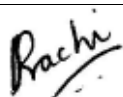
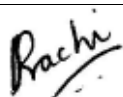
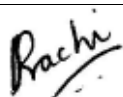


	 A4 - 10	Purchase specification; Group: Photovoltaics 33kV HT Power Cables: 1Cx300 sq-mm XLPE, armoured, Al Cable		PS-439-1047 REV No. 02 PAGE 1 OF 5																																																						
	A. Item Description Cables, 1 core x 300 sq-mm, multi-stranded, compacted aluminium conductor, XLPE insulated, Al armouring, PVC outer sheathed, FRLS, voltage grade 33 kV (UE).																																																									
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 to the company	B. Technical specification																																																									
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Purchase specification; Group: Photovoltaics
33kV HT Power Cables: 1Cx300 sq-mm XLPE, armoured, Al Cable

PS-439-1047

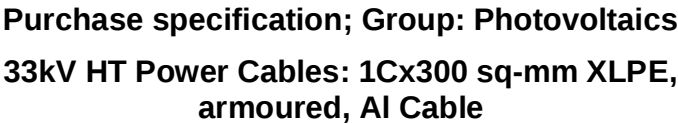
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8.0	Core identification (insulation colour)	Natural
9.0	Inner Sheath	NA
a)	Material	NA
b)	Thickness of inner sheath	NA
c)	Colour of inner sheath	NA
10.0	Armouring	As per IS: 3975- 1979
a)	Armour material and shape	Aluminium round wire armour H4 Grade as per IS:8130
b)	Armour wire diameter (Nominal)	As per IS: 7098 (part-2)
c)	Max. resistivity of armour at 20 °C	0.028264 ohm mm ² per metre
d)	Size and type of armour	Size and type of armour selected shall meet the minimum requirement of Short-Ckt capability as per Cl. 14 (b). Vendor shall submit detailed calculation for the same along with offer.
d)	The gap between armour wires shall not exceed one armour wire space and there shall be no cross over/ over-riding of armour wire. The minimum area of coverage of armouring shall be 90%. The breaking load of armour joint shall not be less than 95% of that of armour wire.	
11.0	Outer sheath	As per IS: 5831-1984 and ASTM stds
a)	Material	Extruded PVC Type ST2
b)	Thickness of outer sheath	As per IS: 7098 (part-2)
c)	Colour of outer sheath	Black
d)	Overall diameter of cable	Vendor shall indicate dimension. Allowable tolerance shall be +/-2 mm over declared value.
12.0	Ovality at any cross section shall be kept minimum so as to have circular cross section of cable.	
13.0	Minimum bending radius	As per IS: 1255
14.0	Short-circuit withstand capacity and duration	25kA / 1 sec (min)
a)	Conductor (kAmps) for 1sec	25kA / 1 sec (min)
b)	Armour (kAmps) for 1 sec	25kA / 1 sec (min)
	Calculation for (a) and (b) enclosed along with offer. Confirm YES/NO	
15.0	FRLS properties	
a)	Minimum Oxygen index	Min 29 %, as per IS 10810 Part 58, ASTM-D-2863
b)	Minimum Temperature index	As per IS 10810 Part 64
c)	Flammability	As per IEC-60332 Part-3
d)	Halogen acid gas evolution by weight	Max 20 %, as per IEC-60754 Part-1
e)	Smoke density	Not more than 60% as per ASTM-D-2843
e)	Fire Resistance requirement	IEEE-383

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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 to the company		16.0	Routine tests (As per IS: 7098 (Part-2) 2011)	
		a)	Conductor resistance test	
		b)	HV test	
			To be conducted the vendor on each drum of finished cables. Test report shall be submitted to BHEL along with inspection call for acceptance tests	
		17.0	Type Tests	
		i)	Conductor	
			Resistance test	
		ii)	For Armour wires/formed wires	
		a.	Measurement of dimensions	
		b.	Tensile test	
		c.	Elongation test	
		d.	Torsion test	For round wires only
		e.	Wrapping test	
		f.	Resistance test	
		iii)	For XLPE Insulation / PVC Sheath	
		a.	Test for thickness	
		b.	Tensile and elongation strength before and after ageing	
		c.	Ageing in air oven	
		d.	Loss of mass test	For PVC outer sheath only
		e.	Hot deformation test	For PVC outer sheath only
		f.	Heat shock test	For PVC outer sheath only
		g.	Shrinkage test	
		h.	Thermal stability test	For PVC outer sheath only
		i.	Hot set test	For XLPE insulation only
		j.	Water absorption test	For XLPE insulation only
		k.	Oxygen Index test	For PVC outer sheath only
		l.	Smoke density test	For PVC outer sheath only
		m.	Acid gas generation test	For PVC outer sheath only
		n.	Flammability test as per IEC-332 Part-3 (Category-B)	For completed cable only
		o.	Insulation Resistance test (Volume resistivity method)	
		p.	High Voltage test	
		(iv)	All cables to be supplied shall be of type tested design. During detailed engineering, vendor shall submit for customer approval the reports of all valid type tests. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. However if the vendor is not able to submit valid type test reports, the vendor shall conduct all such tests under this contract at no additional cost to BHEL either at third party lab or in presence of client /owners representative and submit the reports for approval.	



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iii. FR test on single cable As per IS: 10810 Part 61

Ageing test shall be performed as indicated below: Samples as per IS 7098 part-1: 1988 from the offered lot shall be tested for tensile strength & elongation (before and after ageing) as per IS 7098 part-1: 1988.

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	33kV HT Power Cables: 1Cx300 sq-mm XLPE, armoured, Al Cable		REV No. 02
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19.0	Packing and marking		
a)	The cable shall be supplied in non-returnable wooden or steel drum of heavy construction. The surface of the drum and the outermost cable layer shall be covered with water proof cover. Both the ends of the cable shall be properly sealed with heat shrinkable PVC/ rubber caps secured by 'U' nails so as to eliminate ingress of water during transportation, storage and erection. Wood preservative anti-termite treatment shall be applied to the entire drum. Wooden drums shall comply IS: 10418.		
b)	Drum length	500 meters. +/- 2%	
c)	Marking on the drum	Each drum shall be marked with following information: BHEL PO number and date, BHEL specification number, Cable description, Manufacturer name, Address and contact number, Part number, Size & Length of the cable, Cable code, Voltage grade, Approx. gross mass, Year of manufacture etc stenciled on both sides of the drum. A tag containing same information shall be attached to the leading end of the cable. An arrow and suitable accompanying wording shall be marked on one end of the reel indicating the direction in which it should be rolled.	
20.0	Cable Identification /marking		
a)	The printing/ embossing shall be progressive, automatic, in line and marking shall be legible and indelible.		
b)	Identification scheme / printing on the cable.		
c)		Embossing on outer sheath at an interval of 1 meter: (a) Cable size and voltage grade (b) Word 'FRLS' (c) Manufacturer name, brand name or trade mark, ISI mark / IS standard (d) Drum no. Sequential marking of length of the cable in meters.	
NOTE	Vendor has to enclose the deviation sheet clause wise separately in case any deviations are sought by the vendor. Absence of any deviation sheet shall be taken as compliance of BHEL specification in total without any deviation		

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