

**2X660 MW UDANGUDI STP****BOQ CUM PRICE SCHEDULE****(A) MAIN SUPPLY**

**(1.1)** 1.1KV, Al conductor, XLPE insulated, Galvanised Steel Round/ Formed Wire Armoured for multi-core cables (Non Magnetic Hard drawn Aluminium **Round Wire** Armoured conforming to H4 grade for single core cables), INNER SHEATH: Extruded PVC compound conforming to type ST2 of IS: 5831 for multicore cable & no inner sheath for single core cables, OVERALL SHEATH: Extruded FRLSH PVC compound conforming to type ST2 of IS: 5831 & black in colour.

S. No.	CABLE SIZE [No. of cores - Cross section Area (sq.mm)]	UNIT	Quantity	Remarks
A1	1C - 400- AL ARMoured	MTR	7000	
A2	1C - 630- AL ARMoured	MTR	13000	
A3	2C - 10- AL ARMoured	MTR	16000	
A4	2C - 25- AL ARMoured	MTR	4000	
A5	2C - 50- AL ARMoured	MTR	1000	
A6	2C - 95- AL ARMoured	MTR	3000	
A7	3C - 10- AL ARMoured	MTR	23000	
A8	3C - 25- AL ARMoured	MTR	15000	
A9	3C - 50- AL ARMoured	MTR	7000	
A10	3C - 95- AL ARMoured	MTR	9000	
A11	3C - 150- AL ARMoured	MTR	3000	
A12	3C - 240- AL ARMoured	MTR	7000	
A13	3.5C - 25- AL ARMoured	MTR	16000	
A14	3.5C - 50- AL ARMoured	MTR	22000	
A15	3.5C - 95- AL ARMoured	MTR	8000	
A16	3.5C - 185- AL ARMoured	MTR	1000	

**(1.2)** 1.1KV, Cu conductor, XLPE insulated, Galvanised Steel Round/ Formed Wire Armoured for multi-core cables (Non Magnetic Hard drawn Aluminium Round/ Formed Wire Armoured conforming to H4 grade for single core cables), INNER SHEATH: Extruded PVC compound conforming to type ST2 of IS: 5831 for multicore cable & no inner sheath for single core cables, OVERALL SHEATH: Extruded FRLSH PVC compound conforming to type ST2 of IS: 5831 & black in colour.

S. No.	CABLE SIZE [No. of cores - Cross section Area (sq.mm)]	UNIT	Quantity	Remarks
A17	2C - 2.5- CU ARMoured	MTR	90000	
A18	3C - 2.5- CU ARMoured	MTR	125000	
<b>Notes</b>				

<b>1</b>	Total Quantity indicated above (column 'D') shall be known as Order Quantities. The total quantity variation shall be as per NIT.
<b>2</b>	Tolerance on individual drum length shall be $\pm 5\%$ . 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. The overall tolerance limits stipulated above shall continue to apply (in case short lengths are accepted).
<b>3</b>	Overall tolerance on total dispatched quantity of each size shall be (-) 2% and (+) 0%. Cables consumed for testing and inspection shall be to bidder's account.
<b>4</b>	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.
<b>5</b>	Bidder to note that unit price of cables shall be inclusive of type test charges. No separate charges shall be payable for type tests.

6	WOODEN DRUM SHALL BE AS PER IS 10418. Standard drum length shall be 500/750 metres for cables having cross section area greater than 120 sq.mm, for other cables drum length shall be 500/1000 meters.Tolerance on individual drum length shall be $\pm 5\%$ .
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**VOLUME II**

**2 X 660 MW UDANGUDI TPS  
TECHNICAL SPECIFICATION  
FOR  
*LT XLPE POWER CABLES***

**SPECIFICATION NO: *PE-TS-435-507-E001***

***REVISION: 00***



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



**TECHNICAL SPECIFICATION FOR  
LT XLPE POWER CABLES**

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**COMPLIANCE CERTIFICATE**

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

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

-----  
BIDDER'S STAMP & SIGNATURE

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**SECTION – I**

**SPECIFIC TECHNICAL REQUIREMENTS**



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### 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 CABLES conforming to this specification.
- 1.2 General technical requirements of the LT XLPE Power cables are indicated in Section-II. Project specific technical/ quality requirements / changes are listed in Section-I.
- 1.3 The stipulations of Section-I, followed by those of Data Sheet-A shall prevail in case of any conflict between the stipulations of Section-I, Data Sheet - A & Section-II.
- 1.4 The documents shall be in English Language and MKS system of units.

### 2.0 BILL OF QUANTITIES:

- 2.1 Quantity requirements shall be as per 'BOQ-cum-price schedule' as part of NIT.
- 2.2 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 item(s)/package will be supplied free of cost in most reasonable time."

### 3.0 SPECIFIC TECHNICAL REQUIREMENTS

<b><u>S.No.</u></b>	<b><i>Reference Clause No. of Section- II</i></b>	<b><i>Specific Requirement/ Change</i></b>
1	3.1	BHEL Standard Quality Plan (PE-QP-999-507-E002) shall be read as "QP. NO. PE_V0-435-507-E913, REV-03".



