



TECHNICAL SPECIFICATION FOR EARTH WIRE BY PREFERRED SUPPLIER

ENERGY FIJI LIMITED

MR05/2019

Revision History & Document Control

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1	Prepared by	Rajiv Singh		15/01/18
2	Reviewed		Basant Kumar	16/01/19

Next Scheduled Revision

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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.

This document outlines the technical requirements for earth wire for use in EFL's sub-transmission networks.

The items covered under this specification are tabulated below.

No.	Stock Code	Item Description
1	I03956	Earth Wire - SC/GZ

This Specification covers the general requirements of design, manufacture, testing, supply and delivery of earth wires for use in overhead sub-transmission systems.

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.

AS 1222.1	Steel conductors and stays - Bare overhead Galvanized (SC/GZ)
AS 3822	Test methods for bare overhead conductors
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4791	Hot-dip galvanized (zinc) coatings on ferrous open sections, applied by an in-line process
AS/NZS 4792	Hot-dip galvanized (zinc) coatings on ferrous hollow sections, applied by a continuous or a specialized process
AS 2841	Galvanized steel wire strands
AS/NZS 1660	Test methods for electric cables, cords and conductors. Part 1 - Conductors and metallic components
AS/NZS 3822	Test methods for bare overhead conductors
AS/NZS 3983	Metal drums for insulated electric cables and bare conductors
IEC 61089	Round wire concentric lay overhead electrical stranded conductors
AS/NZS ISO 9001	Quality management system - Requirements

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

3.0 System Conditions

3.1 Environmental Conditions

The earth wires shall be suitable for outdoor installation and shall be designed to withstand the following service conditions.

Description		Conditions
Atmosphere Pollution Level	:	Very heavy (IEC 815)
Ambient Temperature	:	Peak: 40°C 24 Hour Average: 30°C Annual Average: 22°C Minimum: 10°C
Relative Humidity (Average)	:	85%
Rainfall	:	Annual Average: 2663mm
Wind Speed	:	Sustained: 55 m/s Gusts: 70 - 110 m/s
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	33kV
System Highest Voltage	36kV
System Frequency	50Hz
Number of Phases	3
System Earthing	Effectively Earthed
Impulse Withstand Voltage (peak)	200kV
Power Frequency Withstand Voltage (rms)	70kV
Design Symmetrical Fault Level	31.5 kA

4.0 Design and Construction

Equipment offered by the bidders will need to conform to this Specification.

4.1 General

The Steel Conductor Zinc Galvanized (SC/GZ) conductor construction shall be as follows:

Conductor	Fabrication Requirements
SC/GZ	Galvanized steel conductors constructed in accordance to AS 1222.1

The earth wire shall have the following properties as per AS 1222.1:

Stranding and wire diameter (no/mm)	Nominal overall diameter (mm)	Cross-sectional area (mm ²)	Approximate mass (kg/km)	Breaking load (kN)
7/2.75	8.3	41.6	328	49.0

4.2 Rigidity of Conductor

The wire shall be so stranded that the conductor is essentially free from the tendency to untwist or spring apart when cut.

The complete conductor shall be uniformly cylindrical and shall be capable of withstanding normal handling during manufacturing, transportation and installing without being deformed from its cylindrical form.

4.3 Grease Requirements

The earth wire shall be greased for additional corrosion protection in accordance with AS 1222.1.

The grease shall be suitable for use over a temperature range of 10 degree Celsius to 40 degree Celsius without becoming hard or brittle and the grease shall remain non migratory.

4.4 Lay Ratio

The lay ratio of the earth wire shall be as follows:

Conductor	Lay
SC/GZ	AS 1222.1 for galvanized steel conductors, where the direction of lay for the outermost layer shall be right-handed

5.0 Quality Assurance

The manufacture shall submit evidence that the design and manufacture of the earth wires are 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 Testing

Earth wires shall be tested in accordance with AS 1222.1 and AS 3822 and copies of certificated shall be submitted with the offer.

The earth wire breaking load tests shall be carried out in accordance with Clause 6.2 of AS 3822.

6.2 Routine Tests

Routine test are intended to eliminate defective units and shall be carried out during the manufacture of the earth wires.

