



Project Engineering Management

Bharat Heavy Electricals Limited

(A Govt. Of India Undertaking)

Enquiry		Phone	1204368960	
Notice Inviting Tender		Email	akashverma@bhelpem.co.in	
TWO PART BID	Enquiry Number	E-5630/2017	Due date	12/06/2017
Tender to be submitted in two parts	Enquiry date	01/06/2017	Due time	14:00 hrs
Nature of enquiry		OPEN TENDER ENQUIRY		
Mode of enquiry		E PROCUREMENT		
Project		2X660 MW ENNORE SEZ		
Package		EPR INSULATED FIRE SURVIVAL CABLE		
PRICES		PVC for sublet package of cable is applicable as per annexure 1 uploaded on www.bhelpem.com at following link http://www.bhelpem.com/Tenders_Rev/Documents/GCC/Price%20Variation%20Formulae%20for%20Cables.pdf With reference to the link above regarding Price variation formulae, please note that the factors' reference at sl. No. 10 & 11 under the heading Copper Conductor Cables is applicable for the project.		
Detail tender documents are uploaded on websites		WWW.BHELPEM.COM WWW.BHEL.COM WWW.EPROCURE.GOV.IN WWW.BHELEPS.BUYJUCTION.IN		
(1) Bidders are requested to quote the Enquiry number, date and due date in all your correspondences. This is only a request for quotation and not an order. Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is uploaded on our website www.bheleps.buyjunction.in before due date and due time (2) 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.				
S.NO	Description	Quantity	Delivery	
1	EPR INSULATED FIRE SURVIVAL CABLE	As per BOQ cum price schedule	Delivery for LOT-1 quantity shall be within 4 months from the date of approval of technical and quality documents by BHEL/Customer. This is subject to submission of all drawing/documents by vendor within 2 weeks from the date of PO and re-submission within 10 days from Comments, if any. Bidder to note that drawings submitted shall be complete in all respects with revised drawing submitted incorporating all comments. Any incomplete drawing submitted shall be treated as non-submission with delays attributable to bidder's account. Any delay in submission/resubmission shall be reduced from delivery period. Subsequent Lot: A lead-time of three months shall be given for completion of supply of each lot from the date of clearance of the quantities.	
2	Brief Scope	As per Tech spec no PE-TS-412-507-E006, Rev 00		
Important points to be taken care during submission of offer				
1	The offers of the bidders who are on the banned list as also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site http://www.bhel.com/vender_registration/vender.php .			
2	All corrigenda, addenda, amendments, time extensions, clarifications, etc. to the tender will be hosted on BHEL website (www.bhel.com) & BHEL-PEM website (www.bhelpem.com) only. Bidders should regularly visit websites to keep themselves updated. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.			
3	Your best quotation/offer for the above requirement, in line with our terms and conditions (hosted on our website, as indicated above), should be uploaded on www.bheleps.buyjunction.in:			
Terms and condition				
Vendors are requested to read the following points / guidelines / instructions and ensure that the offer is prepared and submitted strictly as per the requirements. Offers with insufficient details would not be considered for evaluation. The following points / guidelines / instructions are part and parcel of the tender and non-compliance will result in rejection of offer.				
1	General Guidelines and instructions while submitting offer	Bidders are advised to go through the GCC Rev-06 while submitting the offers. Bidders may download GCC Rev 06 from following link (http://bhelpem.com/Documents/GCC/GCC-Rev.06.pdf)		
2	Integrity pact	Integrity Pact Not Applicable		
3	Address for any correspondence	Name: 1. AKASH VERMA. M/s. Bharat Heavy Electricals Ltd., Project Engineering Management, Power Project Engineering Institute, HRD & ESI Complex, Plot No 25, Sector-16 A, Noida-201301, U.P., INDIA E-MAIL: akashverma@bhelpem.co.in Ph. No. 0120-4368960	Name: 2. Mr. SHREEDHAR SINGH M/s. Bharat Heavy Electricals Ltd., Project Engineering Management, Power Project Engineering Institute, HRD & ESI Complex, Plot No 25, Sector-16 A, Noida-201301, U.P., INDIA E-MAIL: shreedharsingh@bhelpem.co.in Ph. No. 0120-4368720	



Project Engineering Management				
Bharat Heavy Electricals Limited				
(A Govt. Of India Undertaking)				
Enquiry		Phone	1204368960	
Notice Inviting Tender		Email	akashverma@bhelpem.co.in	
TWO PART BID	Enquiry Number	E-5630/2017	Due date	12/06/2017
Tender to be submitted in two parts	Enquiry date	01/06/2017	Due time	14:00 hrs
3	Pre-Qualifying Requirements	Bidders have to provide the required details as per TECHNICAL PRE-QUALIFICATION REQUIREMENT CRITERIA (enclosed as NIT Tender Documents) in their Techno-Commercial offer. Bids of only those bidders shall be evaluated who meet the Technical Pre-Qualifying requirements.		
4	Submission of offer	Bidders have to submit their offers in line with clause no. 2.0 of "Instructions to Bidders" of GCC Rev. 06.		
5	Conditional Enquiry	Bidders have to note that this is a conditional OPEN Tender enquiry. Price bid (Part-II) opening/RA participation of those bidders, who are not approved by end Customer, shall be subjected to following: a) Approval of bidder by the customer. Same shall be taken up by BHEL with the customer based on the credentials/reference list being submitted by the bidder. b) Clause no. 2.2 of GCC Rev06.		
6	Reverse Auction (RA)	Reverse Auction is applicable as per guidelines uploaded on http://www.bhel.com/vender_registration/pdf/Guidelines%20for%20Reverse%20Auction-2016.pdf Bidders have to note that BHEL reserves the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. For details refer clause no. 13.0 of "Instructions to Bidders" of GCC Rev. 06. The Bidders has to quote the Single Price (i.e. Total Cost to BHEL) in Reverse Auction. 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, etc. including loading (if any). De-loading (if any) shall be done in line with SCC of the project. Following Condition in Reverse Auction shall be treated as follows: Case-I (Taxes & duties and freight are identical in Reverse Auction & Conventional Price Bid) Resolution: - Ordering shall be done on lower of the two bids (RA closing price & Conventional Price 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. Case-II (In case Bidder has quoted 'CST' in Conventional Price 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 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.		
7	CIF	CIF is not available for subject package of subject project. For any import, if any, shall be on merit basis.		
8	Fraud Prevention Policy	The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.		
9	Evaluation	Evaluation shall be done on total cost to BHEL		
10	Part of tender document	Bidders to note that following forms the part of Tender Documents : A) General Conditions of Contract (GCC) Rev. 06 B) Technical Specification PE-TS-412-507-E006,Rev 00 C) Price format D) Special Conditions of Contract Rev 01 E) Technical PQR. F) NIT CONDITIONS & other Enclosures G) RA Guidelines uploaded on www.bhel.com. Please refer link "http://www.bhel.com/vender_registration/pdf/Guidelines%20for%20Reverse%20Auction-2016.pdf" to download the same. Bidders to note that offers shall be submitted strictly in accordance with the requirements of the above Tender Documents & all the above Tender Documents along with post-bid agreements/MoMs (during Techno-Commercial evaluation) shall automatically become the part of the Order/Contract after its finalisation.		
11	Deviations (if any) in Annexure II	Bidders to note that Deviations (if any) are to be listed only in 'Annexure II: Deviation Sheet' of GCC Rev. 06. Any deviation mentioned or shown separately or found hidden in offer, will not be taken cognizance of.		



Project Engineering Management																												
Bharat Heavy Electricals Limited																												
(A Govt. Of India Undertaking)																												
Enquiry		Phone	1204368960																									
Notice Inviting Tender		Email	akashverma@bhelpem.co.in																									
TWO PART BID	Enquiry Number	E-5630/2017	Due date	12/06/2017																								
Tender to be submitted in two parts	Enquiry date	01/06/2017	Due time	14:00 hrs																								
12	Foreign bidders quoting along with their Authorised Indian associates	Foreign bidders quoting along with their Authorised Indian associates to comply with BHEL corporate circular AA:MM:AGENCY dated 06th August 2010 for the guidelines regarding dealings with Indian agents of Foreign bidders (as enclosed).																										
13	Online Registration Portal	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.bhhelpem.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. Bharat Heavy Electricals Ltd. Project Engineering Management PPEI Building, HRD & ESI Complex, Plot No. 25, Sector - 16A, NOIDA - 201 301 (U.P.)																										
14	Basis for quotation	Indigenous Bidders to quote on FOR site basis and foreign bidders to quote on C&F Indian Sea Port basis (INSURANCE shall be in BHEL scope as per clause no 17.0 of GCC Rev 06). However FOR site price for foreign bidder will be calculated by loading their C&F Indian sea port price as per GCC rev 06.																										
15	Digital Signature	Foreign and indigenous bidders participating in subject tender will necessarily have to buy class III DSCs (Digital Signature Certificate) issued by the certifying authorities in India. Basic procedure /checklist is uploaded on www.bhel.com for participating in future tender enquires through e procurement.																										
16	Bank Guarantee	Bank Guarantee (if applicable, as per GCC rev-06) is to be submitted as per enclosed Annexure-B																										
All other terms and condition shall be applicable as per GCC Rev 06, SCC Rev 01 of project, NIT, subsequent corrigendum(if any) and Technical specification																												
Thanking You. <i>Akash Verma</i> 01/06/17 Yours faithfully, For and on behalf of BHEL Enclosures: <table border="1"><tr><td>1</td><td>Technical Specification No</td><td>PE-TS-412-507-E006, Rev 00</td></tr><tr><td>2</td><td>BOQ cum price schedule</td><td></td></tr><tr><td>3</td><td>Special Conditions of Contract</td><td>REV 01</td></tr><tr><td>4</td><td>Technical PQR.</td><td></td></tr><tr><td>5</td><td>BHEL corporate circular AA:MM:AGENCY dated 06th August 2010</td><td></td></tr><tr><td>6</td><td>GCC REV 06 available on www.bhhelpem.com.</td><td></td></tr><tr><td>7</td><td>Annexure-B of bank Guarantee</td><td></td></tr><tr><td>7</td><td colspan="2">RA Guidelines uploaded on www.bhel.com. Please refer link "http://www.bhel.com/vender_registration/pdf/Guidelines%20for%20Reverse%20Auction-2016.pdf" to download the same</td></tr></table>					1	Technical Specification No	PE-TS-412-507-E006, Rev 00	2	BOQ cum price schedule		3	Special Conditions of Contract	REV 01	4	Technical PQR.		5	BHEL corporate circular AA:MM:AGENCY dated 06th August 2010		6	GCC REV 06 available on www.bhhelpem.com .		7	Annexure-B of bank Guarantee		7	RA Guidelines uploaded on www.bhel.com . Please refer link " http://www.bhel.com/vender_registration/pdf/Guidelines%20for%20Reverse%20Auction-2016.pdf " to download the same	
1	Technical Specification No	PE-TS-412-507-E006, Rev 00																										
2	BOQ cum price schedule																											
3	Special Conditions of Contract	REV 01																										
4	Technical PQR.																											
5	BHEL corporate circular AA:MM:AGENCY dated 06th August 2010																											
6	GCC REV 06 available on www.bhhelpem.com .																											
7	Annexure-B of bank Guarantee																											
7	RA Guidelines uploaded on www.bhel.com . Please refer link " http://www.bhel.com/vender_registration/pdf/Guidelines%20for%20Reverse%20Auction-2016.pdf " to download the same																											

**Corporate Materials Management
BHEL New Delhi**

AA:MM:Agency
Dt. 06.08.2010

Guidelines regarding dealings with Indian Agents of Foreign Suppliers

1. BHEL shall deal directly with the foreign original equipment manufacturers (OEM)/ Foreign Principal, for all its purchases which are imported.
2. Wherever the foreign OEM/ principal desires to avail the services of an Indian Agent, the dealings with Indian Agents are to be regulated. The guidelines of BHEL in this regard have been drafted as per CVC circular no. 007/VGL/033 dated 04.12.2007.