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**4.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED**

4.1 Documents/drawings shall be submitted after placement of order for BHEL & customer's approval which has been 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 to be appended with cover sheet bearing document number and description as stated above. The signed and stamped copy of the same shall be submitted to BHEL without making any changes in the contents of the document.

NOTE-

1. Vendor shall submit drawing/document submission/BHEL comments/ re-submission schedule after approval of documents.

2. Standard Quality Plan along with its annexure as enclosed in the technical specification is to be appended with cover sheet bearing document number and description as specified 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.



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**DATA SHEET-A**

1.0	Type of Cable	Flame Retardant Low Smoke (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	<b>FAULT CHARACTERISTICS</b>		
	Fault Level	50kA (rms) for 1Sec	
6.0	<b>CONDUCTOR</b>		
(a)	Material	Plain Aluminium	Plain Copper
	Grade and Class	STRANDED COMPACTED PLAIN ALUMINIUM CONDUCTOR OF H2 GRADE CLASS 2 (NON-COMPACTED AL CONDUCTOR FOR SIZE <16 SQ.MM)	STRANDED HIGH CONDUCTIVITY ANNEALED PLAIN COPPER. (NON-COMPACTED CU CONDUCTOR FOR<10)
(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	<b>INSULATION</b>		
(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	<b>CORE IDENTIFICATION</b>	Colour coding as per IS:7098(Part-1)	
9.0	<b>INNER SHEATH</b>		
(a)	Material	EXTRUDED PVC TYPE-ST2 FOR MULTI CORE CABLES. SINGLE CORE SHALL HAVE NO INNER SHEATH.	



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(b)	Standard Applicable	IS: 7098 (Part-1) & IS: 5831
(c)	Colour	<i>Black</i>
(d)	Whether FR-LSH	<i>[ ✓ ]YES [ ]NO</i>
(e)	Inner sheath applicable for single core cable	<i>[ ]YES [ ✓ ]NO</i>
(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	<i>Pressure/Vacuum extruded</i>
(ii)	Without fillers	<i>Pressure extruded</i>
(2)	Single-core cables:	<i>Pressure/Vacuum extruded</i>
<b>10.0</b>	<b>ARMOUR</b>	
(a)	<i>Applicable</i>	<i>[ ✓ ]YES [ ]NO</i>
(b)	Material:	
(i)	Single core cables	Aluminium Round Wire H4 grade to IS: 8130
(ii)	<i>Multi-core cables</i>	GS ROUND/FORMED STEEL WIRE
(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
<b>11.0</b>	<b>OUTERSHEATH</b>	
(a)	Material	<i>EXTRUDED FRLSH PVC TYPE ST2</i>
(b)	Colour	<i>Black</i>
(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	(i) CABLE SIZE (BIS MARK, CROSS SECTION AREA AND NO. OF CORES, VOLTAGE GRADE, REF. IS, TYPE OF CABLE, TYPE OF INSULATION/ SHEATH, MANUFACTURER'S NAME AND/OR TRADE NAME, YEAR OF MANUFACTURE, ISI Logo, BHEL-PEM and TANGEDCO-AT EVERY 1M (BY EMBOSSING/PRINTING) (ii) PROGRESSIVE SEQUENTIAL MARKING OF LENGTH OF CABLE IN METERS- AT EVERY 1M (BY EMBOSSING/PRINTING) (iii) WORD 'FRLS AT EVERY 5M (BY EMBOSSING/PRINTING) The embossing/printing shall be progressive, automatic, in line and marking shall be legible and indelible.
<b>12.0</b>	<b>FR-LSH CHARACTERISTICS</b>	
(a)	Oxygen index	Oxygen index of minimum 29 when tested as per IS 10810 Part-58



