RAJASTHAN TEST & RESEARCH CENTRE

An IS/ISO/IEC 17025:2017 Accredited Laboratory
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DEWA (Dubai Electricity & Water Authority) Registration No. 103065
D-U-N-S Registration No. 737950000

An Electro Technical & Chemical Testing Laboratory

TEST REPORT

TEST REPORT NO : ULR-TC507323000001978F	Page 1 of 21

SECTION - A (GENERAL)

DATE OF RECEIPT OF TEST ITEM : 08/06/2023		DATE OF ISSUE OF TEST REPORT: 04/08/2023
1	JOB ID NUMBER	RTRC/JC/C/23F0801
2	NAME OF CUSTOMER	Dynamic Cables Limited
3	ADDRESS OF CUSTOMER	A-129, A129A, A-130, SKS Industrial area, Reengus, Tehsil Shri Madhopur, Dist. Sikar-332404 (Rajasthan), India
4	CUSTOMER REFERENCE No. AND DATE	Ref. Letter : DCL/RTRC/TT/2023-24/395 Dated : 03/06/2023
5	ITEM DESCRIPTION	1Cx 630 Sqmm stranded compacted circular aluminium conductor (class 2), Semi-conducting tape over conductor, Conductor screened by a layer of extruded semiconducting compound, Cross linked polyethylene (XLPE) Insulated, Insulation screened by a layer of extruded semiconducting compound, A layer of semiconducting water swellable tapes, Semi-conducting copper woven tape, Aluminium corrugated metallic sheath, Bitumenized cottan tape over corrugated aluminium sheath, Non-woven water swellable tape & Overall Extruded Polyethylene (HDPE) outer sheathed with graphite coating 38/66 kV (E) Cable, Cable code - A2XA2Y
6	MODE OF PACKING	Sample wound in wooden drum and covered with HDPE Sheets
7	CONDITION (WHEN RECEIVED)	Satisfactory
8	QUANTITY OF ITEM	45 Metres cable + 5 Metres Aluminium wire (Before stranding)
9	SEAL NUMBER (IF ANY)	Nil
10	TESTS TO BE CONDUCTED	Type Tests
11	REFERENCE SPECIFICATION	IS 7098 (Part-3):1993 (up to & including Amendment No. 4), IEC 60502-2: 2014, IEC 60840 : 2020 & GETCO Specification GETCO/E/TS-PCBL025A R5 july.2022
12	DISCIPLINE	Electrical Testing
13	GROUP	Cables and Wires
14	DATE OF STARTING TESTS	15/06/2023
15	DATE OF COMPLETION OF TESTS	31/07/2023

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Authorized Signatory

16	ADDITIONS, DEVIATIONS OR EXCLUSIONS (IF ANY)	Nil
17	NAME OF FIRM	Nil
18	IDENTIFICATION	Nil
19	TEST WITNESSED BY (CUSTOMER REPRESENTATIVE)	Nil
20	TEST WITNESSED BY (OTHER THAN CUSTOMER REPRESENTATIVE)	Nil
21	TEST SUBCONTRACTED WITH ADDRESS OF THE LABORATORY	Nil
22	EMBOSSING	DYNAMIC CABLES 38/66 KV XLPE CABLE 1CX630 SQ.MM A2XA2Y 2023
23	PRINTING	Nil
24	SPECIFIC TESTS CONDITIONS (IF ANY)	Nil
25	ENCLOSURE	Nil
26	WHETHER THE RESULTS CONFORM TO SPECIFICATIONS/ISS OR NOT	The sample conforms to the requirements of the tests carried out as per IS 7098 (Part-3):1993 (up to & including Amendment No. 4), IEC 60502-2: 2014, IEC 60840 : 2020 & GETCO Specification GETCO/E/TS-PCBL025A R5 july.2022
Note :- Hologram is fixed on each page of the test report		

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SECTION - B (OBSERVATIONS)

Sr. No.	Observations	Visual	Specified Requirement	Observed Values	Remarks
1)	**CONDUCTOR**				
	MATERIAL Cl. 4.1 of IS:7098(P-3)-1993	Visual examination	Conductor shall be composed of plain copper or aluminium wires complying with IS 8130 : 2013	Plain aluminium wires	Conforms
	Cl. 4.1 of IS 8130:2013	Visual examination	The material for conductor shall consist of plain aluminium. For shaped solid conductors and the welding cable conductors only Grade 0 aluminium shall be used. For conductors of cross sectional area up to and including 10 mm^2 H2 or H4 grade aluminium shall be used and For the remaining conductors aluminium of Grade 0, H2, H4 may be used.	H4 Grade Aluminium wire	Conforms
	Form of Conductor Cl. 4.3 of IS 8130:2013	Visual examination	The conductor shall be solid, circular, shaped, compacted, stranded or bunched as required by the appropriate cable specifications. The conductor shall be clean reasonably uniform in size and shape, smooth and free from harmful defects.	Stranded compacted circular and the conductor is clean reasonably uniform in size and shape, smooth and free from harmful defects.	Conforms
	Joints in stranded Conductor Cl. 4.4.1 of IS 8130:2013	Visual examination	The joints shall be permitted in the individual wires of which the conductor is formed, but no joints shall be with in 300 mm of any other joint with in the same layer.	No joint observed	Conforms
	Cl. 6.3.1 of IS 8130:2013	Visual examination	Conductor shall consist of plain or tinned annealed copper or plain aluminium.	Plain aluminium wires	Conforms
	Cl. 6.3.2 of IS 8130:2013	Visual examination	The ratio of the diameters of two wires before stranding in the same conductor shall not exceed 2	Satisfactory	Conforms

