Kashmir Power Distribution Corporation Ltd.
Office of the Chief Engineer Planning & Procurement,
PDD Complex, Bemina, Srinagar.
Email: ceppkpdcl@gmail.com

TECHNICAL SPECIFICATION AND GTP

FOR 1.1 kV GRADE, TWO CORE AND FOUR CORE UN-ARMOURED

ALUMINIUM SERVICE LINE CABLES

OF SIZES

10 mm^2, 16 mm^2, 25 mm^2 & 35 mm^2

Prepared by	**Checked by**	**Checked by**	**Checked by**	**Approved by**
Er. Aamina Kirmani (AEE) Er. Shazia Basharat (AEE) Er Sheikh Abid (J.E)	Er. Manzoor Ahmad Dar Executive Engineer, Procurement Circle, KPDCL	Er. Muzafar Mukhtar Shah Superintending Engineer, Procurement Circle, KPDCL	Er. Bashir Ahmad Dar Chief Engineer, Planning & Procurement Wing, KPDCL, Srinagar.	Techno Economic Committee vide No.MD/KPDCL/ TS-1/1920-26 Dated:12/08/2022
Specification-GTP No: CE/P&P/SPEC-GTP/2022/ Service Line Cables/023		**Date of Issue: 12/08/2022**		**Revisions:0**

This Tender Specification and Guaranteed Technical Particulars are for tendering purpose only and may be subjected to the modification by the purchaser as per actual field requirement. Contractor/Supplier to submit the Guaranteed Technical Particulars (GTP) and Drawings, after the award of the Contract, for approval of the Purchaser.

In case any discrepancy is noticed in this Specification/GTP, please report to Chief Engineer P&P, KPDCL.

CLIMATIC AND ISOCERAUNIC CONDITIONS (CIC)

1.	The climatic and Isoceraunic conditions at the site of work are approximately given as under:	
	Description	Kashmir
i)	Max. temp of air in shade	30.6^0 C
ii)	Min. temp of air in shade	-20^0 C
iii)	Max. temp of air in sun	45^0 C
iv)	Height above sea level (App.)	1600 meter
v)	Max. relative humidity	90%
vi)	Min. relative humidity	15%
vii)	Average no. of thunderstorm days per year	54
viii)	Average rainfall	80 cm
ix)	Wind Zone	WZ –3
x)	Average number of rainy days per year	106
xi)	Seismic Zone	SZ–5
xii)	Area of installation	Heavy Snow Zone
2.	**Communication and Transport:** The nearest railway station is Udhampur on the broad gauge line and is connected to the Divisional Stores by a metal road. The equipment is required to pass en-route through various tunnels on NH-44 (Nandni, Nashri and Jawahar Tunnel). The weight and maximum dimensions of the packages suitable for transportation through tunnel route are as follows: 1. Length =7.0 m 2. Width =3.0 m 3. Height =4.55 m 4. Weight =40 MT The supplier shall get the permissible weight and dimensions confirmed from the Highway Authorities before proceeding with the manufacture of the equipment. It will be the responsibility of the supplier to ensure timely and proper delivery of the equipment on door delivery basis, at Srinagar, through road transport. The supplier shall also ensure that the weight and dimensions of the packages which are suitable to be carried by road transport up to Srinagar.	
3.	**Additional conditions**	
i	Permitted Noise Level	45 dB
ii	Induced Electromagnetic disturbance	1.6 kV
iii	Pollution class/Creepage distance	III/ 25 mm/ kV
iv	Isoceraunic Level (days/year)	50
v	Condensation	Occasional

Technical Specifications of Un-armoured Service Line Cables (Four Core & Twin Core) of Various Sizes

1. Scope:

1.1 This specification covers design, manufacture, testing before dispatch, packing, supply and delivery at F.O.R. destination of Four Core & Twin Core XLPE insulated, PVC Sheathed, FRLS, Un-armoured, circular, LT Cables of Sizes 35 mm^2, 25 mm^2, 16 mm^2 and 10 mm^2 with aluminum conductor suitable for working voltages up to & including 1100 V, ISI Marked & Conforming to IS:7098;(Part-I)-1988 with latest amendments.

