SCHEDULE ' A '

TECHNICAL SPECIFICATION

FOR

L.T.XLPE POWER CABLE

FOR

DISTRIBUTION NETWORK IN MAHARASHTRA

(SPECIFICATION NO.MM/I/LTXLPE/2006)

MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO.LTD.

MUMBAI

(EE D-II/LTXLPESPEC2006:03.01.2006)

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TECHNICAL SPECIFICATION FOR LT XLPE POWER CABLE

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I N D E X

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1. SCOPE:

The specification covers design, manufacture, shop testing, packing and delivery of 1100 Volts grade , Aluminium conductor , XLPE insulated multi core power cables by road/rail to the designated Store Centers in the State of Maharashtra..

2. SERVICE CONDITIONS:

Equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions.

2.1	Maximum ambient temperature (deg C)	50
2.2	Maximum temperature in shade (deg C)	45
2.3	Minimum temperature in air (deg C) in shade	3.5
2.4	Relative Humidity (%)	10 to 100
2.5	Maximum annual Rainfall (mm)	1450
2.6	Maximum Wind Pressure (kg/mm2)	150
2.7	Maximum altitude above mean sea level (Meters)	1000
2.8	Isoceraunic level (days/year)	50
2.9	Seismic level (Horizontal acceleration)	0.3 g.
2.10	Ground temperature (deg. C)	30
2.11	Thermal Resistivity of soil (deg. C cm / watt)	150
2.12	Depth of laying for 1.1 kV (cm)	75
2.13	Cables installed singly for twin / multi core cables and 3 Nos. of single core cables in Trefoil Touching	
2.14	Moderately hot and humid tropical climate, conducive to rust and fungus growth.	

3. STANDARDS:

3.1 Unless otherwise specified elsewhere in this specification, the rating as well as performance and testing of the LT XLPE power cables shall conform to the latest revisions available at the time of placement of order of all the relevant standards as listed in, but not limited to Annexure-I.

4. GENERAL TECHNICAL REQUIREMENTS:

4.1 ARMOURED CABLES

1100 Volts Grade L.T. cable with stranded H2/H4 grade aluminium conductor , XLPE insulated , colour coded , laid up , with fillers and/or binder tape where necessary provided with extruded PVC inner sheath , single galvanized round steel wire / strip armoured and provided with PVC outer sheath . Both inner and outer sheath shall be of Type ST-2 as per IS: 5831-1984 and cable shall be conforming to IS: 7098 (Part 1) - 1988 (amended upto date) and bearing ISI mark . In case of single core cable armouring shall be of almunium.

4.2 INSULATION , INNER SHEATH AND OUTER SHEATH :

Insulation , inner sheath and outer sheath shall be applied by separate extrusion . Inner sheath shall be applied by extrusion only. Bedding of PVC tape for inner sheath is not acceptable. Colour of outer sheath shall be black .

The quality of insulation should be good and insulation should not be deteriorated when exposed to the climatic conditions.

4.3 SEQUENTIAL MARKING OF LENGTH ON CABLE

Non erasable Sequential Marking of length shall be provided by embossing on outer sheath of the cable for each meter length.

4.4 CONTINUOUS A.C. CURRENT CAPACITY:

Continuous a.c. current capacity shall be as per Table given below.

Conductor sizes in sq.mm.	Continuous A.C. current capacity in Amps.	
	When laid direct in the ground 30 deg.C.	When laid in air 40 deg.C.
70 sq.mm	165	175
95 sq mm	200	224
120 sq mm	225	240
150 sq mm	255	305

185 sq mm	285	315
240 sq mm	325	385
300 sq mm	370	410
400 sq mm	425	470

4.5 SHORT CIRCUIT CURRENT

Short circuit current of LT XLPE cable shall be as per Table given below.

Duration of Short Circuit in sec	Area of Al. conductor	Short circuit current in kA
T	A	I=0.094 x A/sq.rt (t)
1	70 sq.mm	6.58
1	95 sq.mm	8.93
1	120 sq.mm	11.28
1	150 sq.mm	14.10
1	185 sq.mm.	17.39
1	240 sq.mm.	22.56
1	300 sq.mm.	28.20
1	400 sq.mm.	37.60

5. TESTS :

5.1 TYPE TESTS:

All the type tests in accordance with IS: 7098 (Part 1) - 1988 (amended upto date) shall be performed on cable samples drawn by purchaser..

Type tests are required to be carried out from the first lot of supply on a sample of any one size of cable ordered . In case facilities of any of the type tests are not available at the works of the supplier , then such type test shall be carried out by the supplier at the independent recognized laboratory at the cost of supplier. Sample for the type test will be drawn by the purchaser's representative and the type test will be witnessed by him.

