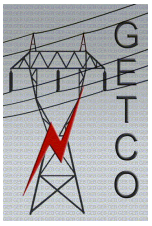

GUJARAT ENERGY TRANSMISSION CORPORATION LTD.
Sardar Patel Vidyut Bhavan, Race Course,
Vadodara: 390 007

TECHNICAL SPECIFICATION

OF

CONTROL AND L.T. POWER CABLES FOR SUB-STATIONS

GETCO/E/TS –CCBL 027/R3 JULY 2022

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TECHNICAL SPECIFICATION FOR CONTROL AND L.T. POWER CABLES

1.0 SCOPE

1.1 This specification covers design, manufacture, testing, inspection, packing and dispatch to destination of Copper Cored Control Cables and aluminum cored LT Power Cables, here in, as specified in wooden drums, for their satisfactory operation in various substations of the Gujarat State.

1.2 These cables are to be used as control signal carrying cables or power carrying cables as the case may be, in various sub – stations in the Gujarat State having varying atmospheric conditions, for voltage ratings from 66KV to 400KV and above, from various equipments situated in the switchyard to the control cabinet, generally situated in the control room.

1.3 These cables are generally laid underground either in the cable trenches with no. of layers as per requirement covered with the RCC slabs or in the pipes laid underground.

2.0 REQUIREMENT

2.1 The cables offered must be ISI marked. The Bidder shall invariably submit the attested copy of ISI certificate. Any cables without this mark will be out rightly rejected. The cables will be accepted only from the works, name and address of which is indicated in the offer.

2.2 All the bids shall comprise the copy of type test reports, of any of the quoted size, which shall not be later than seven years from the date of opening of the Tender and valid till validity of the offer. However, GETCO reserves the right to ask any or all the suppliers to carry out the Type Test at the Government Approved Testing Laboratory on the ordered size/s.

2.3 The quantity of each size offered shall be indicated clearly in the Technical Bid. The Bid will be out rightly rejected if this clause is not found clear.

2.4 This Specification shall be signed page to page without any addition / alteration and shall be submitted with the Technical Bid. Any offer without this will be out rightly rejected.

3.0 STANDARDS

3.1 The control and power cables shall conform to the following Indian / International Standards, which shall mean latest revisions, amendments / changes adopted and / or published as on the date of opening of the Tender.

Sr. No.	Indian Standards	Description
1	IS : 1554 (Part – I)	Cables
2	IS : 5831	Insulation Sheath
3	IS : 8130	Copper And Aluminum
4	IS : 10418	Wooden Drums
5	IS : 3975	Armouring
6	IS : 3961	Current Rating

3.2 Over and above, any other standards which are relevant may be quoted by the bidder. However, in an event where the supplier offers Control and / or power cables conforming to standards other than the above, then the salient points of comparison between the standards adopted and the standards quoted herein shall be detailed in relevant schedule with an authenticated English version of such standards referred to. GETCO also reserves right to ask any supplier to supply the control / power cables related to any other IS or International Standards which may be found to give better quality and performance of the cables.

4.0 CLIMATIC CONDITIONS

4.1 The cables to be supplied under these Specifications are to be used in various Sub-Stations of the Gujarat State, located at different locations having varying atmospheric and climatic conditions and are supposed to operate satisfactorily under any conditions.

4.2 However, the General conditions are given as under:

i) Location: In the State of Gujarat as per Annexure-I.

ii) Maximum Ambient Air Temperature. ° C. : 50

iii) Minimum Ambient Air Temperature. ° C. : 0

iv) Average daily ambient Air Temperature ° C. : 35

v) Maximum relative humidity. - % : 95

vi) Average rainfall per annum. (mm) : 1150

vii) Maximum altitude above mean sea level – Mtrs : 1000

viii) Ceraunic level i.e. Average number of Thunder storm - Days/annum : 15

ix) Maximum wind pressure (Kg/sq.mtrs.) : 200

x) Seismic level i.e. Earthquake Acceleration

a) Horizontal Seismic Co-efficient (acceleration) – g (Equivalent to zone – 5) : 0.3

b) Vertical Seismic Co-efficient (acceleration) – G (Equivalent to zone – 5) 0.34

xi) Terrain : Hot, Humid, Tropical, Highly Polluted, Conductive, Corrosive, Prone to Fungus Growth etc.

5.0 PRINCIPAL PARAMETERS

5.1 The control cables shall comprise round copper conductor (of required size) with PVC insulation, PVC inner Sheath, Galvanized Steel armouring and PVC outer sheath with Black color as per relevant standards or as specified by the GETCO. Outer sheath of cable used in GIS shall be with FRLSH property, if mentioned in schedule-A of respective tender.

5.2 The LT Power cables shall be of aluminum conductor (of required size) XLPE/PVC insulation, PVC inner Sheath, Galvanized steel armouring and PVC outer sheath with Yellow color as per relevant standards or as specified by the GETCO. Outer sheath of cable used in GIS shall be with FRLSH property, if mentioned in schedule-A of respective tender.

5.3 The control cables shall be rated for minimum 1100V and LT Power cables for minimum 6600V, however Bidder may quote for higher voltage ratings, which shall be clearly brought out in the Technical Bid.

5.4 All the cables quoted / supplied shall be ISI marked.

5.5 The insulation of each core and outer & inner sheath, shall comply with the relevant IS / this Specification, whichever is stringent, for control and / or power cables.

5.6 All the armoring shall be strip / round wire type, hot dip galvanized. The armoring and galvanizing shall comply with relevant standards and or this Specification and shall be ISI marked.

5.7 The copper conductor used shall be electrolytic grade annealed and shall be made of minimum 99.5% pure copper, thus the total impurities shall not exceed 0.5%. The Aluminum conductor shall

be of EC Grade 99.5% pure aluminum and thus the total impurities shall not exceed 0.5%. Both the copper and aluminum shall possess ISI mark.

5.8 If the conductor is a bought out item or manufactured by the supplier, following Technical Particulars shall be followed invariably as per Table 1.

Table 1

Sr. No	Description	Control cable. sq. mm.		LT Power cable
		2.5	4.00	
1)	Number of Strands – Nos.	7	7	N.A.
2)	Diameter of – mm. I) Strands a) Nominal b) Minimum II) Overall Conductor / Core (Min.)	 - 0.68 2.06	 - 0.86 2.55	N.A. as compacted circular shaped
3)	Cross Sectional Area of – Sq. mm. a) Each Strand (Minimum) d) Conductor / Core	 - 2.50	 - 4.00	 10/25/50/120/ 150/240/300
4)	D.C. resistance at 20 ^{0}C - Max. a) Conductor of core - Ohms / Km (All 7 strands of a core)	 7.41	 4.61	 1.2
5)	Specific Insulation Resistance– Ohms – Cm. i) At 27^{0}C ii) At 75^{0}C	 1 x 10^{13} 1 x 10^{10}		
6)	Chemical Composition - % a) Conductor Cu / Al. b) Copper (Max.) c) Carbon d) Manganese e) Phosphorous f) Sulphur g) Silicon	 99.5 N.A. N.A N.A N.A N.A N.A		 99.5 N.A. 0.50 – 0.85 0.50 – 1.10 Max. 0.035 Max. 0.045 0.10 – 0.35
7)	Zinc Purity - %	99.95		
8)	Resistivity – Ohms Sq.mm / Mtr.	0.28264 (Al) 0.01724 (Cu)		0.28264
9)	Density (At 20°C) – Gm / Cu Cm.	2.703 (Al) 8.89 (Cu)		2.703 / 7.80

10)	Constant Mass Temp. Co-efficient Of resistance – Per°C	0.004		0.004 / N.A.
11)	Minimum Current Rating at Max. operating temp. – Amp. a) Continuous b) Short time	27 1650	50 3000	225 For 150mm² 13500For150mm²
12)	Type Of Armouring	Round Wire up to 7C & Steel Strip above 7C	Round Wire for 4C & Steel Strip for 12C	Steel Strip
13)	Standard Length – Mtrs.	500 ± 5%		250 ± 5%

6.0 GENERAL TECHNICAL REQUIREMENT

6.1 The Control / Power cables shall be suitable for being laid directly in the ground, in the pipes or in the cable trenches.

6.2 The cables shall therefore be suitable for satisfactory operation under the tropical climatic conditions listed in the relevant clause. The applicable design particulars of the cables are furnished in "System Particulars".

6.3 Physical Constants of Materials

6.3.1 Physical Constants for Copper / Aluminum Conductors.

6.3.1.1 Resistivity:

The volume resistivity of copper / aluminum depends upon its purity and its physical condition. However as per the specified value of purity, the maximum value permitted is 0.01724 for copper and 0.028264 ohm. Sq. mm / mtr at 20 Deg. C, for aluminum. These values shall be used for calculation of the maximum permissible value of resistance. This value may be checked from the measured value of the resistance.

6.3.1.2 Density:

At a temperature of 20°C the minimum density of electrolytic grade annealed copper shall be 8.89 and that of hard drawn aluminum shall be 2.703 g/cm3.

6.3.1 Constant-Mass Temperature Co-efficient of Resistance

6.3.2.1 At a temperature of 20°C the constant-mass temperature co-efficient of resistance of copper and hard drawn aluminum measured between two potential points rigidly fixed to the wire, the metal being allowed to expand freely, has been taken as 0.0039 & 0.004 per degree Celsius respectively for copper and aluminum.

6.3.3 Co-efficient of Linear Expansion:

6.3.3.1 The co-efficient of linear expansion of copper and hard-drawn aluminum at O°C has been taken as $17x10^{-6}$ and 23×10^{-6} per-- °C respectively for copper and aluminum. This value holds good for all practical purposes over the range of temperature from 0°C to highest safe operating temperature.

6.4 Physical constants for Galvanised steel wires

6.4.1 Density

6.4.1.1 At a temperature of 20°C, the density of galvanized steel wire is taken as 7.80 g/cm3.

6.4.2 Co-efficient of Linear Expansion

6.4.2.1 In order to obtain uniformity in calculations a value of 11.5×10^{-6} Per °C may be taken as the value for the co-efficient of Linear Expansion of galvanized steel wires used for the cores of steel-armored copper / aluminum conductors.

