



Bid Number: GEM/2022/B/2862044
Dated: 15-12-2022

Bid Document

Bid Details	
Bid End Date/Time	26-12-2022 16:00:00
Bid Opening Date/Time	26-12-2022 16:30:00
Bid Offer Validity (From End Date)	80 (Days)
Ministry/State Name	Ministry Of Heavy Industries And Public Enterprises
Department Name	Department Of Heavy Industry
Organisation Name	Bharat Heavy Electricals Limited (bhel)
Office Name	10250020-pem, Noida
Total Quantity	6500
Item Category	3C 2.5 CU ARMOURED , 2C 50 CU ARMOURED , 3.5C 70 CU ARMOURED
BOQ Title	LT XLPE POWER CABLE
MSE Exemption for Years of Experience and Turnover	No
Startup Exemption for Years of Experience and Turnover	No
Document required from seller	Experience Criteria,Certificate (Requested in ATC),Additional Doc 1 (Requested in ATC),Additional Doc 2 (Requested in ATC),Additional Doc 3 (Requested in ATC),Additional Doc 4 (Requested in ATC),Compliance of BoQ specification and supporting document *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
Bid to RA enabled	Yes
RA Qualification Rule	50% Lowest Priced Technically Qualified Bidders
Type of Bid	Two Packet Bid
Primary product category	3.5C 70 CU ARMOURED
Time allowed for Technical Clarifications during technical evaluation	3 Days
Payment Timelines	Payments shall be made to the Seller within 90 days of issue of consignee receipt-cum-acceptance certificate (CRAC) and on-line submission of bills (This is in supersession of 10 days time as provided in clause 12 of GeM GTC)
Evaluation Method	Total value wise evaluation

EMD Detail

Required	No
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ePBG Detail

Advisory Bank	State Bank of India
ePBG Percentage(%)	5.00
Duration of ePBG required (Months).	26

(a). EMD & Performance security should be in favour of Beneficiary, wherever it is applicable.

Beneficiary:

IFSC Code- SBIN0017313, NEWDELHI

10250020-PEM, Noida, Department of Heavy Industry, Bharat Heavy Electricals Limited (BHEL), Ministry of Heavy Industries and Public Enterprises
(Bhel Pem Noida)

Splitting

Bid splitting not applied.

Reserved for Make In India products

Reserved for Make In India products	Yes
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MSE Purchase Preference

MSE Purchase Preference	Yes
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1. Bid reserved for Make In India products: : Procurement under this bid is reserved for purchase from Class 1 local supplier as defined in public procurement (Preference to Make in India), Order 2017 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products. However, eligible micro and small enterprises will be allowed to participate. The minimum local content to qualify as a class 1 local supplier is denoted in the bid document. All bidders must upload a certificate from the OEM regarding the percentage of the local content and the details of locations at which the local value addition is made along with their bid, failing which the bid is liable to be rejected. In case the bid value is more than Rs 10 Crore, the declaration relating to percentage of local content shall be certified by the statutory auditor or cost auditor, if the OEM is a company and by a practicing cost accountant or a chartered accountant for OEMs other than companies as per the Public Procurement (preference to Make-in -India) order 2017 dated 04.06.2020 . In case Buyer has selected Purchase preference to Micro and Small Enterprises clause in the bid, the same will get precedence over this clause.

2. Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L-1+ 15% (Selected by Buyer) of margin of purchase preference /price band defined in relevant policy, such Seller shall be given opportunity to match L-1 price and contract will be awarded for 25%(selected by Buyer) percentage of total QUANTITY.

3. Estimated Bid Value indicated above is being declared solely for the purpose of guidance on EMD amount and

for determining the Eligibility Criteria related to Turn Over, Past Performance and Project / Past Experience etc. This has no relevance or bearing on the price to be quoted by the bidders and is also not going to have any impact on bid participation. Also this is not going to be used as a criteria in determining reasonableness of quoted prices which would be determined by the buyer based on its own assessment of reasonableness and based on competitive prices received in Bid / RA process.

4. Reverse Auction would be conducted amongst first 50% of the technically qualified bidders arranged in the order of prices from lowest to highest. Number of sellers eligible for participating in RA would be rounded off to next higher integer value if number of technically qualified bidders is odd (e.g. if 7 bids are technically qualified, then RA will be conducted amongst L-1 to L-4). In case number of technically qualified bidders are 2 or 3, RA will be between all without any elimination. If Buyer has chosen to split the bid amongst N sellers, then minimum N sellers would be taken to RA round. In case Primary products of only one OEM are left in contention for participation in RA based on lowest 50% bidders qualifying for RA, the number of sellers qualifying for RA would be increased to get at least products of one more OEM (directly participated or through its reseller) if available. Further, if bid(s) of any seller(s) eligible for MSE preference is / are coming within price band of 15% of Non MSE L-1 or if bid of any seller(s) eligible for Make in India preference is / are coming within price band of 20% of non MII L-1, then such MSE / Make in India seller shall also be allowed to participate in the RA process.

3C 2.5 CU ARMoured

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

Brand Type	Unbranded
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Technical Specifications

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer and Quantity

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Arjun Srivastava	201301,BHEL-PEM, PLOT NO-25, SECTOR-16A, NOIDA	3500	999

2C 50 CU ARMoured

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

Brand Type	Unbranded
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Technical Specifications

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer and Quantity

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Arjun Srivastava	201301,BHEL-PEM, PLOT NO-25, SECTOR-16A, NOIDA	1000	999

3.5C 70 CU ARMoured

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

Brand Type	Unbranded
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Technical Specifications

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer and Quantity

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Arjun Srivastava	201301,BHEL-PEM, PLOT NO-25, SECTOR-16A, NOIDA	2000	999

Buyer Added Bid Specific Terms and Conditions

1. Generic

OPTION CLAUSE: The Purchaser reserves the right to increase or decrease the quantity to be ordered up to 25 percent of bid quantity at the time of placement of contract. The purchaser also reserves the right to increase the ordered quantity by up to 25% of the contracted quantity during the currency of the contract at the contracted rates. Bidders are bound to accept the orders accordingly.

2. Inspection

Nominated Inspection Agency: On behalf of the Buyer organization, any one of the following Inspection Agency would be conducting inspection of stores before acceptance:

Pre-dispatch Inspection at Seller Premises (applicable only if pre-dispatch inspection clause has been selected in ATC): Yes

Post Receipt Inspection at consignee site before acceptance of stores: NO

3. Buyer Added Bid Specific ATC

Buyer uploaded ATC document [Click here to view the file.](#)

Disclaimer

The additional terms and conditions have been incorporated by the Buyer after approval of the Competent Authority in Buyer Organization, whereby Buyer organization is solely responsible for the impact of these clauses on the bidding process, its outcome, and consequences thereof including any eccentricity / restriction arising in the bidding process due to these ATCs and due to modification of technical specifications and / or terms and conditions governing the bid. Any clause(s) incorporated by the Buyer regarding following shall be treated as null and void and would not be considered as part of bid:-

1. Definition of Class I and Class II suppliers in the bid not in line with the extant Order / Office Memorandum issued by DPIIT in this regard.
2. Seeking EMD submission from bidder(s), including via Additional Terms & Conditions, in contravention to exemption provided to such sellers under GeM GTC.
3. Publishing Custom / BOQ bids for items for which regular GeM categories are available without any Category item bunched with it.
4. Creating BoQ bid for single item.
5. Mentioning specific Brand or Make or Model or Manufacturer or Dealer name.
6. Mandating submission of documents in physical form as a pre-requisite to qualify bidders.
7. Floating / creation of work contracts as Custom Bids in Services.
8. Seeking sample with bid or approval of samples during bid evaluation process.
9. Mandating foreign / international certifications even in case of existence of Indian Standards without specifying equivalent Indian Certification / standards.
10. Seeking experience from specific organization / department / institute only or from foreign / export experience.
11. Creating bid for items from irrelevant categories.
12. Incorporating any clause against the MSME policy and Preference to Make in India Policy.
13. Reference of conditions published on any external site or reference to external documents/clauses.
14. Asking for any Tender fee / Bid Participation fee / Auction fee in case of Bids / Forward Auction, as the case may be.

Further, if any seller has any objection/grievance against these additional clauses or otherwise on any aspect of this bid, they can raise their representation against the same by using the Representation window provided in the bid details field in Seller dashboard after logging in as a seller within 4 days of bid publication on GeM. Buyer is duty bound to reply to all such representations and would not be allowed to open bids if he fails to reply to such representations.

[This Bid is also governed by the General Terms and Conditions](#)

In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws.

---Thank You---

Index for documents

GeM Tender Enquiry for LT XLPE POWER CABLE for 1X70MW KODAYAR HYDRO RMU, Kodayar

Sl. No.	Description	Annexures
1.	Additional terms and conditions	Annexure-I
2.	Clauses Instruction to Packing List	Annexure-II
3.	An undertaking regarding Model Certificate	Annexure-III
4.	Certificate for local Content	Annexure-IV
5.	BOQ	Refer attachment
6.	PQR	Refer attachment
7.	Technical Specification	SPECIFICATION NO.: PE-TS-470-507-E002

Annexure-I

	ADDITIONAL TERMS & CONDITIONS FOR LT XLPE POWER CABLE PACKAGE IN 1X70MW KODAYAR HYDRO RMU PROJECT :- SAME SHALL SUPERSEDE TERMS AND CONDITIONS MENTIONED ELSEWHERE IN BID	
1	Terms Of Payment	<p>Supply</p> <p>As per clause no. 12 (i), (ii) of GEM GTC 4.0 (Version 1.5)</p> <p>Supplier has to provide original 1 copy of Tax E-invoice (if applicable), Packing List, LR/RR, CRAC, Insurance intimation, Guarantee Certificate, Local content certificate, E-way bill (as applicable) for payment. Offline payment mode shall be selected.</p> <p>100% Payment will be released after CRAC & receipt of complete documents within 90 days for Non-MSME vendors, within 45 days for Micro & Small vendors and 60 days for Medium enterprises (as per MSMED Act).</p>
2	Terms Of Delivery	<p>F.O.R Dispatch station. However, unloading of items (at delivery point) shall be in the scope of buyer. Insurance shall be in seller scope. Bidder to quote prices accordingly.</p> <p>Further, w.r.t. Transit Insurance supplier has to inform the details of dispatches (such as Policy No., Consignee Name, Consignment Packing details, Project Name, Purchase Order No., LR No. & date, Invoice No. & date, Dispatch Origin & destination details etc.) to policy underwriter.</p>
3	Delivery Schedule	<p>For Main Supplies: - Delivery schedule shall be as per Annexure-A.</p> <p>Delivery period for sake of GeM bid shall be chosen as 999 days (maximum allowable delivery time) from PO date. However, this period shall not be considered for Delivery and Delay analysis purpose.</p> <p>For Delivery and delay analysis purpose, standard delivery schedule mentioned in Annexure-A shall be considered.</p>
4	Guarantee Terms	<p>As per Cl. No. 10 of GeM 4.0 (Version 1.5) dt 09th October 2022 on GeM for the bid. However, Guarantee & Warrantee time period shall be 18 months from the date of last supply in the contract.</p>
5	Quantity Variation	<p>Qty Variation shall be upto plus (+) 25%.</p>
6	Bank Guarantee	<p>Bank Guarantee submission shall be as per cl. No. 7 of GeM GTC 4.0 (Version 1.5) with initial validity of 26 Months. Further, extension if any shall be as per GeM Terms.</p>
7	Any other special major condition	<p>a) Material shall be dispatched only after issuance of MDCC/ clearance by BHEL.</p> <p>b) PVC clause: - Bidders to note that PVC formulae for calculating Price variation shall be as available at BHEL-PEM website i.e. https://pem.bhel.com/gcc.aspx</p> <p>c) MSE preference shall be provided with 25% of total Qty/ Business volume.</p> <p>d) Advance intimation of dispatch by bidder shall be given, to PEM and Insurance agency/Site.</p>
8	<p>This is a conditional tender enquiry. Reverse Auction of a bidder shall be subjected to the following:</p> <p>i) Approval of Bidder by end customer i.e. (M/s TANGEDCO)</p> <p>ii) Techno-Commercial evaluation by BHEL.</p> <p>iii) Qualification of Technical PQR.</p> <p>iv) Offered item should mandatorily conform to PP-MII order provisions.</p>	
9	<p>This item/package /system falls under the list of items defined in para 3 of ministry of finance guideline dtd. 20.09.16 (Procurement of items related to Public safety, Health, Critical Security operations & Equipment's etc.) & hence criteria of prior experience/Turnover shall be same for all the bidders including start-up/MSME.</p>	
10	<p>Data Sheet of the product(s) offered in the bid, are to be uploaded along with the bid documents. Buyers can match and verify the Data Sheet with the product specifications offered. In case of any unexplained mismatch of technical parameters, the bid is liable for rejection.</p>	

