



Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
PROJECT ENGINEERING MANAGEMENT

Enq No.: PE/PG/RTC/E-5634/2017

Date: 01/06/2017

TENDER ENQUIRY THROUGH E-PROCUREMENT

DUE DATE
June, 12, 2017
02:00 P.M. IST

Subject: **Tender Enquiry for Rate Contract of Screened Control Cables for two years**

Dear Sir,

We are pleased to invite your tender offers for subject package. Please upload your best quotation/ offer in two (2) parts on <https://bheleps.buyjunction.in> for the requirement strictly as per schedule of price format before above mentioned due date & time. The details of the tender enquiry is as mentioned below:

Sl. No	Description for which Rate Contract is desired	Tentative Quantity	Delivery required
1	<u>Screened Control Cables -</u> Refer Technical specification no. PE-RC-999-507-E005 for detailed description.	As per BOQ cum price schedule in Annexure-I) cumulative for the Prospective Projects as per Annexure-III.	Four (04) months from drgs. /docs. Approval in CAT-I issued by BHEL for respective project/requirement under the RC. Successful bidder to make 1st submission of drawing/docs within 02 weeks from the date of Purchase Order as mentioned in Cl. No. 4.2, Section -I Volume-II of Technical Specification PE-RC-999-507-E005. Vendor to resubmit documents within one week, taking care of all the comments of BHEL. Any deficiency in documents submitted w.r.t. agreed specification/ comments from BHEL shall be treated as non-submission and no. of days delay in submission of complete documents during approval process, on account of this, would be reduced from the delivery. The vendor shall be responsible for getting approval from BHEL as early as possible and BHEL will support the process, in full, within above time frame and terms & conditions. Vendors shall be informed that delivery period mentioned above is for contractual LD calculation purpose, however in case of exigencies BHEL may ask for early delivery.

(i) Rate contract on PVC basis is proposed for 2 years from placement of Rate Contract PO.

(ii) Rate Contract will also be finalized on total lump sum basis instead of item wise evaluation so that the complete requirement against one project is not spilt amongst various vendors to minimize operational difficulty. Bidders to quote total Ex-Works Prices for NIT BOQ, applicable % of Taxes & Duties in respective column & single freight % of total Ex-Works value considering delivery anywhere in India. The rest value shall be obtained by BHEL as indicated in priced schedule. Vendors to note that evaluation shall be done on CST basis, however in case, the entire business volume goes to one vendor

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BHEL House
HRD & ESI Complex,
Plot-25, Sector-16-A NOIDA – 201301

Phone: 0120-4213591
Fax : 0120-4329026
e-mail: ncsharma@bhelpem.co.in

Regd. Office:

Siri Fort
New Delhi - 110049



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(or volume of business shared between the vendors in line with enquiry) having manufacturing facility in the same state, then BHEL may do suitable amendment in PO on case to case basis for taking care the provision of VAT in case of project falling in the same State where manufacturing factory of the vendor is also located.

(iii) Bidders to note the following:-

- a) Rate contract shall be decided on the basis of Grand Total FOR site price of Total BOQ of Screened Control Cables as listed in price format (Annexure-I), Incomplete offer or offer for part of NIT BOM/BOQ shall be summarily rejected.
- b) Though evaluation is proposed on Grand Total FOR site, but there is % allocation weightage against BOQ quantity of each item which shall be used for arriving at price break up. Bidders need to give only their Ex Works price for given BOQ at sl. no-'A.10' Column 6 of BOQ of Annexure-I.
- c) Bidders also requires to mention % of taxes/ duties (against respective column for ED, CST & Service Tax) applicable for each item of the BOQ.
- d) Bidder to give single freight % of total Ex-Works value considering delivery anywhere in India in the freight column.
- e) Rest of the prices shall be derived by BHEL in line with % allocation fixed for each item as given in Annexure-I.
- f) For better clarity to the bidders where value is to be filled is noted as "to be quoted" and for other columns it will be noted as "derived" which denotes shall be derived by BHEL as per % allocation fixed against each item.

(iv) Refer Annex-I for tentative Qty of Screened Control Cables required for prospective projects (refer Annex-III), Project list is indicative only, BHEL may ask for delivery anywhere in India for any of the project added in the prospective project/ existing projects during RC period.

(v) Limit on quantity variation shall be plus 30% of Contract Value (Ex Works) till validity of RC. The Purchaser shall have the right to increase or decrease quantities and scope up to the above extent of value and Seller/ Contractor shall be bound to accept the same at the contracted prices without any escalation.

(vi) PVC shall be applicable for the subject package. Base date for initial prices for this tender shall be 1st May' 2017.

All bidders to quote as per the Price Variation Formulae for Cables uploaded on BHEL PEM website on the link given below:

<http://bhelpem.com/Documents/GCC/Price%20Variation%20Formulae%20for%20Cables.pdf>

(vii) Rate contract is to be done with 2 vendors in ratio of 70:30 value wise at L1 FOR site price for this package (BHEL will try to ensure % split mentioned above, however % of splitting of RC between 2 vendors may be changed during ordering process for reason such as if L1 bidder is not customer approved etc.). However, order for a project shall not be split and will be placed on single vendor.

(viii) L1 Rates shall be counter offered to vendors (L2, L3 & so on) in succession. If none accepts L1 rates, RC shall be done with L1 vendor for 100% value.

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(ix) L1 bidder will have to submit Bank Guarantee for each POs (irrespective of value) which will be placed under the Rate Contract finalised through this tender considering RC as original contract as per format enclosed with NIT instead of format mentioned in GCC Rev 06.

(x) Drawings/ documents, equipment manufacture inspection & dispatch requirement will be as per Technical Specification no. PE-RC-999-507-E005.

(xi) **Pre-Qualifying Requirements (PQR):** All the bidders (registered/ non-registered) to submit documents fulfilling PQR requirements (as per enclosed annex-V) with the bid & their further evaluation shall be done based on qualification in PQR.

(xii) Bidders to note that their bid shall be conditional subject to qualifying the PQR by registered vendors & non-registered vendors have to qualify PQR & get registered with PEM for the package.

For registration in PEM "Bidders needs to apply & get registered for subject package with PEM before P-2 (price bid opening) & **hence you need to apply online for registration on PEM web portal & have to enclose acknowledgement with this effect with the bid documents else your bid will not be considered for evaluation**"

Online Registration Portal is operational in BHEL. Non-registered Vendors, who wish to apply for registration with BHEL-PEM, have to apply through Online Registration Portal available at www.bhelpem.com → vendor section → Online Supplier Registration. All credentials and/or documents duly signed and stamped related to registration has to be uploaded on the website and submit the application for registration. One set of hard copy of the filled-up SRF downloaded from Online Registration Portal duly signed and stamped has to be submitted.

(xiii) Bidder are required to submit offer strictly in accordance with the requirements of the above tender documents. Deviations (Technical as well as Commercial) from NIT are generally not acceptable, if any, Technical deviations and Commercial deviations shall be furnished in **"Cost of Withdrawal sheet"** (as per Annexure-II of GCC Rev. 06, copy enclosed) **only under the headings "TECHNICAL DEVIATIONS" and "COMMERCIAL DEVIATIONS"** respectively, along with reasons for taking such deviations. Deviations (Technical & Commercial) taken other than as mentioned on cost of withdrawal sheet shall not be considered.

(GCC Rev. 06 is available on <http://www.bhelpem.com/Documents/GCC/GCC-Rev-06.pdf> , you are requested to kindly download the same).

(xiv) **Integrity Pact (IP)** shall be applicable for subject tender:

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. A Panel of Independent External Monitors (IEMs) has been appointed to oversee implementation of IP in BHEL.

The IP (Refer Annexure-IX, as per GCC Rev-06) is to be submitted (duly signed by authorized signatory who signs in the offer) along with techno-commercial 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.

Details of IEM for this tender are furnished below:-

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Date: 01/06/2017

Name: - Sh. Shri D.R.S Chaudhary, IAS (Retd.)

Address: - Flat No. L-202 & L-203 (1st Floor), Ansal Lake View Enclave, Shamla Hills, Bhopal-

462013 (M.P.), Email: - dilip.chaudhary@icloud.com

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.

Tender Enquiry Terms and Conditions: -

1. Offers should be submitted in two parts online at <https://bheleps.buyjunction.in> as follows:

Part-I: TECHNO-COMMERCIAL BID (along with un-priced copy of Annexure-I)

Part-II: PRICE BID (along with priced copy of Annexure-I)

2. For detailed instructions, please see clause no. 2 of "Instructions to Bidders" of GCC, Rev. 06.
3. Standard pre-printed terms & conditions of the tenderers shall not be considered valid.
4. Bidder to submit complete tender in all respects duly signed & stamped on each and every page by the authorized signatory of the bidder as a token of acceptance of all the terms and conditions of tender.
5. Unsolicited fresh/ revised price bids shall not be entertained.
6. Tender will be opened at **03.00 PM on 12/06/2017**.
7. Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any/ all tender(s) in part or full without assigning any reason whatsoever.
8. Purchaser reserves the right to split up the scope of the tender enquiry and place the orders for different scope/ items with different bidders and also increase or decrease the quantity.
9. **BHEL reserves the right to go for Reverse Auction (RA)** (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid/ e-bid already submitted to BHEL along with the offer. The envelope sealed price bid/ e-bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.

