TECHNICAL SPECIFICATION FOR PREFERRED SUPPLIER FOR SUPPLY OF HIGH VOLTAGE AERIAL BUNDLED XLPE INSULATED CABLE ACCESSORIES

ENERGY FIJI LIMITED

Revision History & Document Control

Rev no.	Notes	Prepared By	Reviewed By	Date of Issue
1	Issued for internal review	Rajiv Singh		19/02/18
2	Reviewed	Rajiv Singh		22/06/18
3	Approved for tender		Basant Kumar	22/06/18

Next Scheduled Revision

Date of Next Revision	Notes	Revision By	Revision Approved By
June 2021			

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1.0 Introduction

Energy Fiji Limited [EFL] is responsible for generation, transmission and distribution of electricity in Viti Levu, Vanua Levu, Ovalau and Tavuni in Fiji. By the end of 2017, EFL had 182,439 customers. This includes residential, commercial and institutional customers.

The Energy Fiji Limited (EFL) is requesting proposal for the Preferred Supplier for supply of item listed below for EFL's consumption to carryout repair, maintenance and Construction of Power line Network in Fiji.

The preferred Supplier arrangement will be for a period of 3 (three) years from the date of signing of the contract. The award of this Tender may be split and awarded to more than one successful bidder.

The items covered under this specification are as per the clauses under Design and Construction.

This Specification covers the general requirements of design, manufacture, testing, supply and delivery of HV ABC accessories for use on overhead distribution systems in a totally exposed environment.

2.0 References

2.1 Applicable Standards

The item shall be designed, manufactured and tested in accordance with the latest edition of the Standards specified below and all amendments issued prior to the date of closing of tenders except where varied by this specification.

IEC 61284:1997	Overhead lines – Requirements and tests for fittings
AS/NZS 3599.2	Electric cables – Aerial bundled – Polymeric insulated – Voltages 6.35/11(12) kV and 12.7/22(24) kV Non-metallic screened
IEC 60243-1:2013	Electrical strength of insulating materials – Test methods – Part 1: Tests at power frequencies
IEC 61442:2005	Test methods for accessories for power cables with rated voltages from 6kV up to 30kV
ISO 1461: 2009	Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods
AS/NZS ISO 9001	Quality management systems -Requirements

Should inconsistencies be identified between standards and/or this specification, the tenderer shall immediately refer such inconsistencies to the EFL for resolution.

3.0 System Conditions

3.1 Environmental Conditions

The HVABC accessories shall be suitable for installation outdoors and shall be designed to withstand the following service conditions.

Description		**Conditions**
Atmosphere	:	Saliferous, corrosive and dusty
Ambient Temperature	:	Peak: 40°C 24 Hour Average: 30°C Annual Average: 22°C Minimum: 10°C
Relative Humidity (Average)	:	85%
Rainfall	:	Annual Average: 1900mm
Isokeraunic (Thunder day) level	:	60 thunder days per year
Seismic	:	To a maximum of 7 on the open-ended Richter Scale

Note: Fiji is situated in a region where cyclones are experienced frequently. All plant and equipment shall be designed and constructed to withstand these extreme conditions.

3.2 System Conditions

Nominal Voltage	11kV
System Highest Voltage	12kV
System Frequency	50Hz
Number of Phases	3
System Earthing	Effectively Earthed
Impulse Withstand Voltage (peak)	28kV
Power Frequency Withstand Voltage	95kV (peak)

4.0 Design and Construction

Equipment offered that is found on inspection not to conform to this Specification shall be replaced by the vendor at no cost to Energy Fiji Limited.

4.1 General

The accessories for ABC rated at 6.35/11 (12) kV are as specified below and should satisfy all the loading and tests as stipulated therein.

All the accessories for HV ABC should have characteristics conforming to relevant AS, AS/NZS and IEC standards and specifications.

The HV ABC's used in EFLs system are as follows:

HVABC Description
6.35/ 11 (12) kV XLPE ABC – 50mm^2
6.35/ 11 (12) kV XLPE ABC – 95mm^2

The messenger/ catenary wire used with the phase conductors is of Aluminum alloy type.

The accessories for HV ABC system shall be suitably designed to install on 10.2m/6kN and 11m/5.5kN concrete poles as shown in EFL drawing number A3 01 E24 022(6) in Appendix 15.10.

4.2 Clamps and Assembly

The clamps and assembly for ABC specified below shall satisfy the requirements as stipulated therein.

a) Suspension Small Angle Assembly
   i. Suspension bracket
   ii. Suspension clamp and movable connecting (articulated) link
b) Dead End Assembly
   i. Tension bracket
   ii. Tension (dead end) clamp
c) Large Angle Assembly

4.2.1 Suspension Small Angle Assembly

Suspension assembly shall be suitable for use on overhead lines of rated voltage 6.35/11 kV with bundled insulated conductors stretched between poles. Suspension assemblies shall be installed to hold the insulated messenger/catenary wire.

The assembly shall also be suitable for use on 'out of aligned' poles with the angles of deviation such that the maximum angle is 45° for salient angles and 27° for re-entrant angles.

The dimensions of the components shall be such that the suspension clamp does not touch the pole at re-entrant angle locations.