Supplier, however, can claim exemption from carrying out type test as above, provided such type test were already conducted for M.S.E.D.C.L. (previous M.S.E.B.) in the past within five years and the test certificates thereof submitted to our C.E.(Dist) . Chief Engineer (Dist) may at his option grant waival from carrying out type tests if the test certificates are acceptable .In case of other Government recognized laboratories / Test House valid approved Government certificate shall be enclosed alongwith test.

5.2 ROUTINE TESTS:

All the Routine tests as per IS: 7098 (Part 1) - 1988 amended upto date shall be carried out on each and every delivery length of cable. The result should be given in test report.

The details of facility available in the manufacturer's works in this connection should be given in the bid.

5.3 ACCEPTANCE TESTS:

All Acceptance tests as per IS-7098 (Part-I) 1988 as amended upto date including the optional test as per clause no 15.4 and Flammability Test as per clause No. 16.3 shall be carried out on sample taken from the delivery lot.

5.4 The following additional acceptance test should be carried out on PVC compounds used for outer sheath , as per IS: 5831 - 1984 (amended upto date)

1.Hot Deformation Test.

5.4.1 TESTING FACILITIES AND DETAILS OF EQUIPMENTS :

The supplier / tenderer shall clearly state as to what testing facilities are available in the works of manufacturer and whether the facilities are adequate to carry out type, routine and acceptance tests mentioned in IS: 7098 (Part 1) - 1988 (amended upto date) on the cable including test as per clause No.5.4 of specification. The facilities shall be provided by the bidder to purchaser's representative for witnessing the tests in the manufacturer's works. If any test cannot be carried out at manufacturer's works reason should be clearly stated in the tender.

6 PACKING AND MARKING :

6.1 a) Upto 120 sq. mm. Size :
Cables shall be supplied in continuous standard length of 500 meters with plus minus 5% (five percent) tolerance wound on non returnable wooden drums of good quality or on non-returnable steel drums without any extra cost to the purchaser.

b) Above 120 sq.mm. size :
Cables shall be supplied in continuous standard length of 250 meters with plus minus 5% (five percent) tolerance wound on non returnable wooden drums of good quality or on non-returnable steel drums without any extra cost to the purchaser.

6.2 Non standard length :
5% (five percent) of the ordered quantity of respective size shall be acceptable in non-standard length which shall not be less than 100 meters in length.

6.3 The following particulars shall be properly legible embossed on the cable sheath at the intervals of not exceeding one meter through out the length of the cable. The cables with poor and illegible embossing shall be liable for rejection.

a) Manufactures name .
b) Voltage grade.
c) Year of manufacture.
d) M.S.E.D.C.L.
e) Successive Length.
f) Size of cable
g) ISI mark

6.4 Packing and marking shall be as per clause No. 18 of IS 7098 (part I)/1988 amended up to date.

6.5 Supplier should provide statistical data regarding cables of all sizes viz.-

1) Weight of one meter of finished product of cable of various sizes and ratings.
2) Weight of one meter of bare conductor used for cables of various sizes and ratings.

7. QUALITY ASSURANCE PLAN:

A detailed list of bought out items which got into the manufacture of cables should be furnished indicating the name of the firms from whom these items are procured.. The bidder shall enclose the quality assurance plan invariably along with offer followed by him in respect of the bought out items, items manufactured by him & raw materials in process as well as final inspection, packing & marking. The Company may at its option order the verification of these plans at manufacturer's works as a pre qualification for technically accepting the bid. During verification if it is found that the firm is not meeting with the quality assurance plan submitted by the firm, the offer shall be liable for rejection.

8. SCHEDULES:

8.1 The tenderer shall fill in the following schedule which form part of the offer.

Schedule `C' - Tenderer's Experience.

8.2 The tenderer shall submit the list of orders for similar type of equipments, executed or under execution during the last three years, with full details in the schedule of Tenderer's experience (Schedule `C') to enable the purchaser to evaluate the tender.

SCHEDULE - C

SCHEDULE OF TENDERER'S EXPERIENCE

Tenderer shall furnish here a list of similar orders executed/under execution by him to whom a reference may be made by purchaser in case he considers such a reference necessary.

Sr. No.	Name of client and description	Value of order	Period of supply and commissioning	Name and address to whom reference may be made
1	2	3	4	5

NAME OF FIRM

NAME & SIGNATURE OF TENDERER

DESIGNATION

DATE

ANNEXURE-I

LIST OF STANDARDS
(All amended uptodate)

SR.NO.	STANDARD NO.	TITLE
1.	IS: 7098(Part 1)-1988	Specification for XLPE insulated , PVC sheathed cables for working voltages upto and including 1100 Volts.
2.	IS : 5831-1984	Specification for PVC insulation and sheath of electric cables.
3.	IS: 8130-1984	Specification for conductors for insulated electric cables and flexible cords.
4.	IS: 3975-1988	Specification for Mild Steel wires, formed wires and tapes for armouring of cables.
5.	IS: 10462 (Part I) – 1983	Fictitious calculation method for determination of dimensionS of protective covering of cables.