


# BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

## MANUFACTURING QUALITY PLAN -- PVC POWER CABLE

	<b>MANUFACTURERS</b>		Customer	Vendor's	Item:	MQP No :006	Valid	15.01.2016
	<b>DETAILS</b>		BSPTCL	Code	1.1 KV GRADE PVC POWER CABLE		From:	
							Valid	Till Revision
							Upto:	
				Date 02.01.2016	Page of: 1 of 25			

<p><b>Code 1</b> Indicates place <b>where testing is planned</b> to be performed i.e. Inspection Location</p> <p>A At Equipment Manufacturer's works</p> <p>B At Component Manufacturer's works</p> <p>C At Authorised Distributor's place</p> <p>D At Independent Lab</p> <p>E At Turn Key Contractor's location</p> <p>F Not specified</p> <p><b>Code 3</b> Indicates place <b>who shall witness</b> tests i.e. Witnessing Agency</p> <p>P Component Manufacturer itself</p> <p>Q Component Manufacturer and Equipment Manufacturer</p> <p>R Component Manufacturer, Equipment Manufacturer and Contractor</p> <p>S Equipment Manufacturer itself</p> <p>T Equipment Manufacturer and Contractor</p> <p>U Equipment Manufacturer, Contractor and BSPTCL</p> <p>V Third Party itself</p> <p><b>Code 5</b> Whether specific approval of sub-vendor / Component make is envisaged?</p> <p>E Envisaged</p> <p>N Not Envisaged</p>	<p><b>Code 2</b> Indicate <b>who has to perform the tests</b> i.e. Testing Agency</p> <p>J The Equipment Manufacturer</p> <p>K The Component Manufacturer</p> <p>L The Third Party</p> <p>M The Turnkey Contractor</p> <p><b>Code 4</b> Review of Test Reports/Certificates</p> <p>W By Equipment manufacturer</p> <p>X By Contractor during product/process inspection</p> <p>Y BY BSPTCL during product/process inspection</p> <p>Z By Contractor and/or BSPTCL during product/process inspection.</p> <p><b>Code 6</b> Whether test records required to be submitted after final inspection for issuance of Dispatch Instructions/Clearance</p> <p>Y Yes</p> <p>N No</p>
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<b>DETAILS</b>		<b>Code</b>			<b>From:</b>	<b>15.01.2016</b>
	<b>BSPTCL</b>		<b>1.1 KV GRADE PVC POWER CABLE</b>	<b>Rev. No. 00</b>	<b>Valid</b>	<b>Till Revision</b>
				<b>Date 02.01.2016</b>	<b>Upto:</b>	
					<b>Page of: 2 of 25</b>	

**NOTE:**

- a. The MQP should be read in conjunction with BSPTCL specification and shall deem to include additional tests if any required as per the contract.
- b. BSPTCL specification shall include provisions of letter of Award, BSPTCL approved drawings /technical data sheet / BOM / test schedule / test procedure applicable to the specific contract.
- c. In case of any contradiction between the manufacturer's plant standards, this MQP and BSPTCL specification following precedence shall be followed :-
  - i) BSPTCL specification
  - ii) This Manufacturing Quality plan.
  - iii) Manufacturer's plant standards
- d. It is the responsibility of the manufacturer to ensure that this document is readily available at their works, as well as at the works of their sub vendors in order to avoid any delay at the time of inspection.
- e. The manufacturer shall ensure that their as well as their sub vendors control, metering & testing instruments are duly calibrated and should have calibration certificates traceable to Indian/International standards. Calibration records should be available during inspection by BSPTCL. Key testing instruments will be calibrated only by NABL accredited laboratories or manufacturer laboratories.
- f. In case of any tests being carried out at third party lab, such lab / facility should be NABL accredited /accepted by BSPTCL
- g. The manufacturer shall maintain the proper co-relation of test certificates from raw material stage to finished product stage and the records should be available during inspection by BSPTCL.
- h. Manufacturer shall show the approval of BSPTCL engineering for all contract specific type tests, including specific type tests if any as per the BSPTCL specification at the time of final inspection.
- i. All packing cases should be marked with BSPTCL LOA details, name of project, item description and Dispatch Instructions/Clearance number by which material has been cleared for dispatch.
- j. One copy of test report, Dispatch Instructions/Clearance & shall also be sent along with consignment.