The assembly shall consist of the following three components.

a) Suspension bracket
b) Movable connecting (articulated) link
c) Suspension clamp

4.2.2 Suspension Bracket

The suspension bracket shall be designed to be used with the EFLs standard concrete pole as shown in EFL drawing number A3 01 E24 022(4) in Appendix 15.6. The bracket shall be mounted on the concrete pole using two (2) galvanized steel bolts. It shall be designed to withstand a minimum breaking load of 30kN.

The bracket shall be smooth and free from edges that could damage the Aerial Bundled Conductor or cause injuries to the installer or user. It shall be designed to best performance and reliability so that persons and surrounding will not be exposed to any dangers.

4.2.3 Suspension Clamp and Connecting (articulated) Link

The Suspension Clamp and the connecting link shall be made of weather resistant and corrosion proof material. Suspension Clamp shall be designed to withstand a minimum breaking load of 20kN and shall also be capable to withstand up to 6.35kV power frequency voltage. Connecting link shall be capable to act as a mechanical fuse in case of overloading on the bundled conductor (when breaking, suspension assembly releases the cables preventing the disruption at the dead end)which has a suitable breaking load less than the breaking load of suspension clamp.

The main body of the suspension clamp shall be fully insulated with adequate thickness. Internal shape of the suspension clamp shall allow the messenger to a turning angle not less than 45° inside the clamp.

Clamping of the messenger shall be capable of controlling slippage. This device shall have the capacity for suspension and tightening the messenger wire. A bolt on the clamp body is preferred method to lock the messenger wire to the clamp body. During installation of ABC system it shall be possible to suspend the messenger wire in the open clamp before it is locked by the bolt.

Preferably a hole with minimum size 20mm x 10 mm shall be provided at the end of the clamp body. The hole shall be suitable to be used for strapping an insulated binding strap (as per clause 4.6.2) through it for supporting the phase conductors from sagging away from the clamp.

Clamping messenger wire to the insulated suspension clamp shall not require any special tools. The suspension clamp shall be designed such that it does not have any loose parts. Overall design of the clamp shall allow the interconnection between 6.35/11 kV rated ABC insulated messenger wire and the suspension bracket on the concrete pole with ease and without damaging them or causing the ABC messenger wire from slipping out of its intended position from the suspension clamp.

4.3 Dead End Assembly

Dead end assembly shall be suitable for anchoring of overhead lines of rated voltage 6.35/11 kV with bundled insulated conductors stretched between poles. Dead end assembly shall be installed to hold the messenger wire.

The assembly shall consist of the following two components.

a) Tension bracket
b) Tension clamp

4.3.1 Tension Bracket

The tension bracket shall be designed to withstand a minimum breaking load of 31kN. It shall be smooth and free from edges that could damage the Aerial Bundled Conductor or cause injuries to the installer or user. It shall be designed to best performance and reliability so that persons and surrounding will not be exposed to any dangers.

The tension bracket shall be galvanized to ISO 1461.

4.3.2 Tension (Dead End) Clamp

Tension clamps shall be suitably designed to anchor the bundled conductor on the messenger wire. The Tension Clamp shall be designed to withstand a minimum breaking load of 31 kN and shall be capable of withstanding 6.35kV power frequency voltage.

Housing of the tension clamp shall be made out of weather resisting material. All components shall be unlosable. In all cases, it shall be possible to install the cable clamp without using any special tool.

To ease the torsional movement involved in the ABC system, the clamp shall be supplied with a suitable stainless steel attachment to the above tension bracket. The Clamp shall be exclusively made of weather resistant insulating material and shall be designed to withstand the relevant breaking load of the messenger wire without slipping.

All the components shall be made of corrosion resistant materials.

4.4 Large Angle Assembly

Each assembly shall include:

a) Tension Bracket with Two Shackles.
b) Tension Clamps.

Description of sub components of the large angle assembly are the same as for the dead end assembly described in Clause 4.3 above.

4.5 T-offs and Straight through Joints

T -offs and straight through joints in ABC system are used to interconnect three or two ABC lines. Following components shall contain in a 6.35/11 (12) kV ABC T-off joint.

a) Dead end assemblies for each cable end
b) Insulator Mounting Bracket
c) Connection Cover
d) PG Clamp, Bi-Metal, (For earthing arrangement)
e) PG Clamp, Al, (suitable for messenger wire)
f) HV ABC Termination Kit 50mm^2 – 95mm^2
g) Surge Arrester 11 kV, 10 kA
h) Copper Bus Conductor Plate
i) Copper Bus Conductor Plate, T-Off
j) Conductor Crimping Ferrule (suitable for messenger wire)
k) Eye Lugs (For earthing arrangement)
l) Split Bolt -type D (For earthing arrangement)

Preferred conceptual drawing is indicated in EFL drawing number A3 01 E24 022(5) in Appendix 15.5. Manufacture may propose alternative designs based on the conceptual design with the adherence to the main functional requirements of T-offs. Proposed designs shall be in accordance with the specification of the poles indicated in appendix 15.10. Relevant design drawings and documentation complete with the dimensions, tolerances and description with details about necessary tools required for T-off joint shall be attached in the submission.

Straight through joints shall be analogous to T-offs, with relevant components indicated above, having ability to connect two ABC lines.

Note: Provision shall be available to earth the Surge Arrester and Cable Sheath Separately.

4.6 Termination Kits and Other Accessories

4.6.1 Termination Kits

The termination kits shall be designed and manufactured to IEC 61442 and shall be of heat shrinkable material suitable for use in terminating ABC having aluminum stranded conductors.