If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid/ e-bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it

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will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com)."

As a reminder to the bidders, system will flash following message (in RED Color) during the course of 'online sealed bid':

"Bidders to submit online sealed bid less than or equal to their envelope sealed bid already submitted to BHEL"

Detailed guidelines of reverse auction 2016 are available in "information section" of www.bhhelpem.com, same are applicable for subject tender.

The Bidders has to quote the Single Price (i.e. Total Cost to BHEL) in Reverse Auction i.e. Price mentioned in Sl. no-A.11, column -10 with loading/de loading (if any). Price are to be inclusive of Packing & Forwarding charges, all the routine & type tests as per tender scope, ED + cess, CST against C-form/VAT, Freight as applicable, including loading (if any). De-loading (if any) shall be done in line with NIT terms.

Important instruction to bidders in case of Reverse Auction

Following Condition in Reverse Auction shall be treated as follows:

Case-I (Taxes & duties and freight are identical in Reverse Auction & Conventional Price Bid/ e-bid)

Resolution: - Ordering shall be done on lower of the two bids (RA closing price & Conventional Price Bid/ e-bid). After successful completion of reverse auction L1 bidder shall be asked to submit break up in line with taxes & duties, freight quoted in their Conventional Price Bid/ e-bid.

Case-II (In case Bidder has quoted 'CST' in Conventional Price Bid/ e-bid and applicable Tax is 'VAT')

Resolution: - "Total Cost to BHEL shall be maintained by reducing proportion amount in Ex-works quoted by Bidder".

Case-III (In case Bidder has quoted 'VAT' in Conventional Price Bid/ e-bid and applicable Tax is 'CST')

Resolution: - Conventional Bid/RA quoted Prices shall be reduced and CST will be allowed.

Statutory variation shall be applicable.

Any new tax structure (like Goods & Services Tax) as and when implemented by the Government shall become applicable in addition to or in lieu of existing tax structure.

Note: - Applicable taxes & duties shall be determined as per location of works of bidder.

Kindly consider the same while quoting the tender.

10. **Tenders should be submitted ONLINE via e-Procurement System only**, however, all correspondence thereof, shall be addressed to the undersigned by name & designation and sent at the following address :

Mr. N.C Sharma, Sr.ENGR/MM
e-mail : ncsharma@bhhelpem.co.in
Ph. No. 0120- 4213591

Mr. I P Singh, Sr. Mgr./ CMM
e-mail: INDRA@bhhelpem.co.in
Ph. No. 0120-4368749

However, for **Technical clarifications**, following persons may be contacted:

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Mr. Vikas Kumar Singh, Sr. Engr. /Elec. e-mail : vikaskingsh@bhelpem.co.in Ph. No. 0120- 4213616	Mr Vikas Yadav, Mgr. /Elec. e-mail : vikasyadav@bhelpem.co.in Ph. No. 0120- 4368741
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11. All corrigenda, addenda, amendments, time extensions, clarifications etc. to the tender will be hosted on BHEL websites only (www.bhhelpem.com, www.bhel.com, & <https://bheleps.buyjunction.in>) under subject tender reference. Bidders are requested to visit our websites from time to time to keep themselves updated. Bidders may go through the Sellers' manual & Help documents provided on E-Procurement Portal website & obtain class III Digital Signature Certificate for participating in the subject Tender.

For Bidders' convenience, the Helpdesk Nos. of E-Procurement Portal m-junction are also listed below:

MJUNCTION HELPDESK Nos. 033-6601 1717, 9163348283 / 9163348284 / 9163348285 / 9163348286 / 8584008116 / eps.customercare@mjunction.in

CRM Contact Details:

Mr. Santosh Kumar - Cell No. 09717149600, santosh.kumar@mjunction.in

Ms. Rimi Ghosh – Cell No 09650044156, rimi.ghosh@mjunction.in

12. If any bidder uploads price bid in the unpriced section (techno-commercial attachment page) of the tender in e-procurement, in that case bidder(s) shall only be responsible for such mistake and any consequences thereof. Hence all bidders are requested to be more careful at the time of uploading the Unpriced and Price Bid for Part-I and Part-II respectively to avoid mismatch.
13. Any taxes and duties applicable on the date of bid but not quoted by the bidders shall be to the bidders' account.
14. Delivery terms for dispatches shall be FOR Dispatch Station.
15. CIF is not available for this package.
16. Bidders to submit their offers strictly in line with the enclosed Price Format (Annexure-I).
17. This enquiry is subject to Conditions/ limits if any imposed in PMD / Vendor registration.
18. Procurement of the subject package shall be done through e-procurement.
19. All corrigenda, addenda, amendments, time extensions, clarifications etc. to the tender will be hosted on EPS website (<https://bheleps.buyjunction.in>), BHEL website (www.bhel.com), BHEL-PEM website (www.bhhelpem.com) & CPP Portal. Bidders should regularly visit websites to keep themselves updated.
20. Bidders participating through open tender will necessarily have to buy class III DSCs issued by the certifying authorities in India for future tenders. Basic procedure /checklist has been uploaded on www.bhel.com for participating in tender enquires through e- procurement.
21. Bidder to note that all other terms and condition shall be strictly as per NIT, GCC Rev. 06 & SCC. In the event of any contradiction in the terms and conditions mentioned, the order of preference shall be NIT (this letter) / SCC / GCC Rev. 06.

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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,
Yours faithfully,
For and on behalf of BHEL

N C Sharma
Sr. ENGR. / CMM

Enclosures:

- a) NIT (this letter itself)
- b) Technical Specification No. PE-RC-999-507-E005
- c) Annexure-I: Price Format
- d) Annexure-II: Deviation Sheet (Cost of Withdrawal sheet)
- e) Annexure-III: List of prospective projects
- f) Annexure-IV-Special Conditions of Rate Contract (SCC).
- g) Annexure-V: PQR (Pre-qualifying Requirement)
- h) PBG Format
- i) Integrity Pact
- j) Following documents are available at BHELPEM website [www. bhelpem.com](http://bhelpem.com)
 - i) PVC Factors/Formulae
<http://bhelpem.com/Documents/GCC/Price%20Variation%20Formulae%20for%20Cables.pdf>
 - ii) GCC REV.06

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PRICE SCHEDULE FOR RATE CONTRACT OF SCREENED CONTROL CABLE

ANNEXURE-1

Name of Bidder:

Item.No	Item Description	Unit	Quantity	Drum Length	Unit Price (Rs.)	Total Price (Ex-works) (Rs.)	ED (Including cess)	CST against from C and form E	FREIGHT CHARGES (Including Service Tax)	TOTAL F.O.R. SITE PRICE (Rs.)
	1	2	3	4	5	6	7	8	9	10=(6+7+8+9)
A.1	1.1KV TYPE F(I/O) 4P - 0.5 ARMoured	Metres	205000	1000	(0.1593 * X)/205000	0.1593 * X	% TO BE QUOTED	% TO BE QUOTED		Derived
A.2	1.1KV TYPE F(I/O) 8P - 0.5 ARMoured	Metres	79000	1000	(0.108 * X)/79000	0.108 * X	% TO BE QUOTED	% TO BE QUOTED		Derived
A.3	1.1KV TYPE F(I/O) 12P - 0.5 ARMoured	Metres	34000	1000	(0.06 * X)/34000	0.06 * X	% TO BE QUOTED	% TO BE QUOTED		Derived
A.4	1.1KV TYPE F(I/O) 20P - 0.5 ARMoured	Metres	10000	500	(0.0259 * X)/10000	0.0259 * X	% TO BE QUOTED	% TO BE QUOTED		Derived
A.5	1.1KV TYPE F(I/O) 24P-0.5 ARMoured	Metres	24000	500	(0.08 * X)/24000	0.08 * X	% TO BE QUOTED	% TO BE QUOTED	% TO BE QUOTED	Derived
A.6	1.1KV TYPE G(O) 2P - 0.5 ARMoured	Metres	103000	1000	(0.0516 * X)/103000	0.0516 * X	% TO BE QUOTED	% TO BE QUOTED		Derived
A.7	1.1KV TYPE G(O) 4P - 0.5 ARMoured	Metres	116000	1000	(0.0709 * X)/116000	0.0709 * X	% TO BE QUOTED	% TO BE QUOTED		Derived
A.8	1.1KV TYPE G(O) 8P - 0.5 ARMoured	Metres	299000	1000	(0.3243 * X)/299000	0.3243 * X	% TO BE QUOTED	% TO BE QUOTED		Derived
A.9	1.1KV TYPE G(O) 12P - 0.5 ARMoured	Metres	91000	1000	(0.12 * X)/91000	0.12 * X	% TO BE QUOTED	% TO BE QUOTED		Derived
A.10						X (To be Quoted)				
A.11	GRAND TOTAL (FOR Site Price for items at sl. A.1 to A.9)									Derived

NOTES:-

1	Bidder has to quote only Total Value 'X'. Based on this price, unit price shall be derived for all items as per formula indicated above.
2	L1 bidder shall be decided based on the lowest of the GRAND TOTAL (FOR Site Price for items at sl. A.1 to A.9).
3	Base date for initial prices for this tender shall be 1st May 2017.
4	The standard drum length shall be 500/1000 meters as indicated above. Tolerance on individual drum length shall be ±5%.
5	Overall tolerance on total dispatched quantity of each size shall be (-) 2% and (+) 0% except where the total ordered quantity is one single drum length of 500/1000m, in which case it shall be -5% to 0%.
6	For each individual cable size, one short length of not less than 200m may be accepted only in the final drum length to complete the supply (except where the total ordered quantity is one single drum length of 500/1000m). The overall tolerance limits stipulated above shall continue to apply (in case short lengths are accepted).
7	In case of the quantities cleared by BHEL for manufacturing are manufactured and offered for inspection by successful bidder in more than one batch, BHEL reserves the right to witness type testing on all batches without any price implications.
8	Unit price of cables quoted by bidder shall be inclusive of type test charges. No separate charges shall be payable for type tests.