6.5 Materials

6.5.1 The conductors shall be manufactured from Electrolytic annealed copper / EC grade aluminum rods suitably hard-drawn on wire drawing machines. The copper / aluminum rods used shall comply with all the relevant ISS, BSS, or other standards to be specified along with the due justifications and this Specification.

6.5.2 Galvanized steel wire shall be drawn from high carbon steel rods produced by either acidic or basic open hearth process, electric furnace process or basic oxygen process. All the properties of the steel strips and wires shall conform to the relevant standards.

6.5.3 The zinc used for galvanizing shall be electrolytic high grade Zinc not less than 99.95 percent purity. It shall conform to and satisfy all the requirements of relevant ISS, BSS, the Specification or other Standards to be specified with the due justification. Galvanizing shall be done by hot dip galvanizing process.

6.5.4 The bidder should specify the source of raw materials along with the proof of last purchases made. The Purchaser may reject the order of the Bidders whose raw material suppliers are found to be supplying any poor quality or non-standard materials, to the purchaser of this Specification or any other purchaser.

6.6 Freedom From Defects

The wires shall be smooth and free from all imperfections such as spills, splits, slag inclusion, die marks, scratches, fittings, blow-holes, projections, looseness, overlapping of strands, chipping of copper / aluminum layers etc. and all such other defects which may hamper the mechanical & electrical properties of the conductor as also the installation of the cable at the site etc. Special care should be taken to keep away dirt, grit etc. during stranding / applying PVC coating.

6.7 Wire Sizes

6.7.1 Nominal Size and Tolerances

The copper, aluminum and galvanized steel wires for the cable covered by this Specification / standard shall have diameters as specified in GTP and shall be within the tolerances indicated therein. The diameter of the steel wires shall be measured over the zinc coating.

6.8 Joints in Wires

6.8.1 Copper / Aluminum Wires

6.8.1.1 No joints shall be permitted in the copper / aluminum wires in any of the cables and any of the cores.

6.8.2 Galvanised steel wires

6.8.2.1 There shall be no joints except those in the base rod or wire before final drawing in steel wires and strips forming the armouring of the copper / aluminum cables.

6.9 Stranding

6.9.1 The wires used in the construction of galvanized steel armouring of copper and aluminum cables before stranding and after stranding shall satisfy all the relevant requirements as per the standards indicated or any other standards with due justification and this Specification.

6.9.2 The zinc used for galvanizing shall be electrolytic high grade Zinc. It shall conform to and satisfy all the requirements of relevant

standards indicated or any other standards with due justification and this Specification. Galvanizing shall be done by hot dip galvanizing process.

6.10 Standard Length

6.10.1 The standard length of the conductor shall be 500 meters for all control cables and 250 meters for LT Power cables. A tolerance of +/-5% on the standard length shall be permitted. All lengths outside this limit of tolerance shall be treated as random lengths.

6.10.2 Random lengths will be accepted provided no length is less than 95% of the standard length specified and the total quantity of such random lengths shall not be more than 5% of the total quantity ordered.

6.10.3 Bidder shall also indicate the maximum single length, above the standard length, he can manufacture in the guaranteed technical particulars. This is required in special case. The purchaser reserves the right to place orders for the above length to the extent of 50% of the total ordered quantity on the same terms and conditions applicable for the standard lengths during the pendency of the contract.

6.10.4 The standard length mentioned in 6.10.1 may be specified as under for various sizes of the cables:

Sr. No.	Type of Cables	Standard length in Meter	Tolerance.
1	Control	500	± 5%
		1000*	± 5%
2	LT Power	250	± 5%
		500*	± 5%

(*) for special cases, if any.

6.11 All the cables shall be marked at every meter with the name and logo of the manufacturer & purchaser, rating & size of the cable, and date of manufacture, along the length.

6.12 Every core of the cable shall be marked with core no. at every meter, serially.

7.0 TESTS:

7.1 The type, acceptance, routine tests, any tests specifically demanded by the Purchaser and tests during manufacture shall be carried out on the cables free of cost.

7.1.1 Type tests shall mean those tests, which are to be carried out to prove the process of manufacture and general conformity of the material to this Specification and relevant Standards. These tests shall be carried out on samples prior to commencement of commercial production against the order. The Bidder shall indicate his schedule for carrying out these tests in the activity schedule. These tests shall have to be carried out at the Government Approved Testing Laboratory. Purchaser reserves the right to specify the name of the laboratory also, if so felt.

7.1.2 Acceptance Tests shall mean those tests, which are to be carried out on samples taken from each lot offered for pre-dispatch inspection, for the purposes of acceptance of that lot. These tests shall be carried out at the manufacturer's works in presence of Purchaser's representative before the dispatch of the materials to the site.

7.1.3 Routine Tests shall mean those tests which are to be carried out on each strand / spool / length of the cable to check requirements which are likely to vary during production. These tests shall be carried out by the manufacturer on each drum and shall have to furnish reports to the GETCO's representative during his visit for witnessing acceptance tests.

7.1.4 Tests during manufacture shall mean those tests, which are to be carried out during the process of manufacture and inspection by the supplier to ensure the desired quality of the end product to be supplied by him, including all Quality Control checks and Raw Materials testing.

7.1.5 Samples for individual wires for tests shall be taken before stranding from not less than ten percent of the spools in the case of copper & aluminum wires and ten percent of the coils in the case of steel wires. If samples are taken after stranding, they shall be obtained by cutting 1.2 meters from the outer end or inner end of the finished cable from at least ten percent of the finished reels.

7.1.6 The standards to which these tests will be carried out are listed against them. Where a particular test is a specific requirement of this specification, the norms and procedures of the test shall be as specified in this Specification or as mutually agreed to between the Bidder and the purchaser in the Quality Assurance Plan.

7.1.7 For all type and acceptance tests, the acceptance values shall be the values guaranteed by the Bidder in the "Guaranteed Technical Particulars ", of his proposal or the acceptance value specified in this specification, whichever is more stringent for that particular test.

7.2 Type Tests

7.2.1 Bidder shall submit following tests from NABL accredited/Government Laboratory. The test shall be carried out in accordance with latest /amended / up to date IS. The bidder has to submit the all type test reports as stated hereunder for the offered item along with the technical bid. The type test reports from NABL accredited/Government Laboratory shall not be older than Ten years. Type test reports shall be valid as on the last date of submission of bid.

7.2.2 The list of Type test are as follows:

A) Tests on Conductor:
   1. Annealing test (for Copper)
   2. Tensile test (for Aluminum)
   3. Conductor resistance test

B) Tests on Armouring wire/ strip
   1. Tensile Test
   2. Elongation Test
   3. Torsion/Winding Test
   4. Resistivity Test.

C) Test onThickness of Insulation and Sheath.

D) Physical Tests for Insulation & outer Sheath
   1. Tensile Strength & elongation at break
   2. Ageing in air oven
   3. Shrinkage test
   4. Hot deformation Test.
   5. Loss of mass in air oven
   6. Heat shock Test
   7. Thermal stability

E) Insulation Resistance Test

F) High Voltage Test (Water immersion test)

G) High Voltage Test (at room temperature)

H) Flammability Test

I) Test on outer sheath to confirm FRLSH property (In case of supply for GIS)

Important Note:

In case of non-submission / partial submission or type test reports of which validity is over, the bidder shall submit pending type test report/s from NABL accredited/Government Laboratory, in the event of an order, before commencement of supply without affecting delivery schedule, free of cost to GETCO. Confirmation for above shall be invariably submitted along with technical bid. Furthermore, purchaser reserve right to select the sample from Manuf. Works & recommend the NABL lab to carry out type tests in case of non-submission/ partial submission or type test reports of which validity is over.

7.3 Acceptance Tests

The following acceptance tests shall be carried out on samples selected randomly by GETCO inspector.

A) Tests on Conductor:
   1. Annealing test (for Copper)
   2. Tensile test (for Aluminum)
   3. Conductor resistance test
   4. Wrapping Test (for Aluminum)

B) Tests on Armouring wire/ strip
   1. % Coverage of Armour(90% Min)
   2. Armour resistance test
   3. Tensile Test & Elongation Test

C) Test on Thickness of Insulation and Sheath.

D) Physical Tests for Insulation & outer Sheath
   1. Tensile Strength & elongation at break

E) Insulation Resistance Test

F) High Voltage Test (at room temperature)

G) Cable Weight/meter.

H) Tests on outer sheath for conformity of FRLSH property (if applicable)

I) Length Verification and Drum Tare Weight.

J) Drum Dimension Verifications

7.3.1 Sampling criteria for acceptance testing (A to H) shall be as per IS 1554, subject to minimum of two drums for each size(type) in each lot offered for final inspection, shall be selected randomly by GETCO inspector.

7.3.2 Sampling criteria for acceptance testing (I) shall be at least 5% of the total number of drums subject to minimum of two in any lot for each size put up for inspection, shall be selected at random to ascertain the length of cable by following method:

"At the works of the manufacturer of the cable, the cable shall be transferred from one drum to another at the same time measuring its length with the help of a graduated pulley & Cyclometer. The difference in the length (higher of the total measured lengths) thus obtained and as declared by the Bidder in the packing list shall be applied to all the drums if the cable is found short during checking."

7.3.3 Sampling criteria for acceptance testing (J) shall be minimum One Drum of each Drum size in each lot put up for inspection, shall be selected randomly by GETCO inspector. Drum Drawings shall be as per Annexure II of GETCO Specification.

7.3.4 The supplier shall have all the testing facilities to carry out all the Acceptance Tests. If it is found that the testing equipment/s are not performing to the Standard or they are not duly Calibrated the related test/s shall be carried out at the Government approved laboratory in presence of Purchaser’s Representative, at no extra

cost to the GETCO. The GETCO may specify the name of the laboratory.

7.3.5 All the cables shall be accepted only after carrying out all the acceptance tests, as per the relevant IS and the GETCO Specification, in presence of the GETCO's Representative.

7.4 Routine tests

7.4.1 All the routine tests shall be carried out by the supplier during the production of the cable and a copy of the same shall be provided to the Inspecting Officer, during inspection.