Annexure-I

11	<p>Bidders have to note, "For this procurement, the local content to categorize a supplier as a Class I local supplier as defined in Public Procurement (Preference to Make in India) Order 2017 dated 16.09.2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT."</p> <p>Since this package falls under clause 3 (a) of DPIIT's PP-MII order 2017, Rev dated 16/09/2020 & MHI Order no. 9/45/2017 HE&MT-Part I dated 29.12.2021 issued by MHI, therefore, in line with clause of DPIIT's PP-MII order 2017, Rev dated 16/09/2020, "Class-I local suppliers" as defined in the order are eligible to bid.</p> <p>In accordance with para 9 (a) of DPIIT's PP-MII order 2017 revision dated 16/09/2020, Class-I local suppliers at the time of tender, bidding or solicitation shall be required to indicate percentage of local content and provide self-certification that the item offered meets the local content requirement for the Class-I local supplier". They shall also give details of the location(s) at which the local value addition is made as per annexure-IV.</p> <p>*Class-II suppliers as per MII order is not eligible to bid for subject tender and it is reserved for Class-I supplier having min. local content 60%. In case tender is showing for class-II suppliers also due to GeM logic, same may please be ignored/neglected.</p>
12	<p>Bidders to ensure that Third party / customer issued certificates being submitted as proof of PQR qualification should have verifiable details of document / certificate issuing authority such as name & designation of Issuing Authority and its organization contact number and e-mail Id etc. In case the same found not available, Purchaser has right to reject such document from evaluation.</p>
13	<p>Bidders to,</p> <ul style="list-style-type: none"> • ensure compliance to Ministry of Power (MoP) Order No. 25-11/6/2018-PG dt. 02/07/2020 & Order No. 11/05/2018-Coord. dt. 28/07/2020, if applicable. • ensure compliance of Ministry of Finance (MoF) Order (Public Procurement No. 1 & 2) F. No. 6/18/2019/PPD dt. 23/07/2020. • to submit "Model Certificate for Tenders" as per Annexure-III of Ministry of Finance (MoF) Order (Public Procurement No. 1 & 2) F. No. 6/18/2019/PPD dt. 23/07/2020. <p>Note: Subsequent orders/circulars to be checked and to be complied.</p>
14	<p>Due to COVID-19 pandemic and other pandemic condition prevailing in the country, BHEL/PEM may go for Remote Inspection of Offered items, if required. Vendors are requested to be equipped with the facilities/gadgets as indicated in the guidelines mentioned in "https://pem.bhel.com/Documents/VendorSection/Vendor/Guidelines.pdf" to take up the inspection REMOTELY.</p> <p>Inspection call to be raised by bidder on BHEL CQIR portal (details shall be shared at the of execution of order) and Inspection agency shall attend at the inspection within seven (07) days of the date on which the material is notified as being ready. In case of delay in witnessing of inspection beyond stipulated time (i.e. 7 days from the date on which the material is notified as being ready), by BHEL arising due to reasons not attributable to vendor, BHEL will extend the delivery period for such delay in carrying out inspection. If BHEL is not able to witness inspection up to 15 days then in addition to delay beyond stipulated period, extension in delivery time of 07 days for arranging fresh inspection will be given.</p> <p>When the tests have been satisfactorily completed at Seller/ Contractor's works, the Inspection Agency shall issue an inspection report that effect within seven (07) days after completion of the tests, but if the tests were not witnessed by the Inspection Agency or his representative, the material acceptance report would be issued within seven (07) days after receipt of the test certificates by the Purchaser.</p> <p>Purchaser will issue MDCC to the Seller/ Contractor within 7 days based on inspection report/ test certificates/Certificate of Conformance as applicable. In case of delay in issuance of MDCC beyond 7 days stipulated time (i.e. from the date of successful inspection report), by BHEL arising due to reasons not attributable to vendor, BHEL will extend the delivery period for such delay in issuing MDCC. If BHEL is not able to issue MDCC up to 15 days then in addition to delay beyond stipulated period, 7 days' additional time shall be given to vendor to facilitate the vendor for arranging logistics arrangements.</p>
15	<p>The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/guideline.</p>

Annexure-I

16	Bidders to inform freight /GST (%) percentage for all the items as part of un-priced bid to be submitted along with their Techno-Commercial offer. However, negotiation/RA shall be on Total Evaluation (FOR as per GeM) price only as per GeM logics. Detailed Price Break shall be reverse calculated based on freight/GST percentage furnished by bidder for Order Placement.
17	Bidder has to provide the details as per TECHNICAL PQR (of technical specification document) in its offer and has to note that bids of only those bidders shall be evaluated who meet the Technical Pre-Qualifying requirements. Above terms for PQR shall prevail in conflict (if any).
18	For bidders (who are not registered with BHEL-PEM) - For registration in BHEL PEM- Online registration portal is operational, Non-registered Vendors who wish to apply for registration in BHEL-PEM can apply through Online Registration Portal available at www.pem.bhel.com - vendor section - Online Supplier Registration. All credentials and/or documents duly signed and stamped related to registration can be uploaded on the website and submit the application for registration. However, registration of suppliers is not mandatory in case of open tender.
19	<p>Dispatch Markings: - Each box shall be marked with Capital Letters in "Red" indicating: Main Supply OR Commissioning spare OR Mandatory Spare for 1X70MW KODAYAR HYDRO RMU, Kodayar Lower Camp Kanyakumari District, pin 629102, India Each package/Drum delivered under the Contract shall be marked by Supplier as per details listed below and such marking must be distinct and in English Language (all previous irrelevant markings being carefully obliterated) for purposes of identification. Each and every box(package) shall be marked with following: -</p> <ol style="list-style-type: none"> 1) Name and address of the consignee. 2) Project Reference. 3) Name of Supplier 4) P.O. reference no. along with package name. 5) Packing No. (1/10, 2/10, 3/10 when there are 10 packages for one consignment) 6) The Gross weight and net weight of the package. <p>Besides above necessary, packing shall bear a special marking "TOP", "BOTTOM", "DO NOT TURN OVER", "DEEP DRY", "HANDLE WITH CARE", etc.</p> <p>IMPORTANT Two copies of respective standard manufacturer's erection instruction /operation manual shall be provided for immediate reference by BHEL site. The Copy of complete Packing list for the consignment must be put inside the Box/Boxes. 12 copies of supplier's Erection/ Instruction manuals to be given to the BHEL, PEM, PPEI Noida and 3 copies to BHEL, PSSR, Kodayar Site within 30 days of dispatch for handing over to Customer/BHEL site. LOP shall essentially have O&M Manuals and E&C guidelines to be kept inside box duly enclosed.</p> <p>Commissioning Spares (If any): - The commissioning spares shall be properly packed separately in separate box and each spare shall be properly tagged giving details i.e. dispatch (to match the description given in the packing slip) to facilitate their proper identification. One Copy of Packing list must be put inside the packing Box.</p>
20	<p>Liquidated Damages: -</p> <p>a) Supply:- Purchaser reserves the right to recover from the Seller/ Contractor, as agreed liquidated damages and not by way of penalty, a sum equivalent to half (½ %) percent and applicable GST thereon, of the total main supply & commissioning spares (if any) contract price excluding GST per week or part thereof, subject to a maximum of ten(10 %) percent of the total main supply & commissioning Spares(if any) contract price excluding GST, if the Seller/ Contractor fails to deliver any part of the ordered goods/stores within the period stipulated in the Order/ Contract.</p> <p>NOTE: i. LR/RR date for indigenous supplies (Bill of Lading/AWB for Foreign supplies) shall be treated as the date of dispatch for levying LD. However, if receipted LR date for indigenous supply is beyond 30 days for FTL/ 45 days for PTL from the date of LR (PTL to be clearly mentioned in LR), such excess period shall be considered for LD purpose</p>

Annexure-I

	<p>irrespective of dispatch date. Import General Manifest (IGM)/Bill of entry date (whichever is earlier), for foreign supplies, is beyond 90 days from the date of Bill of Lading/AWB, such excess period shall be considered for LD purpose irrespective of dispatch date.</p> <p>ii. In case of any amendment/ revision, LD shall be linked to the amended/ revised contract value and delivery date(s).</p> <p>iii. If Order/ Contract involves two or more Units/ Sets/ Lots/ Stages, then Liquidated Damages shall be levied on order/ contract value excluding GST of the delayed Unit/ Set/ Lot/ Stage, provided delivery stipulated in the Order/ Contract is Unit/ Set/ Lot/Stage wise, however total LD amount shall be limited to 10% of total order/ amended order value excluding GST of delayed Unit/ Set/ Lot/Stage. Any subsequent lot released (not envisaged in original contract) due to increase in quantity within permissible quantity variation shall be treated as separate lot for the purpose of LD.</p> <p>iv. The sum specified above is not a penalty but a genuine pre-estimate of the loss/ damage which will be suffered by purchaser on account of delay on the part of the Contractor/Seller and the said amount will be deductible without proof of actual loss or damage caused by such delay.</p>
21	Risk & Cost Purchase - As per Annexure-V
22	The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.
23	GeM has the functionality to quote Single Unit Price (F.O.R) for each item. Bidders to furnish applicable Freight & GST % w.r.t. Ex Works included in Single quoted (FOR) price.
24	For recognition of dispatch, vendor to submit following documents to BHEL by e-mail/ fax immediately on dispatch: - GST compliant invoice, LR for Indian Vendors (indicating Invoice No., no. of boxes, PTL (if applicable) etc.) / Bill of Lading or AWB for foreign vendor, Packing List (Must be indicating No. of boxes, Packing size, Gross weight and net weight of each package, Contents of the package with cross reference to BoM item code no. or item serial no. and Quantity of each item separately), Insurance Intimation to underwriter through email/fax, Dispatch Clearance.
25	<p>i. Bidder's offer is liable to be rejected if they don't upload any of the certificates / documents sought in the Bid document, ATC and Corrigendum if any.</p> <p>ii. Bidders are advised to check applicable GST on their own before quoting. Buyer will not take any responsibility in this regards. GST reimbursement will be as per actuals or as per applicable rates (whichever is lower), subject to the maximum of quoted GST %.</p> <p>iii. Data Sheet of the product(s) offered in the bid, are to be uploaded along with the bid documents. Buyers can match and verify the Data Sheet with the product specifications offered. In case of any unexplained mismatch of technical parameters, the bid is liable for rejection.</p> <p>iv. The bidder is required to upload, along with the bid, all relevant certificates such as BIS license, type test certificate, approval certificates and other certificates as prescribed in the Product Specification given in the bid document.</p> <p>v. While generating invoice in GeM portal, the seller must upload scanned copy of GST invoice and the screenshot of GST portal confirming payment of GST.</p>

