TECHNICAL SPECIFICATION FOR L.T. AERIAL BUNCHED CABLE WITH PROVISION OF INSULATED MESSENGER / NEUTRAL CONDUDCTOR (1x16 +1x25) sq. mm.

1. SCOPE:

This specification provides for manufacture, testing & supply of 1100 V Aerial Bunched Cable having XLPE insulated cable with stranded compacted circular Aluminum conductor twisted over an insulated aluminum alloy messenger wire.

1.1. It is not the intent to specify completely herein all the details of the design and construction of material. However the material shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith.

2. STANDARDS:

This Aerial Bunched Cable shall comply with the following standards with latest amendments unless otherwise stipulated in this specification.

1 IS: 7098-Part-I XLPE Cable
2 IS: 8130-Conductors for cable
3 IS: 398 (Part-IV)-Aluminium Alloy Conductors
4 IS: 10810- Test methods
5 IS: 5484-E.C. Grade Aluminium Rods
6 IS: 9997- Aluminium Alloy Rods
7 IS:IEC: 207- Aluminium Alloy Standard Conductor
8 IS:IEC: 502: Excluded Solid Di-electric insulated Cable
9 IS:IEC: 540 Test methods for insulation & sheath of cable
10 IS: 14255:1995 for Aerial Bunched Cable
11 IS: 10418:1982 Drums of electric Cables

3.0 CONSTRUCTION OF L.T. AERIAL BUNCHED CABLE:

MAIN FEATURES:

The ABC cables shall be of LT 1.1 kV Grade, stranded compacted, high conductivity, aluminum conductor, XLPE insulated, conforming to relevant standards suitable for LT AC three phase, 50 c/s, effectively earthed distribution system.

In the ABC System, the insulated conductor is twisted around the insulated Aluminum Alloy messenger conductor.

3.1 PHASE CONDUCTOR/STREET LIGHT CONDUCTOR:

The Phase conductor is made of hard drawn Aluminium wires having tensile strength not less than 100N/mm^2 Stranded circular compacted Aluminium Conductor Insulated with cross-

linked polyethylene (XLPE). One phase conductors is twisted around insulated stranded Aluminium Alloy Messenger Conductor of size 25 mm^2

The power/outer insulated neutral/street lighting conductors shall be made from stranded Aluminium to form compact circular conductor having resistance within limits as specified in table-2 of IS: 8130/1984 and any amendment there of. **The total Minimum Guaranteed weight of Aluminium in phase conductors shall be 43.2 kgs/ km.**

3.2 CONSTRUCTION:

1) All materials used in the manufacture of cable shall be new, unused and of finest quality. All materials shall comply with the applicable provisions of the tests of the relevant Standards.

2) The XLPE material used in the manufacture of cable shall be of reputed make. The purchaser reserves the right to ask for documentary proof of the purchase of various materials to be used for the manufacture of cable and to check that the conductor is complying with quality control.

3) The XLPE insulating material should be UV resistant weather proof. Black carbon content should be minimum 2.5% - 3% as per IS: 14255.

4) A sample of the material supplied by the manufacturer may be sent by the purchaser for type testing at the Govt. approved test lab at the cost of the contractor which shall be refunded in case sample passes the type test otherwise no refund shall be made and the supplied material shall be rejected and contractor/ manufacturer shall be debarred from participation in further three consecutive tenders.

3.4 CORE IDENTIFICATION: For the identification of individual cores longitudinal ridges or number printing over cores shall be used at regular intervals to identify phase conductors.

3.5 MESSENGER/NEUTRAL CONDUCTOR:

Messenger/Neutral Conductor is made of Aluminium Alloy Consisting of 7 strands each having tensile strength not less than 7.4 KN with elongation 4% and suitably compacted to smooth round surface to avoid damage to XLPE Insulation of phase conductor. The conductor shall be of heat treated aluminium-magnesium-silicon alloy wires containing approximately 0.5 percent magnesium and approximately 0.5 percent silicon conforming to IS: 398 (Part-IV)-1979. There shall be no joints in any wire of messenger conductor except those made in base rod or wires before final drawing. The direction of the outer layer of wires in messenger conductor shall be right hand. **The Minimum Guaranteed weight of Aluminium alloy in messenger wire shall be 67.5 kgs/ km.**

4.0 INSULATION:

The XLPE Insulation shall be suitable for specified LT System voltage. The manufacturing process shall ensure that insulation shall be free from voids. The insulation shall withstand mechanical stress under steady state and transit operating conditions.

5.0 The insulation of the cable shall be of high standard quality and conform to clauses 11 of IS: 7098 (Part-1)/1985 of test amendment thereof.

The make of XLPE material to be used by manufacturer in production of ordered LT ABC shall be as follows:

Sl. No.	Make
1.	M/s Kalpana Industries
2.	M/s Polylink Polymer, Vadodra
3.	M/s Borealis Polymer Industries.
4.	M/s Sun Petrochemicals Pvt. Ltd., Mumbai.
5	M/s DOW
6	M/s KLJ, Silvassa

6.0 WORKMANSHIP AND QUALITY ASSURANCE

The workmanship shall be neat clean and of highest grade/quality.