Definition of Indian Agent

3. An Indian Agent of foreign principal is an individual, a partnership, an association of persons, a private or public Company, that carries out specific obligation(s) towards processing of BHEL tender or finalization or execution of BHEL's contract on behalf of the foreign supplier.

Recommendations

4. All NITs shall have the following terms regarding Indian agents of foreign principals:
 - i. BHEL shall deal directly with foreign vendors, wherever required, for procurement of goods. However, if the foreign principal desires to avail of the services of an Indian agent, then the foreign principal should ensure compliance to regulatory guidelines - which require mandatory submission of an Agency Agreement.
 - ii. It shall be incumbent on the Indian agent and the foreign principal to adhere to the relevant guidelines of Government of India, issued from time to time.
 - iii. The Agency Agreement should specify the precise relationship between the foreign OEM / foreign principal and their Indian agent and their mutual interest in the business. All services to be rendered by agent/ associate, whether of general nature or in relation to the particular contract, must be clearly stated by the foreign supplier/ Indian agent. Any payment, which the agent or associate receives in India or abroad from the OEM, whether as commission or as a general retainer fee should be brought on record in the Agreement and be made explicit in order to ensure compliance to laws of the country.
 - iv. Any agency commission to be paid by BHEL to the Indian agent shall be in Indian currency only.
 - v. Tax deduction at source is applicable to the agency commission paid to the Indian agent as per the prevailing rules.
 - vi. In the absence of any agency agreement, BHEL shall not deal with any Indian agent (authorized representatives / associate / consultant, or by whatever name called) and shall deal directly with the foreign principal only for all correspondence and business purposes.
 - vii. The "Guidelines for Indian Agents of Foreign Suppliers" enclosed at annexure -'A' shall apply in all such cases.

- viii. The supply and execution of the Purchase Order (including indigenous supplies/ service) shall be in the scope of the OEM/ foreign principal. The OEM/ foreign principal should submit their offer inclusive of all indigenous supplies/ services and evaluation will be based on 'total cost to BHEL'. In case OEM/ foreign principal recommends placement of order(s) towards indigenous portion of supplies/ services on Indian supplier(s)/ agent on their behalf, the credentials/ capacity/ capability of the Indian supplier(s)/ agent to make the supplies/ services shall be checked by BHEL as per the extant guidelines of Supplier Evaluation, Approval & Review Procedure (SEARP), before opening of price bids. In this regard, details may be checked as per Annexure-B (copy enclosed). It will be the responsibility of the OEM/ foreign principal to get acquainted with the evaluation requirements of Indian supplier/ agent as per SEARP available on www.bhel.com.

The responsibility for successful execution of the contract (including indigenous supplies/ services) lies with the OEM/ foreign principal. All bank guarantees to this effect shall be in the scope of the OEM/ foreign principal.

---X---

Guidelines for Indian Agents of Foreign Suppliers

- 1.0 There shall be compulsory registration of agents for all Global (Open) Tender and Limited Tender. An agent who is not registered with BHEL shall apply for registration in the registration form in line with SEARP.
- 1.1 Registered agents will file an authenticated Photostat copy duly attested by a Notary Public/Original certificate of the Principal confirming the agency agreement and giving the status being enjoyed by the agent and the commission/ remuneration/ salary/ retainership being paid by the principal to the agent before the placement of order by BHEL.
- 1.2 Wherever the Indian representatives have communicated on behalf of their principals and the foreign parties have stated that they are not paying any commission to the Indian agents, and the Indian representative is working on the basis of salary or as retainer, a written declaration to this effect should be submitted by the party (i.e. Principal) before finalizing the order.
- 2.0 **Disclosure of particulars of agents/ representatives in India, if any.**
- 2.1 Tenderers of Foreign nationality shall furnish the following details in their offers:
 - 2.1.1 The Bidder(s)/ Contractor(s) of foreign origin shall disclose the name and address of the agents/ representatives in India if any and the extent of authorization and authority given to commit the Principals. In case the agent/ representative be a foreign Company, it shall be confirmed whether it is existing Company and details of the same shall be furnished.
 - 2.1.2 The amount of commission/ remuneration included in the quoted price(s) for such agents/ representatives in India.
 - 2.1.3 Confirmation of the Tenderer that the commission/ remuneration, if any, payable to his agents/ representatives in India, may be paid by BHEL in Indian Rupees only.
- 2.2 Tenderers of Indian Nationality shall furnish the following details in their offers:
 - 2.2.1 The Bidder(s)/ Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any, indicating their nationality as well as their status, i.e. whether manufacturer or agents of manufacturer holding the Letter of Authority of the Principal specifically authorizing the agent to make an offer in India in response to tender either directly or through the agents/ representatives.
 - 2.2.2 The amount of commission/ remuneration included in the price (s) quoted by the Tenderer for himself.
 - 2.2.3 Confirmation of the foreign principals of the Tenderer that the commission/ remuneration, if any, reserved for the Tenderer in the quoted price(s), may be paid by BHEL in India in equivalent Indian Rupees on satisfactory completion of the Project or supplies of Stores and Spares in case of operation items.
- 2.3 In either case, in the event of contract materializing, the terms of payment will provide for payment of the commission/ remuneration, if any payable to the agents/ representatives in India in Indian Rupees on expiry of 90 days after the discharge of the obligations under the contract.
- 2.4 Failure to furnish correct and detailed information as called for in paragraph 2.0 above will render the concerned tender liable to rejection or in the event of a contract materializing, the same liable to termination by BHEL. Besides this there would be a penalty of banning business dealings with BHEL or damage or payment of a named sum.

---X---

Annexure-B

This format is applicable only to Indian Suppliers/ Agents supplying indigenous portion of Foreign Purchases.

* In all other cases, extant guidelines of SEARP, 2010 are to be followed.

SEARP (SRF) Clause No	Detail
	Name & address of the firm
1.0	Products/ Systems / Services being considered for
2.0	General Information
2.2	Name of Chief Executive
2.3	Details of authorized signatory
3.0	Ownership Information
3.1	Type of firm
3.2	Nature of Business • Attach authorization letter and agency agreement from Principal (from whom capital equipment is procured) • Attach copy of declaration from Foreign Principal for total guarantee/ warranty of indigenous supplies
3.3	Year of establishment
3.4	Year of commencement of business
4.0	Registration particulars
4.1	Permanent Account No.
4.2 / 4.3	Sales Tax / TIN no
4.6	Service tax no. (in case of E&C)
5.0	Organisational strength
6.0	Other particulars
6.1	If the company is already registered with other units
6.2	Directors/ Partners, if related to any BHEL Employee
6.9	If any Ex BHEL Personnel employed by the Company
6.12	Details of pending legal issues with BHEL
6.13	Bank Account information
9.0	Financial information
9.6	Sales/ Turnover details of last 3 years (or from the date of incorporation whichever is less)

---X---



SPECIAL CONDITIONS OF CONTRACT (REV 01)

**FOR 2 X 660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF
NCTPS, CHENNAI, Job No. 412**

These Conditions shall be read in conjunction with General Condition of Contract (GCC) enclosed along with the tender enquiry. In case of any conflict or inconsistency, the requirement of SCC shall prevail over the GCC.

1.0	Project Name	2 X 660 MW ENNORE SEZ COAL BASED STPP
2.0	Ultimate Customer (TANGEDCO)	Tamilnadu Generation and Distribution Corporation (TANGEDCO)
3.0	Location of Plant	Site for main plant is located near ennore port (approx. 5 km) and approx. 5 km from Athipattu Pudunagar, State : Tamil Nadu, Nearest Airport: Chennai (60 km), Nearest Seaport: Ennore Port (Approx. 5 km), Nearest Railway Station: Athipattu Pudunagar (Approx. 5 kms), Site is adjacent to the Chennai-Howrah broad gauge line. Access to site: Distance from Chennai city is 35 km. All weather roads from Pattamandri on the Thiruvottiyar district highway.
4.0	Consignee Address / BHEL Site Office Address	Construction Manager BHEL Site-Office 2 x 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS Vayalur Village, Ambathur Taluk, Thiruvallur District, Tamil Nadu.
	Notes:	1. Consignee address in LR should be strictly as per Sl. No. 04. 2. Vendor to note that to effect "Sale in Transit", BHEL shall issue "Delivery Note" to the Transporter for transferring the ownership from BHEL to customer (TANGEDCO). 3. It is Vendor's responsibility to ensure availability of trucks well in advance for dispatch of material to meet contractual delivery requirement. Delivery note shall be carried by transporter along with other dispatch documents
5.0	Buyer and Paying Authority	A) <u>For Inter-State sales (where CST is applicable):</u> 1. For those packages, for which PO is placed by BHEL-PEM - PEM, Noida . 2. For those packages for which PO is placed by BHEL-PSSR & LOA is issued by BHEL-PEM - BHEL-PSSR, Chennai .

Daj

Swati

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



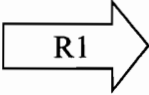
		B) FOR Intra-State sales (where VAT is applicable): 1. For those packages, for which PO is placed by BHEL-PEM- <u>Paying Authority shall be BHEL-PEM, Noida. However Buyer will be BHEL HPBP, TIRUCHIRAPALLI.</u> Detailed requirements are enclosed as Annexure I which are to be followed strictly. 2. For those packages for which PO is placed by BHEL-PSSR & LOA is issued by BHEL-PEM - <u>Paying Authority shall be BHEL-PSSR, Chennai. However Buyer will be BHEL HPBP, TIRUCHIRAPALLI.</u> Detailed requirements are enclosed as Annexure I which are to be followed strictly.
6.0	Mode of Dispatch	By Road/Rail/Sea on Door Delivery and freight Pre-Paid Basis.
7.0	Road Permit Required	Not applicable
8.0	Transit Insurance	In BHEL Scope. Vendor shall inform the following details of dispatches to the Underwriter (refer details below) under intimation to BHEL-PEM and BHEL Site office: (1) Policy No. (2) Consignee Name. (3) Consignment Details (items with their weights and value (in INR)). (4) Project Name and P.O. No. (5) LR No. and date, Despatch origin and destination details, Inv. No..
	Policy No.	SCE - 500300/44/15/04/40000004 MARINE - 500300/21/15/02/00000005 Policy period : 15/04/2015 - 14/04/2018
	Underwriters	M/s. United India Insurance Company – New Delhi D-24 & E-25, 2nd Floor Himalaya House 23 KG Marg, Connaught Place, New Delhi
9.0	BHEL-PEM TIN No.	09765702874
10.0	Customer CST & VAT Nos.	TANGEDCO CST No. - 1248670 TANGEDCO TIN / VAT No. - 33181706465 TANGEDCO TAN No. - CHET 11 952 D TANGEDCO PAN No. - AADCT4784E
11.0	Unloading at site	- By BHEL site office for Supply packages. (The Vendor shall furnish LR wise Gross Wt. and net weight of the consignment for the purpose of handling the consignment by BHEL site loading/unloading contractor). - By Vendor for Turnkey i.e. Supply and Erection & Commissioning Packages.

