



**TECHNICAL SPECIFICATION FOR
PREFERRED SUPPLIER FOR SUPPLY OF
12kV AND 36kV ISOLATORS**

ENERGY FIJI LIMITED

MR 376/2018

REVISION HISTORY & DOCUMENT CONTROL

Rev no.	Notes	Prepared By	Reviewed By	Date of Issue
1	Draft - Issued for review - 33kV	Amitesh C		18/9/17
2	Draft - Issued for review - 12kV	Nitin N Bali		13/12/17
3	Complied and Reviewed		Rajiv Singh	10/07/18

NEXT SCHEDULED REVISION

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

TABLE OF CONTENT

REVISION HISTORY & DOCUMENT CONTROL	2
NEXT SCHEDULED REVISION	2
1.0 INTRODUCTION.....	5
2.0 REFERENCES	6
2.1 Applicable Standards	6
3.0 SYSTEM CONDITIONS.....	7
3.1 Environmental Conditions	7
3.2 System Conditions.....	7
4.0 DESIGN AND CONSTRUCTION.....	8
4.1 Ratings	8
4.2 Operation	8
4.3 Mounting	8
4.4 Contacts	9
4.5 Insulators	9
4.6 Terminal Connections	9
4.7 Earthing Attachment	9
4.8 Corrosion Protection.....	9
4.9 Vibration and Impact	10
4.10 Corona.....	10
4.11 Marking.....	10
5.0 QUALITY ASSURANCE	11
6.0 PERFORMANCE AND TESTING	11
6.1 Type Tests	11
6.2 Routine Tests	11
6.3 Batch Test for Insulators (See AS 4398.2).....	11
6.4 Witnessing of Tests	11
7.0 PACKAGING AND MARKING.....	11
7.1 General	11
7.2 Marking.....	11
7.3 Storage	11
8.0 TECHNICAL INFORMATION TO BE SUPPLIED	12
9.0 STOCK AVAILABILITY.....	12
10.0 PRODUCT WARRANTY PERIOD	12
11.0 ENVIRONMENTAL CONSIDERATIONS	12
12.0 RELIABILITY.....	12

13.0	SAMPLES	12
13.1	Production Samples	12
13.2	Sample Delivery	12
14.0	TRAINING	13
15.0	APPENDIX.....	14
15.1	Technical Data.....	14
15.2	Typical Drawing for 12kV Single Pole Isolator.....	15
15.3	Submission Requirements.....	17

1.0 INTRODUCTION

Energy Fiji Limited [EFL] is a sole utility business unit in Fiji responsible for the power production, transmission, distribution and retailing to its valued customers around the Nation.

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.

This document outlines the technical requirements for 12 and 36 kV single pole Isolators for use in EFL's distribution and sub-transmission network. Isolators are primarily used as mechanical switching devices which provide in the open position, an isolating distance.

The items covered under this specification are tabulated below.

Stock Code	Item Description
105089	12kV Single Pole Isolator
105095	36kV Single Pole Isolator

This Specification covers the general requirements of design, manufacture, testing, supply and delivery of 12 and 36 kV single pole Isolators for overhead distribution and 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/NZS 62271.102	High-voltage switchgear and control gear - Part 102: Alternating current disconnectors and earthing switches
AS 1154	Insulator and conductor fittings for overhead power lines
AS 1214	Hot-dip galvanised coatings on threaded fasteners (I.S.O. metric coarse thread series)
AS/NZS 60625	High voltage switches - Switches for rated voltages above 1kV and less than 52kV
AS 1856	Electroplated coatings - silver
AS 2650	Common Specifications for high voltage a.c. switchgear and controlgear standards
AS 2837	Wrought alloy steels - Stainless steel bars and semi-finished products
AS 2947	Insulators - Porcelain and glass for overhead power lines - Voltages greater than 1000 V a.c.
AS 4169	Electroplated coatings - Tin and tin alloys
AS 4360	Risk Management
AS 4398	Insulators - Ceramic or glass - Station post for indoor and outdoor use - Voltages greater than 1000 V a.c.
AS 4680	Hot-dipped galvanised (zinc) coatings on fabricated ferrous articles
AS 62217	Polymeric insulators for indoor and outdoor use with a nominal voltage > 1000 V - General definitions, test methods and acceptance criteria
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 EFL for resolution.

