

**SPECIFICATIONS OF LT AERIAL BUNCHED CABLE OF SIZE**  
**1CoreX 35mm<sup>2</sup>+25mm<sup>2</sup>**

**(1) Scope:**

This specification covers Manufacture; testing at works, supply and delivery of 1.1 KV LT Aerial Bunch Cable of size 1Cx35mm<sup>2</sup>+25mm<sup>2</sup>, having XLPE insulation Aluminum Cable twisted over a Central XLPE Insulated Aluminum Alloy Neutral cum messenger wire for use of L.T over head lines in Rural Electrical system as well as in thickly Populated City / Town in narrow streets.

**(2) Rated Voltage:** The rated voltage of the cables shall be 1100 Volts.

**(3) Applicable Standards:**

1. IS 14255-1995 with latest amendment if any for ABC Cables 1100 Volts.
2. IS 7098(P-1) / 1988 with latest amendment if any for XLPE Insulation
3. IS 8130/1984 with latest amendment, if any, for Conductor to be used for insulated cables.
4. IS 398(P-IV)/1994 with latest amendment if any for Aluminum Alloy Conductor.
5. IS 10418/ 1982 with latest amendment if any for drum for electric cables.

**(4) General:**

The XLPE Insulated Phase Conductor Shall twisted around the XLPE Insulated Aluminum Alloy messenger cum Neutral wire, which shall take all the mechanical stresses. The messenger wire shall also serve as Earth cum Neutral wire.

**(5) Phase Conductor:**

5.1: The Phase Conductor shall be of Aluminum – Governed by IS 8130 / 1984 with latest amendment if any – and shall be insulated with XLPE insulation suitable for 1100 Volts Insulation. The insulated Conductor shall generally Confirm to IS 14255 – 1995 and IS 7098 (P-I)/1988 with latest amendment if any.

5.2: The Phase Conductor shall suitably compact and outer diameter shall be within the specified limits as per applicable standard of ABC cable (IS 14255/1995).

5.3: The Tensile strength of Aluminum wire used in Conductor shall not be less than 90N / mm<sup>2</sup>.

5.4: The phase Conductor shall be provided with special Identification with **ONE** Ridge- and neutral cum messenger with **TWO** ridges for easy identification.

5.5: The standard size and technical Characteristics of the phase and Neutral Conductor shall be as under

**Table – I**

Nominal Sectional area mm <sup>2</sup>	No of Strands	Dia. of Compacted Conductor mm	(Bare)/Approx mass Kg / Km Approx (Phase) Neutral	Maximum DC Resistance at 20 °C ohm / Km	Insulation Thickness mm
<b>35 mm<sup>2</sup></b>	<b>7</b>	<b>6.8</b>	<b>95</b>	<b>0.868</b>	<b>1.2</b>
50 mm <sup>2</sup>	7	7.9	136	0.641	1.5

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**Table – II (Apprx. Weights)**

Size of Cable	Wt. of Phase Conductor (WO Insulation) Kg./Km	Wt. of Insulation & Phase Conductor Kg./Km	Wt. of Neutral Conductor (WO Insulation) Kg./Km	Wt. of Insulation Neutral Conductor Kg./Km	Total Weight Kg./Km
<b>1*35+25</b>	<b>95</b>	<b>29.40</b>	<b>67</b>	<b>23.40</b>	<b>216</b>
1*50+25	136	44.85	67	23.40	272

Note:

(1) Density of XLPE Insulation is taken as 1.0 for Insulation Weight Calculation Purpose.

(2) Plus minus ( $\pm$ ) Tolerance of 5 % is permissible.

**(6) The Messenger cum Neutral / Earthing Wire.**

6.1 The XLPE Insulated Messenger Cum Neutral Wire shall be of Aluminum Alloy Confirming to IS 398(P-IV) / 1994 with latest amendment if any Composed of 7 Strands and shall be suitably compacted to have smooth round surface to avoid damage to the XLPE Insulation of phase conductor twisted around the insulated messenger wire. The shape of compacted conductor shall be as per requirement of applicable standard.

6.2 There shall be No Joint in any of standard messenger Cum Neutral Conductor, except those made in the base rods or wires before final drawing.