ANNEXURE-A

Standard Delivery Schedule

Sl. No.	Package Code	Package name	BHEL Drawing No	Drawing Title	Primary/ Secondary	Drg Sch for Vendors	Standard Delivery Terms for Supply Portion	Scope of Services, (if any, as per Indent) and corresponding schedule for rendering the services
1	507-28000-A	LT XLPE POWER CABLES	PE-V0-XXX-507-E113	CROSS SECTION DRGS. - LT XLPE POWER CABLES	Primary	R-0 within 14 days from PO & subsequent revisions within 10 days of comments received from BHEL.	For Lot-1: Within Four (04) months from date of CAT-1 approval of Primary drawing/documents, subjected to drawing/document submission/re-submission schedule as stipulated, in case of any delay in submission/re-submission of Primary drawings/documents, then same shall be reduced from the given delivery period.	NA
			PE-V0-XXX-507-E913	QUALITY PLAN - LT XLPE POWER CABLES	Primary			
			PE-V0-XXX-507-E111	TECHNICAL DATA SHEET - LT XLPE POWER CABLES	Primary			
			PE-V0-XXX-507-E114	TYPE TEST CERTIFICATES - LT XLPE POWER CABLES	Secondary	Within 1 week after conduction of type test	For Subsequent Lots (if any): Within 3 months from Lot clearance by BHEL.	

Note:

- The end period specified is for completion of the deliveries. Deliveries to start progressively so as to meet the completion schedule.
- The delivery conditions specified are for contractual LD purposes, however BHEL may ask for early deliveries without any compensation thereof.
- Non-applicable drawings shall be decided during execution of the package.
- Wherever schedule of drawings/documents submission / re-submission is stipulated in the Technical Specifications, same shall be superseded by delivery specified in NIT

GeM BID NO. -....., Dt:-

ANNEXURE -II (INSTRUCTIONS TO PACKING LIST)

For faster verification of bills, successful bidder to submit detailed Bill of Material (BOM) at the time of drawings/ documents submission after placement of PO. Each item of the BOM to be uniquely identified with item code no. or item Sl. No. Supplier to ensure that all items which will find separate mention in the packing list are covered in this detailed BOM.

Supplier to also give the following undertaking in the BOM:

“The BOM provided herewith completes the scope (in content and intent) of material supply under PO No. Dated Any additional material which may become necessary for the intended application of the supplied items/package will be supplied free of cost in most reasonable time.

Packing List must indicate:

- a) Packing size
- b) Gross weight and net weight of each package
- c) Contents of the package with cross reference to BOM item code no. / Sl. No.
- d) Quantity of each items separately.

The packing list must cover all the BOM items.

Supplier to give following undertaking in the packing list:

The Packing list provided herewith is as per BOM approved under PO No. ----

Annexure-III

UNDERTAKING

PROJECT NAME: 1X70MW KODAYAR HYDRO RMU

PACKAGE NAME: LT XLPE POWER CABLE

TENDER ENQUIRY REF:

"I (M/s) have read the clause (GOI- MOF F.No. 6/18/2019-PPD dated 23/07/2020 and clarification dated 24.07.2020) regarding restrictions on procurement from a bidder of a country which shares a land border with India; I hereby certify that M/s (bidder name) is not from a such country and eligible to be considered".

For(Bidder Company Name)

(Authorized Signatory)

Note :- Bidder is requested to furnish the above undertaking on company letterhead from the highest competent authority at your end (i.e Owner, partner, CMD, Director, company secretariat etc.).

Bidder's company letter head

Annexure-IV

TO WHOM IT MAY CONCERN

PROJECT NAME: 1X70MW KODAYAR HYDRO RMU

PACKAGE NAME: LT XLPE POWER CABLE

GeM Bid No.:

As per Make in India orders issued by Govt. of India, we hereby confirm that minimum local content for GeM tender no. will be%.

We further confirm that address for local value addition will be our registered works is at

.....

Your's faithfully

Authorised Signatory & stamp

Note :- Bidder is requested to furnish the above undertaking on company letterhead from the highest competent authority at your end (i.e Owner, partner, CMD, Director, company secretariat etc.).

ANNEXURE-V

(RISK AND COST CLAUSE)

1. BHEL reserves the right to terminate the contract or withdraw portion of work and get it done through other agency, at the risk and cost of the contractor *after due notice of a period of 14 days' by BHEL* in any of the following cases:
 - i) If the Seller/Contractor fails to deliver the goods or materials or any instalment thereof within the period(s) fixed for such delivery or the Seller's poor progress of the supply/ services vis-a-vis delivery/execution timeline as stipulated in the Contract, backlog attributable to seller including unexecuted portion of supply does not appear to be executable within balance available period;
 - ii) Delivers goods or materials not of the contracted quality and failing to adhere to the contract specifications;
 - iii) Withdrawal from or repudiation/ abandonment of the supply/ services by Seller before completion as per contract or if the Seller refuses or is unable to supply goods or materials covered by the Order/Contract either in whole or in part or otherwise fails to perform the Order/Contract;
 - iv) Non-supply by the Seller within scheduled completion/delivery period as per Contract or as extended from time to time, for the reasons attributable to the Seller;
 - v) Termination of Contract on account of any other reason (s) attributable to Seller.
 - vi) Assignment, transfer, subletting of Contract without BHEL's written permission resulting in termination of Contract or part thereof by BHEL.
 - vii) If the Seller be an individual or a sole proprietorship Firm, in the event of the death or insanity of the Seller;
 - viii) If the Seller/Contractor being an individual or if a firm on a partnership thereof, shall at any time, be adjudged insolvent or shall have a receiving order for administration of his estate made against him or shall take any proceeding for composition under any Insolvency Act for the time being in force or make any assignment of the Order/Contract or enter into any arrangement or composition with his creditors or suspend payment or if the firm dissolved under the Partnership Act;
 - ix) If the Seller/Contractor being a company is wound up voluntarily or by order of a Court or a Receiver, Liquidator or Manager on behalf of the debenture holders and creditors is appointed or circumstances shall have arisen which entitles the Court of debenture holder and creditors to appoint a receiver, liquidator or manager;
 - x) Non-compliance to any contractual condition or any other default attributable to Seller.

1.1 Risk & Cost Amount against Balance Work:

Risk & Cost amount against balance work shall be calculated as follows:

$$\text{Risk \& Cost Amount} = [(A-B) + (A \times H/100)]$$

Where,

A= Value of Balance scope of Work (*) as per rates of new contract

B= Value of Balance scope of Work (*) as per rates of old contract being paid to the contractor at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

1.2 * Balance scope of work (in case of termination of contract):

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work for calculating risk & cost amount.

Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities.

Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose.

Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions.

However, increase in quantities on account of additional scope in new tender shall not be considered for this purpose.

NOTE: In case portion of work is being withdrawn at risk & cost of contractor instead of termination of contract, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work' for calculating Risk & Cost amount.

1.3 LD against delay in executed work in case of Termination of Contract:

LD against delay in executed work shall be calculated in line with LD clause no. 16 of GCC, for the delay attributable to contractor. For limiting the maximum value of LD, contract value shall be taken as Executed Value of work till termination of contract.

Method for calculation of LD against delay in executed work in case of termination of contract" is given below.

- i. Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor = T1
- ii. Let the value of executed work till the time of termination of contract = X
- iii. Let the Total Executable Value of work for which inputs/fronts were made available to contractor and were planned for execution till termination of contract = Y
- iv. Delay in executed work attributable to contractor i.e. $T2 = [1 - (X/Y)] \times T1$
- v. LD shall be calculated in line with LD clause (clause 16) of the Contract for the delay attributable to contractor taking "X" as Contract Value and "T2" as period of delay attributable to contractor.

2. Recoveries arising out of Risk & Cost and LD or any other recoveries due from Contractor

Without prejudice to the other means of recovery of such dues from the Seller recoveries from the Seller on whom risk & cost has been invoked shall be made from the following:

- a) Dues available in the form of Bills payable to seller, SD, BGs against the same contract.
- b) Dues payable to seller against other contracts in the same Region/Unit/ Division of BHEL.
- c) Dues payable to seller against other contracts in the different Region/Unit/ division of BHEL.

In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against contractor.

RISK & COST PURCHASE.

DEFAULT/ BREACH OF CONTRACT, INSOLVENCY AND RISK PURCHASE

In case of delays (beyond the maximum late delivery period as per LD clause) in supplies, or if there be defective supplies or non-fulfilment of any other terms and conditions of the Contract as enumerated subsequently in this clause, then, without prejudice to its right to recover any expenses, losses or damages to which the Buyer may be put to incur or sustain by reason of the Seller/Contractor's default or breach of Order/Contract or to suspend business dealings with the Seller/Contractor in terms of the Buyers' Guidelines for Suspension of Business Dealings as applicable from time to time, the Buyer shall also be entitled to cancel the Order/ Contract either in whole or portion thereof without compensation to Seller. On the occurrence of any of the acts/omissions mentioned below, the Buyer may if it so desires, procure upon such terms and in such manner as deemed appropriate, plant/ equipment/ stores not so delivered or others of similar description where plant/ equipment/ stores exactly complying with particulars are not, in the opinion of the Buyer (which shall be final), readily procurable, at the risk and cost of the Seller.

The Seller shall be liable to the Buyer for any excess costs incurred thereof and the Seller shall continue the performance of the Order/Contract to the extent not cancelled under the provisions of this clause. The Seller shall on no account be entitled to any gain on such repurchases. If the Bidder does not agree to this Risk Purchase clause, BHEL reserves the right to reject the bid/offer of the Bidder.

