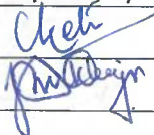
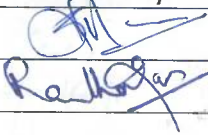
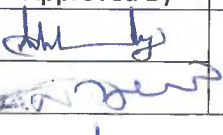
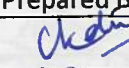
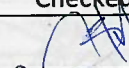
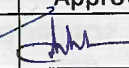
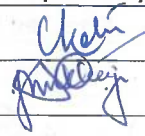
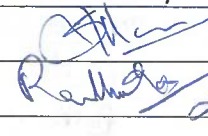
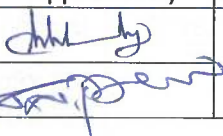
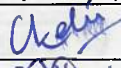
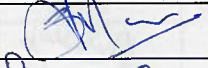
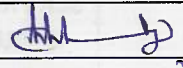
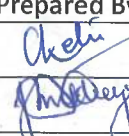


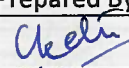
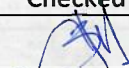
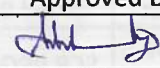
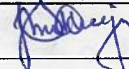
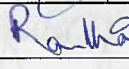
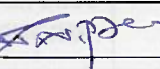
MATERIAL CODE EL8341800098	 1800-01 Rev. 00		PURCHASE SPECIFICATION FOR 1.1 kV XLPE LT POWER CABLES			ISSUE NO : 06 DOC.NO: SCR-UT-030 REV : 01 JUNE 2019 Page 1 of 9	
	SECTION - I						
	1.0 GENERAL SITE INFORMATION						
	1.1 SITE CONDITIONS						
COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.	1.1.1 Project site : BHEL-EPD, MALLESWARAM, Bangalore						
	1.1.2 Altitude above MSL : 920 mtrs						
	1.1.3 Ambient air temperature						
	1) Max. : 35°C 2) Min. : 12°C 3) Ambient temperature for design purpose : 50°C						
	Rev.00: 1st Issue	Issued By SCR PROD GROUP	Prepared By 	Checked By 	Approved By 	Date 27.6.19	

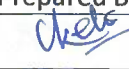
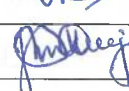
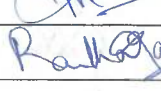
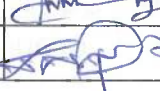
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								Page 2 of 9																							
SECTION – II 2.0 TECHNICAL SPECIFICATIONS Scope of supply includes manufacturing, testing, inspection, packing and dispatch to site LT Power cables of stranded aluminium conductor of 1100V grade, extruded XLPE insulated, FRLS PVC ST-2 inner sheathed, galvanized flat steel wire armoured, FRLS PVC Type ST – 2 outer sheathed cables as per the detailed technical specification mentioned in section IV. <i>The cable length in each drum shall be 500 /1000 metres. Length tolerance for individual drum shall be $\pm 5\%$ and overall length tolerance shall be $\pm 2\%$.</i> The size and requirement of the cable are given below. <table border="1"> <thead> <tr> <th>Sl.No</th> <th>Size</th> <th>Description</th> <th>Length of Cable</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>1100V, 3.5Cx400 sqmm</td> <td>Stranded, sector shaped aluminum conductor, extruded XLPE insulated with extruded FRLS PVC inner sheathed of type – ST2, galvanized flat steel wire armoured and with extruded outer sheath made of FRLS PVC compound of type ST-2 cable.</td> <td>1600 meters</td> </tr> </tbody> </table> APPLICABLE STANDARDS <table border="1"> <tbody> <tr> <td>1</td> <td>IS:7098(1) – 1985</td> <td>Specification for Cross linked Polyethylene insulated PVC sheathed cables for working voltages up to and including 1.1KV.</td> </tr> <tr> <td>2</td> <td>IS:8130 – 1984</td> <td>Conductors for Insulated electric cables</td> </tr> <tr> <td>3</td> <td>IS:5831 - 1984</td> <td>PVC Insulation and sheath of Electric cables.</td> </tr> <tr> <td>4</td> <td>IS:3975 – 1988</td> <td>Specification for mild steel wires, formed wires and and tapes for armoring of cables.</td> </tr> <tr> <td>5</td> <td>IS 6380 – 1984</td> <td>Elastometric Insulation & sheath of electric cables.