**ANNEXURE-II: DEVIATION SHEET (COST OF WITHDRAWAL)****PACKAGE:- SCREENED CONTROL CABLES****TENDER ENQUIRY REF NO-PE/PG/RTC/E-5634/2017, DTD-01/06/2017****NAME OF VENDOR:-**

SL NO	VOLUME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF WITHDRAWAL OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWAL OF DEVIATION IS APPLICABLE	NATURE OF COST OF WITHDRAWAL OF DEVIATION (POSITIVE/ NEGATIVE)	REASONS FOR QUOTING DEVIATION
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TECHNICAL DEVIATIONS

COMMERCIAL DEVIATIONS

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	DESIGNATIONS	SIGN & DATE

NOTES:

1. For self manufactured items of bidder, cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
2. For directly dispatchable items, cost of withdrawal of deviation will be applicable on the basic price including taxes, duties & freight.
3. All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
4. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
5. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable
6. Bidder shall furnish price copy of above format along with price bid.
7. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
8. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered
9. For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
10. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
11. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
12. Cost of withdrawal is to be given separately for each deviation. In no event bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of such deviations which have been clubbed together shall be considered as NIL.
13. In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
14. In case of discrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.

Annexure-III

List of Prospective Projects:

- (i) 1X800 MW VIJAYAWADA STPP.
- (ii) 1X800 MW KRISHNAPATNAM STPP.
- (iii) 1X800 MW KOTHAGUDEM STPP: Lot-2 requirement considered.
- (iv) 1X800 MW WANABORI STPP: Lot-2 requirement considered.



Annexure-IV: Special Condition of Rate Contract for Screened Control Cables

1. BHEL/PEM intends to enter into Rate Contract for the tendered BOQ of Screened Control Cables for a period of two years. The Rate Contract shall come into force from the date of issue of Purchase order for Rate Contract.
2. Freight charges shall be paid on percentage on ex-works prices or actual freight charges paid to transporter whichever is lower against production of documentary evidence. Vendor to quote freight charges as percentage (%) of ex-works price for destination anywhere in India.
3. Bidders to note that Excise Duty is payable on self manufacturing item only as per clause no 4.1.2 of GCC Rev 06 & hence for their BOI may quote Excise Duty is inclusive or Nil.
4. 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 vendor to for obtain Material Dispatch Clearance Certificate (MDCC) from BHEL or CUSTOMER as required before dispatch of material.
5. Items have to be manufactured as per 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.
6. Mode dispatch shall be by road through Schedule Bank/BHEL (PEM) approved transporters.
7. Other terms and conditions shall be as per Standard Technical specification no. PE-RC-999-507-E005, GCC Rev 06 & Enquiry letter.
8. This enquiry is subject to Conditions/ limits if any imposed in PMD/ Vendor registration.
9. The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendor/ 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.

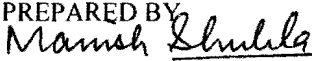
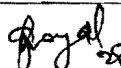
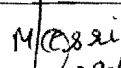


	PRE-QUALIFICATION REQUIREMENTS FOR SCREENED CONTROL CABLE	PE-PQ-999-507-E016
		REVISION NO. 03 DATE 29/04/2016
		SHEET NO. 1 OF 1

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 application for registration or date of techno-commercial bid opening (as applicable) for establishing continuity in business.

NOTE:

Supplier to comply to "general points of PQR" available at <http://bhelpem.com/vensection/PMD/PMD.aspx>
In case supplier is not OEM, the offer shall be evaluated as per point no 1 of "general points of PQR".

PREPARED BY  NAME: MANISH SHUKLA 29/04/16 DESIGNATION: SR. MGR	REVIEWED BY  NAME: RAJNISH GOYAL 29/4/16 DESIGNATION: AGM	APPROVED BY  NAME: MEENA KESRI 29-4-16 DESIGNATION: AGM & DH (E)
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BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the Bharat Heavy Electricals Limited ¹ (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____ through its Unit at.....(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) having its registered office at _____ ² hereinafter referred to as the 'Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No.....dated³ valued at Rs.....⁴ (Rupees -----)/FC.....(in words.....) for⁵ (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Performance Guarantee, equivalent to% (.... Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

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

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

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

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

We 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 and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

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

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

This Guarantee shall remain in force upto and including.....⁶ and shall be extended from time to time for such period as may be desired by Employer.

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

Unless a demand or claim under this guarantee is made on us in writing on or before the⁷we shall be discharged from all liabilities under this guarantee thereafter.

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

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁸
- b) This Guarantee shall be valid up to⁹
- c) Unless the Bank is served a written claim or demand on or before¹⁰ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

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

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

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

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

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ PROJECT/SUPPLY DETAILS

⁵ BG AMOUNT IN FIGURES AND WORDS

⁶ VALIDITY DATE

⁷ DATE OF EXPIRY OF CLAIM PERIOD

⁸ BG AMOUNT IN FIGURES AND WORDS.

⁹ VALIDITY DATE

¹⁰ DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Units are advised that expiry of claim period may be kept 2/3 months after validity date.
2. In Case of Bank Guarantees submitted by Foreign Vendors-
 - a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
 - b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**
 - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.
 - b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 will required to be followed.
 - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.
 - b.4 The BG should clearly specify that the demand or other document can be presented in electronic form.

	PROJECT ENGINEERING MANAGEMENT	GENERAL CONDITIONS OF CONTRACT (GCC) Revision No. 06	ANNEXURES (wef from 01-03-2014)
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ANNEXURE– IX

INTEGRITY PACT

Between

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

and

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

Preamble

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

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

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

Section 1 – Commitments of the Principal

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

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

	PROJECT ENGINEERING MANAGEMENT	GENERAL CONDITIONS OF CONTRACT (GCC) Revision No. 06	ANNEXURES (wef from 01-03-2014)
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1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

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

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

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

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

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

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

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC 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

	PROJECT ENGINEERING MANAGEMENT	GENERAL CONDITIONS OF CONTRACT (GCC) Revision No. 06	ANNEXURES (wef from 01-03-2014)
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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 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.

Section 3 – Disqualification from tender process & exclusion from future contracts

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

Section 4 – Compensation for Damages

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

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

	PROJECT ENGINEERING MANAGEMENT	GENERAL CONDITIONS OF CONTRACT (GCC) Revision No. 06	ANNEXURES (wef from 01-03-2014)
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5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

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

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

6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from all subcontractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20 % of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/ Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).

6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

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

Section 7 – Criminal Charges against violating Bidders / Contractors / Sub-contractors

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

Section 8 –Independent External Monitor(s)

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

	PROJECT ENGINEERING MANAGEMENT	GENERAL CONDITIONS OF CONTRACT (GCC) Revision No. 06	ANNEXURES (wef from 01-03-2014)
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8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

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

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

8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

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

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

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

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by

	PROJECT ENGINEERING MANAGEMENT	GENERAL CONDITIONS OF CONTRACT (GCC) Revision No. 06	ANNEXURES (wef from 01-03-2014)
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bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

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

Section 10 – Other Provisions

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

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

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

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

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

For & On behalf of the Principal
(Office Seal)

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

Place-----

Date-----

Witness: _____
(Name & Address) _____

Witness: _____
(Name & Address) _____

VOLUME-II

TECHNICAL SPECIFICATION FOR *SCREENED CONTROL CABLE*

SPECIFICATION NO: *PE-RC-999-507-E005*

REVISION: 00



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, UP (INDIA) – 201301**



TECHNICAL SPECIFICATION FOR SCREENED CONTROL CABLES

SPECIFICATION NO. PE-RC-999-507-E005

VOLUME II

SECTION

REVISION 0

DATE: 29.05.2017

SHEET 1 OF 1

CONTENTS

<u>S. NO.</u>	<u>DESCRIPTION</u>	<u>NO. OF SHEETS</u>
1.	SECTION – I	
	COMPLIANCE CERTIFICATE	01
	SPECIFIC TECHNICAL REQUIREMENTS	01
	DATA SHEET-A	04
	ANNEXURE BI	01
	DATA SHEET-C	04
2.	SECTION – II	
	STANDARD TECHNICAL SPECIFICATION	02
	QUALITY PLAN (ALONGWITH ANNEXURE I TO QP)	08
	TOTAL NO. OF SHEETS=	27
	(INCLUDING COVER/ SEPARATOR SHEETS)	



**TECHNICAL SPECIFICATION FOR
SCREENED CONTROL CABLES**

SPECIFICATION NO. PE-RC- 999-507-E005

VOLUME II

SECTION I

REVISION 0

DATE: 29.05.2017

SHEET 1 of 1

COMPLIANCE CERTIFICATE

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

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

BIDDER'S STAMP & SIGNATURE



**TECHNICAL SPECIFICATION FOR
SCREENED CONTROL CABLES**

SPECIFICATION NO. PE-RC-999-507-E005

VOLUME II

SECTION I

REVISION 0

DATE: 29.05.2017

SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS



TECHNICAL SPECIFICATION FOR SCREENED CONTROL CABLES

SPECIFICATION NO. PE-RC-999-507-E005

VOLUME II

SECTION I

REVISION 0

DATE: 29.05.2017

SHEET 1 OF 1

1.0 PURPOSE

This specification is intended for finalization of rate contract between BHEL PEM and Bidder. Standard technical detail as indicated in the specification shall be agreed upon between BHEL PEM and bidder. Project specific technical detail shall be made available to the bidder along with project enquiry.