(Signature)

(Signature)

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



12.0	Storage at site	- By BHEL site for Supply packages. - By Vendor for Turnkey i.e. Supply and Erection & Commissioning Packages.
13.0	Movement of Material within Site	- By BHEL site for Supply packages. - By Vendor for Turnkey i.e. Supply and Erection & Commissioning Packages.
14.0	Provision of facilities at Site (Applicable for Turnkey Packages) 	Construction Power: HT power supply (33KV/433 V or 11KV/433 V) shall be made available for erection work at the rates prevailing at the time of usage on chargeable basis as per HT tariff V (Temporary construction supply) rates applicable as per TNERC tariff order. Fuel and start-up power required during testing, commissioning, PG testing, re-testing etc. shall be provided at free of cost. Construction Water: Construction water shall be available at one point within the plant boundary on chargeable basis subject to availability.
15.0	Inspection Agency (Domestic supplies)	Later
	Inspection Agency (Imported supplies)	Later




Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



16.0	Dispatch Documents required (to be furnished by Vendor for payment)	<u>For Despatch Payment</u> For materials originating from Indian Territory (a). One (1) original and Six (6) copies of the clean rail/lorry receipt. For payment Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes original / copy. (b). One (1) original and Six (6) copies of signed Invoices (Paying Authority along with TIN No. should be mentioned, for VAT cases Annexure-I to be followed). (c). One (1) original and Seven (7) copies of Challan and Packing List (clearly showing number of packages, gross weight and net weight). (d). Six (6) copies of inspection certificate, if any issued by the customer. (e). Eight (8) copies of Customer/BHEL MDCC. (f). Six (6) copies of Approved Test Certificates if any. (g). Delivery order- Two (2) copies. (h). Guarantee Certificate – One (1) Original + One (1) copy. (i). Insurance Intimation - Two (2) copies. (j). CQIR / Inspection Reports – One (1) Original + One (1) copy. (k). PVC Calculation and copy of all applicable indices, if PVC applicable. – Two (2) copies. For materials originating from non-Indian Territory (a). Three (3) original and Seven (7) copies of clean bill of lading or One (1) clean original Airway Bill & Four (4) copies, in case of air freight. (b). One (1) original and Six (6) copies of signed Invoices (Paying Authority along with TIN No. should be Mentioned). (c). One (1) original and Seven (7) copies of Packing List (clearly showing number of packages, gross weight and net weight).
------	---	--

Raj

Swati

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



		(d). Six (6) copies of certificate of country of origin. (e). Eight (8) copies of Customer/BHEL MDCC. (f). Six (6) copies of inspection certificate, if any, issued by the customer/his authorised representative. (g). Six (6) copies of certificate from the vendor to the effect that drawings and catalogues for customs clearance purpose have been kept with the packages for shipment. (h). Six (6) copies of certificate from the vendor to the effect that the contents in each case are not less than that entered in the invoices and guaranteed as new and as per the relevant technical specifications. (i) Shipping Specification – One (1) copy. (j). Quality Certificate – One (1) copy. (k). Approved Test Certificates if any. - Six (6) copies. (l). Guarantee Certificate – One (1) Original + One (1) copy. (m). Inspection Reports – One (1) Original + One (1) copy. (n). PVC Calculation and copy of all applicable indices, if PVC applicable. – Two (2) copies. For Claiming Freight, MRC & Services Payments refer GCC.
17.0	Material Receipt Certificate (MRC).	FOR Packages wherever E&C is in the scope of Vendor, The vendor shall arrange Material Receipt Certificate from the project site, duly signed by Customer and BHEL-Site after receipt & physical verification of the material at site. FOR Supply Packages, Material Receipt Certificate shall be arranged by BHEL-PEM. Vendor to provide copy of receipted LR's to enable BHEL-PEM to obtain MRC from site.




Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



18.A	Taxes & Duties (For Domestic Bidder) (Concessional Custom Duty against EC except for packages mentioned at sr. no. 18 C)	All bidders/vendors to note that this project is a Non-Mega (ICB) power Project. However Essentiality certificate shall be issued by TANGEDCO (Ultimate customer) for availing concessional custom duty under Project Import Regulations. Essentiality certificate shall be issued by TANGEDCO (Ultimate customer) for the specified items to be imported by the vendor, limited to CIF content mentioned in the NIT, for availing concessional custom duty. The bidder has to indicate in their offer, the import contents (if any) for the package i.e. list of items along with qty., currency of import, country of import & CIF value. The benefits availed in concessional custom duty must be passed onto BHEL in their offer. Availability of CIF for the packages, if any, shall be intimated in NIT.
		Concessional Sales Tax against issuance and exchange of form 'C' & 'E1/E2' / VAT, as applicable, are to be quoted by the bidder in their offer. Bidders has to note that in order to derive the total Landed Cost to BHEL following pricing elements shall also be considered in evaluation: i. ED (as applicable on self-manufactured items)- Except for packages mentioned at Sr. no. 18C. ii. CST/VAT (as applicable), iii. Service Tax (For Supply Packages). iv. Freight (including service Tax), However R1 i. Service tax quoted in case of Turnkey packages shall not be considered for evaluation purpose. However same shall be considered for ordering purpose. VAT for Intra-state dispatch shall be paid subject to conditions specified in Annexure I. "Wherever cenvat credit, if applicable could not be availed by BHEL within statutory time limit of six months(as per cenvat credit rule,2014) due to delay in submission of invoices or for any other reason attributable to bidder/contractor, liability towards loss of such cenvat credit(Excise duty/service tax etc) should be passed on to bidders/contractors." Entry Tax/ Octroi: Not Applicable.

Dij

Swati

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



18.B	Taxes & Duties (For Order Directly to Foreign Bidders)	In case of Order on foreign supplier, the dispatches shall be FOB (Port of Dispatch) basis and the Taxes Duties in the country of dispatch shall be borne by Foreign Bidder & to be accounted in the prices quoted to BHEL/PEM/NOIDA. Evaluation shall be done as per provisions of GCC.
18.C	Custom duty (CD) & Excise duty ED for water treatment plant. R1 →	Custom duty (CD) & Excise duty (ED) are exempted against exemption certificate for following packages as per GOI notification 14/2004-Custom dated 08/01/2004 and 3/2004-Central Excise dated 08/01/2014 respectively :- 1. Oxygen dosing system 2. Chemical Dosing system 3. Condensate polishing unit 4. Pre-Treatment plant 5. Effluent treatment plant 6. Electrolytic Chlorination plant 7. Sewage Treatment plant Necessary documents shall be facilitated by TANGEDCO from concerned Government authorities for availing relevant exemption by BHEL. Exemption certificate shall be arranged by BHEL and provided to vendor for their self-manufactured as well as sub-vendor items directly dispatchable to site. Vendor should quote their price considering benefits of NIL Custom duty and NIL Excise duty. However vendor shall indicate the list of imported items, quantity and value of imported items in Indian Rupee and Foreign currency, amount of CD, rate of CD alongwith the country of import in their bid.
19.0	Packing, Identification & marking	• The supplier shall include and provide for securely protecting and packing the materials so as to avoid loss or damage during handling & transport by air, sea, rail and road. • All packing shall allow for easy removal and checking at site. Special precaution shall be taken to prevent rusting of steel and iron parts during transit by sea. Gas seals or other materials shall be adopted by the Contractor for protection against moisture during transit. • The number of each package in a shipment shall be shown in fraction, numerator showing number of the package and the denominator showing total number of packages in a lot / consignment. The packages number shall be generally prepared in the sequence in which they will be required for erection. • Each package delivered under the Contract shall be marked by and at the expense of the supplier and such marking must be distinct and in English language (all previous irrelevant markings being carefully obliterated). Such marking shall show the description and quantity of contents, the name and

Day

Swati

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



address of consignee, the gross weight and net weight of the package, the name of the Contractor with a distinctive number of mark sufficient for purposes of identification. All markings shall be carried out with such materials as to ensure quickness of drying, fastness and indelibility. Each equipment or parts of equipment shall, when shipped or railed or otherwise dispatched be tagged with reference to the assembly drawings and corresponding part numbers. Each bale or package shall contain a packing note quoting specifically the name of the Contractor, the number and date of contract and the name of the office placing the contract, nomenclature of the stores and include a schedule of parts for each complete equipment giving the part numbers with reference to the assembly drawing and the quantity of each part, drawings nos. and tag numbers.

- Rotor bearings should not be used as a support while packing.
- Besides wherever necessary, packing shall bear a special marking "TOP", "BOTTOM", "DO NOT TURN OVER", "KEEP DRY", "HANDLE WITH CARE", etc.
- All packing cases, containers (excluding marine container), packing and other similar materials shall be new.
- Notwithstanding anything stated in this clause, the Contractor shall be entirely responsible for loss, damage or depreciation or deterioration to the materials & supplies due to faulty and/or insecure packing.
- One copy of respective standard manufacturer's erection instruction/operation instruction manual shall be kept in each package/container for immediate reference.
- Each and every package box shall be marked with the following, as a minimum:

(i). Name and address of Consignee :

(ii). Project reference :

(iii). Contract No.:

(iv). Packing No.: (1/10, 2/10, 3/10 when there are 10 packages For one consignment)

(v). Net Weight/Gross Weight :

(vi). Port of Loading :

(vii). Destination Port : Ennore Port

(viii). Packing Mark : [symbols indicating "TOP" and other special markings as per

clause 10.10.(4) & 10.10.(6) above]

(ix). Type of Equipment :

"E" (for Equipment supply)

"T" (for Tools & Tackles)

"S" (for Mandatory Spares)

- Two copies of packing list should be kept in case/package No. 1 of each consignment of the goods and four copies in each case (three inside the box and one copy in a special packet at the outer side of the box).

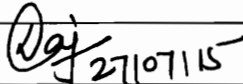
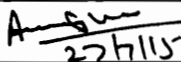
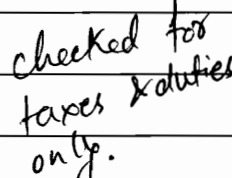
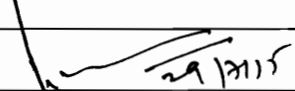
Day

Swati

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



20.0	Commissioning spares	The commissioning spares shall be properly packed separately in separate box and each spare shall be properly tagged giving details (to match the description given in the packing slip) to facilitate their proper identification. Three copies of packing list is to be kept inside the box and one copy in a special packet at the outer side of the Box.		
21.0	Mandatory Spares	The Mandatory spares shall be properly packed separately in separate box indicating Mandatory Spares in bold letters and each spare shall be properly tagged giving details i.e. item number of the equipment in line with the Ultimate Customer Contract & Number per item (to match the description given in the packing slip) to facilitate their proper identification by ultimate customer M/s TANGEDCO. Three copies of packing list along with Manufacturing drawing no. Reference, Catalogue reference etc. is to be kept inside the box and one copy in a special packet at the outer side of the Box.		
22.0	Submission of Final Drawing / Documents along with O&M Manual, Type Test Certificates (if any)	As per GCC/ Technical specification/ Kickoff meeting.		