7.5 Tests during Manufacture

a)	Chemical analysis of zinc used for galvanizing	Relevant IS with latest Amendment and this Specification.
b)	Chemical analysis of copper & aluminum used for making copper / aluminum conductors.	Relevant IS with latest Amendment and this Specification
c)	Chemical analysis of steel used making steel armouring.	Relevant IS with latest Amendment and this Specification

7.6 Testing Charges

7.6.1 The testing charges for the type tests specified and as per relevant IS / international standards, shall be borne by the Supplier. All the Suppliers will have to carry out the Type Test, as per the terms of this Specification at their own cost and the Purchaser will not have any financial or technical implication on this account.

7.6.2 In case of failure in any of the type test/s, the supplier is either required to modify the design of the material or repeat the particular type test three times successfully at his own expenses. The decision of the purchaser in this regard shall be final and binding. The Purchaser at its own desecration may also cancel the order at the risk and cost of the contractor, if the material fails twice successively in the Type Test.

7.6.3 Bidder shall indicate the laboratories in which they propose to conduct the type tests. They shall ensure that the tests can be completed in these laboratories within the time schedule guaranteed by them in the appropriate schedule. The Purchaser reserves the right to specify the name of the laboratory also, if so felt.

7.6.4 The entire cost of testing for the type, acceptance routine tests and tests during manufacture, special tests etc. Specified herein or in the relevant Standards shall be treated as included in the quoted unit price of cable.

7.7 Additional Tests

7.7.1 The Purchaser reserves the right of getting done any other test(s) of reasonable nature carried out at Purchaser's premises, at site, or in any other place in addition to the aforesaid type, acceptance and routine tests to satisfy himself that the material comply with the specifications. In such case all the implications (financial and / or Technical) will be to Suppliers account.

7.8 Test Reports

7.8.1 Test reports shall be furnished in at least two (2) copies along with one original. One copy shall be returned duly certified by the Purchaser only after which the material already inspected shall be dispatched on receipt of Dispatch Instructions from the CE. (Projects)H.O. Baroda

7.8.2 Record of routine test, stage wise test during manufacture, QC test etc. reports shall be maintained by the Bidder at his works for periodic inspection by the purchaser's representative.

7.9 Test Facilities

7.9.1 The following additional facilities shall be available at Supplier's works: -

a) Calibration Reports from Government approved testing laboratory of various testing and measuring equipment including tensile testing machine, resistance measurement facilities, burette, thermometer, barometer etc.

b) Standard resistance for calibration of resistance bridges.

c) Finished cable shall be checked for length verification and surface finish on separate rewinding machine at reduced speed (variable from 8 to 16 meters per minute). The rewinding facilities shall have appropriate clutch system and free of vibrations, jerks etc. with transverse layering facilities.

d) The bidder should have all the routine and acceptance testing facilities, in house.

8.0 INSPECTION

8.1 The Purchaser's representative shall at all times during the dependency of the contract be entitled to have access to the works and all places of manufacture where conductor is being

manufactured and the representative shall have full facilities for unrestricted inspection of the Suppliers works raw materials and process of manufacture and conducting necessary tests as may be deemed fit, for certifying the quality of product.

8.2 The Supplier shall keep the Purchaser informed in advance of the time of starting and of the progress of manufacture of cable in its various stages so that arrangements can be made for inspection.

8.3 No material shall be dispatched from its point of manufacture before it has been satisfactorily inspected, tested, and necessary dispatch instructions are issued in writing, except for the cases where waiver of inspection is granted by competent authority of the Purchaser, and even in this case also written dispatch instructions will be issued. Any dispatches before the issue of Dispatch Instructions in writing will be liable for rejection and non-acceptance of the materials by the consignee.

8.4 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 Standards / Specification, and shall not prevent subsequent rejection if such material is later found to defective.

8.5 At least 5% of the total number of drums subject to minimum of two in any lot for each size put up for inspection, shall be selected at random to ascertain the length of cable by following method:

"At the works of the manufacturer of the cable, the cable shall be transferred from one drum to another at the same time measuring its length with the help of a graduated pulley & Cyclometer. The difference in the length (higher of the total measured lengths) thus obtained and as declared by the Bidder in the packing list shall be applied to all the drums if the cable is found short during checking."

8.6 The sample cut from any numbers of drums for carrying out any type of tests shall be to the suppliers account.

9.0 QUALITY ASSURANCE PLAN

9.1 The bidder shall invariably furnish following information along with his offer, failing in which his offer shall be rejected.

i) Statement giving list of important raw materials, accessories proposed to be used in the manufacture of the cable against this Specification, names of sub suppliers for the raw materials, list of standards according to which these are tested, list of tests normally carried out on raw materials in presence of Bidder's representative as routine

and / or acceptance during production and on finished goods, copies of test certificates.

ii) Information and copies of test certificates as in (i) above in respect of bought out accessories.

iii) List of manufacturing facilities available.

iv) Level of automation achieved and list of areas where manual processing exists.

v) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.

vi) List of testing equipment available with the Bidder for final testing of Cable specified. In the case if the Bidder does not possess all the Routine and Acceptance testing facilities the tender will be rejected.

vii) The Purchaser reserves the right for factory inspection to verify the facts quoted in the offer. If any of the facts are found to be misleading or incorrect the offer of that Bidder will be out rightly rejected.

viii) Special features provided to make it maintenance free and also any marking for identification after installation.

ix) Type test certificates of the raw material bought out accessories and finished cables, offered. The reports shall not be older than 7 years on the date of opening of the Tender and valid till validity of offer.

x) Quality assurance plan (QAP) withhold points for purchaser's inspection

9.2 The Bidders shall submit the routine test certificates of all the cables, bought out items, accessories etc.

10.0 DOCUMENTATION

10.1 Two sets of type test reports, duly approved by the Purchaser shall be submitted by the Bidder, before commencement of supply. A copy of acceptance and routine test certificates, and drawings duly approved by the GETCO shall accompany the dispatch consignment.

10.2 The manufacturing of the cables shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the Purchaser. All manufacturing and fabrication work in connection with the cable prior to the approval of the drawing shall be at supplier’s risk.

10.3 Approval of drawing etc. by the purchaser shall not relieve the Bidder of his responsibility and liability for ensuring correctness and correct interpretation of the latest revision of applicable standards, rules and codes of practices. The cables shall conform in all respects to high standards of engineering, design,

workmanship and latest revisions of relevant standards in vogue on the day of opening of the Technical Bid and purchaser shall have the power to reject any work or material which in his judgement is not in full accordance therewith.

10.4 All the drawings, i.e. elevation, side view, plan, cross sectional view etc., in AutoCAD format and manuals in PDF format, for offered item shall be submitted. Also the hard copies as per specification shall be submitted.

10.5 The bidder shall submit Quality Assurance Plan for manufacturing process and Field Quality Plan with the technical bid.

10.6 All the points other than GTP, which are asked to confirm in technical specifications must be submitted separately with the bid.

11.0 PACKING & FORWARDING

11.1 The cables shall be supplied in non-returnable strong wooden drums provided with lagging of adequate strength, and displacement during transit, storage and subsequent handling and laying operations in the field. The drums shall generally conform to relevant IS accept otherwise specified hereinafter.

11.2 The drums shall be suitable for wheel mounting and for jetting off the cable under a minimum controlled stress of the order of 5 Kg/Sq.M for copper cables and 15Kg/Sq.M for aluminum cables.

11.3 The bidder should submit the proposed drum drawings along with the bid. However, the same shall be in line with the requirements as stated herein. After placement of the Letter of Award, the Bidder shall submit two copies of fully dimensional drawing of the drum as per Annexure II and cross section(s) of the cable, for Purchaser's approval before taking up manufacturing of Cables and or drums. After getting approval from the Purchaser, Bidder shall submit 6 copies of the approved drawing to Purchaser for further distribution and field use at Purchaser's end.

11.4 All wooden components shall be manufactured out of seasoned soft wood free from defects that may materially weaken the component parts of the drums. Preservative treatment for anti-termite/anti-fungus (Aldrime / Aldruse) etc. shall be applied to the entire drum with preservatives of a quality which is not harmful to the cable or to the persons using or storing the same.

11.5 The flanges shall be of minimum two ply or higher construction with each ply at right angles to the other and nailed together. The nails shall be driven from the inside face flange, punched and

then clenched on the outer face. The tolerance in thickness of each ply shall be +3 mm only. There shall be at least 3 nails per plank of ply with maximum nail spacing of 75 mm. Where a slot is cut in the flange to receive the inner end of the cable, the entrance shall be in the line with the periphery of the barrel.

11.6 The wooden battens used for making the barrel of the cable shall be of segmental type. These shall be nailed to the barrel supports with at least two nails. The battens shall be closely butted and shall provide a round barrel with smooth external surface. The edges of the battens shall be rounded or chamfered to avoid damage to the cable.

11.7 Barrel studs shall be used for construction of drums. The flanges shall be holed and the barrel supports slotted to receive them. The barrel studs shall be threaded over a length on either end, sufficient to accommodate washers, spindle plates and nuts for fixing flanges at the required spacing. Barrel studs should be tack welded with the nuts after tightening.

11.8 Normally, the nuts on the studs shall stand Stroud of the flanges. All the nails used on the inner surface of the flanges and the drum barrel shall be countersunk. The ends of barrel shall generally be flushed with the top of the nuts.

11.9 The complete drum including inner cheek of the flanges and drum barrel surface shall be painted with bitumen based paint.

11.10 Before reeling, card board or double corrugated or thick bituminized waterproof bamboo paper shall be secured to the drum barrel and inside of flanges or the drum by means of a suitable commercial adhesive material. The paper should be dried before use. After reeling the cable, the exposed surface of the outer layer of cable shall be wrapped with thin polyphone sheet across the flanges to preserve the cable from dirt, grit and damage during transportation and handling and also to prevent ingress of rain water during storage / transport.

11.11 A minimum space of 125 mm shall be provided between the inner surface of the external protective layer and outer layer of the power cables; however, 75 mm shall be acceptable for all control cables.

11.12 Each batten shall be securely nailed across grains as far as possible to the flange edges with at least 2 nails per end. The length of the nails shall not be less than twice the thickness of the battens. The nail shall not protrude above the general surface and shall not have exposed sharp edges or allow the battens to be released due to corrosion.

