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SPECIFICATION OF LT AERIAL BUNCHED CABLES FOR LT LINES

(APPLICABLE FOR LT AB CABLE WITH XLPE INSULATION ONLY)
(Size 3C x35mm²+1C x16 + 25mm² and 3C 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 three phase, 4 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.

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-1

Nominal sectional area in mm²	No. of Strands	Diameter of compacted conductor in mm	Approx. mass Kg/KMs.	Max. DC Résistance at 20ºc (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 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 mm²	No. of strands	Diameter of compacted conductor in mm	Approx. mass Kg/KM	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 / mm² Min
2	Elongation at break	200 % Min.
3	Ageing in air over	
a	Treatment:Temperature & duration	135 ± 3ºC & 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 ± 3ºC, 15 minutes 20 N /cm².
b	Elongation under load	175 % max.
c	Permanent elongation (set) after cooling	15 % Max
5	Shrinkage	
a	Treatment temperature duration	130 ± 3ºC For 1 hour
b	Shrinkage	4% Max
6	Water absorption (Gravimetric)	
a	Treatment– Temp. Duration	85 ± 2ºC 14 days
b	Water absorbed	1 mg. / cm² 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:

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 180^0. 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:

a. Tensile test (for Phase / Street light conductor)
b. Wrapping test (for Phase / Street light 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. 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:

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 metre with ± 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.

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 and also with ISI marking as applicable and even after inspection of the lot, if the materials received at site is found without ISI marking, the lot shall be rejected and no further correspondence shall be entertained in this regard.

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Manufacturer's Name:

Address:

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 3C x 35 + 1C X16 +25 mm² and 3C x 50+ 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: 3 Core 35+1CX16mm² + 25mm² messenger	Yes
4b	Size: 3 Core 50+1CX25mm² + 35mm² messenger	Yes
5	Shape – compacted	Yes
6	Standard length in case 500 mtrs ± 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: 3 Core 35+1CX16mm² + 25mm² messenger	Yes
9b	Size: 3 Core 50+1CX25mm² + 35mm² messenger	Yes
10	Following shall be embossed on cable & Marking on drum shall be as per IS: 14255/1995	
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 mm² & 50 mm² Alluminium as per IS 8130/1984	Yes

11b	For Messenger wire 25 mm² & 35 mm²Alluminium Alloy as per IS 398/Pt.IV/1994	Yes
12	Maximum Conductor resistance at 20ºC For Phase Conductor	
12a	35 mm² Conductor – 0.868 Ohm/KM	Yes
12b	50 mm² Conductor – 0.641 Ohm/KM	Yes
	For Messenger Conductor	
12c	25 mm² Conductor – 1.380 Ohm/KM	Yes
12d	35 mm² Conductor – 0.986 Ohm/KM	Yes
13	XLPE Insulation thickness for AB Cable	
13a	Size: 3 Core 35+1CX16mm² + 25mm² - 1.20 mm	Yes
13b	Size: 3 Core 50+1CX25mm² + 35mm² - 1.50 mm	Yes
14	Volume resistivity of insulation	
14a	At 27ºC – 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/mm² 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

PART- B

Bidders have to furnish below details about material for information:

<table>
<tr><td>Sr. No.</td><td colspan="4">Particulars</td><td>confirmation</td></tr>
<tr><td>1</td><td colspan="4">ISI License for IS:14255/1995</td><td>Yes</td></tr>
<tr><td>1a</td><td colspan="4">Number</td><td></td></tr>
<tr><td>1b</td><td colspan="4">Date of expiry</td><td></td></tr>
<tr><td>2</td><td colspan="4">Approximate weight of 1000 meters length (Weight in Kg.)</td><td></td></tr>
<tr><td rowspan="3">2a</td><td>Size of cable</td><td>Alum.</td><td>Alu. Alloy</td><td>XLPE</td><td>Total</td></tr>
<tr><td>3Cx35+1Cx16+ 25mm²</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3Cx50+1Cx25+ 35mm²</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3</td><td colspan="4">Cable Conductor, Circular Compacted?</td><td>Yes</td></tr>
</table>

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		3Cx35+1Cx16+ 25mm²	3Cx50+1Cx25+ 35mm²	
	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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