2.0 SCOPE OF ENQUIRY

- 2.1 Design, Manufacture, Inspection and Testing at Manufacturer's works, proper packing and delivery to site of Screened Control Cable conforming to this specification.
- 2.2 It is not the intent to specify herein all the details of design & manufacture of material. However, the material shall conform in all respects to high standard of design, engineering & workmanship and shall be capable of performing in continuous commercial operation at site condition.
- 2.3 Technical requirements of Screened Control Cable are indicated in Data Sheet-A & Section-II.
- 2.4 The stipulation of Data Sheet-A shall prevail in case of any conflict between the stipulations of Data Sheet-A & Section-II.

3.0 BILL OF QUANTITIES

The bidder to quote for items as per price schedule attached with NIT. **The quantity as mentioned in the BOQ is only for evaluation purpose.** However actual ordered quantity may vary from project to project throughout the contract.

4.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED

- 4.1 After rate contract; against specific project requirement following information shall be furnished by BHEL: -
- a) BOQ (Bill of Quantities)
- 4.2 Following documents shall be submitted for specific project requirement after placement of order for BHEL & customer's approval: -

Sl. No.	Drawing / Document Description	Drawing / Document no	Document Type	First Submission	Resubmission
1	Technical Data sheet – Screened Control cables	PE-V0-XXX-507-E141	Primary	Within 2 week of award of contract.	Within 1 week of comments
2	Cross-sectional Drgs.- Screened Control Cables	PE-V0-XXX-507-E143	Primary	Within 2 week of award of contract.	Within 1 week of comments
3	Quality Plan - Screened Control Cables	PE-V0-XXX-507-E916	Primary	Within 2 week of award of contract.	Within 1 week of comments

- 4.3 Drawings/documents shall be submitted through Document Management System (DMS).



TECHNICAL SPECIFICATION FOR SCREENED CONTROL CABLES

SPECIFICATION NO. PE-RC-999-507-E005

VOLUME II

SECTION I

REVISION 0

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SHEET 1 OF 4

DATA SHEET-A

1.0	Type of Cable	Flame Retardant Low Smoke Halogen (FR-LSH)
2.0	Standard applicable in general (Latest amendment to be referred if any)	IS:1554 (Part-1), IS:8130, IS:5831, , IS:3975, IS:694, SEN-SS-424-1475, Class F3, IEEE-383, IS:10810 Part 62, Cat-B, ASTMD:2843, ASTMD:2863, ASTM D 3137:81, IEC-60754-1, IEC:60332 Part-1, IEC:60332 Part-3-23, Cat-B.
3.0	Voltage Grade	1.1kV
4.0	Number of cores, cross sectional area of conductors and quantities	As per BOQ-Cum-Price Schedule
5.0	CONDUCTOR	
(a)	Material	Copper
	Grade and Class	Stranded, annealed high conductivity, Class 2 <i>Non-Compacted, Electrolytic</i> <i>Tinned</i>
(b)	Standard Applicable	IS: 8130
(c)	Shape	Circular
(d)	Min. number of strands, Dia and cross sectional area.	7, 0.3 mm (nom.), 0.5 sq.mm
6.0	INSULATION	
(a)	Material	Extruded HRPVC Type-C
(b)	Standard Applicable	IS: 5831
(c)	Continuous withstand temperature	85°C
(d)	Short-circuit withstand temperature	160°C
(e)	Method of application	By extrusion; sleeve extrusion not permitted.
(f)	Nominal Thickness of insulation	0.6 mm nominal (for 0.5 sq.mm) as per IS-694
(g)	Volume resistivity (Min.)	1x10 ¹⁴ ohm-cm at 20 deg. C & 1x10 ¹¹ ohm-cm at 70 deg. C. or 1x10 ¹³ ohm-cm at 27 deg. C & 1x10 ¹⁰ ohm-cm at 85 deg. C. <i>Project specific requirement shall be informed later.</i>
7.0	LAYING OF CORES	
(a)	Min. number of twist per metre for paired cables.	20 (For 0.5 Sq.mm)
(b)	Maximum lay of individual twisted pair	50 mm (For 0.5 Sq.mm)
(c)	Diameter of core	In accordance with clause 6 (f)
8.0	IDENTIFICATION OF CORES	As per Annexure-BI
9.0	INDIVIDUALLY SCREENED	
(a)	Material	Aluminium-Mylar tape
(b)	Coverage	100%
(c)	Overlap	Minimum 25%
(d)	Min. thickness (Micron)	28 micron



TECHNICAL SPECIFICATION FOR SCREENED CONTROL CABLES

SPECIFICATION NO. PE-RC-999-507-E005

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SECTION I

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DATE: 29.05.2017

SHEET 2 OF 4

10.0	OVERALL SCREENED	
(a)	Material	Aluminium-Mylar tape
(b)	Coverage	100%
(c)	Overlap	Minimum 25%
(d)	Min. thickness (Micron)	55 micron / 60 micron <i>Project specific requirement shall be informed later.</i>
11.0	DRAIN WIRE	
	To be provided separately for individual pair shield and overall shield.	
(a)	Material	Multi stranded Annealed tinned copper drain wire.
(b)	Size (No. of strands/ Dia. of each strand)	0.5 sq. mm. (7/0.3 mm.)
12.0	BEDDING / BINDER/ TAPE	
(a)	Material	Mylar tape.
13.0	INNER SHEATH	
(a)	Material	Extruded PVC Type ST-2
(b)	Standard Applicable	IS: 5831
(c)	Colour	<i>Project specific requirement shall be informed later.</i>
(d)	Whether FR-LSH Applicable	YES
(e)	Thickness of inner sheath	As per Table-4 of IS: 1554 (Part-1)
(f)	Fillers	Acceptable
(g)	Material of fillers (if permitted)	Same as inner sheath (with moisture resistant properties)
(h)	Method of application for multi-core cables:	
(i)	With fillers	<i>Pressure/Vacuum extruded</i>
(ii)	Without fillers	<i>Pressure extruded</i>
14.0	RIP CORD	A non-hygroscopic and non-wicking non-metallic cord
15.0	ARMOUR	
(a)	Applicable	YES
(b)	Material:	<i>Galvanised Steel Round Wire, as per BOQ-Cum price schedule.</i> <i>Galvanised Steel Formed Wire/Strip, as per BOQ-Cum price schedule.</i> conforming to (i) Type 'a' / 'b' as per Table-5 of IS 1554-I and (ii) IS 3975 as per project requirements.
(c)	Standard Applicable	IS: 1554 (Part-1) Table-5 and IS:3975
(d)	Minimum Coverage	90%
(e)	Gap between armour wires	Shall not exceed one armour wire space (No cross-over/ over-riding)
(f)	Breaking load of joint	95 % of normal armour
(g)	Method of jointing	Welding
16.0	OUTERSHEATH	
(a)	Material	Extruded PVC Type ST2
(b)	Standard Applicable	IS: 1554 (Part-1) & IS: 5831
(c)	Colour	<i>Black / Grey</i> <i>Project specific requirement shall be informed later.</i>



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(d)	Whether FR-LSH	Yes
(e)	Method of application	Extruded
(f)	Thickness of outer sheath	As per IS: 1554 Part-1 (i.e. Min thickness shall be 1.24 mm)
(g)	Other properties	Resistant to water, termite & rodent attack
(h)	Marking	<i>Cable size (cross section area and no. of pairs), voltage grade, Type of Insulation e.g. HRPVC, FRLS, Manufacturer's name and/ or trade name, and year of manufacture @ 5m (by embossing) 'BHEL-PEM' and 'CUSTOMER' Name @5m (by embossing) Progressive sequential length marking @ 1m. (by printing) Further customer specific marking requirement (if any) shall be informed later.</i>
17.0	FR-LSH CHARACTERISTICS	
(a)	Oxygen index	Min 29 (As per ASTM D 2863)
(b)	Temperature index	Min. 250°C at oxygen index value of 21 (As per ASTM D 2863)
(c)	Acid gas generation	Max. 20% by weight (As per IEC-60754-1)
(d)	Smoke density rating	Max. 60% (As per ASTM D 2843): Area under coverage.
(e)	Flammability Test	
(i)	Flammability test for single cable	YES, As per: IEC-60332 Part-1
(ii)	Flammability test for bunched cables	YES, As per: IEC-60332 Part-3-23, CAT-B
(iii)	Flammability test as per IEEE: 60383	YES
(iv)	Flammability test as per IS-10810 Part 62, Cat B	YES
iv)	Swedish Chimney test SEN-SS-424-1475-F3	YES
18.0	Anti-rodent and Termite repulsion Test	YES
19.0	Special Tests	
(a)	Hydrolytic Stability Test	No (Refer Clause no 3.4 of Section-II). <i>Project specific requirement shall be informed later</i>
(b)	Ultraviolet Radiation Test	No (Refer Clause no 3.4 of Section-II). <i>Project specific requirement shall be informed later</i>
20.0	TOLERANCE ON OVERALL DIAMETER	± 2mm max. over the declared value in Technical datasheet.
21.0	VARIATION IN DIA & OVALITY AT ANY CROSS SECTION	Maximum 1 mm
22.0	CABLE DRUM DETAILS	
(a)	Material Type	Wooden, as per IS 10418
(b)	Standard drum length	1000 metres: upto and including 12 Pairs. 500 metres: above 12 pairs.
(c)	Tolerance on drum length	±5%
(d)	Painting	Entire surface to be painted
(e)	Construction Details	<i>Clause no 4.2 of Section-II of this technical specification</i>
(f)	Particular details on Drum	<i>Clause no 4.3 of Section-II of this technical specification. Further customer specific marking requirement (if any) shall be informed later.</i>



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(g)

Outermost layer

To be covered with waterproof polyethylene.

