



PASCHIM GUJARAT VIJ COMPANY LTD
Regd. & Corporate Office, "Paschim Gujarat Vij Seva Sadan",
Nana Mava main Road, Laxminagar, Rajkot - 360 004
CIN: U40102GJ2003SGC042908; Phone: (0281)2380425, 2380427
Email: info.pgvcl@gebmail.com; Web site: www.pgvcl.com



TENDER NOTICE NO:- PGVCL/PROC/LT AB Cable/1228
TECHNICAL SPECIFICATION OF LT AERIAL BUNCHED CABLES
FOR LT LINES

(APPLICABLE FOR LT AB CABLE WITH XLPE INSULATION ONLY)
(Size 1C x35mm²+1C x16 + 25mm² and 2C x50mm² +1Cx25 + 35mm²)

1. SCOPE:

This specification covers XLPE insulated Aluminum cable twisted over a central bare Aluminum Alloy messenger wire for use of L.T. Over-Head lines in Rural Electrification System. The Aerial Bunched cable and messenger wire should be confirming to IS.

2. RATED VOLTAGE:

The rated voltage of the AB cables shall be 1100 volts

3. APPLICABLE STANDARDS:

Unless otherwise stipulated in this specification the following Standards shall be applicable.

- (i) IS – 14255/1995 : ABC cables 1100 volts.
- (ii) IS – 8130/1984 : Conductors for insulated cables.
- (iii) IS – 398/Pt.IV/1994: Aluminium alloy conductor.
- (iv) IS – 10418/1982 : Drums for electric cables

4. GENERAL:

The AB cable covered under this specification should be suitable for use on 1phase - 2 wire & 2 phase – 3 wire earthed system for working voltage up to 1100 V. It should confirm the relevant standards stated above and others if applicable.

The phase conductor should be 50 mm² and 35 mm² XLPE insulated and the neutral conductor should be 25 mm² and 16 mm² XLPE insulated whereas messenger conductor should be Bare heat treated aluminium silicon containing 0.5% magnesium and approximately 0.5% silicon confirming to IS: 398 (Part-IV):1979 and its latest amendment, if any.

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5. PHASE & NEUTRAL CONDUCTORS:

5.1 The phase & neutral conductor shall be provided cross linked poly ethylene insulation applied by extrusion. The thickness of insulation shall not be less than 1.2 mm up to 35mm² and shall not be less than 1.5 mm for above 35mm² at any point and insulation shall be so applied that it fits closely on the conductor and it shall be possible to remove it without damaging the conductor. The insulated conductors shall generally conform to the standards IS-14255:1995. (Please refer G.T.P Clause no. 13)

5.2 The phase conductors shall be provided with one, two & three 'ridges' for easy identification.

5.3 The tensile strength of the aluminum wire used in the conductor shall not be less 90 N/mn².

5.4 The standard size and technical characteristics of the phase conductors shall be as shown in the Table-1.

TABLE-I

| Nominal sectional area in mm ² | No. of Strands | Diameter of compacted conductor in mm | Approx. mass Kg/KMs. | Max. DC Résistance at 20°C (Ohm/km) | Insulation Thickness in mm |
|---|----------------|---------------------------------------|----------------------|-------------------------------------|----------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 16 | 7 | 4.4 | 42 | 1.91 | 1.2 |
| 25 | 7 | 5.5 | 65 | 1.20 | 1.2 |
| 35 | 7 | 6.8 | 95 | 0.868 | 1.2 |
| 50 | 7 | 7.9 | 127 | 0.641 | 1.5 |

NOTE: 1) The resistance values given in col.5 are the max. permissible.
2) Tolerance of + 5% is allowable on dimension.

6. MESSENGER WIRE:

6.1 The bare messenger wire shall be of aluminium alloy generally confirming to IS-398/Pt.IV/94 composed of 7 strands and shall be suitable

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compacted to have smooth round surface to avoid damages to the overall insulation of phase & neutral conductor twisted around the messenger.

6.2 There shall be no joint in any wire of the stranded messenger Conductor except these made in the base rod or wires before final drawing.

6.3 The sizes and other technical characteristics of the messenger wire shall be as given in the Table No.2.

TABLE -2

| Nominal sectional area in mm ² | No. of strands | Diameter of compacted conductor in mm | Approx. mass Kgs/KMs | Max .DC Resistance |
|---|----------------|---------------------------------------|----------------------|--------------------|
| 1 | 2 | 3 | 4 | 5 |
| 25 | 7 | 5.8 | 65 | 1.380 |
| 35 | 7 | 6.8 | 95 | 0.986 |

NOTE: while limiting values in col. 3 is to be guaranteed a tolerance of + 5% will be permissible.

