

# POWER GRID BANGLADESH PLC



## Tender Documents For Procurement of

**Power Transmission Strengthening and Integration of  
Renewable Energy Project (PTSIREP)**

**Design, Supply, Installation, Testing & Commissioning of  
400/230/132 kV AIS Substation at Pekua and associated  
single /double circuit 400kV/230kV/132 kV LILO Lines on  
turnkey basis (Package-1)**

**Volume 3 of 3 [Transmission Line Part]**

**Invitation for Tenders No.** : 27.21.0000.101.07.425.24.6193, dated 3<sup>rd</sup> December, 2024  
**OCB No.** : POWERGRID/ADB/400kV/PEKUA/PTSIREP/PACKAGE-1/Re-Tender  
**Country** : Peoples Republic of Bangladesh

**Employer:**



Power Grid Bangladesh PLC  
Grid Bhaban, Avenue-03, Jahurul Islam City  
Aftabnagar, Badda, Dhaka-1212, Bangladesh

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# **Schedule A: Introduction and Preamble to the Price and Technical Schedules**

## **1. Scope of Works and General Information**

Please refer to the volume 2 of 3 of the tender documents.

### **Annex 1-1: Scope and Extent of Definite Works**

Please refer to the volume 2 of 3 of the tender documents.

### **Annex 1-2: Terminal Points**

Please refer to the volume 2 of 3 of the tender documents.

# Schedule B: Tender Prices & Schedules

## 1. General

1. The Price Schedules are divided as follows:

Schedule No. 1:	Plant and Mandatory Spare Parts Supplied from Abroad
Schedule No. 2:	Plant and Mandatory Spare Parts Supplied from within the Employer's Country
Schedule No. 3:	Design Services
Schedule No. 4:	Installation and Other Services
Schedule No. 5:	Grand Summary
Schedule No. 6:	Recommended Spare Parts

2. The Schedules do not generally give a full description of the plant to be supplied and the services to be performed under each item. Tenderers shall be deemed to have read the Employer's Requirements and other sections of the Tender document and reviewed the Drawings to ascertain the full scope of the requirements included in each item prior to filling in the rates and prices. The entered rates and prices shall be deemed to cover the full scope as previously mentioned, including overheads and profit.

3. If Tenderers are unclear or uncertain as to the scope of any item, they shall seek clarification in accordance with ITB 7 prior to submitting their tender.

## 2. Pricing

1. The units and rates in figures entered into the price schedules should be type written or if written by hand, must be in print form. Price schedules not presented accordingly may be considered nonresponsive. Any alterations necessary due to errors, etc., shall be initialed by the Tenderer.

As specified in the tender data sheet and special conditions of contract, prices shall be fixed and firm for the duration of the contract, or prices shall be subject to adjustment in accordance with the corresponding appendix (price adjustment) to the contract agreement.

2. Tender prices shall be quoted in the manner indicated and in the currencies specified in the Instructions to Tenderers in the tender document.

For each item, Tenderers shall complete each appropriate column in the respective schedules, giving the price breakdown as indicated in the schedules.

Prices given in the schedules against each item shall be for the scope covered by that item as detailed in Volume II (Employer's Requirements) or elsewhere in the tender document.

3. Payments will be made to the Contractor in the currency or currencies indicated under each respective item.

4. When requested by the Employer for the purposes of making payments or part payments, valuing variations or evaluating claims, or for such other purposes as the Employer may

reasonably require, the Contractor shall provide the Employer with a breakdown of any composite or lump sum items included in the schedules.

### 3. Schedules of Rates and Prices

Schedule No. 1:	Plant and Mandatory Spare Parts Supplied from Abroad
Schedule No. 2:	Plant and Mandatory Spare Parts Supplied from within the Employer's Country
Schedule No. 3:	Design Services
Schedule No. 4:	Installation and Other Services
Schedule No. 5:	Grand Summary
Schedule No. 6:	Recommended Spare Parts

Please see the separate EXCEL file for the above.

The Tenderer shall fill, sign and stamp the attached price schedules and shall attach them to the tender.

**(Price schedules are attached at the end of this document.)**

## Schedule C: Bar Chart Program of Key Activities- Delivery & Completion Time Schedule

The Tenderer shall fill, sign and stamp the attached time schedule and shall attach it to the tender.

Time for completion of the whole facilities **is 900 (Nine Hundred) days** from the effective date as described in Section 8 - Special Conditions of Contract, Sub-Clause 8.2.

The Tenderer shall provide

- filled general time schedule, provided below and as Appendix 4 to the Section 9: Contract Forms,
- a detailed proposal for mobilization schedule, Section 4: Tendering forms, item 5.3. and
- a detailed proposal for the construction schedule, Section 4: Tendering forms, item 5.4.

Please find the time schedule attached.

**Time Schedule (Show Activity in Bar Chart for 30 months.)**

Work under this contract shall be completed within 24 (twenty-four) months from contract effective date.

[illegible]



## Schedule D: Manufacturers, Places of Manufacture and Testing

The following form shall be filled and attached to the tender. Tenderers are free to propose more than one Manufacturer for each item.

