

## ANNEXURE-2

### LT UG underground Power cables

#### 1.0 Technical specifications of item no.1 in Annexure-1

S.NO	Particulars	Specification
1.	Cable type	1.1KV grade 3CX4 Sq.mm copper conductor XLPE insulated &FRLS PVC sheathed armoured heavy duty LT UG cable as per IS 7098 (Part 1)
2.	Conductor	Multi strand (Class 2), electrolytic grade annealed high conductivity Copper as per IS 8130
3.	Insulation	XLPE insulated as per IS 7098 part-1
4.	Laid up	Cores Laid up Suitably and form Circular (Fillers & Binders shall be Used wherever required)
5.	Sheath	Inner: Extruded PVC (ST-2) with FR-LSH properties Outer: Extruded FRLS PVC sheathed (ST-2) with FR-LSH properties
6.	Armour	Galvanized steel round wire as per standard
7.	Cable Identification	The cable identification shall be provided by embossing the details on the outer sheath; the parameters like Manufacturer's name and trademark, <b>Month &amp; year of manufacturing</b> , ISI Marking, Type of Cable and Voltage grade, Type of Insulation, Nominal Cross-sectional area of conductor etc., as per std.
8.	Core Identification	Coloured insulation–Red/Black/Green
9.	Electrical	
A)	Max D.C.Resistance of conductor at 20°C	≤ 4.61 Ω / km
B)	Current Ratings	
a)	Under burial condition at 30°C (at a depth of 750mm & Thermal Resistivity of Soil is 1.5 K.m/W)	45 A
b)	In air at ambient temp40°C	41A
C)	Short Circuit Current of conductor for 1 Sec	0.57 kA
D)	High Voltage Withstand	3 kV ac for 5 Minutes
E)	Maximum Temperature of Conductor	
a)	For Continuous Operation	90°C
b)	Under Short Circuit Condition	250°C
10.	FRLSH properties	
	Flame Retardant , Min. Oxygen Index , Min. Temperature Index , Max. HCL Gas Emission by Weight, Smoke Density	As per BIS/IES standards
11.	Cable Length	3350 m
12.	Cable Length/drum	1000 m/drum - 3 Nos 350 m/drum - 1 Nos (or as approved)

13.	Test Certificates	Routine / Type / Acceptance test certificates as per BIS for cables shall be submitted along with the item delivery.
14.	Other specification	As per BIS Higher specifications in terms of quality and capability Which results in better reliability and safety are also acceptable

## 2.0 Technical specifications of Item no.2 in Annexure-1

S.NO	Particulars	Specification
1.	Cable type	1.1KV grade 4CX10Sq.mm copper conductor XLPE insulated & FRLS PVC sheathed armoured heavy duty LT UG cable as per IS 7098 (Part 1)
2.	Conductor	Multi strand (Class 2), electrolytic grade annealed high conductivity Copper as per IS 8130
3.	Insulation	XLPE insulated as per IS 7098 part-1
4.	Laid up	Cores Laid up Suitably and form Circular (Fillers & Binders shall be Used wherever required)
5.	Sheath	Inner: Extruded PVC (ST-2) with FR-LSH properties Outer: Extruded FRLS PVC sheathed (ST-2) with FR-LSH properties
6.	Armour	Galvanized steel round wire as per standard
7.	Cable Identification	The cable identification shall be provided by embossing the details on the outer sheath; the parameters like Manufacturer's name and trademark, <b>Month &amp; year of manufacturing</b> , ISI Marking, Type of Cable and Voltage grade, Type of Insulation, Nominal Cross-sectional area of conductor etc., as per std.
8.	Core Identification	Coloured insulation-Red, Yellow, Blue & Black
9.	Electrical	
A)	Max D.C. Resistance of conductor at 20°C	$\leq 1.83 \Omega / \text{km}$
B)	Current Ratings	
a)	Under burial condition at 30°C (at a depth of 750mm & Thermal Resistivity of Soil is 1.5 K.m/W)	74 A
b)	In air at ambient temp 40°C	70A
C)	Short Circuit Current of conductor for 1 Sec	1.4 kA
D)	High Voltage Withstand	3 kV ac for 5 Minutes
E)	Maximum Temperature of Conductor	
a)	For Continuous Operation	90°C
b)	Under Short Circuit Condition	250°C
10.	FRLSH properties	
	Flame Retardant , Min. Oxygen Index , Min. Temperature Index , Max. HCL Gas Emission by Weight, Smoke Density	As per BIS/IES standards
11.	Cable Length	2300 m

12.	Cable Length/drum	1000 m/drum - 2 Nos 300 m/drum - 1 Nos (or as approved)
13.	Test Certificates	Routine / Type / Acceptance test certificates as per BIS for cables shall be submitted along with the item delivery.
14.	Other specification	As per BIS Better specifications in terms of quality and capability which results in better reliability and safety are also acceptable