11.13 Outside the protective layer, there shall be minimum of two binders consisting of hoop iron / galvanized steel wire. Each protective layer shall have two recesses to accommodate the binders.

11.14 Both ends of the cable shall be sealed by means of non-hygroscopic sealing material. Both ends of cable shall be kept outside through Cable Hole Diameter and secured with the help of U-nails on one side of the flanges. The cable shall be banded by use of galvanized steel wire / aluminum wire.

11.15 Wire shall be bound at least at three locations at the most 75 mm apart covered with PVC adhesive tape so as to avoid loosening of cable in transit and handling.

11.16 Only Single length of cable shall be wound on each non-returnable drum.

	Type of cable	Length	Drum Size	Flange Dia (A)	Barral Dia (B)	Travers (W)	No. of tie rod	Thickness each side (Minimum) (t)
1	Control Cable	500 ± 5% * 1000 ± 5% *	Drawing to be submitted for approval shall be as per Specification and Annexure II					37+37= 74 50+50= 100
2	Power Cables	250 ± 5% * 500 ± 5% *	Drawing to be submitted for approval shall be as per Specification and Annexure II					37+37= 74 50+50= 100

* The total random lengths acceptable will not be more than ± 5% of the total ordered quantity.

11.17 If any bidder wishes to supply the cables in the non-returnable steel drums the same will be acceptable, however they shall be without any additional cost to the GETCO.

11.18 Packing List shall be provided by bidder at the time of Inspection with following details:

a) Drum Number b) Length of Cable Offered c) Weight of Cable d)Tare Weight of Drum e) Total Weight. f) Inspected length of Cable for selected Drum in acceptance Test shall be reflected in packing list.

12 MARKING

12.1 Each drum shall have the following information stenciled on it in indelible ink along with other essential data:

a) Contract Award letter / order number
b) Name and address of consignee
c) Manufacturer's name and address
d) Drum Number
e) Size of cable
f) Length of cables in meters
g) Gross weight of drum with cable
h) Weight of empty drum with lagging
i) Arrow marking for unwinding.

13.0 DRAWINGS

13.1 Following Drawings shall be submitted by all bidders with tender bid as per relevant IS/IEC with latest amendments and GETCO technical specifications:

a) Sectional View of Control Cables.
b) Sectional View of LT Power Cables.
c) Drum Drawings [to be utilized for packing of the control and power cables for the lengths specified in this Specification].

13.2 The successful bidder shall have to submit cable drawing along with current rating calculations and drum drawings along with calculations for accommodating required cable length in Drum for respective Drum Size as per IS: 10418: Table 1 (Clause 5.1).

14.0 DEVIATIONS

14.1 All the deviations shall only be mentioned in Annex-XII in n(Procure). Deviation mention elsewhere shall not be considered. All the Bidders have to submit this specification duly signed and stamped without any alterations, additions etc. on any page along with the Technical Bid. Any offer without this is liable to be rejected.

ANNEXURE-I

SYSTEM PARTICULARS

Electrical System Data:

a)	System Voltage a) Control Cables (DC Volts) b) LT Power Cables (AC Volts)	 110/220 440
b)	Max. Voltage a) Control Cables (DC Volts) b) LT Power Cables (AC Volts)	 130/250 470
c)	Lightning impulse withstand voltage (dry & wet) (KVP)	
d)	Power Frequency withstand voltage (wet) (KV rms)	
e)	Short circuit level (KA)	
f)	Switching Surge withstand voltage (wet) KVP	
g)	Radio interference voltage at one MHz when subjected to 50Hz AC. Voltage 320KV (rms) Line to ground – Micro Volts.	1000
h)	Corona Voltages in 50 Hz AC system – KV (rms) Inception I) Dry II) Wet Extinction I) Dry II) Wet	 >320 >320 >320 >320

GURANTEED TECHNICAL PARTICULARS OF

CONTROL CABLES

The Guaranteed Technical particulars furnished below for each size of cable shall be duly attested by the Bidder. Any correction / alterations in this GTP will lead to outright rejection of the Bid. Blank Space shown in the Column of details shall be furnished by bidder invariably. In no case any column should be left blank. The bidder must fill up all the point of GTP for offered item/s. Instead of indicating "refer drawing, or as per IS/IEC", the exact value/s must be filled in. For each size separate sheet should be filled up and endorsed failing in which offer will be out rightly rejected.

(I) 2 CORE 2.5 SQMM.

SR.NO.	DESCRIPTION	DETAILS
1	Address of Works	
2	Voltage grade (Volts)	1100
3	Suitable for earthed or unearthed system	Both
	Conductor	
4	Material	Electrolytic Annealed Copper
5	Diameter of the conductor strand (mm)	
	a) Nominal	
	b) Minimum	0.68
6	No. of Strands Per Core	7
7	Cross Sectional Area (Sq.mm)	
	a) Minimum	2.5
8	Shape	Circular
9	Resistance at 20 ºC (Ohm/Km,Max.)	7.41
10	Resistivity	0.01724
11	Constant Mass Temp. Co-efficient Of resistance For Copper – Per°C	0.0039
12	Annealing (Elongation in % , Min)	18.0 / 22.5
	Core Insulation	
13	Material	PVC, Type - A
14	Thickness Of PVC Core Insulation (mm)	
	a) Nominal	0.9
	b) Minimum	0.8
15	Application	By Extrusion
16	Volume resistivity at 20 ºC (Ohm-Cm)	1x10E13
17	Volume resistivity at 70 ºC (Ohm-	1x10E10

	Cm)	
18	Tensile strength (N/mm2 , Min)	12.5
19	Elongation in %	150
20	Core Identification	
	Inner Sheath	
21	Material	PVC, Type - ST-1
22	Thickness (mm)	
	a) Nominal	0.35
	b) Minimum	0.3
23	Application	By Extrusion
24	Tensile strength (N/mm2 , Min)	12.5
25	Elongation in %	150
26	Dia. over inner sheath (mm)	
27	Colour	Black
	Armouring	
28	Material & Type	Galvanized Steel Round Wire
29	Diameter Of Armour Wire – mm.	
	a) Nominal	1.5
	b) Minimum	1.4
30	Resistance at 20 ºC (Ohm/Km, Max.)	5.54
31	Dia. over armour (mm)	
32	Tensile strength (N/mm2 , Min)	
33	Elongation in %	
34	% Coverage of armour (90%(Min)	
	Outer Sheath	
35	Material	PVC, Type - ST-1
36	Thickness (mm)	
	a) Nominal	1.3
	b) Minimum	1.24
37	Application	By Extrusion
38	Tensile strength (N/mm2 , Min)	12.5
39	Elongation in %	150
40	Colour	
41	Overall Diameter Of Cable (mm , Min)	
	General	
42	Continuous Current Rating (Amp)	
	a) In Ground	32
	b) In Duct	27
	c) In Air	27
43	Short time current rating for 1 Sec (KA)	0.288
44	Max. permissible conductor temperature ºC	
	a) Under continues full load	70
	b) Under transient condition	160
45	Rated DC Voltage (Volts)	220

46	Safe Pulling Force – Kg. / Sq. mm.	5
47	Minimum Radius of Installation.	12 x Outer Dia. Of Cable.
48	Length Per Drum – Mtr.	
	a) Nominal	500
	b) Maximum	525
	c) Minimum	475
49	Weight Of Cable (Kg/ Km)	
50	Total weight including drum (Kg)	
51	**Cable Drum**	
	a) Material	
	b) Tare Weight	
52	**Information stenciled on the drum**	Yes
1	- Reference IS	
2	- Contract Award letter / order number	
3	- Manufacturer's Name, Brand Name or TM & address	
4	- Type of Cable & Voltage grade	
5	- Size of cable	2Cx2.5 Sq. mm
6	- Cable code	
7	- Length of Cable	
8	- Direction of rotation of drum	
9	- Drum No.	
10	- Running end of cable	
11	- Country of manufacturer	
12	- Year of Manufacture	
53	**Embossing On Cable Every Running Meter**	Yes
	a) GETCO	
	b) 1100 V	
	c) Trade Name & logo	
	d) Batch, Month, &Year Of Manufacture	
	e) Length – Mtrs.	

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber

Stamp / seal of the bidder: ___

(II) 4 CORE 2.5 SQMM.

SR.NO.	DESCRIPTION	DETAILS
1	Address of works	
2	Voltage grade (Volts)	1100
3	Suitable for earthed or unearthed system	Both
	Conductor	
4	Material	Electrolytic Annealed Copper
5	Diameter of the conductor strand (mm)	
	a) Nominal	
	b) Minimum	0.68
6	No. of Strands Per Core	7
7	Cross Sectional Area (Sq.mm)	
	a) Minimum	2.5
8	Shape	Circular
9	Resistance at 20 ºC (Ohm/Km,Max.)	7.41
10	Resistivity	0.01724
11	Constant Mass Temp. Co-efficient Of resistance For Copper – Per°C	0.0039
12	Annealing (Elongation in % , Min)	18.0 / 22.5
	Core Insulation	
13	Material	PVC, Type - A
14	Thickness Of PVC Core Insulation (mm)	
	a) Nominal	0.9
	b) Minimum	0.8
15	Application	By Extrusion
16	Volume resistivity at 20 ºC (Ohm-Cm)	1x10E13
17	Volume resistivity at 70 ºC (Ohm-Cm)	1x10E10
18	Tensile strength (N/mm2 , Min)	12.5
19	Elongation in %	150
20	Core Identification	
	Inner Sheath	
21	Material	PVC, Type - ST-1
22	Thickness (mm)	
	a) Nominal	0.35
	b) Minimum	0.3
23	Application	By Extrusion
24	Tensile strength (N/mm2 , Min)	12.5
25	Elongation in %	150
26	Dia. over inner sheath (mm)	
27	Colour	