### Manufacturers

Item	Description	Manufacturer	Place of Manufacture	Place of Testing and Inspection	Country of Origin
1.	Tower				
2.	Nuts, bolts, washers etc.				
3.	ERS				
4.	Conductor (ACSR)				
5.	Earthwire				
6.	OPGW				
7.	Insulator				
8.	Hardware fittings for conductor(ACSR)				
9.	Hardware fittings for Insulator				
10.	Hardware fittings for OPGW				

Name of Tenderer: \_\_\_\_\_

Signature of Tenderer: \_\_\_\_\_

# **Schedule E: Technical Particulars and Guarantees**

## **1. General**

The technical data schedules hereafter provide more details on the specific technical criteria and complement the Information given in the tender document.

They form an essential part of tender submission and will be used in tender evaluation. They should be fully completed and submitted with the tender.

## 2. Technical Data Schedules

The technical data schedules hereafter provide more details on the specific technical criteria and complement the Information given in the tender documents.

They form an essential part of tender submission and will be used in tender

evaluation. They should be fully completed and submitted with the tender.

### 2.1 Towers

#### 2.1.1 400 kV Tower- For Twin ACCC Dhaka Conductor-Not Applicable

Fill out 1 form for each manufacturer

Parameters	Unit	Tower Type				
		4DL	4D1	4D25	4D45	4DT6
Total height of tower (standard)	(mm)					
Vertical spacing between conductor-earthwire	(mm)					
Horizontal phase separation	(mm)					
Vertical phase separation	(mm)					
Total approx. mass of standard height tower without stub & cleat*	(kg)					
Total approx. mass of E1.5 tower*	(kg)					
Total approx. mass of E3.0 tower*	(kg)					
Total approx. mass of E4.5 tower*	(kg)					
Total approx. mass of E6.0 tower*	(kg)					
Total approx. mass of E9.0 tower*	(kg)					
Total approx. mass of E12.0 tower*	(kg)					
Total approx. mass of E15.0 tower*	(kg)					
Total approx. mass of E20.0 tower*	(kg)					
Total approx. mass of E25.0 tower*	(kg)					
Total approx. mass of E30.0 tower*	(kg)					
Total approx. mass of E40.0 tower*	(kg)					
Total approx. mass of stub & cleat*	(kg)					
Approximate ultimate compression load/leg (highest extension)*	(kN)					
Approximate ultimate uplift load/leg (highest extension)*	(kN)					

\* The final figures will be obtained during detailed design of towers and the approval thereof after award of contract, and the towers shall be supplied accordingly within the contract price.

	Mild Steel			High Yield Steel		
	Standard	Grade	Yield Stress	Standard	Grade	Yield Stress
Steel standard and grades						
Bolt standard and grades						

Name & Signature of  
Manufacturer`s Representative:

Stamp of Manufacturer

## 2.1.2 400 kV Tower-For Quad ACSR Finch Conductor

Fill out 1 form for each manufacturer

Parameters	Unit	Tower Type				
		4DL	4D1	4D25	4D45	4DT6
Total height of tower (standard)	(mm)					
Vertical spacing between conductor-earthwire	(mm)					
Horizontal phase separation	(mm)					
Vertical phase separation	(mm)					
Total approx. mass of standard height tower without stub & cleat*	(kg)					
Total approx. mass of E1.5 tower*	(kg)					
Total approx. mass of E3.0 tower*	(kg)					
Total approx. mass of E4.5 tower*	(kg)					
Total approx. mass of E6.0 tower*	(kg)					
Total approx. mass of E9.0 tower*	(kg)					
Total approx. mass of E12.0 tower*	(kg)					
Total approx. mass of E15.0 tower*	(kg)					
Total approx. mass of E20.0 tower*	(kg)					
Total approx. mass of E25.0 tower*	(kg)					
Total approx. mass of E30.0 tower*	(kg)					
Total approx. mass of E40.0 tower*	(kg)					
Total approx. mass of stub & cleat*	(kg)					
Approximate ultimate compression load/leg (highest extension)*	(kN)					
Approximate ultimate uplift load/leg (highest extension)*	(kN)					

\* The final figures will be obtained during detailed design of towers and the approval thereof after award of contract, and the towers shall be supplied accordingly within the contract price.

	Mild Steel			High Yield Steel		
	Standard	Grade	Yield Stress	Standard	Grade	Yield Stress
Steel standard and grades						
Bolt standard and grades						

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

### 2.1.3 230kV Towers (No need to fill if tower design is provided by the Employer)

Fill out 1 form for each manufacturer

Parameters	Unit	Tower Type										
		2DL- (N/A)**	2D1 - (N/A)	2D25- (N/A)	2DT6	2D9 - (N/A)	2QL	2Q1- (N/A)	2Q30	2QT6	2DR- (N/A)	2DAX- (N/A)
Total height of tower (standard)	(mm)											
Vertical spacing between conductor- earthwire	(mm)											
Horizontal phase separation	(mm)											
Vertical phase separation	(mm)											
Total approx. mass of standard height tower without stub & cleat*	(kg)											
Total approx. mass of E1.5 tower*	(kg)											
Total approx. mass of E3.0 tower**	(kg)											
Total approx. mass of E4.5 tower**	(kg)											
Total approx. mass of E6.0 tower**	(kg)											
Total approx. mass of E9.0 tower**	(kg)											
Total approx. mass of E12.0 tower**	(kg)											
Total approx. mass of E15.0 Tower**	(kg)											
Total approx. mass of stub & cleat*	(kg)											
Approximate ultimate compression load/leg (E9.0 & E15)*	(kN)											
Approximate ultimate uplift load/leg (E9.0 & E15)*	(kN)											

\* The final figures will be obtained during detailed design of towers and the approval thereof after award of contract, and the towers shall be supplied accordingly within the contract price.