1.2 It is not the intent to specify completely herein all details of the design and construction of the material/equipment. However, the material/equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing continuous commercial operation up to the bidder's guarantee in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specifications and shall have the discretion to reject any work or material which in his judgment, is not in accordance there with.

2. Location:

2.1 The cables may be laid anywhere in Kashmir Valley and should be suitable for outdoor use.

2.2 Cables shall be suitable for Climatic and Isoceraunic Conditions as listed above in "CLIMATIC AND ISOCERAUNIC CONDITIONS".

3. STANDARDS:

The material/equipment shall comply in all respects with regard to the technical specifications, the rating, performance and testing with the latest revisions and amendments of relevant standards as listed in the table below or any other International Standards which ensure equal or higher quality material.

S.No.	Indian Standards	Title
1	IS:7098 Part 1 -1984	Specification for XLPE insulated PVC sheathed cables For working voltages up to and including 1.1 kV.
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:10810-1984	Method of tests for cables.
5	IS:10418-1982	Drums for electric cables.
6	IS:10462-1991	Fictitious calculation method for determination of dimensions of protective covering of cables.
7	IEC-754	Test on gases evolved during combustion of electric cables.
	Part-I:1994	Determination of the amount of halogen acid gas evolved during combustion of polymeric material taken from the cables.
8	NEMA_WCS-1992	Thermoplastic insulated wire and cable for the transmission and distribution of electrical energy.

The cable joints, outdoor and indoor terminations and their accessories and fittings shall conform to IS:1255-1983 or equivalent/higher standards which ensure equal or better performance, but shall not fall short of the requirement of this specification. The bidder shall clearly indicate such standards in his offer**.**

4. GENERAL REQUIRMENT:

a) The ISI marked XLPE Insulated un-armoured cables shall conform to IS:7098;(Part-I)- 1988 with latest amendment and bear BIS certification mark. All materials used in manufacturing of cable shall be new, unused and of best quality complying with the requirement of IS:7098; (Part-I)-1988 and other relevant standards. The purchaser reserves the right to ask for documentary evidence of the purchase of various materials, (to be used for the manufacture of cable) as a part of quality control. Quality Assurance plan shall be submitted.

b) The cables shall be suitable for outdoor/indoor installation free in air, in duct or buried underground directly or through trenchless boring and shall be capable of withstanding the normal stresses associated with transportation, erection, reeling and unreeling operations without getting deformed.

c) The cable shall be suitable for use where combination of ambient temperature and temperature rise due to load results in a conductor temperature not exceeding 90^{o}C under normal operation and 250^{o}C under short circuit condition.

d) The XLPE Insulated Un-armored LT Cable shall be ISI marked. The manufacturer must furnish valid ISI certificates along with offer.

e) Cable shall be suitable for operation under voltage and frequency variations as per Latest Indian Electricity rule.

f) Cable shall have heat & moisture resistance properties. These shall be of type & design with proven record on distribution network service.

g) In order to distinguish this electric cable from communication cables installed on the same pole during inspection, the colour of the outer sheath of the cable shall be Yellow.

5. CONDUCTOR:

The conductor of the cable shall be made from high conductivity Electrolytic, H4 Grade, Aluminium to form compacted and circular shaped conductor having resistance within limits as specified in IS:8130-1984 with latest amendments. The Aluminium conductor shall be of class-2 as per IS:8130. The conductors shall be stranded for cross section area above 10 mm^2 and solid single conductor for cross section area of 10 mm^2.

A protective barrier may be applied between the conductor and insulation. Such barriers when used shall be compatible with insulating material and suitable for the operating temperature of the cable.

6. Insulation:

The insulation shall be suitable for LT system voltage and the insulating material shall be cross linked Poly Ethylene (XLPE) and applied by extrusion process as per IS:7098; Part-1 and its latest amendments. The insulation shall be an extrusion of thermosetting cross-linked polyethylene rated for 90°C continuous operation.

The insulating material shall have excellent electrical properties with regard to resistivity,

dielectric constant and loss factor and shall have high tensile strength and resistance to abrasion. This shall not deteriorate at elevated temperatures or when immersed in water. The insulation shall be preferably fire resistant and resistant to chemicals like acids, alkalis, oils and ozone.