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	<b>DETAILS</b>		<b>Code</b>			<b>From:</b>		
		<b>BSPTCL</b>		<b>1.1 KV GRADE PVC POWER CABLE</b>	<b>Rev. No. 00</b>	<b>Valid</b>		<b>Till Revision</b>
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						<b>Page of: 3 of 25</b>		

- k Inspection of spare items ordered by BSPTCL shall also be governed by the provisions of this MQP. Items if not governed under MQP shall be offered for inspection as per BSPTCL specification / Relevant-Indian / International Specification
- l The manufacturer shall align their quality system and that of their sub vendors to the requirements of latest ISO 9000 quality standards in a time bound Manner.
- m The relevant details of plant standards and quality plan for different ratings are shown in attached Annexure.
- n BSPTCL may review the effective implementation of the processes during the product inspection / process inspection in case any violation in process or process parameters are observed, the reason along with corrective & preventive measures shall be conveyed to BSPTCL within 2 weeks.
- o) All the Aluminium wire strands and galvanized steel wire/ strips are required to be tested for each sample drawn for acceptance tests
- p) Strips/ wire armouring following method (a) mentioned in relevant IS 1554(I) shall not be acceptable to BSPTCL.
- q) For single core armoured cables, armouring should be of aluminium wire instead of galvanised steel wire/ strip.
- r) The filler and innersheath shall be of non-hygrosopic fire retardant materials and shall be softer than insulation.
- s) The manufacturer shall not offer repaired cables for inspection under no circumstances.
- t) The contractor shall obtain the following test certificates from their subvendor for various raw materials for review by BSPTCL.
  - i) Chemical composition of Aluminium wire/rod.
  - ii) Purity of Zinc
  - iii) All the test results of the tests carried out by their sub vendor on aluminium wire rod/ Aluminium wire/XLPE Compound for insulation, PVC Compound. for inner and outer sheath and galvanised steel wire/ strips.
- u) The cable ends shall be properly sealed with PVC/ rubber caps and secured with the help of U nails on the side of one of the flange using galvanised steel wire at three locations 75mm apart or more covered with PVC Adhesive tape.
- v) The following test facilities/ calibration certificates shall be available at contractors work.
  - i) Calibration of all testing and measuring equipments.
  - ii) Standard Resistance.
  - iii) Tensile testing Machine.
  - iv) Test facilities for all the galvanising tests.
  - v) Tests facilities for all the tests for XLPE/ PVC insulation / Sheath and final routine and acceptance tests.
- w) The wood used for drums shall meet the requirements of BSPTCL specification. The contractor shall furnish an undertaking regarding the seasoning of wood used for manufacturing of the drums.
- x) Tensile test and wrapping test as specified SI.No 14.2.1 & 14.2.2 above are not required to be conducted in case of compacted circular and shaped conductor line with clause 6.2.1 & 6.2.2 of IS 8130-1984.
- y) In addition to the requirement indicated at serial no 14.1.1 (v) the manufacturer shall get verified the length of 10% of the drums offered by rewinding irrespective of the sizes at the time of final inspection. If by rewinding the length is found less than declared length, another two drums from the same lot shall be verified for declared length. In case of any of these two drums found to have length less than the declared length, the lot will be rejected otherwise the lot will be accepted with the modification of declared length of original drums.