Sr. No.	Observations	Visual	Specified Requirement	Observed Values	Remarks
	Cl. 6.3.3 of IS 8130:2013	Visual examination	The number of wires in the conductor shall be not less than appropriate minimum number given in Table 2 of IS 8130 : 2013	Satisfactory	Conforms
	CONSTRUCTION Cl. 11, 11.1 of IS:7098(P-3)-1993	Visual examination	The conductor shall be of stranded circular compacted construction complying with class 2 of IS 8130 :2013 NOTE - Where necessary, segmental construction is permissible	Class 2 (Stranded compacted circular)	Conforms
	Cl. 11.2 , Table-4 of IS:7098(P-3)-1993	Visual examination	The smallest nominal cross sectional for each voltage grade shall be as per Table 4 of IS:7098 (P-3) 1993	630 mm^2 for 38/66 kV voltage grade	Conforms
2)	**CONDUCTOR SCREENING** Cl.12.1 of IS: 7098(P-3):1993	Visual examination	The conductor screening shall consist of a layer of semi-conducting compound extruded over the conductor. Note - Semi-conducting barrier tape / tapes with suitable overlap may be applied between the conductor and extruded conductor screening. Such barrier tape/tapes when used shall be compatible for operating temperature of the cable.	Conductor screened with semiconducting tape and extruded semiconducting compound.	Conforms
3)	**INSULATION**				
	MATERIAL Cl.5 of IS : 7098(P-3):1993	Visual examination	The insulation shall be of cross-linked polyethylene conforming to the requirements of Table 2 of IS 7098(P-3):1993	XLPE insulation	Conforms
	CONSTRUCTION Cl. 13.1 & Table 2 of IS : 7098(P-3):1993	Visual examination	The Insulation shall be extruded cross-linked poly-ethylene (XLPE), conforming to the requirements of table 2 of IS 7098(P-3) : 1993	Extruded XLPE insulation	Conforms

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Sr. No.	Observations	Visual	Specified Requirement	Observed Values	Remarks
	Check on Insulation Thickness Before the Electrical Type Tests Cl. 19.5 & table 5 of IS 7098(P-3):1993	.....	The average value of the insulation thickness shall be measured at both ends of the sample (as per Part 6 of IS 10810). If the average of the two measurements of the insulation thickness is: — not more than 10% over the declared nominal value for the cable, the test voltages as specified in relevant clauses of this specification shall be used — more than 10% but not more than 15% over the declared nominal value for the cable, the test voltages as specified in relevant clauses of this specification shall be increased to give an electrical field stress at the conductor screen, which will be the same value as with nominal insulation thickness and specified test voltage. — more than 15% over the declared nominal value for the cables another test sample shall be chosen	Satisfactory The average value of the insulation thickness is less than 10% over the declared nominal value for the cable (See Sr.No. 3 A & B)	Conforms
4	**SCREENING**				
	MATERIAL Cl. 6 of IS 7098(P-3) : 1993	visual examination	The screening shall consist of one or more of the following: a) Non-metallic semi-conducting tape; b) Non-metallic semi-conducting compound, and c) Non-magnetic metallic tape, wire, strip or sheath. d) Copper woven fibric tape. NOTE — The semi-conducting tape and the semiconducting compound shall be suitable for the operating temperature of the cable and compatible with the insulating material.	The screening consists of a) Non metallic semiconducting tape, b) Non metallic semiconducting compound, c) Semi conducting Copper woven tape	Conforms

Sr. No.	Observations	Visual	Specified Requirement	Observed Values	Remarks
5)	**INSULATION SCREENING** Cl. 14 of IS 7098(P-3):1993				
	CONSTRUCTION Cl. 14.1 of IS 7098(P-3):1993	Visual examination	The insulation screening shall consist of two parts namely metallic and non metallic.	Insulation Screening provided in two parts (Metallic & Non metallic)	Conforms
	Non-metallic Part Cl. 14.2, 14.2.1 of IS 7098(P-3):1993	Visual examination	The non metallic part shall consist of a layer of semi-conducting compound extruded directly over the insulation.	A non metallic layer of extruded semi-conducting compound directly applied over the insulation	Conforms
	Cl. 14.2.3 of IS 7098(P-3):1993	Visual examination	Semi-conducting tape/ tapes with suitable overlap may be applied over the extruded insulation screening , such barrier tape/tapes used shall be compatible with the insulation material and suitable for the operating temperatures of the cable.	Semiconducting water swellable tape wrapped with overlap over the insulation screening	Conforms
	Metallic part Cl. 14.3, 14.3.1 of IS 7098(P-3):1993	Visual examination	The metallic part of the screening shall consist of either copper wires/copper tape(s) helically applied over non-metallic screening (or) metallic sheath of aluminium or lead alloy. The metallic sheath applied over the non-metallic part of the insulation screen shall form the metallic part of the screening.	The metallic part of the screening is provided by Aluminium corrugated sheath over the semiconducting Copper woven tape	Conforms

