		Track resistant sealant tape Heat shrinkable track resistant rain skirts 3-Core Breakout boot Support insulator

7.4.8.4 Straight-through joint box for 33KV XLPE, 1Cx95 mm² Copper cable

Item	Description of Items	Particulars
i	Application	For 33KV, XLPE, 1Cx95 mm² Copper Conductors
ii	Installation	For underground horizontal mounting
iii	System	33KV, effectively earthed system
iv	Cable conductor	95 mm² 1-Core Copper Conductors
v	Construction	The joint shall be proof against ingress of moisture and water
vi	Kit content	Compression ferrules / mechanical connectors Void filling tape Heat shrinkable stress control tubing Track resistant sealant tape Heat shrinkable dual wall/elastomeric tubes Armor continuity kit & roll springs 3-Core breakout boots Heat shrinkable outer jacket tube Cable preparation kit

7.4.8.5 Information Required

The Bidder/ Manufacturer as per tender requirements shall provide all information for 33KV Power Cable.

Besides these, the following information has to be submitted:

- Manufacturer's Printed Catalogue describing specification and technical data
- Outline and General Arrangement drawings.
- The Bidder/ Manufacturer shall submit the list of available testing/ measuring equipment, meters, etc., along with valid Calibration Certificate(s) from competent authority used in manufacturer's laboratory for performing Routine Test as per IEC standard.
- Manufacturer's ISO 9001 Certificate.

7.4.8.6 Documentation

The following Documents, shall be submitted with the Tender for the offered type 33KV Cables, otherwise the bid will be rejected:-

a) Letter of authorization from the Manufacturers (in case, the bidder is not the manufacturer), in prescribed Form.

b) Manufacturer's supply record for at least 3 years within the last 7 years specifically mentioning purchaser's name, address, telephone number, fax number, contract number with date, supply quantity with ratings, date of commencement & completion of supply, in format below. Supply record will be equipped with the same offered type 33KV Cable.

Sl. No.	Name, Address, Phone & Fax No. of the Consumer	Contract No. & Date	Contract Value	Description of Materials with	Date of completion

				Quantity	of supply

d) Satisfactory Performance certificates (SPC) issued within the last 7 years from at least 2 End users depicting that the offered type equipment or higher Ampere rating of same voltage class, has been in service for at least 3 years.

e) Submission of Type Test Reports as stated in per relevant IEC from recognized independent laboratories.

7.4.8.7 **APPROVAL OF DRAWINGS**

Design, Drawing diagrams, Manufacturer's printed catalogue, Specification and Technical Particulars & Guarantees etc of 33 KV cables shall be submitted to the Engineer, Project Director, GPESDP, WZPDCL by the Bidder for approval, prior to the manufacturing of the goods. The Tenderer shall have to submit 3 (three) sets of the same for approval within 30 (thirty) days from the date of signing Contract. The submittal shall include detail design Calculation.

No work shall be performed in connection with the fabrication and manufacture of the Testing Equipment until the technical data and drawings have been approved. The cost of supplying drawings and specifications shall be borne by the supplier.

At the time of delivery of Equipment, the supplier shall supply three (5) sets of all approved technical data and drawings in bound book form along with manufacturer's original catalogue of the Equipment to the office of Project Director, Grid Power Evacuation System Development Project (GPESFDP), WZPDCL, Khulna, Bangladesh. WZPDCL will approve the submitted design and drawings within 15 days from the date of submission if the submitted design and drawings meets the technical specification and GTP.

7.4.9 LV Cables

7.4.9.1 4x150 mm^2 PVC Copper Cable

GENERAL SPECIFICATIONS:

These single core cables shall be designed as per above standards and suitable for operation at a maximum voltage of 1000V line to line and suitable for use underground buried in earth or in ducts and above ground in air or in buildings under local ambient conditions.

The maximum acceptable length of cable on a drum shall be 500M and shall be supplied on standard non-returnable treated wooden drum, each drum having stenciled on each side: drum number, code name of conductor, drum wound length together with gross and net weight, the manufacturer name, the purchaser's name and contract number with date. The cover of the drum should be of same treated wood.