The insulation properties shall be stable under thermal conditions arising out of continuous operation at conductor temperature of 90°C rising momentarily to 250°C under short circuit conditions. It shall be free from any foreign material or porosity visible to the unaided eye. The insulation shall be so applied that it fits closely on the conductor and it shall be possible to remove it without damaging the conductor.

The average thickness of insulation shall not be less than the nominal value as specified in IS:7098; (Part-I) with latest amendments. Tolerance on insulation thickness shall be as per IS:7098; Part-1. The insulation shall withstand mechanical and thermal stress under both steady state and transient operating conditions.

7. Core identification (for multiple core cables):

Individual core of multi-core cables shall be colour coded and/or numbered for proper identification in accordance with clause 10.1 of IS:7098;(Part-1).

8. Fillers and Laying up of cores (for multiple core cables):

In multi core cables, the cores shall be laid together with a suitable right hand lay. The interstices shall be invariably filled with non-hygroscopic filler material so that there is no gap in the centre of cable. The filler shall be of vulcanized rubber, un-vulcanized rubber or Thermoplastic material and shall be provided to fill the gaps between cores.

Further, the compounds used with fillers shall be such as to have no deleterious effect on other components of the cable and to be stable at cable temperatures.

These shall not be harder than XLPE and PVC used for insulation and outer sheath respectively.

9. Inner sheath (common covering):

The laid up cores shall be provided with inner sheath applied by extrusion process. It shall be ensured that the shape is as circular as possible. It shall be applied to fit closely on to the laid up cores and shall be possible to remove easily without causing any damage to the underlying insulated cores. The thickness of the inner sheath shall be as per (12.3) IS:7098;(Part -1). No tolerance on the negative side shall be acceptable.

10. Outer sheath:

The outer sheath shall consist of extruded tough outer sheath of PVC compound insulation over the inner sheath. The PVC compound for the outer sheath shall conform to type ST-2 of IS: 5831-1984 (amended up to date) with suitable additives (to prevent attacks by rodents and termites) shall be provided. The colour of the outer sheath shall be Yellow. The cable must meet all the requirements of the IS:7098;(Part 1) amended up to date and shall bear ISI mark.

11. FRLS PROPERTIES:

All cable shall be Flame Retardant, Low Smoke (FRLS) type. Outer sheath shall have the following properties:

- Acid Gas Generation: Max 20% (as per IEC 754-1)
- Smoke density rating: 60% (As per ASTMD 2843)
- Flammability test: As per Swedish chimney test F3 as per SEN 4241475 As per IEC:332; part-3

12. Operation:

i) Cable shall be suitable for operation under voltage and frequency variation as per Latest Indian Electricity rule.

ii) Cable shall be suitable for laying in air, in duct or buried underground directly or through trenchless boring.

iii) Cable shall have heat & moisture resistance properties. These shall be of type & design with proven record on distribution network service.

iv) Repaired cables shall not be acceptable.

13. Tests:

A. Type tests:

All the cable types and sizes i.e. items offered should have been fully type tested as per IS:7098; (Part-1) with amendments upto date at any NABL accredited Laboratory/ Test house. If the manufacturer's lab is accredited by NABL then it shall be acceptable for type testing. The bidder shall furnish one set of authenticated copy of type test reports along with the offer. These type tests must have been conducted within last ten years prior to date of Bid opening. For any change between design/type of already type tested and the design/type offered against this specification, the purchaser reserves the right to demand repetition of type tests without any extra cost. For each type and size the type test shall be got carried out independently.

The purchaser also reserves the right to have tests carried out from an independent agency without any extra cost, whenever there is a dispute regarding the quality of supply.

The type test certificates type tests as per IS:7098; Part-1 shall be furnished invariably with the offer:

(a) Tests on conductor:

(i) Tensile test

(ii) Wrapping test

(iii) Resistance test

(b) Tests for armouring wires /strips.

(c) Tests for thickness of insulation (eccentricity) and sheath.

(d) Physical tests for insulation:

(i) Tensile strength and elongation at break.