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Sr. No.	Observations	Visual	Specified Requirement	Observed Values	Remarks
	Cl. 14.3.2 of IS 7098(P-3):1993	Visual examination	The diameter of copper wire in the screening shall not be less than 0.8 mm The perpendicular gap between two adjacent wires shall not be more than 4.0 mm. The nominal thickness of copper tape shall be not less than 0.1 mm. The minimum thickness shall not fall below the nominal value by more than 10%.	Not applicable	.....
	Cl. 14.3.3 of IS 7098(P-3):1993	Visual examination	A binder tape of copper may be applied over the wire screen. The nominal thickness of the tape shall be not less than 0.1 mm The minimum thickness shall not fall below the nominal value by more than 10% NOTE — Where Lead Alloy Sheath is provided over the non-metallic part of the insulation screening as moisture barrier, it may form the metallic part of the screening	Not applicable	.....
6)	**MOISTURE BARRIER**				
	MATERIAL Cl. 7 of IS:7098(P-3):1993				
	Laminated Tape Cl. 7.1of IS:7098(P-3):1993	Visual examination	This shall be a plastic coated non-ferrous metal tape longitudinally applied and suitably sealed.	Not applicable	.....
	Metallic Sheath Cl. 7. 2 of IS:7098(P-3):1993				
	Cl. 7. 2.1 of IS:7098(P-3):1993	Visual examination	The metallic sheath shall be either lead alloy sheath or aluminium sheath	Aluminium sheath in corrugated form	Conforms
	Cl.7.2.2 of IS:7098(P-3):1993	Visual examination	Composition of lead alloy 'E' sheath shall be as per Table 3 of IS:7098(P-3)1993	Not applicable	.....
	Composition of aluminium for sheathing Cl.7.2.3 of IS:7098(P-3):1993	Visual examination	Aluminium for sheathing shall have minimum 99.6% by weight of aluminium	Satisfactory	Conforms

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Sr. No.	Observations	Visual	Specified Requirement	Observed Values	Remarks
	Water Blocking Tape/Powder Cl.7.3 of IS:7098(P-3):1993	Visual examination	This shall be synthetic non woven tape/ synthetic powder with suitable water swellable absorbent. The tape/powder can be either non conducting or semiconducting	Synthetic non woven tape with water swellable absorbent non-conducting tape	Conforms
	CONSTRUCTION Cl.15.1 of IS 7098(P-3):1993	Visual examination	Water blocking tape/powder shall be suitably applied and laminated tape shall be applied longitudinally with overlap and sealed.	Semiconducting water swellable tape is applied satisfactorily	Conforms
	Cl. 15.1.2 of IS:7098(P-3):1993	Visual examination	Metallic sheath of lead alloy as per Annex E as per Cl.7.2 of IS 7098(P-3) : 1993 shall be applied.	Not applicable	.....
	Cl. 15.1.3 of IS:7098(P-3):1993	Visual examination	Alternative to above, moister barrier shall be provided by aluminium sheath either smooth or corrugated.	Aluminium sheath is corrugated	.....
	Metallic Sheath Cl. 15.2.1 of IS:7098(P-3):1993	Visual examination	Metallic sheath shall consist of either lead alloy 'E' sheath as per 7.2.2 or Aluminium sheath smooth or corrugated	Aluminium sheath in corrugated form	.....
	Cl. 15.2.2 of IS:7098(P-3):1993	Visual examination	Thickness of lead alloy sheath shall not fall below the value specified in Table 6A. Thickness of aluminium sheath shall not fall below the value specified in Table 6B. NOTE - Aluminium sheath can be either smooth or corrugated. From flexibility and thermal expansion point of view corrugated aluminium sheath is recommended. Smooth aluminium sheath is not recommended for cables of calculated diameter under metallic sheath exceeding 50 mm	Aluminium sheath in corrugated form (Calculated diameter under metallic sheath is more than 50 mm)	Conforms