	Armouring	
28	Material & Type	Galvanized Steel Round Wire
29	Diameter Of Armour Wire – mm.	
	a) Nominal	1.5
	b) Minimum	1.4
30	Resistance at 20 ºC (Ohm/Km, Max.)	5.54
31	Dia. over armour (mm)	
32	Tensile strength (N/mm2 , Min)	
33	Elongation in %	
34	% Coverage of armour (90%(Min)	
	Outer Sheath	
35	Material	PVC, Type - ST-1
36	Thickness (mm)	
	a) Nominal	1.3
	b) Minimum	1.24
37	Application	By Extrusion
38	Tensile strength (N/mm2 , Min)	12.5
39	Elongation in %	150
40	Colour	
41	Overall Diameter Of Cable (mm , Min)	
	General	
42	Continuous Current Rating (Amp)	
	a) In Ground	30
	b) In Duct	24
	c) In Air	24
43	Short time current rating for 1 Sec (KA)	0.288
44	Max. permissible conductor temperature ºC	
	a) Under continues full load	70
	b) Under transient condition	160
45	Rated DC Voltage (Volts)	220
46	Safe Pulling Force – Kg. / Sq. mm.	5
47	Minimum Radius of Installation.	12 x Outer Dia. Of Cable.
48	Length Per Drum – Mtr.	
	a) Nominal	500
	b) Maximum	525
	c) Minimum	475
49	Weight Of Cable (Kg/ Km)	
50	Total weight including drum (Kg)	
51	**Cable Drum**	
	Material	
	Tare Weight	
52	**Information stenciled on the drum**	Yes
1	- Reference IS	

2	- Contract Award letter / order number	
3	- Manufacturer's Name, Brand Name or TM & address	
4	- Type of Cable & Voltage grade	
5	- Size of cable	4Cx2.5 Sq. mm
6	- Cable code	
7	- Length of Cable	
8	- Direction of rotation of drum	
9	- Drum No.	
10	- Running end of cable	
11	- Country of manufacturer	
12	- Year of Manufacture	
53	**Embossing On Cable Every Running Meter**	Yes
	a) GETCO	
	b) 1100 V	
	c) Trade Name & logo	
	d) Batch, Month, &Year Of Manufacture	
	e) Length – Mtrs.	

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber

Stamp / seal of the bidder: ___

(II) 7 CORE 2.5 SQMM

SR.NO.	DESCRIPTION	DETAILS
1	Address of works	
2	Voltage grade (Volts)	1100
3	Suitable for earthed or unearthed system	Both
	Conductor	
4	Material	Electrolytic Annealed Copper
5	Diameter of the conductor strand (mm)	
	a) Nominal	
	b) Minimum	0.68
6	No. of Strands Per Core	7
7	Cross Sectional Area (Sq.mm)	
	a) Minimum	2.5
8	Shape	Circular
9	Resistance at 20 ºC (Ohm/Km,Max.)	7.41
10	Resistivity	0.01724
11	Constant Mass Temp. Co-efficient Of resistance For Copper – Per°C	0.0039
12	Annealing (Elongation in % , Min)	18.0 / 22.5
	Core Insulation	
13	Material	PVC, Type - A
14	Thickness Of PVC Core Insulation (mm)	
	a) Nominal	0.9
	b) Minimum	0.8
15	Application	By Extrusion
16	Volume resistivity at 20 ºC (Ohm-Cm)	1x10E13
17	Volume resistivity at 70 ºC (Ohm-Cm)	1x10E10
18	Tensile strength (N/mm2 , Min)	12.5
19	Elongation in %	150
20	Core Identification	
	Inner Sheath	
21	Material	PVC, Type - ST-1
22	Thickness (mm)	
	a) Nominal	0.35
	b) Minimum	0.3
23	Application	By Extrusion
24	Tensile strength (N/mm2 , Min)	12.5
25	Elongation in %	150
26	Dia. over inner sheath (mm)	
27	Colour	

	Armouring	
28	Material & Type	Galvanized Steel Round Wire
29	Diameter Of Armour Wire – mm.	
	a) Nominal	1.5
	b) Minimum	1.4
30	Resistance at 20 ºC (Ohm/Km, Max.)	5.54
31	Dia. over armour (mm)	
32	Tensile strength (N/mm2 , Min)	
33	Elongation in %	
34	% Coverage of armour (90%(Min)	
	Outer Sheath	
35	Material	PVC, Type - ST-1
36	Thickness (mm)	
	a) Nominal	1.5
	b) Minimum	1.4
37	Application	By Extrusion
38	Tensile strength (N/mm2 , Min)	12.5
39	Elongation in %	150
40	Colour	
41	Overall Diameter Of Cable (mm , Min)	
	General	
42	Continuous Current Rating (Amp)	
	a) In Ground	20
	b) In Duct	17
	c) In Air	17
43	Short time current rating for 1 Sec (KA)	0.288
44	Max. permissible conductor temperature ºC	
	a) Under continues full load	70
	b) Under transient condition	160
45	Rated DC Voltage (Volts)	220
46	Safe Pulling Force – Kg. / Sq. mm.	5
47	Minimum Radius of Installation.	12 x Outer Dia. Of Cable.
48	Length Per Drum – Mtr.	
	a) Nominal	500
	b) Maximum	525
	c) Minimum	475
49	Weight Of Cable (Kg/ Km)	
50	Total weight including drum (Kg)	
51	Cable Drum	
	Material	
	Tare Weight	
52	Information stenciled on the drum	
1	- Reference IS	

2	- Contract Award letter / order number	
3	- Manufacturer's Name, Brand Name or TM	
4	- Type of Cable & Voltage grade	
5	- Size of cable	7Cx2.5 Sq. mm
6	- Cable code	
7	- Length of Cable	
8	- Direction of rotation of drum	
9	- Drum No.	
10	- Running end of cable	
11	- Country of manufacturer	
12	- Year of Manufacture	
53	Embossing On Cable Every Running Meter	Yes
	a) GETCO	
	b) 1100 V	
	c) Trade Name & logo	
	d) Batch, Month, &Year Of Manufacture	
	e) Length – Mtrs.	

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber

Stamp / seal of the bidder: ___

(IV) 12CORE 2.5 SQMM.

SR.NO.	DESCRIPTION	DETAILS
1	Address of Works	
2	Voltage grade (Volts)	1100
3	Suitable for earthed or unearthed system	Both
	Conductor	
4	Material	Electrolytic Annealed Copper
5	Diameter of the conductor strand (mm)	
	a) Nominal	
	b) Minimum	0.68
6	No. of Strands Per Core	7
7	Cross Sectional Area (Sq.mm)	
	a) Minimum	2.5
8	Shape	Circular
9	Resistance at 20 ºC (Ohm/Km, Max.)	7.41
10	Resistivity	0.01724
11	Constant Mass Temp. Co-efficient Of resistance For Copper – Per°C	0.0039
12	Annealing (Elongation in % , Min)	18.0 / 22.5
	Core Insulation	
13	Material	PVC, Type - A
14	Thickness Of PVC Core Insulation (mm)	
	a) Nominal	0.9
	b) Minimum	0.8
15	Application	By Extrusion
16	Volume resistivity at 20 ºC (Ohm-Cm)	1x10E13
17	Volume resistivity at 70 ºC (Ohm-Cm)	1x10E10
18	Tensile strength (N/mm2 , Min)	12.5
19	Elongation in %	150
20	Core Identification	
	Inner Sheath	
21	Material	PVC, Type - ST-1
22	Thickness (mm)	
	a) Nominal	0.35
	b) Minimum	0.3
23	Application	By Extrusion
24	Tensile strength (N/mm2 , Min)	12.5
25	Elongation in %	150
26	Dia. over inner sheath (mm)	
27	Colour	
	Armouring	

28	Material & Type	Galvanised Steel Strips
29	Size of Armour Strip [thickness (mm) X width (mm)]	
	a) Nominal	0.85 X 4
	b) Minimum	0.80 X 4
30	Resistance at 20 ºC (Ohm/Km, Max.)	5.54
31	Dia. over armour (mm)	
32	Tensile strength (N/mm2 , Min)	
33	Elongation in %	
34	% Coverage of armour (90%(Min)	
	Outer Sheath	
35	Material	PVC, Type - ST-1
36	Thickness (mm)	
	a) Nominal	1.5
	b) Minimum	1.4
37	Application	By Extrusion
38	Tensile strength (N/mm2 , Min)	12.5
39	Elongation in %	150
40	Colour	
41	Overall Diameter Of Cable (mm , Min)	
	General	
42	Continuous Current Rating (Amp)	
	a) In Ground	17
	b) In Duct	14
	c) In Air	14
43	Short time current rating for 1 Sec (KA)	0.288
44	Max. permissible conductor temperature ºC	
	a) Under continues full load	70
	b) Under transient condition	160
45	Rated DC Voltage (Volts)	220
46	Safe Pulling Force – Kg. / Sq. mm.	5
47	Minimum Radius of Installation.	12 x Outer Dia. Of Cable.
48	Length Per Drum – Mtr.	
	a) Nominal	500
	b) Maximum	525
	c) Minimum	475
49	Weight Of Cable (Kg/ Km)	
50	Total weight including drum (Kg)	
51	**Cable Drum**	
	Material	
	Tare Weight	
52	**Information stenciled on the drum**	
1	- Reference IS	

2	- Contract Award letter / order number	
3	- Manufacturer's Name, Brand Name or TM	
4	- Type of Cable & Voltage grade	
5	- Size of cable	12Cx2.5 Sq. mm
6	- Cable code	
7	- Length of Cable	
8	- Direction of rotation of drum	
9	- Drum No.	
10	- Running end of cable	
11	- Country of manufacturer	
12	- Year of Manufacture	
53	**Embossing On Cable Every Running Meter**	Yes
	a) GETCO	
	b) 1100 V	
	c) Trade Name & logo	
	d) Batch, Month, &Year Of Manufacture	
	e) Length – Mtrs.	

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber
Stamp / seal of the bidder: _____

(V) 19CORE 2.5 SQMM.