23.0 TECHNICAL PARAMETERS (C & I) As per Tables below:

Parameter	0.5 mm ² (IS & OS) type-F	0.5 mm ² (OS) type-G
Mutual Capacitance (max.) at 0.8 kHz, nF/Km	120	100
Conductor Loop Resistance (max.), Ohm/Km	78 (tinned)	78 (tinned)
Insulation Resistance (min), M Ohm/ Km	100	100
Cross Talk attenuation (min) at 0.8kHz, dB	60	60
Characteristic impedance (max.) at 1 kHz	320	340
Attenuation (max.) at 1 kHz db/Km	1.2	1.2

Note:

1. Cable parameters indicated above are at 20 degC (+/- 3 degC)

24.0	TEST VOLTAGE & DURATION	
(a)	High Voltage Test, AC Tests	
(i)	Core to core	2 kV (max.) for 1 minute (max.)
(ii)	Core to shield	2 kV (max.) for 1 minute (max.)



DOCUMENT TITLE

TECHNICAL SPECIFICATION FOR SCREENED CONTROL
CABLES

SPECIFICATION NO.
PE-RC-999-507-E005

VOLUME NO. II

SECTION: I

REV NO. : 0 DATE 29.05.2017

SHEET: 1 OF 2

ANNEXURE: B-I

CORE IDENTIFICATION / PAIR IDENTIFICATION



DOCUMENT TITLE

TECHNICAL SPECIFICATION FOR SCREENED CONTROL
CABLESSPECIFICATION NO.
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ANNEXURE: B-I

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.



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DATA SHEET-C

S.No.	Particulars	Unit	Description
1	Manufacturer's name	-	
2	Reference design standards	-	
3	Conductor size	sq. mm	
4	Rated Voltage	V	
5	Number of pairs	No.	
6	Cable suitable for both earthed & unearthed system	-	
7	Conductor		
	a) Material	-	
	b) Reference Standard	-	
	c) Grade	-	
	d) No. of strands	No.	
	e) Diameter of strands (nom.)	mm	
	f) Approx. dia of conductor	mm	
	g) Cross Section area	sq. mm	
8	Insulation		
	a) Reference Standard	-	
	b) Material composition	-	
	c) Application	-	
	d) Minimum thickness	mm	
	e) Nom.Thickness	mm	
	f) Max. thickness	mm	
	g) Minimum volume resistivity as per IS 5831	Ohm cm	
	h) Dielectric constant	-	
	i) Maximum conductor temperature withstand capacity	°C	
9	Core laying		
	a) Whether cores/pairs are twisted.	-	
	b) Minimum no. of twists per meter.		
	c) Maximum lay of twist	mm	
	d) Identification of cores/pairs	-	
10	Individual Shield		



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	a) Material	-	
	b) Thickness of tape	micron	
	c) Coverage/ Overlap	%	
	d) Noise interference better than	dB	
11	Drain wire for individual shield		
	a) Reference standard	-	
	b) Size (No. of strands x dia. of each strand)	sq. mm (no. x mm)	
	c) Material	-	
	d) Resistance of drain wire per km at 20 deg.C	ohm	
12	Overall shield		
	a) Material	-	
	b) Thickness of tape	mm	
	c) Coverage/Overlap	%	
	d) Noise interference better than	dB	
13	Drain wire for overall shield		
	a) Reference standard	-	
	b) Size (No. of strands x dia. of each strand)	sq. mm (no. x mm)	
	c) Material	-	
	d) Resistance per Km (with shield) at 20°C	Ohm/ km	
14	a) Fillers: Material (if applicable)		
	b) Bedding Material		
15	Inner sheath		
	a) Material, type and standard	-	
	b) Whether FRLS	-	
	c) Colour	-	
	d) Method of application	-	
	e) Thickness (min)	mm	
16	Armour		
	a) Material,	-	
	b) Formed wire / round wire		
	c) Minimum Coverage	%	
	d) Method of jointing	-	
	e) Breaking load of joint	-	
	f) Size (approx.) of strip	mm	
	g) Dia of armour	mm	
	h) No. of wires/ strip.	No.	
17	Outer sheath		
	a) Reference standard	-	
	b) Material	-	
	c) Minimum thickness of sheath	mm	



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	d) Calculated dia under outersheath	mm	
	e) Oxygen index (as per ASTM D 2863)	-	
	f) Temperature index (in deg. C as per ASTM D 2863)	deg. C	
	g) Maximum acid gas generation as per IEC754-1	%	
	h) Maximum smoke density rating as per ASTM D 2843	%	
	i) Colour of outer sheath	-	
18	Dia over laid-up core	mm	
19	Dia under armour	mm	
20	Dia above armour	mm	
21	Overall diameter of cable	mm	
22	Tolerance on overall diameter	mm	
23	Weight of		
	Copper (conductor & drain wire)	Kg/ km	
	PVC (insulation, sheath & fillers)	Kg/ km	
	Armour	Kg/ km	
	Cable (approx.)	Kg/ km	
24	Cable parameters at 20°C(+/-3 deg. C)		
	a) Conductor resistance (max)	Ohm/ km	
	b) Insulation resistance (min)	M-Ohm/ km	
	c) Mutual capacitance at 0.8KHz (max)	nF/ km	
	d) Cross talk at 0.8KHz (min)	dB	
	e) Attenuation at 1 KHz (max)	dB/ km	
	f) Characteristic impedance at 1 KHz (max)	Ohm	
25	Continuous operating temp. (deg.C)	deg. C	
26	(a) Relevant IS standard including Part & category for Flame retardance of complete cable	-	
	(b) Relevant IEC standard including Part & category for Flammability of complete cable		
27	Whether complete cable passes Swedish Chimney test as per SEN 4241475 (F3)	-	
28	Identification		
	a) Length of cable marked at every mtr.	-	
	b) FRLS marked at every 5 mtrs	-	
	c) Each core of the pair numbered	-	
	d) Conductor identification details for pairs	-	
	e) Details of cable markings	-	
29	Test voltage		
	a) High voltage test/ Dielectric Strength		
	i) Voltage (KV), Core - Core	kV	
	ii) Duration	min	
	b) High Voltage test		



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	i) Voltage (KV), Core - Screen	V	
	ii) Duration	min	
	c) Resistance to direct current test (applicable for 225 V cable as per VDE)	-	
	Voltage	V	
	Duration	hrs/days	
30	Min bending radius	No. x OD	
31	Ovality at any cross section	mm	
32	Variation of dia through out cable length	mm	
33	Cable cross-sectional drawings for each type of cable furnished		
34	i) Length of single coil in a drum	M	
	ii) Marking on drum	-	
	iii) Seasoned wood drum provided	-	
	iv) Both ends of cable to be sealed with PVC/ Rubber caps to prevent water/ moisture ingress	-	
	v) Gross weight (approx.)	kg.	
	vi) Net weight (approx.)	kg	
35	Type test procedures as per BHEL Technical Spec. and other relevant standards enclosed.	-	
36	Anti termite & rodent test	-	



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SECTION-II

STANDARD TECHNICAL REQUIREMENTS



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1.0 CODES AND STANDARDS

- 1.1 The material shall comply with all currently applicable safety codes and statutory regulations of India as well as of the locality where the material is to be installed.
- 1.2 The design, material, construction, manufacture, inspection and testing of Screened Control Cable shall conform to the latest revision of relevant standards as per Data Sheet-A.
- 1.3 In case of conflict between the applicable reference standard and this specification, this specification shall govern.

2.0 TECHNICAL REQUIREMENTS

- 2.1 Screened Control Cable shall be supplied as per technical particulars specified in Data Sheet – A.