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Sr. No.	Observations	Visual	Specified Requirement	Observed Values	Remarks
7)	**INNER SHEATH**				
	MATERIAL Cl. 8.1 of IS:7098(P-3):1993	Visual examination	The inner sheath shall be PVC compound or thermoplastic polyethylene compound	Not applicable	.....
	Cl. 8.2 of IS:7098(P-3):1993	Visual examination	The PVC compound shall conforms to Type ST2 of IS 5831 : 1984	Not applicable	.....
	Cl. 8.3 of IS:7098(P-3):1993	Visual examination	The thermoplastics polyethylene compound conform to Cl. 8.3 of IS 7098(P-3)1993	Not applicable	.....
	CONSTRUCTION Cl. 16.1 of IS:7098(P-3):1993	Visual examination	For armoured cable the extruded inner sheath shall be applied over the moister barrier or metallic screen	Not applicable	.....
8)	**ARMOUR**				
	MATERIAL Cl. 9.1 of IS:7098(P-3):1993	Visual examination	The armour shall be of non-magnetic metallic wires	Not applicable	.....
	CONSTRUCTION Cl.17.1 of IS:7098(P-3):1993	Visual examination	The armour, when specified shall consist of non magnetic metallic wire helically applied over the inner sheath	Not applicable	.....
	Cl.17.2 of IS:7098(P-3):1993	Visual examination	The nominal diameter of armour wire shall be as per table 8	Not applicable	.....
	Cl.17.3 of IS:7098(P-3):1993	Visual examination	The armour wire shall be applied as closely as possible	Not applicable	.....
	Cl.17.4 of IS:7098(P-3):1993	Visual examination	The direction of lay of armour shall be left hand	Not applicable	.....
	Cl.17.5 of IS:7098(P-3):1993	Visual examination	Joints in armour wire shall be made by welding and surface irregularities shall be removed . A joint in any wire shall be at least 300 mm from the nearest joint in any other armour wire in the completed cable	Not applicable	.....

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Sr. No.	Observations	Visual	Specified Requirement	Observed Values	Remarks
9)	**OUTER SHETH**				
	MATERIAL Cl. 10, 10.1, 10.2, 10.3 of IS:7098(P-3):1993	Visual examination	Outer sheath shall be of PVC compound or thermo-plastic polyethylene compound. The PVC compound shall conform to Type ST2 of IS:5831:1984. The thermoplastics polyethylene compound conform to Cl. 8.3 of IS 7098(P-3)1993	Thermoplastic polyethylene	Conforms
	CONSTRUCTION Cl. 18.1 of IS:7098(P-3):1993	Visual examination	Outer sheath shall be applied by extrusion, a) over the moisture barrier or metallic screen for unarmoured cables, and b) over the armour for armoured cables.	Satisfactorily applied by extrusion over the moisture barrier(water swellable tape over the metallic sheath)	Conforms
			NOTE - A binder tape may be applied under the outer sheath.	Binder tape is provided under the outer sheath	Conforms
	Colour of Outer Sheath Cl. 18.2 of IS:7098(P-3):1993	Visual examination	Colour of Outer sheath shall be Black	Black	Conforms
	Cl. 18.4 of IS:7098(P-3):1993	Visual examination	The outer sheath shall be coated with a suitable conducting material when required.	Outer sheathed provided with graphite coating.	Conforms

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Sr. No.	Observations	Visual	Specified Requirement	Observed Values	Remarks
10)	**IDENTIFICATION** Cl. 21 of IS:7098 (P-3)1993				
	Manufacturer's Identification Cl. 21.1 of IS:7098 (P-3)1993	Visual examination	The manufacturer shall be identified throughout the length of cable by means manufacture's name or trade mark and the voltage grade and year of manufacture's indented, printed or embossed or by means of tape bearing this information. The identification, printing or embossing shall be done only on the outer sheath. For manufacturer's name if none of these method employed or if the purchaser so desires, colour identification threads in accordance with a scheme to be approved by the Bureau of Indian Standards shall be employed.	(Satisfactory) The surface of outer is embossed with - "DYNAMIC CABLES 38/66 KV XLPE CABLE 1CX630 SQ.MM A2XA2Y 2023" throughout the length of cable.	Conforms
	Cable Code Cl. 21.2 of IS:7098 (P-3)1993	Visual examination	The following code shall be used for designating the cable. **Constituent — Code Letter** Aluminium conductor — A XLPE Insulation — 2X Copper screen — C Non magnetic round wire armour — Wa Steel strip armour — F Lead alloy sheath — Ly Aluminium sheath — A PVC Outer sheath — Y Polyethylene outer sheath — 2Y NOTE - No code letter is required for material when the conductor is copper.	A2XA2Y	Conforms

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SECTION - C (TESTS)

Sr. No.	Test	Unit	Specified Requirement	Observed Values	Remarks
1)	**Tests on conductor** Cl.4 of IS 7098(P-3) : 1993				
a)	**No. of strands** Table 2 of IS 8130 : 2013	Nos.	53 (Min)	61	Conforms
b)	**Flexibility class** Cl.11.1 of IS 7098(P-3):1993	------	Class 2	Class 2	Conforms
c)	**Tests on aluminium wire before stranding**				
i)	**Grade** Cl. 4.1 of IS 8130:2013	.....	H2 or H4	H4	Conforms
ii)	**Tensile Strength (for Aluminium wire)** Cl. 4.1,7.2.1 of IS 8130: 2013 and IS 10810 (P-2) 1984	N/mm^2	Note : Not applicable for compacted circular or shaped conductors) **Before Stranding** **Grade** **Tensile Strength** 0 Up to and Including 100 H2 Above 100 and up to and Including 150 H4 Above 150	176	Conforms
			After Stranding The Tensile Strength of any of the wires shall be not less than 95% of the minimum values given above.	Not applicable	.....
iv)	**Wrapping (for aluminium wire)** Cl. 7.2.2 of IS 8130 : 2013 and IS 10810 (P-3) : 1984	Visual examination	**Before stranding** The wire should not break during the test.	Satisfactory (Wire did not break during the test)	Conforms
d)	**Conductor resistance** Cl. 7.3, 7.3.1 Table-2 of IS : 8130:2013 and IS:10810 (P-5) - 1984	Ohm/km (Corrected to 20°C)	0.0469 (Max)	0.0444	Conforms
2)	**Dimension of Extruded conductor screening and insulation screening**				
a)	**Thickness of conductor screening** Cl. 12.2 of IS 7098 (P-3)1993	mm	0.8 (Min)	1.03	Conforms