EM : Equipment Manufacturer

CM: Component Manufacturer



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	<b>BSPTCL</b>		<b>1.1 KV GRADE PVC POWER CABLE</b>	<b>Rev. No. 00</b>	<b>Valid Upto:</b>	<b>Till Revision</b>
				<b>Date 02.01.2016</b>	<b>Page of: 4 of 25</b>	

Sr. No.	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	
<b>A</b>	<b>RAW MATERIAL INSPECTION</b>												
1.0	<b>ALUMINIUM WIRE ROD</b>											<b>E</b>	
1.1	Chemical Analysis	Chem	One Sample per heat per lot	IS: 4026 (Gr. II) and Power Grid Specification Al-99.6% min. Si-0.13%max. Fe-0.30% max. Cu-0.04% max. (Ti+Va)-0.02% max.	IS: 4026 (Gr. II) and Power Grid Specification Al-99.6% min. Si-0.13%max. Fe-0.30% max. Cu-0.04% max. (Ti+Va)-0.02% max.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or TRs from 3 <sup>rd</sup> party recognized lab at the time of final inspection.
1.2	Diameter of Aluminium Wire Rod	Meas.	One sample from each coil	IS: 5484 & Power Grid Specification Min. 9.00 mm Nom. 9.50 mm Max. 10.00 mm	IS: 5484 & Power Grid Specification Min. 9.00 mm Nom. 9.50 mm Max. 10.00 mm	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturers TCs or the records of the contractor at the time of final inspection.
1.3	Breaking Load	Mech	One sample from each coil	IS: 5484 & Power Grid Specification Range I to IV Tensile strength- 65 to 150 N/mm <sup>2</sup>	IS: 5484 & Power Grid Specification Range I to IV Tensile strength- 65 to 150 N/mm <sup>2</sup>	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturers TCs or the records of the contractor at the time of final inspection.



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							1	2	3	4	5	6	
2.2	Visual Check for PVC granules i.e. burns etc	Visual	One sample per lot of 5 MT or part thereof	IS:5831 & Approved Data Sheets. Should be generally free from burn particles	IS:5831 & Approved Data Sheets. Should be generally free from burn particles	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
2.3	Tensile strength and elongation before aging	Mech	One sample per lot of 5 MT or part thereof	IS:5831 & Approved Data Sheets. Min. TS-12.5 N/mm2 Elongation 150% (min.)	IS:5831 & Approved Data Sheets. Min. TS-12.5 N/mm2 Elongation 150% (min.)	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
2.4	Tensile strength and elongation after aging	Mech	One sample per lot of 5 MT or part thereof	IS:5831 & Approved Data Sheets. Min. TS-12.5 N/mm2 Max. variation $\pm 20\%$ from the actual values before aging. Elongation-150% (Min.) Max. variation $\pm 20\%$ from the actual values before aging.	IS:5831 & Approved Data Sheets. Min. TS-12.5 N/mm2 Max. variation $\pm 20\%$ from the actual values before aging. Elongation-150% (Min.) Max. variation $\pm 20\%$ from the actual values before aging.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
2.5	Loss of Mass in air oven	Therm	One sample per lot of 5 MT or part thereof	IS:5831 & BSPTCL Specification Max. 2mg/cm <sup>2</sup>	IS:5831 & BSPTCL Specification Max. 2mg/cm <sup>2</sup>	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.

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							1	2	3	4	5	6	
2.6	Thermal Stability	Therm	One sample per lot of 5 MT or part thereof	IS:5831 & BSPTCL Specification. The indicating paper shall not change colour when the insulation is kept at a temperature of 200 deg C for a period of Min. 80 Minutes.	IS:5831 & BSPTCL Specification. The indicating paper shall not change colour when the insulation is kept at a temperature of 200 deg C for a period of Min. 80 Minutes.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
2.7	Volume Resistivity	Elect	One sample per lot of 5 MT or part thereof	IS:5831 & Approved Data Sheets. Min. at 27 deg C -1x10 <sup>13</sup> Ohm.cm. Min. at 70 deg C -1x10 <sup>10</sup> Ohm.cm.	IS:5831 & Approved Data Sheets. Min. at 27 deg C -1x10 <sup>13</sup> Ohm.cm. Min. at 70 deg C -1x10 <sup>10</sup> Ohm.cm.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
<b>3.0 PVC COMPOUND FOR SHEATH (Type ST1)</b>													
3.1	Type/Specific gravity	Meas.	One sample per lot of 5 MT or part thereof	IS:5831 & approved data sheet	IS:5831 & approved data sheet	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
3.2	Visual Check for PVC granules i.e. burns etc.	Visual	One sample per lot of 5 MT or part thereof	IS:5831 & BSPTCL Specification. Should be generally free from burn particles	IS:5831 & BSPTCL Specification. Should be generally free from burn particles	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.

