1.4648
34	0.7020	0.8710	0.9298	1.0270	1.5216
35	0.7020	0.8710	0.9298	1.0270	1.5216
36	0.7085	0.8775	0.9363	1.0335	1.5281
37	0.7085	0.8775	0.9363	1.0335	1.5281
38	0.7365	0.9006	0.9637	1.1527	1.5857
39	0.7430	0.9071	0.9702	1.1592	1.5924
40	0.7430	0.9071	0.9702	1.1592	1.5924
41	0.8667	0.9482	1.0023	1.2101	1.7887
42	0.8667	0.9547	1.0091	1.2101	1.7887
43	0.8732	0.9547	1.0091	1.2101	1.7952
44	0.9006	0.9822	1.0454	1.2540	1.8537
45	0.9006	0.9822	1.0519	1.2540	1.8537
46	0.9006	0.9887	1.0519	1.2540	1.8602
47	0.9071	0.9887	1.0519	1.2605	1.8602
48	0.9166	1.0028	1.1527	1.3661	1.8922
49	0.9392	1.0208	1.1756	1.4664	1.9433
50	0.9392	1.0275	1.1756	1.4729	1.9433
51	0.9457	1.0322	1.1830	1.4795	2.0691
52	0.9457	1.0322	1.1895	1.4795	2.0691
53	0.9457	1.0322	1.1895	1.4795	2.0756
54	0.9594	1.1369	1.2106	1.5222	2.2459
55	0.9731	1.1485	1.2222	1.5222	2.2794
56	0.9796	1.1485	1.2287	1.5222	2.2859
57	0.9796	1.1485	1.2287	1.5290	2.2859
58	0.9981	1.1877	1.2614	1.5791	2.3308
59	0.9981	1.1877	1.2614	1.5791	2.3376
60	1.0048	1.1877	1.2679	1.5856	2.3376
61	1.0048	1.1877	1.2679	1.5856	2.3376

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Polymer Factors for Instrumentation Cables - POC POS					
Pair Instrumentation Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.1073	0.1190	0.1233	0.1364	0.1643
2	0.1769	0.1953	0.2106	0.2312	0.2889
3	0.1793	0.1984	0.2032	0.2378	0.2973
4	0.2042	0.2255	0.2443	0.2752	0.3505
5	0.2341	0.2627	0.2861	0.3158	0.4240
6	0.2653	0.2941	0.3174	0.3753	0.4998
7	0.2595	0.2865	0.3079	0.3627	0.4801
8	0.3001	0.3380	0.3611	0.4188	0.5607
9	0.3312	0.3665	0.4117	0.4739	0.6256
10	0.3663	0.4074	0.4531	0.5212	0.6909
11	0.3686	0.4097	0.4551	0.5227	0.6923
12	0.3781	0.4336	0.4657	0.5307	0.7345
13	0.4030	0.4598	0.4929	0.5811	0.7763
14	0.4127	0.4717	0.5069	0.5979	0.8025
15	0.4571	0.5059	0.5601	0.6380	0.8792
16	0.4701	0.5207	0.5762	0.6575	0.9070
17	0.4964	0.5643	0.6033	0.7089	0.9729
18	0.5095	0.5792	0.6203	0.7298	1.0039
19	0.5090	0.5777	0.6180	0.7257	0.9972
20	0.5469	0.6235	0.6856	0.7822	1.0884
21	0.5554	0.6330	0.6959	0.7939	1.1049
22	0.5887	0.6679	0.7421	0.8704	1.2232
23	0.5966	0.6772	0.7525	0.8823	1.2413
24	0.6391	0.7092	0.7728	0.9293	1.3121
25	0.6473	0.7184	0.7831	0.9412	1.3301
26	0.6591	0.7320	0.7981	0.9582	1.3528
27	0.6624	0.7597	0.8297	0.9897	1.3569
28	0.6889	0.7840	0.8602	1.0276	1.4266
29	0.6986	0.7956	0.8730	1.0428	1.4493
30	0.7068	0.8049	0.8831	1.0548	1.4676