Cable construction shall be as per BS 6004:1994 or equivalent to any internationally acceptable standard. Conductors shall be circular plain annealed copper in accordance with IEC 60228. Thickness of insulation shall be in accordance with IEC 502-1. The over sheath shall be an external layer of black PVC.

A means of identifying the cable size and WZPDCL ownership shall be inscribed throughout the length of the Cable in a single line on the PVC Insulation. The letters shall be upright block characters embossed on the surface; they are being not more than 300 mm between each group. The manufacturer's name with year of manufacture and Progressive Meter Marking shall be provided throughout the length of the cable.

Drum wound length of each drum may vary up to ± 5% of the total drum length as tolerance. However, the sum of total drum length shall be as per ordered quantity. Only one short length of conductor on a drum is considered for acceptance, if necessary. For the other requirements, the given data shall be considered as minimum and maximum where necessary. No negative tolerances for the diameter and thickness are acceptable.

Description	Unit	Requirements
Cable Size	mm^2	4CX150
Material		PVC Insulated plain annealed copper.
Numbers & Diameter of wires	No/mm	19/2.52
Maximum resistance at 30 °C	Ω/KM	0.1964
Nominal thickness of insulation	Mm	1.6
Nominal thickness of sheath	Mm	1.8
Colour of sheath		Black
Approximate outer diameter	Mm	19.4
Approximate weight	Kg/KM	1129
Continuous permissible service voltage	V	600/1000
Current rating at 30 °C ambient temperature U/G	Amps	270
Current rating at 35 °C ambient in air	Amps	300

FEATURES AND ACCESSORIES:

- Conductors shall be delivered on standard non-returnable strong wooden drum. The central hole of the drum shall be reinforced to fit on axle size 95 mm diameter. The interior of the conductor drum shall be lined with bituminous paper to prevent the conductor from being in contact with timber or Aluminium water proof paper and felt lining shall overlap at seams by at least 20 mm and the seams shall be sealed.
- Drum shall be adequately protected by securely fastening substantial wooden battens around the periphery. These battens shall be secured by means of hoop metal bindings. Conductor drum shall be treated in an approved manner to resist termite and fungus attacks and shall be suitable for outside storage for a minimum period of 3 years in an equatorial climate with out undue deterioration.
- The PVC covering shall be complete with PVC/A for Insulation and PVC-ST2 for Sheath as per requirement of IEC60502-1.
- There shall be only one length of conductor on a drum.
- Treated wooden drum standard: AWPA C_1 - 82, C_2 -83, C_{16} -82, P_5 -83.

7.4.9.2 95 mm^2 PVC Copper Cable

GENERAL SPECIFICATIONS

These single core cables shall be designed as per above standards and suitable for operation at a maximum voltage of 1000V line to line and suitable for use underground buried in earth or in ducts and above ground in air or in buildings under local ambient conditions.

The maximum acceptable length of cable on a drum shall be 500M and shall be supplied on standard non-returnable treated wooden drum, each drum having stenciled on each side: drum number, code name of conductor, drum wound length together with gross and net weight, the manufacturer name, the purchaser's name and contract number with date. The cover of the drum should be of same treated wood.

Cable construction shall be as per BS 6004:1994 or equivalent to any internationally acceptable standard. Conductors shall be circular plain annealed copper in accordance with IEC 60228. Thickness of insulation shall be in accordance with IEC 502-1. The over sheath shall be an external layer of black PVC.

A means of identifying the cable size and WZPDCL ownership shall be inscribed throughout the length of the Cable in a single line on the PVC Insulation. The letters shall be upright block characters embossed on the surface; they are being not more than 300 mm between each group. The manufacturer's name with year of manufacture and Progressive Meter Marking shall be provided throughout the length of the cable.

Drum wound length of each drum may vary up to ± 5% of the total drum length as tolerance. However, the sum of total drum length shall be as per ordered quantity. Only one short length of conductor on a drum is considered for acceptance, if necessary. For the other requirements, the given data shall be considered as minimum and maximum where necessary. No negative tolerances for the diameter and thickness are acceptable.