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(b)	Temperature index	The measured value of temperature index shall be 21 at a temperature of 250°C when tested as per IS 10810 Part-64
(c)	Acid gas generation	Acid gas emission of maximum 20% when tested as per IS 10810 Part-59
(d)	Smoke density rating	Average light transmission of 40% minimum when tested as per IS 10810 Part-63 (average smoke density is maximum 60%)
(e)	<b>Flammability Test</b>	
(i)	<i>Flammability test for single cable</i>	[ <input checked="" type="checkbox"/> ] YES [ ] NO As per: (a) IEC-60332 Part-1 [ <input checked="" type="checkbox"/> ]
(ii)	<i>Flammability test for bunched cables</i>	[ <input checked="" type="checkbox"/> ] YES [ ] NO As per: (a) IEC-60332 Part-3-23, CAT-B
(iii)	<i>As per Swedish Chimney test SEN-SS-424-1475-F3</i>	[ ] YES [ <input checked="" type="checkbox"/> ] NO
13.0	<b>Anti-rodent and Termite repulsion Test</b>	[ <input checked="" type="checkbox"/> ] YES [ ] NO  The test shall be carried out to note the presence of rodent and termite repelling chemical in PVC compound. Normal procedure is that a few chippings of the PVC compound are slowly ignited in a porcelain dish or crucible in a muffle furnace at about 600°C. The resulting ignited ash is boiled with a little ammonium acetate solution (10%). A drop of aqueous sodium sulphide solution is placed on a thick filter paper and it is allowed to soak. The spot is touched with a drop of above extract. A black spot indicates the presence of anti-termite & rodent compound.
14.0	<b>Anti-Fungal Test</b>	[ ] YES [ <input checked="" type="checkbox"/> ] NO
15.0	<b>Special Tests</b>	
(a)	<b>Hydrolytic Stability as per ASTM D 3137 :81 (Duration:- 14 days)</b>	[ ] YES [ <input checked="" type="checkbox"/> ] NO
(b)	<b>UV Radiation Test as per BS EN ISO 4892-2 (Duration:- 14 days)</b>	[ ] YES [ <input checked="" type="checkbox"/> ] NO
16.0	<b>TOLERANCE ON OUTER DIAMETER</b>	± 2mm
17.0	<b>MINIMUM BENDING RADIUS</b>	
(a)	Single core cables	15 x O.D.
(b)	Multi core cables	12 x O.D.
18.0	<b>SAFE PULLING FORCE</b>	
(a)	Aluminium conductor cable	30 N/ sq. mm.
(b)	Copper conductor cable	50 N/ sq. mm.

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19.0	<b>CABLE DRUMS</b>	
(a)	<i>Type of Drum</i>	NON-RETURNABLE WOODEN OR STEEL (HEAVY CONSTRUCTION). WOODEN DRUM SHALL BE AS PER IS 10418
(b)	Standard drum length	NON RETURNABLE WOODEN OR STEEL(HEAVY CONSTRUCTION). WOODEN DRUM SHALL BE AS PER IS 10418
(c)	Painting	Entire surface to be painted
(d)	Outermost Layer	To be covered with waterproof polyethylene
(e)	Particular information on Drum	a) TANGEDCO b) Manufacturer's name or trade make c) Type of cable & voltage grade d) Year of manufacture e) Type of insulation e.g. XLPE f) No. of core and size of cables g) Cable code e.g. FRLSH h) Length of cable on drum i) No. of length on drum, if more than one j) Direction of rotation, by arrow k) Approx. gross mass.
20.0	<b>SEA WORTHY PACKING</b>	[ ] YES [X] NO

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**SECTION-II**

**STANDARD TECHNICAL REQUIREMENTS**



## TECHNICAL SPECIFICATION FOR LT XLPE Power Cable

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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



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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.

 STANDARD QUALITY PLAN SHEET 1 OF 6			CUSTOMER : TAMIL NADU GENERATION & DISTRIBUTION CORPORATION LIMITED BIDDER/ VENDOR			PROJECT: 2 X 660 MW UDANGUDI SUPERCRITICAL THERMAL TITLE POWER PROJECT - STAGE - 1 QUALITY PLAN NUMBER: PE-V0-435-507-913, R03			SPECIFICATION TECHNICAL SPECIFICATION FOR TITLE LT XLPE POWER CABLE			
SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	SECTION II VOLUME II			
									P	W	V	REMARKS
1	2	3	4	5	6	7	8	9	10		11	
<b>Instructions:</b> 1. Cable manufacturer to maintain records to show co-relation of raw materials to finished cables i.e. raw material batch/ lot no. should be traceable to the final cable drum number or batch no. 2. Cable manufacturer to maintain all quality records identified as per all QP stages enumerated below whether it is identified for BHEL verification or witness or not.												
1.0	<b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b>											
1.1	Aluminium /Copper Rods (Conductor/ Armour Wire)	<b>GENERAL :</b> 1. Physical properties	MA	Physical Tests	Sample/ Batch	IS:7098-I,IS:5082, IS:5484, IS:8130 & Appd Datasheet	IS:7098-I,IS: 5082, IS:5484, IS:8130 & Appd Datasheet	Inspection Report/ Test Cert	2/3	-	1/2	Supplier TC shall be provided (if any) Supplier TC shall be provided (if any)
		2. Elec.Properties	MA	Electrical Tests	Sample/ Batch	-do-	-do-	-do-	2/3	-	1/2	
		3. Dimensional check	MA	Electrical Tests	Sample/ Batch	-do-	-do-	-do-	2/3	-	1/2	
		4. Chemical.Properties	MA	Electrical Tests	Sample/ Batch	Supplier T.C	-do-	-do-	2/3	-	-	
		5. Purity check	MA	Electrical Tests	Sample/ Batch	Supplier T.C	-do-	-do-	2/3	-	-	
		<b>SPECIFIC CHECKS :</b> a) Make	MA	Verify	100%	Manufacturer approved source	Manufacturer approved source	COC/ Test Cert.	2/3	-	1	
		b) Grade	MA	-do-	-do-	Approved datasheet	Approved datasheet	-do-	2/3	-	1	
		c) Resistivity	MA	Electrical Tests	Manufacturer std.	IS 8130, IS 5082	IS 8130, IS 5082	-do-	2/3	-	1	
1.2	XLPE Compound for insulation	<b>GENERAL :</b> 1. Physical properties	MA	Physical Tests	Sample/ Batch	IS 7098-I & Mfs Std./ Approved datasheet	IS 7098-I & Mfs Std./ Approved datasheet	Inspection Report/ Test Cert.	2/3	-	1/2	Supplier TC shall be provided (if any)
		2. Chemical properties and purity check (If Applicable)	MA	Physical Tests	Sample/ Batch	Supplier T.C	IS 7098-I & Mfs Std./ Approved datasheet	Inspection Report/ Test Cert.	2/3	-	-	
		3. Elec.Properties	MA	Electrical Tests	Sample/ Batch	-do-	-do-	-do-	2/3	-	1/2	
		<b>SPECIFIC CHECKS :</b> a) Make	MA	Verify	100%	Manufacturer approved source	Manufacturer approved source	COC/ Test Cert.	2/3	-	1	
		b) Type/ Grade	MA	-do-	-do-	Approved datasheet	Approved datasheet	-do-	2/3	-	1	
	c) Shelf life/ Storage condition	MA	-do-	-do-	Compound Manufacturer std.	Compound Manufacturer std.	-do-	2/3	-	1		
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME			NATIQUE QUAMAR						
			SIGNATURE									
			DATE			23.07.2019			BIDDER'S/VENDORS COMPANY SEAL			