(ii) Ageing in air oven

(iii) Hot Set Test

(iv) Shrinkage test

(v) Water absorption test (gravimetric)

(e) Physical tests for outer sheath:

(i) Tensile strength and elongation at break.

(ii) Ageing in air oven

(iii) Shrinkage test

(iv) Hot deformation

(v) Loss of mass in air oven

(vi) Heat shock

(vii) Thermal stability

(viii) Carbon black content of polythene sheath.

(f) Insulation resistance test (volume resistivity)

(g) High voltage test

(h) Flammability test

(i) FRLS Tests

The following FRLS tests are to be conducted as per the referred standard:

- HCL gas evolution test (IEC - 754.1)
- Oxygen Index (ASTM-D-2863)
- Temperature Index (ASTM-D-2863)
- Smoke density test (ASTM-D-2863)
- Flammability test (IEC-332.1)
- Swedish Chimney test (SS-424 14 75)
- Ladder Test (IEEE-383)

XLPE cables shall be tested as per IS:7098/IEC.

The LT XLPE cables shall be routine tested as per relevant IEC/IS

B. Acceptance test:

The selection of sample pieces for acceptance test shall be as per Appendix-A of IS:7098; (Part-I) for each lot offered for inspection or part thereof. The minimum quantity shall be one drum.

The acceptance tests shall be carried as per IS:7098; (Part-I) out on the selected samples.

a) Tensile test (for Aluminium)

b) Wrapping test (for Aluminium)

c) Conductor resistance test.

d) Test for thickness of insulation and sheath

e) Hot set test for insulation

f) Tensile strength and elongation at break test for insulation andsheath.

g) High voltage test.

h) Insulation resistance (volume resistivity) test

All the acceptance tests shall be carried out by third party agency in the presence of purchaser's representative at bidder's works place. The firm shall give at least 15 days advance notice to the purchaser to enable him to depute the engineer for witnessing the tests. The test certificates for acceptance tests witnessed by inspecting officer/engineer shall be submitted for approval before dispatch of material.

C. Routine Tests:

The following shall constitute the routine tests. The Inspector may also inspect the routine tests at the time of inspection.

(a) Conductor resistance test

(b) High-voltage test for 5 minutes [as per Clause 16.2 of IS:7098; (Part-I)].

14. TYPE TEST CERTIFICATES:

Bidder shall submit Type Test Certificates for the tests as mentioned above. All the tests should have been conducted during the period not exceeding ten years from the date of opening the bid at CPRI/ ERDA accredited lab as per the relevant standards.

In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to the Purchaser.

15. INSPECTION:

15.1 The Purchaser's representative shall, at all times, be entitled to have access to the works and all places of manufacture where material/equipment shall be manufactured and the representative shall have full facilities for unrestricted inspection of the Bidder's works, raw material and process of manufacture and conducting necessary tests as detailed herein.

15.2 The Bidder shall keep the Purchaser informed in advance of the time of starting and of the progress of manufacture of material/equipment in its various stages so that arrangement can be made for

inspection. The stage and final inspections will be carried by third party agency in presence of Purchaser's representative.

15.3 The contractor will intimate the Purchaser about carrying out of the tests at least 45 days in advance of the scheduled date of tests during which the Purchaser will arrange to depute his representative/s to be present at the time of carrying out of the tests. Six (6) copies of the test reports shall be submitted.

15.4 No material shall be dispatched from its point of manufacture before it has been satisfactorily inspected and tested, Unless the inspection is waived off by the purchaser in writing. In the latter case also, the material/equipment shall be dispatched only after satisfactory testing for all tests specified herein has been completed and approved by the Purchaser.

15.5 The acceptance of any quantity of material shall in no way relieve the Bidder of any of his responsibilities for meeting all requirements of the specification, and shall not prevent subsequent rejection if such material is later found to be defective.

15.6 The acceptance tests as per IS:7098;(Part-I)/1988 shall also be conducted by the manufacturer before dispatch through third party agency in the presence of purchaser's Representative/ Inspecting Officer as per relevant clause of "General Conditions of Contract" along with verification of lengths & weight and checking the manufacturing defects, if any of sample coils. The mass of aluminum, XLPE, PVC & Filler in sample coils shall also be verified by the Inspecting Officer(s). Cold bend/ cold impact test (IS:5831-1984) shall constitute the optional tests and shall be conducted on each offered lot of the cables of each size as per Clause No. 15.4 of IS:7098(Pt- I)/1988.