3.0 SYSTEM CONDITIONS

3.1 Environmental Conditions

The isolators 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	33kV
System Highest Voltage	12kV	36kV
System Frequency	50Hz	50Hz
Number of Phases	3	3
System Earthing	Effectively Earthed	Effectively Earthed
Impulse Withstand Voltage (peak)	95kV	200kV
Power Frequency Withstand Voltage (rms)	28kV	70kV

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 Ratings

The isolators shall have the following ratings:

Particulars	Units	Requirement	
Rated Voltage	kV	12	36
Rated Frequency	Hz	50	50
Continuous Operating Current	A	630	400
Short Time Withstand Current (3 sec)	kA	25	12.5
Rated Peak Withstand Current	kA	50	31
Lighting Impulse Withstand Voltage (BIL):			
Between Phases and to Earth (Peak)	kV	110	170
Across Isolating Distances (Peak)	kV	110	230
Lighting Impulse Withstand Voltage (Peak)	kV	150	170
Wet Power Frequency Withstand Voltage	kV	50	70
Creepage Distance	mm	496	950
Dry Arcing Distance	mm	312	400

4.2 Operation

A 20mm minimum internal diameter ring shall be provided at the moving end of the isolator blade to enable the operation of the isolator switch using a standard operating rod fitted with a hook/link stick. The force required for such operation shall not be greater than 250 N.

The top contact support of the isolator shall be provided with hooks suitable for attachment of a portable load breaking tool.

The bottom hinge joint assembly of the isolator shall be provided with a removable stop to restrict the movement of the blade when in open position, to 90° from the closed position.

4.3 Mounting

The angle of inclination of the isolator blade shall be sufficient to allow ease of operation with due regard to the safety of the operator.

The isolator shall be capable of being mounted on wooden crossarms. Bidders are advised to provide options for 12kV isolator for single and double crossarm mounting. The bidders are required to provide all the required mounting bolts/nuts/washers assembly with the isolators for the following crossarm types:

- Wooden crossarm for 12kV isolators - 2m x 100mm x 75mm
- Wooden crossarm type 1 for 36kV isolators - 3m x 150mm x 100mm
- Wooden crossarm type 2 for 36kV isolators - 6m x 200mm x 150mm

Bidders are also advised to provide any other fittings as required for jumper wires such as U bolts and shall provide complete dimensional drawings with the offer.

A suitable locking arrangement shall be provided to prevent rotation of the isolator about the mounting bolt when in service.

4.4 Contacts

All electrical contact surfaces are to be silver plated in accordance with AS 1856 to ensure that the thickness of plating provides durability of the contact surfaces over a service life of 35 years.

All contacts shall be greased, self-aligning and shall have wiping action to remove oxide or other contamination on the contact surfaces and constructed to eliminate arcing damage to the main contacts. As the hinge and blade may be subject to operation from an off-center position they shall be of robust construction to align correctly under this condition.

4.5 Insulators

The insulator shall be a single piece, fully vitrified non-puncturable porcelain, polymer or silicon rubber type in accordance with AS 4398 and AS 62217. The preferred color is munsell grey. The minimum electrical characteristics of each insulator shall be as stated in Clause 4.1.

The insulator shall be of adequate mechanical strength to withstand the loads applied during the opening and closing cycles.

4.6 Terminal Connections

A terminal palm of 3mm minimum thickness shall provide for the connection of up to two cables on both the supply and load sides of the unit and shall satisfy the temperature rise limits in accordance with Clause 4.4 of AS 62271.102.

The connections shall be designed for use with aluminium, copper or steel conductors and to minimize the effects of electrolytic corrosion of dissimilar metals.

The connectors provided shall be a M12 x 40mm fully threaded stainless steel bolt and nut provided on both the supply and load side terminal palm and fitted with two stainless steel round washers and a stainless steel Belleville or spring washer so as to provide a positive locking pressure at all times when tightened.

4.7 Earthing Attachment

The bottom hinge section of the isolator unit shall be provided with an earth attachment device satisfying the following requirements:

- a) Be capable of supporting the weight of the portable earthing cables (nominally 35kg) and not allow accidental detachment of the portable earths.
- b) Have a 1 second withstand current rating of 6kA (minimum).
- c) Provide a clearance of 500mm (minimum) from the live parts to the earth attachment point.
- d) Be orientated in-line with the isolator so that the device does not interfere with the operation of the isolator or reduce the phase to phase clearances.

4.8 Corrosion Protection

The hinge and latch mechanisms of the isolator switch shall be constructed of corrosion resistant metals and shall include no ferrous parts other than stainless steel.