\*\* N/A - Not Applicable

### 2.1.4 132kV Towers (No need to fill if tower design is provided by the Employer)

Fill out 1 form for each manufacturer

Parameters	Unit	Tower Type									
		1DL- (N/A)	1D1- (N/A)	1D25- (N/A)	1DT6	1DR- (N/A)	1DAX- (N/A)	1QL	1Q15- (N/A)	1Q30	1QT6
Total height of tower (standard)	(mm)										
Vertical spacing between conductor- earthwire	(mm)										
Horizontal phase separation	(mm)										
Vertical phase separation	(mm)										
Total approx. mass of standard height tower without stub & cleat*	(kg)										
Total approx. mass of E1.5 tower*	(kg)										
Total approx. mass of E3.0 tower**	(kg)										
Total approx. mass of E4.5 tower**	(kg)										
Total approx. mass of E6.0 tower**	(kg)										
Total approx. mass of E9.0 tower**	(kg)										
Total approx. mass of E12.0 tower**	(kg)										
Total approx. mass of E15.0 Tower**	(kg)										
Total approx. mass of stub & cleat*	(kg)										
Approximate ultimate compression load/leg (E9.0 & E15)*	(kN)										
Approximate ultimate uplift load/leg (E9.0 & E15)*	(kN)										

\* The final figures will be obtained during detailed design of towers and the approval thereof after award of contract, and the towers shall be supplied accordingly within the contract price.

## 2.2 132kV Poles

### 2.2.1 Particulars of Steel

	Mild Steel			High Yield Steel		
	Standard	Grade	Yield Stress	Standard	Grade	Yield Stress
Steel standard and grades						
Bolt standard and grades						

- The final figures will be obtained during detailed design of poles and the approval thereof after award of contract, and the towers shall be supplied accordingly within the contract price.

## 2.3 Piled Foundation Details

### 2.3.1 400 kV Towers- For Twin ACCC Dhaka Conductor (ACSR Finch equivalent)- Not Applicable

Tower Type Particulars	4DL (Highest extension)	4D1 (Upto 25m extension)	4D1 (above 25m to 40m extension)	4D25 (Highest extension)	4D45 (Highest extension)	4DT6 (Highest extension)	4DR-Not Required (Highest extension)	4DAX-Not Required
Type of piled								
Number of piles per								
Length of pile*								
Diameter of pile* (mm)								

\* The final figures will be obtained during detailed design of tower foundations and the approval thereof after award of contract, and the foundations shall be supplied accordingly within the contract price.



### 2.3.2 400 kV Towers- For Quad ACSR Finch Conductor

Tower Type Particulars	4DL (Highest extension)	4D1 (Upto 25m extension)	4D1 (above 25m to 40m extension) - Not Required	4D25 (Highest extension)	4D45 (Highest extension)	4DT6 (Highest extension)	4DR (Highest extension) – Not Required	4DAX- Not Required
Type of piled foundation								
Number of piles per leg*								
Length of pile* (mm)								
Diameter of pile* (mm)								

\* The final figures will be obtained during detailed design of tower foundations and the approval thereof after award of contract, and the foundations shall be supplied accordingly within the contract price.

### 2.3.3 400 kV Towers- For Twin ACSR mallard Conductor (Not Applicable)

\* The final figures will be obtained during detailed design of tower foundations and the approval thereof after award of contract, and the foundations shall be supplied accordingly within the contract price.

Tower Type Particulars	4DL (Highest extension)	4D1 (Upto 25m extension)	4D1 (above 25m to 40m extension)	4D25 (Highest extension)	4D45 (Highest extension)	4DT6 (Highest extension)	4DR-Not Required (Highest extension)	4DAX- Not Required
Type of piled foundation								
Number of piles per leg*								
Length of pile* (mm)								
Diameter of pile* (mm)								

### 2.3.4 230kV Towers (No need to fill if tower design is provided by the Employer)

Tower Type	2DL (Highest extension) - Not Required	2D1 (Highest extension) - Not Required	2D25 (Highest extension) - Not Required	2DT6 (Highest extension) - Not Required	2D9 (Highest extension)- - Not Required	2QL (Highest Extension) - Not Required	2Q1 (Highest Extension) - Not Required	2Q30 (Highest Extension) - Not Required	2QT6 (Highest Extension) - Not Required	2DR - (Highest Extension) - Not Required	2DAX (Highest Extension) - Not Required
Particulars	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required
Type of piled foundation											
Number of piles per leg*											
Length of pile* (mm)											
Diameter of pile* (mm)											

\* The final figures will be obtained during detailed design of tower foundations and the approval thereof after award of contract, and the foundations shall be supplied accordingly within the contract price.