15.7 The purchaser reserves the right to insist for witnessing the acceptance/routine tests of the purchased items.

15.8 The supplier shall present the latest Calibration Certificate(s) of testing instruments/equipment to be used for the testing of the material covered in the Purchase Order to the authorized inspecting officer/inspecting agency of the purchaser. The testing instruments / meters /apparatus etc. should be got calibrated by the supplier from time to time from an independent testing laboratory/house having valid accreditation certificate from National Accreditation Board for testing and calibrating laboratories for the testing equipment or from original manufacturers having trace ability to NABL /NPL. The calibration certificate(s) should not in any case be older than one year at the time of presenting the same to the inspecting officer/inspecting agency of the purchaser. The testing instruments /equipment should be duly sealed by the Calibrating Agency and mention thereof shall be indicated in the calibration certificate(s).

16 PRE-DISPATCH INSPECTION*:*

The Material shall be subject to inspection by the Third Party Agency in presence of duly authorized representative of the Purchaser. Inspection may be made at any stage of manufacture at the discretion of the Purchaser and the equipment/material, if found unsatisfactory as to workmanship or material, the same is liable to be rejected. Following documents shall be sent along with material

a) Test reports
b) Invoice in duplicate
c) Packing list
d) Drawings & catalogue
e) Guarantee / Warrantee card
f) Delivery Challan
g) Other Documents (as applicable).

17 INSPECTION AFTER RECEIPT AT STORES:

The equipment/material received at Purchaser's Site/Stores shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection.

18 QUALITY CONTROL:

The Bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. Purchaser shall reserve the sole right for the test of a random sample from the lot and in case of any discrepancy or deviation from theType test certificates submitted along with the Bid, the complete lot shall be rejected.

19 IDENTIFICATION:

a. The manufacture shall be identified through-out the length of cables as per Clause No. 17.1 IS:7098;(Part-1)/1988.

b. In order to distinguish these electric cables from telephone cables, the word ELECTRIC shall be indicated, printed or embossed throughout the length of the cable on outer sheath.

c. The cable code shall be provided as per Clause No. 17.3 of IS:7098; (Part- I)/1988.

d. The cable shall be colour coded as per Clause No 10 of IS:7098; (Part-1),1988

e. The outer sheath of the cable shall bear following identification parameters embossed at intervals of length of one meter of cable, throughout the cable:

i) Name of manufacturer

ii) Year of manufacture

iii) Voltage grade

iv) Size of cable

v) Cable code

vi) Name of purchaser "KPDCL"

vii) ISI certification mark.

viii) Successive length

ix) Marking for FRLS cable

20 Packing and forwarding:

20.1 The cable shall be wound on non-returnable wooden drums as per IS:10418-1972 and packed in drums suitable for vertical/horizontal transport, as the case may be and shall be suitable to withstand rough handling during transport and outer storage. The outer surface of the drum shall be painted with white Aluminium paint. Similarly, the inside surface of drum shall have the protective layer of varnish/paint.

20.2 The wooden drums shall be reinforced with steel bends and strips for better protection.

20.3 Length: The cable shall be supplied in standard drum lengths only

20.4 The ends of the cable shall be sealed by means of non-hygroscopic heat shrinkable

sealing material.

20.5 The following information be stenciled on the drum with either water proof ink or oil paint:

20.5.1 Reference of IS/IEC standard.
20.5.2 Manufacturer's name or trademark.
20.5.3 Type of cable and voltage grade.
20.5.4 No. of cores.
20.5.5 Nominal cross sectional area of conductor
20.5.6 Cable code.
20.5.7 Length of cable on the drum
20.5.8 Gross weight
20.5.9 Direction of rotation of drum (by means of an arrow)
20.5.10 Position of outer end of cable
20.5.11 Nigam's technical specification number.
20.5.12 Year of manufacture
20.5.13 Reference of Tender No. /P.O. No. date
20.5.14 Property of KPDCL
20.5.15 Name of consignee and the destination
20.5.16 ISI Certification Mark.