	Prepared By	Checked & Reviewed By	Vetted By Finance	Approved By
Name:	RAJEEV KUMAR	ANUJ KUMAR	SWATI NAIR	PERMINDER SINGH
Designation:	SR.ENGINEER	DGM	checked for taxes & duties only.	AGM/DH
Signature:				
Date:	27/07/15	27/7/15		29/7/15

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



Annexure-I

SPECIAL CONDITIONS OF CONTRACT (REV 01)

2 X 660 MW ENNORE SEZ COAL BASED STPP, Job No. 412

In order to avail the benefit of input tax credit available to BHEL in case of VAT leviable on intra-state transaction between BHEL and vendor, & to fulfill the compliances as per requirements of applicable State's VAT law, the following modality shall be applicable:

BHEL has identified a nodal agency in each State to take care of VAT compliances in the State in which project is located. For the subject project nodal agency shall be:

BHEL HPBP, TIRUCHIRAPALLI – 620014, Tamil Nadu
VAT TIN No. 33243560005

Nodal agency is defined as Buyer in such cases, where VAT is applicable.

Vendors' original tax invoice for intra State transactions is one of important documents for availing Input Tax credit. In this regard the following may be noted by all vendors for strict compliance:

- As a general rule, a tax invoice must be original, must contain vendor's TIN No with full address, invoice no & date, product description with unit rate, quantity, value, VAT rate, VAT amount, gross value of bill, **buyer i.e. BHEL's address with TIN No.** (as given above) special marking like "Original" and/or "valid for input credit"/ Buyer can take credit against this" etc as per applicable State VAT law.
- Please note that BHEL's address and TIN to be mentioned in vendors tax invoice shall be **principal place of business & applicable TIN No. of nodal agency of BHEL, as given above.** In no case the vendors, invoices shall be addressed to BHEL PEM nor shall they contain our TIN as buyer.
- As original tax invoice of vendors are to be furnished to nodal unit for assessment/VAT audit purposes, extra copy of Original invoice is required to be submitted by vendors for retaining with bank payment voucher.
- Original tax invoice along with extra copy of Original Tax invoice in line with respective state VAT law shall be essential document to be submitted by vendor for claiming payment.
- Vendor shall also furnish a certificate/statement/document as prescribed under applicable State VAT law. Please note that some of the States requires additional certificate/documents e.g. Haryana requires certificate in form C-4 in addition to original tax invoice.
- Please note that reimbursement/payment of VAT shall be subject to furnishing of Vat complaint tax invoice and other certificate/document as per applicable State VAT law.
- Tax invoice must show Vat rate & VAT amount separately and in no case all inclusive prices is to be shown in the tax invoice since input credit is not admissible in case VAT is not indicated separately.
- In case vendor is unable to furnish Vat compliant tax invoice & other certificate/document, VAT shall not be reimbursed by BHEL.

R1

Where the supplies are made from within the same state where the project is located, the vendor has to provide VAT tax invoice for such supplies even if the price quoted is all inclusive.

Raj

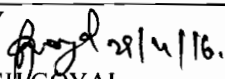
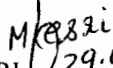
Swati

	PRE-QUALIFICATION REQUIREMENTS FOR EPR INULATED FIRE SURVIVAL CABLE	PE-PQ-999-507-E018
		REVISION NO. 03 DATE 29/04/2016
		SHEET NO. 1 OF 1

ITEMS : EPR Insulated Fire Survival cable	
SCOPE : Supply : YES; Erection & Commissioning : NO;	
1.0	Vendor should be a manufacturer of LT Power &/or Control cable.
2.0	Availability of test reports of tests on LT EPR fire survival cables to establish in-house capability to carry out all routine, type & acceptance test as per relevant IS/International standards (except UV radiation , hydrolytic stability & Fire Survival test) which can be conducted at Govt. Lab/ Govt. approved Independent lab.
3.0	Availability of type test certificate for LT-EPR fire survival cables for fire survival test conducted at independent lab or witnessed by third party as per relevant IS/ International standards.
4.0	Capacity of manufacturing 200 km of power/control cables (including non-EPR cables) per month.
5.0	Manufactured & supplied at least 5 km of LT EPR fire survival cables.
6.0	Minimum two (2) nos. purchase orders for Power &/ or Control cable 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 DESIGNATION: SR. MGR	REVIEWED BY  NAME: RAJNISH GOYAL DESIGNATION: AGM	APPROVED BY  NAME: MEENA KESRI DESIGNATION: AGM & DH (E)
---	--	--

**2 X 660MW ENNORE SEZ STPP AT ASH DYKE OF
NCTPS, CHENNAI**

TAMIL NADU GENERATION & DISTRIBUTION CORPORATION LTD.

**TECHNICAL SPECIFICATION FOR
EPR INSULATED FIRE SURVIVAL CABLES**

VOLUME-II

SPECIFICATION NO: PE-TS-412-507-E006

REVISION: 00



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



**TECHNICAL SPECIFICATION FOR
EPR INSULATED FIRE SURVIVAL
CABLES**

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS- 412-507-E006

VOLUME II

SECTION -

REVISION 00

DATE: 30.01.2017

SHEET -

CONTENTS

<u>S. NO.</u>	<u>CONTENTS</u>	<u>NO. OF SHEETS</u>
01	SECTION – I	
a)	COMPLIANCE CERTIFICATE	01
b)	SPECIFIC TECHNICAL REQUIREMENTS	02
c)	DATA SHEET-A	02
d)	DATA SHEET-B (TO BE SUBMITTED ALONG-WITH BID)	04
e)	DATA SHEET-C (GUARANTEED TECHNICAL PARTICULARS)	05
02	SECTION – II	
a)	STANDARD TECHNICAL SPECIFICATION	01
b)	ANNEXURE- I TO SECTION-II (STEEL DRUM DRAWING, TYPICAL)	01
c)	QUALITY PLAN (ALONGWITH ANNEXURE)	10
	TOTAL NO. OF SHEETS= (INCLUDING COVER/ SEPARATOR SHEETS)	32



**TECHNICAL SPECIFICATION FOR
EPR INSULATED FIRE SURVIVAL
CABLES**

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS- 412-507-E006

VOLUME II

SECTION I

REVISION - 00

DATE: 30.01.2017

SHEET -

SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS



**TECHNICAL SPECIFICATION FOR
EPR INSULATED FIRE SURVIVAL
CABLES**

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS- 412-507-E006

VOLUME II

SECTION I

REVISION - 00

DATE: 30.01.2017

SHEET -

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 Annexure-A [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 EPR INSULATED FIRE SURVIVAL CABLES

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS-412-507-E006

VOLUME II

SECTION I

REVISION - 00

DATE: 30.01.2017

SHEET 1 of 2

1.0 SCOPE OF ENQUIRY

- 1.1 This specification covers the Design, Manufacture, Inspection and Testing at Manufacturer's works, proper packing and delivery to site of EPR INSULATED FIRE SURVIVAL CABLES.
- 1.2 It is not the intent to specify herein all the details of design & manufacture. However, the equipment shall conform in all respects to high standards of design engineering and workmanship and shall be capable of performing in continuous commercial operation at site conditions.
- 1.3 General technical requirements of the EPR INSULATED FIRE SURVIVAL CABLES are indicated in Section-II. Project specific technical/ quality requirements / changes are listed in Section-I.
- 1.4 The stipulations of Section-I, followed by those of Data Sheet-A shall prevail in case of any conflict between the stipulations of Section-I, Data Sheet - A & Section-II.
- 1.5 The documents shall be in English Language and MKS system of units

2.0 BILL OF QUANTITIES:

- 2.1 Quantity requirements shall be as per Annexure for Bill of Quantities (BOQ) enclosed as part of NIT.

3.0 TECHNICAL REQUIREMENTS

- 3.1 Specific Technical Requirement:

<u>S.No.</u>	<u>Reference Clause No. of Section- II</u>	<u>Specific Requirement/ Change</u>
1.	4.1: Cables shall be supplied in non-returnable drums. Material of cable drums shall be as specified in Datasheet-A.	Shall be read as: "Cables shall be supplied in non-returnable drums, of heavy construction . Material of cable drums shall be as specified in Datasheet-A."
2.	4.2: In case of wooden drums, all wooden parts shall be manufactured from seasoned wood treated with copper napthenates / zinc napthenates (refer IS: 401). 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.	Shall be read as: " In case of wooden drums, 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. Wood preservative anti-termite treatment shall be applied to the entire drum. Wooden drums shall comply with IS: 10418. BIS certification mark shall be stamped on each cable drum "



**TECHNICAL SPECIFICATION FOR
EPR INSULATED FIRE SURVIVAL
CABLES**

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS-412-507-E006

VOLUME II

SECTION I

REVISION - 00

DATE: 30.01.2017

SHEET 2 of 2

3.2 Quality/ Inspection:

<u>S.No.</u>	<u>Reference Clause No. of Section- II</u>	<u>Specific Requirement/ Change</u>
1.	ANNEXURE-II: Standard Quality Plan: Note "C: CABLE ENDS SHALL BE SEALED AS PER MANUFACTURERS STANDARD."	Note C shall be read as: "CABLE ENDS SHALL BE SEALED AS PER APPROVED DATASHEET."

4.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED

- 4.1 Documents/drawings to be submitted as part of technical offer & after placement of order for BHEL & customer's approval shall be as part of NIT.
- 4.2 Datasheet-B shall be submitted along-with all drawing/documents to be submitted during tender stage (Before award of contract) as per NIT.
- 4.3 Following documents/drawings shall be submitted after placement of order for BHEL & customer's approval:

Sl. No.	Drawings/Document Description	Drawings / Document Number
1.	Technical Data Sheet for EPR INSULATED FIRE SURVIVAL CABLES	PE-V0-412-507-E601
2.	Cross-sectional Drawings for EPR INSULATED FIRE SURVIVAL CABLES	PE-V0-412-507-E602
3.	Manufacturing Quality Plan for EPR INSULATED FIRE SURVIVAL CABLES	PE-V0-412-507-E603*

Note:

* Standard Quality Plan as enclosed in the technical specification is to be appended with cover sheet bearing document number and description as stated above. The signed and stamped copy of the same shall be submitted to BHEL without making any changes in the contents of the document.

- 4.4 All drawings/ documents indicated above shall be submitted through Document Management System (DMS).