3.0 QUALITY ASSURANCE, TESTING & INSPECTION

- 3.1 Bidder shall confirm compliance with the BHEL Standard Quality Plan (PE-QP-999-507-E004, Rev-1) as attached with the specification without any deviations. At contract stage, the successful bidder shall submit the same QP for BHEL/ ultimate customer's approval. In case bidder has reference QP agreed with ultimate customer, same can be submitted for specific project after award of contract for BHEL/ultimate customer's approval. There shall be no commercial implication to BHEL on account of minor changes in QP during contract stage.
- 3.2 All materials shall be procured, manufactured, inspected and tested by vendor/ sub-vendor as per approved Quality Plan.
- 3.3 Type testing, routine / acceptance testing and special testing requirements shall be as per Annexure –I to QP. Charges for all these tests for all the equipment & components shall be deemed to be included in the bid price (except UV Radiation & Hydraulic Stability test).
- 3.4 The charges of UV Radiation test & Hydrolytic Stability test (if applicable) shall be reimbursed extra at actual against original money receipt of Govt. Lab. (CPRI/ ERDA etc).
- 3.5 Cost of cables consumed for testing shall be to bidder's account.

4.0 PACKING

- 4.1 Cables shall be supplied in non-returnable drums. Material of cable drums shall be wooden.
- 4.2 For wooden drums, all wooden parts shall be manufactured from seasoned wood treated with copper naphthenates / zinc naphthenates (refer IS: 401) and anti-termite. The surface of the drum and the outer most cable layer shall be covered with water proof cover. Both the ends of the cables shall be properly sealed with heat shrinkable PVC/ rubber caps secured by 'U' nails so as to eliminate ingress of water during transportation, storage and erection. Dimensions of wooden drums shall be as per IS 10418. All ferrous parts shall be treated with suitable rust protective finish or coating to avoid rusting during transit and storage. BIS certification mark shall be stamped on each cable drum.



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- 4.3 Each drum shall carry manufacturer's name or trade make, purchaser's name, address and contract no., Type of cable & voltage grade, Year of manufacture, Type of insulation e.g. HRPVC item no., No. of pairs and size of cables & Type, Cable code e.g. FRLS, No. of length on drum, if more than one, length of cable and net gross weight stencilled on both sides of drum. A tag containing same information shall be attached to the leading end of the cable. An arrow & suitable accompanying wording shall be marked on one end of the reel indicating the direction in which it should be rolled.

		QUALITY PLAN		CUSTOMER :		PROJECT :		SPECIFICATION : PE-RC-999-507-E005			
				BIDDER/ : VENDOR		QUALITY PLAN NUMBER: PE-QP-999-507-E004, REV 01.		SPECIFICATION : TECHNICAL SPECIFICATION TITLE : OF SCREENED CONTROL			
		SHEET 1 OF 8		SYSTEM		ITEM :INSTRUMENTATION CABLES		SECTION		VOLUME II	
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY	REMARKS	
									P	W	V
1	2	3	4	5	6	7	8	9	10	11	
Instructions: 1. Cable manufacturer to maintain records to show co-relation of raw materials to finished cables i.e. raw material batch/ lot no. should be traceable to the final cable drum number or batch no. 2. Cable manufacturer to maintain all quality records identified as per all QP stages enumerated below whether it is identified for BHEL verification or witness or not.											
1.0	RAW MATERIAL										
1.1	Copper Rods/ Wires (For Conductor & drain wire)	GENERAL : 1. Physical properties 2. Elec.Properties SPECIFIC CHECKS : a) Make b) Grade c) Resistivity	MA	Physical Tests	Sample/Batch	Relevant Standard/ Approved datasheet	Relevant Standard/ Approved datasheet	Inspection Report/ Test Cert.	2/3	-	1/2
			MA	Electrical Tests	Sample/Batch	-do-	-do-	-do-	2/3	-	1/2
			MA	Verify	100%	Manufacturer approved source	Manufacturer approved source	COC/ Test Cert.	3/2	-	1
			MA	-do-	-do-	Relevant Std./ Approved datasheet	Relevant Std./ Approved datasheet	-do-	3/2	-	1
			MA	Electrical Tests	Manufacturer std.	Relevant Std.	Relevant Std.	-do-	3/2	-	1
1.2	PVC Compound (for insulation)	GENERAL : 1. Physical properties 2. Elec.Properties SPECIFIC CHECKS : a) Make b) Type/ Grade c) Shelf life/ Storage condition	MA	Physical Tests	Sample/Batch	Relevant Standard/ Approved datasheet	Relevant Standard/ Approved datasheet	Inspection Report/ Test Cert.	2/3	-	1/2
			MA	Electrical Tests	Sample/Batch	-do-	-do-	-do-	2/3	-	1/2
			MA	Verify	100%	Manufacturer approved source	Manufacturer approved source	COC/ Test Cert.	3/2	-	1
			MA	-do-	-do-	Approved datasheet	Approved datasheet	-do-	3/2	-	1
			MA	-do-	-do-	Compound Manufacturer std.	Compound Manufacturer std.	-do-	3/2	-	1
1.3	Screen / Tapes/ Binders	1. Make 2. Dimension 3. T.S. & Elongation 4. Chem. & Phys. Properties	MA	Verify	100%	Manufacturer approved source	Manufacturer approved source	TC & IR	3/2	-	1/2
			MA	Measurement	Manufacturer std.	Manufacturer datasheet/ Approved datasheet	Manufacturer datasheet/ Approved datasheet	TC & IR	3/2	-	1/2
			MA	Physical Tests	-do-	Manufacturer datasheet	Manufacturer datasheet	-do-	3/2		1/2
			MA	Chemical & Physical Tests	-do-	Manufacturer std.	Manufacturer std.	-do-	3/2		1/2
BHEL			PARTICULARS		BIDDER/VENDOR						
			NAME								
			SIGNATURE								
			DATE				BIDDER'S/VENDORS COMPANY SEAL				

		QUALITY PLAN			CUSTOMER :			PROJECT :			SPECIFICATION : PE-RC-999-507-E005		
					BIDDER/ : VENDOR			QUALITY PLAN NUMBER: PE-QP-999-507-E004, REV 01.			NUMBER :		
		SHEET 2 OF 8			SYSTEM			ITEM :INSTRUMENTATION CABLES			SPECIFICATION TECHNICAL SPECIFICATION TITLE OF SCREENED CONTROL		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	SECTION VOLUME III AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	10			11	
1.4	Fillers (as applicable)	1. Make 2. Flame retardant & moisture resistant (as applicable)	MA MA	Verify Chemical/ Environ.	100% -do-	Manufacturer approved source Appd. Data Sheet	Manufacturer approved source Appd. Data Sheet	COC/Test certificate -do-	3/2 3/2	- -	1 2	Filler material chosen shall be compatible with the temperature rating of the cable and shall have no deleterious effect on any other component of the cable * Sample from each armorsize/ Batch/Lot.	
1.5	Galvanised steel wire/strip for Armour (if applicable)	GENERAL : 1. Make 2. Dimension 3. Phy.and Elec. Properties 4.Galvanization Quality	MA MA MA MA	Verify Measurement Physical & Electrical Tests Galv. Tests	Manufacturer std. -do- Sample* -do-	Manufacturer approved source Relevant Standard/Appd. Data Sheet -do- Relevant Standard/ Mfr. Std.	Manufacturer approved source Relevant Standard/Appd. Data Sheet -do- Relevant Standard/ Mfr. Std.	Inspection Report/ Test Cert. -do- -do- -do-	2/3 2/3 2/3 2/3	- - - -	1 2 2 2		
1.6	PVC compound for Sheath	GENERAL : 1. Physical properties 2. Elec.Properties 3. FRLS Properties (as applicable) SPECIFIC CHECKS : a) Make b) Type/ Grade c) Shelf life/ Storage condition	MA MA CR MA MA MA	Physical Tests Electrical Tests Chemical/ Environ. Verify -do- -do-	Sample/Batch Sample/Batch Sample/Batch 100% -do- -do-	Relevant Standard/ Approved datasheet -do- -do- Manufacturer approved source Approved datasheet Compound Manufacturer std.	Relevant Standard/ Approved datasheet -do- -do- Manufacturer approved source Approved datasheet Compound Manufacturer std.	Inspection Report/ Test Cert. -do- -do- COC/ Test Cert. -do- -do-	3/2 3/2 3/2 3/2 3/2 3/2	- - - - - -	1/2 1/2 1/2 1 1 1		
1.7	Wooden drums	1. Phy. & Constructional checks 2. Anti termite treatment	MA MA	Visual Chem.	Mfr's Plant Std. -do-	IS 10418 Mfr's Plant Std.	IS 10418 Mfr's Plant Std.	Inspection Report/ Test Cert. COC	3/2 3/2	- -	1 1		
1.8	Steel drums #	1. Dimension 2. Surface finish	MA MA	Meas. Visual	Mfr's Plant Std. -do-	Approved drg/BHEL Spec Surface shall be smooth	Approved drg/BHEL Spe Surface shall be smooth	Inspection Report/ Test Cert. Inspection Report	3/2 3/2	- -	1 1		#If applicable
2.0	IN PROCESS												
2.1	Wire Drawing & Annealing.	1. Size 2. Surface finish 3. % of Elongation	MA MA MA	Dimensional Visual Mechanical	Mfr's Plant Std. -do- -do-	Approved datasheet Surface shall be smooth Relevant std./Approved data sheet	Approved datasheet Surface shall be smooth Relevant std./Approved data sheet	Inspection Report -do- -do-	2 2 2	- - -	1 1 1		
2.2	Tinning (Conductor or drain wire)	1. Size 2. Chemical test for tinning	MA CR	Dimensional Chemical	Plant Mfg. Std. -do-	Approved datasheet Relevant Standard	Approved datasheet Relevant Standard	-do- -do-	2 2	- -	1 1		(Applicable only for tin-coated copper conductor and drain wire)
2.3	Stranding of wires	1. No.of wires	MA	Counting	Mfr's Plant Std.	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-	-		
			PARTICULARS		BIDDER/VENDOR								
BHEL			NAME										
			SIGNATURE										
			DATE					BIDDER'S/VENDORS COMPANY SEAL					