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							1	2	3	4	5	6	
3.3	Tensile strength and elongation before aging	Mech	One sample per lot of 5 MT or part thereof	IS:5831 & BSPTCL Specification.	IS:5831 & BSPTCL Specification.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
				Min.TS 12.5 N/mm2	Min.TS 12.5 N/mm2								
				Elongation 150% (min.)	Elongation 150% (min.)								
3.4	Tensile strength and elongation after aging	Mech	One sample per lot of 5 MT or part thereof	IS:5831 & BSPTCL Specification.	IS:5831 & BSPTCL Specification.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
				Min.TS 12.5 N/mm2	Min.TS 12.5 N/mm2								
				(max.) variation ± 20% from the actual value before aging	(max.) variation ± 20% from the actual value before aging								
				Elongation 150%	Elongation 150%								
				(min.) Max. variation ± 20% from the actual values before aging	(min.) Max. variation ± 20% from the actual values before aging								
3.5	Loss of Mass in air Oven	Therm	One sample per lot of 5 MT or part thereof	IS:5831 & BSPTCL Grid Specification	IS:5831 & BSPTCL Grid Specification	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
				Max. 2mg/cm <sup>2</sup>	Max. 2mg/cm <sup>2</sup>								
3.6	Thermal Stability	Therm	One sample per lot of 5 MT or part thereof	IS:5831 & BSPTCL Specification.	IS:5831 & BSPTCL Specification.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
				The indicating paper shall not change colour when the Sample	The indicating paper shall not change colour when the Sample								
				of Sheath is kept at	of Sheath is kept at								
				200 deg.C for a period of min. 40 minutes	200 deg.C for a period of min. 40 minutes								



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							1	2	3	4	5	6	
3.7	Oxygen Index Test on PVC for outer sheath only.	Envir.	One sample per lot of 5 MT or part thereof	ASTM-D-2863 & approved data sheets Min. 29%	ASTM-D-2863 & approved data sheets Min. 29%	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
3.8	Temperature Index Test on PVC for Outer Sheath only.	Envir.	One sample per lot of 5 MT or part thereof	ASTM-D-2863 & approved data sheets Min. 250 Deg.C	ASTM-D-2863 & approved data sheets Min. 250 Deg.C	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
<b>4.0 ARMOUR WIRE/STRIP</b>													
<b>4.1 DIMENSION</b>													
4.1		Meas.	One Sample for every 10 coils	IS:3975 & Approved Data Sheets	IS:3975 & Approved Data Sheets	Manuf. T.C./RM TEST REPORT	A	J	S	W	E	N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
4.2	Tensile Strength	Mech	One Sample for every 10 coils	IS:3975 & Approved Data Sheets	IS:3975 & Approved Data Sheets	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
4.3	Elongation	Mech	One Sample for every 10 coils	IS:3975 & Approved Data Sheets	IS:3975 & Approved Data Sheets	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
4.4	Torsion/Winding	Mech	One Sample for every 10 coils	IS:3975 & Approved Data Sheets	IS:3975 & Approved Data Sheets	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.