</td> </tr> </tbody> </table>									Sl.No	Size	Description	Length of Cable	01	1100V, 3.5Cx400 sqmm	Stranded, sector shaped aluminum conductor, extruded XLPE insulated with extruded FRLS PVC inner sheathed of type – ST2, galvanized flat steel wire armoured and with extruded outer sheath made of FRLS PVC compound of type ST-2 cable.	1600 meters	1	IS:7098(1) – 1985	Specification for Cross linked Polyethylene insulated PVC sheathed cables for working voltages up to and including 1.1KV.	2	IS:8130 – 1984	Conductors for Insulated electric cables	3	IS:5831 - 1984	PVC Insulation and sheath of Electric cables.	4	IS:3975 – 1988	Specification for mild steel wires, formed wires and and tapes for armoring of cables.	5	IS 6380 – 1984	Elastometric Insulation & sheath of electric cables.
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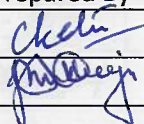
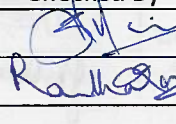
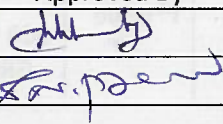
MATERIAL CODE EL8341800098	 1800-01 Rev. 00		PURCHASE SPECIFICATION FOR 1.1 kV XLPE LT POWER CABLES			ISSUE NO : 06 DOC.NO: SCR-UT-030 REV : 01 JUNE 2019
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	2.1 Insulation: The insulation shall be extruded XLPE confirming to IS 7098 –part I as specified above. Continuous withstand temperature 90°C, temperature for emergency load shall be 130°C and short circuit temperature of 250°C. Colour identification as per relevant codes & standards. 2.2 Armouring: This shall be of galvanized flat steel wire for multi core cables & Aluminum wire for single core cables as per IS: 3975 - 1988. Minimum coverage of 90%. Breaking load of joint shall be 95% of normal armour. 2.3 Cores identification: Cores identification shall be done by Red, yellow, Blue colour for main core and black colour for half core. 2.4 The inner & outer sheath of FRLS PVC compound shall meet the following performance requirements a) The critical oxygen index value shall be minimum 29 when tested at 27+2 °C as per ASTM- D-2863-77 and the temperature index shall be minimum 250°C at oxygen I index value of 21 when tested as ASTM-D-2863-77. b) The smoke generation under fire shall have maximum smoke density rating of 60% when tested as per ASTM-D-2843-7 (1988). c) The cables will pass the hydraulic stability & ultraviolet tests as per DIN 53387 2.5 The finished cable shall pass the flammability test as per IEC-332-1 and IEEE-383. In addition, it shall also pass flammability test as per Class F3 of Swedish Standard SS-424-1475 (1978). 2.6 Packing & Marking The cable shall be wound on a wooden drum of suitable size. Cable drums shall be manufactured as per IS: 10418 and supplied in non - returnable wooden drums. Length of cable to be stenciled on drums. Cable size, Voltage grade, No of Cores and sequential incremental length should be printed by embossing on the cable. NOTE 1: Both the end seals of cable shall positively prevent the entry of moisture / water during transportation / storage					
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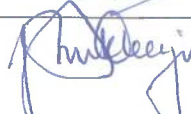
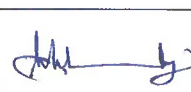
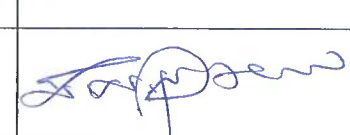
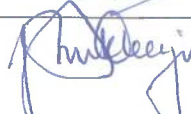
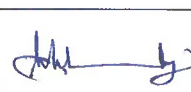
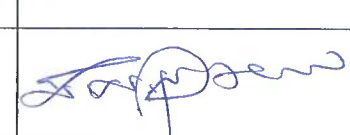
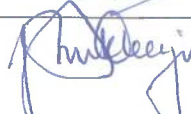
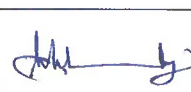
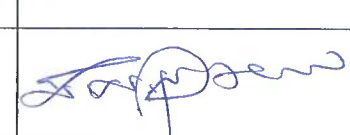
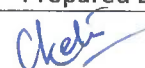
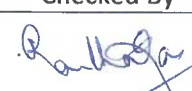