		QUALITY PLAN		CUSTOMER :			PROJECT :			SPECIFICATION : PE-RC-999-507-E005 NUMBER :			
				BIDDER/ : VENDOR			QUALITY PLAN NUMBER: PE-QP-999-507-E004, REV 01.			SPECIFICATION TECHNICAL SPECIFICATION TITLE OF SCREENED CONTROL			
				SHEET 3 OF 8			SYSTEM			ITEM :INSTRUMENTATION CABLES			SECTION VOLUME III
SL. NO.	COMPONENT/OPERATION		CHARACTERISTICS CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P W V			REMARKS
1	2		3	4	5	6	7	8	9	10		11	
2.4	Core Insulation (No repair permitted)	2. Resistance	CR	Electrical	-do-	-do-	-do-	-do-	2	-	-	# To be checked at starting & finish end of Extruded Length	
		3. Sequence, lay length & Direction	MA	Visual, Meas	one Sample of each size/lot	Mfr. Std./ Approved datasheet	Mfr. Std./ Approved datasheet	-do-	2	-	-		
		4. Surface Finish	MA	Visual	100%	Surface shall be smooth	Surface shall be smooth	-do-	2	-	-		
		5.Dimension	MA	Measurement	one Sample of each size/lot	Appd. Data Sheet/Relevant std.	Appd. Data Sheet/Relevant std.	-do-	2	-	-		
		1. Surface finish	MA	Visual	100%	Free from bulging burnt particles lumps, cuts & Scratches.	Free from bulging burnt particles lumps, cuts & Scratches.	Inspection Report	2	-	1		
		2 Insulation thickness (Min./ Max.)	CR	Measurement	one Sample of each size/lot	Appd.data sheet/ Relevant Std.	Appd.data sheet/ Relevant Std.	-do-	2	-	-		
		3. Concentricity #	CR	Measurement	-do-	Mfr's Std./Appd. data sheet	Mfr's Std./Appd. data sheet	Inspection Report	2	-	1		
		4 Dia over insulation	MA	Measurement	-do-	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-	-		
		5. Core identification	MA	Visual	100%	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-	-		
		6. TS & % Elongation	MA	Mechanical	100%	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-	-		
2.5	Core pairing, screening (provision of drain wire & laying)	1. Pair identification	MA	Visual	100%	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	Inspection Report	2	-	-		
		2.Wire size & tape size	MA	Measurement	100%	-do-	-do-	-do-	2	-	-		
		3.Test for capacitance	CR	Elect. Test	100%	-do-	-do-	-do-	2	-	-		
		4. Sequence of lay and lay length	MA	Visual meas	one Sample of each size/lot	Appd. Data Sheet & MFRs. Std.	Appd. Data Sheet & MFRs. Std.	-do-	2	-	-		
		5. Screen overlap & coverage	MA	Measurement	-do-	-do-	-do-	-do-	2	-	-		
		6. Dia over laid up core	MA	Measurement	-do-	-do-	-do-	-do-	2	-	-		
		7. Continuity of drain & drain wire with Screen	MA	Elect. Test	100%	<-----No Discontinuity ----->		-do-	2	-	-		
BHEL			PARTICULARS		BIDDER/VENDOR								
			NAME										
			SIGNATURE										
			DATE				BIDDER'S/VENDORS COMPANY SEAL						

		QUALITY PLAN		CUSTOMER :			PROJECT :			SPECIFICATION : PE-RC-999-507-E005		
				BIDDER/ VENDOR :			QUALITY PLAN NUMBER: PE-QP-999-507-E004, REV 01.			SPECIFICATION TECHNICAL SPECIFICATION TITLE OF SCREENED CONTROL		
SHEET 4 OF 8		SYSTEM			ITEM :INSTRUMENTATION CABLES				SECTION VOLUME III			
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
2.6	Inner Sheath Extrusion (if applicable)	1. Surface finish	MA	Visual	100%	Free from bulging, burnt particles,lumps cuts & scratches.	Free from bulging, burnt particles,lumps cuts & scratches.	-do-	2	-	-	
		2. Sheath thickness	CR	Measurement	One sample of ech size/lot	Relevant std./Approved Data sheet	Relevant std./Approved Data sheet	-do-	2	-	-	
		3.Dia over inner sheath	MA	Measurement	-do-	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-	-	
		4. Colour	MA	Visual	100%	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-	-	
2.7	Armouring (If Applicable)	1. No.of wires/Strips	MA	Counting	At the start of the process	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-	-	
		2. Size of wire/ Strip	MA	Measurement	-do-	-do-	-do-	-do-	2	-	-	
		3. Lay Direction	MA	Visual	-do-	-do-	-do-	-do-	2	-	-	
		4. Lay Length	MA	Visual, Meas.	At the start of the process	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-	-	
		5. Coverage	MA	Measurement	-do-	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-	-	
		6. Dia over armouring	MA	Measurement	-do-	-do-	-do-	-do-	2	-	-	
2.8	Outer Sheath Extrusion	1. Surface Finish	MA	Visual	100%	-	Free from Bulging Burnt particles, lumps, cuts & scratches	-do-	2	-	-	
		2.Sheath thickness	CR	Measurement	One sample of ech size/lot	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-	-	
		3. Dia over outer sheath	MA	Measurement	-do-	-do-	-do-	-do-	2	-	-	
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE									
								BIDDER'S/VENDORS COMPANY SEAL				

		QUALITY PLAN SHEET 5 OF 8		CUSTOMER :		PROJECT :			SPECIFICATION : PE-RC-999-507-E005					
				BIDDER/ VENDOR :		QUALITY PLAN NUMBER: PE-QP-999-507-E004, REV 01.			SPECIFICATION TECHNICAL SPECIFICATION TITLE OF SCREENED CONTROL					
SYSTEM		ITEM :INSTRUMENTATION CABLES			SECTION VOLUME III									
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY	W	V	REMARKS		
1	2	3	4	5	6	7	8	9	10			11		
3.0	Final Inspection	4. Marking/ Colour/ Embossing	MA	Visual	100%	Appd. Data Sheet	Appd. Data Sheet	-do-	2	-	-	Sequential marking shall be done by printing		
		5. TS & % Elongation	MA	Mechanical	100%	Relevant Standard/ Appd. Data Sheet	Relevant Standard/ Appd. Data Sheet	-do-	2	-				
		1. Finish & Length	MA	Visual, Measurement	One drum in each lot	Relevant Standard/ Appd. Data Sheet	Free from Bulging	Inspection Report	2	1	-			
		2. Dimensions	MA	Measurement	As per std.	Appd. Data sheet	Burnt particles, lumps, cuts & scratches/ Approved Data Sheet Appd. Data sheet	Inspection Report	2	1	-			
				3. Armouring - Coverage No.of Wires/Strips	MA	Visual & Meas.	-do-	-do-	-do-	-do-	2	1	-	Refer Annexure-I to QP for sampling plan.
				4. Marking/Colour/ pair identification	MA	Visual	-do-	-do-	-do-	-do-	2	1	-	
				5. Test for screening	CR	Elect. Test	-do-	-do-	-do-	-do-	2	1	-	
				6. Acceptance Tests (Refer Note-H)	CR	Phy & Elect. Tests	sample	-do-	-do-	-do-	2	1		
		7. Type & FRLS Tests (Refer Note-H)	CR	Measurement	Sample	Appd. Data sheet	Appd. Data sheet	-do-	2	1	-			
NOTES:- (A) JOINTS IN WIRE SHALL BE AS PERMITTED BY REL STD / BHEL SPECIFICATION. VENDOR TO CERTIFY THE SAME. (B) NO REPAIR OF CORE INSULATION PERMITTED (C) CABLE ENDS SHALL BE SEALED AS PER REL. STD./ BHEL SPECIFICATION (D) RECORD OF RAW MATERIAL, PROCESS & ALL STAGES SHALL BE CERTIFIED BY VENDORS QC. AND ARE LIABLE TO AUDIT CHECK BY PURCHASER. (E) FILLERS/DUMMY CORES ETC. SHALL BE AS PER BHEL SPECIFICATION (F) WHEREVER EXTENT OF CHECK FOR STAGE IS MENTIONED AS SAMPLES AND NOT DEFINED IN QP, THE SAME SHALL BE AS PER VENDORS SAMPLING PLAN AGREED BY PURCHASER. (G) VENDOR SHALL FURNISH COMPLIANCE CERTIFICATE TO THE INSPECTION AGENCY CONFIRMING THE PACKING AS PER REL. STD/ BHEL SPECIFICATION. (H) FOR LIST OF TYPE TESTS, ROUTINE TESTS & ACCEPTANCE TESTS; REFER ANNEXURE I TO QP.														
LEGEND : P : PERFORMER W: WITNESSER V: VERIFIER 1- BHEL/CUSTOMER 2-VENDOR 3 SUB VENDOR CHP: CUSTOMER HOLD POINT TC : Test Certificates, Spec. : Specification Mfg. : Manufacturer.														
BHEL			PARTICULARS			BIDDER/VENDOR								
			NAME											
			SIGNATURE											
			DATE						BIDDER'S/VENDORS COMPANY SEAL					

	ANNEXURE - I TO QP	CUSTOMER:	PROJECT TITLE: RATE CONTRACT	SPECIFICATION NUMBER: PE-RC-999-507-E005
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E004, R1	SPECIFICATION TITLE:
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TYPE/ ACCEPTANCE/ ROUTINE TEST REQUIREMENTS

A. Type Test Conduction:

- Tests for which "T" is indicated in the 'Test Conduction Required As' column below shall be conducted as Type Test.
- Sampling:
 - Type tests (except for Sl. no. b & c below) to be conducted on one size (2P, 4P etc.) of each type (F or G type)/ lot.
 - Electrical & C&I tests to be conducted on each size of each type of cables /lot.
 - FRLS & Flammability tests to be conducted only on one sample/ lot, irrespective of size/type.