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							1	2	3	4	5	6	
4.5	Wrapping test	Mech	One Sample for every 10 coils	IS:3975 & approved Data Sheet.Wrap-8 Unwrap-6 & Wrap-6 on a mandrel as per above IS. The wire shall not crack or break.	IS:3975 & approved Data Sheet.Wrap-8 Unwrap-6 & Wrap-6 on a mandrel as per above IS. The wire shall not crack or break.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
4.6	Uniformity of Zinc coating (Preece Test)	Chem.	One Sample for every 10 coils	IS:4826, IS:3975 & approved data sheets. At the end of specified number of dips as per IS,the specimen shall not show any red deposit of copper upon base metal.	IS:4826, IS:3975 & approved data sheets. At the end of specified number of dips as per IS,the specimen shall not show any red deposit of copper upon base metal.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
4.7	Weight of Zinc Coating	Chem.	One Sample for every 10 coils	IS:4826, IS:3975 & approved data sheets.	IS:4826, IS:3975 & approved data sheets.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.
4.8	Adhesion Test	Mech.	One Sample for every 10 coils	IS:4826, IS 3975 & Approved Data Sheets. The Zinc Coating shall remain adherent to the steel wire.	IS:4826, IS 3975 & Approved Data Sheets. The Zinc Coating shall remain adherent to the steel wire.	Manuf. T.C./RM TEST REPORT	A	J	S	W		N	Review of manufacturer's TCs or the records of the contractor at the time of final inspection.





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6.2	Smoothness/Surface scratches (Visual check)	Visual	100%	The surface shall be smooth and free from Scratches	The surface shall be smooth and free from Scratches	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
6.3	Resistance /Km at 20° C	Elect	One Sample from each spool	IS:8130 & approved data sheet.	IS:8130 & approved data sheet.	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
6.4	Dimensions	Meas.	One Sample from each spool	approved data sheet	approved data sheet	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
<b>7.0 INSULATED CORE</b>													
7.1	Thickness of Insulation		Each setting	IS:1554(Part-1)Table 2 & approved data sheet	IS:1554(Part-1)Table 2 & approved data sheet	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
	Average	Meas.	during running of machine										
	Minimum	Meas.											
7.2	Type of Insulating Material	Visual	Each setting during running of machine	IS:1554(Part-1) and approved data sheet Type-A	IS:1554(Part-1) and approved data sheet Type-A	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
7.3	Surface finish	Meas.	Each setting during running of machine	IS:1554(Part-1) The Surface shall be smooth and free from any defects	IS:1554(Part-1) The Surface shall be smooth and free from any defects	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
7.4	Spark Test	Elect.	100%	min. 6 KV (r.m.s.)	min. 6 KV (r.m.s.)	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.

i.  
ii.

Sr. No.	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
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7.5	Core Identification/Colour of cores	Visual	100%	IS:1554 (Part-1) & approved data sheet	IS:1554 (Part-1) & approved data sheet	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
7.6	Eccentricity	Meas.	100%	Max. 10%/ approved data sheet	Max. 10%/ approved data sheet	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
<b>8.0</b>	<b>LAID UP CORES</b>												
8.1	Direction of Lay	Visual	Each setting during Process	The outer most layer shall be right hand and other layers opposite to previous one.	The outer most layer shall be right hand and other layers opposite to previous one.	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
8.2	Lay Length	Meas.	Each setting during Process	approved data sheet	approved data sheet	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
8.3	Sequence of laying	Visual	Each setting during Process	approved data sheet	approved data sheet	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
8.4	Tightness of cores	Visual	Each setting during Process	The cores shall be reasonable tight.	The cores shall be reasonable tight.	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.