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IEEMA (PVC)/Instrumentation Cable/2022

Effective from: 01st January 2023

Polymer Factors for Instrumentation Cables - POC POS					
Pair Instrumentation Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
31	0.7560	0.8780	0.9578	1.1024	1.5753
32	0.7697	0.8938	0.9758	1.1240	1.6084
33	0.7779	0.9032	0.9861	1.1361	1.6264
34	0.7987	0.9317	1.0110	1.1942	1.7045
35	0.8091	0.9436	1.0243	1.2102	1.7280
36	0.8262	0.9638	1.0472	1.2375	1.7693
37	0.8229	0.9590	1.0410	1.2289	1.7551
38	0.8727	0.9860	1.1023	1.2989	1.8217
39	0.8829	0.9978	1.1157	1.3145	1.8450
40	0.8940	1.0105	1.1294	1.3312	1.8695
41	0.9316	1.0705	1.1559	1.3625	1.9523
42	0.9508	1.0932	1.1812	1.3931	1.9981
43	0.9612	1.1051	1.1946	1.4088	2.0213
44	0.9826	1.1299	1.2540	1.4754	2.0903
45	0.9928	1.1417	1.2670	1.4911	2.1134
46	0.9940	1.1426	1.2678	1.4908	2.1130
47	1.0045	1.1545	1.2808	1.5065	2.1360
48	1.0393	1.1897	1.3007	1.5488	2.1913
49	1.0763	1.2267	1.3312	1.5929	2.2877
50	1.0865	1.2388	1.3443	1.6085	2.3107
51	1.0948	1.2487	1.3897	1.6248	2.3319
52	1.1058	1.2610	1.4037	1.6412	2.3565
53	1.1160	1.2729	1.4167	1.6566	2.3795
54	1.1474	1.3198	1.4514	1.6900	2.4387
55	1.1556	1.3256	1.4625	1.7421	2.4952
56	1.1713	1.3441	1.4836	1.7674	2.5333
57	1.1815	1.3560	1.4967	1.7829	2.5563
58	1.2046	1.4175	1.5269	1.8573	2.6381
59	1.2150	1.4294	1.5400	1.8727	2.6611
60	1.2290	1.4458	1.5585	1.8950	2.6946
61	1.2281	1.4440	1.5557	1.8907	2.6872

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Copper Factors for Instrumentation Cables - Cu PIS					
Pair Instrumentation Individual and Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.0170	0.0216	0.0267	0.0363	0.0545
2	0.0330	0.0430	0.0524	0.0709	0.1080
3	0.0472	0.0621	0.0759	0.1039	0.1594
4	0.0605	0.0814	0.0997	0.1369	0.2109
5	0.0745	0.1005	0.1235	0.1699	0.2625
6	0.0886	0.1196	0.1473	0.2030	0.3140
7	0.1027	0.1390	0.1713	0.2365	0.3665
8	0.1167	0.1583	0.1951	0.2696	0.4181
9	0.1308	0.1773	0.2188	0.3026	0.4696
10	0.1446	0.1967	0.2426	0.3359	0.5213
11	0.1586	0.2158	0.2665	0.3689	0.5730
12	0.1727	0.2349	0.2902	0.4019	0.6247
13	0.1867	0.2542	0.3140	0.4352	0.6764
14	0.2005	0.2733	0.3378	0.4683	0.7281
15	0.2143	0.2921	0.3610	0.5002	0.7780
16	0.2284	0.3112	0.3846	0.5333	0.8295
17	0.2422	0.3303	0.4084	0.5664	0.8812
18	0.2562	0.3496	0.4322	0.5996	0.9326
19	0.2705	0.3692	0.4567	0.6339	0.9863
20	0.2846	0.3886	0.4808	0.6670	1.0381
21	0.2986	0.4076	0.5045	0.7000	1.0897
22	0.3127	0.4270	0.5283	0.7332	1.1414
23	0.3265	0.4461	0.5521	0.7663	1.1931
24	0.3405	0.4652	0.5758	0.7993	1.2448
25	0.3546	0.4845	0.5996	0.8326	1.2963
26	0.3686	0.5036	0.6235	0.8656	1.3480
27	0.3819	0.5219	0.6460	0.8969	1.3966
28	0.3960	0.5410	0.6697	0.9299	1.4481
29	0.4098	0.5603	0.6935	0.9630	1.4998
30	0.4238	0.5794	0.7173	0.9960	1.5513