The termination shall be complete with all components and materials necessary for terminating cables of specified size. The components and materials for each category of termination shall include the following items.

a) Internal insulation tubing

b) Stress control tubing
c) Anti-track tubing
d) Moisture sealant
e) Compression/mechanical lugs for appropriate size of the cable
f) Sufficient duty earth strip
g) Constant tension clips
h) Insulation boots for indoor termination and shields to increase creepage for outdoor termination. Boots are either angle or straight depending on the use.
i) Cable break out to separate the cores.

The termination kits shall be designed and manufactured to ensure that all components and materials shall be weather resistant. The components and materials shall be manufactured to ensure high moisture sealing capacity, proper stress control and resistance to tracking when in service. Relevant design drawings and documentation complete with the dimensions, tolerances, and description with details about necessary tools required for termination kit, shall be attached in the bid submission.

4.6.2 Insulating Binding Straps

The binding strap shall be used for binding the cable at different locations with the tension clamp and suspension clamp.

The strap shall be made of polyamide which is suitable to strap ABC systems up to 150mm^2 phase conductors with sufficient strength to hold all cable cores tight. The binding strap shall be designed to comply with the dimensions of relevant accessories mentioned in clause 4.2.

There shall be tilted grooves on one side of the strap and the top of the strap shall have a locking and releasing facility.

Note to bidders: Any other equipment/ item that may be used with the above mentioned items (or separately) has to be included in the bidding document with full details as per clauses 2.0, 3.0, 5.0 to 13.0.

5.0 Quality Assurance

The manufacture shall submit evidence that the design and manufacture of the HV ABC accessories is in accordance with AS/NZS ISO 9001 and shall include the Capability Statement associated with the Quality System Certification.

6.0 Performance and Testing

6.1 Type Tests

The equipment/items shall be subjected to the following Type Tests, in accordance with the relevant AS, AS/NZS and IEC standards and standards as specified in clause 2.1.

Type Tests Relevant to items in Clause 4.2:

a) Mechanical Test
   i. Tensile tests on brackets
   ii. Tensile tests on sub-assemblies
   iii. Slippage test on the clamp of the suspension assemblies
b) Voltage tests on sub-assembly suspension clamp & connecting link
c) Ageing Test
d) Corrosion test
e) Hot dip galvanizing test according to BS EN ISO 1461 for tension and suspension brackets

Type Tests Relevant to items in Clause 4.5:

a) Voltage and water tightness test
b) Temperature rise and over current tests
c) Climatic ageing test
d) Installation tests at Low temperature
e) Mechanical test
f) Corrosion test
g) Electrical ageing test

Type Tests Relevant to items in Clause 4.6.1:

a) AC voltage test
b) DC voltage test
c) Voltage and water tightness test
d) Impulse Voltage test
e) Partial discharge test
f) Heating cycle voltage tests
g) Impact test at ambient temperature
h) Screen resistance measurement
i) Screen leakage current measurements

Test Certificates based on the type tests conforming to the relevant standard shall be supplied along with the offer for evaluation purpose.

Test certificates referred to shall be from an **accredited independent testing laboratory acceptable to the purchaser**. Proof of accreditation by a national/ international authority shall be forwarded with the offer. Test reports shall be complete including all the pages as issued by the testing authority. Parts of test reports shall not be acceptable.

6.2 Routine Test

While manufacturing each batch of equipment/item shall be subjected to the Routine Tests conforming to the relevant AS, AS/NZS and IEC standards and standards as specified in clause 2.1.

6.3 Acceptance Tests

The EFL may carry out acceptance tests on an item to prove it conforms to the requirements of this Specification.

The following tests shall be carried out as acceptance tests:

Relevant to items in Clause 4.2:

a) Mechanical Tests
b) Voltage tests on sub-assembly suspension clamp &connecting link
c) Galvanizing Test according to BS EN ISO 1461 for tension and suspension brackets

Relevant to items in Clause 4.5:

a) Voltage and water tightness test
b) Temperature rise and over current tests
c) Mechanical tests

Relevant to items in Clause 4.6.1:

a) Voltage and water tightness test
b) Impulse Voltage test
c) Impact test at ambient temperature
d) Screen resistance measurement
e) Screen leakage current measurements

6.4 Witnessing of Test

The EFL reserves the right to witness all testing. The Supplier shall give the EFL reasonable notice of when testing will be carried out and two (2) EFL engineers to be invited to witness the testing.

Note to bidders: Type test/Routine tests and any other tests not covered as stated in different clauses of the specification but required as per relevant Standards shall also to be carried out.

7.0 Packaging and Marking

7.1 Packaging

The Accessories for Aerial Bundled Conductors shall be packed as indicated below.

Relevant to items in Clause 4.2:

a) The complete Suspension Small Angle Assembly shall be delivered in a single pack in a suitable bag.
b) The complete Dead End Assembly shall be delivered in a single pack in a suitable bag.
c) The complete Large Angle Assembly shall be delivered in a single pack in a suitable bag.

Relevant to items in Clause 4.5:

Each accessory shall be packed in a strong suitable container to protect from mechanical damage. Individual parts shall be packed in strong sealed plastic bags to protect them from ingress of dirt and moisture. The container shall have:

a) Installation instructions indicating the tools required for each stage all in English Language.
b) All necessary components and consumables required to complete the installation as per the Clause 4.5.
c) Packing shall be such as to permit easy identification of the components without their removal of packaging.