**TECHNICAL SPECIFICATION FOR
EPR INSULATED FIRE SURVIVAL
CABLES**

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS- 412-507-E006

VOLUME II

SECTION I

REVISION: 00

DATE: 30.01.2017

SHEET -

DATASHEET A



TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS- 412-507-E006

VOLUME II

SECTION I

REVISION: 00

DATE: 30.01.2017

SHEET 1 of 2

DATASHEET-A

1.0	Type of Cable	EPR INSULATED FIRE SURVIVAL CABLES
2.0	Standard applicable in general(Latest amendment to be referred if any)	IS-9968(PART-1), IS-6380, IS -10810,IS 10418, IS-3975, ASTM D:2843, ASTM D-2863, IEC-60754-1, IEC-60331-1, IEC-60332, IEEE-60383,SS-424-1475
3.0	Voltage Grade	1.1 KV
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, Tinned annealed high conductivity, Class 2
(b)	Standard Applicable	IS - 8130
(c)	Shape	Compacted circular / Shaped
(d)	Min. number and diameter of strands for main and neutral conductor.	As per class -2 of IS 8130
(e)	Fire Barrier tape (separator tape)	Glass Mica tape in two layers with minimum 50% overlap
6.0	INSULATION	
(a)	Material	Heat resistant Elastomer compound , type IE2
(b)	Standard Applicable	IS : 9968(Part-1),IS -6380
(c)	Continuous withstand temperature	90°C
(d)	Short-circuit withstand temperature	250°C
(e)	Method of application	By extrusion; sleeve extrusion not permitted.
(f)	Method of curing	Dry/Steam/Gas/Sioplas
(g)	Nominal Thickness of insulation	As per IS : 9968(Part-1)
(h)	Fire proof tape	Two Layers of plain Glass Fibre Binder Tape
7.0	CORE IDENTIFICATION	Colour coding as per IS : 9968(Part-1)
8.0	INNER SHEATH	
(a)	Material	Heat resistant, oil resistant , flame retardant (HOFR) Elastomer compound
(b)	Grade and type	Extruded Type SE-3
(c)	Standard Applicable	IS : 9968(Part-1)
(d)	Colour	Black
9.0	ARMOUR	
(a)	Material:	
(i)	Single core cables	Single layer of Hard Drawn Aluminium Round Wire of H4 grade
	Standard Applicable	IS 8130
(ii)	Multi-core cables	Galvanised Steel Round Wire / Galvanised Steel Formed Wire Strip
	Standard Applicable	IS-3975
(b)	Gap between armour wires	Shall not exceed one armour wire space (No cross-over/ over-riding)
(c)	Minimum Coverage	90%
(d)	Breaking load of joint	95 % of normal armour



TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS- 412-507-E006

VOLUME II

SECTION I

REVISION: 00

DATE: 30.01.2017

SHEET 2 of 2

		Zinc rich paint shall be applied on armour joint surface of GS wire
10.0	OUTERSHEATH	
(a)	Material	Heat resistant, oil resistant , flame retardant (HOFR) Elastomer compound
(b)	Grade and type	Extruded Type SE-3
(c)	Colour	Black
(d)	Marking	Cable size (cross section area and no. of cores) and voltage grade, IS 9968-Part II @ 5m (by embossing) Word "EPR" "FS" etc, @ 5m (by embossing) Manufacturer's name and/ or trade name, and year of manufacture @ 5m (by embossing) 'BHEL-PEM' and 'CUSTOMER' Name @5m (by embossing) Progressive sequential marking @ 1m (by embossing/ printing)
11.0	HOFR CHARACTERISTICS	
(a)	Oxygen index	≥30 (as per ASTM D 2863)
(b)	Temperature Index	≥350°C (as per ASTM D-2863)
(c)	Acid gas generation	≤ 2% by weight (as per IEC-60754-1)
(d)	Smoke density rating	≤ 20% (As per ASTM D 2843)
(e)	Water absorption test	IS 10810-28
(e)	Flammability Test	
(i)	Flammability test for single cable	As per IEC-60332 Part-1
(ii)	Flammability test for bunched cables	As per IEC-60332 Part-3 CAT-B
(iii)	Flammability test for complete cable	As per IEEE-60383
(iv)	Swedish Chimney test	As per SEN-SS-424-1475-F3
(f)	Fire survival test	As per IEC -60331-11 for min 3 Hrs at 950°C
12.0	Allowable Tolerance on OD	±2 mm (max.)
13.0	CABLE DRUMS	
(a)	Type of Drum	Wooden Drum as per IS 10418 / Steel Drum As per Annexure I to Section II
(b)	Standard drum length	500m (±) 5% (as specified in BOQ-Cum-Price Schedule)
(c)	Painting	Entire surface to be painted
(d)	Outermost Layer	To be covered with water-proof polyethylene
(e)	Particular information on Drum	Both the end of 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 & erection. Wood preservative anti-termite treatment shall be applied to the entire drum.

NOTE: Suitable fire retardant material fillers shall be used for filling in the interstices. Two layers of plain glass binder tape should be applied over the laid up cores.

	TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES 2 X 660MW ENNORE SEZ STPP	SPECIFICATION NO. PE-TS- 412-507-E006	
		VOLUME II	
		SECTION I	
		REVISION: 00	DATE: 30.01.2017
		SHEET 1 OF 4	

DATASHEET B
(TO BE SUBMITTED ALONGWITH BID)

S.No.	Particulars	Unit	Description
1.0	GENERAL		
1.1	Name of Manufacturer	-	
1.2	Place of Manufacture	-	
2.0	STANDARDS APPLICABLE		
2.1	For general specification of EPR Cables	-	
2.2	For conductor material	-	
2.3	For material of inner-sheath & outer-sheath	-	
2.4	For method of tests	-	
2.5	For cable drums	-	
2.6	For oxygen index test	-	
2.7	For flammability test	-	
2.8	For acid gas generation test	-	
2.9	For smoke generation test	-	
2.10	For fire survival test	-	
2.11	Current rating of cables conforms to	-	
2.12	Short circuit rating conforms to	-	
3.0	INFORMATION TO BE FILLED IN FOR EACH SIZE CABLE IN THE FORM OF TABLE		
3.1	No. of cores x size	-	
3.2	Voltage grade (Uo/U)	kV	
3.3	Base current ratings as per standard		
a)	In air	Amp	
b)	In ground	Amp	
c)	ducts	Amp	
3.4	Short circuit rating	kA, sec	
3.5	Properties		
a)	D.C. resistance of conductor at 20 deg. C	ohm/km	
b)	A.C. resistance of conductor at 85 deg. C	ohm/km	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES 2 X 660MW ENNORE SEZ STPP	SPECIFICATION NO. PE-TS- 412-507-E006	
		VOLUME II	
		SECTION I	
		REVISION: 00	DATE: 30.01.2017
		SHEET 2 OF 4	

c)	A.C. resistance of conductor at 90 deg. C	ohm/km	
d)	Maximum charging current for cable at nominal voltage	Amps/km	
e)	Minimum tensile strength	N/mm ²	
f)	Minimum elongation percentage at rupture		
3.6	CONDUCTOR		
a)	Applicable Standard	-	
b)	Material type & grade	-	
c)	No & dia of wires in each core before stranding	no x mm	
d)	Shape	-	
e)	Maximum conductor temperature	deg. C	
f)	Maximum short circuit temperature	deg. C	
3.7	HEAT BARRIER TAPE		
a)	Applicable Standard	-	
b)	Material	-	
c)	Thickness of tape	mm	
d)	No. of layers, overlap	-	
3.8	INSULATION		
a)	Applicable Standard	-	
b)	Material	-	
c)	Method of cross linking	-	
e)	Method of curing	-	
f)	Process of extrusion	-	
g)	Nominal thickness	mm	
h)	Minimum thickness	mm	
i)	Minimum insulation resistance constant at 27 deg. C	mega ohm/km	
j)	Minimum volume resistivity at 27 deg. C	ohm.cm	
k)	Minimum volume resistivity at 85/90 deg. C	ohm.cm	
l)	Dielectric strength of insulation		
m)	Resistivity of insulation		
n)	Acid gas generation of insulation & tape	%	
3.9	CORE IDENTIFICATION		

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES 2 X 660MW ENNORE SEZ STPP	SPECIFICATION NO. PE-TS- 412-507-E006	
		VOLUME II	
		SECTION I	
		REVISION: 00	DATE: 30.01.2017
		SHEET 3 OF 4	

a)	Applicable Standard	-	
3.10	INNERSHEATH		
a)	Material & type	-	
b)	Nominal Thickness	mm.	
c)	Minimum Thickness	mm.	
d)	Process of Extrusion	-	
e)	Type & Shape of fillers (if used)	-	
f)	Colour	-	
3.11	ARMOUR		
a)	Applicable Standard	-	
b)	Material	-	
c)	Size/ dimensions	-	
d)	Minimum no. of wires/ formed wires	-	
e)	Maximum DC resistance of armour	-	
f)	Maximum AC resistance of armour	-	
g)	Minimum coverage	-	
3.12	OUTERSHEATH		
a)	Material & type	-	
b)	Nominal Thickness	mm.	
c)	Minimum Thickness	mm.	
d)	Process of Extrusion	-	
e)	Colour	-	
4.0	PERMISSIBLE VARIATION		
a)	Voltage variation	%	
b)	Frequency Variation	%	
c)	Combined voltage & frequency	IAbsl	
5.0	CHARACTERISTICS OF HOFR SHEATH (Inner & Outer)		
a)	Oxygen index at 50 deg. C.	-	
b)	Temperature index	-	
c)	Acid gas generation	-	
d)	Smoke density rating	-	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES 2 X 660MW ENNORE SEZ STPP	SPECIFICATION NO. PE-TS- 412-507-E006	
		VOLUME II	
		SECTION I	
		REVISION: 00	DATE: 30.01.2017
		SHEET 4 OF 4	

6.0	APPLICABLE TESTS UNDER FIRE CONDITIONS FOR SINGLE CABLE & MULTIPLE CABLES		
7.0	CIRCUIT INTEGRITY TEST		
a)	Applicable Standard	-	
b)	Temperature	Deg. C.	
c)	Duration	hrs	
8.0	CABLE DRUMS		
a)	Type & construction	-	
b)	Standard drum length (as per BOQ)	-	
c)	Tolerance on drum length	(+/-) 5%	
9.0	DIAMETERS		
a)	Overall diameter of conductor	mm	
b)	Overall diameter over taped conductor	mm	
c)	Approximate cable diameter of insulated conductor	mm	
d)	Approximate Cable diameter over inner sheath		
e)	Approximate overall diameter of cable		
10.0	Tolerance on overall diameter	(±) mm	
11.0	Minimum bending radius	x O.D.	
12.0	Safe pulling force	kg.	
13.0	Weight of cable / components	kg./m	
a)	Weight of conductor	-	
b)	Weight of fire barrier tape	-	
c)	Weight of insulation	-	
d)	Weight of polymeric material	-	
e)	Weight of Armour (GS/Aluminium)	-	
f)	Total weight of cable	-	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES 2 X 660MW ENNORE SEZ STPP	SPECIFICATION NO. PE-TS- 412-507-E006	
		VOLUME II	
		SECTION I	
		REVISION: 00	DATE: 30.01.2017
		SHEET 1 OF 5	