		STANDARD QUALITY PLAN			CUSTOMER : TAMIL NADU GENERATION & DISTRIBUTION CORPORATION LIMITED		PROJECT: 2 X 660 MW UDANGUDI SUPERCRITICAL THERMAL POWER PROJECT - STAGE - 1		SPECIFICATION TECHNICAL SPECIFICATION FOR LT XLPE POWER CABLE			
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SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
1.3	PVC Compound (for inner and outer sheath)	<b>GENERAL :</b> 1. Physical properties 2. Chemical properties and purity check (If Applicable) 3. Elec.Properties 4. FRLS Properties (as applicable)  <b>SPECIFIC CHECKS :</b> a) Make b) Type/ Grade c) Shelf life/ Storage condition	MA	Physical Tests	Sample/ Batch	IS 7098-I, IS 5831& Mfr. Std./ Approved datasheet	IS 7098-I, IS 5831& Mfr. Std./ Approved datasheet	Inspection Report/ Test Cert.	2/3	-	1/2	Supplier TC shall be provided (if any)
			MA	Physical Tests	Sample/ Batch	Supplier T.C	IS 7098-I, IS 5831& Mfr. Std./ Approved datasheet	Inspection Report/ Test Cert.	2/3	-	-	
			MA	Electrical Tests	Sample/ Batch	-do-	-do-	-do-	2/3	-	1/2	
			CR	Chemical/ Environ.	Sample/ Batch	-do-	-do-	-do-	2/3	-	1/2	
			MA	Verify	100%	Manufacturer approved source	Manufacturer approved source	COC/ Test Cert.	2/3	-	1	
			MA	-do-	-do-	Approved datasheet	Approved datasheet	-do-	2/3	-	1	
			MA	-do-	-do-	Compound Manufacturer std.	Compound Manufacturer std.	-do-	2/3	-	1	
			MA	Verify	100%	Manufacturer approved source	Manufacturer approved source	COC/ Test Cert.	2/3	-	1	
			MA	-do-	-do-	Approved datasheet	Approved datasheet	-do-	2/3	-	2	
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME		NATIQUE QUAMAR							
			SIGNATURE									
			DATE		23.07.2019		BIDDER'S/VENDORS COMPANY SEAL					

		STANDARD QUALITY PLAN			CUSTOMER : TAMIL NADU GENERATION & DISTRIBUTION CORPORATION LIMITED		PROJECT: 2 X 660 MW UDANGUDI SUPERCRITICAL THERMAL POWER PROJECT - STAGE - 1		SPECIFICATION TECHNICAL SPECIFICATION FOR LT XLPE POWER CABLE			
SHEET 3 OF 6		SYSTEM			ITEM : LT XLPE Power Cables		SECTION II VOLUME II					
SL NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
1.5	Galvanised steel wire/strip for Armour (as applicable)	<b>GENERAL :</b> 1. Make 2. Dimension 3. Phy.and Elec. Properties 4. Chemical properties and purity check (If Applicable) 5. Galvanization Quality	MA	Verify	Manufacturer std.	Manufacturer approved source	Manufacturer approved source	Inspection Report/ Test Cert.	2/3	-	1	* Sample from each armour size/ Batch / Lot Supplier TC shall be provided (if any)
			MA	Measurement	-do-	IS 7098-I, IS 3975 & Approved datasheet	IS 7098-I, IS 3975 & Approved datasheet	-do-	2/3	-	2	
			MA	Physical & Electrical Tests	Sample*	-do-	-do-	-do-	2/3	-	2	
			MA	Physical & Electrical Tests	Manufacturer std.	Supplier T.C	-do-	-do-	2/3	-	-	
			MA	Galv. Tests	Sample*	IS 3975 & Mfr. Std.	IS 3975 & Mfr. Std.	-do-	2/3	-	2	
1.6	Wooden Drum	1. Phy. & Constructional checks (All ferrous parts shall have rust protective coating) 2. Anti termite treatment	MA		Mfr's Plant Std.	IS 10418	IS 10418	Inspection Report/ Test Cert.	2/3	-	1	# (If Applicable)
			MA	Chem.	Mfr's Plant Std.	Mfr's Plant Std.	Mfr's Plant Std.	COC	2/3		1	
1.7	Steel Drum #	1. Dimension 2. Surface finish	MA	Meas.	Mfr's Plant Std.	Approved drawing of steel drum / BHEL specification	Approved drawing of steel drum / BHEL specification	Inspection Report/ Test Cert.	2/3	-	1	
			MA	Visual	-do-	Surface shall be smooth	Surface shall be smooth	-do-	2/3		1	
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME		NATIQUE QUAMAR							
			SIGNATURE									
			DATE		23.07.2019		BIDDER'S/VENDORS COMPANY SEAL					