The order/contract may be cancelled in whole or part thereof and Risk & Cost Clause in line with terms and conditions of PO/Contract may be invoked by the Buyer in any of the following cases:

- i. If the Seller/Contractor fails to deliver the goods or materials or any installment thereof within the period(s) fixed for such delivery or the Seller's poor progress of the supply/services vis-à-vis delivery/execution timeline as stipulated in the contract, backlog attributable to the Seller including unexecuted portion of supply does not appear to be executable within balance period available;
- ii. delivers goods or materials not of the contracted quality and failing to adhere to the contract specifications/execution methodology;
- iii. withdrawal from or repudiation/abandonment of the supply/services by the Seller before completion as per contract or if the Seller refuses or is unable to supply goods or materials covered by the order/Contract either in whole or in part or otherwise fails to perform the Order/Contract.

- iv. Non supply by the Seller within scheduled completion/delivery period as per contract or as extended from time to time for reasons attributable to the Seller;
- v. Termination of Contract on account of any other reason(s) attributable to the Seller.
- vi. Assignment, transfer, sub-letting of Contract without BHEL's written permission resulting in termination of Contract or part thereof by BHEL.
- vii. If the Seller be an individual or a Sole Proprietorship, in the event of death or insanity of the Seller.
- viii. If the Seller/Contractor being an individual or if a partnership firm thereof, shall at any time be adjudged insolvent or shall have a receiving order for administration of his estate made against him or shall take any proceeding for composition under any Insolvency Act for the time being in force or make any assignment of the order/Contract or enter into any arrangement or composition with his creditors or suspend payment or if the firm dissolved under the Partnership Act;
- ix. If the Seller/Contractor being a Company is wound up voluntarily or by order of a Court or a Receiver, Liquidator or Manager on behalf of the debenture holders and creditors is appointed or circumstances have arisen which entitles the Court of debenture holder and creditors to appoint a receiver, liquidator or manager
- x. Non- Compliance to any contractual condition or any other default attributable to the Seller.

Such defaulting vendor/Seller shall not be eligible to participate in re-tendering conducted on account of risk purchase made due to fault of such vendor/Seller.

BHEL's right to go for Risk and Cost, Calculation of Risk and Cost amount & LD, recovery options to BHEL are given in detail in Annexure-V hereto.

BOQ OF LT XLPE POWER CABLES FOR 1X70MW KODAYAR HYDRO RMU

A)

1.1KV, Copper conductor, XLPE insulated, Galvanised Steel Round Wire Armoured for multi-core cables, INNER SHEATH: Extruded FRLS PVC compound conforming to type ST2 of IS: 5831 for multicore cable, OVERALL SHEATH: Extruded FRLS PVC compound conforming to type ST2 of IS: 5831 & black in colour.

S. No.	ITEM CODE	CABLE SIZE [No. of cores - Cross section Area (sq.mm)]	UNIT	QUANTITY (Metre)	DRUM LENGTH
1	507-28043-A	3C - 2.5- CU ARMoured	MTR	3500	500
2	507-28023-A	2C - 50- CU ARMoured	MTR	1000	500
3	507-28117-A	3.5C - 70- CU ARMoured	MTR	2000	500

NOTES:

- 1 The standard drum length shall be 500 meters as indicated above. Tolerance on individual drum length shall be $\pm 5\%$.
- 2 Overall tolerance on total dispatched quantity of each size shall be (-) 2% and (+) 0% except where the total ordered quantity is one single drum length of 500m, in which case it shall be -5% to 0%. Cables consumed for testing and inspection shall be to bidder's account.
- 3 For each individual cable size, one short length of not less than 200m may be accepted only in the final drum length to complete the supply (except where the total ordered quantity is one single drum length of 500m). The overall tolerance limits stipulated above shall continue to apply (in case short lengths are accepted).
- 4 In case of the quantities cleared by BHEL for manufacturing are manufactured and offered for inspection by successful bidder in more than one batch, BHEL reserves the right to witness type testing on all batches without any price implications.
- 5 Unit price of cables quoted by bidder shall be inclusive of type test charges. No separate charges shall be payable for type tests.
- 6 For any clarification please refer technical specification no.PE-TS-470-507-E002.(Rev-0)

1187533/2022/PEP



PRE-QUALIFICATION REQUIREMENTS OF LT XLPE POWER CABLE FOR 1x70MW KODAYAR HYDRO RMU

PE-PQ-470-507-E002

REVISION NO. 0 DATE 05/12/2022

SHEET NO. 1 OF 1

ITEMS : LT XLPE POWER CABLE

SCOPE : Supply : YES; Erection & Commissioning : NO;

1.0	Vendor should be a manufacturer of LT power cables.
2.0	Availability of test reports of tests on LT XLPE FRLS power cables to establish in- house capability to carry out all routine, type & acceptance tests as per relevant IS/international standards (except UV radiation & hydrolytic stability test which can be conducted at Govt. lab/ Govt. approved independent lab).
3.0	Capacity of manufacturing 10 km of LT power cables per month.
4.0	Manufactured and supplied at least one (1) km of FRLS cables.
5.0	Manufactured and supplied LT Power cable sizes of minimum 50 sq. mm for 3/3.5 core cable.
6.0	Manufactured and supplied at least 10 km of LT Power cables in one or more orders and at least 5 km in one single order.
7.0	Minimum two (2) nos. purchase orders for LT XLPE power cable shall be submitted which should not be more than five (5) years old from the date of techno- commercial bid opening for establishing continuity in business.

NOTES:

1. Consideration of bidder's offer is subject to customer approval.

2. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self-attested English translated document should also be submitted.

3. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder/collaborators to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.

4. After satisfactory fulfillment of all the above criteria requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.

<p>PREPARED BY</p> <p><i>[Signature]</i> 05/12/2022</p> <p>NAME: MANJU BHATNAGAR DESIGNATION: DY MANAGER</p>	<p>CHECKED BY</p> <p><i>[Signature]</i> 05/12/2022</p> <p>NAME: KANHAIYA KUMAR DESIGNATION: SR.MGR</p>	<p>REVIEWED BY</p> <p><i>[Signature]</i> 05/12/2022</p> <p>NAME: PRAVEEN DUTTA DESIGNATION: AGM</p>	<p>APPROVED BY</p> <p><i>[Signature]</i> 05/12/2022</p> <p>NAME: DEBASIS RATH DESIGNATION: DH-ELECT(AGM)</p>
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BOQ OF LT XLPE POWER CABLES FOR 1X70MW KODAYAR HYDRO RMU**A)**

1.1KV, Copper conductor, XLPE insulated, Galvanised Steel Round Wire Armoured for multi-core cables,
 INNER SHEATH: Extruded FRLS PVC compound conforming to type ST2 of IS: 5831 for multicore cable,
 OVERALL SHEATH: Extruded FRLS PVC compound conforming to type ST2 of IS: 5831 & black in colour.

S. No.	ITEM CODE	CABLE SIZE [No. of cores - Cross section Area (sq.mm)]	UNIT	QUANTITY (Metre)	DRUM LENGTH
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3	507-28117-A	3.5C - 70- CU ARMoured	MTR	2000	500

NOTES:

- 1 The standard drum length shall be 500 meters as indicated above. Tolerance on individual drum length shall be $\pm 5\%$.
- 2 Overall tolerance on total dispatched quantity of each size shall be (-) 2% and (+) 0% except where the total ordered quantity is one single drum length of 500m, in which case it shall be -5% to 0%. Cables consumed for testing and inspection shall be to bidder's account.
- 3 For each individual cable size, one short length of not less than 200m may be accepted only in the final drum length to complete the supply (except where the total ordered quantity is one single drum length of 500m). The overall tolerance limits stipulated above shall continue to apply (in case short lengths are accepted).
- 4 In case of the quantities cleared by BHEL for manufacturing are manufactured and offered for inspection by successful bidder in more than one batch, BHEL reserves the right to witness type testing on all batches without any price implications.
- 5 Unit price of cables quoted by bidder shall be inclusive of type test charges. No separate charges shall be payable for type tests.
- 6 For any clarification please refer technical specification no.PE-TS-470-507-E002.(Rev-0)

VOLUME-II

1x70MW KODAYAR HYDRO RMU

TECHNICAL SPECIFICATION

FOR

LT XLPE POWER CABLE

SPECIFICATION NO: *PE-TS-470-507-E002*

REVISION: 00



BHARAT HEAVY ELECTRICALS LIMITED

POWER SECTOR

PROJECT ENGINEERING MANAGEMENT

NOIDA, UP (INDIA) – 201301

1187533/2022/PS-PEM-EL



TECHNICAL SPECIFICATION FOR LT XLPE POWER CABLES

1x70MW KODAYAR HYDRO RMU

SPECIFICATION NO. PE-TS-470-507-E002

VOLUME II

SECTION

REVISION 00

DATE: 05.12.2022

SHEET 1 OF 1

CONTENTS

<u>S. NO.</u>	<u>DESCRIPTION</u>	<u>NO. OF SHEETS</u>
1.	CONTENTS	01
2.	SECTION – I	
	COMPLIANCE CERTIFICATE	01
	SPECIFIC TECHNICAL REQUIREMENTS	02
	DATA SHEET-A	03
	DATA SHEET-C	03
3.	SECTION – II	
	STANDARD TECHNICAL SPECIFICATION	02
	TYPICAL DRAWING OF CABLE DRUM PACKING	01
	QUALITY PLAN (ALONGWITH ANNEXURE A TO QP)	15
	TOTAL NO. OF SHEETS=	30
	(INCLUDING COVER/ SEPARATOR SHEETS)	



TECHNICAL SPECIFICATION FOR LT XLPE POWER CABLES

1x70MW KODAYAR HYDRO RMU

SPECIFICATION NO. PE-TS- 470-507-E002

VOLUME II

SECTION I

REVISION 00

DATE: 05.12.2022

SHEET 1 of 1

COMPLIANCE CERTIFICATE

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

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

BIDDER'S STAMP & SIGNATURE

1187533/2022/PS-PEM-EL

**TECHNICAL SPECIFICATION FOR
LT XLPE POWER CABLES****1x70MW KODAYAR HYDRO RMU**

SPECIFICATION NO. PE-TS-470-507-E002

VOLUME II

SECTION I

REVISION 0

DATE: 05.12.2022

SECTION – I**SPECIFIC TECHNICAL REQUIREMENTS**



TECHNICAL SPECIFICATION FOR LT XLPE POWER CABLES

1x70MW KODAYAR HYDRO RMU

SPECIFICATION NO. PE-TS-470-507-E002

VOLUME II

SECTION I

REVISION 0

DATE: 05.12.2022

SHEET 1 OF 1

1.0 SCOPE OF ENQUIRY

- 1.1 Design, Manufacture, Inspection and Testing at Manufacturer's works, proper packing and delivery to site of LT XLPE Power Cable conforming to this specification.
- 1.2 It is not the intent to specify herein all the details of design & manufacture of material. However, the material shall conform in all respects to high standard of design, engineering & workmanship and shall be capable of performing in continuous commercial operation at site condition.
- 1.3 General technical requirements of the LT XLPE Power cables are indicated in Section-II & Datasheet-A. Project specific technical/ quality requirements / changes are listed in Section-I.
- 1.4 The stipulation of Data Sheet-A shall prevail in case of any conflict between the stipulations of Data Sheet-A & Section-II.
- 1.5 The documents shall be in English Language and MKS system of units.