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<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="4" style="width: 15%;"><b>MANUFACTURERS DETAILS</b></td> <td style="width: 15%;">Customer</td> <td style="width: 15%;">Vendor's Code</td> <td style="width: 15%;">Item:</td> <td style="width: 20%;">MQP No :006</td> <td style="width: 10%;">Valid From:</td> <td style="width: 20%; text-align: center;">15.01.2016</td> </tr> <tr> <td rowspan="3" style="text-align: center;">BSPTCL</td> <td rowspan="3" style="text-align: center;">1.1 KV GRADE PVC POWER CABLE</td> <td rowspan="3"></td> <td>Rev. No. 00</td> <td>Valid Upto:</td> <td style="text-align: center;">Till Revision</td> </tr> <tr> <td colspan="3">Date 02.01.2016</td> <td colspan="3">Page of: 16 of 25</td> </tr> <tr> <td colspan="6"></td> </tr> </table>													<b>MANUFACTURERS DETAILS</b>	Customer	Vendor's Code	Item:	MQP No :006	Valid From:	15.01.2016	BSPTCL	1.1 KV GRADE PVC POWER CABLE		Rev. No. 00	Valid Upto:	Till Revision	Date 02.01.2016			Page of: 16 of 25								
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	BSPTCL	1.1 KV GRADE PVC POWER CABLE		Rev. No. 00	Valid Upto:	Till Revision																															
				Date 02.01.2016			Page of: 16 of 25																														
10.2	Dimensions of Armour Wire/strip	Meas.	Starting of M/C and during running	approved data sheet	approved data sheet	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.																								
10.3	Surface Finish	Visual	Starting of M/C and during running	Should be reasonably smooth	Should be reasonably smooth	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.																								
10.4	Lay Direction	Visual	Starting of M/C and during running	Left hand lay	Left hand lay	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.																								
10.5	Gap between two wires/strip	Meas.	Starting of M/C and during running	Not more than one wire dia. / width of strip.	Not more than one wire dia. / width of strip.	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.																								
10.6	Cross over/over Riding	Visual	Starting of M/C and during running	No cross - over.	No cross - over.	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.																								
10.7	Armour Coverage/face Bend	Meas.	Starting of M/C and during running	Min. 90% coverage. No face bend	Min. 90% coverage. No face bend	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.																								
10.8	Dia over Armour	Meas.	Starting of M/C and during running	approved data sheet	approved data sheet	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.																								



Sr. No.	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	
11.0	<b>FINISHED CABLES (Outer Sheathing )</b>												
11.1	Thickness of Outer Sheath	Meas.	Starting of M/C and during running	IS:1554 (Part-1) Table-7 and approved data sheet	IS:1554 (Part-1) Table-7 and approved data sheet	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
11.2	Type of Sheathing material	Visual	Starting of M/C and during running	IS:1554 (Part-1) & approved data sheet	IS:1554 (Part-1) & approved data sheet	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
11.3	Surface finish	Visual	Starting of M/C and during running	The surface shall be smooth and free from any defects.	The surface shall be smooth and free from any defects.	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
11.4	Overall Dia	Meas.	Starting of M/C and during running	Approved data sheets	Approved data sheets	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
11.5	Porosity	Visual	Starting of M/C and during running	No Porosity	No Porosity	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
11.6	Embossing	Visual	Starting of M/C and during running	IS:1554(Part-1) and BSPTCL Specification	IS:1554(Part-1) and BSPTCL Specification	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.
11.7	Progressive Sequential marking	Visual	Starting of M/C and during running	BSPTCL Specification	BSPTCL Specification	In Process Log Sheet	A	J	S	W		N	Review of the records of the contractor at the time of final inspection.