All current carrying parts shall be of a high electrical conductivity, corrosion resistant metal

All nuts, bolts and washers other than those associated with the mounting bracket shall be stainless steel in accordance with AS 2837. The bolts and washers shall be grade 316 and to avoid binding, the nuts should be grade 304 and a suitable lubricant shall be applied to the threads of all stainless steel bolts before tightening. The lubricant shall not contain graphite.

All support brackets and other ferrous parts of the units other than stainless steel, shall be galvanized in accordance with AS 4680.

4.9 Vibration and Impact

The blades shall be self-latching in the closed position or provided with a safety latch to prevent maloperation due to gravity, vibration, wind pressure, electromagnetic forces or shocks caused by minor vehicle impact on the pole.

4.10 Corona

Corona and Radio Interference Voltages shall be avoided by eliminating sharp edges, points or loose metal fittings on energized parts.

4.11 Marking

The isolator shall be clearly and durably marked with the year of manufacture and in accordance with AS 62271.102.

5.0 QUALITY ASSURANCE

The manufacture shall submit evidence that the design and manufacture of the isolator 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

Test reports on the following type tests shall be provided:

- a) Dielectric Tests. (Refer Clause 6.2 of AS 62271.102).
- b) Temperature - Rise Tests. (Refer Clause 6.5 of AS 62271.102)
- c) Short-time withstand current and peak withstand current tests. (Refer Clause 6.6 of AS 62271.102).
- d) Mechanical endurance test. (Refer Clause 6.102 of AS 62271.102).

6.2 Routine Tests

Routine Test Certificates shall be supplied with each batch delivery in accordance with Clause 7 of AS 62271.102.

6.3 Batch Test for Insulators (See AS 4398.2)

Batch Test Certificates for the insulators shall be provided with each delivery.

6.4 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 two (2) EFL engineers to be invited to witness the testing.

7.0 PACKAGING AND MARKING

7.1 General

- a) Individual cartons shall contain one isolator unit and accessories.
- b) The cartons must be sufficiently sturdy to allow storage by stacking on a pallet.

7.2 Marking

The following information shall be legibly and indelibly marked on BOTH sides of the crate:

- a) Manufacturer's name and catalogue number
- b) Rated Voltage and Current
- c) Purchase Order Number
- d) Description of contents and gross mass
- e) Handling or lifting instructions where applicable

7.3 Storage

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

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 for the isolators offered complete with fittings
- 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) Test certificates as per clauses 6.1, 6.2 and 6.3

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 isolators 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.

Stock Code	Item Description	Approximate 3 Year Stock Movement
I05089	12kV Single Pole Isolator	492
I05095	36 kV Single Pole Isolator	48

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 Contract Number.

The EFL 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.