2.0 BILL OF QUANTITIES

Quantity requirements shall be as per 'BOQ-cum-price schedule' as part of NIT.


3.0 SPECIFIC TECHNICAL REQUIREMENTS

S.No.	Reference Clause No. of Section- II	Specific Requirement/ Change
1.	-	-

4.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED


- 4.1 After placement of order, documents shall be submitted for BHEL & customer's approval as specified in NIT.
- 4.2 Drawings/documents shall be submitted through Document Management System (DMS).

Note: Standard Quality Plan as enclosed in the technical specification is for reference and same shall be finalized during detailed engineering without any price implication to BHEL. The finalized QP during detailed engineering is to be appended with cover sheet bearing document number and description given in NIT. The signed and stamped copy of the same shall be submitted to BHEL without making any changes in the contents of the document.


	DOCUMENT TITLE		SPECIFICATION NO. PE-TS- 470-507-E002	
	TECHNICAL SPECIFICATION FOR LT XLPE POWER CABLES 1x70MW KODAYAR HYDRO RMU		VOLUME II	
			SECTION I	
			REVISION 00	DATE: 05.12.2022
			SHEET 1 OF 3	

DATA SHEET-A

1.0	Type of Cable	Flame Retardant Low Smoke halogen (FR-LSH)
2.0	Standard applicable in general(Latest amendment to be referred if any)	IS:7098 (Part-1), IS:8130, IS:5831, IS:10810, IS:3975, ASTM D:2843, ASTM D:2863, IEC-754-1, IEC:60332 (Part-1), IEC:60332-3-23, IEEE:60383
3.0	Voltage Grade	1.1kV
4.0	Number of cores, cross sectional area of conductors and quantities	As per BOQ-Cum-Price Schedule
5.0	FAULT CHARACTERISTICS	
	Fault Level	30kA RMS
	Fault Clearing Time	1.0 sec
6.0	CONDUCTOR	
(a)	Material	Copper
	Grade and Class	Stranded, annealed plain high conductivity, Class 2
(b)	Standard Applicable	IS: 8130
(c)	Shape	Circular/ Shaped – as per IS
(d)	Min. number and diameter of strands for main and neutral conductor [Neutral conductor cross section w.r.t main conductor shall be as per Table-2 of IS: 7098 (Part-1)]	As per Table-2 of IS: 8130
7.0	INSULATION	
(a)	Material	Cross-Linked Polyethylene(XLPE)
(b)	Standard Applicable	IS: 7098 (Part-1)
(c)	Continuous withstand temperature	90°C
(d)	Short-circuit withstand temperature	250°C
(e)	Method of application	By extrusion; sleeve extrusion not permitted.
(f)	Nominal Thickness of insulation	As per IS: 7098 (Part-1)
8.0	CORE IDENTIFICATION	<p>Cores of the cables shall be identified by colouring of insulation. Following colour scheme shall be adopted:</p> <p>1 core - Red, Black, Yellow or Blue</p> <p>2 core - Red & Black</p> <p>3 core - Red, Yellow & Blue</p> <p>4 core - Red, Yellow, Blue and Black</p> <p>For reduced neutral conductors, the core shall be black</p>
9.0	INNER SHEATH	
(a)	Material	Extruded PVC Type ST-2
(b)	Standard Applicable	IS: 7098 (Part-1) & IS: 5831
(c)	Colour	Black
(d)	Whether FR-LSH	Yes


	DOCUMENT TITLE		SPECIFICATION NO. PE-TS- 470-507-E002	
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(e)	Inner sheath applicable for single core cable	Yes
(f)	Fillers	Acceptable
(g)	Material of fillers (if permitted)	Same as inner sheath (Material of filler to be compatible with that of inner sheath)
(h)	Method of application	
(1)	Multi-core cables:	
(i)	With fillers	Pressure/ Vacuum extruded
(ii)	Without fillers	Pressure extruded
(2)	Single-core cables:	NOT APPLICABLE
10.0	ARMOUR	
(a)	Applicable	Yes (As specified in BOQ cum price schedule)
(b)	Material:	Wherever armouring is applicable
(i)	Single core cables	Non Magnetic Hard drawn Aluminium Round/Formed Wire H4 grade to IS: 8130 (as specified in BOQ cum price schedule)
(ii)	Multi-core cables	Galvanised Steel Round Wire, conforming to (i) Type 'b' as per Table-6 of IS 7098 Part-I and (ii) IS 3975
(iii)	Standard Applicable	Dimension as per IS: 7098 (Part-1) Table-6 and tolerance on dimension as per IS:3975
(c)	Minimum Coverage	90%
(d)	Gap between armour wires	Shall not exceed one armour wire space (No cross-over/ over-riding)
(e)	Breaking load of joint	95 % of normal armour
11.0	OUTERSHEATH	
(a)	Material	PVC Type ST2 as per IS: 5831
(b)	Colour	Black
(c)	Whether FR-LSH	Yes
(d)	Method of application	Extruded
(e)	Thickness of outer sheath	As per Table-8 of IS: 7098 (Part-1)
(f)	Marking	<p>Cable size (cross section area and no. of cores), voltage grade and Reference IS @ 5m (by embossing)</p> <p>Word "XLPE", "FR-LSH" @ 5m (by embossing)</p> <p>Manufacturer's name and/ or trade name, and year of manufacture @ 5m (by embossing)</p> <p>'BHEL' and 'CUSTOMER' name @ 5m (by embossing)</p> <p>Progressive sequential marking of length of the cable in metres @ 1m (by embossing/ printing)</p> <p>The embossing shall be progressive, automatic, in line and marking shall be legible and indelible.</p>
12.0	FR-LS CHARACTERISTICS	
(a)	Oxygen index	Min 29 (As per IS 7098-I /ASTMD 2863)
(b)	Temperature index	Min. 250°C(As per IS 7098-I /ASTMD 2863)
(c)	Acid gas generation	Max. 20% by weight (As per IS 7098-I /IEC-60754-1)
(d)	Smoke density rating	Max. 60% (As per IS 7098-I /ASTM D 2843)
(e)	Flammability Test	
(i)	Flammability test for single cable	YES

	DOCUMENT TITLE		SPECIFICATION NO. PE-TS- 470-507-E002	
	TECHNICAL SPECIFICATION FOR LT XLPE POWER CABLES 1x70MW KODAYAR HYDRO RMU		VOLUME II	
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		As per IEC-60332 Part-1
(ii)	Flammability test for bunched cables	YES As per IEC-60332 Part-3-23, CAT-B
(iii)	Flammability test as per IEEE: 60383	YES
(iv)	As per Swedish Chimney test SEN-SS-424-1475-F3	YES
(f)	Special Tests	
I.	Hydrolytic Stability Test	No/ Refer Cl. 3.4 of Sec-II
II.	Ultraviolet Radiation Test	No/ Refer Cl. 3.4 of Sec-II
13.0	Anti-rodent and Termite repulsion Test	YES
14.0	Anti-Fungal Test	No
15.0	TOLERANCE ON OUTER DIAMETER	$\pm 2\text{mm}$
16.0	MINIMUM BENDING RADIUS	
(a)	Single core cables	15 x O.D.
(b)	Multi core cables	12 x O.D.
17.0	SAFE PULLING FORCE	
(a)	Copper conductor cable (if applicable)	50 N/ sq. mm
18.0	CABLE DRUMS	
(a)	Type of Drum	Wooden as per IS 10418
(b)	Standard drum length	500m (\pm) 5% (as specified in BOQ-Cum-Priced Schedule)
(c)	Painting	Entire surface to be painted
(d)	Outermost Layer	To be covered with waterproof polyethylene
(e)	Construction details	<i>Clause no 4.2 of Section-II of this technical specification</i>
(f)	Particular details on Drum	Clause no 4.3 of Section-II of this technical specification. 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.
(g)	Cable packing	Please refer Clause no 4.2 of Section-II of this technical specification. It may be noted that the outer most cable layer shall be covered with water proof cover polythene followed by complete drum covering with wooden plank of suitable thickness across flanges. (Refer typical drawing of cable drum packing, attached in section -II)
19.0	Sea Worthy packing	No

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	<p>DOCUMENT TITLE</p> <p>TECHNICAL SPECIFICATION FOR</p> <p>LT XLPE POWER CABLES</p> <p>1x70MW KODAYAR HYDRO RMU</p>	SPECIFICATION NO. PE-TS-470-507-E002
		VOLUME II
		SECTION I
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DATASHEET C

GUARANTEED TECHNICAL PARTICULARS
(TO BE SUBMITTED BY SUCCESSFUL BIDDER)

S.No.		Unit	Description
A	GENERAL	-	
1	Name of manufacturer	-	
2	Place of Manufacture	-	
3	Current rating of cables conforms to	-	
4	Short circuit rating conforms to	-	
5	Formula for calculating short circuit current for different duration	-	
6	Permissible conductor temperature		
	(a) Maximum continuous rating	deg. C	
	(b) Short circuit rating	deg. C	
7	(a) Installation Conditions at site		
	i) Ambient air temperature	deg. C	
	ii) Ground temperature	deg. C	
	iii) Depth of laying of cables buried in ground	cm	
8	CHARACTERISTICS OF FRLS SHEATH		
	(a) Oxygen index	%	
	(b) Temperature index	deg. C	
	(c) Acid gas generation	%	
	(d) Smoke density rating	%	
9	CABLE DRUMS		
	(a) Type & construction	-	
	(b) Standard drum length	Mtr	
	(c) Tolerance on drum length	%	
B	INFORMATION TO BE FILLED IN FOR EACH SIZE CABLE IN THE FORM OF TABLE		
1	No. of cores x size	No. x sq.mm	
2	Voltage grade (Uo/U)	kV	
3	Base current ratings (*) based on Sl. (A) 7.0		
	(a) In air	Amp	
	(b) In ground	Amp	
	(c) ducts	Amp	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			


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533/2022/PS-PEM-EL		SPECIFICATION NO. PE-TS-470-507-E002	
<div><div>बी एच ई एल</div><div></div></div>	DOCUMENT TITLE	VOLUME II	
	TECHNICAL SPECIFICATION FOR	SECTION I	
	LT XLPE POWER CABLES	REV NO. 00 DATE 05.12.2022	
	1x70MW KODAYAR HYDRO RMU	SHEET 2 OF 3	