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							1	2	3	4	5	6	
C	<b>FINAL INSPECTION &amp; TESTING</b>												
13.0	<b>ROUTINE TESTING</b>												
13.1	Conductor resistance at 20°C	Elect	100% Drums	IS:8130 Table-2 / approved data sheet	IS:8130 Table-2 / approved data sheet	Routine Test Certificate	A	J	U	Y		N	Review of the records of the contractor at the time of final inspection.
13.2	High Voltage Test at room temperature	Elect	100% Drums	IS:1554(Part-1)shall withstand 3 KV (r.m.s.) for 5 Minute	IS:1554(Part-1)shall withstand 3 KV (r.m.s.) for 5 Minute	Routine Test Certificate	A	J	U	Y		N	Review of the records of the contractor at the time of final inspection.
14.0	<b>ACCEPTANCE TESTS</b>												
14.1	<b>FINISHED CABLE</b>												
14.1.1	Visual Check for Core identification	Visual	All Drums	IS:1554(Part-1) / approved data sheet	IS:1554(Part-1) / approved data sheet		A	J	U	Y		Y	Dispatch Instructions/Clearance
i.)	Embossing												
ii.)	Printing quality												
iii.)	of sequential marking check												
iv.)	Surface finish												
v.)	Top & Bottom sequential marking check												
vi.)	Length Measurement	Measurement through rewinding 10%											
14.1.2	High Voltage test at room temperature	Elect	100% drums	IS:1554(Part-1) / BSPTCLSpecifi- cation shall with- stand 3 KV (r.m.s.) for 5 minutes.	IS:1554(Part-1) / BSPTCLSpecifi- cation shall with- stand 3 KV (r.m.s.) for 5 minutes.	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance

Sr. No.	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	
14.1.3	Conductor Resistance at 20°C	Elect	100% Drums	IS:8130 Table 2 / approved data sheet	IS:8130 Table 2 / approved data sheet	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Standard resistance to be kept available for equipment calibration verification.
14.1.4	Insulation Resistance Test	Elect	every 10 drums or part thereof per size	IS:5831 / approved data sheets. Min. at 27°C 36.7 M Ohm Km	IS:5831 / approved data sheets. Min. at 27°C 36.7 M Ohm Km	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.1.5	Flamability Test	Thermal	1 sample per lot for each size	IS:1554(Part-1) / BSPTCLSpecn.	IS:1554(Part-1) / BSPTCLSpecn.	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
<b>14.2</b>	<b>ALUMINIUM CONDUCTOR</b>												
14.2.1	Tensile strength	Mech	1 sample for every 10 drums or part thereof per size	BSPTCL Specification Min.- 100 N/mm <sup>2</sup>	BSPTCL Specification Min.- 100 N/mm <sup>2</sup>	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.2.2	Wrapping Test	Mech.		BSPTCL Specification. Wrap-8, Unwrap-6 &	BSPTCL Specification. Wrap-8, Unwrap-6 &	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
<b>14.3</b>	<b>PVC INSULATION &amp; SHEATH</b>			Wrap-6 on its own dia. The wire shall not crack or break.	Wrap-6 on its own dia. The wire shall not crack or break.								
14.3.1 i.) ii.)	Thickness of insulation of core Average Minimum	Meas.	1 sample for every 10 drums or part thereof per size	IS:1554(Part-1) Table-2 / approved data sheets.	IS:1554(Part-1) Table-2 / approved data sheets.	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance



Sr. No.	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	
14.3.8	Oxygen Index test on outer sheath	Envir.	1 sample per lot for each size	ASTMD-2863 / approved data sheet Min. 29%	ASTMD-2863 / approved data sheet Min. 29%	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch
14.3.9	Temperature Index test on outer sheath	Envir.	1 sample per lot for each size	ASTMD-2863 / approved data sheet Min. 250 Deg.C	ASTMD-2863 / approved data sheet Min. 250 Deg.C	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.3.10	Flame Retardant test on single core cables	Thermal	1 sample per lot for each size	IS:1554 Cl. 16.6 No visible damages on the test specimen within 300 mm from its upper end	IS:1554 Cl. 16.6 No visible damages on the test specimen within 300 mm from its upper end	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
<b>14.4</b>	<b>ADDITIONAL TESTS FOR FRLS CABLES</b>												
14.4.1	Smoke Density Rating	Envir.	1 sample per lot for each size	ASTMD-2843 / approved data sheet Max. 60%	ASTMD-2843 / approved data sheet Max. 60%	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.4.2	Acid Gas Generation	Envir.	1 sample per lot for each size	IEC-754-1 / Power Grid Specn. Max. 20% by weight	IEC-754-1 / Power Grid Specn. Max. 20% by weight	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.4.3	Flamability Test	Thermal	1 sample per lot for each size	IEEE-383 Swedish Chimney SS-424-14  -75 class-F3 & approved data sheet	IEEE-383 Swedish Chimney SS-424-14  -75 class-F3 & approved data sheet	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance

Sr. No.	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks	
							1	2	3	4	5	6		
<b>14.5</b>	<b>ARMOURING</b>													
14.5.1	Resistivity for Armour wire	Elect	1 sample per every 10 drums or part thereof per size	IS:3975 / approved data sheets Max. $14.5 \times 10^{-6}$ Ohm.cm at 20 Deg.C	IS:3975 / approved data sheets Max. $14.5 \times 10^{-6}$ Ohm.cm at 20 Deg.C	Acceptance Test Certificate	A	J	U	Y			Y	Dispatch Instructions/Clearance
14.5.2	Tensile Strength	Mech	1 sample per every 10 drums or part thereof per size	IS:3975 / approved data sheets	IS:3975 / approved data sheets	Acceptance Test Certificate	A	J	U	Y			Y	Dispatch Instructions/Clearance
14.5.3	Closeness	Visual	1 sample per every 10 drums or part thereof per size	IS:3975 / approved data sheets. Gap between two wires shall not be more than one wire dia/ width of strip	IS:3975 / approved data sheets. Gap between two wires shall not be more than one wire dia/ width of strip	Acceptance Test Certificate	A	J	U	Y			Y	Dispatch Instructions/Clearance
14.5.4	Uniformity of zinc coating	Meas.	1 sample per every 10 drums or part thereof per size	IS:3975 & IS:4826 / approved data sheets. At the end of specified number of dips as per IS, the specimen shall not show any red deposit of copper upon base metal.	IS:3975 & IS:4826 / approved data sheets. At the end of specified number of dips as per IS, the specimen shall not show any red deposit of copper upon base metal.	Acceptance Test Certificate	A	J	U	Y			Y	Dispatch Instructions/Clearance

Sr. No.	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	
14.5.5	Weight of Zinc Coating	Chem	1 sample per every 10 drums or part thereof	IS:3975, IS:4826 / approved data sheet	IS:3975, IS:4826 / approved data sheet	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.5.6	Torsion/Winding	Mech	1 sample per every 10 drums or part thereof per size	IS:3975 / approved data sheets.	IS:3975 / approved data sheets.	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
<b>14.6</b>	<b>DRUMS</b>												
14.6.1	Visual check for defects	Visual	100%	BSPTCL Specification	BSPTCL Specification	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.6.2	Dimensions	Meas.	1 sample per every 10 drums or part thereof per size	Approved drawings	Approved drawings	Acceptance Test Certificate	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.6.3	sealing of drums	Visual	100%	As per attached annexure		Test	A	J	U	Y		Y	Dispatch Instructions/Clearance
<b>14.7</b>	<b>Additional Test(If called in the contract)</b>												
	Physical test for insulation and outer sheath												
14.7.1	Shrinkage Test	Meas.	1 Sample/Lot/Type	BSPTCL specs/As Per IS 1554(Part-1)	BSPTCL specs/As Per IS 1554(Part-1)	Test Report	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.7.2	Hot Deformation Test	Meas.	1 Sample/Lot/Type	BSPTCL specs/As Per IS 1554(Part-1)	BSPTCL specs/As Per IS 1554(Part-1)	Test Report	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.7.3	Heat Shock Test	Meas.	1 Sample/Lot/Type	BSPTCL specs/As Per IS 1554(Part-1)	BSPTCL specs/As Per IS 1554(Part-1)	Test Report	A	J	U	Y		Y	Dispatch Instructions/Clearance
14.7.4	Thermal Stability	Meas.	1 Sample/Lot/Type	BSPTCL specs/As Per IS 1554(Part-1)	BSPTCL specs/As Per IS 1554(Part-1)	Test Report	A	J	U	Y		Y	Dispatch Instructions/Clearance