SR.NO.	DESCRIPTION	DETAILS
1	Address of Works	
2	Voltage grade (Volts)	1100
3	Suitable for earthed or unearthed system	Both
	Conductor	
4	Material	Electrolytic Annealed Copper
5	Diameter of the conductor strand (mm)	
	a) Nominal	
	b) Minimum	0.68
6	No. of Strands Per Core	7
7	Cross Sectional Area (Sq.mm)	
	a) Minimum	2.5
8	Shape	Circular
9	Resistance at 20 ºC (Ohm/Km, Max.)	7.41
10	Resistivity	0.01724
11	Constant Mass Temp. Co-efficient Of resistance For Copper – Per°C	0.0039
12	Annealing (Elongation in % , Min)	18.0 / 22.5
	Core Insulation	
13	Material	PVC, Type - A
14	Thickness Of PVC Core Insulation (mm)	
	a) Nominal	0.9
	b) Minimum	0.8
15	Application	By Extrusion
16	Volume resistivity at 20 ºC (Ohm-Cm)	1x10E13
17	Volume resistivity at 70 ºC (Ohm-Cm)	1x10E10
18	Tensile strength (N/mm2 , Min)	12.5
19	Elongation in %	150
20	Core Identification	
	Inner Sheath	
21	Material	PVC, Type - ST-1
22	Thickness (mm)	
	a) Nominal	0.35
	b) Minimum	0.3
23	Application	By Extrusion
24	Tensile strength (N/mm2 , Min)	12.5
25	Elongation in %	150
26	Dia. over inner sheath (mm)	
27	Colour	
	Armouring	

28	Material & Type	Galvanized Steel Strips
29	Size of Armour Strip [thickness (mm) X width (mm)]	
	a) Nominal	0.85 X 4
	b) Minimum	0.80 X 4
30	Resistance at 20 ºC (Ohm/Km, Max.)	5.54
31	Dia. over armour (mm)	
32	Tensile strength (N/mm2 , Min)	
33	Elongation in %	
34	% Coverage of armour (90%(Min)	
	Outer Sheath	
35	Material	PVC, Type - ST-1
36	Thickness (mm)	
	a) Nominal	1.5
	b) Minimum	1.4
37	Application	By Extrusion
38	Tensile strength (N/mm2 , Min)	12.5
39	Elongation in %	150
40	Colour	
41	Overall Diameter of Cable (mm , Min)	
	General	
42	Continuous Current Rating (Amp)	
	a) In Ground	14
	b) In Duct	12
	c) In Air	12
43	Short time current rating for 1 Sec (KA)	0.288
44	Max. permissible conductor temperature ºC	
	a) Under continues full load	70
	b) Under transient condition	160
45	Rated DC Voltage (Volts)	220
46	Safe Pulling Force – Kg. / Sq. mm.	5
47	Minimum Radius of Installation.	12 x Outer Dia. Of Cable.
48	Length Per Drum – Mtr.	
	a) Nominal	500
	b) Maximum	525
	c) Minimum	475
49	Weight Of Cable (Kg/ Km)	
50	Total weight including drum (Kg)	
51	**Cable Drum**	
	Material	
	Tare Weight	
52	**Information stenciled on the drum**	
1	- Reference IS	

2	- Contract Award letter / order number	
3	- Manufacturer's Name, Brand Name or TM	
4	- Type of Cable & Voltage grade	
5	- Size of cable	19Cx2.5 Sq. mm
6	- Cable code	
7	- Length of Cable	
8	- Direction of rotation of drum	
9	- Drum No.	
10	- Running end of cable	
11	- Country of manufacturer	
12	- Year of Manufacture	
53	**Embossing On Cable Every Running Meter**	Yes
	a) GETCO	
	b) 1100 V	
	c) Trade Name & logo	
	d) Batch, Month, &Year Of Manufacture	
	e) Length – Mtrs.	

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber
Stamp / seal of the bidder: _____

(VI) 27CORE 2.5 SQMM.

SR.NO.	DESCRIPTION	DETAILS
1	Address of Works	
2	Voltage grade (Volts)	1100
3	Suitable for earthed or unearthed system	Both
	Conductor	
4	Material	Electrolytic Annealed Copper
5	Diameter of the conductor strand (mm)	
	a) Nominal	
	b) Minimum	0.68
6	No. of Strands Per Core	7
7	Cross Sectional Area (Sq.mm)	
	b) Minimum	2.5
8	Shape	Circular
9	Resistance at 20 ºC (Ohm/Km, Max.)	7.41
10	Resistivity	0.01724
11	Constant Mass Temp. Co-efficient Of resistance For Copper – Per°C	0.0039
12	Annealing (Elongation in % , Min)	18.0 / 22.5
	Core Insulation	
13	Material	PVC, Type - A
14	Thickness Of PVC Core Insulation (mm)	
	a) Nominal	0.9
	b) Minimum	0.8
15	Application	By Extrusion
16	Volume resistivity at 20 ºC (Ohm-Cm)	1x10E13
17	Volume resistivity at 70 ºC (Ohm-Cm)	1x10E10
18	Tensile strength (N/mm2 , Min)	12.5
19	Elongation in %	150
20	Core Identification	
	Inner Sheath	
21	Material	PVC, Type - ST-1
22	Thickness (mm)	
	a) Nominal	0.35
	b) Minimum	0.3
23	Application	By Extrusion
24	Tensile strength (N/mm2 , Min)	12.5
25	Elongation in %	150
26	Dia. over inner sheath (mm)	
27	Colour	
	Armouring	

28	Material & Type	Galvanized Steel Strips
29	Size of Armour Strip [thickness (mm) X width (mm)]	
	a) Nominal	0.85 X 4
	b) Minimum	0.80 X 4
30	Resistance at 20 ºC (Ohm/Km, Max.)	5.54
31	Dia. over armour (mm)	
32	Tensile strength (N/mm2 , Min)	
33	Elongation in %	
34	% Coverage of armour (90%(Min)	
	Outer Sheath	
35	Material	PVC, Type - ST-1
36	Thickness (mm)	
	a) Nominal	1.5
	b) Minimum	1.4
37	Application	By Extrusion
38	Tensile strength (N/mm2 , Min)	12.5
39	Elongation in %	150
40	Colour	
41	Overall Diameter Of Cable (mm , Min)	
	General	
42	Continuous Current Rating (Amp)	
	a) In Ground	12
	b) In Duct	10
	c) In Air	10
43	Short time current rating for 1 Sec (KA)	0.288
44	Max. permissible conductor temperature ºC	
	a) Under continues full load	70
	b) Under transient condition	160
45	Rated DC Voltage (Volts)	220
46	Safe Pulling Force – Kg. / Sq. mm.	5
47	Minimum Radius Of Installation.	12 x Outer Dia. Of Cable.
48	Length Per Drum – Mtr.	
	a) Nominal	500
	b) Maximum	525
	c) Minimum	475
49	Weight Of Cable (Kg/ Km)	
50	Total weight including drum (Kg)	
51	Cable Drum	
	Material	
	Tare Weight	
52	Information stenciled on the drum	Yes
1	- Reference IS	

2	- Contract Award letter / order number	
3	- Manufacturer's Name, Brand Name or TM	
4	- Type of Cable & Voltage grade	
5	- Size of cable	27Cx2.5 Sq. mm
6	- Cable code	
7	- Length of Cable	
8	- Direction of rotation of drum	
9	- Drum No.	
10	- Running end of cable	
11	- Country of manufacturer	
12	- Year of Manufacture	
53	Embossing On Cable Every Running Meter	Yes
	a) GETCO	
	b) 1100 V	
	c) Trade Name & logo	
	d) Batch, Month, &Year Of Manufacture	
	e) Length – Mtrs.	

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber
Stamp / seal of the bidder: _____

(VII) 2CORE 4.0 SQMM.

SR.NO.	Description	Acceptable Design / data
1	Address of Works	
2	Voltage grade (Volts)	1100
3	Suitable for earthed or unearthed system	Both
	Conductor	
4	Material	Electrolytic Annealed Copper
5	Diameter of the conductor strand (mm)	
	a) Nominal	
	b) Minimum	0.86
6	No. of Strands Per Core	7
7	Cross Sectional Area (Sq.mm)	
	b) Minimum	4
8	Shape	Circular
9	Resistance at 20 ºC (Ohm/Km, Max.)	4.61
10	Resistivity	0.01724
11	Constant Mass Temp. Co-efficient Of resistance For Copper – Per°C	0.0039
12	Annealing (Elongation in % , Min)	18.0 / 22.5
	Core Insulation	
13	Material	PVC, Type - A
14	Thickness Of PVC Core Insulation (mm)	
	a) Nominal	1
	b) Minimum	0.9
15	Application	By Extrusion
16	Volume resistivity at 20 ºC (Ohm-Cm)	1x10E13
17	Volume resistivity at 70 ºC (Ohm-Cm)	1x10E10
18	Tensile strength (N/mm2 , Min)	12.5
19	Elongation in %	150
20	Core Identification	
	Inner Sheath	
21	Material	PVC, Type - ST-1
22	Thickness (mm)	
	a) Nominal	0.45
	b) Minimum	0.4
23	Application	By Extrusion /
24	Tensile strength (N/mm2 , Min)	12.5
25	Elongation in %	150
26	Dia. over inner sheath (mm)	
27	Colour	Black
	Armouring	

28	Material & Type	Galvanized Steel Round Wire
29	Diameter Of Armour Wire – mm.	
	a) Nominal	1.5
	b) Minimum	1.4
30	Resistance at 20 ºC (Ohm/Km, Max.)	5.54
31	Dia. over armour (mm)	
32	Tensile strength (N/mm2 , Min)	
33	Elongation in %	
34	% Coverage of armour (90%(Min)	
	Outer Sheath	
35	Material	PVC, Type - ST-1
36	Thickness (mm)	
	a) Nominal	1.3
	b) Minimum	1.24
37	Application	By Extrusion
38	Tensile strength (N/mm2 , Min)	12.5
39	Elongation in %	150
40	Colour	Black
41	Overall Diameter Of Cable (mm , Min)	
	General	
42	Continuous Current Rating (Amp)	
	a) In Ground	35
	b) In Duct	31
	c) In Air	31
43	Short time current rating for 1 Sec (KA)	0.46
44	Max. permissible conductor temperature ºC	
	a) Under continuous full load	70
	b) Under transient condition	160
45	Rated DC Voltage (Volts)	220
46	Safe Pulling Force – Kg. / Sq. mm.	5
47	Minimum Radius of Installation.	12 x Outer Dia. Of Cable.
48	Length Per Drum – Mtr.	
	a) Nominal	500
	b) Maximum	525
	c) Minimum	475
49	Weight Of Cable (Kg/ Km)	
50	Total weight including drum (Kg)	
51	**Cable Drum**	
	Material	
	Tare Weight	
52	**Information stenciled on the drum**	Yes
1	- Reference IS	
2	- Contract Award letter / order	

	number	
3	- Manufacturer's Name, Brand Name or TM	
4	- Type of Cable & Voltage grade	
5	- Size of cable	2Cx4 Sq. mm
6	- Cable code	
7	- Length of Cable	
8	- Direction of rotation of drum	
9	- Drum No.	
10	- Running end of cable	
11	- Country of manufacturer	
12	- Year of Manufacture	
53	**Embossing On Cable Every Running Meter**	Yes
	a) GETCO	
	b) 1100 V	
	c) Trade Name & logo	
	d) Batch, Month, &Year Of Manufacture	
	e) Length – Mtrs.	