### 2.3.5 132kV Towers (No need to fill if tower design is provided by the Employer)

Tower Type	1DL (Highest extension) - Not Required	1D1 (Highest extension) - Not Required	1D25 (Highest extension) - Not Required	1DT6 (Highest extension) - Not Required	1DR (Highest extension) - Not Required	1DAX (Highest extension) - Not Required	1QL (Highest Extension) - Not Required	1Q15 (Highest Extension) - Not Required	1Q30 (Highest Extension) - Not Required	1QT6 (Highest Extension) - Not Required
Particulars	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required
Type of piled foundation										
Number of piles per leg*										
Length of pile* (mm)										
Diameter of pile* (mm)										

\* The final figures will be obtained during detailed design of tower foundations and the approval thereof after award of contract, and the foundations shall be supplied accordingly within the contract price.

### 2.3.5 132kV Poles- Not Required

Tower Type Particulars	1DLP (Highest extension)	1D1P (Highest extension)	1D25P (Highest extension)	1DT6P (Highest extension)	1D9P (Highest Extension)
Type of piled foundation					
Number of piles per leg*					
Length of pile* (mm)					
Diameter of pile* (mm)					

\* The final figures will be obtained during detailed design of pole foundations and the approval thereof after award of contract, and the foundations shall be supplied accordingly within the contract price.

## 2.4 Conductor, Earthwire & OPGW

### 2.4.1 400 kV Line – Twin ACCC Dhaka Conductor (ACSR Finch equivalent)- Not Applicable

Fill out 1 form for each manufacturer

Conductor	Phase		Earthwire	
	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
Designation (Code Name)				
Type				
Reference standards				
Aluminium/ Aluminium alloy grade				
Steel grade				
Galvanising Thickness				
Aluminium class (AS wire)				
Aluminium type (AS wire)				
Conductor max. continuous operating temperature (°C)				
Minimum mass of grease (kg/km)				
Creep period of conductor to be considered (years)				
No. and diameter of aluminium wire (No./mm)				
No. and diameter of steel wire (No./mm)				
Overall diameter of conductor (mm)				
Overall sectional area of conductor (mm <sup>2</sup> )				
Rated tensile strength of conductor (kN)				
Weight (kg/km)				
Direction of external lay				
Cross Sectional Area of Al (mm <sup>2</sup> )				
Cross Sectional Area of Composite Core (mm <sup>2</sup> )				
No. of Composite Core (mm)				
Shape of wires				
Diameter of Composite Core (mm)				
Rated tensile strength of core (kN)				
Current carrying capacity at 180 Deg C (amp)				
Max. allowable emergency operating temp. (Deg C)				
Maximum DC Resistance at 20 Deg C (ohm/km)				

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

## 2.4.2 400kV Line –Quad ACSR Finch Conductor

Conductor	Phase		Earthwire	
	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
Designation (Code Name)				
Type				
Reference standards				
Aluminium/ Aluminium alloy grade				
Steel grade				
Galvanising Thickness				
Aluminium class (AS wire)				
Aluminium type (AS wire)				
Conductor max. continuous operating temperature (°C)				
Minimum mass of grease (kg/km)				
Creep period of conductor to be considered (years)				
No. and diameter of aluminium wire (No./mm)				
No. and diameter of steel wire (No./mm)				
Overall diameter of conductor (mm)				
Overall sectional area of conductor (mm <sup>2</sup> )				
Rated tensile strength of conductor (kN)				
Weight (kg/km)				
Direction of external lay				
Cross Sectional Area of Al (mm <sup>2</sup> )				
Cross Sectional Area of Composite Core (mm <sup>2</sup> )				
No. of Composite Core (mm)				
Shape of wires				
Diameter of Composite Core (mm)				
Rated tensile strength of core (kN)				
Current carrying capacity at 180 Deg C (amp)				
Max. allowable emergency operating temp. (Deg C)				
Maximum DC Resistance at 20 Deg C (ohm/km)				

### 2.4.3 230 kV Line - Overland Portion (Twin ACSR Mallard Conductor)

Fill out 1 form for each manufacturer

Conductor	Phase		Earthwire	
	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
Designation (Code Name)				
Type				
Reference standards				
Aluminium/ Aluminium alloy grade				
Steel grade				
Galvanising Thickness				
Aluminium class (AS wire)				
Aluminium type (AS wire)				
Conductor max. continuous operating temperature (°C)				
Minimum mass of grease (kg/km)				
Creep period of conductor to be considered (years)				
No. and diameter of aluminium wire (No./mm)				
No. and diameter of steel wire (No./mm)				
Overall diameter of conductor (mm)				
Overall sectional area of conductor (mm <sup>2</sup> )				
Rated tensile strength of conductor (kN)				
Weight (kg/km)				
Direction of external lay				
Cross Sectional Area of Al (mm <sup>2</sup> )				
Cross Sectional Area of Composite Core (mm <sup>2</sup> )				
No. of Composite Core (mm)				
Shape of wires				
Diameter of Composite Core (mm)				
Rated tensile strength of core (kN)				
Current carrying capacity at 180 Deg C (amp)				
Max. allowable emergency operating temp. (Deg C)				
Maximum DC Resistance at 20 Deg C (ohm/km)				