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Sr. No.	Test	Unit	Specified Requirement	Observed Values	Remarks
b)	**Thickness of insulation screening** Cl. 14.2.2 of IS : 7098 (P-3)1993	mm	0.8 (Min)	1.05	Conforms
c)	**Diameter of copper wire in the screening** Cl.14.3.2 of IS 7098(P-3)1993	mm	Not applicable	Not applicable	.....
d)	**Thickness of binder tape (Copper tape)** Cl.14.3.2 of IS 7098(P-3)1993	mm	Not applicable	Not applicable	.....
e)	**Thickness of corrugated aluminium sheath** Cl.15.2, 20.4 Table 6B of IS 7098(P-3)1993, IS 10810(P-34) -1984, Customer GTP	mm	2.0 (Min)	2.12	Conforms
3)	**Test for thickness, Eccentricity of insulation and ovality of core** Cl. 13 , 13.3, 20.15.2, 20.15.3 Table-5 of IS:7098 (P-3):1993 and IS:10810 (P-6) - 1984				
A)	**End No. 01** Cl. 19.5 of IS:7098 (P-3):1993				
a)	**Thickness** Cl. 13.2, 13.3, 20.15.1,Table-5 of IS:7098 (P-3):1993	mm	Nominal 11 / Minimum 9.90	Avg. 11.73 / Min. 11.41	Conforms
b)	**Eccentricity of insulation** Cl. 20.15.2 of IS:7098 (P-3):1993	%	10 (Max)	5.15	Conforms
c)	**Ovality of insulated core** Cl. 20.15.3 of IS:7098 (P-3):1993	%	5 (Max)	0.93	Conforms
B)	**End No. 02** Cl. 19.5 of IS:7098 (P-3):1993				
a)	**Thickness** Cl. 13.2, 13.3, 20.15.1,Table-5 of IS:7098 (P-3):1993	mm	Nominal 11 / Minimum 9.90	Avg. 11.63 / Min. 11.38	Conforms
b)	**Eccentricity of insulation** Cl. 20.15.2 of IS:7098 (P-3):1993	%	10 (Max)	5.17	Conforms
c)	**Ovality of insulated core** Cl.20.15.3 of IS 7098(P-3):1993	%	5 (Max)	0.81	Conforms

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Sr. No.	Test	Unit	Specified Requirement	Observed Values	Remarks
4)	**Physical tests on insulation**				
a)	**Type of insulation**	.....	XLPE	XLPE	Conforms
b)	**Tensile strength & Elongation at break** Cl. 5, Table-2 of IS 7098 (P-3) :1993 IS:10810 (P-7)-1984 **Before ageing**				
	Tensile strength	N/mm^2	12.5 (Min)	19.04	Conforms
	Elongation at break	%	200 (Min)	375.0	Conforms
c)	**After ageing in air oven** (at 135±3°C for 168 h) Cl. 5,Table-2 of IS 7098 (P-3) :1993 & IS:10810 (P-11)-1984				
	Tensile strength	N/mm^2	.....	20.70	.....
	Tensile strength variation	%	±25 (Max)	-8.72	Conforms
	Elongation at break	%	.....	337.5	.....
	Elongation at break, variation	%	±25 (Max)	10.00	Conforms
d)	**Hot set** (at 200±3°C for 15+ 5 Minutes) Mechanical stress 20 N/cm^2 Cl. 5,Table-2 of IS 7098 (P-3) :1993, IS:10810 (P-30)-1984				
i)	Elongation under load	%	175 (Max)	40	Conforms
ii)	Permanent elongation (Set) after cooling	%	15 (Max)	2.4	Conforms
e)	**Shrinkage on XLPE insulation** (at 130±3°C for 6 h) Cl. 5, Table-2 of IS 7098 (P-3) :1993, IS:10810 (P-12)-1984				
i)	**Shrinkage**	%	4 (Max)	0.4	Conforms
ii)	**Visual examination of surface condition**	Visual examination	Cracks observed Yes/No	No	Conforms