### 3.0 Technical specifications of Item no.3 in Annexure-1

S.NO	Particulars	Specification
15.	Cable type	1.1KV grade 4CX16Sq.mm copper conductor XLPE insulated & FRLS PVC sheathed armoured heavy duty LT UG cable as per IS 7098 (Part 1)
16.	Conductor	Multi strand (Class 2), electrolytic grade annealed high conductivity Copper as per IS 8130
17.	Insulation	XLPE insulated as per IS 7098 part-1
18.	Laid up	Cores Laid up Suitably and form Circular (Fillers & Binders shall be Used wherever required)
19.	Sheath	Inner: Extruded PVC (ST-2) with FR-LSH properties Outer: Extruded FRLS PVC sheathed (ST-2) with FR-LSH properties
20.	Armour	Galvanized steel round wire as per standard
21.	Cable Identification	The cable identification shall be provided by embossing the details on the outer sheath; the parameters like Manufacturer's name and trademark, <b>Month &amp; year of manufacturing</b> , ISI Marking, Type of Cable and Voltage grade, Type of Insulation, Nominal Cross-sectional area of conductor etc., as per std.
22.	Core Identification	Coloured insulation–Red, Yellow, Blue & Black
23.	Electrical	
A)	Max D.C. Resistance of conductor at 20°C	$\leq 1.15 \Omega / \text{km}$
B)	Current Ratings	
c)	Under burial condition at 30°C (at a depth of 750mm & Thermal Resistivity of Soil is 1.5 K.m/W)	95 A
d)	In air at ambient temp 40°C	89A
C)	Short Circuit Current of conductor for 1 Sec	2.3 kA
D)	High Voltage Withstand	3 kV ac for 5 Minutes
E)	Maximum Temperature of Conductor	
a)	For Continuous Operation	90°C
b)	Under Short Circuit Condition	250°C
24.	FRLSH properties	
	Flame Retardant , Min. Oxygen Index , Min. Temperature Index ,	As per BIS/IES standards

	Max. HCL Gas Emission by Weight, Smoke Density	
25.	Cable Length	1000 m
26.	Cable Length/drum	1000 m/drum - 1 no (or as approved)
27.	Test Certificates	Routine / Type / Acceptance test certificates as per BIS for cables shall be submitted along with the item delivery.
28.	Other specification	As per BIS Better specifications in terms of quality and capability which results in better reliability and safety are also acceptable

#### 4.0 Technical specifications of Item no.4 in Annexure-1

S.NO	Particulars	Specification
1.	Cable type	1.1KV grade 1CX6Sq.mm Fire retardant (FR) PVC insulated copper conductor LT UG cable as per BIS
2.	Conductor	Fine stranded electrolytic grade copper, (class 5 as per IS 8130)
3.	Insulation	Fire retardant (FR) PVC insulation
4.	Core Identification	Coloured insulation: Yellow-Green stripes
5.	Electrical	
A)	Max D.C.Resistance of conductor at 20°C	$\leq 4.61 \Omega / \text{km}$
B)	Current Ratings	
a)	Under burial condition at 30°C (at a depth of 750mm & Thermal Resistivity of Soil is 1.5 K.m/W)	49 A
b)	In air at ambient temp 40°C	44 A
C)	Short Circuit Current of conductor for 1 Sec	0.69 kA
6.	Cable Length	300 m

## **6.0 General specifications related to all the above power cables:**

1. Technical Data sheets and type test reports shall be submitted along with the technical bid .
2. The cable shall be taken up for manufacturing only after approval of detailed technical datasheets by SDSC.
3. The party shall mention the following in the technical data sheet:
  - a) Resistance R(AC) value at 20° C (Ohms per Km)
  - b) Resistance R(AC) value at 90° C (Ohms per Km)
  - c) Reactance (X) value (Ohms per KM)
  - d) Current Carrying Capacity in Air, in Ground and in tray
4. The cables shall be of brand new and in good condition. It shall be suitable for laying in trays, trenches, ducts, conduits.
5. The insulation and sheath materials shall be tough enough to withstand the mechanical stresses during Installation.
6. The dimensions of the insulation, Inner sheath, Outer sheath shall be governed by values given in the relevant IS standards.
7. The cables shall be provided with secured and protected packing so as to avoid damages in transit to site under normal conditions and prevention from deterioration during storage.
8. Both the ends of the cables shall be accessible for testing purposes.
9. Cable ends shall be suitably sealed to prevent any ingress of moisture and shall be fully protected against mechanical damage.
10. The cables shall be supplied wound on suitable Metal drum and adequately packed to meet the requirements of shipping involved. Metal drum shall undergo suitable metal treatment and two coats of primer shall be applied. The drum reference no, cable details, cable reference no shall be displayed on the cable drum.