		STANDARD QUALITY PLAN			CUSTOMER : TAMIL NADU GENERATION & DISTRIBUTION CORPORATION LIMITED		PROJECT: 2 X 660 MW UDANGUDI SUPERCRITICAL THERMAL POWER PROJECT - STAGE - 1		TECHNICAL SPECIFICATION FOR LT XLPE POWER CABLE			
SHEET 4 OF 6		BIDDER/ :			QUALITY PLAN		SPECIFICATION			TITLE		
VENDOR		SYSTEM			NUMBER: PE-V0-435-507-913, R03		SECTION II			VOLUME II		
SL NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
2.0	<b>IN PROCESS</b>											
2.1	Wire Drawing	1. Size	MA	Dimensional	Plant Mfg. Std.	IS 8130 & Appd. Datasheet	IS 8130 & Appd. Datasheet	Inspection Report	2	-	1	
		2. Surface finish	MA	Visual	-do-	Surface shall be smooth	Surface shall be smooth	-do-	2	-	1	
		3. % of Elongation test	MA	Mechanical	-do-	IS 8130 & Appd. Datasheet	IS 8130 & Appd. Datasheet	-do-	2	-	1	
		4. Annealing test for Cu	MA	Mechanical	-do-	IS 8130 & Appd. Datasheet	IS 8130 & Appd. Datasheet	-do-	2	-	-	
		5. Tensile & wrapping test for Al	MA	Mechanical	-do-	IS 8130 & Appd. Datasheet	IS 8130 & Appd. Datasheet	-do-	2	-	-	
		6. Persulphate test for tinned Cu (if applicable)	MA	Mechanical	-do-	IS 8130 & Appd. Datasheet	IS 8130 & Appd. Datasheet	-do-	2	-	-	*For Tinned Cu only
2.2	Stranding of wires	1. No. of wires	MA	Counting	Plant Mfg. Std.	IS 8130 & Appd. Datasheet	IS 8130 & Appd. Datasheet	Inspection Report	2	-	-	
		2. Resistance	CR	Electrical	-do-	-do-	-do-	-do-	2	-	-	
		3. Sequence, lay length & Direction	MA	Visual, Meas.	One Sample of each size/ lot	Mfrs Std. / Appd. Datasheet	Mfrs Std. / Appd. Datasheet	-do-	2	-	-	
		4. Surface Finish	MA	Visual	100%	Surface shall be smooth	Surface shall be smooth	-do-	2	-	-	
		5. Dimension	MA	Measurement	One Sample of each size/ lot	IS 8130 & Appd. Datasheet	IS 8130 & Appd. Datasheet	-do-	2	-	-	
2.3	Core Insulation (XLPE) (No repair permitted)	1. Surface finish	MA	Visual	100%	Free from bulging, burnt particles, lumps, cuts & scratches	Free from bulging, burnt particles, lumps, cuts & scratches	Inspection Report	2	-	1	
		2. Eccentricity & Ovality #	CR	Measurement	One Sample of each size/ lot	IS 7098-I & Appd. Datasheet	IS 7098-I & Appd. Datasheet	-do-	2	-	1	# To be checked at starting & finished end of extruded length.
		3. Insulation Thickness	CR	Measurement	-do-	-do-	-do-	-do-	2	-	-	
		4. Dia over insulation	MA	Measurement	-do-	-do-	-do-	-do-	2	-	-	
		5. Tensile Strength & % Elongation	MA	Mechanical	100%	-do-	-do-	-do-	2	-	-	
		6. Spark Test or Water immersion test	CR	Electrical	100%	Mnfr's Std	Mnfr's Std	-do-	2	-	1	
		7. Hot set test	CR	Mechanical	One Sample of each size/ lot	IS 7098-I & Appd. Datasheet	IS 7098-I & Appd. Datasheet	-do-	2	-	-	
		8. Colour of cores	CR	Visual	One Sample of each size/ lot	IS 7098-I & Appd. Datasheet	IS 7098-I & Appd. Datasheet	-do-	2	-	-	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME			NATIQUE QUAMAR						
			SIGNATURE									
			DATE			23.07.2019			BIDDER'S/VENDORS COMPANY SEAL			