6.3 Other technical requirement will be as per applicable standards.

6.4 Thickness of XLPE insulation shall be as per applicable standards IS 14255 & IS 7098 (P-I).

**(7) Composition and Designation of Finished Cable**

Sr. No	Designation	Complete Bunched over all diameter Approx MM	Total Mass Kg / Km Approx
<b>1</b>	<b>1*35 Sq mm +25Sqmm</b>	<b>18.5</b>	<b>216</b>
2	1*50 Sq mm +25Sqmm	30	272

**Note:** First part of the Designation refers number and size of phase conductor; Second part refers to messenger cum neutral wire Number / Size and area. The sizes mentioned are the nominal Sectional area.

**(8) Type Test:**

**(A) Test for Phase Conductors**

- a) Tensile Test (IS-8130)
- b) Wrapping Test (IS-8130)
- c) Conductor Resistance Test (IS-8130)

**(B) Test for Messenger:**

- a) Breaking load test (to be made on finished conductor)—(IS-398 / Pt. IV/ 1994 with latest revision)
- b) Elongation test (IS –398 / Pt.IV /1994)
- c) Resistance test (IS-398/ Pt.IV /1994)
- d) If insulated, the test of insulation as per relevant IS will be applicable.

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**(C) Physical test for XLPE insulation**

- i) Tensile strength and Elongation at break
- ii) Ageing in air oven
- iii) Hot set test
- iv) Shrinkage test
- v) Water absorption (Gravimetric)
- vi) Carbon black
  - 1 Content
  - 2 Dispersion

**(D) Test for thickness of insulation**

**(E) Insulation Resistance (Volume Resistivity) Test**

**(F) High Voltage Test**

**(G) Bending test on complete cable:**

Bending test shall be performed on a sample of complete cable. The sample shall be bent around a test mandrel at room temperature for at least one complete turn.

It shall then be unwound and the process shall be repeated after turning the sample around its axis 180. The cycle of these operations shall be then repeated twice.

The diameter of mandrel shall be  $10(D+d)$

Where D = Actual dia. of cable (i.e. the min circulatory scrutiny circle diameter)

d = Actual diameter of the conductor, mm No. Cracks visible to the necked eye are allowed.

The tenderer should submit the entire above type test along with their offer.

**(9) Acceptance Tests:**

**9.1 Tests for Phase Conductors:**

- a) Tensile test (for Phase conductor)
- b) Wrapping test (for Phase conductor)
- c) Breaking load test for messenger conductor
- d) Elongation test for messenger conductor
- e) Conductor Resistance test
- f) Test for thickness of insulation
- g) Tensile strength and elongation at break test
- h) Hot set test (For XLPE insulation)
- i) Insulation Resistance test
- j) High voltage test

**9.2 Tests on complete cable :**

Bending test shall be performed on a sample of complete cable as under

The sample shall be around a test mandrel at room temperature for at least one complete turn.

It shall be than unwound and the process shall be repeated after turning the sample around its Axis 180. The cycle of these operation shall than be repeated twice. The diameter of the mandrel shall be  $10(D+d)$ .

Where D = Actual diameter of the cable

d = Actual diameter of the conductor

No cracks visible to the necked eye shall be permitted.

**(10). Packing Marking**

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**10.1** The cable shall be wound in non-returnable drums conforming to IS-10418/1982 “Specification for Reels and Drums for bare wire” of the latest version thereof.

**The drums shall be marked with the following:**

- a) Manufactures name
- b) Trade mark if any
- c) Drum number
- d) Size of Conductor
- e) Size of Messenger
- f) Voltage grade
- g) Number of lengths of pieces of Cable in each drum
- h) Gross mass of the packing
- i) Net mass of Cable
- j) ISI mark.

**10.2** The drums shall be of such a construction as to assure delivery of conductor in field free from displacement and damage and should be able to withstand all stresses due to handling and the stringing operation so that cable surface not dented, scratched or damaged in any way during transport and erection. The cable shall be properly lugged on the drums.

**10.3** The cable drums should be suitable for wheel mounting.

**10.4** The mass of finished cable in drums (without mass of various designations shall not exceed by 500 kgs.)

**10.5 Standard Length:**

The standard length of drum will be 500 meter with – 5% tolerance and longer length shall be acceptable.

**Non – standard Length:**

Non-standard length not less than 50 % of the standard length shall be accepted to the extend of 10% of the ordered quantity.