Description	Unit	Requirements
Cable Size	mm^2	1CX95
Material		PVC Insulated plain annealed copper.
Numbers & Diameter of wires	No/mm	19/2.52
Maximum resistance at 30 °C	Ω/KM	0.1964
Nominal thickness of insulation	Mm	1.6
Nominal thickness of sheath	Mm	1.8
Co lour of sheath		Black
Approximate outer diameter	Mm	19.4

Description	Unit	Requirements
Approximate weight	Kg/KM	1129
Continuous permissible service voltage	V	600/1000
Current rating at 30 °C ambient temperature U/G	Amps	270
Current rating at 35 °C ambient in air	Amps	300

FEATURES AND ACCESSORIES:

- Conductors shall be delivered on standard non-returnable strong wooden drum. The central hole of the drum shall be reinforced to fit on axle size 95 mm diameter. The interior of the conductor drum shall be lined with bituminous paper to prevent the conductor from being in contact with timber or Aluminum water proof paper and felt lining shall overlap at seams by at least 20 mm and the seams shall be sealed.
- Drum shall be adequately protected by securely fastening substantial wooden battens around the periphery. These battens shall be secured by means of hoop metal bindings. Conductor drum shall be treated in an approved manner to resist termite and fungus attacks and shall be suitable for outside storage for a minimum period of 3 years in an equatorial climate without undue deterioration.
- The PVC covering shall be complete with PVC/A for Insulation and PVC-ST2 for Sheath as per requirement of IEC60502-1.
- There shall be only one length of conductor on a drum.
- Treated wooden drum standard: AWPA C_1 - 82, C_2 -83, C_{16} -82, P_5 -83.

APPROVAL OF DRAWINGS

Design, Drawing diagrams, Specification and Technical Particulars & Guarantees etc of ACSR Conductor shall be submitted to the Project, Director, Grid Power Evacuation System Development Project (GPESDP), WZPDCL by the Bidder for approval, prior to the manufacturing of the goods. The Tenderer shall have to submit 3 (three) sets of the same for approval within 30 (thirty) days from the date of signing Contract. The submittal shall include details Calculation.

No work shall be performed in connection with the fabrication and manufacture of the Testing Equipment until the technical data and drawings have been approved.

The cost of supplying drawings and specifications shall be borne by the supplier.

At the time of delivery of Equipment, the supplier shall supply three (3) sets of all approved technical data and drawings in bound book form along with manufacturer's original catalogue of the Equipment to the office of the Project Director, Grid Power Evacuation System Development Project (GPESDP), WZPDCL. WZPDCL will approve the submitted design and drawings within 15 days from the date of submission if the submitted design and drawings meets the technical specification and GTP.

SECTION 7.5

TOOLS AND ACCESSORIES

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SECTION 7.5: TOOLS AND ACCESSORIES

7.5.1Technical Specifications of Gas Filling Device for GIS:

7.5.1.1 Purpose

The purpose of the device is for evacuating air/gas from the gas chamber for GIS busbar and breakers and refilling it.

7.5.1.2 Requirements-

- Mobile as cylinder cart.
- Vacuum pressure from 0 to 1200 mbar
- It shall have vacuum and filling pressure gauges.
- Should be an Approved brand from GIS manufacturer's.

7.5.1.3 Accessories

- All required connection accessories shall be supplied with the test sets.
- Instruction manual in English shall be provided

7.5.2INFORMATION REQUIRED:

The Bidder/ Manufacturer as per tender requirements shall provide all information. Besides these, the following information has to be submitted:

a) Manufacturer's Printed Catalogue describing specification and technical data for offered items.

b) Detail description of testing facilities (Routine & Type Test) at manufacturer's plant.

c) Manufacturer's valid ISO 9001 Certificate.