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 Technical Data

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

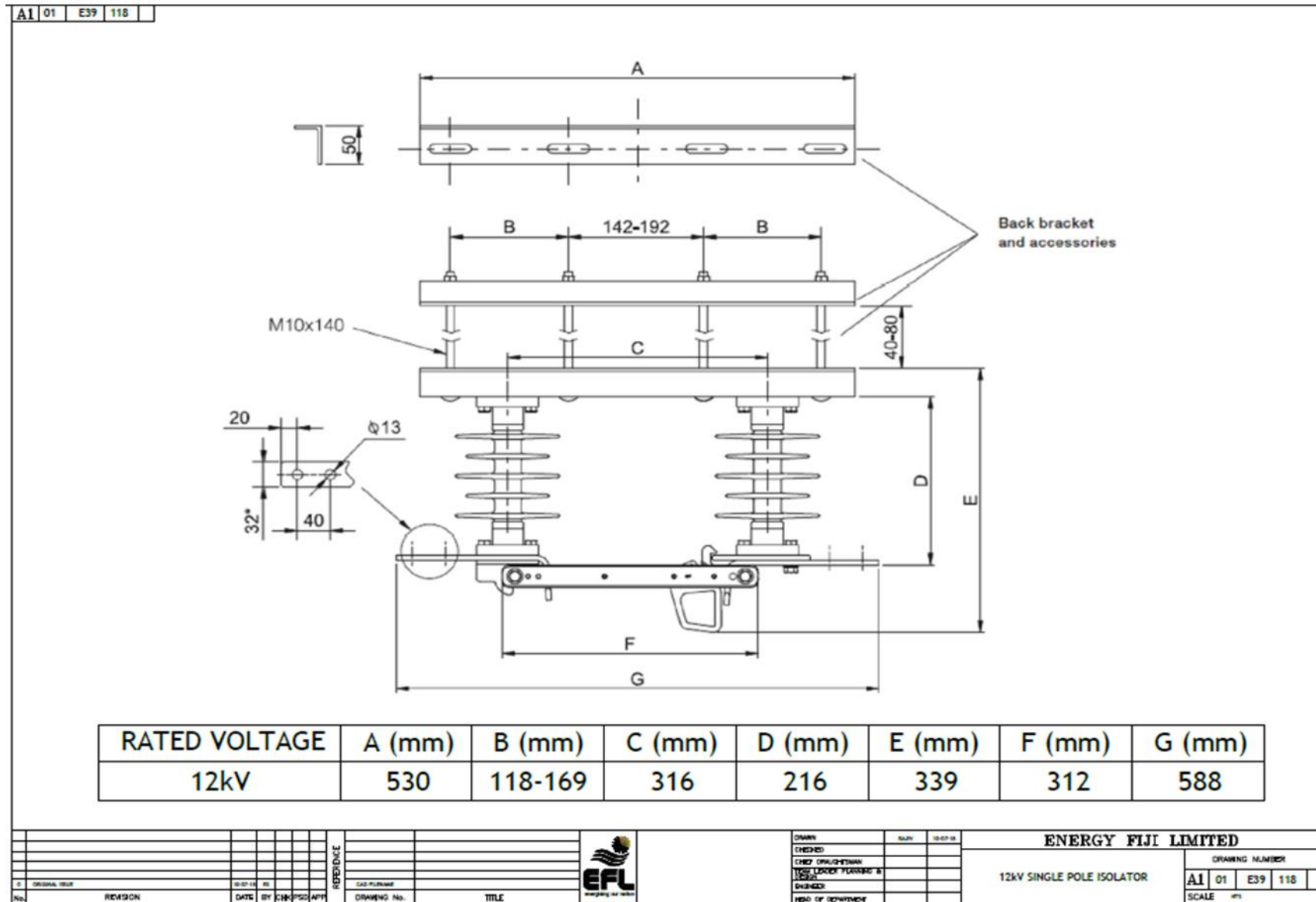
Particulars	Units	Requirements		Bidders Response	
		12kV	36kV	12kV	36kV
Manufacture name					
Country of origin of materials					
Standards used for manufacturing					
Insulator material		Porcelain/ Polymer/ Silicon Rubber			
Type test certificate number					
Rated Voltage	kV	12	36		
Rated Frequency	Hz	50	50		
Continuous Operating Current	A	630	400		
Short Time Withstand Current (3 sec)	kA	25	12.5		
Rated Peak Withstand Current	kA	50	31		
Lighting Impulse Withstand Voltage (BIL):					
Between Phases and to Earth (Peak)	kV	110	170		
Across Isolating Distances (Peak)	kV	110	195		
Lighting Impulse Withstand Voltage (Peak)	kV	150	170		
Wet Power Frequency Withstand Voltage	kV	50	70		
Creepage Distance	mm	496	900		
Dry Arcing Distance	mm	312	400		
Resistance of main circuit	$\mu\Omega$	Bidder to state			
Mechanical endurance	Counts	Bidder to state			
Details of hot dip galvanizations		Bidder to state			
Corrosion protection treatment offered		Bidder to state			
Weight	Kg				