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TEST REPORT NO.: ULR-TC507323000001978F (1C X 630 SQ.MM 38/66 kV A2XA2Y)	Page 15 of 21
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Sr. No.	Test	Unit	Specified Requirement	Observed Values	Remarks
5)	**Test for thickness of outer sheath** Cl. 18.3, Table-9, Annexure B of IS 7098 (P-3):1993 , IS:10810 (P-6) - 1984, Customer GTP				
	Thickness	mm	Nominal 3.60 / Minimum 2.68	Avg. 3.67 / Min. 3.42	Conforms
6)	**Physical tests on outer sheath**				
a)	**Type of outer Sheath**	.....	Thermoplastic polyethylene (HDPE)	Thermoplastic polyethylene (HDPE)	Conforms
b)	**Tensile Strength & Elongation at Break** Cl. 8.3 of IS 7098(P-3)1993 and IS:10810 (P-7)-1984				
i)	**Before ageing**				
	Tensile strength	N/mm^2	12.5 (Min)	21.18	Conforms
	Elongation	%	300 (Min)	445.0	Conforms
ii)	**After ageing in air oven** (at 110±2°C for 14 days) Cl. 8.3 of IS 7098(P-3)1993 and IS:10810 (P-11)-1984				
	Tensile strength	N/mm^2	.....	23.17	.....
	Elongation at break	%	300 (Min)	390.0	Conforms
c)	**Hot deformation** (at 115±2°C for 6 Hours) Cl. 8.3 of IS 7098(P-3)1993 and IS 10810:(P-15)-1984	%	Depth of Indentation 50 (Max)	20	Conforms
d)	**Carbon black content** Cl. 8.3 of IS 7098(P-3)1993 and IS:10810 (P-32)-1984	%	2.5±0.5	2.51	Conforms
7)	**Resistivity test for semi-conducting layers** Cl. 20.1.4, Annex-C of IS 7098 (P-3):1993				
i)	Conductor screen	ohm-metre	1000 (Max)	306.61	Conforms
ii)	Core screen	ohm-metre	500 (Max)	254.41	Conforms

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Sr. No.	Test	Unit	Specified Requirement	Observed Values	Remarks
8)	**Thermal ageing tests on complete cable** Cl. 20.8 of IS 7098(P-3):1993 (at 100 ±2°C for 168 Hours)				
a)	**Tensile strength & Elongation at break (After thermal ageing)**				
i)	**Insulation** Table-2 of IS 7098 (P-3) :1993 & IS:10810 (P-7)-1984, IS 10810 (P-11): 1984				
	Tensile strength	N/mm²	.....	20.15	.....
	Tensile strength variation	%	±25 (Max)	-5.83	Conforms
	Elongation at break	%	.....	350.0	.....
	Elongation variation	%	±25 (Max)	6.67	Conforms
ii)	**Outer sheath** Cl. 8.3 of IS 7098(P-3):1993 and IS 10810 (P-11): 1984				
	Tensile strength	N/mm²	.....	22.05	.....
	Elongation at break	%	300 (Min)	400.0	Conforms
b)	**Resistivity test for semi-conducting layers (after ageing)** Cl. 20.8.1, Annex C of IS 7098(P-3):1993				
	Conductor screen	ohm-metre	1000 (Max)	334.73	Conforms
	Insulation screen	ohm-metre	500 (Max)	287.69	Conforms
9)	**Bending test** Cl. 20.10 of IS 7098(P-3):1993, IS 10810(P-50)1984	Visual observation	Three complete bending cycle on a mandrel of diameter 25(d+D) ± 5% No abnormality	No abnormality observed	Conforms
	Partial discharge (After bending) Cl. 20.9 of IS 7098(P-3):1993 and IS 10810(P-46)1984,	pC	Length of Sample : 10 meters Method of Connection : Both ends of the core of the cable were immersed in oil terminations with high voltage applied to the conductor and metallic shield grounded The test voltage shall be applied and raised to 1.75 Uo and maintained for 10 second between conductor and screen. The test voltage shall be gradually reduced to, and the measurement of partial discharge made at 1.5 Uo = 57 kV 5 (Max)	2.0	Conforms

Sr. No.	Test	Unit	Specified Requirement	Observed Values	Remarks
10)	**Dielectric power factor and capacitance measurement at ambient temperature** Cl. 20.11 of IS 7098(P-3):1993 and IS 10810(P-48)1984				
a)	**Dielectric power factor at ambient temperature** at Uo = 38 kV	.....	0.001 (Max)	0.000532	Conforms
b)	**Capacitance** (Declared by the manufacturer)	µF/km	0.260 + 8% (Max)	0.269	Conforms
11)	**Dielectric power factor measurement at elevated temperature (100°C to 105°C)** Cl. 20.12 of IS 7098(P-3):1993 and IS 10810(P-48)1984				
	at Uo = 38 kV	.....	0.001 (Max)	0.000605	Conforms
12)	**Load cycle test** Cl. 20.13 of IS 7098(P-3):1993 and IS 10810(P-49)1984	.....	The conductor temperature during heating cycle maintained at 100°C to 105°C. The conductor shall attain the specified temperature for the last two hours of each heating cycle 20 cycles of heating and cooling are carried out. Each cycle of 8 Hours heating & at least 16 hours cooling in natural air During the entire period of the test a voltage of 2Uo = 76 kV shall be applied to the sample	Withstood	Conforms
	Partial discharge test (After load cycle test) Cl. 20.13 , 20.9) of IS 7098(P-3) :1993 and IS 10810(P-48)1984	pC	Length of Sample : 10 meters Method of Connection : Both ends of the core of the cable were immersed in oil terminations with high voltage applied to the conductor and metallic shield grounded The test voltage shall be applied and raised to 1.75 Uo and maintained for 10 second between conductor and screen. The test voltage shall be gradually reduced to, and the measurement of partial discharge made at 1.5 Uo = 57 kV 5 (Max)	2.0	Conforms