7. XLPE INSULATION:

The insulation shall generally confirm to IS-7098(Part-II):85

| Sr. No. | Property | Requirement |
|---------|---|---|
| 1 | Tensile Strength | 12.5 N / mm ² Min |
| 2 | Elongation at break | 200 % Min. |
| 3 | Ageing in air over | |
| a | Treatment: Temperature & duration | 135 ± 3°C & 7 days |
| b | Tensile strength variation | ± 25% Max. |
| c | Elongation variation | ± 25% Max. |
| 4 | Hot Set | |
| a | Treatment temperature, Time Under load, mechanical stresses | 200 ± 3°C, 15 minutes 20 N /cm ² . |
| b | Elongation under load | 175 % max. |
| c | Permanent elongation (set) after cooling | 15 % Max |
| 5 | Shrinkage | |

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|---|--------------------------------|------------------------------|
| a | Treatment temperature duration | 130 ± 3°C For 1 hour |
| b | Shrinkage | 4% Max |
| 6 | Water absorption (Gravimetric) | |
| a | Treatment– Temp. Duration | 85 ± 2°C 14 days |
| b | Water absorbed | 1 mg. / cm ² max. |

8. TYPE TEST:

(A) Test for Phase/Street Light Conductors

- (i) Tensile Test (IS-8130)
- (ii) Wrapping Test (IS-8130)
- (iii) Conductor Resistance Test (IS-8130)

(B) Test for Messenger:

- (i) Breaking load test (to be made on finished conductor) -(IS-398/ Pt.IV/ 1994 with latest revision)
- (ii) Elongation test (IS - 398 / Pt.IV/1994)
- (iii) Resistance test (IS - 398 / Pt. IV /1994)
- (iv) If insulated , the test of insulation as per relevant IS will be applicable

(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

Note: The tenderer should submit the entire above type test of Govt. of India's approved Laboratory along with their offer.

Optional Test:

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Bending test on the completed 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 this operation shall be then repeated twice.

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

Where

D = Actual diameter of cable (i.e. the min. circumscribing diameter in mm)

d = Actual diameter of the phase conductor in mm

No cracks visible to the naked eye are allowed.

9. ACCEPTANCE TESTS:

Tests for Phase / Street Light Conductors:

- Tensile test (for Phase / Street light conductor)
- Wrapping test (for Phase / Street light conductor)
- Breaking load test for messenger conductor
- Elongation test for messenger conductor
- Conductor Resistance test
- Test for thickness of insulation
- Tensile strength and elongation at break test
- Hot set test (For XLPE insulation)
- Insulation Resistance test
- High voltage test

10. PACKING MARKING:

10.1 The LT AB 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:

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- a) Manufacturers 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.

11. STANDARD LENGTH:

The standard length of drum will be 500 meter with $\pm 5\%$

Non-standard Length:

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

12. 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.

13. EXPERIENCE:

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

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14. TYPE TEST CERTIFICATES:

The duly attested copy of Type Test Certificate of the offered sizes of AB cable, as per IS: 14255/1995 with latest amendment/revision be submitted from any Govt. approved laboratory along with the offer. In absence of type test certificate, offer will be liable to be ignored/rejected without any further correspondence [at Purchaser's (DGVCL/MGVCL/PGVCL/UGVCL) discretion]. Type Test Certificate shall not be More Than Five Years Old from Date of Opening of Tender.

15. SUBMISSION OF ISI LICENSE FOR IS14255:1995

The tenderer/s are required to submit duly attested photo copy of the valid ISI License up to the date of delivery for supply of these AB cables/wires along with tender and they should submit GTP along with the tender failing which, the offer would be ignored.

16. IMPORTANT:

In absence of valid ISI License/GTP duly filled in/and copy of type test certificate of Govt. approved Laboratory, duly attested by authorized person, offer will be liable to be ignored without any further correspondence.

17. ISI MARKING:

The material supplied shall be confirming to Indian Standard Specification.

Marking of ISI must be on 1Cx35 sqmm+1Cx16 sqmm+25 sqmm LT AB Cable. But Marking of ISI is not applicable for 2Cx50 sqmm+1Cx25 sqmm+35 sqmm LT AB Cable as per latest amendment of IS: 14255-1995 (amendment No.1 , October 2010).

Manufacturer's Name:

Address:

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GUARANTEED TECHNICAL PARTICULARS (G.T.P.)

Technical information and Guaranteed Technical Particulars (G.T.P.) for LT Aerial Bunched Cable (XLPE insulated only) of sizes 1C x 35 mm² + 1C X16 mm² +25 mm² and 2C x 50 mm²+ 1C x 25 mm² + 35 mm² messenger wire .

