SPECIFICATIONS FOR 11KV, 1 CORE 630SQ.MM , UE, ALUMINIUM CONDUCTOR, XLPE INSULATED, ARMOURED FRLS CABLE

PROJECT : 250MW TESTBED, BHEL, RC PURAM, HYDERABAD
DESCRIPTION: DESIGN, ENGINEERING, MANUFACTURE, TESTING, PACKING AND SUPPLY OF 11KV (UE), 1 CORE, 630 SQ.MM ALUMINIUM CONDUCTOR, XLPE INSULATED, ARMOURED FRLS CABLE CONFIRMING TO IS 7098 PART II WITH LATEST AMENDMENTS AND AS PER BHEL SPECIFICATION.

1.0 SCOPE:

This specification governs the quality requirements of design, manufacture, testing, packing at manufacturer's work and delivery at site as per requirements complete in all respects.

2.0 APPLICABLE STANDARDS:

IS 7098 (PART II)	- Specification for cross linked polyethylene insulated PVC sheathed cables.
ASTM-D2863	- Standard for critical oxygen index and temperature index Test.
IS 3975	- Mild steel wire, strips and tapes for armouring of cable.
IEC-754 – 1	- Standard for acid gas generation test.
ASTM-D2843	- Standard for smoke generation test.
IEC-332 – 1	- Standard for flammability test.
SS 424 1475 Class F3	- Standard for flammability test.
IS 209	- Specification for Zinc.
IS 104 18	- Wooden drums for electric cables.

3.0 CONSTRUCTIONAL REQUIREMENTS: All cables shall be unearthed grade type.

3.1 Voltage grade	: 3.3KV, 6.6KV, 11KV, 33KV (as per enquiry)
3.2 Conductor	: Standard aluminium conductor as per IS 8130 with extruded semi-conducting conductor shielding.
3.3 Insulation	: Cross linked polyethylene with extruded semi-conducting core shielding.

3.4 Screening : Annealed copper tape screening on each core with core identification tape and overall tape wrapping.
3.5 Inner Sheath : Extruded PVC (as per enquiry)
3.6 Armour : Aluminium wire for single core cables.
Galvanised steel strips for 3 core cables.
3.7 Outer Sheath : Extruded FRLS PVC (as per enquiry)

4.0 TESTS:

All acceptance and routine tests shall be carried out on all cables at vendor's works in the presence of purchaser's representative. Wherever FRLS PVC sheaths are specified, cables shall be tested to demonstrate FRLS properties. Type test reports of similar cables whenever they are called for shall be furnished.

5.0 CHARACTERSTICS FOR FRLS PVC:

Inner / Outer sheathing material of cables supplied under this specification, wherever FRLS PVC sheathing is called for shall meet the following requirements:

5.1 The critical oxygen index value shall be greater than 29% at room temperature when tested as per ASTM-D 2863.
5.2 Temperature index shall be greater than 250 degree C at a normal oxygen content of, 21% in air when tested as per ASTM-D2863.
5.3 The acid gas generation shall be less than 20% by weight when tested as per EC754-1.
5.4 Smoke density rating shall be 60% maximum when tested as per ASTM-D 2843.
5.5 The finished cable shall pass the flammability test as per IEC-332-1 and Swedish standard SS424 1475, Class F3.

The cable shall be guaranteed for satisfactory operation of 18 months from the date of dispatch or 12 months from the date of commissioning whichever is earlier.

LOW TENSION POWER CABLES (PVC INSULATED)

1.0 SCOPE:

This specification governs the quality requirements of design, manufacture, testing packing at manufacturers work and delivery at site, as per requirements complete in all respects.

2.0 APPLICABLE STANDARDS:

IS: 1554/IEC502	- PVC insulated (Heavy duty) electric cables.
IS: 8130	- Conductors for insulated electric cables and flexible cords.
ASTM- D2863	- Standard for critical oxygen index and temperature index test.
IEC-754 – 1	- Standard for acid gas generation test.
ASTM- D2843	- Standard for smoke generation test.
IEC-332.3	- Standard for flammability test (Part 3 Cat 'B')
SS 424 1475 Class F3	- Standard for flammability test.
IS:5831	- PVC insulation and sheath of electric cables
IS: 3975	- Mild steel wires, strips and tapes for armouring of cables.
IS:3961 (Part 2)	- Recommended current ratings for cables; part 2 PVC insulated and PVC sheathed heavy duty cables
IS:10418	- Wooden drums for electric cables.