7.5.3APPROVAL OF DRAWINGS

Design, Drawing diagrams, Manufacturer's printed catalogue(s), Specification and Technical Particulars & Guarantees etc of testing equipment and tools shall be submitted to the Engineer, Project Director, Grid Power Evacuation System Development Project (GPESDP), WZPDCL by the Bidder for approval, prior to the manufacturing of the goods. The Tenderer shall have to submit 3 (three) sets of the same for approval within 30 (thirty) days from the date of signing Contract.

No work shall be performed in connection with the fabrication and manufacture of the Testing Equipment until the technical data and drawings have been approved.

The cost of supplying drawings and specifications shall be borne by the supplier.

At the time of delivery of Equipment, the supplier shall supply three (3) sets of all approved technical data and drawings in bound book form along with manufacturer's original catalogue of the Equipment to the office of Project Director, Grid Power Evacuation System Development Project (GPESFDP), WZPDCL, Khulna. WZPDCL will approve the submitted design and drawings within 30 days from the date of submission if the submitted design and drawings meets the technical specification and GTP.

SECTION 7.6

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7.6 SUPPLEMENTARY INFORMATION

7.6.1 Project Requirement

7.6.1.1 Restricted Working Period

The Contractor shall obtain reliable information concerning the conditions appertaining to the working areas covered by this Contract and shall plan his work in accordance with local conditions

7.6.2 System Electrical Parameters

7.6.2.1 33 kV Transmission System

Normal Service Voltage	...	33	kV
Rated Voltage	...	36	kV
Impulse Voltage Withstand Level	...	170	kV
Number of Phase	...	3	
Frequency	...	50	Hz
Switchgear Symmetrical Breaking Capacity	...	31.5	kA, 3 sec

The 33 kV system is solidly earthed at some of the 132/33 kV Grid substations and resistance earthed at some of the Grid substations.

At the Proposed 132/33 kV sub-station the 33 kV systems will be resistance earthed.

7.6.2.2 Low Voltage AC System

Normal Service Voltage	...	400/230	volts
Rated Voltage	...	415/240	volts
Number of Phase	...	3 phase 4 wire	
Frequency	...	50	Hz
Switchgear Symmetrical Breaking Capacity	...	22	kA, 3 sec
System earthing	...	Solid	

7.6.2.3 D.C System

For D.C. motor driven auxiliaries, tripping, indicating lamps and controls.

Normal battery voltage	...	110V nominal for new sub-stations.
Tolerance on rated voltage	...	+ 10%, -15%
Voltage at various existing sites		30V, 48V, 110V, 220V, 250V.

For Supervisory and Telecommunications

Nominal System Voltage	...	48V
Normal float charge voltage	...	53V
Tolerance on rated voltage	...	+1V, -7V

Climatic Conditions

All plant and equipment supplied under the Contract shall be entirely suitable for the climatic conditions prevailing at site.

The area is close to sea level and is in a tropical climate. The ambient temperature variation is between 5°C and 40°C with periods of high humidity.

The area is designated a zone of moderate intensity for earthquakes.

The seismic factor is 0.15 g.

Atmospheric pollution is mid level and special insulator design or washing is not required. The area is subject to high winds of typhoon strength.

Maximum ambient shade temperature	...	40°C
Minimum ambient shade temperature	...	5°C
Maximum daily average temperature	...	35°C
Maximum annual average temperature	...	25°C
Maximum wind velocity (3 second gust)	...	160 Km/h
Minimum wind velocity for line rating purposes	...	1.6/3.2 Km/h (33/132kV)
Solar radiation	...	100mW/sq. cm
Rainfall	...	2.5 m/annum
Relative humidity, maximum	...	100%
average	...	80%
Altitude	...	less than 150m
(No ice or snow expected)		
Atmospheric Pollution	...	mid level
Soil type	...	alluvial
Soil temperature (at 1.1m)	...	30°C
Soil thermal resistivity	...	1.5°C m/w
Isokeraunic Level (Thunderstorm days)	...	80

The information in this Clause is given solely for the general assistance of Bidders and no responsibility for it will be accepted nor will any claims based on this Clause be considered.