4	Short circuit rating for 1 sec duration	kA	
5	(a) D.C. resistance of conductor at 20 deg C (main / neutral)	ohm/km	
	(b) A.C. resistance of conductor at 90 deg. C (main / neutral)	ohm/km	
	(c) Reactance of cable at Normal frequency	ohm/km	
	(d) Electrostatic capacitance of cable at normal frequency	µF/km	
6	CONDUCTOR		
	(a) Material type	-	
	(b) Grade	-	
	(c) No & dia of wires in each core before stranding	no x mm	
	(d) Shape	-	
7	INSULATION		
	(a) Material	-	
	(b) Nominal thickness (main / neutral)	mm	
	(c) Minimum thickness (main / neutral)	mm	
	(d) Minimum volume resistivity at 27 deg. C	Ohm-cm	
	(e) Minimum volume resistivity at 90 deg. C	Ohm-cm	
8	INNERSHEATH		
	(a) Material	-	
	(b) Whether FRLS	-	
	(c) Thickness (min.)	mm	
	(d) Method of application for multi-core cables	-	
	(e) Type and shape of fillers (if used)	-	
	(f) Colour	-	
9	ARMOUR		
	(a) Material	-	
	(b) Type of armour	-	
	(c) Size/ dimensions (Nominal dia of wire)	mm	
	(d) Minimum no. of round / formed wires	No.	
	(e) Minimum coverage	%	
	(f) Gap between armour wire/strip	-	
	(g) Breaking load of joint	-	
	(h) Maximum resistivity of GS formed / Round wire	Ohm-cm	
	(i) Maximum resistivity of Aluminium round wire	Ohm-cm	
10	OUTERSHEATH		
	(a) Material	-	
	(b) Whether FRLS	-	
	(c) Minimum thickness	mm	

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

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	<p>DOCUMENT TITLE</p> <p>TECHNICAL SPECIFICATION FOR</p> <p>LT XLPE POWER CABLES</p> <p>1x70MW KODAYAR HYDRO RMU</p>	SPECIFICATION NO. PE-TS-470-507-E002
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	(d) Colour	-	
	(e) Method of application	-	
11	DIAMETERS		
	(a) Diameter of insulated conductor	mm	
	(b) Cable diameter under armour	mm	
	(c) Cable diameter over armour	mm	
	(d) Overall diameter of cable	mm	
	(e) Tolerance on overall diameter	(±) mm	
12	Ovality	mm	
13	Minimum bending radius	x O.D	
14	Safe Pulling Force	N/mm ²	
15	Weight of cable	kg./km	
16	Dimension of drum	mm	
17	Shipping weight (approx.)	kg	
18	Cable marking on outer sheath	-	
19	Marking on drum	-	

(*) For single core cables, the continuous current rating shall be furnished separately for armour earthed at one end and at both ends.

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

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TECHNICAL SPECIFICATION FOR
LT XLPE POWER CABLES

1x70MW KODAYAR HYDRO RMU

SPECIFICATION NO. PE-TS-470-507-E002

VOLUME II

SECTION II

REVISION 0

DATE: 05.12.2022

SECTION-II

STANDARD TECHNICAL REQUIREMENTS



TECHNICAL SPECIFICATION FOR LT XLPE Power Cable

1x70MW KODAYAR HYDRO RMU

SPECIFICATION NO. PE-TS-470-507-E002

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1.0 CODES AND STANDARDS

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

2.0 TECHNICAL REQUIREMENTS

- 2.1 LT XLPE POWER Cable shall be supplied as per technical particulars specified in Data Sheet – A.

3.0 QUALITY ASSURANCE, TESTING & INSPECTION

- 3.1 Bidder shall confirm compliance with the BHEL Standard Quality Plan (PE-QP-999-507-E002, Rev-02) as attached with the specification without any deviations. At contract stage (project specific), the successful bidder shall submit the same QP for BHEL/ ultimate customer's approval. In case bidder has reference QP agreed with ultimate customer, same can be submitted for specific project after award of contract for BHEL/ultimate customer's approval. There shall be no commercial implication to BHEL on account of minor changes in QP during contract stage.
- 3.2 All materials shall be procured, manufactured, inspected and tested by vendor/ sub-vendor as per approved quality plan.
- 3.3 Type testing, routine / acceptance testing and special testing requirements shall be as per Annexure –A to QAP. Charges for all these tests for all the equipments & components shall be deemed to be included in the bid price (except UV Radiation & Hydraulic Stability test).
- 3.4 The charges of UV Radiation test & Hydrolytic Stability test (if applicable) shall be reimbursed extra at actual against original money receipt of Govt. Lab. (CPRI/ ERDA etc).
- 3.5 Cost of cables consumed for testing shall be to bidder's account.

4.0 PACKING

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



TECHNICAL SPECIFICATION FOR LT XLPE Power Cable

1x70MW KODAYAR HYDRO RMU

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finish or coating to avoid rusting during transit and storage. BIS certification mark shall be stamped on each cable drum.

- 4.3 Each drum shall carry manufacturer's name, purchaser's name, address and contract no., item no. & type, size & length of cable and net gross weight stencilled on both sides of drum. A tag containing same information shall be attached to the leading end of the cable. An arrow & suitable accompanying wording shall be marked on one end of the reel indicating the direction in which it should be rolled.




	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO.: PE-TS-470-507-E002	DATE: 22
		CUSTOMER :		QP NO.: PE-QP-999-507-E002, REV 02.	118
		PROJECT: 1x70MW KODAYAR HYDRO RMU		PO NO.:	
ITEM: LT XLPE POWER CABLE		SYSTEM: CABLE	SECTION: II	SHEET 1 OF 12	

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	* D	** M C N
					M C/N					

1.0	RAW MATERIALS													
1.1	Aluminium /Copper Rods	GENERAL :												
	(Conductor/ Armour Wire)	1. Physical properties	MA	Physical Tests	Sample/ Batch	Sample / Batch	IS:8130 (Al), IS:613 (Cu)	IS:8130 (Al), IS:613 (Cu)	Test Cert.	✓	P/V	V	-	
		2. Elec. Properties	MA	Electrical Tests	Sample/ Batch	Sample / Batch	-do-	-do-	-do-	✓	P/V	V	-	
		SPECIFIC CHECKS:												
		a) Make	MA	Verify	100%	100%	Manufacturer approved source	Manufacturer approved source	Test Cert.	✓	P	V	-	
		b) Grade	MA	-do-	-do-	-do-	IS:8130 (Al), IS:613 (Cu)	IS:8130 (Al), IS:613 (Cu)	-do-	✓	P	V	-	
		c) Resistivity	MA	Electrical Tests	Manufacturer std.	Manufacturer std.	IS:613 (Cu), IS:5082 (Al)	IS:613 (Cu), IS:5082 (Al)	-do-	✓	P	V	-	
1.2	XLPE Compound for insulation	GENERAL :												
		1. Physical properties	MA	Physical Tests	Sample/ Batch	Sample / Batch	IS 7098-I	IS 7098-I	Test Cert.	✓	P	V	-	


BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Seal			Sign & Date	Name	Seal
Reviewed by:	MANISH SHUKLA	MANISH SHUKLA	Reviewed by:	RITESH KUMAR JAISWAL	RITESH KUMAR JAISWAL			Reviewed by:			
Approved by:			Approved by:					Approved by:			

	MANUFACTURER/ BIDDER/	STANDARD QUALITY PLAN		SPEC. NO.:	PE-TS-470-507-E002	DATE:	23
	SUPPLIER NAME & ADDRESS	CUSTOMER :		QP NO.: PE-QP-999-507-E002, REV 02.		118	
		PROJECT: 1x70MW KODAYAR HYDRO RMU		PO NO.:			
		ITEM: LT XLPE POWER CABLE	SYSTEM: CABLE	SECTION: II		SHEET 2 OF 12	

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLAS S	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANC E NORMS	FORMAT OF RECORD	AGENCY	REMARKS				
1	2	3	4	5	6	7	8	9	* D	**				
					M					C/N		M	C	N

		2. Elec. Properties	MA	Electrical Tests	Sample/ Batch	Sample / Batch	-do-	-do-	-do-	✓	P	V	-	
		<u>SPECIFIC CHECKS:</u>												
		a) Make	MA	Verify	100%	100%	Manufacturer approved source	Manufacturer approved source	Test Cert.	✓	P/V	V	-	
		b) Type/ Grade	MA	-do-	-do-	-do-	-do-	-do-	-do-	✓	P/V	V	-	
		c) Shelf life/ Storage condition	MA	-do-	-do-	-do-	-do-	-do-	-do-	✓	P/V	V	-	
1.3	PVC Compound (for sheath)	<u>GENERAL:</u>												
		1. Physical properties	MA	Physical Tests	Sample/ Batch	Sample / Batch	IS 5831	IS 5831	Test Cert.	✓	P/V	V	-	
		2. Elec. Properties	MA	Electrical Tests	Sample/ Batch	Sample / Batch	-do-	-do-	-do-	✓	P/V	V	-	
		3. FRLS Properties (as applicable)	CR	Chemical/ Environ.	Sample/ Batch	Sample / Batch	Approved datasheet	Approved datasheet	-do-	✓	P/V	V	-	
		<u>SPECIFIC CHECKS:</u>												

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ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:	<i>Vikas</i> 8/03/2020	VIKAS KUMAR SINGH	Checked by:	<i>Kunal</i> 19/3/20	KUNAL GANDHI						
Reviewed by:	<i>Manish</i> 18/03/20	MANISH SHUKLA	Reviewed by:	<i>Ritesh</i> 19/3/2020	RITESH KUMAR JAISWAL						

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO. PE-TS-470-507-E002	DATE: 24
		CUSTOMER :		QP NO.: PE-QP-999-507-E002, REV 02.	118
		PROJECT: 1x70MW KODAYAR HYDRO RMU		PO NO.:	
ITEM: LT XLPE POWER CABLE		SYSTEM: CABLE	SECTION: II	SHEET 3 OF 12	


Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLAS S	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANC E NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	

		a) Make	MA	Verify	100%	100%	Manufactur er approved source	Manufactur er approved source	Test Cert.	✓	P	V	-	
		b) Type/ Grade	MA	-do-	-do-	-do-	Approved datasheet	Approved datasheet	-do-	✓	P	V	-	
		c) Shelf life/ Storage condition	MA	-do-	-do-	-do-	Compound Manufactur er std.	Compound Manufactur er std.	-do-	✓	P	V	-	
1.4	Fillers (as applicable)	1. Make	MA	Verify	100%	100%	Manufactur er approved source	Manufactur er approved source	Test Cert.	✓	P	V	-	Fillers material chosen shall be compatible with the temperatur e rating of the cable and shall have no deleterious effect on any other

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ENGINEERING		QUALITY		
	Sign & Date	Name	Sign & Date	Name
Prepared by:	<i>Vikas</i> 18/03/2020	VIKAS KUMAR SINGH	Checked by: <i>Kunal</i> 19/3/20	KUNAL GANDHI
Reviewed by:	<i>Manish</i> 18/03/20	MANISH SHUKLA	Reviewed by: <i>Ritesh</i> 19/3/2020	RITESH KUMAR JAISWAL

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	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN				SPEC. NO. PE-TS-470-507-E002		DATE: 25	
		CUSTOMER :				QP NO.: PE-QP-999-507-E002, REV 02.			
		PROJECT: 1x70MW KODAYAR HYDRO RMU				PO NO.:			
		ITEM: LT XLPE POWER CABLE		SYSTEM: CABLE		SECTION: II		SHEET 4 OF 12	