**(11) Inspection:**

All tests and inspections shall be made at the place of manufacturer unless otherwise especially agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities, without charge, to satisfy him that the material is being furnished in accordance with this specification.

**(12) Experience:**

The tendered must have some experience of manufacturer and supply of this cable to any Electricity Board/DISCOMS. Copy of order executed and performance report may be submitted along with the offer.

**(13) Type Test Certificates**

The duly attested copy of Type Test Certificate not more than five years old as per IS 14255-1995 with latest Amendment if any, be submitted from Govt. approved NABL laboratory along with offer otherwise such offer shall not be technically accepted (i.e. failing to submit type test report such offer would be ignored/ rejected).

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**GUARANTEED TECHNICAL PARTICULARS(G.T.P.)**

**Technical information and Guaranteed Technical Particulars for supply of  
1 Core 35 sq. mm. + 25 sq.mm messenger wire XLPE insulated Aerial Bunch Cable**

**PART – A**

Bidders have to confirm following important requirements:

Sr.	Particulars	confirmation
1.	Cable shall be manufactured and supplied Confirming to IS: 14255/1995 with latest Amendment if any and UGVCL's specification	Yes
2.	Cable drums/label shall bear ISI Mark	Yes
3.	ISI License shall remain valid till order is Completed	Yes
4.	Colour of XLPE Insulation – Black Size: 1 Core 35mm <sup>2</sup> + 25mm <sup>2</sup> messenger	Yes Yes
5.	Shape – compacted	Yes
6.	Standard length in case 500 mts - 5 % tol. Longer length acceptable	Yes
7.	Non-Standard length 50% of Std.length upto 10% of ordered qty.	Yes
8.	Packing shall contain only one Length.	Yes
9.	Packing material: a) For 1 Core 35mm <sup>2</sup> + 25mm. – Wooden drums as per IS: 10418/1982 duly painted.	Yes
10.	Following shall be embossed on cable	
	a. UGVCL	Yes
	b. 1100 Volts	Yes
	c.IS:14255/1995	Yes
	d. Year of manufacture	Yes
	e. Trade Mark	
	Marking on drum shall be as per IS: 14255/1995	Yes
11.	Conductor –	
	a) For Phase 35 mm <sup>2</sup> Alluminium as per IS 8130/1984	Yes
	b) For Messenger wire 25 mm <sup>2</sup> Alluminium Alloy as per IS 398/Pt.IV/1994	Yes
12.	Maximum Conductor resistance at 20°C	
	a) Phase Conductor - 0.868 Ohm/KM.	Yes
13.	Thickness of insulation :	

Cable size mm <sup>2</sup>	Insulation thickness(in mm)	Confirmation
1*35+25	1.2	Yes

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14. Volume resistivity of insulation
- a). At 27°C – 1 x 10<sup>13</sup> Ohm-cm. Min Yes
- b). At 70°C – 1 x 10<sup>11</sup> Ohm-cm. Min Yes
15. Tensile strength of Insulation and sheath - 12.5 N/mm<sup>2</sup> Min. Yes
16. Elongation at break of Insulation and Sheath – 200% Min. Yes

**PART- B**

Bidders have to furnish below details about material for information:

Sr.No.	Particulars	Confirmation
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1. ISI License for IS:14255/1995
- a. Number
- b. Date of expiry

2. Approximate weight of 1000 METRES length

Size	<u>Alum</u>	<u>Alu.Alloy</u>	<u>XLPE</u>	<u>Total</u>
1*35+25 mm <sup>2</sup>				

3. Cable Conductor, Circular Compacted?

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**PART – C (ENCLOSURES)**

Bidders have to enclose following documents and has to confirm for the same

Sr.No.	Particulars	Confirmation
1.	ISI License	Yes
2.	Proof if applied for renewal of ISI License	Yes/No
3.	<u>TYPE TEST CERTIFICATE:</u>	
3.1	Type test certificate from <u>Govt. approved Laboratory</u>	Yes
	a. Name of Lab.	
	b. T.R. No.	
	c. Date	
4.	List of plant and machinery	Yes
5.	List of testing facility available	Yes
6.	List of orders pending/executed	
	a. with MGVCL /DGVCL/UGVCL/PGVCL	Yes
	b. with agencies other than Sr. no. 6(a)	Yes

**PART – D**

Bidder has to mention below deviation if any, quoting relevant clause of specification.

Date:

Seal & Signature of Tenderer