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Copper Factors for Instrumentation Cables - Cu PIS					
Pair Instrumentation Individual and Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
31	0.4387	0.5995	0.7424	1.0313	1.6064
32	0.4525	0.6189	0.7661	1.0644	1.6582
33	0.4665	0.6380	0.7899	1.0974	1.7096
34	0.4805	0.6573	0.8137	1.1306	1.7613
35	0.4946	0.6764	0.8375	1.1637	1.8130
36	0.5084	0.6955	0.8613	1.1967	1.8647
37	0.5225	0.7148	0.8850	1.2300	1.9164
38	0.5365	0.7339	0.9088	1.2630	1.9681
39	0.5496	0.7518	0.9309	1.2936	2.0153
40	0.5636	0.7710	0.9546	1.3266	2.0667
41	0.5777	0.7901	0.9784	1.3596	2.1184
42	0.5915	0.8093	1.0022	1.3927	2.1699
43	0.6065	0.8298	1.0280	1.4284	2.2263
44	0.6206	0.8492	1.0518	1.4617	2.2780
45	0.6344	0.8683	1.0756	1.4947	2.3298
46	0.6484	0.8876	1.0993	1.5277	2.3814
47	0.6625	0.9067	1.1231	1.5610	2.4331
48	0.6766	0.9258	1.1469	1.5941	2.4846
49	0.6905	0.9451	1.1707	1.6271	2.5362
50	0.7044	0.9642	1.1945	1.6604	2.5880
51	0.7185	0.9836	1.2183	1.6935	2.6397
52	0.7325	1.0026	1.2420	1.7265	2.6914
53	0.7465	1.0217	1.2658	1.7597	2.7430
54	0.7603	1.0410	1.2896	1.7928	2.7948
55	0.7731	1.0584	1.3109	1.8223	2.8402
56	0.7872	1.0775	1.3347	1.8553	2.8917
57	0.8013	1.0966	1.3585	1.8884	2.9434
58	0.8151	1.1159	1.3823	1.9214	2.9948
59	0.8303	1.1370	1.4086	1.9584	3.0530
60	0.8444	1.1561	1.4326	1.9915	3.1047
61	0.8585	1.1754	1.4564	2.0245	3.1564