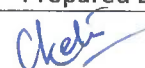
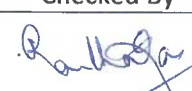
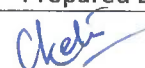
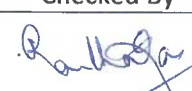
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								Page 4 of 9																																						
SECTION - III 3.0 INSPECTION & TESTING 3.1 <i>The supplier shall furnish the reports of all the type tests carried out as per specification and relevant standards for each type and size of the cable supplied by the vendor. These reports should be for the tests conducted on the same size of the cable of same voltage grade and same specification to be supplied under this contract.</i> 3.2 Schedule of Tests Routine and type tests to be conducted as per IS and IEC cables. 3.3 Additional tests Following additional acceptance tests shall also be performed on cables having outer sheath with improved fire performance. • Oxygen index test – oxygen index shall not be less than 29 • Temperature index test – measured value of temperature index shall be 21 at a temperature of 250°C. 3.4 TECHNICAL DOCUMENTATION REQUIREMENT <table border="1"> <thead> <tr> <th>Sl no.</th> <th>Description</th> <th>No of copies</th> <th>Size</th> <th>Time Schedule</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Along with the offer</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>a) GTP as per Annexure – 1</td> <td>1</td> <td>A4</td> <td>Along with offer</td> </tr> <tr> <td></td> <td>b) Deviation Format (if any)</td> <td>1</td> <td>A4</td> <td>Along with offer</td> </tr> <tr> <td>2.</td> <td>After Purchase Order</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>a) Catalogs</td> <td>2</td> <td>A4</td> <td rowspan="3">Before dispatch</td> </tr> <tr> <td></td> <td>b) Test certificates</td> <td>2</td> <td>A4</td> </tr> <tr> <td></td> <td>c) Storage Instructions for long period storage</td> <td>2</td> <td>A4</td> </tr> </tbody> </table>									Sl no.	Description	No of copies	Size	Time Schedule	1.	Along with the offer					a) GTP as per Annexure – 1	1	A4	Along with offer		b) Deviation Format (if any)	1	A4	Along with offer	2.	After Purchase Order					a) Catalogs	2	A4	Before dispatch		b) Test certificates	2	A4		c) Storage Instructions for long period storage	2	A4
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	ANNEXURE – 1						
	GTP OF THE CABLES TO BE FILLED AND TO SUBMIT ALONG WITH THE TECHNICAL OFFER						
COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.	Sl. No	Description	Particulars				
	A	GENERAL					
	1.	Make					
	2.	Type					
	3.	Applicable standard					
	4.	Manufacturer's name and address					
	5.	Location of factory					
	6.	Voltage grade					
	7.	Suitable for system with service voltage					
	B	CONDUCTOR					
	1.	Applicable Standard					
	2.	Maximum conductor temperature (°C)					
		i) Continuous					
		ii) Short time					
	3.	Material Aluminum grade only					
	4.	Size					
	5.	Nominal cross – sectional area					
	6.	Form of conductor circular / shaped					
	7.	No. of strands					
	8.	Nominal dia. of each strand					
	9.	Whether strands are tinned or not					
	10.	Temperature co-efficient of resistance at 20°C					
	11.	Overall diameter of the core					
	12.	Weight of the cable per KM					
	C	INSULATION					
	1.	Material					
	2.	Type / Applicable standard					
	3.	Nominal Thickness					
	4.	Negative tolerance of thickness					
	5.	Diameter of core over insulation					
	6.	i) Minimum volume resistivity at 27°C					
