MR 74/2024

PREFERRED SUPPLIER
FOR
DESIGN, MANUFACTURE, TESTING AND SUPPLY OF POLE-MOUNTED AND PLATFORM-MOUNTED DISTRIBUTION TRANSFORMERS

ENERGY FIJI LIMITED

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1 INTRODUCTION AND SCOPE OF WORK

EFL is primarily responsible for generation, transmission and distribution of electricity in Viti Levu, Vanua Levu, Ovalau and Tavueni in Fiji. It owns over twenty (20) power stations and forty (40) substations and switching stations on the islands of Viti Levu, Vanua Levu, Taveuni and Ovalau. EFL owns, operates and maintains a network of 147km of 132kV transmission lines, 534.86km of 33kV lines and over 9,810km of 11kV and 415V distribution lines, as at 31st December 2019. By the end of December 2019, EFL had over 198,000 customers. This included residential, commercial and institutional customers.

EFL is seeking tender bids from reputable transformer manufacturers and suppliers for design, manufacture, testing and supply of pole-mounted and platform-mounted distribution transformers for a period of three years for various project work and operations. .

The pole-mounted and platform-mounted distribution transformers required are as listed below.

EFL Stock Code	Item Description
I04360A	5kVA, 6.35kV/240V, 1-phase, SWER, pole-mounted
I04361	5kVA, 11kV/240V, 1-phase, pole-mounted
I04371	16kVA, 11kV/240V, 1-phase, pole-mounted
I04372	30kVA, 11kV/240V, 1-phase, pole-mounted
I04373	30kVA, 11kV/433V, 3-phase, pole-mounted
I04374	50kVA, 11kV/433V, 3-phase, pole-mounted
I04375	100kVA, 11kV/433V, 3-phase, platform-mounted
I04376	200kVA, 11kV/433V, 3-phase, platform-mounted
I04377A	300kVA, 11kV/433V, 3-phase, platform-mounted
I04415	50kVA, 33kV/433V, 3-phase, platform-mounted
I04416	200kVA, 33kV/11kV, 3-phase, platform-mounted
I04422	300kVA, 33kV/433V, 3-phase, platform-mounted

This tender specification outlines the instruction to bidders, design and performance criteria for the pole-mounted and platform-mounted distribution transformers, and supply of these for use in EFL's distribution networks

2 INSTRUCTIONS TO BIDDERS

2.1 Eligible Bidders

This invitation is open to all Bidders who have sound Financial Background, and have previous experience in design, manufacture, testing and supply of such pole-mounted and platform-mounted transformers.

Bidders shall provide such evidence of their continued eligibility satisfactory to EFL as EFL shall reasonably request. Bidders who are not manufacturers of such transformers shall provide evidence of agency.

Bidders shall not be under a declaration of ineligibility for corrupt or fraudulent practice.

2.2 Eligible Materials, Equipment and Services

The materials, equipment, and services to be supplied under the Contract shall have their origin from reputable companies (as specified by EFL where relevant) and from various countries and all expenditures made under the Contract will be limited to such materials, equipment, and services. Upon request, bidders may be required to provide evidence of the origin of materials, equipment, and services.

For purposes of this Contract, "services" means the works and all related services including design services.

For purposes of this Contract, “origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing or substantial or major assembling of components, a commercial recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

The materials, equipment and services to be supplied under the Contract shall not infringe or violate any industrial property or intellectual property rights or claim of any third party.

2.3 One Bid per Bidder

Each bidder shall submit only one bid. A bidder who submits or participates in more than one bid will cause all those bids to be rejected.

2.4 Cost of Bidding

The bidder shall bear all costs associated with the preparation and submission of its bid and EFL will in no case be responsible or liable for those costs.

2.5 Site Visits

Bidders can visit existing EFL networks by making arrangements to visit existing EFL installations. Bidders are required to familiarize themselves with the existing EFL installations so the solutions they offer does not require modification to existing poles and support infrastructure.

2.6 Contents of Bidding Documents

The bidder is expected to examine carefully the contents of this Bidding document. Failure to comply with the requirements of bid submission will be at the bidder's own risk. Bids which are not substantially responsive to the requirements of the bidding documents will be rejected.

2.7 Clarification of Bidding Documents

A prospective bidder requiring any clarification of the bidding documents may notify EFL in writing by email, addressed to:

Jitendra Reddy
Manager Procurement, Inventory & Supply Chain
2 Marlow Street,
Suva, Fiji
Phone: +679 331 3333 Ext 2320 or
Mobile: +679 999 2400
Email: JReddy@efl.com.fj

EFL will respond to any request for clarification which it receives earlier than 10 days prior to the deadline for submission of bids.

2.8 Amendment of Bidding Document

At any time prior to the deadline for submission of bids, EFL may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by issuing addenda.

2.9 Language of Bid

The bid, and all correspondence and documents related to the bid, exchanged between the bidder and the EFL shall be written in the English language.

2.10 Bid Prices

Unless specified otherwise, Bidders shall quote for the entire facilities on a “single responsibility" basis such that the total bid price covers all the Supplier’s obligations mentioned in or to be reasonably inferred from the bidding documents in respect of the design, manufacture, including procurement and subcontracting (if any), testing and delivery.