PART - A

Bidders have to confirm following important requirements:

| Sr. No | Particulars | confirmation |
|--------|---|--------------|
| 1 | AB Cable shall be manufactured and supplied Confirming to IS: 14255/1995 with latest Amendment if any and PGVCL'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 | |
| 4a | Size: 1 Core 35 mm ² +1CX16mm ² + 25mm ² messenger | Yes |
| 4b | Size: 2 Core 50 mm ² +1CX25mm ² + 35mm ² messenger | Yes |
| 5 | Shape – compacted | Yes |
| 6 | Standard length in case 500 mtrs \pm 5 % tolerance longer length acceptable | Yes |
| 7 | Non-Standard length 50% of Std. length up to 10% of ordered quantity | Yes |
| 8 | Packing shall contain only one Length. | Yes |
| 9 | Packing material: Wooden drums as per IS: 10418/1982 duly painted | Yes |
| 9a | Size: 1 Core 35 mm ² +1CX16mm ² + 25mm ² messenger | Yes |
| 9b | Size: 2 Core 50 mm ² +1CX25mm ² + 35mm ² messenger | Yes |
| 10 | Following shall be embossed on cable & Marking on drum shall be as per IS: 14255/1995 | |

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| 10a | Purchaser (DGVCL/MGVCL/PGVCL/UGVCL) | Yes |
| 10b | 1100 Volts | Yes |
| 10c | IS:14255/1995 | Yes |
| 10d | Year of manufacture | Yes |
| 10e | Trade Mark | Yes |
| 11 | Conductor – | |
| 11a | For Phase 35 mm ² & 50 mm ² Aluminium as per IS 8130/1984 | Yes |
| 11b | For Messenger wire 25 mm ² & 35 mm ² Alluminium Alloy as per IS 398/Pt.IV/1994 | Yes |
| 12 | Maximum Conductor resistance at 20°C For Phase Conductor | |
| 12a | 35 mm ² Conductor – 0.868 Ohm/KM | Yes |
| 12b | 50 mm ² Conductor – 0.641 Ohm/KM | Yes |
| | For Messenger Conductor | |
| 12c | 25 mm ² Conductor – 1.380 Ohm/KM | Yes |
| 12d | 35 mm ² Conductor – 0.986 Ohm/KM | Yes |
| 13 | XLPE Insulation thickness for AB Cable | |
| 13a | Size: 1 Core 35 mm ² +1CX16mm ² + 25mm ² - 1.20 mm | Yes |
| 13b | Size: 2 Core 50 mm ² +1CX25mm ² + 35mm ² - 1.50 mm | Yes |
| 14 | Volume resistivity of insulation | |
| 14a | At 27°C – 1 x 10 ¹³ Ohm-cm. Min | Yes |
| 14b | At 70°C – 1 x 10 ¹¹ Ohm-cm. Min | Yes |
| 15 | Tensile strength of Insulation & sheath - 12.5 N/mm ² Min. | Yes |
| 16 | Elongation at break of Insulation and Sheath – 200% Min. | Yes |
| 17 | Overall tolerance in supply of ordered total quantity shall be ± 2 % (Plus and minus two %) | Yes |

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PART- B

Bidders have to furnish below details about material for information:

| Sr.No. | Particulars | | | | confirmation |
|--------|--|-------|------------|------|--------------|
| 1 | ISI License for IS:14255/1995 | | | | Yes |
| 1a | Number | | | | |
| 1b | Date of expiry | | | | |
| 2 | Approximate weight of 1000 meters length (Weight in Kgs.) | | | | |
| 2a | Size of cable | Alum. | Alu. Alloy | XLPE | Total |
| | 1Cx35 mm ² +1Cx16 mm ² + 25mm ² | | | | |
| | 2Cx50 mm ² +1Cx25 mm ² + 35mm ² | | | | |
| 3 | Cable Conductor, Circular Compacted? | | | | Yes |

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 |
| 3 | TYPE TEST CERTIFICATE: Type test certificate from Govt. of India approved Laboratory | | | Yes |
| | Size of AB Cable | 1Cx35 mm ² +1Cx16 mm ² + 25mm ² | 2Cx50 mm ² +1Cx25 mm ² + 35mm ² | |

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|----|--|----------------------------|--|-----|
| | a | Name of Lab. &City Name | | |
| | 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 | | | Yes |
| 6a | with GUVNL(Formerly GEB)/DGVCL /MGVCL/UGVCL/PGVCL | | | Yes |
| 6b | with agencies other than Sr. no. 6(a) | | | Yes |

PART – D

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

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| Signature of Tenderer: | | Company's Round Seal: |
| Date: | Place: | |