Routine testing in accordance with the appropriate Australian standard shall be conducted before stranding, together with Lay Ratio measurements on all layers after stranding.

The vendors shall supply duly certified copies of the routine test preformed on the earth wires with the offer.

6.3 Witnessing of Tests

The EFL reserves the right to witness all testing. The Supplier shall give EFL reasonable notice of when testing will be carried out and one (1) EFL engineers to be invited to witness the testing.

6.4 Compliance

The Supplier shall state in writing that their offer complies with the relevant Standards and this specification. If the Supplier is offering equipment manufactured to an equivalent standard, full details of that standard must be given including a copy written in English.

7.0 Additional Requirements

7.1 Packaging

The earth wires shall be supplied in steel drums in accordance with the requirements of AS 3983.

Heavy weatherproof paper, cardboard or other suitable material shall be placed between the conductor and barrel and flange surfaces of steel drums. This material shall remain attached to the drum during unreeling.

The following shall be clearly marked on the drums:

- a) Manufacture's name
- b) Manufacture's part reference number
- c) EFL stock code
- d) Compliance standards
- e) Batch number
- f) Earth wire description (strands, diameter per strand and overall diameter)
- g) Package weight
- h) Length of earth wire in drum
- i) Arrow to indicate direction of rotation of the drum marked with the words "ROLL THIS WAY"

7.2 Storage

All drums shall be suitable for outdoor storage for a minimum period of 36 months under the environmental conditions of Clause 3.1. For steel drums, the vendor shall comment on the longevity of the measures adopted as described in AS 3983 to prevent galvanic reaction between metals.

8.0 Technical Information to be supplied

The following information shall be supplied with the offer:

- a) Catalogue describing the items and indicating the model number
- b) Constructional features and material used for components
- c) Complete dimensional drawings
- d) Quality assurance certificate as per clause 5.0
- e) Duly completed schedule of guaranteed technical particulars
- f) Manufacturing experience and list of purchasers
- g) Type and routine test certificates as per clauses 6.1 and 6.2

Offers of vendors who fail to furnish above particulars shall be rejected.

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 earth wires will depend on EFL's project works and for operation and maintenance purposes. An estimate movement of the item are outlined in the table below but it will not be purchase as a lump sum quantity at once. 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.

No.	Stock Code	Item Description	Approximate 3 Year Usage
1	I03956	Earth Wire - SC/GZ	2312m

10.0 Product Warranty Period

The bidder is required to provide the warranty period as part of the proposal. A minimum warranty period of twenty-four (24) months from time of dispatch from factory shall be provided.

11.0 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.

12.0 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.

13.0 Samples

13.1 Production Samples

Samples of items may be required during the tender assessment period. Samples would normally only be required from tenderers who have previously not supplied the items to the Purchaser.

13.2 Sample Delivery

When samples are required, production samples shall be delivered freight free, suitably packaged and labelled including reference to the Tender Number.

Samples shall be supplied within 7 days of official request.

14.0 Training

Training material in the form of drawings, instructions and/or audio visuals shall 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 Price Schedule

All tenderers are required to complete and submit a copy of the price schedule with their bid submissions. EFL required the bidders to provide the prices in CIF basis.

No.	Stock Code	Item Description	Price (CIF)
1	I03956	Earth Wire - SC/GZ	

15.2 Technical Data - Earth Wire

All tenderers are required to complete and submit a copy of this form with their bid submissions.

Particulars	Unit	Requirements	Bidders Response
Manufacturer's name			
Place of manufacture			
Origin of materials used for manufacturing			
Type test certificates provided (Yes/No)			
Number of strands	No.	7	
Diameter of each strand	mm	2.75	
Nominal overall diameter	mm	8.3	
Cross sectional area	mm ²	41.6	
Nominal mass	kg/km	328	
Minimum calculated breaking load	kN	49	
Resistance of earth wire per unit meter	Ω/m	Bidder to state	
Type of grease		Bidder to state	
Drop point of grease	°C	Bidder to state	
Safety datasheet for grease included	Yes/No	Bidder to state	
Packaging Details:			
Drums used		Metal	
Length of earth wire per drum	m		
Mass of drum	kg		
Gross weight of earth wire and drum	kg		