DATASHEET C

**GUARANTEED TECHNICAL PARTICULARS
(TO BE SUBMITTED BY SUCCESSFUL BIDDER)**

S.No.	Particulars	Unit	Description
1.0	GENERAL		
1.1	Name of Manufacturer	-	
1.2	Place of Manufacture	-	
2.0	STANDARDS APPLICABLE		
2.1	For general specification of EPR Cables	-	
2.2	For conductor material	-	
2.3	For material of inner-sheath & outer-sheath	-	
2.4	For method of tests	-	
2.5	For cable drums	-	
2.6	For oxygen index test	-	
2.7	For flammability test	-	
2.8	For acid gas generation test	-	
2.9	For smoke generation test	-	
2.10	For fire survival test	-	
2.11	Current rating of cables conforms to	-	
2.12	Short circuit rating conforms to	-	
3.0	INFORMATION TO BE FILLED IN FOR EACH SIZE CABLE IN THE FORM OF TABLE		
3.1	No. of cores x size	-	
3.2	Voltage grade (Uo/U)	kV	
3.3	Base current ratings as per standard		
a)	In air	Amp	
b)	In ground	Amp	
c)	ducts	Amp	
3.4	Short circuit rating	kA, sec	
3.5	CONDUCTOR		
a)	Applicable Standard	-	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES 2 X 660MW ENNORE SEZ STPP	SPECIFICATION NO. PE-TS- 412-507-E006	
		VOLUME II	
		SECTION I	
		REVISION: 00	DATE: 30.01.2017
		SHEET 2 OF 5	

b)	Material type & grade	-	
c)	No & dia of wires in each core before stranding	no x mm	
d)	Shape	-	
e)	D.C. resistance of conductor at 20 deg. C	ohm/km	
f)	A.C. resistance of conductor at 85 deg. C	ohm/km	
g)	A.C. resistance of conductor at 90 deg. C	ohm/km	
h)	Reactance of cable at normal frequency	ohm/km	
i)	Electrostatic capacitance of cable at normal frequency	mF/km	
j)	Maximum conductor temperature	deg. C	
k)	Maximum short circuit temperature	deg. C	
3.6	HEAT BARRIER TAPE		
a)	Applicable Standard	-	
b)	Material	-	
c)	Thickness of tape	mm	
d)	No. of layers, overlap	-	
3.7	INSULATION		
a)	Applicable Standard	-	
b)	Material	-	
c)	Method of cross linking	-	
e)	Method of curing	-	
f)	Process of extrusion	-	
g)	Nominal thickness	mm	
h)	Minimum thickness	mm	
i)	Minimum insulation resistance constant at 27 deg. C	mega ohm/km	
j)	Minimum volume resistivity at 27 deg. C	ohm.cm	
k)	Minimum volume resistivity at 85/90 deg. C	ohm.cm	
l)	Dielectric strength of insulation		
m)	Resistivity of insulation		
n)	Acid gas generation of insulation & tape	%	
3.8	CORE IDENTIFICATION		
a)	Applicable Standard	-	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES 2 X 660MW ENNORE SEZ STPP	SPECIFICATION NO. PE-TS- 412-507-E006	
		VOLUME II	
		SECTION I	
		REVISION: 00	DATE: 30.01.2017
		SHEET 3 OF 5	

3.9	INNERSHEATH		
a)	Material & type	-	
b)	Nominal Thickness	mm.	
c)	Minimum Thickness	mm.	
d)	Process of Extrusion	-	
e)	Type & Shape of fillers (if used)	-	
f)	Colour	-	
3.10	ARMOUR		
a)	Applicable Standard	-	
b)	Material	-	
c)	Size/ dimensions	-	
d)	Minimum no. of wires/ formed wires	-	
e)	Maximum DC resistance of armour	-	
f)	Maximum AC resistance of armour	-	
g)	Minimum coverage	-	
3.11	OUTERSHEATH		
a)	Material & type	-	
b)	Nominal Thickness	mm.	
c)	Minimum Thickness	mm.	
d)	Process of Extrusion	-	
e)	Colour	-	
4.0	PERMISSIBLE VARIATION		
a)	Voltage variation	%	
b)	Frequency Variation	%	
c)	Combined voltage & frequency	IAbsl	
5.0	CHARACTERISTICS OF HOFR SHEATH (Inner & Outer)		
a)	Oxygen index at 50 deg. C.	-	
b)	Temperature index	-	
c)	Acid gas generation	-	
d)	Smoke density rating	-	
6.0	APPLICABLE TESTS UNDER FIRE CONDITIONS FOR SINGLE		

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES 2 X 660MW ENNORE SEZ STPP	SPECIFICATION NO. PE-TS- 412-507-E006	
		VOLUME II	
		SECTION I	
		REVISION: 00	DATE: 30.01.2017
		SHEET 4 OF 5	

	CABLE & MULTIPLE CABLES		
7.0	High Voltage Test Voltage	kV	
8.0	Water Absorption Test Voltage	kV	
9.0	CIRCUIT INTEGRITY TEST		
a)	Applicable Standard	-	
b)	Temperature	Deg. C.	
c)	Duration	hrs	
10.0	CABLE DRUMS		
a)	Type & construction	-	
b)	Standard drum length (as per BOQ)	-	
c)	Tolerance on drum length	(+/-) 5%	
11.0	DIAMETERS		
a)	Overall diameter of conductor	mm	
b)	Overall diameter over taped conductor	mm	
c)	Approximate cable diameter of insulated conductor	mm	
d)	Approximate Cable diameter over inner sheath		
e)	Approximate overall diameter of cable		
12.0	Tolerance on overall diameter	(±) mm	
13.0	Minimum bending radius	x O.D.	
14.0	Safe pulling force	kg.	
15.0	Maximum Charging current at nominal voltage (approx.)	amps/km	
16.0	Minimum Tensile strength	N/mm ²	
17.0	Minimum elongation percentage at rupture		
18.0	Weight of cable / components	kg./m	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES 2 X 660MW ENNORE SEZ STPP	SPECIFICATION NO. PE-TS- 412-507-E006	
		VOLUME II	
		SECTION I	
		REVISION: 00	DATE: 30.01.2017
		SHEET 5 OF 5	

a)	Weight of conductor	-	
b)	Weight of fire barrier tape	-	
c)	Weight of insulation	-	
d)	Weight of polymeric material	-	
e)	Weight of Armour (GS/Aluminium)	-	
f)	Total weight of cable	-	
19.0	Shipping Weight	kg	
20.0	Cable marking on outer sheath	-	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			



**TECHNICAL SPECIFICATION FOR
EPR INSULATED FIRE SURVIVAL
CABLES**

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS-412-507-E006

VOLUME II

SECTION II

REVISION: 00

DATE: 30.01.2017

SHEET -

SECTION-II

STANDARD TECHNICAL SPECIFICATION



TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS-412-507-E006

VOLUME II

SECTION II

REVISION: 00

DATE: 30.01.2017

SHEET 1 OF 1

1.0 TECHNICAL REQUIREMENTS

- 1.1 Technical requirements for EPR INSULATED FIRE SURVIVAL CABLES shall be as indicated in this section, in addition to those specified in Section I & Datasheet-A.

2.0 CODES & STANDARDS

- 2.1 The design, material, construction, manufacture, inspection, testing and performance of EPR INSULATED FIRE SURVIVAL CABLES shall conform to the latest revision of relevant standards and codes of practices mentioned in Data Sheet – A.
- 2.2 In case of conflict between the applicable reference standard and this specification, this specification shall govern.

3.0 QUALITY ASSURANCE REQUIREMENTS

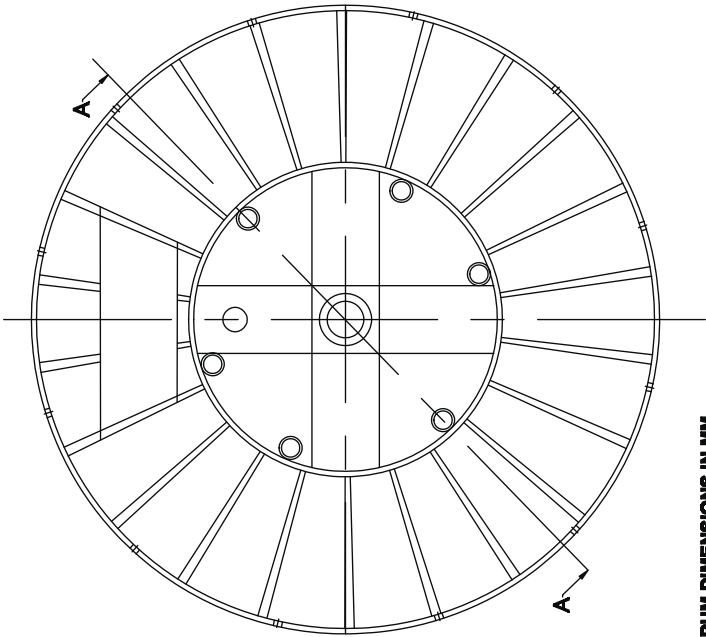
- 3.1 Bidder shall confirm compliance with the BHEL Standard Quality Plan (PE-QP-999-507-E006 as attached with the specification without any deviations. At contract stage, the successful bidder shall submit the same QP for BHEL/ultimate customer's approval. In case bidder has reference QP agreed with 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 requirements, routine / acceptance testing and special testing requirements shall be as per Annexure to QAP. Charges for all these tests for all the equipment & components shall be deemed to be included in the bid price (except UV Radiation test).
- 3.4 The charges of UV Radiation 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 as specified in Datasheet-A.
- 4.2 In case of wooden drums, all wooden parts shall be manufactured from seasoned wood treated with copper naphthenates / zinc naphthenates (refer IS: 401). 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.
- 4.3 In case of Steel drums, New or practically new cable drums made of steel and painted with epoxy resin paint are to be used. Cable ends are carefully protected before packing. Over the cables polyethylene sheet shall be wrapped and then sealed properly. For Typical details of Steel drums, Annexure-I to Section-II, may be referred by the bidder. Bidder may modify, to choose appropriate dimensions of steel drums to suite various sizes/weight/ lengths of EPR INSULATED FIRE SURVIVAL CABLES.

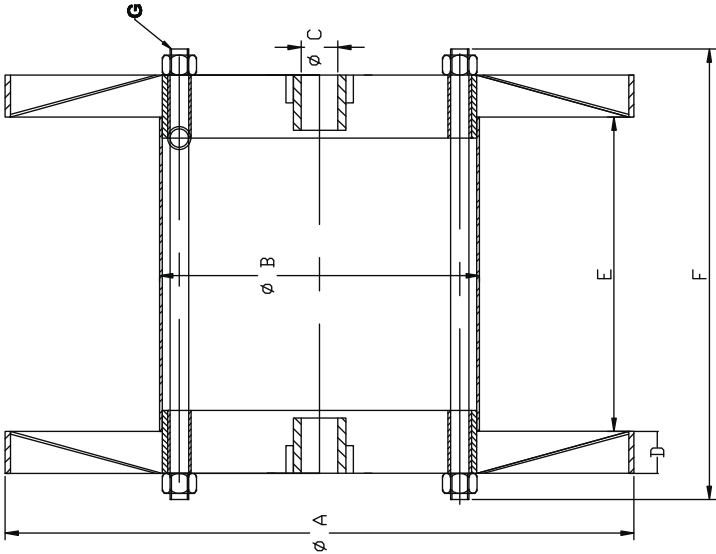
ANNEXURE-I TO SECTION-II

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



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

A	FLANGE	2200
B	BARREL	1200
C	CENTRAL HOLE	100
D	FLANGE	50
E	TRAVERSE	1400
F	GROSS WIDTH	1600
G	STUD SIZE	16 MM.