20.6 The firm shall be responsible for any damage to the cables during transit dueto improper and inadequate packing. Wherever necessary, proper arrangement for lifting, such as lifting hooks, shall be provided. Any cable found short inside the packing cases shall be supplied by the supplier, without any extra cost.

20.7 Each consignment shall be accompanied by a detailed packing list, containing the following information;

(a) Name of consignee

(b) Details of consignment

(c) Destination

(d) Total weight of consignment

(e) Handling and unpacking instruction

(f) Bill of materials, indicating contents of each package.

21 STANDARD LENGTH:

1) The cables shall be supplied in the standard length of 500 Meter for 4-Core of sizes 16 mm^2, 25 mm^2, 35 mm^2, and 1000 Meter for sizes 4-Core of size 10 mm^2, 2-Core of sizes 10 mm^2 ,16 mm^2, 25 mm^2 and 35 mm^2.

2) A tolerance (+/-) 5 % shall be allowed in standard length.

22 GUARANTEED TECHNICAL PARTICULARS:

The Bidder shall furnish Guaranteed Technical Particulars in the relevant schedule. (Annexure–B).

23 CHALLENGE CLAUSE:

Purchaser reserves the right to have the material, received after the inspection by the authorized inspecting officer, again tested for any parameter(s) from approved/NABL Accredited testing house/in house technique of the Purchaser. The results if found deviating/unacceptable or in non-compliance with the approved GTP, the lot shall be rejected and bidder shall arrange to replace the rejected LOT within thirty (30) days of such detection at his cost including to and fro transportation.

ANNEXURE-A

GUARANTEED TECHNICAL PARTICULARS OF FOR LT TWIN CORE AND FOUR CORE UN-ARMOURED, ALUMINIUM CONDUCTOR, XLPE INSULATED, PVC SHEATHED, FRLS CABLES, OF SIZES 10 mm^2, 16 mm^2, 25 mm^2 & 35 mm^2

S. No.	Particulars	Unit	Requirements
1	Type of Cable	:	LT, XLPE INSULATED, UN-ARMOURED, ALUMINIUM CABLE OF FRLS TYPE TWO/FOUR CORE OF SIZES 10/16/25/35 mm^2
2	Applicable Standard in general	:	IS:7098; PART (1)
3	Rated voltage	V	240/440
4	Single/Multi Core	:	Two/Four core
5	Armoured / Un-armoured	:	Un-armoured
6	System	:	1100 V Earthed
7	Highest system voltage	V	1100
8	Normal Current rating		Ground/ Duct /Air
	10 mm^2	A	57/48/53
	16 mm^2		78/61/70
	25 mm^2		95/80/99
	35 mm^2		116/94/117
9	Short circuit current for 1 sec duration		
	10 mm^2	kA	940
	16 mm^2		1500
	25 mm^2		2350
	35 mm^2		3290
10	High Voltage withstand capacity	kV rms	3 KV
11	Max D.C Resistance of conductor at 20˚ C	:	
	10 mm^2	ohm/km	3.08
	16 mm^2		1.91

	25 mm^2		1.20
	35 mm^2		0.868
12	Max A.C Resistance of conductor at 90° C		
	10 mm^2	ohm/km	3.94
	16 mm^2		2.44
	25 mm^2		1.54
	35 mm^2		1.11
13	Reactance of cable at normal frequency (Approximately)		
	10 mm^2	ohm/km	0.084
	16 mm^2		0.080
	25 mm^2		0.080
	35 mm^2		0.080
14	Electrostatic capacitance at normal frequency		
	10 mm^2	µF/km	0.16
	16 mm^2		0.18
	25 mm^2		0.20
	35 mm^2		0.23
15	CONDUCTOR		
a	Material of a conductor	:	Material to IS:8130, H4 Grade Aluminium, Class 2
b	Applicable Standard	:	IS:8130
c	Shape of a conductor	:	Circular
d	Conductor size	:	10/16/25/35 mm^2
e	**Minimum No. of Strands**	:	
	10 mm^2		1/7
	16 mm^2		6
	25 mm^2		6
	35 mm^2		6
16	**INSULATION**		
a	Material	:	XLPE
b	Voltage Grade	V	650/1100
c	Applicable Standard	:	IS:7098; Part-I
d	Continuous withstand temperature	° C	90
e	Short Circuit withstand temperature	° C	250
f	Method of application	:	By triple extrusion, sleeve extrusion not permitted