7.0 CURRENT RATING

The Conductor will have current rating and derating factors as per relevant Indian Standards.

7.1 The current rating shall be based on maximum conductor temperature of 90^0 c with ambient site conditions specified in General Requirement of specification for continuous operation at the rated current.

8.0 OPERATION

8.1 Cable shall be suitable for laying overhead.

8.2 Cable shall have heat and moisture resistant proven with proven record of distribution network service.

9.0 LENGTHS

The cable shall be supplied in standard drum lengths i.e. 500 + 5% meters Non standard lengths of not less than 100 meters is acceptable. Total non standard length should not exceed 5% of the ordered quantity.

10.0 PACKING

The cable shall be supplied on non-returnable wooden drums of heavy standard construction conforming to IS: 10418: 1982 and latest amendment thereof and being suitable for transport by goods train or truck and for storage at site. The wood used for construction of the drums shall be properly seasoned and wood preservative shall be applied to the entire drum.

All ferrous parts shall be treated with a suitable rust preventive finish or coating to avoid rusting during transit of storage. Each drum shall have the following information marked on its with indeliable in along with other important information including technical date:-

I) PVVNL. Specn. No.
II) Consignee & Destination Railway Station
III) Trade name of trademark .if any
IV) Name of the manufacturer
V) Nominal sectional area of the conductor of the cable

VI) Drum No.
VII) No. of cores
VIII) Type of cable & Voltage for which it is suitable
IX) Gross weight of the drum (Approx.)
X) Length of cable in the drum with individual lengths if more than one.
XI) Net weight of the cable
XII) ISI certification mark, if available

A layer of waterproof paper shall be applied to the surface of the drum and over the outer cable layer. A clear space of at least 40 mm shall be left between the cable and the lapping. The packing shall be adequate to protect the cable form damage in transit and contractor shall be responsible for it and make good at his own expenses any and all damage due to improper packing etc.

11.0 IDENTIFICATION MARKING:

For the identification of individual cores longitudinal ridges or number printing over cores used to identify phase conductors.

EMBOSSING:

The manufacturer shall emboss the following at the interval of one meter length throughout the length of the cable.

11.1 Property of PVVNL
11.2 Name of manufacturer
11.3 Year of Manufacture
11.4 Specification No.
11.5 Voltage grade
11.6 Size of cores.

The identification embossing shall be done only on the outer sheath.

12.0 GUARANTEED TECHNICAL PARTICULARS:

The guaranteed technical particulars as detailed in the specification shall be guaranteed and a statement of guaranteed technical particulars shall be furnished in the format along with the bid **without which the Bid shall be treated as Non -Responsive**.

13.0 TEST CERTIFICATE:

The tenderer shall furnish an authenticated copy of results of successful type test report. The successful type test report as carried out over the cable of same design, size, type & manufacturing process during last five years (Counted form the date of tender opening) issused from CPRI/ERDA/NTH.

The purchaser reserves the right to get the cable type tested at any stage during the pendency of the contract at its own expenses in any government recognised testing laboratory.

The transportation and arrangement of testing of sample to test laboratory shall be responsibility of the contractor.

14.0 INSPECTIONS AND TESTING

4.1 The inspection shall be carried out by the purchaser's representative during manufacture and before dispatch. The supplier shall keep the purchaser informed in advance, about the manufacturing programme so that arrangement can be made for inspection.

The manufacturer shall grant free access to the purchaser's representative, at a reasonable time, when the work is in progress. Inspection and acceptance of any equipment under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing the equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective.

14.2 All Acceptance tests and inspection shall be made at the place of manufacturer unless otherwise especially agreed upon by the Bidder and purchaser at the time of purchase.

The purchaser reserves the right to insist for witnessing the acceptance/ routine testing of the bought out items. The supplier shall give 15 days (for local supply)/ 30 days (incase of foreign supply) advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests. Material shall be dispatched only after getting the dispatch authorization from Inspectors representing purchaser, after successful testing.

14.3 If successful type tests have been carried out on the offered design during last five years issued from CPRI/ERDA/NTH (counted from the date of tender opening), repetition of type tests is not required.

On the other hand, if the offered design is not type tested during last five years, the cable shall be subjected to all type test in accordance with IS: 1554 (Part-I)/1988 and amendment thereof at recognized test house of repute. All charges/fee/transportation etc. to conduct these tests shall be borne by Contractor.

Regular supply of the material shall commence only after successful type testing and dispatch authorization from the competent authority.

However, the purchaser reserves the right to get cable type tested at any stage during the currency of contract at his own expenses in any reputed test house. The transportation and arrangement of testing of sample to test laboratory shall be the responsibility of the contractor.

14.4 Routine tests report shall be sent by the manufacturers with their offer for inspection, the acceptance tests as laid down in the referred ISS (with latest amendments) shall be carried out by the inspecting officer of the PVVNL on Samples selected at random.

15.0 CHECKING OF CABLE LENGTH

Sufficient facilities should exist at contractor's premises to measure the cable length by the inspecting officers for this purpose motorized system to facilities quick measurement should be available at the works.