 STANDARD QUALITY PLAN SHEET 5 OF 6			CUSTOMER : TAMIL NADU GENERATION & DISTRIBUTION CORPORATION LIMITED BIDDER/ : VENDOR			PROJECT: 2 X 660 MW UDANGUDI SUPERCRITICAL THERMAL TITLE POWER PROJECT - STAGE - 1 QUALITY PLAN NUMBER: PE-V0-435-507-913, R03			SPECIFICATION TECHNICAL SPECIFICATION FOR TITLE LT XLPE POWER CABLE				
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	SYSTEM CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	SECTION II VOLUME II				
									AGENCY			REMARKS	
1	2	3	4	5	6	7	8	9	P	W	V		11
2.4	Core Laying	1. Dia over laid up core 2. Sequence of lay & direction 3. Lay Length	MA MA MA	Measurement Visual & Meas. Measurement	One Sample of each size/ lot -do- -do-	IS 7098-I & Appd. Datasheet IS 7098-I & Mfr. Std. -do-	IS 7098-I & Appd. Datasheet IS 7098-I & Mfr. Std. -do-	Inspection Report -do- -do-	2 2 2	- - -	- - -	( Pimple, fish eye, porosity & burnt particles not permitted.)	
2.5	InnerSheath Extrusion (as applicable)	1. Surface finish 2. Thickness 3. Dia over inner sheath 4. Concentricity test	MA CR MA MA	Visual Measurement -do- -do-	100% One Sample of each size/ lot -do- -do-	Surface shall be smooth IS 7098-I & Appd. Datasheet -do- Mnfr's Std	Surface shall be smooth IS 7098-I & Appd. Datasheet -do- Mnfr's Std	Inspection Report -do- -do- -do-	2 2 2 2	- - - -	- - - -		
2.6	Armour( as applicable)	1. No. of wires/Strips 2. Lay length & Direction 3. Dia over armouring 4. Coverage	MA MA MA MA	Counting Visual & Meas. Measurement Measurement	At the start of the process -do- -do- -do-	IS 7098-I & Appd. Datasheet IS 7098-I & Mfr. Std. IS 7098-I & Appd. Datasheet -do-	IS 7098-I & Appd. Datasheet IS 7098-I & Mfr. Std. IS 7098-I & Appd. Datasheet -do-	Inspection Report -do- -do- -do-	2 2 2 2	- - - -	- - - -		
2.7	Outer Sheath Extrusion (No repair permitted)	1. Surface finish 2. Sheath Thickness 3. Dia over outer sheath 4. Concentricity test 5. Embossing/ Sequential Marking	MA CR MA MA MA	Visual Measurement -do- -do- Visual	100% One Sample of each size/ lot -do- -do- 100%	Surface shall be smooth IS 7098-I & Appd. Datasheet -do- Mnfr's Std Approved data sheet	Surface shall be smooth IS 7098-I & Appd. Datasheet -do- Mnfr's Std Approved data sheet	Inspection Report -do- -do- -do- -do-	2 2 2 2 2	- - - - -	- - - - -		( Pimple, fish eye, porosity & burnt particles not permitted.)
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME			NATIQUE QUAMAR							
			SIGNATURE										
			DATE			23.07.2019			BIDDER'S/VENDORS COMPANY SEAL				



**TYPE TEST/ACCEPTANCE/ROUTINE TEST REQUIREMENTS**  
**Annexure-A**

**TYPE /ACCEPTANCE/ROUTINE TEST REQUIREMENTS**

- A Type Test Conduction:**  
1 Tests for which "T" is indicated in the 'Test Conduction Required as' column below shall be conducted as Type Test.  
2 Sampling:  
a) Type Test to be conducted on one size of cable for every lot and type of cable (Cu/Al conductor).  
b) FRLS & Flammability Test to be conducted only on one sample/lot.
- B Acceptance Test Conduction:**  
1 Tests for which "A" is indicated in the 'Test Conduction Required as' column below shall be conducted as Acceptance tests.  
2 Sampling:  
3 Flammability Test to be conducted only on one sample/lot.
- C Routine Test Conduction:**  
1 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 shall be conducted only on one sample/lot.**

NOTE: LOT shall be considered as per IS: 7098 Part-1, appendix-B.