Relevant to items in Clause 4.6:

Each accessory shall be packed in a strong cardboard container to protect from mechanical damage. Individual parts shall be packed in strong sealed plastic bags to protect them from ingress of dirt and moisture. The cardboard container shall have:

a) Installation instructions indicating the tools required for each stage all in English Language.
b) All necessary components and consumables required to complete the installation as per the Clause 4.6.
c) Packing shall be such as to permit easy identification of the components without their removal of packaging.

7.2 Marking

Each pack of accessories shall be indelibly and legibly marked with the following information:

- Manufactures name and details
- The rated operating voltage
- Year of Manufacture
- The gross mass of the packaging
- Any special handling instructions
- The number of the Standard with which the equipment/item complies

7.3 Storage

The equipment shall be capable of being stored without deterioration within the temperature range of $10^{o}C$ to $40^{o}C$ for no less than 24 months.

8.0 Technical Information to be supplied

The selected Bidder shall supply all relevant drawings, technical literature, handbooks etc. in English, in order to facilitate proper installation.

Routine Test Certificates conforming to the Clause 6.2 shall be furnished with the equipment. The Bid shall be accompanied with the following also;

a) English version of catalogues describing the equipment and indicating the type/model number.
b) Technical literature in English describing the constructional and operational features of the equipment.
c) The standard to which the goods have been manufactured.
d) Recommended current carrying capacity of the cable joints and terminations.
e) Dimensional drawings of the conductor accessories.
f) Other relevant details, design drawings, recommended tools to be used with respect to clauses 4.2.1, 4.2.2, 4.4, 4.5 and 4.6.
g) Packing details.
h) Completed schedule of technical particulars as per Appendix 15.3.
i) Type test certificates for the following items conforming to Clause 6.1

9.0 Stock Availability

The bidder is required to show the size of his/her stock holding and the ability to meet the required estimate quantity per annum. The movement of the HV ABC accessories will depend on EFL's project works and for operation and maintenance purposes. Hence, the successful bidder will be required to carry a consignment / safety stock at times to meet EFL's demand within the three year contract period.

10.0 Environmental Considerations

Suppliers are required to comment on the environmental soundness of the design and the materials used in the manufacture of the items tendered. In particular, comments should address such issues as recycling and disposal at the end of service life.

11.0 Reliability

Suppliers are required to comment on the reliability of the equipment and the performance of the materials tendered for a service life of 35 years under the specified system and environmental conditions.

Suppliers are invited to submit any proposals which may increase the anticipated service life of the equipment/ item offered.

12.0 Samples

12.1 Production Samples

Samples of items will be required during the tender assessment period. Samples shall be submitted once a request is make by EFL during the evaluation period.

12.2 Sample Delivery

When samples are required, production samples shall be delivered freight free, suitably packaged and labelled with the following information:

a) Name of tenderer and this contract No.
b) Contract Item Numbers
c) Any supporting data on features or characteristics

The Purchaser may at its discretion either purchase the samples at the tendered price or return the samples to the respective tenderer after the contract has been awarded. Samples shall be supplied within 7 days of official request.

The lead time should be confirmed by the supplier from the time of EFL raising the order.

13.0 Special Tools

The bidders are required to provide a list of tools that will be used during the installation of the items offered. If there are any special tools required, bidders are required to offer it with the equipment for ease of installation.

14.0 Training

The manufacture/ supplier shall be responsible to provide the EFL with the relevant trainings required in terms of installation, setup, maintenance, and other details of the equipment's offered. There shall be 2 training sessions, one in Navutu and one in Kinoya depots with approximately 25 persons in each session. The equipment required for training shall be the responsibility of the manufacture/supplier. The training shall be provided at zero cost to EFL.

Training material in the form of drawings, instructions and/or audio visuals shall also be provided for the items accepted under the offer.

This material shall include but is not limited to the following topics:

- Handling
- Storage
- Application
- Installation
- Maintenance
- Environmental performance
- Electrical performance
- Mechanical performance
- Disposal

15.0 Appendix

15.1 Component Breakdown and Price Schedule

Bidders shall complete the following component breakdown and price schedule list and submit a copy with the offer.

List of Components	Unit Prices
Suspension small angle assembly	
Suspension bracket	
Component breakdown required	
Suspension clamp and movable connecting link	
Component breakdown required	
Dead end assembly	
Tension bracket	
Component breakdown required	
Tension (dead end) clamp	
Component breakdown required	
Large angle assembly	

Note to Bidders: Detail breakdown of the components shall be provided.

15.2 Reference List of Customers

Bidders shall complete the following table with the detailed reference list of customers already using equipment offered during the last 5 years with particular emphasis on units of similar design and rating.

Utility Name	Location and Address	Contact Person	Contact Details (Email, phone number, etc.)	Using Item Since:

15.3 Technical Details – HVABC Accessories

All tenderers are required to complete and submit a copy of this form with their bid submissions.
A separate schedule is to be provided for each item offered.