Facilities and Transport to Site

Chittagong is the principal port of entry for material to Bangladesh. Inland transport from Chittagong to Dhaka area can be by barge, rail or road; barge and rail being the more usual methods employed.

The Contractor is responsible for performing all unloading, inland transportation and obtaining all approvals and consents etc. necessary for the movement of plant (substation) and contractor's equipment from the port to the site.

All necessary access roads, jetties or off-loading points etc. required for the transport of the plant etc. to site will be the Contractors responsibility.

Where heavy loads are to be moved the Contractor shall be responsible for performing surveys of the routes to ensure that all portions have adequate load-bearing capacity.

A comprehensive method statement shall be submitted to the Engineer detailing the proposed transport route(s) and requirements. Plans indicating all bridges, ducts, culverts, railway crossings, overhead lines, water mains etc. their load bearing capacity or clearances as appropriate shall be given together with proposed means of achieving the transportation requirements. Any reinforcement, strengthening, modifications or temporary works required to obtain the necessary capacity shall be the responsibility of the Contractor. The cost of the above is to be included in the Bid price.

No plant is to be consigned to Bangladesh by airfreight without the prior written approval of the Employer.

7.6.3 Documentation and Customs Duty

7.6.3.1 Documentation

In order for the Employer to obtain the necessary import permits and satisfy the requirements of the customs authorities the following documentation is required.

Within 60 days of the award the Contract the Contractor shall submit a detailed schedule of Plant he is to provide under the contract indicating the type of equipment and the name of the manufacturer. Six copies of the schedule are to be submitted to the Engineer.

On shipment of plant the following distribution of documentation is required as below:

(a) To the Project Director, Grid Power Evacuation System Development Project (GPESDP), WZPDCL, Khulna.

- 7 Copies of Commercial Invoices- Endorsed by the Contractor
- 1 Negotiable plus 6 copies of Bill of Lading-Endorsed by the Contractor.
- 7 Copies of Insurance Certification
- 7 Copies of packing lists
- 7 Copies of Freight Account
- 7 Original plus 6 copies of Certificate of origin
- 7 Copies of Insurance Invoice
- 7 Copies of Application for Payment

Exemption of Customs Duty

All Plant and Contractor Equipment imported to Bangladesh by the Contractor will be subject to Bangladesh import and customs duties.

The Contractor shall be responsible for and bear the cost of the payment of all duties and obtaining all permits and licenses for contractors Equipment. Should any plant be transported by air-freight without the prior written approval of the Employer the Contractor shall be responsible for, and bear the cost of all import and customs duties, etc. for the airfreight consignment. It is the Contractor's responsibility to ensure that all negotiable shipping documentation and all necessary import information is forwarded to the Employer so that it is received by him in Bangladesh at least 20 days before arrival of the ship in the Bangladesh port. Demurrage and any other charges resulting from the lack of documents or incorrect documentation received in Bangladesh shall be on the Contractor's account.

Shipping Schedule

After factory material orders are placed the Contractor shall forward to the Engineer a shipping schedule and this schedule shall be continually updated in line with the current manufacturing and shipping programmers and shows planned and actual progress.

7.6.4 Standards and Code Not Specified

Where not specified, IEC Standard and Bangladesh National Code (BNBC) shall be applicable

7.6.5 Units of Measurement

In all correspondence, in all technical schedules, on all drawings and for all instrument scales, S.I. units of measurement are to be employed. Angular measurement shall be in degrees with 90 degrees forming a right angle.

7.6.6 Erection and Checking at Site

As each part of the Works is erected the Contractor shall seek the Employers approval that the works have been constructed in accordance with the specification and approved drawings.

For purposes of progress payments for site work a monthly and cumulative system of joint measurement of work done for each Section of Work shall be set up by the Contractor in a manner approved by the Employer.

Any works constructed prior to the issue of drawings approved by the Employer for the particular works may not be included in the percentage completion figures.

The Contractor is to provide such protection and watchmen as he may consider necessary to safeguard his materials and stores. The Employer will not accept responsibilities for any loss or damage, which may occur during the execution of the contract.

