



PASCHIM GUJARAT VIJ COMPANY LIMITED

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SPECIFICATIONS OF LT AERIAL BUNCHED CABLE OF SIZE

1Core X 35mm²+ 35mm² and 1Core x 50 mm² + 50 mm²

(1) SCOPE:

This specification covers Manufacture; testing at works, supply and delivery of 1.1 KV, LT Aerial Bunch Cable of size: **1C x 35mm²+ 35mm² and 1C x 50 mm² + 50 mm²**, having XLPE insulated 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 be 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).

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- 5.3: The Tensile strength of Aluminum wire used in Conductor shall not be less than **90 N/mm²**.
- 5.4: The Phase Conductor shall be provided with **ONE** Ridge for easy identification.

(6) NEUTRAL CUM MESSENGER CONDUCTOR:

- 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 The Neutral cum Messenger Conductor shall be provided with **Four** ridges for easy identification
- 6.3 Other technical requirement will be as per applicable standards.

(7) INSULATION:

- 7.1 The insulation shall be cross-linked polyethylene (XLPE).
- 7.2 All cable insulation shall be black in colour. The pigmentation shall be chosen so as to afford long term stability under ultra-violet radiation and shall include a minimum content of **2.5 % by weight of carbon black** evenly distributed throughout the insulation with **dispersion < 4** and shall not be detrimental to the insulation levels.

(8) STANDARD SIZE & TECHNICAL PARAMETERS:

(With 1.2 mm & 1.5 mm thickness of Insulation)

TABLE - 1

Sr. No	Description of Cable	Number of wires		Thickness of Insulation		Approx. Overall Diameter	Approx. Weight of Cable
		No.	No.	mm	mm		
		P	N	P	N		
1	1C x 35 mm ² + 35 mm ²	7	7	1.2	1.2	28	260
2	1C x 50 mm ² + 50 mm ²	7	7	1.5	1.5	30	360

Note: Tolerance on thickness of insulation is as per IS 14255:1995

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TABLE -2 (Technical Parameters)

Sr. No.	Description of Cable	Breaking Load of Messenger	Max. DC Resistance		AC Current Rating
		KN (mini)	Ohm/Km		Amp
			P	N	In air at 40°C
1	1C x 35 mm ² + 35 mm ²	10.11	0.868	0.986	120
2	1C x 50 mm ² + 50 mm ²	14.00	0.641	0.689	150

TABLE - 3 (Approx. Weights)

Sr No	Size of Cable	Wt. of Phase Conductor (Bare) Kg./Km	Wt. of Insulation of Phase Conductor Kg./Km	Wt. of Neutral Conductor (Bare) Kg./Km	Wt. of Insulation of Neutral Conductor Kg./Km	Total Weight Kg./Km
1	1C x 35 mm ² + 35 mm ²	95	35	95	35	260
2	1C x 50 mm ² + 50 mm ²	135	45	135	45	360

COMPOSITION AND DESIGNATION OF FINISHED CABLE:

Sr. No	Designation	Complete Bunched over all diameter Approx MM	Total Mass Kg / Km Approx
1	1C x 35 mm ² + 35 mm ²	28	260
2	1C x 50 mm ² + 50 mm ²	30	360

Note: First part of the Designation refers number and size of Phase Conductor. Second part refers to number / size of Messenger cum Neutral wire. The sizes mentioned are the nominal Sectional area

(9) 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.

(C) PHYSICAL TEST FOR XLPE INSULATION

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- a) Tensile strength and Elongation at break
- b) Ageing in air oven
- c) Hot set test
- d) Shrinkage test
- e) Water absorption (Gravimetric)
- f) Carbon black
 - 1. Content
 - 2. Dispersion

- (D) TEST FOR THICKNESS OF INSULATION
- (E) INSULATION RESISTANCE (VOLUME RESISTIVELY) 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 all above type test reports along with the offer.

(10) ACCEPTANCE TESTS:

10.1 TESTS FOR PHASE CONDUCTOR:

- 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

10.2 TESTS ON COMPLETE CABLE:

a) Bending test:

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

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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.

(11) MARKING AND PACKING

11.1 The following word shall be duly embossed on every meter Length of cable. The embossing should be clear and visible.

- a) PGVCL
- b) 1100 Volts
- c) IS: 14255/1995
- d) Year of manufacture
- e) Name of Manufacturer/Trade Mark
- f) One Ridge on phase conductor
- g) Batch no./Lot No.

11.2 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

11.3 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 property lugged on the drums.

11.4 The cable drums should be suitable for wheel mounting.

11.5 Standard Length:

The standard length of cable in a drum shall be 500 meter and longer up to 2000 meter with $\pm 5\%$ tolerance shall be acceptable.