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

## 2.4.4 230kV Line - River Crossing Portion (Twin ACSR Mallard Conductor) - Not Applicable

Fill out 1 form for each manufacturer

Conductor	Phase		Earthwire	
	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
Designation (Code Name)				
Type				
Reference standards				
Aluminium/ Aluminium alloy grade				
Steel grade				
Galvanising Thickness				
Aluminium class (AS wire)				
Aluminium type (AS wire)				
Conductor max. continuous operating temperature (°C)				
Minimum mass of grease (kg/km)				
Creep period of conductor to be considered (years)				
No. and diameter of aluminium wire (No./mm)				
No. and diameter of steel wire (No./mm)				
Overall diameter of conductor (mm)				
Overall sectional area of conductor (mm <sup>2</sup> )				
Rated tensile strength of conductor (kN)				
Weight (kg/km)				
Direction of external lay				
Cross Sectional Area of Al (mm <sup>2</sup> )				
Cross Sectional Area of Composite Core (mm <sup>2</sup> )				
No. of Composite Core (mm)				
Shape of wires				
Diameter of Composite Core (mm)				
Rated tensile strength of core (kN)				
Current carrying capacity at 180 Deg C (amp)				
Max. allowable emergency operating temp. (Deg C)				
Maximum DC Resistance at 20 Deg C (ohm/km)				

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

### 2.4.5 132 kV Line – Overland Portion (Single ACSR Grosbeak Equivalent ACCC) - Not Applicable

Fill out 1 form for each manufacturer

Conductor	Phase		Earthwire	
	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
Designation (Code Name)				
Type				
Reference standards				
Aluminium/ Aluminium alloy grade				
Steel grade				
Galvanising Thickness				
Aluminium class (AS wire)				
Aluminium type (AS wire)				
Conductor max. continuous operating temperature (°C)				
Minimum mass of grease (kg/km)				
Creep period of conductor to be considered (years)				
No. and diameter of aluminium wire (No./mm)				
No. and diameter of steel wire (No./mm)				
Overall diameter of conductor (mm)				
Overall sectional area of conductor (mm <sup>2</sup> )				
Rated tensile strength of conductor (kN)				
Weight (kg/km)				
Direction of external lay				
Cross Sectional Area of Al (mm <sup>2</sup> )				
Cross Sectional Area of Composite Core (mm <sup>2</sup> )				
No. of Composite Core (mm)				
Shape of wires				
Diameter of Composite Core (mm)				
Rated tensile strength of core (kN)				
Current carrying capacity at 180 Deg C (amp)				
Max. allowable emergency operating temp. (Deg C)				
Maximum DC Resistance at 20 Deg C (ohm/km)				

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer



## 2.4.6 132 kV Line – River Crossing Portion (Not Applicable)

Fill out 1 form for each manufacturer

Conductor	Phase		Earthwire	
	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
Designation (Code Name)				
Type				
Reference standards				
Aluminium/ Aluminium alloy grade				
Steel grade				
Galvanising Thickness				
Aluminium class (AS wire)				
Aluminium type (AS wire)				
Conductor max. continuous operating temperature (°C)				
Minimum mass of grease (kg/km)				
Creep period of conductor to be considered (years)				
No. and diameter of aluminium wire (No./mm)				
No. and diameter of steel wire (No./mm)				
Overall diameter of conductor (mm)				
Overall sectional area of conductor (mm <sup>2</sup> )				
Rated tensile strength of conductor (kN)				
Weight (kg/km)				
Direction of external lay				
Cross Sectional Area of Al (mm <sup>2</sup> )				
Cross Sectional Area of Composite Core (mm <sup>2</sup> )				
No. of Composite Core (mm)				
Shape of wires				
Diameter of Composite Core (mm)				
Rated tensile strength of core (kN)				
Current carrying capacity at 180 Deg C (amp)				
Max. allowable emergency operating temp. (Deg C)				
Maximum DC Resistance at 20 Deg C (ohm/km)				

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

### 2.4.7 132 kV Line – (Single ACSR Grosbeak)

Fill out 1 form for each manufacturer

Conductor	Phase		Earthwire	
	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
Designation (Code Name)				
Type				
Reference standards				
Aluminium/ Aluminium alloy grade				
Steel grade				
Galvanising Thickness				
Aluminium class (AS wire)				
Aluminium type (AS wire)				
Conductor max. continuous operating temperature (°C)				
Minimum mass of grease (kg/km)				
Creep period of conductor to be considered (years)				
No. and diameter of aluminium wire (No./mm)				
No. and diameter of steel wire (No./mm)				
Overall diameter of conductor (mm)				
Overall sectional area of conductor (mm <sup>2</sup> )				
Rated tensile strength of conductor (kN)				
Weight (kg/km)				
Direction of external lay				
Cross Sectional Area of Al (mm <sup>2</sup> )				
Cross Sectional Area of Composite Core (mm <sup>2</sup> )				
No. of Composite Core (mm)				
Shape of wires				
Diameter of Composite Core (mm)				
Rated tensile strength of core (kN)				
Current carrying capacity at 180 Deg C (amp)				
Max. allowable emergency operating temp. (Deg C)				
Maximum DC Resistance at 20 Deg C (ohm/km)				