3.0 CONSTRUCTIONAL REQUIREMENTS:

3.1 Voltage grade : 650/1100 V

3.2 Conductor : Standard aluminum conductor as per IS: 8130

3.3 Insulation : Heat resistant PVC (Type C)

3.4 Core identification : As per IS: 1554

3.5 Inner sheath : Extruded PVC sheath (ST2)/ extruded FRLS PVC sheath (As per enquiry)

3.6 Armour : Aluminium wire for single core cables.
Galvanised round wire for diameter less than 13mm
Galvanised strip for diameter more than 13mm

3.7 Outer sheath : Extruded PVC sheath (ST2)/ extruded FRLS PVC sheath (As per enquiry).

4.0 TESTS:

All acceptance and routine tests shalll be carried out on all cables at vendor's works in the presence of purchaser's representative. Wherever FRLS PVC sheaths are specified, cables shall be tested to demonstrate FRLS properties. Type test reports of similar cables whenever they are called for shall be furnished.

5.0 GENERAL:

5.1 Cables shall be delivered in maximum possible lengths of not less than 500 M neatly rolled on wooden drums (seasoned wood), with both ends sealed with moisture proof sealing.

5.2 Sequential marking of the length of the cable in meters shall be provided on the outer sheath at every one metre. The embossing shall be legible and indelible.

5.3 PVC/ Rubber end caps shall be supplied free of cost for each drum with a minimum of eight per thousand metre length. In addition, ends of the cables shall be properly sealed with caps to avoid ingress of water during transportation and storage.

6.0 CHARACTERISTICS FOR FRLS PVC:

Oxygen index : 29% (min) at room temperature (27±2°C)
Temperature : 250°C (min)
HCL gas emission : 20% (max)
Smoke density : <60%

7.0 DOCUMENTATION:

7.1 2 Copies of filled in technical data sheets (in given format only). Quality scheduled & type test certificates alongwith bid.

7.2 2 Copies of final data sheets for our approval after releasing LOL.

7.3 12 Copies of test certificates and technical data sheets with in one week after inspection.

7.4 QAP shall be furnished along with the offer.

8.0 GUARANTEE:

The cables shall be guaranteed for satisfactory operation of 18 months from the date of despatch or 12 months from date of commissioning whichever is earlier.

9.0 TECHNICAL DATA SHEETS:

Sl. No.	Description
1.	Make
2.	Type
3.	Applicable standards
4.	Voltage grade
5.	Suitable for system with: a) Service Voltage b) Neutral earthed / unearthed
6.	Maximum conductor temperature a) Continuous Deg. C b) Short time Deg. C
7.	Conductor a) Material b) Size (sq.mm) c) No. of wires & diameter of each wire (No./ mm)
8.	Insulation a) Material b) Type c) Thickness (nominal) mm
9.	Inner sheath a) Material b) Type c) Thickness (nominal) mm d) Extruded Yes / No e) Approx. outside dia over inner sheath mm.

10. Armouring
    a) Material
    b) Size
    c) DC Resistance at 20° C (Ohm/KM)

11. Overall sheath
    a) Material
    b) Type
    c) Thickness (nominal) mm

12. Approx. overall diameter (mm)

13. Standard drum length with tolerance (M)

14. Net weight of cable (Kg/ KM)

15. Continuous current rating for standard IS condition laid direct : Amps.

    a) In ground
    b) In duct
    c) In air

16. Short circuit current for 1- sec. (KA)

17. Electrical parameters at maximum operating temp. (Ohm / KM)
    a) Resistance
    b) Reactance at 50 Hz
    c) Impedence

18. Recommended minimum bending radius

19. Dearating factor for following ambient temp. in air ground:

    a) At 30° C
    b) At 35° C
    c) At 45° C
    d) At 50° C

20 Cable identification code

21 List of routine and type tests certificates enclosed.