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber
Stamp / seal of the bidder: _____

(VIII) 4CORE 4.0 SQMM.

SR.NO.	Description	Acceptable Design / data
1	Address of Works	
2	Voltage grade (Volts)	1100
3	Suitable for earthed or unearthed system	Both
	Conductor	
4	Material	Electrolytic Annealed Copper
5	Diameter of the conductor strand (mm)	
	a) Nominal	
	b) Minimum	0.86
6	No. of Strands Per Core	7
7	Cross Sectional Area (Sq.mm)	
	a) Minimum	4
8	Shape	Circular
9	Resistance at 20 ºC (Ohm/Km, Max.)	4.61
10	Resistivity	0.01724
11	Constant Mass Temp. Co-efficient Of resistance For Copper – Per°C	0.0039
12	Annealing (Elongation in % , Min)	18.0 / 22.5
	Core Insulation	
13	Material	PVC, Type - A
14	Thickness Of PVC Core Insulation (mm)	
	a) Nominal	1
	b) Minimum	0.9
15	Application	By Extrusion
16	Volume resistivity at 20 ºC (Ohm-Cm)	1x10E13
17	Volume resistivity at 70 ºC (Ohm-Cm)	1x10E10
18	Tensile strength (N/mm2 , Min)	12.5
19	Elongation in %	150
20	Core Identification	
	Inner Sheath	
21	Material	PVC, Type - ST-1
22	Thickness (mm)	
	a) Nominal	0.45
	b) Minimum	0.4
23	Application	By Extrusion
24	Tensile strength (N/mm2 , Min)	12.5
25	Elongation in %	150

26	Dia. over inner sheath (mm)	
27	Colour	Black
	Armouring	
28	Material & Type	Galvanised Steel Round Wire
29	Diameter Of Armour Wire – mm.	
	a) Nominal	1.5
	b) Minimum	1.4
30	Resistance at 20 ºC (Ohm/Km, Max.)	5.54
31	Dia. over armour (mm)	
32	Tensile strength (N/mm2 , Min)	
33	Elongation in %	
34	% Coverage of armour (90%(Min)	
	Outer Sheath	
35	Material	PVC, Type - ST-1
36	Thickness (mm)	
	a) Nominal	1.3
	b) Minimum	1.24
37	Application	By Extrusion
38	Tensile strength (N/mm2 , Min)	12.5
39	Elongation in %	150
40	Colour	Black
41	Overall Diameter Of Cable (mm , Min)	
	General	
42	Continuous Current Rating (Amp)	
	a) In Ground	36
	b) In Duct	30
	c) In Air	30
43	Short time current rating for 1 Sec (KA)	0.46
44	Max. permissible conductor temperature ºC	
	a) Under continuous full load	70
	b) Under transient condition	160
45	Rated DC Voltage (Volts)	220
46	Safe Pulling Force – Kg. / Sq. mm.	5
47	Minimum Radius of Installation.	12 x Outer Dia. Of Cable.
48	Length Per Drum – Mtr.	
	a) Nominal	500
	b) Maximum	525
	c) Minimum	475
49	Weight Of Cable (Kg/ Km)	
50	Total weight including drum (Kg)	
51	**Cable Drum**	
	Material	
	Tare Weight	

52	**Information stenciled on the drum**	Yes
1	- Reference IS	
2	- Contract Award letter / order number	
3	- Manufacturer's Name, Brand Name or TM	
4	- Type of Cable & Voltage grade	
5	- Size of cable	4Cx4 Sq. mm
6	- Cable code	
7	- Length of Cable	
8	- Direction of rotation of drum	
9	- Drum No.	
10	- Running end of cable	
11	- Country of manufacturer	
12	- Year of Manufacture	
53	**Embossing On Cable Every Running Meter**	Yes
	a) GETCO	
	b) 1100 V	
	c) Trade Name & logo	
	d) Batch, Month, &Year Of Manufacture	
	e) Length – Mtrs.	

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber
Stamp / seal of the bidder: _____

(IX) 12 CORE 4.0 SQMM.

SR.NO.	Description	Acceptable Design / data
1	Address of Works	
2	Voltage grade (Volts)	1100
3	Suitable for earthed or unearthed system	Both
	Conductor	
4	Material	Electrolytic Annealed Copper
5	Diameter of the conductor strand (mm)	
	a) Nominal	
	b) Minimum	0.86
6	No. of Strands Per Core	7
7	Cross Sectional Area (Sq.mm)	
	b) Minimum	4
8	Shape	Circular
9	Resistance at 20 ºC (Ohm/Km, Max.)	4.61
10	Resistivity	0.01724
11	Constant Mass Temp. Co-efficient Of resistance For Copper – Per°C	0.0039
12	Annealing (Elongation in % , Min)	18.0 / 22.5
	Core Insulation	
13	Material	PVC, Type - A
14	Thickness Of PVC Core Insulation (mm)	
	a) Nominal	1
	b) Minimum	0.9
15	Application	By Extrusion
16	Volume resistivity at 20 ºC (Ohm-Cm)	1x10E13
17	Volume resistivity at 70 ºC (Ohm-Cm)	1x10E10
18	Tensile strength (N/mm2 , Min)	12.5
19	Elongation in %	150
20	Core Identification	
	Inner Sheath	
21	Material	PVC, Type - ST-1
22	Thickness (mm)	
	a) Nominal	0.45
	b) Minimum	0.4
23	Application	By Extrusion
24	Tensile strength (N/mm2 , Min)	12.5
25	Elongation in %	150
26	Dia. over inner sheath (mm)	

27	Colour	Black
	Armouring	
28	Material & Type	Galvanized Steel strip
29	Diameter Of Armour Wire – mm.	
	a) Nominal	0.85 X 4
	b) Minimum	0.80 X 4
30	Resistance at 20 ºC (Ohm/Km, Max.)	5.54
31	Dia. over armour (mm)	
32	Tensile strength (N/mm2 , Min)	
33	Elongation in %	
34	% Coverage of armour (90%(Min)	
	Outer Sheath	
35	Material	PVC, Type - ST-1
36	Thickness (mm)	
	a) Nominal	1.5
	b) Minimum	1.4
37	Application	By Extrusion
38	Tensile strength (N/mm2 , Min)	12.5
39	Elongation in %	150
40	Colour	Black
41	Overall Diameter Of Cable (mm , Min)	
	General	
42	Continuous Current Rating (Amp)	
	a) In Ground	36
	b) In Duct	30
	c) In Air	30
43	Short time current rating for 1 Sec (KA)	0.46
44	Max. permissible conductor temperature ºC	
	a) Under continuous full load	70
	b) Under transient condition	160
45	Rated DC Voltage (Volts)	220
46	Safe Pulling Force – Kg. / Sq. mm.	5
47	Minimum Radius of Installation.	12 x Outer Dia. Of Cable.
48	Length Per Drum – Mtr.	
	a) Nominal	500
	b) Maximum	525
	c) Minimum	475
49	Weight Of Cable (Kg/ Km)	
50	Total weight including drum (Kg)	
51	**Cable Drum**	
	Material	
	Tare Weight	
52	**Information stenciled on the drum**	
1	- Reference IS	

2	- Contract Award letter / order number	
3	- Manufacturer's Name, Brand Name or TM	
4	- Type of Cable & Voltage grade	
5	- Size of cable	12Cx4 Sq. mm
6	- Cable code	
7	- Length of Cable	
8	- Direction of rotation of drum	
9	- Drum No.	
10	- Running end of cable	
11	- Country of manufacturer	
12	- Year of Manufacture	
53	**Embossing On Cable Every Running Meter**	
	a) GETCO	
	b) 1100 V	
	c) Trade Name & logo	
	d) Batch, Month, &Year Of Manufacture	
	e) Length – Mtrs.	

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber
Stamp / seal of the bidder: _____

Technical information and guaranteed technical particulars for supply of armoured L.T. PVC aluminum cable insulated with Yellow Colour Outer Sheathed Round Cable. The bidder must fill up all the point of GTP for offered item/s. Instead of indicating "refer drawing, or as per IS/IEC", the exact value/s must be filled in.

Sr. No.	Description	Confirmation
1	Cable shall be manufactured and supplied conforming to IS: 1554 (P-I) 1988 with latest amendment if any and GETCO's Specification.	
2.	Cable shall be ISI Marked.	
3.	ISI License shall be valid till completion of order	
4.	Colour of Outer Sheath - **"Yellow"**	
5.	Size : i) 3 ½ C x 25 mm^2	
	ii) 3 ½ C x 50 mm^2	
	iii) 3 ½ C x 70 mm^2	
	iv) 3 ½ C x 150 mm^2 or other size--	
6.	Shaped – Round	
7.	Standard length in case of 3 ½ C x 25 mm^2, 50 mm^2 and 70 mm^2 – 500 ± 0.5% mtrs.	
8.	Standard length in case of 3 ½ C x 150 mm^2 – 250 ± 0.5 % mtrs.	
9.a	Length measuring 100 mtrs. To 497 mtrs. Shall be considered non-standard length and is acceptable upto 3% ordered quantity (For 3 ½ C x 25 mm^2, 50 mm^2, and 70 mm^2)	
9.b	Length measuring 100 mtrs. To 248 mtrs. Shall be considered non-standard length and is acceptable upto 3% ordered quantity (For 3 ½ C x 150 mm^2 size).	
10.	Packing shall contain only one length.	
11	Packing material Wooden drum as per IS: 10418 / 1982 duly painted as per Cl. No. VI (iii) of Tender Specification.	
12	Following shall be embossed on every meter length of Cable. (a) GETCO, 1100 Volts (b) Trade Mark (c) Electric (d) Year of Manufacture (e) IS Number	
13	The ends of the cable shall be sealed by means of non-hygroscopic sealing material.	
14	(a) Conductor – Aluminium Sector shape. (b) Class – 2, H4 Grade.	

