

Group – E : Sl. No. - 1) LT XLPE Unarmored Cable (1 C x 70 mm<sup>2</sup>)

Technical Specifications

**1. SCOPE:**

This specification covers the design, manufacturing, testing, supply, delivery and performance requirements of LV XLPE unarmored cable as indicated in our Schedule of requirements for use in the 11/0.433 substation of NESCO..

The materials offered shall have been successfully type tested and the design shall have been in satisfactory operation for a period of not less than one year on the date of bid opening. Compliance shall be demonstrated by submitting with the bid (i) authenticated copies of the type test reports and (ii) performance certificates from the users.

However where the bidder offers similar but not identical material but higher size to that which has been type tested, the difference shall be stated in Test Certificate Schedule. The purchaser shall adjudge whether to accept or reject the offered material and type test data presented.

The scope of supply includes the provision of type tests. Rates for type tests shall be given in the appropriate price schedule of the bidding document and shall be considered for evaluation. The purchaser reserves the right to waive type tests as indicated in the section on Quality Assurance, Inspection and Testing in this specification.

The Aerial Bunched Cable shall conform in all respects to highest standards of engineering, design, workmanship, this specification and the latest revisions of relevant standards at the time of offer and the Purchaser shall have the power to reject any work or material, which, in his judgment is not in full accordance therewith.

**2. STANDARDS:**

Except where modified by this specification, the LV Cable shall be designed, manufactured and tested in accordance with the latest editions of the following standards.

<u>IEC/ISO</u>	<u>Indian Standard</u>	<u>Material</u>
IEC: 1089	IS:398/1994	Round wire concentric lay Overhead electrical Stranded Conductors.
	IS:398(Part-4)/1994	All Aluminum Alloy Conductors, Quality Management Systems.
ISO:9000	IS:8130/1984	Conductors for insulated Electric cables.

IS:10810/1984

Method of Tests for cables.

IEC:502

IS:7098/1998

XLPE Insulated PVC.  
Sheathed power cables.

The Bidder may propose alternative standards, provided it is demonstrated that they give a degree of quality and performance equivalent to or better than the referenced standards. The purchaser shall adjudge whether to accept or reject any standards.

The Bidder shall furnish a copy of the alternative standard proposed along with his bid. If the alternative standard is in a language other than English, an English translation shall be submitted with the standard.

In case of conflict the order of the precedence shall be (1) IEC or ISO standards, (2) Indian Standards, (3) Other alternative standards. This list is not to be considered exhaustive and reference to a particular standard or recommendation in this specification does not relieve the Manufacturer or the necessity of providing the goods complying with other relevant standards or recommendation.

### 3.0 SERVICE CONDITIONS:

The service conditions shall be as follows:

- Maximum altitude above sea level 500m
- Maximum ambient air temperature 50°C
- Maximum daily average ambient air temperature 35°C
- Maximum ambient air temperature 5°C
- Maximum temperature attainable by an object exposed to sun 60°C
- Maximum yearly weighted average ambient temperature 32°C
- Maximum relative humidity 100%
- Average number of thunderstorm days per annum 70
- Average number of rainy days per annum 120
- Average annual rainfall 150cm
- Wind pressure as per IS:5613(Part-I/Sec.I) 1985

Wind Zones IS:5613 Part-I/Sec-I	Light	Medium	Heavy
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Terrain Category	100 Kg/m <sup>2</sup>	150 Kg/m <sup>2</sup>	200 Kg/m <sup>2</sup>
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Environmentally, the region where the work will take place includes coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators.

Therefore, outdoor material shall be designed and protected for use in exposed, heavily polluted salty corrosive and humid coastal atmosphere.

#### 4. SYSTEM CONDITIONS:

The materials shall be suitable for installation in supply systems of the following characteristics.

- Frequency 50Hz
- Nominal System Voltage 400/230V
- Maximum System Voltage LV System 440/250 V
- Minimum LV Voltage 370 V
- Power frequency one minute withstand (set & dry) 2KV
- Neutral Earthing arrangement LV System Solidly earthed

#### 5.0 GENERAL/ TECHNICAL

- The LT Cable shall be of heavy duty, stranded circular Aluminum Conductor, Cross linked Polyethylene (XLPE) insulated provided with extruded PVC inner sheathed & unarmored.

#### 6.0 CONDUCTORS:

The phase & street light conductors shall be of multi-stranded aluminum of compacted circular cross section. The aluminum shall comply with IS 8130:1984. The messenger conductor shall be of multi-stranded Aluminum Alloy conforming to IS 398 (Part 4) – 1994. In addition to meeting all requirement of relevant ISS the LT XLPE AB Cables supplied shall satisfy following general requirements.

#### 7.0 CABLE DRUM LENGTH:

The cable shall be supplied in 250mtr Drum Lengths.

#### 8.0 TESTS:

##### 8.1 Type Tests

- The bidder should submit copies of the type test reports of similar size or higher size of cable from any NABL accredited laboratory.

## 8.2 Routine Tests

The following measurement or tests shall be carried out on all drums and coils of Bunched cable:

- Conductor resistance
- Voltage test.

The conductor to be tested for conductor resistance shall be stored for at least 12 hours in a room at particular constant temperature. If it can not be established that the conductors have reached the room temperature, the test should be postponed for a period of further 12 hours. Alternatively, the test can be carried out on short sample after remaining one hour in a temperature controlled water bath. The test shall be carried out and the conversion factors used to convert the resistance value to a base of 200<sup>0</sup>C and one Km. The DC resistance of each conductor shall not exceed the appropriate maximum values specified in IEC:228/IS:6474.

The voltage test shall be conducted by applying to each core 3.5KV AC (2.5 U<sub>0</sub> plus 2 KV) or 8.4 KV DC for 5 minutes with the specimen lying in a water bath at ambient temperature. The conductor shall pass the test if no electrical breakdown occurs.

## 8.3 Acceptance Tests

The following sample check, measurements and test shall be carried out Measurement of insulation wall thickness;

- Measurement of diameter of each strand, overall outside dia & Cross Sectional Area of the conducting Part in compacted condition.
- Measurement of diameter & cross sectional Area of each strand after entwining.
- Thermal expansion test;
- Check of physical characteristics
- Tensile strength of individual wires of conductor.

This test should be carried out on one length from each production batch of the same sample.

The thickness of the insulation wall shall be measured on a piece removed from each end of the sample length. If either means or minimum values are not met, two further samples shall be removed at 0.5m from the end corresponding to the failed specimen. If these samples do not satisfy the mean and minimum thickness requirements, the test shall be deemed to have been failed.

The longitudinal projections used for phase identifications shall be ignored.

The thermal expansion test need only be carried out on one core.

In relation to the tensile test, the tensile strength of the aluminum wires before stranding and that of the finished conductor shall comply with IEC:1089.