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Steel Factors for Instrumentation Cables - Fe PIS					
Pair Instrumentation Individual and Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.1326	0.1381	0.1465	0.1575	0.1824
2	0.1958	0.2059	0.2146	0.2305	0.2619
3	0.2020	0.2159	0.2299	0.2494	0.3248
4	0.2201	0.2385	0.2494	0.2747	0.4298
5	0.2424	0.2594	0.2748	0.3332	0.4763
6	0.2597	0.3083	0.3279	0.4356	0.5097
7	0.2597	0.3083	0.3279	0.4356	0.5097
8	0.3224	0.4083	0.4450	0.4849	0.5823
9	0.4068	0.4497	0.4784	0.5278	0.6805
10	0.4299	0.4643	0.4904	0.5395	0.7919
11	0.4450	0.4795	0.5056	0.5575	0.8173
12	0.4562	0.4907	0.5194	0.5742	0.8447
13	0.4730	0.5100	0.5416	0.6453	0.8768
14	0.4730	0.5100	0.5481	0.6453	0.8833
15	0.5020	0.5390	0.5732	0.6826	0.9351
16	0.5020	0.5455	0.5797	0.6891	0.9416
17	0.5241	0.5735	0.6529	0.8202	0.9874
18	0.5306	0.5735	0.6529	0.8202	0.9874
19	0.5306	0.5735	0.6597	0.8267	0.9939
20	0.5546	0.6643	0.7076	0.8826	1.1405
21	0.5661	0.6690	0.7124	0.8920	1.1479
22	0.6430	0.6996	0.8427	0.9288	1.3591
23	0.6430	0.6996	0.8427	0.9288	1.3591
24	0.6660	0.8207	0.8790	0.9700	1.4233
25	0.6660	0.8207	0.8790	0.9700	1.4233
26	0.6792	0.8337	0.8920	0.9830	1.4428
27	0.6923	0.8521	0.9057	1.0014	1.4642
28	0.8070	0.8795	0.9378	1.1149	1.5144
29	0.8070	0.8795	0.9378	1.1149	1.5144
30	0.8070	0.8795	0.9378	1.1149	1.5144

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Steel Factors for Instrumentation Cables - Fe PIS					
Pair Instrumentation Individual and Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
31	0.8521	0.9199	0.9782	1.1673	1.7114
32	0.8521	0.9199	0.9782	1.1673	1.7114
33	0.8521	0.9199	0.9782	1.1673	1.7114
34	0.8795	0.9520	1.0895	1.3672	1.7766
35	0.8795	0.9520	1.0895	1.3737	1.7831
36	0.8795	0.9585	1.0962	1.3737	1.7831
37	0.8860	0.9585	1.0962	1.3737	1.7896
38	0.9134	1.0714	1.1380	1.4230	1.9677
39	0.9134	1.0779	1.1445	1.4230	1.9742
40	0.9199	1.0779	1.1445	1.4295	1.9742
41	0.9520	1.1153	1.1836	1.4863	2.1971
42	0.9520	1.1221	1.1836	1.4863	2.1971
43	0.9520	1.1221	1.1836	1.4928	2.2036
44	1.0719	1.1548	1.3877	1.5430	2.2705
45	1.0719	1.1548	1.3877	1.5495	2.2770
46	1.0719	1.1613	1.3877	1.5495	2.2770
47	1.0784	1.1613	1.3877	1.5495	2.2770
48	1.0826	1.1776	1.4156	1.6981	2.3170
49	1.1111	1.3598	1.4370	1.7237	2.3735
50	1.1111	1.3598	1.4370	1.7237	2.3802
51	1.1221	1.3672	1.4583	1.7557	2.3906
52	1.1221	1.3672	1.4583	1.7557	2.3971
53	1.1221	1.3737	1.4583	1.7557	2.3971
54	1.1432	1.3951	1.4928	1.7878	2.4421
55	1.1613	1.4099	1.5076	1.8133	2.4820
56	1.1613	1.4164	1.5076	1.8133	2.4820
57	1.1613	1.4164	1.5076	1.8198	2.4885
58	1.1897	1.4592	1.6774	2.1030	2.7680
59	1.1962	1.4592	1.6774	2.1030	2.7680
60	1.1962	1.4657	1.6774	2.1095	2.7745
61	1.1962	1.4657	1.6841	2.1095	2.7745