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	*	**
					M C/N				D	M C N

														component of cable)
		2. Type/ Grade	MA	-do-	-do-	-do-	Appd. Data Sheet	Appd. Data Sheet	-do-	✓	P/V	V	-	
1.5	Galvanised steel wire/strip for Armour (as applicable)	GENERAL:												
		1. Make	MA	Verify	Manufacturer std.	Manufacturer std.	Manufacturer approved source	Manufacturer approved source	Test Cert.	✓	P	V	-	
		2. Dimension	MA	Measurement	-do-	-do-	Appd. Data Sheet	Appd. Data Sheet	-do-		P/V	-	-	
		3. Phy. and Elec. Properties	MA	Physical & Electrical Tests	Sample*	Sample*	-do-	-do-	-do-	✓	P/V	V	-	
		4. Galvanization Quality	MA	Galv. Tests	-do-	-do-	IS 3975	IS 3975	-do-		P/V	-	-	
1.6	Wooden Drum	1. Phy. & Constructional checks	MA		Mfr's Plant Std.	Mfr's Plant Std.	IS 10418	IS 10418	Test Cert.	✓	P	V	-	


BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:	Vikas 18/03/2020	VIKAS KUMAR SINGH	Checked by:	Kunal Gandhi 19/03/20	KUNAL GANDHI			Reviewed by:			
Reviewed by:	Manish 18/03/20	MANISH SHUKLA	Reviewed by:	Ritesh Kumar Jaishwal 19/03/20	RITESH KUMAR JAISWAL			Approved by:			

	MANUFACTURER/ BIDDER/	STANDARD QUALITY PLAN		SPEC. NO	DATE:	
	PEL	SUPPLIER NAME & ADDRESS	CUSTOMER :		PE-TS-470-507-E002	26
			PROJECT: 1x70MW KODAYAR HYDRO RMU		QP NO.: PE-QP-999-507-E002, REV 02.	118
		ITEM: LT XLPE POWER CABLE	SYSTEM: CABLE	PO NO.:	SHEET 5 OF 12	

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLAS S	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANC E NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	*	**
					M C/N				D	M C N

		2. Anti termite treatment	MA	Chem.	Mfr's Plant Std.	Mfr's Plant Std.	Mfr's Plant Std.	Mfr's Plant Std.	-do-	✓	P	V	-	
1.7	Steel Drum #	1. Dimension	MA	Meas.	Mfr's Plant Std.	Mfr's Plant Std.	Approved drg	Approved drg	Test Cert.	✓	P	V	-	# If required, as per spec.
		2. Surface finish	MA	Visual	-do-	-do-	-	Surface shall be smooth	-do-	✓	P	V	-	
2.0	IN PROCESS													
2.1	Wire Drawing	1. Size	MA	Dimension al	Plant Mfg. Std.	Plant Mfg. Std.	Approved datasheet	Approved datasheet	Inspe ction Repor t/ Test report	✓	P	V	-	
		2. Surface finish	MA	Visual	-do-	-do-	Surface shall be smooth	Surface shall be smooth	-do-	✓	P	V	-	

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:	<i>Vikas</i> 18/03/2020	VIKAS KUMAR SINGH	Checked by:	<i>Kunal</i> 19/3/20	KUNAL GANDHI			Reviewed by:			
Reviewed by:	<i>Manish</i> 18/03/20	MANISH SHUKLA	Reviewed by:	<i>Ritesh</i> 19/3/20	RITESH KUMAR JAISWAL			Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN				SPEC. NO : PE-TS-470-507-E002		DATE: 27	
		CUSTOMER :				QP NO.: PE-QP-999-507-E002, REV 02.			
		PROJECT: 1x70MW KODAYAR HYDRO RMU				PO NO.:			
		ITEM: LT XLPE POWER CABLE		SYSTEM: CABLE		SECTION: II		SHEET 6 OF 12	

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	*	**
					M C/N				D	M C N

		3. % of Elongation	MA	Mechanical	-do-	-do-	IS 8130	IS 8130	-do-	✓	P	V	-	
2.2	Stranding of wires	1. No. of wires	MA	Counting	Plant Mfg. Std.	Plant Mfg. Std.	Appd. Datasheet	Appd. Datasheet	Inspection Report/ Test report	✓	P	V	-	
		2. Resistance	CR	Electrical	-do-	-	-do-	-do-	-do-	-do-	P	-	-	
		3. Sequence, lay length & Direction	MA	Visual, Meas.	One Sample of each size/ lot	-	Mfrs Std.	Mfrs Std.	-do-		P	-	-	
		4. Surface Finish	MA	Visual	100%	-	Surface shall be smooth	Surface shall be smooth	-do-		P	-	-	
		5. Dimension	MA	Measurement	One Sample of each size/ lot	-	Appd. Datasheet	Appd. Datasheet	-do-		P	-	-	
2.3	Core Insulation (XLPE) (No repair permitted)													

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ENGINEERING			QUALITY			Sign & Date		Doc No:			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Seal			Sign & Date	Name	Seal
	<i>Vikas</i> 20.03.2020	VIKAS KUMAR SINGH		<i>Kunal</i> 19/3/20	KUNAL GANDHI						
Reviewed by:	<i>Manish</i> 18/03/20	MANISH SHUKLA	Reviewed by:	<i>Ritesh</i> 19/3/20	RITESH KUMAR JAISWAL						

	MANUFACTURER/ BIDDER/	STANDARD QUALITY PLAN				SPEC. NO : PE-TS-470-507-E002		DATE: 28	
	SUPPLIER NAME & ADDRESS	CUSTOMER :				QP NO.: PE-QP-999-507-E002, REV 02.		118	
		PROJECT: 1x70MW KODAYAR HYDRO RMU				PO NO.:			
		ITEM: LT XLPE POWER CABLE		SYSTEM: CABLE		SECTION: II		SHEET 7 OF 12	

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLAS S	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANC E NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	* D	**
					M C/N					M C N

		1. Surface finish	MA	Visual	100%	100%	Free from bulging, burnt particles, lumps, cuts & scratches	Free from bulging, burnt particles, lumps, cuts & scratches	Inspe ction Repor t/ Test report	✓	P	V	-	
		2. Eccentricity & Ovality #	CR	Measur em ent	One Sample of each size/ lot	One Sample of each size/ lot	Mnfr's Std	Mnfr's Std	-do-	✓	P	V	-	
		3. Insulation Thickness	CR	Measur em ent	-do-	-	Appd. Datasheet	Appd. Datasheet	-do-		P	-	-	
		4. Dia over insulation	MA	Measur em ent	-do-	-	-do-	-do-	-do-		P	-	-	
		5. Tensile Strength & % Elongation	MA	Mechanical	100%	-	IS:1554-I, IS:5831	IS:1554-I, IS:5831	-do-		P	-	-	
		6. Spark Test or Water immersion test	CR	Electrical	100%	-	Mnfr's Std	Mnfr's Std	-do-	Mn fr's Std	P	-	-	
2.4	Core Laying	1. Dia over laid up core	MA	Measur em ent	One Sample of each size/ lot	-	Appd. Datasheet	Appd. Datasheet	Inspe ction Repor t/ Test report		P	-	-	


BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:	<i>Manish</i> 18.03.2020	VIKAS KUMAR SINGH	Checked by:	<i>Kunal Gandhi</i> 19/3/20	KUNAL GANDHI			Reviewed by:			
Reviewed by:	<i>Manish</i> 19/03/20	MANISH SHUKLA	Reviewed by:	<i>Ritesh Kumar Jaiswal</i> 19/3/2020	RITESH KUMAR JAISWAL			Approved by:			

	MANUFACTURER/ BIDDER/	STANDARD QUALITY PLAN				SPEC. NO PE-TS-470-507-E002		DATE: 29		
	BHEL	SUPPLIER NAME & ADDRESS	CUSTOMER :				QP NO.: PE-QP-999-507-E002, REV 02.			
			PROJECT: 1x70MW KODAYAR HYDRO RMU				PO NO.:			
			ITEM: LT XLPE POWER CABLE		SYSTEM: CABLE		SECTION: II		SHEET 8 OF 12	

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	* D	** M C N
					M C/N					

		2. Sequence of lay & direction	MA	Visual & Meas.	-do-	-	IS 7098-I & Mfr. Std.	IS 7098-I & Mfr. Std.	-do-		P	-	-	
2.5	Inner Sheath Extrusion (as applicable)	1. Surface finish	MA	Visual	100%	-	Surface shall be smooth	Surface shall be smooth	Inspection Report/ Test report		P	-	-	
		2. Thickness	CR	Measurement	One Sample of each size/ lot	-	Appd. Datasheet	Appd. Datasheet	-do-		P	-	-	
		3. Dia over inner sheath	MA	-do-	-do-	-	-do-	-do-	-do-		P	-	-	
2.6	Armour(as applicable)	1. No.of wires/Strips	MA	Counting	At the start of the process	-	Mnfr's Std	Mnfr's Std	Inspection Report/ Test report		P	-	-	
		2. Lay length / Direction	MA	Visual & Meas.	-do-	-	Mfr. Std.	Mfr. Std.	-do-		P	-	-	
		3. Dia over armouring	MA	Measurement	-do-	-	Appd. Datasheet	Appd. Datasheet	-do-		P	-	-	

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Seal			Sign & Date	Name	Seal
	<i>Manish</i> 18/03/20	VIKAS KUMAR SINGH		<i>Kunal Gandhi</i> 19/03/20	KUNAL GANDHI						
Reviewed by:		MANISH SHUKLA	Reviewed by:		RITESH KUMAR JAISWAL			Reviewed by:			
								Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO PE-TS-470-507-E002	DATE: 30
		CUSTOMER :		QP NO.: PE-QP-999-507-E002, REV 02.	118
		PROJECT: 1x70MW KODAYAR HYDRO RMU		PO NO.:	
		ITEM: LT XLPE POWER CABLE	SYSTEM: CABLE	SECTION: II	SHEET 9 OF 12


Sl. No.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	* D	** M C N
					M C/N					

		4. Coverage	MA	Measurement	-do-	-	-do-	-do-	-do-		P	-	-	
2.7	Outer Sheath Extrusion (No repair permitted)	1. Surface finish	MA	Visual	100%	-	Surface shall be smooth	Surface shall be smooth	Inspection Report/ Test report		P	-	-	
		2. Sheath Thickness	CR	Measurement	One Sample of each size/ lot	-	Appd. Datasheet	Appd. Datasheet	-do-		P	-	-	
		3. Dia over outer sheath	MA	-do-	-do-	-	-do-	-do-	-do-		P	-	-	
		4. Embossing/ Sequential Marking	MA	Visual	100%	-	Approved data sheet	Approved data sheet	-do-		P	-	-	
3.0	Final Inspection (INTERNAL)	1. Routine Test (Refer Note-H)	CR	Electrical Tests & Measurement	100%	100%	#	#	-do-	✓	P	V	V	#: Refer Annexure-A to QP

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	<i>[Signature]</i>	VIKAS KUMAR SINGH	Checked by:	<i>[Signature]</i>	KUNAL GANDHI
Reviewed by:	<i>[Signature]</i>	MANISH SHUKLA	Reviewed by:	<i>[Signature]</i>	RITESH KUMAR JAISWAL