Sl. No.	TESTS	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
<b>1.0</b>	<b>Tests for Conductors</b>				
I.	Annealing Test	For copper conductor only	T, A	IS: 10810 Part-1	Internal In process Test Report to be furnished for acceptance test
II.	Tensile Test	For Aluminium conductor only (Not applicable for compacted circular or shaped conductor)	T, A	IS: 10810 Part-2	
III.	Wrapping Test	For Aluminium conductor only (Not applicable for compacted circular or shaped conductor)	T, A	IS: 10810 Part-3	
IV.	Conductor Resistance Test	For Al/Cu	T, A, R	IS: 10810 Part-5	
<b>2.0</b>	<b>Tests for Armour Wires/Strips</b>				
I.	Measurement of dimensions	Applicable for Aluminium wire, GS wire/strip	T, A	IS: 10810 Part-36	
II.	Tensile test	Applicable for Aluminium wire, GS wire/strip	T, A	IS: 10810 Part-37	
III.	Elongation at break test	Applicable for GS wire/strip only	T, A	IS: 10810 Part-37	
IV.	Torsion Test	For GS round wire only	T, A	IS: 10810 Part-38	
V.	Winding/Adhesion Test	For GS strip only	T, A	IS: 10810 Part-39	
VI.	Resistivity test	Applicable for Aluminium wire, GS wire/strip	T, A	IS: 10810 Part-42	
VII.	Uniformity of Zinc coating test	For GS wire/strip only	T, A	IS: 10810 Part-40	
VIII.	Mass of Zinc coating test	For GS wire/strip only	T, A	IS: 10810 Part-41	
IX.	Wrapping test	Applicable for Aluminium wire only	A	IS: 10810 Part-3	
<b>3.0</b>	<b>Physical tests for XLPE Insulation &amp; PVC Sheath</b>				
I.	Test for thickness	Applicable for XLPE Insulation, PVC Inner sheath & PVC outer sheath	T, A	IS: 10810 Part-6	

## TYPE TEST/ACCEPTANCE/ROUTINE TEST REQUIREMENTS

## TYPE /ACCEPTANCE/ROUTINE TEST REQUIREMENTS

- A Type Test Conduction:**  
 1 Tests for which "T" is indicated in the 'Test Conduction Required as' column below shall be conducted as Type Test.  
 2 Sampling:  
 a) Type Test to be conducted on one size of cable for every lot and type of cable (Cu/Al conductor).  
 b) FRLS & Flammability Test to be conducted only on one sample/lot.
- B Acceptance Test Conduction:**  
 1 Tests for which "A" is indicated in the 'Test Conduction Required As' column below shall be conducted as Acceptance tests.  
 2 Sampling:  
 3 Flammability Test to be conducted only on one sample/lot.
- C Routine Test Conduction:**  
 1 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 shall be conducted only on one sample/lot.**

NOTE: LOT shall be considered as per IS: 7098 Part-1, appendix-B.

Sl. No.	TESTS	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
II.	Tensile strength & elongation test at break	Applicable for XLPE Insulation, PVC outer sheath	T, A	IS: 10810 Part-7	
	(a) Before ageing (b) After ageing		T, A	IS: 10810 Part-7	
III.	Ageing in air oven test	Applicable for XLPE Insulation & PVC outer sheath	T	IS: 10810 Part-11	
IV.	Loss of mass in air oven test	For PVC outer sheath only	T	IS: 10810 Part-10	
V.	Hot deformation test	For PVC outer sheath only	T	IS: 10810 Part-15	
VI.	Heat Shock test	For PVC outer sheath only	T	IS: 10810 Part-14	
VII.	Shrinkage test	Applicable for XLPE Insulation & PVC outer sheath only	T	IS: 10810 Part-12	
VIII.	Thermal stability test	For PVC outer sheath only	T	IS: 10810 Part-60	
IX.	Hot Set test	For XLPE Insulation only	T, A	IS: 10810 Part-30	
X.	Water Absorption (gravimetric) Test	For XLPE Insulation only	T	IS: 10810 Part-33	
XI.	Cold Impact test (optional)	For PVC outer sheath only	T	IS: 10810 Part-21	
<b>4.0</b>	<b>Improved Fire performance (FR-1SH) Tests</b>				
I.	Oxygen Index test	For PVC outer sheath only	T, A	IS: 10810 (Part-58)/ASTM D 2863	
II.	Smoke Density test	For PVC outer sheath only	T	IS: 10810 (Part-63)/ASTM D-2843	
III.	Acid gas generation test	For PVC outer sheath only	T, A	IS: 10810 (P-59)/IEC: 754-1	
IV.	Temperature Index test	For PVC outer sheath only	T	IS: 10810 (Part-64)/ASTM D 2863	
<b>5.0</b>	<b>Flammability Tests</b>				
I.	Flammability test for bunched cables	For complete cable	T	IS: 10810 (Part-62)/IEC-60332 (Part-3-23-Cat-B)	<b>Test &amp; Category applicable as indicated in Datasheet-A</b>
II.	Flammability test for single cable	For complete cable	T, A	IS: 10810 (Part-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	

## TYPE TEST/ACCEPTANCE/ROUTINE TEST REQUIREMENTS

TYPE /ACCEPTANCE/ROUTINE TEST REQUIREMENTS

9

- A Type Test Conduction:**  
 1 Tests for which "T" is indicated in the 'Test Conduction Required as' column below shall be conducted as Type Test.  
 2 Sampling:  
 a) Type Test to be conducted on one size of cable for every lot and type of cable (Cu/Al conductor).  
 b) FRLS & Flammability Test to be conducted only on one sample/lot.
- B Acceptance Test Conduction:**  
 1 Tests for which "A" is indicated in the 'Test Conduction Required As' column below shall be conducted as Acceptance tests.  
 2 Sampling:  
 3 Flammability Test to be conducted only on one sample/lot.
- C Routine Test Conduction:**  
 1 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 shall be conducted only on one sample/lot.**

NOTE: LOT shall be considered as per IS: 7098 Part-1, appendix-B.