		ii) Minimum volume resistivity at 70°C					
	7.	Colour scheme of identification of cores					
	8.	Average dielectric strength					
9.	Suitability with regard to moisture, ozone, acid, oil and alkaline surroundings						
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	1.	Material						
	2.	Type / Applicable standard						
	3.	Min. Thickness of the inner sheath						
	4.	whether extruded or wrapped						
	5.	Approximate outside diameter over sheath						
	6.	Colour of inner sheath						
	7.	Whether the inner sheath and the filling material are suitable for the operating temperature of the cable						
	E	ARMOURING						
	1.	Material						
	2.	Type / Applicable standard						
	3.	Calculated diameter over inner sheath (under armour)						
	4.	Size/ no. of wires						
	5.	DC resistance at 20°C						
	6.	Short circuit current carrying capacity of armour for 1 second						
	F	OVERALL SHEATH						
	1.	Material						
	2.	Type / Applicable standard						
	3.	Min. Thickness						
	4.	Colour						
	5.	Tolerance of thickness						
	6.	Whether extruded or wrapped						
	7.	Calculated diameter under sheath over armour						
	8.	Whether anti-termite treatment has been given in the outer sheath						
9.	Whether flame retardant low smoke compound added in outer sheath							
G	Approximate overall diameter							
H	Standard drum length with tolerance							
I	Net weight of the cable							
J	Approximate weight of empty drum							
Rev.00:		Issued By	Prepared By	Checked By	Approved By	Date		
1 st Issue		SCR PROD GROUP				27.6.19		
								

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							DOC.NO: SCR-UT-030	
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		i) In ground						
		ii) In duct						
		iii) In air						
	L	Is the cable guaranteed to safely withstand continuous current for temperature of 90°C and also withstand temperature of 130°C for duration of 500 hours per year						
	M	Embossing on outer sheath						
	N	Minimum bending radius for installation						
	Rev.00:	Issued By	Prepared By	Checked By	Approved By	Date		
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						DOC.NO: SCR-UT-030 REV : 01 JUNE 2019 Page 8 of 9	
ANNEXURE – 2 <u>PRE-QUALIFICATION CRITERIA</u>							
COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.	1) The vendor shall be an Original Equipment Manufacturer (OEM). Only the OEM or their authorized dealers along with an authorization letter can submit offers. An authorized Representative/Dealer cannot quote for the same equipment from more than one OEM. 2) Offer shall be for new cables and not for any used cables. A declaration to the above effect to be furnished. 3) Vendor should have ISO:9001 certification and to be submitted along with technical bid. 4) Vendor to submit type test report for the 3.5Cx400 sqmm XLPE cables. 5) The vendor shall furnish a comprehensive warranty of 18 Months from the date of dispatch or 12 months from the date of commissioning of material at BHEL EPD, Bangalore whichever is earlier.						
	Note: The Pre-qualification criteria are mandatory requirements and the technical bids will be evaluated only when the Pre-Qualification criteria are met. BHEL reserve the right for independent verification of PQR.						
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MATERIAL CODE EL8341800098	 EPD		1800-01 Rev. 00		PURCHASE SPECIFICATION FOR 1.1 kV XLPE LT POWER CABLES		ISSUE NO : 06																			
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