Sr. No.	Test	Unit	Specified Requirement	Observed Values	Remarks
13)	**Impulse withstand** Cl. 20.14 of IS 7098(P-3):1993, IS 10810(P-47)1984 IS 2071-1974, GETCO/E/TS-PCBL025A R5 july.2022	.....	The impulse source was connected to the conductor of the cable (ends shorted) under the test and screen connected to ground. The temperature of conductor maintained at 100 °C to 105°C during the test. The sample shall withstand 350 kVp 10 +Ve and 10 -Ve shots without breakdown. The virtual front time between 1µs and 5 µs and a nominal time to half the peak value between 40 µs and 60 µs. Oscillogram of 1st & 10th lighting impulse of +ve and -ve polarities are enclosed	Withstood	Conforms
	High voltage **(at room temperature)** (For 15 Minutes) Cl. 20.14.1 of IS 7098(P-3):1993 & IS:10810 (P-45)-1984	.....	After the impulse test, the cable sample shall subjected to power frequency AC voltage of 2.5Uo = 95 kV for 15 minutes at room temperature and no breakdown of insulation shall occur	Withstood	Conforms
14)	**Physical Inspection after completion of electrical type tests** Cl.19.1, Note 2 of IS 7098(P-3):1993	.....	After completion of electrical type tests from 'm' to 'r' (Section 4 of IS 7098(P-3) 1993) the sheath and any armouring or tapes shall be removed from the sample for physical inspection of the shield and the insulation screen. The observation should not reveal broken wires/tape in the shield and no damages shall have occurred on the insulation screen causing discontinuity.	No broken of sheath/tapes observed in the insulation screen. All components found intact.	Conforms

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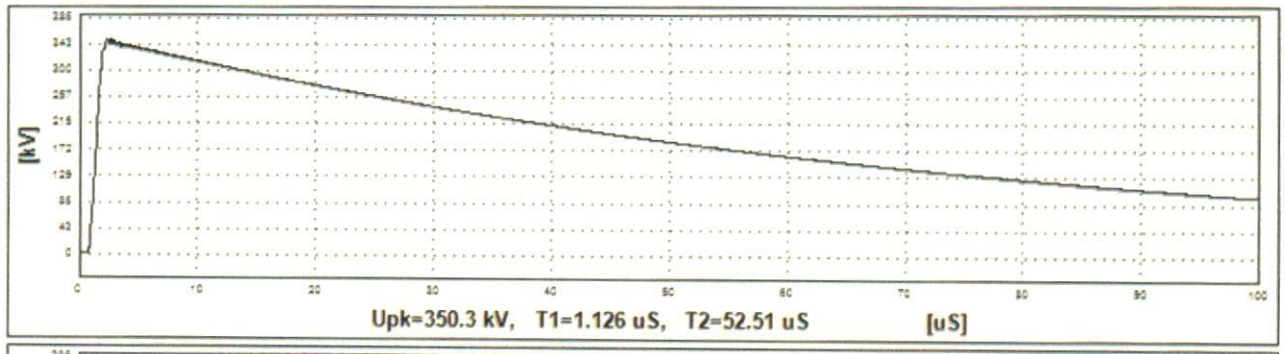
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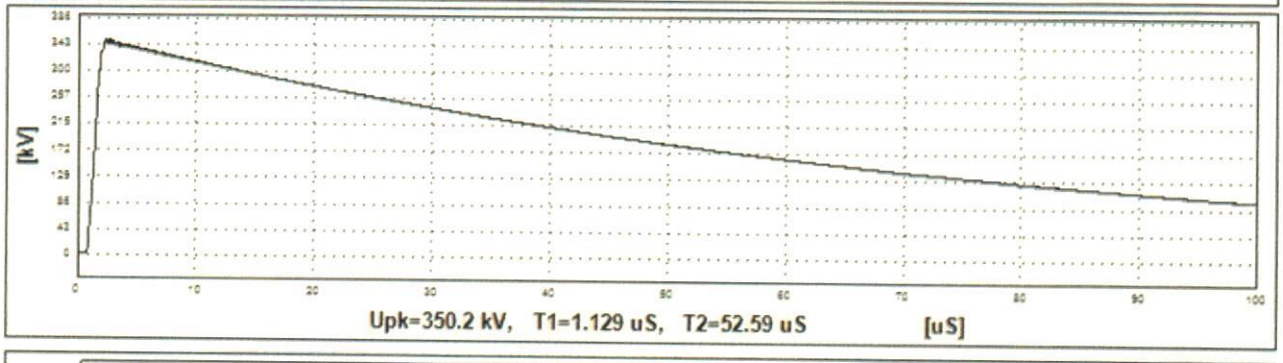
Sr. No.	Test	Unit	Specified Requirement	Observed Values	Remarks
15)	**Water tightness test (Longitudinal water tightness)** Annex D, Cl. 20.7, 20.7.1 of IS 7098(P-3):1993	.....	Not applicable for corrugated aluminium sheath	Not applicable	.....
16)	**Test for Concentric Copper Wires - Resistance** Cl. 20.2 of IS 7098(P-3) : 1993, IS 10810 (P-5) :1984	Ohm/km (Corrected to 20°C)	Not applicable	Not applicable	.....
17)	**Test for Concentric screen of Copper tape - The resistivity of copper wire/tape** Cl. 20.3 of IS 7098(P-3) : 1993, IS:10810 (P-5) - 1984	ohm sqmm/mtr (Corrected to 20°C)	Not applicable	Not applicable	.....
18)	**Optional Tests** Cl. 19.4 of IS 7098(P-3) : 1993				
a)	**Cold Impact** Cl. 19.4. a) of IS 7098(P-3) : 1993, IS 10810 (P-21):1984	Visual examination	Not applicable	Not applicable	.....
b)	**Voltage test** (Spark test on outer sheath without semi-conducting coating) Cl. 19.4. b) of IS 7098(P-3) : 1993	.....	A spark test shall be carried out by earthing the metallic sheath or concentric wires or tapes for an ac test. The voltage shall be 6 kV ac per millimeter nominal thickness of the extruded oversheath subject to maximum values of 15 kV. The dwell time of the cable in the region of test shall have sufficient duration to detect any defect.	Withstood	Conforms
19)	**Insulation resistance test (Volume Resistivity** Table 1 of IS 7098(P-2):2011, IS:10810 (P-43)-1984, GETCO/E/TS-PCBL025A R5 july.2022				
	At 27°C	ohm cm	$1X10^{14}$ (Min)	$2.41 X 10^{16}$	Conforms
	At 90°C	ohm cm	$1X10^{12}$ (Min)	$5.35 X 10^{15}$	Conforms