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Polymer Factors for Instrumentation Cables - POC PIS					
Pair Instrumentation Individual and Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.1160	0.1170	0.1337	0.1346	0.1726
2	0.1950	0.2126	0.2285	0.2551	0.3100
3	0.1994	0.2191	0.2285	0.2644	0.3325
4	0.2289	0.2539	0.2723	0.3023	0.3985
5	0.2646	0.2885	0.3127	0.3540	0.4774
6	0.2929	0.3300	0.3576	0.4166	0.5515
7	0.2871	0.3226	0.3488	0.4046	0.5321
8	0.3429	0.3764	0.4043	0.4615	0.6250
9	0.3738	0.4275	0.4532	0.5160	0.7060
10	0.4110	0.4502	0.4997	0.5736	0.7657
11	0.4160	0.4702	0.5016	0.5718	0.7794
12	0.4433	0.4977	0.5299	0.6039	0.8152
13	0.4655	0.5268	0.5573	0.6607	0.8838
14	0.4767	0.5404	0.5731	0.6797	0.9122
15	0.5117	0.5772	0.6371	0.7281	0.9941
16	0.5266	0.5934	0.6557	0.7490	1.0244
17	0.5703	0.6232	0.6879	0.8042	1.0892
18	0.5846	0.6400	0.7071	0.8270	1.1223
19	0.5847	0.6397	0.7055	0.8238	1.1161
20	0.6153	0.6933	0.7631	0.8880	1.2007
21	0.6386	0.7250	0.7969	0.9252	1.2473
22	0.6811	0.7649	0.8360	0.9930	1.3768
23	0.6903	0.7753	0.8476	1.0062	1.3963
24	0.7362	0.8267	0.9054	1.0685	1.4608
25	0.7453	0.8371	0.9168	1.0817	1.4803
26	0.7606	0.8539	0.9355	1.1026	1.5077
27	0.7717	0.8870	0.9672	1.1344	1.5577
28	0.8026	0.9217	0.9932	1.1768	1.6222
29	0.8132	0.9343	1.0073	1.1934	1.6463
30	0.8224	0.9447	1.0186	1.2066	1.6659

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Polymer Factors for Instrumentation Cables - POC PIS					
Pair Instrumentation Individual and Over all Screen Cables					
Cable size in sq.mm No. of Pairs	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
31	0.8880	0.9893	1.1008	1.2919	1.7863
32	0.9027	1.0067	1.1205	1.3155	1.8214
33	0.9119	1.0171	1.1318	1.3286	1.8409
34	0.9402	1.0727	1.1664	1.3727	1.9228
35	0.9521	1.0861	1.1815	1.3903	1.9486
36	0.9707	1.1082	1.2061	1.4202	1.9929
37	0.9677	1.1041	1.2008	1.4122	1.9796
38	0.9956	1.1427	1.2649	1.4803	2.0606
39	1.0073	1.1561	1.2800	1.4978	2.0860
40	1.0194	1.1703	1.2955	1.5162	2.1129
41	1.0780	1.2328	1.3608	1.5876	2.2506
42	1.0983	1.2567	1.3876	1.6200	2.2985
43	1.1100	1.2701	1.4024	1.6374	2.3240
44	1.1484	1.3302	1.4412	1.7017	2.4034
45	1.1600	1.3436	1.4560	1.7192	2.4289
46	1.1625	1.3459	1.4582	1.7209	2.4308
47	1.1741	1.3593	1.4731	1.7383	2.4561
48	1.2063	1.3716	1.5157	1.7940	2.5204
49	1.2427	1.4171	1.5582	1.8357	2.6182
50	1.2544	1.4305	1.5731	1.8529	2.6434
51	1.2683	1.4765	1.5845	1.9048	2.6621
52	1.2806	1.4904	1.6002	1.9233	2.6891
53	1.2920	1.5038	1.6148	1.9404	2.7143
54	1.3260	1.5068	1.6580	1.9807	2.7652
55	1.3342	1.5463	1.7031	1.9972	2.8202
56	1.3514	1.5668	1.7258	2.0247	2.8611
57	1.3630	1.5799	1.7404	2.0418	2.8864
58	1.4284	1.6246	1.8115	2.1284	3.0240
59	1.4398	1.6377	1.8261	2.1458	3.0492
60	1.4556	1.6557	1.8465	2.1704	3.0854
61	1.4552	1.6549	1.8446	2.1669	3.0793

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