Particulars	Guaranteed Values as per Tender
Applicable conductor particulars	
a) Nominal cross section area of the phase conductor (mm^2)	
b) Nominal cross section area of the messenger wire (mm^2)	
Material	
a) Suspension small angle assembly	
i. Triangular suspension hardware	
ii. Suspension clamp with movable connecting link	
iii. Clamping bolt	
b) Large Angle/Dead End assembly	
i. Tension bracket	
ii. Dead end clamp	
Minimum Breaking Load of:	
a) Suspension clamp (kN)	
b) Triangular suspension bracket (kN)	
c) Tension Clamp (kN)	
d) Tension bracket (kN)	
e) Large angle assembly (kN)	
f) Insulated cable joints (kN)	
Voltage withstand capability of;	
a) Suspension clamp (kV)	
b) Tension Clamp (kV)	
Characteristics of termination & jointing components	
a) Voltage rating applicable (kV)	
b) Specific creepage distance of the terminations (mm)	
c) Maximum current carrying capacity of joints (A)	
d) Maximum current carrying capacity of terminations (A)	

e) Special tools required for joints	
f) Special tools required for terminations	
Are all the offered items suitable for poles types as per appendix 15.10? (Yes/No)	
Whether certified copy of AS/NZS ISO 9001 in accordance with clause 5.0 is furnished with the offer? (Yes/No)	
Whether the entire Type Test certificates in accordance with clause 6.1 furnished with the offer? (Yes/No)	
Whether the information as per clause 8.0 supplied with the offer? (Yes/No)	

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

15.4 Submission Requirements

All tenderers are required to complete and submit a copy of the submission requirements with their bid submissions.

Requirements	Response from Bidders
Completed technical details (Clause 14.1) and submission requirements (Clause 14.2). (Yes/No)	
Validity of bid (120 days required) (Yes/No)	
Training included as part of Bid. (Yes/No)	
Witnessing included as part of bid. (Yes/No)	
Payment conditions.	
Delivery Term. (CIF preferred)	
Price review period after award of tender. (months)	
Country of manufacture. (To be provided separately for all items).	
Origin of materials for manufacturing. (To be provided separately for all items).	
Bidders company profile outlining financial, technical and production capabilities.	
Quality management system used in the production of cables, attached certificate.	
Health, Safety and Environmental plans.	
Detailed receiving, handling and storage details.	
Minimum warranty period from time of acceptance of cables.	
Sample inspection and test plan.	
Typical installation manual for cables.	
Disposal method after service life.	
Complete dimensional drawing of the conductor accessories.	
List of Type test certificates provided. (As per Clause 6.1)	
Sample routine test certificates.	
Technical literature describing the constructional and operational features.	
The standard to which the goods have been manufactured.	
Recommended current carrying capacity of the cable joints and terminations.	
Other relevant details & recommended tools to be used with respect to clauses 4.2.1, 4.2.2, 4.4, 4.5 and 4.6.	

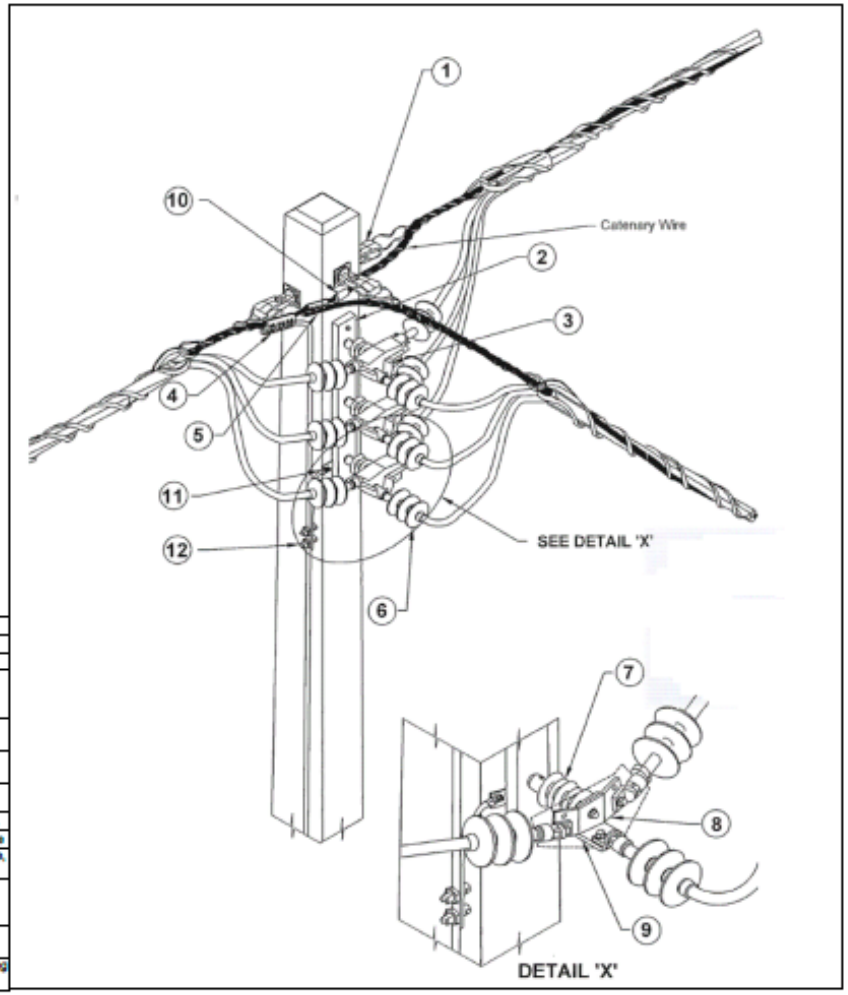
Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