15	PVC Insulation type – A as per IS – 5831/1984			
16	Volume resistivity of Insulation: (a) At 27°C – 1 x 10^{13} Ohm – Cm (min) (b) At 70°C – 1 x 10^{10} Ohm – Cm (min)			
Sr. No.	Particulars			Confirmation
17	Maximum Conductor Resistance at 20°C (a) For 25 mm^2 – Main Core – 1.20 Ohm/km. – Neutral Core – 1.91 Ohm/Km. (b) For 50 mm^2 – Main Core – 0.641 Ohm/Km Neutral Core – 1.20 Ohm/Km (c) For 70 mm^2 – Main Core – 0.443 Ohm/Km Neutral Core – 0.868 Ohm/Km (d) For150 mm^2 – Main Core – 0.206 Ohm/Km Neutral Core – 0.443 Ohm/Km (e) other- quote standard and declared value			
18	Minimum thickness of Insulation:			
		Average	Minimum	
a)	3 ½ C x 25 mm^2			
	Main Core	1.20 mm	0.98 mm	
	Neutral Core	1.00 mm	0.80 mm	
b)	3 ½ C x 50 mm^2			
	Main Core	1.40 mm	1.16 mm	
	Neutral Core	1.20 mm	0.98 mm	
c)	3 ½ C x 70 mm^2			
	Main Core	1.40 mm	1.16 mm	
	Neutral Core	1.20 mm	0.98 mm	
d)	3 ½ C x 150 mm^2			
	Main Core	1.80 mm	1.52 mm	
	Neutral Core	1.40 mm	1.16 mm	
e)	3 ½ C x other size quote standard and declared values			
	Main Core/Neutral core			
19	Minimum Thickness of Inner Sheath (a) For 25 mm^2 – 0.3 mm (b) For 50 mm^2 – 0.3 mm (c) For 70 mm^2 – 0.4 mm (d) For 150 mm^2 – 0.5 mm (e) For other size quote standard and declared value			
20	PVC Outer Sheath type “ST-1” as per IS: 5831/84.			
21	Minimum Thickness of Outer Sheath :			
		Average	Minimum	
	3 ½ C x 25 mm^2	2.00 mm	1.40 mm	
	3 ½ C x 50 mm^2	2.20 mm	1.56 mm	
	3 ½ C x 70 mm^2	2.20 mm	1.56 mm	
	3 ½ C x 150 mm^2	2.40 mm	1.72 mm	
	For other size quote standard and declared value			

22	Tensile Strength of Insulation and Sheath 12.5 N/mm^2 (Min.)	
23	Elongation at break of Insulation and Sheath – 150 % (Min.)	
24	% Coverage of armour (90%(Min)	

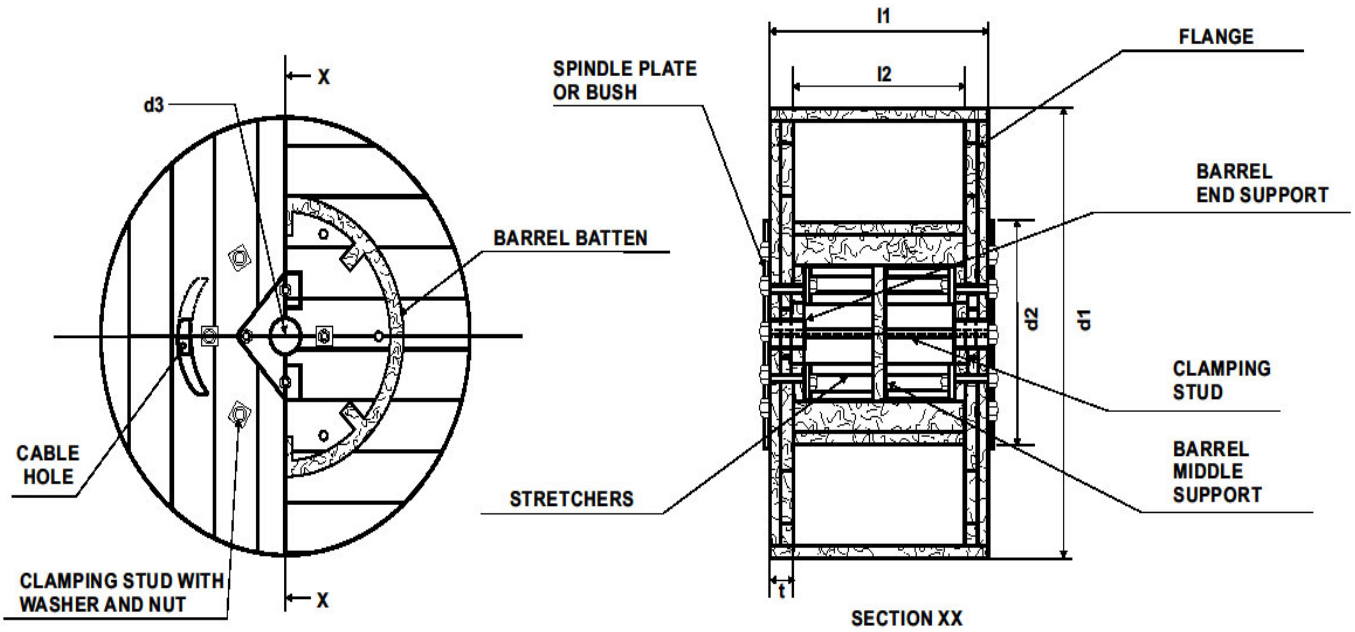
Note: For the cable of all other sizes (if scope permits) such particulars shall be submitted in separate sheet.

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber
Stamp / seal of the bidder: _____

ANNEXURE-II

Wooden Drum:



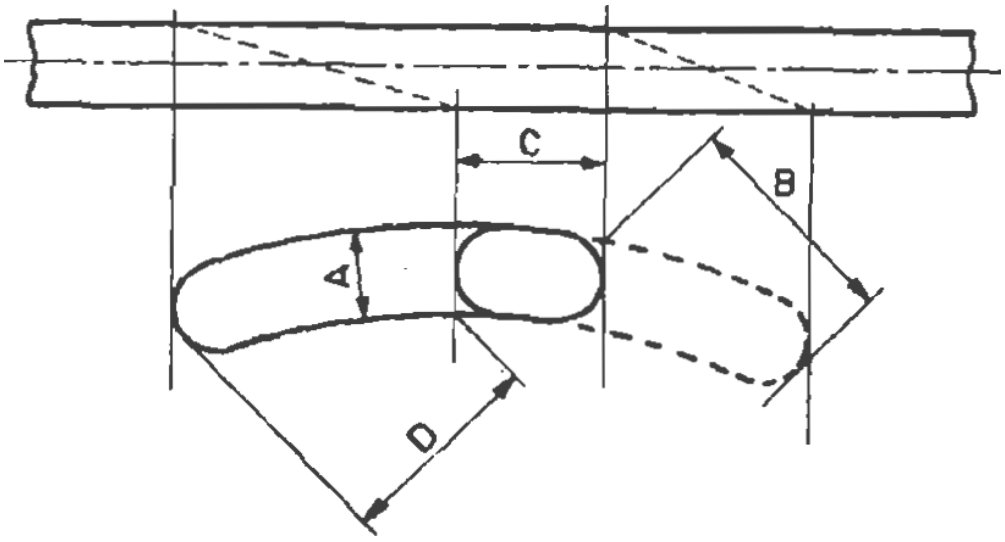
l1 = Overall Width
l2 = Traverse
d1 = Flange Diameter
d2 = Barrel diameter
d3 = Centre hole diameter
t = Flange thickness

1A Drum Having 2 - Full Ply Plus Flange Construction

Details shall be furnished:

Cable Size	
Weight of Cable(Kg/Km)	
Weight of Cable(Kg per 500mtr/250mtr(Power Cable)	
Cable Drum Tare Weight (Kg)	
Total weight including drum (Kg)	
Drum Size (As per IS: 10418: Table 1 (Clause 5.1))	
d1 (Flange Diameter)	
d2 (Barrel Diameter)	
d3 (Centre Hole Diameter)	
F (Outer Lagging Thickness)	
t (Flange Thickness)	
K (Cable Hole Diameter)	
l1 (Overall width)	
l2 (Traverse)	
Number & Diameter of tie Rod	

Details of Cable Hole



Drum Size	A	B	C	D
Up to and including 0 905	40	120	45	160
Above 0 905 up to and including 1 608	65	190	70	260
Above 1 608 up to including 2 012	90	270	95	360

General Notes to successful Bidder:

1. t (Flange thickness) Shall be as Per GETCO Technical Specification R2 Clause 11.16.
2. Each drum shall have the following information stenciled on it in indelible ink along with other essential data:
   a) Contract award letter / order number, b) Name and address of consignee, c) Manufacturer name and address, d) Drum Number, e) Size of cable, f) Length of cables in meters, g) Gross weight of drum with cable, h) Weight of empty drum with lagging, i) Arrow marking for unwinding.
3. Drum Size, Flange Diameter, Barrel Diameter, Centre Hole Diameter, Overall width, Traverse Dimensions shall be as per Table 1 (Clause 5.1) IS: 10418 with latest amendments.
4. Only one length of control / power cable shall be wound on each drum.
5. Flange shall be minimum 2 ply of higher construction with tolerance of thickness +3 mm only. Drum Flange Diameter, Flange Thickness, Barrel Diameter, Overall width, Traverse and Centre Hole Diameter Tolerance shall be as per IS: 10418 with latest amendments.
6. Complete drum including inner cheek of flanges & drum barrel surface to be painted with bitumen based paint.
7. The cable ends shall be properly sealed as per GETCO technical specifications Clause. 11.14 and Packaging List as per Clause. 11.18.

Signature of the Bidder: _____
Name : _____
Designation: _____
Date: _____

Authorised common rubber
Stamp / seal of the bidder: _____