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

15.3 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 15.2) (Yes/No)	
Witnessing included as part of bid. (Yes/No)	
Validity of bid (180 days required) (Yes/No)	
Payment conditions.	
Delivery Term. (CIF preferred)	
Price review period after award of tender. (months)	
Bidders company profile outlining financial, technical and production capabilities.	
Detailed reference list of customers already using equipment offered during the last 5 years with particular emphasis on units of similar design and rating.	
Quality management system used in the production of wires, attached certificate.	
Minimum warranty period from time of acceptance of wires.	
Typical installation manual for wires.	
Disposal method after service life.	
Complete dimensional drawing.	
List of Type test certificates provided. (As per Clause 6.1)	
Sample routine test certificates.	

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

TENDER SUBMISSION CHECK LIST

The Bidders must ensure that the details and documentation mention below must submitted as part of their tender Bid

Tender Number _____

Tender Name _____

1. Full Company Name: _____

(Attach copy of Registration Certificate)

2. Director/Owner(s): _____

3. Postal Address: _____

4. Phone Contact: _____

5. Fax Number: _____

6. Email address: _____

7. Office Location: _____

8. TIN Number: _____

(Attach copy of the VAT/TIN Registration Certificate - Local Bidders Only)

9. Company Registration Number: _____

(Attach copy of the Business License)

10. FNPF Employer Registration Number: _____

(For Local Bidders only)

11. Contact Person: _____

I declare that all the above information is

correct. Name: _____

Position: _____

Sign: _____ Date: _____

15.4 Tender Submission - Instruction to Bidders

The Energy Fiji Limited (EFL) ("The Employer") is requesting proposal for the Preferred Supplier for Tender No. **MR05/2019** for EFL's consumption to carryout repair, maintenance and Construction of Power line Network in Fiji.

The bidder shall seal the original hard copy of the technical proposal, the original hard copy of the financial proposal and each copy of the technical proposal and each copy of the financial proposal in **separate envelopes** clearly marking each one as: "ORIGINAL ", "COPY NO. 1 "etc. as appropriate.

The bidder shall seal the original bids and each copy of the bids in an inner and an outer envelope, duly marking the envelopes as "ORIGINAL" and "COPY".

The inner and outer envelopes shall be addressed to the Employer at the following address:

Tuvitu Delairewa
General Manager Commercial
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 185
Facsimile: 679 331 1882
Email: TDelairewa@efl.com.fj

The envelopes shall bear the following identification:

- Bid for: **MR05/2019: Preferred Supplier for Earth Wire**
- **DO NOT OPEN BEFORE 1600hrs 6th February 2019**
- Address and contract details of bidder **on the reverse of the envelope**

It is mandatory for Bidders to upload a copy of their bid in the TENDER LINK Electronic Tender Box no later than 4:00pm, on Wednesday **6th February, 2019**. The uploaded tender bids shall be in two (2) separate files clearly labelled as Technical Proposal and Financial Proposal respectively.

Bids shall remain valid for a period of **180 days** after the date of opening of technical and financial proposals.

To register your interest and tender a response, view 'Current Tenders' at: <https://www.tenderlink.com/efl>

For further information contact The Secretary Tender Committee, by e-mail TDelairewa@efl.com.fj

Hard copies of the Tender bid will also be accepted after the closing date and time provided a soft copy is uploaded in the e-Tender Box and hard copy is dispatched to courier before the closing date and time. Please note courier submission date should be forwarded to EFL with your bid.

Tenders received after **4:00pm** on the closing date of **Wednesday 6th February, 2019**:

- Will not be considered.
- Lowest bid will not necessarily be accepted as successful bid
- **It is the responsibility of the bidder to pay courier chargers and all other cost associated with the delivery of the hard copy of the Tender submission including any Duties/Taxes. Hard copies of the Tender submission via Post Box will not be considered.**

Extension of tender closing date: Bidders are to note that if they require extension on the tender closing date, they are required to request for an extension 3 working days prior to the initial tender closing date.