The carrying out of all the work included in the Contract shall be supervised by a sufficient number of qualified representatives of the Contractor, and full facilities and assistance shall be provided to the Employer to check the Works. The Contractor shall obtain from the Employer details of the works that he proposes to inspect, but such inspection shall in no way exonerate the Contractor from any of his obligations. The Contractor, if required by the Employer, shall open for inspection before erection any equipment, which has been delivered to the site partly assembled.

On completion of the Works the Site shall be left clean and tidy to the satisfaction of the Employer. Any damage done to buildings, structures, plant or property belonging to the Employer shall be made good at the Contractor's expense.

The Contractor shall ensure the correctness of electrical and mechanical connections to all equipment supplied under the Contract before such equipment is commissioned.

During erection and commissioning the Contractor shall provide all temporary scaffolding, ladders, platforms with toe boards and hand-rails essential for proper access of workmen and inspectors, cover or rail off dangerous opening or holes in floors, and afford adequate protection against materials falling from a higher level on a person below.

The maximum personal safety must be afforded to personnel either directly engaged on this Contract or who in the normal course of their occupations find it necessary to utilize temporary works erected by the Contractor or to frequent the working area.

In each and every case involving a connection between the Plant supplied under this Contract and any other existing plant which may or may not be in service, the Contractor must make suitable arrangements as regards the time and manner in which the connection is made subject to the approval of Employer's Representative who is in charge of the existing plant. Where cases arise involving the operation of the plant or work on plant in operation or whenever required

by the Employer's Representative, the Contractor must obtain a written "Permit to Work" signed by a person duly authorized by the Employer.

7.6.7 Contractor's Responsibilities

7.6.7.1 Planning of Works

Within 30 days after acceptance of the Bid, the Contractor shall prepare, in an agreed form, a detailed Manufacture, Delivery and Erection Program Chart for the complete Contract Works, and shall submit the chart to the Employer for approval.

The Manufacture, Delivery and Erection Program Chart shall indicate for each major item of the Contract the various phases of work from the commencement of the Contract to its completion, e.g., design, ordering of materials, manufacture, delivery, installation and commissioning. The program shall include a fully comprehensive drawings production program which shall demonstrate the Contractors intended issue dates for approval.

These presentations shall be in bar chart and precedence critical path analysis format.

The program shall indicate percentage completion points of the various phases which can form the basis of progress reporting.

A cash-flow forecast of the estimated monthly invoice values shall be included in the program. This forecast shall take into account the terms of payment and indicate down-payments, release of retention's, etc. Figures may be rounded to the nearest thousands of the appropriate currency.

The Contractor shall indicate in the program the number, grade and discipline of supervisory and managerial site staff proposed throughout the site construction periods. If specialist erection and commissioning staff are to be employed by the Contractor details of the number, discipline and duration of visit of these staff are to be indicated in the program. The provision of this information will not form any contractual limit on the number of staff to be provided by the Contractor to ensure the timely completion of the contract. Should any incident occur which, in the opinion of the Contractor will result in an over-run of any section of the Works this shall be indicated in the program and brought to the Employers attention.

If, at any time during the execution of the Contract, it is found necessary to modify the approved Manufacture, Delivery and Erection program Chart, the Contractor shall inform the Employer and submit a modified chart for his approval. The submission, and subsequent approval, of a modified Manufacture, Delivery and Erection program Chart shall not necessarily obviate or diminish the Contractor's responsibilities and liabilities under the Contract. The Chart shall be updated at monthly intervals and submitted to the Employer no later than the middle of each calendar month.

7.6.7.2 Progress Reports and Meetings

At monthly intervals after approval of the Plant Manufacture, Delivery and Erection Program Chart, the Contractor shall submit to the Employer updated bar chart programs and precedence critical path analysis networks in triplicate in an approved format indicating the stage reached in the design, ordering of material, manufacture, delivery and erection of all components of plant. In addition the Contractor will compile and submit "S-curves" based upon the approved program indicating programmed and actual percentage completion of the various stages of drawing approval, manufacture, shipping, civil works and erection for each section of the works plus the overall contract.