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

## 2.5 OPGW & Fittings

### 2.5.1 400kV Line

Fill out 1 form for each manufacturer

Parameter	Unit	Overland Portion		River Crossing Portion	
		As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
OPGW designation & type					
Number of fibres					
Reference standard					
Number and diameter of aluminium strands	mm				
Number and diameter of steel strands	mm				
Corrosion protection of steel strands					
Internal fibre tube diameter	mm				
Overall diameter	mm				
Guaranteed ultimate tensile strength	kN				
Final modulus of elasticity	N/mm <sup>2</sup>				
Coefficient of linear expansion	1/degree				
DC resistance at 20°C	ohms/m				
Maximum short circuit current capacity	kA <sup>2</sup> sec				
Assumed temperature rise	°C				
Standard weight	kg/m				
Weight of grease	kg/m				
Standard length on drum*	m				
Weight of complete drum	kg				
Maximum drum length	m				
Installation minimum bending radius	m				
<b>Optical Characteristics:</b>					
Cut-off wave length	nm				
Attenuation at ..... Nm	dB/km				
Zero dispersion wave length	nm				
Chromatic dispersion at ..... nm	ps/km				
Individual splice loss	dB				

Parameter	Unit	Overland Portion		River Crossing Portion	
		As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
Bit error rate					
<b>OPGW Fittings:</b>					
Guaranteed ultimate tensile strength					
• Suspension set	kN				
• Tension set	kN				
Overall length of set					
• Suspension set	mm				
• Tension set	mm				
Mass of set					
• Suspension set	kg				
• Tension set	kg				
Drawing numbers					
Cross section of OPGW					
Cross section of non-metallic cable					
Joint box					
Fixing clamps					
OPGW suspension set					
OPGW tension set					
OPGW vibration damper					

\* Drum length to be finalized after finalization of tower locations as per check survey.

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

## 2.5.2 230kV Line

Fill out 1 form for each manufacturer

Parameter	Unit	Overland Portion		River Crossing Portion	
		As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
OPGW designation & type					
Number of fibres					
Reference standard					
Number and diameter of aluminium strands	mm				
Number and diameter of steel strands	mm				
Corrosion protection of steel strands					
Internal fibre tube diameter	mm				
Overall diameter	mm				
Guaranteed ultimate tensile strength	kN				
Final modulus of elasticity	N/mm <sup>2</sup>				
Coefficient of linear expansion	1/degree				
DC resistance at 20°C	ohms/m				
Maximum short circuit current capacity	kA <sup>2</sup> sec				
Assumed temperature rise	°C				
Standard weight	kg/m				
Weight of grease	kg/m				
Standard length on drum*	m				
Weight of complete drum	kg				
Maximum drum length	m				
Installation minimum bending radius	m				
<b>Optical Characteristics:</b>					
Cut-off wave length	nm				
Attenuation at ..... Nm	dB/km				
Zero dispersion wave length	nm				
Chromatic dispersion at ..... nm	ps/km				
Individual splice loss	dB				
Bit error rate					
<b>OPGW Fittings:</b>					
Guaranteed ultimate					

Parameter	Unit	Overland Portion		River Crossing Portion	
		As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
tensile strength	kN				
• Suspension set	kN				
• Tension set					
Overall length of set					
• Suspension set	mm				
• Tension set	mm				
Mass of set					
• Suspension set	kg				
• Tension set	kg				
Drawing numbers					
Cross section of OPGW					
Cross section of non-metallic cable					
Joint box					
Fixing clamps					
OPGW suspension set					
OPGW tension set					
OPGW vibration damper					

\* Drum length to be finalized after finalization of tower locations as per check survey.

Name & Signature of  
Manufacturer`s Representative:

Stamp of Manufacturer

## 2.5.3 132 kV Line

Fill out 1 form for each manufacturer

Parameter	Unit	Overland Portion		River Crossing Portion	
		As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
OPGW designation & type					
Number of fibres					
Reference standard					
Number and diameter of aluminium strands	mm				
Number and diameter of steel strands	mm				
Corrosion protection of steel strands					
Internal fibre tube diameter	mm				
Overall diameter	mm				
Guaranteed ultimate tensile strength	kN				
Final modulus of elasticity	N/mm <sup>2</sup>				
Coefficient of linear expansion	1/degree				
DC resistance at 20°C	ohms/m				
Maximum short circuit current capacity	kA <sup>2</sup> sec				
Assumed temperature rise	°C				
Standard weight	kg/m				
Weight of grease	kg/m				
Standard length on drum*	m				
Weight of complete drum	kg				
Maximum drum length	m				
Installation minimum bending radius	m				
Optical Characteristics:					
Cut-off wave length	nm				
Attenuation at ..... Nm	dB/km				
Zero dispersion wave length	nm				
Chromatic dispersion at ..... nm	ps/km				
Individual splice loss	dB				
Bit error rate					
OPGW Fittings:					
Guaranteed ultimate tensile strength	kN				

• Suspension set	kN				
• Tension set					
Overall length of set					
• Suspension set	mm				
• Tension set	mm				
Mass of set					
• Suspension set	kg				
• Tension set	kg				
Drawing numbers					
Cross section of OPGW					
Cross section of non-metallic cable					
Joint box					
Fixing clamps					
OPGW suspension set					
OPGW tension set					
OPGW vibration damper					

\* Drum length to be finalized after finalization of tower locations as per check survey.