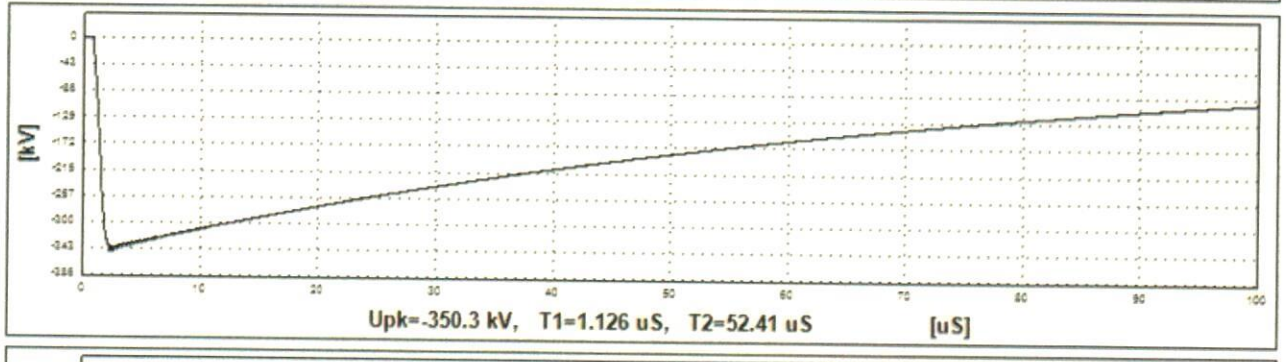
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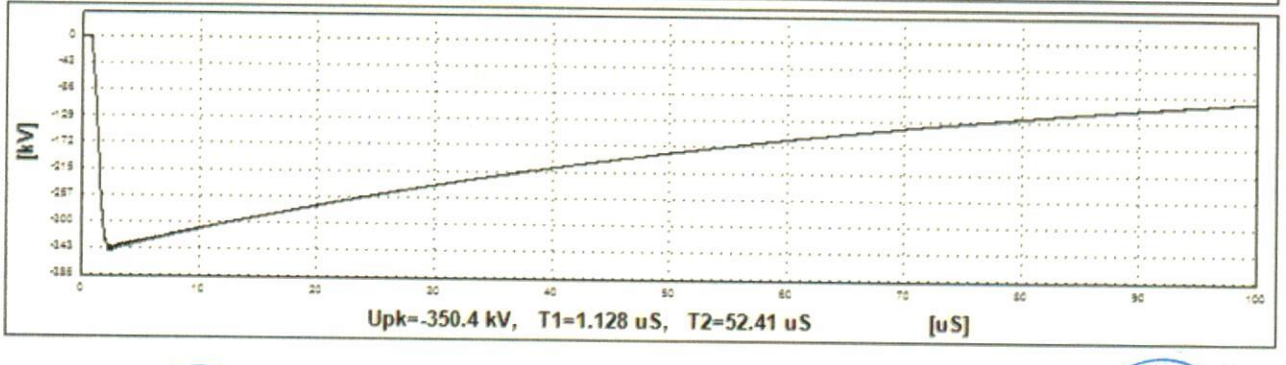
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Note :-

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