Name of Tenderer: _____

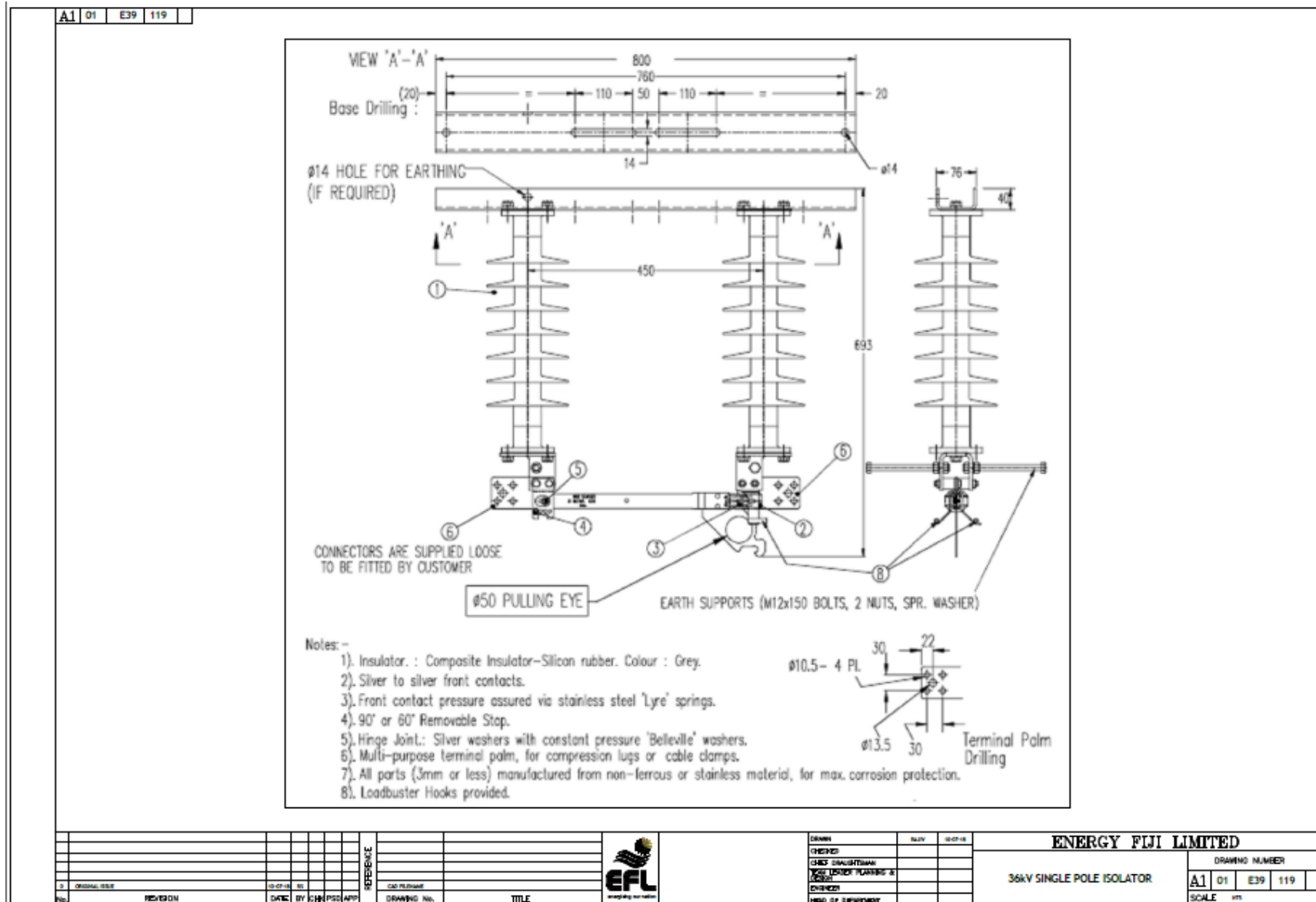
Signature of Tenderer: _____

Date: _____

15.2 Typical Drawing for 12kV Single Pole Isolator



15.3 Typical Drawing for 36kV Single Pole Isolator



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 15.1) (Yes/No)	
Witnessing included as part of bid. (Yes/No)	
Validity of bid (180 day 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 isolators, attached certificate.	
Health, Safety and Environmental plans.	
Detailed receiving, handling and storage details.	
Minimum warranty period from time of acceptance of isolators.	
Sample inspection and test plan.	
Typical installation manual for isolators.	
Disposal method after service life.	
Complete dimensional drawing.	
List of Type, Routine and Batch test certificates provided. (As per Clauses 6.1, 6.2 and 6.3)	

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

15.5 Tender Submission - Instruction to Bidders

It is mandatory for Bidders to upload a copy of their bid in the TENDER LINK Electronic Tender Box no later than **1600hrs, Thursday 15th November, 2018**.

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

In addition, hard copies of the tender, one original and one copy must be deposited in the tender box located at the EFL Head Office, 2 Marlow Street, Suva, Fiji no later than new time and date to be inserted - Addressed as

Tender – MR 376/2018 – Preferred Supplier for the Supply of 12kV and 36kV Isolators

The Secretary Tender Committee
Energy Fiji Limited
Head Office
Suva
Fiji

Hard copies of the Tender bid will be accepted after the closing date and time provided a soft copy is uploaded in the e-Tender Box and it is dispatched before the closing date and time.

Tenders received after **closing time 1600hrs, Thursday 15th November, 2018**.

- 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.