15.5 Typical Layout of 11kV ABC T-off

A3	01	E24	022(5)



ITEM NO.	DESCRIPTION
1	Deadend Assembly
2	Insulator Mtg Bracket
3	Connection Cover(Animal Protection)
4	PG Clamp,Bi-Metal [For Earthing Arrangement)
5	PG Clamp, Al (Suitable for messenger wire)
6	HVABC Term Kit/3 95/105mm²
7	Surge Arrester 11kv, 10kA
8	Copper Bus Conductor Plate
9	Copper Bus Conductor Plate, T-Off
10	Conductor Crimping Ferrule(Suitable for messenger wire)
11	Eye Lug(For earthing arrangement)
12	Split Bolt Type D(For earthing arrangement)

11kV ABC T - OFF

No.	REVISION	DATE	BY	CHK	PSD	APP
0		22.06.18	SK			

EFL Energising Our Nation

DRAWN	SHANE	22.06.18
CHECKED		
CHIEF DRAUGHTSMAN		
TEAM LEADER DESIGN & PLANNING		
ENGINEER		
HEAD OF DEPARTMENT		

ENERGY FIJI LIMITED

11kV ABC T - OFF

DRAWING NUMBER: A3 | 01 | E24 | 022(5)

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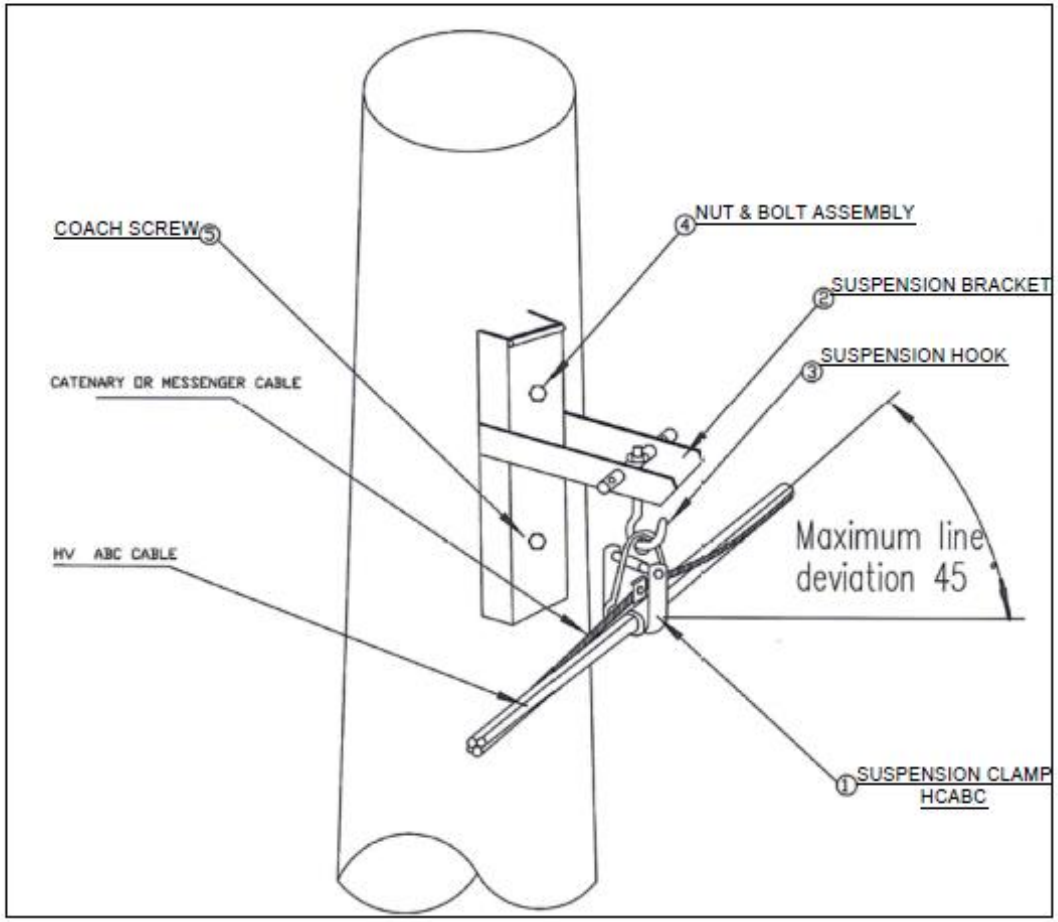
15.6 Typical Layout of HV ABC Suspension Assembly

A3	01	E24	022(4)



HVABC SUSPENSION ASSEMBLY

No.	REVISION	DATE	BY	CHK	PSD	APP
0		22.06.18	SK			

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DRAWN	SHANE	22.06.18
CHECKED		
CHIEF DRAUGHTSMAN / TEAM LEADER DESIGN & PLANNING		
ENGINEER		
HEAD OF DEPARTMENT		