**TECHNICAL SPECIFICATION FOR
EPR INSULATED FIRE SURVIVAL
CABLES**

2 X 660MW ENNORE SEZ STPP

SPECIFICATION NO. PE-TS- 412-507-E006

VOLUME II

SECTION II

REVISION: 00

DATE: 30.01.2017

SHEET -

ANNEXURE-II

QUALITY PLAN

		STANDARD QUALITY PLAN		CUSTOMER : TAMILNADU GENERATION & DISTRIBUTION CORP. LTD.		PROJECT: 2 X 660MW ENNORE SEZ TITLE: SUPERCRITICAL TPP		SPECIFICATION NUMBER : PE-TS-412-507-E006			
				BIDDER/ : VENDOR		QUALITY PLAN NUMBER: PE-QP-999-507-E006, R0		SPECIFICATION TECHNICAL SPECIFICATION FOR TITLE: EPR INSULATED FIRE SURVIVAL			
				SYSTEM		ITEM : EPR INSULATED FIRE SURVIVAL CABLES		SECTION VOLUME II			
SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY	REMARKS	
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 MATERIALS & BOUGHT OUT ITEMS										
1.1	Aluminium/copper Rods (Conductor/Armour Wire)	GENERAL : 1. Physical properties	MA	Physical Tests	Sample/ Batch	IS 9968 Pt 1,IS 8130 & Appd Datasheet	IS 9968 Pt 1,IS 8130 & Appd Datasheet	Inpection Report/ Test Cert.	2/3	-	1/2
		2. Elec.Properties	MA	Electrical Tests	Sample/ Batch	-do-	-do-	-do-	2/3	-	1/2
		SPECIFIC CHECKS : a) Make	MA	Verify	100%	Manufacturer approved source	Manufacturer approved source	COC/ Test Cert.	2/3	-	1
		b) Grade	MA	-do-	-do-	IS 8130/ Approved datasheet	IS 8130/ Approved datasheet	-do-	2/3	-	1
		c) Resistivity	MA	Electrical Tests	Manufacturer std.	IS 8130	IS 8130	-do-	2/3	-	1
1.2	Insulation (EPR) Copmpound	GENERAL : 1. Physical properties	MA	Physical Tests	Sample/ Batch	IS 9968 Pt 1, IS 6380 & Mfs Std./ Approved datasheet	IS 9968 Pt 1, IS 6380 & Mfs Std./ Approved datasheet	Inpection Report/ Test Cert.	2/3	-	1/2
		2. Elec.Properties	MA	Electrical Tests	Sample/ Batch	-do-	-do-	-do-	2/3	-	1/2
		SPECIFIC CHECKS : a) Make	MA	Verify	100%	Manufacturer approved source	Manufacturer approved source	COC/ Test Cert.	2/3	-	1
		b) Type/ Grade	MA	-do-	-do-	Approved datasheet	Approved datasheet	-do-	2/3	-	1
		c) Shelf life/ Storage condition	MA	-do-	-do-	Compound Manufacturer std.	Compound Manufacturer std.	-do-	2/3	-	1
BHEL			PARTICULARS		BIDDER/VENDOR						
			NAME								
			SIGNATURE								
			DATE								
									BIDDER'S/VENDORS COMPANY SEAL		

		STANDARD QUALITY PLAN		CUSTOMER : TAMILNADU GENERATION & DISTRIBUTION CORP. LTD.		PROJECT: 2 X 660MW ENNORE SEZ SUPERCRITICAL TPP		SPECIFICATION				
				BIDDER/ : VENDOR		QUALITY PLAN NUMBER: PE-QP-999-507-E006, R0		SPECIFICATION TECHNICAL SPECIFICATION FOR TITLE EPR INSULATED FIRE SURVIVAL				
		SHEET 2 OF 10		SYSTEM		ITEM : EPR INSULATED FIRE SURVIVAL CABLES		SECTION		VOLUME II		
SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC 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
1.3	Seathing Compound	<u>GENERAL :</u> 1. Physical properties 2. HOFR properties <u>SPECIFIC CHECKS :</u> 1. Make 2. Type/ Grade 3. Shelf life/ Storage condition	MA	Physical Tests	Sample/ Batch	IS 9968 Pt 1 & Mfs Std./ Approved datasheet	IS 9968 Pt 1 & Mfs Std./ Approved datasheet	Inpection Report/ Test Cert.	2/3	-	1/2	
			MA	Envir/Chemical	Sample/ Batch	ASTMD:2843, ASTMD-2863, IEC-60754-1/ Approved datasheet	ASTMD:2843, ASTMD-2863, IEC-60754-1/ Approved datasheet	Inpection Report/ Test Cert.	2/3	-	1/2	
			MA	Verify	100%	Manufacturer approved source	Manufacturer approved source	COC/ Test Cert.	2/3	-	1	
			MA	-do-	-do-	Approved datasheet	Approved datasheet	-do-	2/3	-	1	
			MA	-do-	-do-	Compound Manufacturer std.	Compound Manufacturer std.	-do-	2/3	-	1	
1.4	Glass Mica Tape (Separator Tape)	<u>GENERAL :</u> 1. Physical properties 2. Elec.Properties	MA	Physical Tests	Sample/ Batch	Mfr. Std./ Approved datasheet	Mfr. Std./ Approved datasheet	Inpection Report/ Test Cert.	2/3	-	1/2	
			MA	Electrical Tests	Sample/ Batch	-do-	-do-	-do-	2/3	-	1/2	
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE									
									BIDDER'S/VENDORS COMPANY SEAL			

		STANDARD QUALITY PLAN SHEET 3 OF 10		CUSTOMER : TAMILNADU GENERATION & DISTRIBUTION CORP. LTD.		PROJECT: 2 X 660MW ENNORE SEZ TITLE: SUPERCRITICAL TPP		SPECIFICATION NUMBER : PE-TS-412-507-E006				
				BIDDER/ : VENDOR		QUALITY PLAN NUMBER: PE-QP-999-507-E006, R0		SPECIFICATION TITLE: EPR INSULATED FIRE SURVIVAL CABLES				
				SYSTEM		ITEM : EPR INSULATED FIRE SURVIVAL CABLES		SECTION VOLUME II				
SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
1.5	Galvanised steel round wire/Aluminium round wire for Armour (as applicable)	GENERAL : 1. Make 2. Dimension 3. Phy.and Elec. Properties 4.Galvanization Quality	MA	Verify	Manufacturer std.	Manufacturer approved source	Manufacturer approved source	Inspection Report/ Test Cert.	2/3	-	1	* Sample from each armour size/ Batch / Lot
			MA	Measurement	-do-	IS 3975 & Approved datasheet	IS 3975 & Approved datasheet	-do-	2/3	-	2	
			MA	Physical & Electrical Tests	Sample*	-do-	-do-	-do-	2/3	-	2	
			MA	Galv.Tests	-do-	Relevant. IS & Mfr. Std.	Relevant. IS & Mfr. Std.	-do-	2/3	-	2	
1.6	Wodden Drum	1. Phy. And constructional checks	MA	Meas.	Mfr's Plant Std.	IS10418	IS10418	Inspection Report/ Test Cert. COC	2/3	-	1	
		2. Anti termite treatment	MA	chemical	-do-	Mfr's Plant Std.	Mfr's Plant Std.	-do-	2/3	-	1	
1.7	Steel Drum	1. Dimension	MA	Meas.	Mfr's Plant Std.	Approved drawing of steel drum / BHEL specification	Approved drawing of steel drum / BHEL specification	Inspection Report/ Test Cert.	2/3	-	1	
		2. Surface finish	MA	Meas.	-do-	Surface shall be smooth	Surface shall be smooth	-do-	2/3	-	1	
BHEL		PARTICULARS		BIDDER/VENDOR								
		NAME										
		SIGNATURE										
		DATE							BIDDER'S/VENDORS COMPANY SEAL			

			STANDARD QUALITY PLAN			CUSTOMER : TAMILNADU GENERATION & DISTRIBUTION CORP. LTD.			PROJECT TITLE : 2 X 660MW ENNORE SEZ SUPERCRITICAL TPP			SPECIFICATION : NUMBER : PE-TS-412-507-E006		
SHEET 4 OF 10			BIDDER/ VENDOR :			QUALITY PLAN NUMBER: PE-QP-999-507-E006, R0			SPECIFICATION TECHNICAL SPECIFICATION FOR TITLE EPR INSULATED FIRE SURVIVAL			SECTION VOLUME II		
SYSTEM			ITEM : EPR INSULATED FIRE SURVIVAL CABLES			AGENCY			REMARKS					
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	P	W	V			
1	2	3	4	5	6	7	8	9	10			11		
2.0	IN PROCESS													
2.1	Wire Drawing	1. Size	MA	Dimensional	Plant Mfg. Std.	IS 8130 & Appd. Datasheet	IS 8130 & Appd. Datasheet	Inpection Report	2	-	1	* Sample from each armour size/ Batch / Lot		
		2. Surface finish	MA	Visual	-do-	Surface shall be smooth	Surface shall be smooth	-do-	2	-	1			
		3. Phy.and Elec. Properties	CR	Physical & Electrical Tests	Sample*	IS 8130 & Mfr. Std.	IS 8130 & Mfr. Std.	-do-	2/3	-	2			
2.2	Stranding of wires	1. No. of wires	MA	Counting	Plant Mfg. Std.	IS 8130 & Appd. Datasheet	IS 8130 & Appd. Datasheet	Inpection Report	2	-	-			
		2. Resistance	CR	Electrical	-do-	-do-	-do-	-do-	2	-	-			
		3. Sequence, lay length & Direction	MA	Visual, Meas.	One Sample of each size/ lot	Mfrs Std. / Appd. Datasheet	Mfrs Std. / Appd. 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	IS 8130 & Appd. Datasheet	IS 8130 & Appd. Datasheet	-do-	2	-	-			
2.3	Glass Mica tape	1. Dimensions	MA	Measurement	100%	Appd. datasheet	Appd. datasheet	Inpection Report	2	-	-			
		2. Dia over tape	MA	Measurement	Sample	Mfrs Std.	Mfrs Std.	-do-	2	-	-			
		3.Mica tape overlap	MA	Measurement	Sample	Appd. datasheet	Appd. datasheet	-do-	2	-	-			
2.4	Core Insulation (EPR) (No repair permitted)	1. Surface finish	MA	Visual	100%	Free from bulging, burnt particles, lumps, cuts & scratches	Free from bulging, burnt particles, lumps, cuts & scratches	Inpection Report	2	-	1	# To be checked at starting & finished end of extruded length.		
		2. Concentricity#	CR	Measurement	One Sample of each size/ lot	IS 9968 Pt 1 & Appd. Datasheet	IS 9968 Pt 1 & Appd. Datasheet	-do-	2	-	1			
		3. Insulation Thickness	CR	Measurement	-do-	-do-	-do-	-do-	2	-	-			
		4. Dia over insulation	MA	Measurement	-do-	-do-	-do-	-do-	2	-	-			
		5. Tensile Strength & % Elongation	MA	Mechanical	100%	-do-	-do-	-do-	2	-	-			
		6. Water absorption test	CR	Electrical	100%	IS 6380 ,Mfrs Std.	IS 6380 ,Mfrs Std.	Inpection Report	2	-	1			
BHEL			PARTICULARS			BIDDER/VENDOR								
			NAME											
			SIGNATURE											
			DATE						BIDDER'S/VENDORS COMPANY SEAL					

		STANDARD QUALITY PLAN		CUSTOMER : TAMILNADU GENERATION & DISTRIBUTION CORP. LTD.			PROJECT TITLE		2 X 660MW ENNORE SEZ SUPERCRITICAL TPP		SPECIFICATION : NUMBER : PE-TS-412-507-E006		
				BIDDER/ : VENDOR			QUALITY PLAN NUMBER: PE-QP-999-507-E006, R0		SPECIFICATION TECHNICAL SPECIFICATION FOR TITLE EPR INSULATED FIRE SURVIVAL				
		SHEET 5 OF 10		SYSTEM			ITEM : EPR INSULATED FIRE SURVIVAL CABLES		SECTION		VOLUME II		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC 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	
2.5	Core Laying	1. Dia over laid up core 2. Sequence of lay & direction 3. Lay Length	MA MA MA	Measurement Visual & Meas. Measurement	One Sample of each size/ lot -do- -do-	IS 9968 Pt 1 & Approved datasheet IS 9968 Pt 1 & Mfs Std. -do-	IS 9968 Pt 1 & Approved datasheet IS 9968 Pt 1 & Mfs Std. -do-	Inpection Report -do- -do-	2 2 2	- - -	- - -	(Pimple, fish eye, porosity & burnt particles not permitted.)	
2.6	InnerSheath Extrusion	1. Surface finish 2. Thickness 3. Dia over inner sheath	MA CR MA	Visual Measurement -do-	100% One Sample of each size/ lot -do-	Surface shall be smooth Appd. Datasheet -do-	Surface shall be smooth Appd. Datasheet -do-	Inpection Report -do- -do-	2 2 2	- - -	- - -		
2.7	Armour	1. No.of wires/Strips 2. Lay length & Direction 3. Dia over armouring 4. Coverage	MA MA MA MA	Counting Visual & Meas. Measurement Measurement	At the start of the process -do- -do- -do-	Mfrs Std. / Appd. Datasheet -do- Appd. Datasheet -do-	Mfrs Std. / Appd. Datasheet -do- Appd. Datasheet -do-	Inpection Report -do- -do- -do-	2 2 2 2	- - - -	- - - -		
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME										
			SIGNATURE										
			DATE										
													BIDDER'S/VENDORS COMPANY SEAL