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Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO. PE-TS-470-507-E002	DATE: 31
		CUSTOMER :		QP NO.: PE-QP-999-507-E002, REV 02.	
		PROJECT: 1x70MW KODAYAR HYDRO RMU		PO NO.:	
		ITEM: LT XLPE POWER CABLE	SYSTEM: CABLE	SECTION: II	SHEET 10 OF 12


Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLAS S	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANC E NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	* D	** M C N
					M C/N					

4.0	Final Inspection (EXTERNAL)	1. Finish & Length (Cable & cable drum)	MA	Visual	One drum in each Lot	One drum in each Lot	Appd. Datasheet	Free from Porosity, Bulging, Burnt particles, lumps, cuts & scratches	Inspe ction Repor t/ Test report	✓	P	W	W	
		2. Dimension	MA	-do-	IS 7098-I	IS 7098-I	Appd. Datasheet	Appd. Datasheet	-do-	✓	P	W	W	
		3. Armouring - Coverage & No.of Wires/Strips	MA	Visual & Meas.	-do-	-do-	-do-	-do-	-do-	✓	P	W	W	
		4. Marking & Colour Coding	MA	Visual	-do-	-do-	-do-	-do-	-do-	✓	P	W	W	
		5. Acceptance Tests (Refer Note-H)	CR	Phy, Elect. Tests & FRLS Tests	Sample #	Sample #	#	-do-	-do-	✓	P	W	W	
		6. Type Tests (Refer Note-H)	CR	Physical & Electrical Tests	Sample #	Sample #	-do-	-do-	-do-	✓	P	W	W	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	<i>[Signature]</i> 18-03-2020	VIKAS KUMAR SINGH	Checked by:	<i>[Signature]</i> 19/3/20	KUNAL GANDHI
Reviewed by:	<i>[Signature]</i> 18/03/20	MANISH SHUKLA	Reviewed by:	<i>[Signature]</i> 19/3/20	RITESH KUMAR JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		STANDARD QUALITY PLAN				SPEC. NO PE-TS-470-507-E002		DATE: 33	
			CUSTOMER :				QP NO.: PE-QP-999-507-E002, REV 02.			
			PROJECT: 1x70MW KODAYAR HYDRO RMU				PO NO.:			
			ITEM: LT XLPE POWER CABLE		SYSTEM: CABLE		SECTION: II		SHEET 12 OF 12	

SI. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLAS S	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANC E NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	*	**
					M C/N				D	M C N

*RECORDS, IDENTIFIED WITH "TICK"(✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,

** M: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, B: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, C: CUSTOMER,

P: PERFORM, W: WITNESS, V: VERIFICATION, AS APPROPRIATE

MA: MAJOR, MI: MINOR, CR: CRITICAL


D: DOCUMENTATION

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	<i>[Signature]</i> 18.03.2020	VIKAS KUMAR SINGH	Checked by:	<i>[Signature]</i> 19/3/20	KUNAL GANDHI
Reviewed by:	<i>[Signature]</i> 18/03/20	MANISH SHUKLA	Reviewed by:	<i>[Signature]</i> 19/3/20	RITESH KUMAR JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

1187533/2022/PS-PEM-EL

	ANNEXURE-A TO QP	CUSTOMER:	PROJECT TITLE 1x70MW KODAYAR HYDRO RMU	SPECIFICATION NUMBER: PE-TS-470-507-E002
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E002, R02	SPECIFICATION TITLE:
	SHEET 1 OF 3	SYSTEM: CABLE	ITEM: LT XLPE POWER 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 of cable for every lot and type of cable (CU/AL conductor)
 - FRLS & Flammability Test to be conducted only on one sample/ 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:
Sampling for acceptance tests shall be as per Appendix-B (Clause 15.2.2) of IS: 7098 Part-I.
- Flammability Test to be conducted only on one sample/ lot.

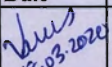
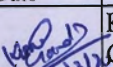
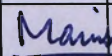
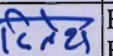
C. Routine Test Conduction:

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

D. Tests listed in S.No-7.0 & 8.0 shall be conducted only on one sample / lot.

Note: LOT shall be considered as per IS: 7098 Part-I, appendix-B.


S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
1.0	Tests for Conductor				
I.	Annealing test	For copper conductor only	T, A	IS 10810 Pt 1	<u>Internal in process Test Report to be furnished for acceptance test</u>
II.	Tensile test	For aluminium conductor only (Not applicable for compacted circular or shaped conductor)	T, A	IS 10810 Pt 2	
III.	Wrapping test	For aluminium conductor only (Not applicable for compacted circular or shaped conductor)	T, A	IS 10810 Pt 3	
IV.	Resistance test	For Al/Cu	T, A, R	IS 10810 Pt 5	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		VIKAS KUMAR SINGH	Checked by:		KUNAL GANDHI
Reviewed by:		MANISH SHUKLA	Reviewed by:		RITESH KUMAR

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

1187533/2022/PS-PEM-EL

	ANNEXURE-A TO QP	CUSTOMER:	PROJECT TITLE 1x70MW KODAYAR HYDRO RMU	SPECIFICATION NUMBER: PE-TS-470-507-E002
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E002, R02	SPECIFICATION TITLE:
	SHEET 2 OF 3	SYSTEM: CABLE	ITEM: LT XLPE POWER CABLE	DOC. NO.


S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
2.0	Tests for Armour Wires/Strips				
I.	Measurement of dimensions	Applicable for Aluminium wire & GS wire/Strip	T,A	IS 10810 Pt 36	
II.	Tensile test	Applicable for Aluminium wire & GS wire/Strip	T, A	IS 10810 Pt 37	
III.	Elongation at break test	Applicable for GS wire/Strip only	T, A	IS 10810 Pt 37	
IV.	Torsion test	For GS round wire only	T, A	IS 10810 Pt 38	
V.	Winding / Adhesion Test	For GS strip only	T, A	IS 10810 Pt 39	
VI.	Resistivity test	Applicable for Aluminium wire & GS wire	T, A	IS 10810 Pt 42	
VII.	Uniformity of Zinc coating test	For G. S. wires/Strip only	T, A	IS 10810 Pt 40	
VIII.	Mass of Zinc coating test	For G. S. wires/Strip only	T, A	IS 10810 Pt 41	
IX.	Wrapping Test	Applicable for Aluminium wire & GS wire	A	IS 10810 Pt 3	
3.0	Physical Tests for XLPE Insulation & PVC sheath				
I.	Test for thickness	Applicable for XLPE insulation, PVC inner sheath & PVC outer sheath	T, A	IS 10810 Pt 6	
II.	Tensile strength and elongation test at break	Applicable for XLPE insulation & PVC outer sheath			
(a)	Before ageing		T, A	IS 10810 Pt 7	
(b)	After ageing		T, A	IS 10810 Pt 7	
III.	Ageing in air oven	Applicable for XLPE insulation & PVC outer sheath	T	IS 10810 Pt 11	
IV.	Loss of mass in air oven test	For PVC outer sheath only	T	IS 10810 Pt 10	
V.	Hot deformation test	For PVC outer sheath only	T	IS 10810 Pt 15	
VI.	Heat shock test	For PVC outer sheath only	T	IS 10810 Pt 14	
VII.	Shrinkage test	For XLPE insulation & PVC outer sheath only	T	IS 10810 Pt 12	
VIII.	Thermal stability test	For PVC outer sheath only	T	IS 10810 Pt 60	
IX.	Hot set test	For XLPE insulation only	T, A	IS 10810 Pt 30	
X.	Water absorption (gravimetric) test	For XLPE insulation only	T	IS 10810 Pt 33	
4.0	Improved Fire performance (FR-LSH) Tests				

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	<i>[Signature]</i> 18-02-2022	VIKAS KUMAR SINGH	Checked by:	<i>[Signature]</i> 18/2/22	KUNAL GANDHI
Reviewed by:	<i>[Signature]</i> 18-02-22	MANISH SHUKLA	Reviewed by:	<i>[Signature]</i>	RITESH KUMAR

BIDDER/ SUPPLIER	
Sign & Date	
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FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
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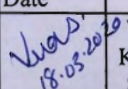
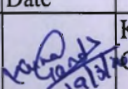
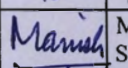
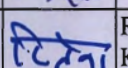
1187533/2022/PS-PEM-EL

	ANNEXURE-A TO QP	CUSTOMER:	PROJECT TITLE 1x70MW KODAYAR HYDRO RMU	SPECIFICATION NUMBER: PE-TS-470-507-E002
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E002, R02	SPECIFICATION TITLE:
		SYSTEM: CABLE	ITEM: LT XLPE POWER CABLE	DOC. NO.

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
I.	Oxygen index test	For PVC outer sheath only	T, A	IS 10810 Pt 58 / ASTM D 2863/ NES 715-I	<u>Applicable for Inner Sheath also, if the same is indicated in Datasheet-A</u>
II.	Smoke density test	For PVC outer sheath only	T	IS 10810 Pt 63 / ASTM D 2843	
III.	Acid gas generation test	For PVC outer sheath only	T, A	IS 10810 Pt 59 / IEC-754-1	
IV.	Temperature Index Test	For PVC outer sheath only	T	IS 10810 Pt 64 / ASTM D 2863	
5.0	Flammability Tests				
I.	Flammability test for bunched cables	For complete cable	T	IS 10810 Pt 62/ IEC-60332 (Part-3-23-Cat-B)	<u>Test & Category applicable as indicated in Datasheet-A</u>
II.	Flammability test for single cable	For complete cable	T,A	IS: 10810 Pt 61 / IEC:60332 Part-1	
III.	Swedish chimney test	For complete cable	A	SEN SS 424 1475 (Class F3)	
IV.	Flammability test	For complete cable	A	IEEE: 60383	
6.0	Electrical Tests				
I.	High Voltage Test	For complete cable	T, A, R	IS 10810 Pt 45	
II.	Insulation Resistance Test (Volume resistivity method)	For complete cable	T, A	IS 10810 Pt 43	
7.0	Anti-rodent and Termite Repulsion test	For PVC outer sheath only	A	Refer Note	<u>Test applicable if indicated in Datasheet-A</u>
8.0	Anti-Fungal Test	For PVC outer sheath only	A	--	
9.0	Special Tests				
I.	Hydrolytic Stability Test	For complete cable	**	ASTM D 3137:81	<u>Test applicable if indicated in Datasheet-A</u>
II.	Ultraviolet Radiation Test	For complete cable	**	BS EN ISO 4892-2	

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

Note: A few chipping of the PVC compound is slowly ignited on a porcelain dish or cubicle in a muffle furnace at about 600 degree C. The resulting ignited ash is boiled with a little ammonium acetate solution (10%). Place a drop of aqueous sodium sulphide solution on a thick filter paper and allow soaking. Touch the spot with a drop of above extract. A black spot indicates the presence of lead, the anti-termite and rodent compound.

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		VIKAS KUMAR SINGH	Checked by:		KUNAL GANDHI
Reviewed by:		MANISH SHUKLA	Reviewed by:		RITESH KUMAR

BIDDER/ SUPPLIER	
Sign & Date	
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