Name & Signature of  
Manufacturer`s Representative:

Stamp of Manufacturer



## 2.6 Insulator Sets & Fittings

### 2.6.1 400kV Line- Twin ACCC Dhaka Conductor-Not Applicable

Fill out 1 form for each manufacturer

Parameter	Unit	As per Tender requirement					As per Tender Proposal				
		Insulator Set Type									
		Suspension	Heavy Suspension	Tension	Low Duty Tension	Jumper Suspension	Suspension	Heavy Suspension	Tension	Low Duty Tension	Jumper Suspension
Insulator unit type no.											
Dielectric material											
Total creepage per unit	mm										
Spacing	mm										
Overall shed diameter	mm										
Puncture voltage	kV										
Electro-mechanical failing load of unit	kN										
Drawing no. of unit											
Type test certificate no.											
Number of units per string	pcs.										
Total creepage of string	mm										
Overall length of set	mm										
Sag adjuster type and step	mm										
Ultimate strength of set	kN										
Mass of set	kg										
Anticipated											
• lightning impulse withstand voltage	kV										
• Power frequency withstand voltage	kV										
• Corona extinction level	kV										

Name & Signature of  
Manufacturer`s Representative:

Stamp of Manufacturer

## 2.6.2 400kV Line- Quad ACSR Finch Conductor

Parameter	Unit	As per Tender requirement		As per Tender Proposal	
		Insulator Set Type			
		Suspension	Tension	Suspension	Tension
Insulator unit type no.					
Dielectric material					
Total creepage per unit	mm				
Spacing	mm				
Overall shed diameter	mm				
Puncture voltage	kV				
Electro-mechanical failing load of unit	kN				
Drawing no. of unit					
Type test certificate no.					
Number of units per string	pcs.				
Total creepage of string	mm				
Overall length of set	mm				
Sag adjuster type and step	mm				
Ultimate strength of set	kN				
Mass of set	kg				
Anticipated					
• lightning impulse withstand voltage	kV				
• Power frequency withstand voltage	kV				
• Corona extinction level	kV				

Name & Signature of  
Manufacturer`s Representative:

Stamp of Manufacturer

### 2.6.3 230kV Line - Overland Portion (ACSR Twin Mallard Conductor)

Fill out 1 form for each manufacturer

Parameter	Unit	As per Tender requirement				As per Tender Proposal			
		Insulator Set Type							
		Suspension/ Heavy Suspension	Tension	Low Duty Tension	Jumper Suspension	Suspension/ Heavy Suspension	Tension	Low Duty Tension	Jumper Suspension
Insulator unit type no.									
Dielectric material									
Total creepage per unit	mm								
Spacing	mm								
Overall shed diameter	mm								
Puncture voltage	kV								
Electro-mechanical failing load of unit	kN								
Drawing no. of unit									
Type test certificate no.									
Number of units per string	pcs.								
Total creepage of string	mm								
Overall length of set	mm								
Sag adjuster type and step	mm								
Ultimate strength of set	kN								
Mass of set	kg								
Anticipated									
• lightning impulse withstand voltage	kV								
• Power frequency withstand voltage	kV								
• Corona extinction level	kV								

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

## 2.6.4 230kV Line – River Crossing Portion (ACSR Twin Mallard Conductor) - Not Applicable

Fill out 1 form for each manufacturer

Parameter	Unit	As per Tender requirement		As per Tender Proposal	
		Insulator Set Type			
		Suspension	Tension	Suspension	Tension
Insulator unit type no.					
Dielectric material					
Total creepage per unit	mm				
Spacing	mm				
Overall shed diameter	mm				
Puncture voltage	kV				
Electro-mechanical failing load of unit	kN				
Drawing no. of unit					
Type test certificate no.					
Number of units per string	pcs.				
Total creepage of string	mm				
Overall length of set	mm				
Sag adjuster type and step	mm				
Ultimate strength of set	kN				
Mass of set	kg				
Anticipated					
• lightning impulse withstand voltage	kV				
• Power frequency withstand voltage	kV				
• Corona extinction level	kV				