ENERGY FIJI LIMITED

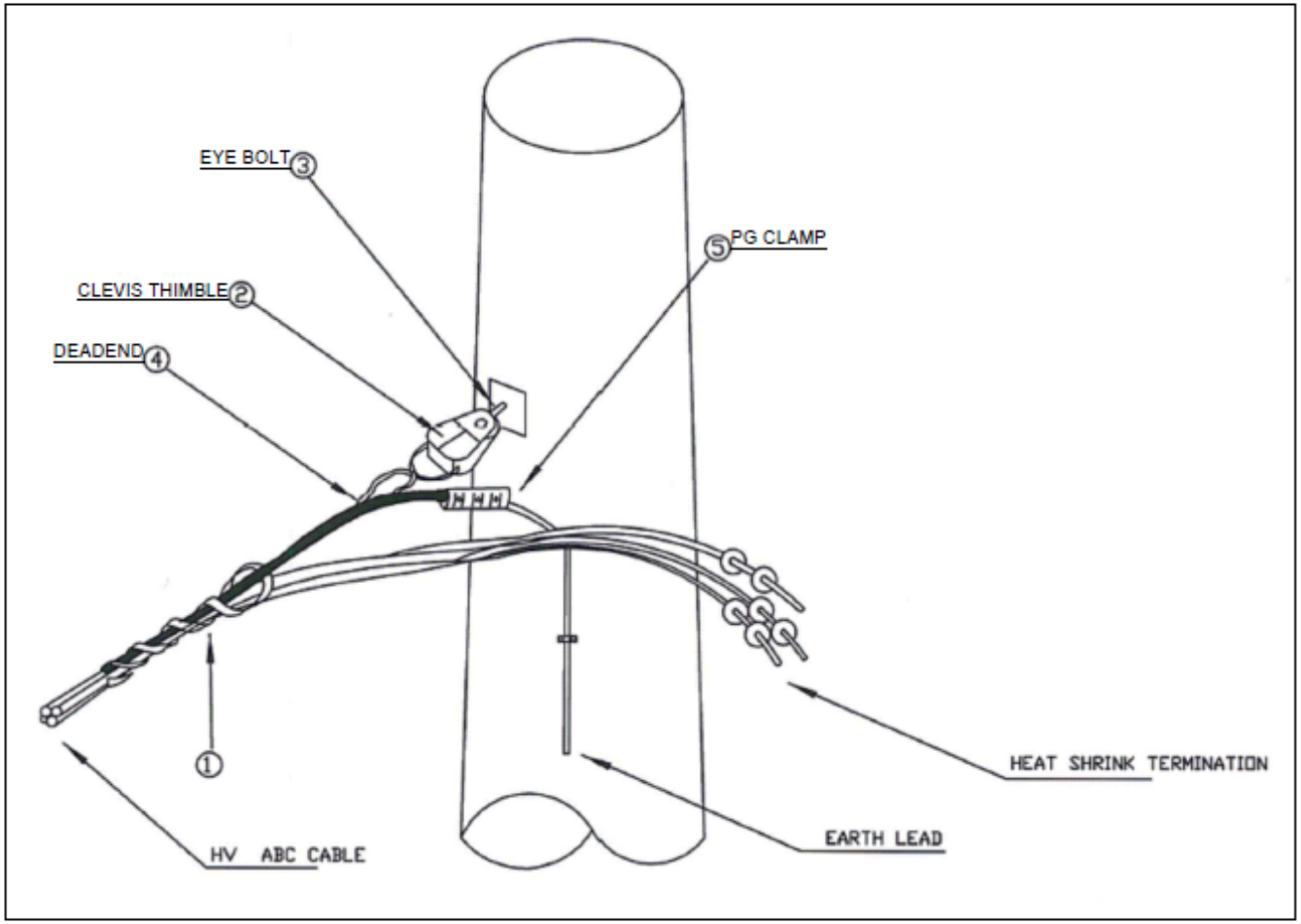
HVABC SUSPENSION ASSEMBLY

DRAWING NUMBER: A3 | 01 | E24 | 022(4)

SCALE 1:1000

15.7 Typical Layout of HV ABC Termination Assembly

A3	01	E24	022(3)



HVABC TERMINATION ASSEMBLY

								DRAWN	SHANE	22.06.18	ENERGY FIJI LIMITED
								CHECKED			
								CHIEF DRAUGHTSMAN			
								TEAM LEADER DESIGN & PLANNING			HVABC TERMINATION ASSEMBLY
	0		22.06.18	SK				ENGINEER			DRAWING NUMBER: A3 01 E24 022(3)
	No.	REVISION	DATE	BY	CHK	PSD	APP	HEAD OF DEPARTMENT			SCALE 1:1000