				STANDARD QUALITY PLAN		CUSTOMER : TAMILNADU GENERATION & DISTRIBUTION CORP. LTD.		PROJECT : 2 X 660MW ENNORE SEZ SUPERCRITICAL TPP		SPECIFICATION : NUMBER : PE-TS-412-507-E006		
				BIDDER/ VENDOR :		QUALITY PLAN NUMBER: PE-QP-999-507-E006, R0		TECHNICAL SPECIFICATION FOR TITLE : EPR INSULATED FIRE SURVIVAL				
SHEET 6 OF 10				SYSTEM :		ITEM : EPR INSULATED FIRE SURVIVAL CABLES		SECTION :		VOLUME II		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	10	11	12	
2.8	Outer Sheath Extrusion (No repair permitted)	1. Surface finish 2. Sheath Thickness 3. Dia over outer sheath 4. Embossing/ Sequential Marking	MA CR MA MA	Visual Measurement -do- Visual	100% One Sample of each size/ lot -do- 100%	Surface shall be smooth Appd. Datasheet -do- -do-	Surface shall be smooth Appd. Datasheet -do- -do-	Inpection Report -do- -do- -do-	2 2 2 2	- - - -	- - - -	(Pimple, fish eye, porosity & burnt particles not permitted.)
3.0	Finished Cable (INTERNAL)	1. Routine Test (Refer Note-G)	CR	Electrical Tests & Measurement	100%	IS 9968 Pt 1 & Approved datasheet	IS 9968 Pt 1 & Approved datasheet	Test Report	2	-	1	
4.0	Final Inspection (EXTERNAL)	1. Finish 2. Dimension 3. Armouring - Coverage No.of Wires	MA MA MA	Visual Measurement Visual & Meas.	One drum in each Lot -do- -do-	IS 9968 Pt 1 & Approved datasheet -do- -do-	Free from Porosity, Bulging, Burnt particles,lumps, cuts & Approved Data Sheet -do- -do-	Test Report -do- -do-	2 2 2	1 1 1	- - -	
BHEL			PARTICULARS			BIDDER/ VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

		STANDARD QUALITY PLAN		CUSTOMER : TAMILNADU GENERATION & DISTRIBUTION CORP. LTD.			PROJECT TITLE 2 X 660MW ENNORE SEZ SUPERCRITICAL TPP		SPECIFICATION : NUMBER : PE-TS-412-507-E006			
				BIDDER/ VENDOR :			QUALITY PLAN NUMBER: PE-QP-999-507-E006, R0		SPECIFICATION TECHNICAL SPECIFICATION FOR TITLE EPR INSULATED FIRE SURVIVAL			
		SHEET 7 OF 10		SYSTEM			ITEM : EPR INSULATED FIRE SURVIVAL CABLES			SECTION VOLUME II		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC 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
5.0	Packing	4. Marking & Colour coding 5. Acceptance Tests (Refer Note-G) 6. Type Tests (Refer Note-G) Sealing Identification	MA	Visual	IS 9968 Pt 1 & Approved datasheet	-do-	IS 9968 Pt 1 & Approved datasheet	-do-	2	1	-	# Refer Annexure to QAP enclsod
			CR	Phy, Elect. Tests FRLS Tests	Sample #	-do-	-do-	-do-	2	1	-	
			CR	Physical & Electrical Tests	Sample #	-do-	-do-	-do-	2	1	-	
			MA	Visual	100%	As per IS	As per Mfr. Std.	-do-	2	1	-	
NOTES:- (A) JOINTS IN WIRE SHALL BE AS PERMITTED BY IS / BHEL SPECIFICATION, VENDOR TO CERTIFY THE SAME. (B) NO REPAIR OF CORE INSULATION PERMITTED. (C) CABLE ENDS SHALL BE SEALED AS PER MANUFACTRERS STANDARD. (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 APPROVED DATA SHEET (F) VENDOR SHALL FURNISH COMPLIANCE CERTIFICATE TO THE INSPECTION AGENCY CONFIRMING THE PACKING AS PER BHEL SPECIFICATION. (G) FOR LIST OF ROUTINE, TYPE & ACCEPTANCE TESTS, REFER ANNEXURE TO QAP ENCLOSED.												
LEGEND : P : PERFORMER W: WITNESSER V: VERIFIER 1- BHEL/ CUSTOMER 2-VENDOR 3- SUB VENDOR CHP:CUSTOMER HOLD POINT WHICH WILL BE DECIDED AT CONTRACT STAGE												
		BHEL			PARTICULARS	BIDDER/ VENDOR						
					NAME							
					SIGNATURE							
					DATE							
									BIDDER'S/VENDORS COMPANY SEAL			

	ANNEXURE TO QAP	CUSTOMER: TAMILNADU GENERATION & DISTRIBUTION CORP. LTD.	PROJECT TITLE: 2 X 660MW ENNORE SEZ SUPERCRITICAL TPP	SPECIFICATION NUMBER: PE-TS-412-507-E006
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E006, R0	SPECIFICATION TITLE: TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES
	SHEET 8 of 10	SYSTEM	ITEM: EPR INSULATED FIRE SURVIVAL CABLE	DOC. NO.

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 test to be conducted on one size / lot.
 - Fire Survival tests at sl.no. 8 to be conducted on all sizes / lot.

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 shall be carried out on 4 drums / lot.

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 tests shall be conducted on 100% drums.

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
1.0	Tests for Conductor				
I.	Persulphate test	For copper conductor only	T	IS 10810 Pt 4	
II.	Annealing test	For copper conductor only	T, A	IS 10810 Pt 1	<i>Internal in process Test Report to be furnished for acceptance test</i>
III.	Conductor Resistance test	For Cu	T, A, R	IS 10810 Pt 5	
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	

BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S / VENDORS COMPANY SEAL

	ANNEXURE TO QAP	CUSTOMER: TAMILNADU GENERATION & DISTRIBUTION CORP. LTD.	PROJECT TITLE: 2 X 660MW ENNORE SEZ SUPERCRITICAL TPP	SPECIFICATION NUMBER: PE-TS-412-507-E006
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E006, R0	SPECIFICATION TITLE: TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES
	SHEET 9 of 10	SYSTEM	ITEM: EPR INSULATED FIRE SURVIVAL CABLE	DOC. NO.

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
V.	Winding test	For GS strip only	T, A	IS 10810 Pt 39	
VI.	Resistivity test	Applicable for Aluminium wire & GS wire	T, A,R	IS 10810 Pt 42	
VII.	Uniformity of Zinc coating test	For G. S. wires/Strip only	T, A	IS 10810 Pt 40	
VIII.	Mass of Zinc coating test	For G. S. wires/Strip only	T, A	IS 10810 Pt 41	
IX.	Wrapping Test	For Aluminium wires only	T, A	IS 10810 Pt 3	
3.0	<u>Test for Fire Barrier Tape</u>				
I.	Test for minimum thickness	Fire barrier tape	T,A	IS 10810 Pt 6	
4.0	<u>Physical Tests for EPR insulation & sheath</u>				
I.	Material	Applicable for insulation, HOFR elastomeric inner & outer sheath	T,A	IS 9968 Pt 1	
II.	Test for thickness	Applicable for insulation, HOFR elastomeric inner & outer sheath	T,A	IS 10810 Pt 6	
III.	Tensile strength and elongation test at break	Applicable for insulation, HOFR elastomeric inner & outer sheath	T,A	IS 10810 Pt 7	
IV.	Ageing in air oven	Applicable for insulation	T	IS 10810 Pt 11	
V.	Ageing in air bomb	Applicable for insulation, HOFR elastomeric inner & outer sheath	T	IS 10810 Pt 56	
VI.	Hot set test	Applicable for insulation, HOFR elastomeric inner & outer sheath	T,A	IS 10810 Pt 30	
VII.	Oil resistance	Applicable for insulation, HOFR elastomeric inner & outer sheath	T	IS 10810 Pt 31	
VIII.	Tear resistance	Applicable for insulation, HOFR elastomeric inner & outer sheath	T	IS 10810 Pt 17	
5.0	<u>Electrical Tests</u>				
I.	Insulation resistance	Applicable for EPR insulation	T,A	IS 10810 Pt 43	
II.	High voltage (Water immersion) test	Applicable for HOFR elastomeric Inner & outer sheath	T,A,R	IS 10810 Pt 45	
III.	Water absorption test	Applicable for EPR insulation	T	IS 10810 Pt 28	
6.0	<u>HOFR Tests (On complete cable)</u>				

BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S / VENDORS COMPANY SEAL

	ANNEXURE TO QAP	CUSTOMER: TAMILNADU GENERATION & DISTRIBUTION CORP. LTD.	PROJECT TITLE: 2 X 660MW ENNORE SEZ SUPERCRITICAL TPP	SPECIFICATION NUMBER: PE-TS-412-507-E006
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E006, R0	SPECIFICATION TITLE: TECHNICAL SPECIFICATION FOR EPR INSULATED FIRE SURVIVAL CABLES
	SHEET 10 of 10	SYSTEM	ITEM: EPR INSULATED FIRE SURVIVAL CABLE	DOC. NO.

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
I.	Oxygen Index test	Applicable for HOFR elastomeric Inner & outer sheath	T, A	ASTMD-2863	
II.	Temperature index test	Applicable for HOFR elastomeric Inner & outer sheath	T, A	ASTMD-2863	
III.	Smoke density test	Applicable for HOFR elastomeric Inner & outer sheath	T, A	ASTMD 2843	
IV.	Swedish chimney test	For complete cable	T, A	SEN SS 424 1475 (Class F3)	
V.	Acid Gas Generation test	Applicable for HOFR elastomeric Inner & outer sheath	T, A	IEC 60754-1	
7.0	<u>Flammability Tests</u>				
I.	Flammability test for bunched cables	For complete cable	T	IEC-60332 (Part- 3) CAT-B	
II.	Flammability test for single cable	For complete cable	T	IEC:60332 Part-1	
III.	Flammability test	For complete cable	T	IEEE: 60383	
8.0	<u>Fire Survival Test</u>	For complete cable	T	IEC-60331-1	
9.0	<u>Toxicity Index (max 5%)</u>		T	NES 713	<u>Acceptance Criteria: Material Certificate or availability of facility for conduction of test</u>
10.0	<u>Corrosive Gases Test (pH > 4.3 & conductivity < 100 microSiemens/cm)</u>		T	IEC 60754-2	

BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S / VENDORS COMPANY SEAL

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.