B. Acceptance Test Conduction:

- Tests for which "A" is indicated in the 'Test Conduction Required As' column below shall be conducted as Acceptance tests.
- Sampling:
 - Acceptance tests (except for Sl. no. b & c below) for every lot shall be as per Appendix-B (Clause 15.2.2) of IS: 1554 Part-I.
 - Electrical & C&I tests to be conducted on each size of each type of cables /lot.
 - FRLS & Flammability tests to be conducted only on one sample/ lot, irrespective of size/type.

C. Routine Test Conduction:

- Tests for which "R" is indicated in the 'Test Conduction Required As' column below shall be conducted as Routine tests.
- Sampling:

Routine testing shall be conducted in line with the applicable standards and as per the Manufacturing Quality Plan approved for the project for every lot offered for inspection.

D. ADS: Approved datasheet.

NOTE: LOT shall be defined as per IS: 1554 Part-1.

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
1.0	Tests for Conductor				
I.	Annealing test	For copper conductor only	T, A	IS 10810 Pt 1	<u>In process records shall be furnished to inspector at the time of inspection.</u>
II.	Tin coating test (for tinned copper)	For copper conductor only	T, A	IS 10810 Pt 4	
III.	Resistance test	For Al/Cu	T, A, R	IS 10810 Pt 5	
IV.	Diameter test	For conductor	T, A	ADS	

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	SIGNATURE		
	DATE		BIDDER'S / VENDORS COMPANY SEAL

	ANNEXURE - I TO QP	CUSTOMER:	PROJECT TITLE: RATE CONTRACT	SPECIFICATION NUMBER: PE-RC-999-507-E005
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E004, R1	SPECIFICATION TITLE:
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S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
2.0	Tests for Armour Wires/Strips				
I.	Measurement of dimensions	Applicable for Aluminium wire & GS wire/Strip	T,A	IS 10810 Pt 36	
II.	Tensile test	Applicable for Aluminium wire & GS wire/Strip	T, A	IS 10810 Pt 37	
III.	Elongation at break test	Applicable for GS wire/Strip only	T, A	IS 10810 Pt 37	
IV.	Torsion test	For GS round wire only	T, A	IS 10810 Pt 38	
V.	Winding test	For GS strip only	T, A	IS 10810 Pt 39	
VI.	Resistivity test	Applicable for Aluminium wire & GS wire	T, A	IS 10810 Pt 42	
VII.	Uniformity of Zinc coating test	For G. S. wires/Strip only	T, A	IS 10810 Pt 40 , IS: 2633	
VIII.	Mass of Zinc coating test	For G. S. wires/Strip only	T, A	IS 10810 Pt 41	
3.0	Physical Tests for PVC Insulation, PVC sheath.				
I.	Test for thickness & Eccentricity	Applicable for PVC insulation, PVC inner sheath & PVC outer sheath	T, A	IS 10810 Pt 6	
II.	Tensile strength and elongation test at break	Applicable for PVC insulation & PVC outer sheath	T, A	IS 10810 Pt 7	
(a)	Before ageing		T, A	IS 10810 Pt 7	
(b)	After ageing		T, A	IS 10810 Pt 7	
III.	Ageing in air oven	For PVC insulation & PVC outer sheath	T	IS 10810 Pt 11	
IV.	Loss of mass in air oven test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 10	
V.	Hot deformation test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 15	
VI.	Heat shock test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 14	
VII.	Shrinkage test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 12	
VIII.	Thermal stability test	For PVC insulation & PVC outer sheath	T	IS 1554-1	
IX.	Bleeding & Blooming test	Applicable for PVC insulation & PVC outer sheath	T	IS 10810 Pt 19	
X.	Cold bend test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 20	
XI.	Cold impact test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 21	
XII.	Colour fastness to water	For PVC insulation & PVC outer sheath	T	IS 10810 Pt 18, Appendix-A of IS: 5831	

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	SIGNATURE		
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	ANNEXURE - I TO QP	CUSTOMER:	PROJECT TITLE: RATE CONTRACT	SPECIFICATION NUMBER: PE-RC-999-507-E005
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E004, R1	SPECIFICATION TITLE:
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S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
4.0	Tests for Al-Mylar Shield				
I.	Continuity test	For Al-Mylar shield	T, A	Plant Standard	
II.	Shield thickness	For Al-Mylar shield	A	ADS	
III	Overlap test	For Al-Mylar shield	A	ADS	
IV	Constructional details, dimensions	For Al-Mylar shield	A	ADS	
V	Visual, surface finish+	For Al-Mylar shield	A	Plant Standard	
VI	Overall coverage	For Al-Mylar shield	A	Plant Standard	
VII	Noise interference test.	For Al-Mylar shield	A	ADS	
5.0	Tests for Drain Wire				
I.	Annealing test	For copper conductor only	T, A	IS 10810 Pt 1	<u>In process records shall be furnished to inspector at the time of inspection.</u>
II.	Tin coating test (for tinned copper)	For copper conductor only	T, A	IS 10810 Pt 4	
III.	Resistance test	For Cu Conductor	T, A, R	IS 10810 Pt 5	
IV.	Diameter test	For conductor	T, A	ADS	
6.0	FRLS Tests				
I.	Oxygen index test	For PVC outer sheath & Fillers only	T, A	IS 10810 Pt 58 / ASTM D 2863	<u>Applicable for Inner Sheath if the same is indicated in Datasheet-A</u>
II.	Smoke density test	For PVC outer sheath & Fillers only	T, A	ASTM D 2843	
III.	Acid gas generation test	For PVC outer sheath & Fillers only	T, A	IS 10810 Pt 59 / IEC-754-1	
IV.	Temperature Index Test	For PVC outer sheath only	T	IS 10810 Pt 64 / ASTM D 2863	
7.0	Flammability Tests				
I.	Flammability test for bunched cables	For complete cable	T,A	IS 10810 Pt 62/ IEC-60332 (Part-3-23, CAT B).	<u>Test & Category applicable as indicated in Datasheet-A</u>
II.	Flammability test for single cable	For complete cable	T,A	IS: 10810 Pt 61 / IEC:60332 Part-1	
III.	Swedish chimney test	For complete cable	A	SEN SS 424 1475 (Class F3)	
IV.	Flammability test	For complete cable	A	IEEE: 60383	

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	ANNEXURE - I TO QP	CUSTOMER:	PROJECT TITLE: RATE CONTRACT	SPECIFICATION NUMBER: PE-RC-999-507-E005
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E004, R1	SPECIFICATION TITLE:
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S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
8.0	Electrical Tests				
I.	High Voltage Test	For complete cable	T, A, R	IS: 10810 Pt 45	
II.	Insulation Resistance Test (Volume resistivity method)	For complete cable	T, A, R	IS: 10810 Pt 43	
III.	L/R Ratio	For complete cable	A, R	BS:5308 Part II	
IV.	Spark Test	Online Process during Extrusion of Insulation	Online	BS:5308 Part II	
V.	Thermal ageing test	For complete cable	T	IS-1554 Pt-I	
9.0	C&I Tests				
I.	Cross talk	For complete cable	T, A	ADS	
II.	Attenuation	For complete cable	T, A	ADS	
III.	Characteristic Impedance	For complete cable	T, A	ADS	
IV.	Mutual capacitance	For complete cable	T, A, R	ADS	
V.	Noise interference	For complete cable	T, A	ADS	
10.0	Anti-rodent and Termite Repulsion test	For PVC outer sheath only	A	Refer Note	Test applicable as indicated in Datasheet-A
11.0	Anti-Fungal Test	For PVC outer sheath only	A	Self-certification by vendor for anti-fungal property.	Same shall be applicable as per the project requirement to be furnished later.
12.0	Special Tests				
I.	Hydrolytic Stability	For complete cable	A ^(**)	ASTM D 3137	Test applicable as indicated in Datasheet-A
II.	Ultraviolet Test	For complete cable	A ^(**)	BS EN ISO 4892-2	

**** These tests shall be conducted on one sample for the entire contract and duration of these tests shall be 14 days.**

Note: Few chippings of PVC compound are slowly ignited in a porcelain dish in a muffle furnace at about 600 deg. C. The resulting ignited ash is boiled with a little ammonium acetate solution (10%). A drop of aqueous sodium sulphide solution is placed on a thick filter paper and it is allowed to soak. The spot is touched with a drop of above extract. A black spot indicates the presence of anti-termite & rodent compound (lead).

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