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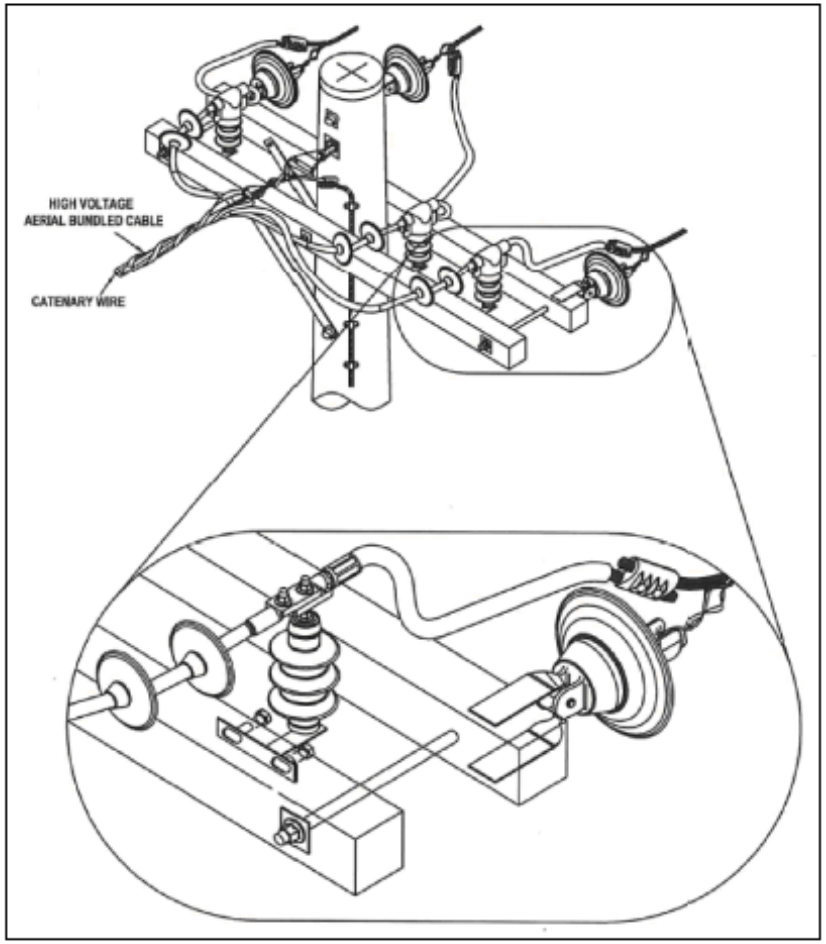
15.8 Typical Layout of HV ABC Wire Assembly

A3	01	E24	022(2)



HVABC TO WIRE
ASSEMBLY

No.	REVISION	DATE	BY	CHK	PSD	APP
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DRAWN	SHANE	22.06.18
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CHIEF DRAUGHTSMAN		
TEAM LEADER DESIGN & PLANNING		
ENGINEER		
HEAD OF DEPARTMENT		

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HVABC TO WIRE
ASSEMBLY

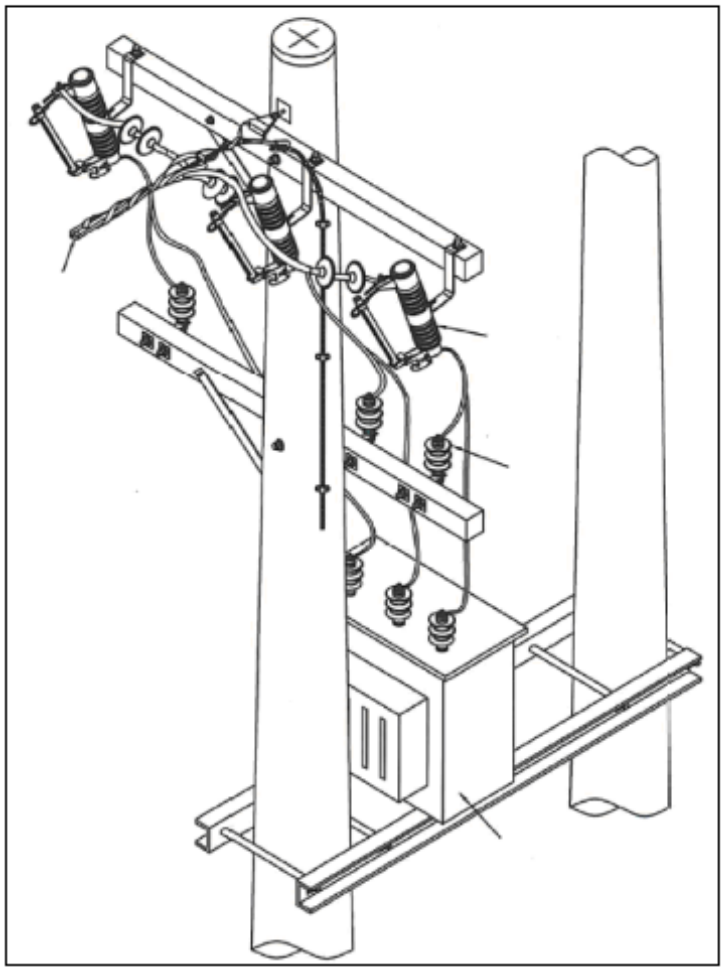
DRAWING NUMBER

A3	01	E24	022(2)

SCALE 1:1000

15.9 Typical Layout of HV ABC Arrangement to Transformer

A3	01	E24	022(1)



HVABC TYPICAL ARRANGEMENT
TO TRANSFORMER

No.	REVISION	DATE	BY	CHK	PSD	APP
0	AMMENDMENTTITLE	XX.XX.98	RR			

EFL Energising Our Nation

DRAWN	RAULUI.R	DATE
CHECKED		
CHIEF DRAUGHTSMAN TEAM LEADER DESIGN & PLANNING		
ENGINEER		
HEAD OF DEPARTMENT		

ENERGY FIJI LIMITED

HVABC TYPICAL ARRANGEMENT
TO TRANSFORMER

DRAWING NUMBER			
A3	01	E24	022(1)

SCALE 1:1000

15.10 Standard EFL 10.2 and 11 m Concrete Poles