g	Nominal Insulation Thickness	mm	
	10 mm^2		0.7
	16 mm^2		0.7
	25 mm^2		0.9
	35 mm^2		0.9
17	**INNER SHEATH**		Extruded FRLS, PVC Type ST2 as per IS:5831
a	Type and material	:	
b	Whether extruded /wrapped	:	Extruded
c	Minimum thickness	mm	
	10 mm^2		0.3
	16 mm^2		0.3
	25 mm^2		0.3
	35 mm^2		0.3
18	**OUTER SHEATH**		
a	Material	:	Extruded FRLS, PVC Type ST2 as per IS:5831
b	Method of Application	:	Extruded
c	Minimum thickness of outer sheath	:	As per IS -7098 PART –I (1988)
	10 mm^2	mm	1.8
	16 mm^2		1.8
	25 mm^2		2.0
	35 mm^2		2.0
20	CABLE DRUMS		As specified
a	Type and construction	:	Wooden Drum As per IS:10418
b	Standard Drum Length	:	As per IS:10418

Annexure B
GUARANTEED TECHNICAL PARTICULARS
(To be filled by the Bidder)

S. No.	Particulars	Unit	Requirements
1	Type of Cable	:	
2	Standard applicable in general	:	
3	Rated voltage	V	
4	Two/Four core	:	
5	Armoured/Un-armoured	:	
6	System	:	
7	Highest system voltage	V	
8	Current rating		
	10 mm^2	A	
	16 mm^2		
	25 mm^2		
	35 mm^2		
9	Short circuit current for 1 sec duration		
	10 mm^2	kA	
	16 mm^2		
	25 mm^2		
	35 mm^2		
10	High Voltage withstand capacity	kV rms	
11	Max D.C Resistance of conductor at 20˚C	:	
	10 mm^2	ohm/km	
	16 mm^2		
	25 mm^2		
	35 mm^2		

12	Max A.C Resistance of conductor at 90˚C		
	10 mm^2	ohm/km	
	16 mm^2		
	25 mm^2		
	35 mm^2		
13	Reactance of cable at normal frequency		
	10 mm^2	ohm/km	
	16 mm^2		
	25 mm^2		
	35 mm^2		
14	Electrostatic capacitance at normal frequency		
	10 mm^2	µF/km	
	16 mm^2		
	25 mm^2		
	35 mm^2		
15	CONDUCTOR		
a	Material of a conductor	:	
b	Standard Applicable	:	
c	Shape of a conductor	:	
d	Conductor size	:	
e	**Minimum No. of Strands**	:	
	10 mm^2		
	16 mm^2		
	25 mm^2		
	35 mm^2		
16	**INSULATION**		
a	Material	:	
b	Voltage Grade	V	
c	Applicable Standard	:	
d	Continuous withstand temperature	˚C	
e	Short Circuit withstand temperature	˚C	
f	Method of application	:	
g	Minimum Thickness	mm	
	10 mm^2		
	16 mm^2		
	25 mm^2		
	35 mm^2		

17	**INNER SHEATH**		
a	Type and material	:	
b	Whether extruded /wrapped	:	
c	Minimum thickness	mm	
	10 mm^2		
	16 mm^2		
	25 mm^2		
	35 mm^2		
18	**OUTER SHEATH**		
a	Material	:	
b	Colour	:	
c	Method of Application	:	
d	Minimum thickness of outer sheath	:	
	10 mm^2	mm	
	16 mm^2		
	25 mm^2		
	35 mm^2		
19	APPROX. OVERALL DIA OF CABLE		Two Core/Four Core
	10 mm^2	mm	
	16 mm^2		
	25 mm^2		
	35 mm^2		
20	Minimum Bending Radius	:	
21	CABLE DRUMS		
a	Type and construction	:	
b	Standard Drum Length	:	