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Non - standard Length:

The non-standard length shall not less than 1/3rd of standard length up to 3% of order quantity

(12) **SEALING:**

In each drum, both the ends of cable shall be sealed with non-hygroscopic sealing material.

(13) **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.

(14) **EXPERIENCE: (MODIFIED)**

Bidders should have supplied Aerial Bunch Cable in last two years to any of the DISCOMs or other Electricity Boards. Copy of order executed and satisfactory performance report may be submitted along with the offer.

(15) **TYPE TEST CERTIFICATES:**

The duly attested copy of Type Test Certificate not more than SEVEN years old as per IS 14255-1995 with latest Amendment if any, be submitted from **any NABL / Govt. approved 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).

(16) **BIS LICENSE : (Added)**

The Bidder should submit notarized copy of BIS License of IS 14255/1995 along with offer valid at least up to the date of opening of Tender. If applied for renewal of the License, Copy of Receipt of the Fees and acknowledgement for renewal application from BIS shall be submitted. The offer without the BIS License shall be straight away rejected.

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GUARANTEED TECHNICAL PARTICULARS (G.T.P.) Technical information and Guaranteed Technical Particulars

For supply of 1 Core 35 mm² + 35 mm² and 1 Core 50 mm² + 50 mm² XLPE insulated Aerial Bunch Cable

PART - A

Bidders have to confirm following important requirements:

Sr. No.	Particulars	confirmation
1.	Cable shall be manufactured and supplied Confirming to IS: 14255/1995 with latest Amendment if any and PGVCL's specification	Yes
2.	BIS License shall remain valid till order is Completed	Yes
3.	XLPE Insulation (UVR Protected) Phase - Black Colour Neutral/Messenger - Black Colour Size: 1 Core 35mm ² + 35mm ² messenger Size: 1 Core 50mm ² + 50mm ² messenger	Yes Yes Yes Yes
4.	Shape - compacted	Yes
5.	Standard length 500 Mtrs (up to 2000 Mtrs.) with ± 5 % tolerance	Yes
6.	Non-Standard length not less 1/3 rd of standard length up to 3 % of ordered qty.	Yes
7.	Packing shall contain only one Length.	Yes
9.	Packing material: For 1 Core 35mm ² + 35mm ² ABC - Wooden drums For 1 Core 50mm ² + 50mm ² ABC - Wooden drums (as per IS: 10418/1982 & duly painted)	Yes Yes
10.	Following shall be embossed on cable (at every one meter length); a. PGVCL b. 1100 Volts c. IS:14255/1995 d. Year of manufacture e. Name of Manufacturer/Trade Mark f. One Ridge on phase conductor g. Batch NO./Lot no.	Yes Yes Yes Yes Yes Yes Yes
11.	Conductor - a) For Phase 35 mm ² Alluminium as per IS 8130/1984 For Phase 50 mm ² Alluminium as per IS 8130/1984 b) For Messenger wire 35 mm ² Alluminium Alloy as per IS 398/P.IV/1994 For Messenger wire 50 mm ² Alluminium Alloy as per IS 398/P.IV/1994	Yes Yes Yes Yes

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12. Maximum Conductor resistance at 20°C

For 1 Core 35mm²+ 35mm² ABC

a) Phase Conductor - 0.868 Ohm/KM. Yes

b) Messenger Conductor - 0.986 Ohm/Km Yes

For 1 Core 50mm²+ 50mm² ABC

a) Phase Conductor - 0.641 Ohm/KM. Yes

b) Messenger Conductor - 0.689 Ohm/Km Yes

13. Thickness of insulation :

Cable size mm ²	Insulation thickness for Phase & Neutral Conductor (in mm)	Confirmation
1x35 mm ² + 35 mm ²	1.2	Yes
1x50 mm ² + 50 mm ²	1.5	Yes

14. Volume resistivity of insulation

a). At 27°C - 1 x 10¹³ Ohm-cm. Min Yes

b). At 70°C - 1 x 10¹¹ Ohm-cm. Min Yes

15. Tensile strength of Insulation and sheath - 12.5 N/mm² 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 of cable (in Kgs.)

AB Cable of Size	Cable Components weight in Kg.			Total weight in Kg.
	Aluminum	Alu. Alloy	XLPE	
1C x 35 mm ² + 35 mm ²				
1C x 50 mm ² + 50 mm ²				

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.	BIS License	Yes
2.	Proof if applied for renewal of BIS License	Yes/No
3.	<u>TYPE TEST CERTIFICATE:</u>	
3.1	Type test certificate from any <u>Govt. approved</u> <u>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. For MG VCL /DG VCL/UG VCL/PG VCL	Yes
	b. For Agencies other than above	Yes

PART - D

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

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