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

## 2.6.5 132kV Line- Overland Portion (ACSR Grosbeak equivalent ACCC Conductor) -Not Applicable

Parameter	Unit	As per Tender requirement		As per Tender Proposal	
		Insulator Set Type			
		Suspension	Tension	Suspension	Tension
Insulator unit type no.					
Dielectric material					
Total creepage per unit	mm				
Spacing	mm				
Overall shed diameter	mm				
Puncture voltage	kV				
Electro-mechanical failing load of unit	kN				
Drawing no. of unit					
Type test certificate no.					
Number of units per string	pcs.				
Total creepage of string	mm				
Overall length of set	mm				
Sag adjuster type and step	mm				
Ultimate strength of set	kN				
Mass of set	kg				
Anticipated					
• lightning impulse withstand voltage	kV				
• Power frequency withstand voltage	kV				
• Corona extinction level	kV				

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

### 2.6.6 132kV Line- River Crossing Portion (Not Applicable)

Parameter	Unit	As per Tender requirement		As per Tender Proposal	
		Insulator Set Type			
		Suspension	Tension	Suspension	Tension
Insulator unit type no.					
Dielectric material					
Total creepage per unit	mm				
Spacing	mm				
Overall shed diameter	mm				
Puncture voltage	kV				
Electro-mechanical failing load of unit	kN				
Drawing no. of unit					
Type test certificate no.					
Number of units per string	pcs.				
Total creepage of string	mm				
Overall length of set	mm				
Sag adjuster type and step	mm				
Ultimate strength of set	kN				
Mass of set	kg				
Anticipated					
• lightning impulse withstand voltage	kV				
• Power frequency withstand voltage	kV				
• Corona extinction level	kV				

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

### 2.6.7 132kV Line- ACSR Grosbeak Conductor

Parameter	Unit	As per Tender requirement		As per Tender Proposal	
		Insulator Set Type			
		Suspension	Tension	Suspension	Tension
Insulator unit type no.					
Dielectric material					
Total creepage per unit	mm				
Spacing	mm				
Overall shed diameter	mm				
Puncture voltage	kV				
Electro-mechanical failing load of unit	kN				
Drawing no. of unit					
Type test certificate no.					
Number of units per string	pcs.				
Total creepage of string	mm				
Overall length of set	mm				
Sag adjuster type and step	mm				
Ultimate strength of set	kN				
Mass of set	kg				
Anticipated					
• lightning impulse withstand voltage	kV				
• Power frequency withstand voltage	kV				
• Corona extinction level	kV				

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

## 2.7 Spacers and Spacer Dampers

Fill out 1 form for each manufacturer

### 400kV Line:

Parameter	Unit	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
		Overland		River Crossing	
Unit weight	kg				
Material	-				
Number of spacer dampers to be used for each phase per span*	pcs.				
Total quantity of spacer dampers for one basic span*	pcs.				

\* These quantities shall be based on the design of the proposed spacer dampers. The quantities mentioned above may increase at the contractor's cost, if during design approval such increase is necessary.

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

### 230kV Line:

Parameter	Unit	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
		Overland		River Crossing	
Unit weight	kg				
Material	-				
Number of spacer dampers to be used for each phase per span*	pcs.				
Total quantity of spacer dampers for one basic span*	pcs.				

\* These quantities shall be based on the design of the proposed spacer dampers. The quantities mentioned above may increase at the contractor's cost, if during design approval such increase is necessary.

Name & Signature of  
Manufacturer's Representative:



Stamp of Manufacturer

## 2.8 Vibration Dampers

Fill out 1 form for each manufacturer

### 400kV Line:

Parameter	Unit	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
		Overland		River Crossing	
Unit weight of vibration dampers					
• for phase conductor	kg				
• for earthwire	kg				
• for OPGW	kg				
Number of vibration dampers to be used for phase conductor per standard span	pcs.				
Number of vibration dampers to be used for earthwire per standard span	pcs.				
Number of vibration dampers to be used for OPGW per standard span	pcs.				

These quantities shall be based on the design of the proposed vibration dampers. Actual number of vibration damper will be decided according to the Manufacturer's recommendation for each span.

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

**230kV Line:**

Parameter	Unit	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
		Overland		River Crossing	
Unit weight of vibration dampers					
• for phase conductor	kg				
• for earthwire	kg				
• for OPGW	kg				
Number of vibration dampers to be used for phase conductor per standard span	pcs.				
Number of vibration dampers to be used for earthwire per standard span	pcs.				
Number of vibration dampers to be used for OPGW per standard span	pcs.				

These quantities shall be based on the design of the proposed vibration dampers. Actual number of vibration damper will be decided according to the Manufacturer's recommendation for each span.

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer

**132kV Line:**

Parameter	Unit	As per Tender requirement	As per Tender Proposal	As per Tender requirement	As per Tender Proposal
		Overland		River Crossing	
Unit weight of vibration dampers					
• for phase conductor	kg				
• for earthwire	kg				
• for OPGW	kg				
Number of vibration dampers to be used for phase conductor per standard span	pcs.				
Number of vibration dampers to be used for earthwire per standard span	pcs.				
Number of vibration dampers to be used for OPGW per standard span	pcs.				

These quantities shall be based on the design of the proposed vibration dampers. Actual number of vibration damper will be decided according to the Manufacturer's recommendation for each span.

Name & Signature of  
Manufacturer's Representative:

Stamp of Manufacturer