<u>Sl. No.</u>	<u>TESTS</u>	<u>APPLICABLE FOR</u>	<u>TEST CONDUCTION REQUIRED AS</u>	<u>REFERENCE STANDARD</u>	<u>REMARKS</u>
<u>6.0</u>	<b>ELECTRICAL TESTS</b>				
<u>I.</u>	High voltage test	For complete cable	T, A, R	IS: 10810 Part-45	
<u>II.</u>	Insulation resistance test (Volume resistivity method)	For complete cable	T, A	IS: 10810 Part-43	
<u>7.0</u>	<b>Anti-rodent and Termite Repulsion test</b>	For PVC outer sheath only	A	--	

Note: A few chipping of the PVC compound is slowly ignited on a cubble in a muffle furnace at about 60 Deg 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



2X660 MW UDANGUDI STPS  
PRE-QUALIFICATION REQUIREMENTS FOR  
LT XLPE POWER CABLE

PE-PQ-435-507-E012

REVISION NO. 00 DATE 12/08/2022

SHEET NO. 1 OF 1

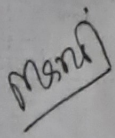
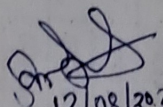
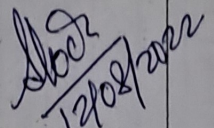
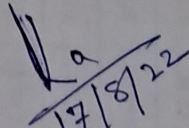
ITEMS : LT XLPE Power Cable

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 150 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 240 sq. mm for 3/3.5 core and minimum 630 sq. mm for single core cable.
6.0	Manufactured & supplied at least 350 km of LT Power cables in one or more orders and at least 100 km in one single order.
7.0	Minimum two (2) nos. purchase orders for LT XLPE Power cables shall be submitted which should not be more than five (5) years old from the date of techno- commercial bid opening for establishing continuity in business.

Notes:

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

<p>PREPARED BY</p> <p> Digitally signed by Manoj Kumar Meena DN: cn=Manoj Kumar Meena, o=BHEL, ou=PEM, email=manojmeena@bhel.in, c=IN Date: 2022.08.12 13:49:04 +05'30'</p> <p>NAME: Manoj Kumar Meena DESIGNATION: Dy.MGR</p>	<p>REVIEWED BY</p> <p> 12/08/2022 NAME: Ankur Arora / DESIGNATION: MGR</p> <p> 12/08/2022 NAME: Sandeep Lodh DESIGNATION: Sr. DGM</p>	<p>APPROVED BY</p> <p> 17/8/22 NAME: Debasisa Rath DESIGNATION: AGM (DH-Electrical)</p>
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**INTEGRITY PACT****Between**

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

and

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

**Preamble**

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

\_\_\_\_\_ (hereinafter referred to as "Contract"). The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

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

**Section 1- Commitments of the Principal**

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles: -
  - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
  - 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
  - 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

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

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



- 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and shall await their decision in the matter.

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

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

### **Section 4 - Compensation for Damages**

- 4.1 If the Principal has disqualified the Bidder (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above, the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.



**Section 5 - Previous Transgression**

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

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

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity Pact or violate its provisions.

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

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

**Section 8 -Independent External Monitor(s)**

- 8.1 The Principal appoints competent and credible panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.
- 8.2 The IEMs are not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.



- 8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a Bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some Bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

#### Section 9 - Pact Duration

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties till the final completion of contract for successful Bidder, and for all other Bidders 6 months after the Contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

*Noted*

## Section 10 - Other Provisions

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

*Netral*

For & On behalf of the Principal  
(Office Seal)

नेत्रपाल सिंह / Netrapal Singh  
Place: भारत में अग्रियता (पी.जी.-1) / Sr. Engineer (PG-1)  
भारत हेवी इलेक्ट्रिकल्स लिमिटेड / Bharat Heavy Electricals Ltd.  
Date: पावर सेक्टर-परियोजना अभियंत्रिकी प्रबंधन  
Power Sector-Project Engineering Management  
पीपीईईआई भवन, एच.आर.डी.आई. एण्ड ईएसआई कॉम्प्लेक्स  
PPEI Bldg, H.R.D.I. & ESI Complex,  
प्लॉट नं. 25, सेक्टर 16 ए, नोएडा -201301  
Plot No. 25, Sec. 16 A, Noida - 201301

Witness: \_\_\_\_\_  
(Name & Address) \_\_\_\_\_

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

Witness: \_\_\_\_\_  
(Name & Address) \_\_\_\_\_