Bidders shall give a breakdown of the prices in the manner and detail called for in this bidding document, or any issued addenda.

Bids shall be given on CIF basis. The point of delivery shall be EFL’s Navutu Depot in Lautoka. The term CIF shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce, Paris.

EFL has a marine insurance cover for items it is required for purchase for its project and operational works. Bidders are required to comment if the marine insurance component is covered in their bids.

2.11 Bid Currencies

Prices shall be quoted in a single currency only.

2.12 Bid Validity

Bids shall remain valid for a period of **180 days** from the date of Deadline for Submission of Bids specified in Sub-Clause 21.1.

2.13 Format and Signing of Bids

The bidder shall provide one electronic copy of the Technical and Financial proposals on EFL's electronic tender hosting website; https://www.tenderlink.com/efl

The bid shall contain no alterations, omissions or additions, except those to comply with instructions issued by EFL, or as necessary to correct errors made by the bidder, in which case such corrections shall be initialed by the person or persons signing the bid.

2.14 Sealing and Marking of Bids

Due to the Covid19 restrictions on movements, bidders are encouraged to bid via Tender link Portal.

2.15 Deadline for Submission of Bids

Bids must be received by EFL at the address specified above no later than 1600 hours (Fiji Time) 10th April 2024.

EFL may, at its discretion, extend the deadline for submission of bids by issuing an addendum, in which case all rights and obligations of EFL and the bidders previously subject to the original deadline will thereafter be subject to the deadlines extended.

2.16 Late Bids

Any bid received by EFL after the deadline for submission of bids prescribed above will be rejected.

2.17 Modification and Withdrawal of Bids

The bidder may modify or withdraw its bid after bid submission, provided that written notice of the modification or withdrawal is received by EFL prior to the deadline for submission of bids.

No bid may be modified by the bidder after the deadline for submission of bids.

2.18 Rejection of One or All Bids

EFL reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for the rejection.

2.19 Process to be Confidential

2.19.1. Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process.

2.19.2. Any effort by a bidder to influence EFL's processing of bids or award decisions may result in the rejection of the bidder's bid.

2.19.3. Lowest bid will not necessarily be accepted as successful bid.

2.20 Clarification of Bids

To assist in the examination, evaluation and comparison of bids, EFL may, at its discretion, ask any bidder for clarification of its bid. The request for clarification and the response shall be in writing, but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by EFL in the evaluation of the bids.

2.21 Compliance with Specifications

The tender shall be based on the equipment and work specified and shall be in accordance with the Technical Specification. It should be noted that unless departures from specifications are detailed in Schedules of the Technical Specification, the tender would be taken as conforming to the Specification in its entirety. The Bidder shall tender for the whole of the Works included in the Specification.

3 GENERAL CONDITIONS OF CONTRACT

The General Conditions of Contract shall be based upon AS 4912 – 2002 General Conditions of Contract for Periodic Supply of Goods.

The Conditions of Contract comprises two parts:

1. Part 1 – General Conditions; and
2. Part 2 – Conditions of Particular Application

4 CONDITIONS OF PARTICULAR APPLICATION

1. Interpretation and Construction of Contract

Add the following:

"Bid has the same meaning as tender."

Replace

"*Base contract sum means the sum of the products ascertained by multiplying the quantities of goods stated in Item 13 by the corresponding unit prices, excluding any additions or deductions which may be required to be made under the Contract.*"

With

"*Contract sum means:*

(a) Where the Purchaser accepted a lump sum, the lump sum;

(b) Where the Purchaser accepted unit prices, the sum of the products ascertained by multiplying the quantities of goods and the corresponding unit prices in the

schedule of unit prices; or

(c) Where the Purchaser accepted a lump sum and unit prices, the aggregate of the sums referred to in paragraphs (a) and (b),

Excluding any additions or deductions which may be required to be made under the Contract.

7. Assignment

Replace *"7. Assignment"* with *"7. Assignment and Subcontracting"*

Add *"7.1 Assignment"* after *"7. Assignment and Subcontracting"*

Add the following after paragraph *7.1 Assignment*.

"7.2 Subcontracting

The Supplier shall not subcontract any part of the Contract without the prior written approval of the Purchaser, which approval shall not be unreasonably withheld. Any sub subcontracting shall not relieve the Supplier from any liability or obligation under the Contract. The Supplier shall if requested by the Purchaser provide copies of the proposed subcontract documents without prices."

9. Warranties

Replace "*9. Designated Items*" and its contents with the following

"*9. Warranties*

9.1 Ownership

The Supplier represents and warrants that:

a) It is the legal and beneficial owner of the goods; and
b) That upon payment of the contract sum no person other than the Purchaser will be entitled to hold any interests in, or hold any encumbrance over, the goods.

9.2 Supplier's Warranty

The Supplier represents and warrants that the goods will upon delivery:

a) Comply in all respects with the Contract;
b) Be suitable for the purpose stated in Item 5;
c) Be of merchantable quality;
d) Conform to any sample provided by the Supplier and approved by the Purchaser.
e) In the absence of any specific provision of the Contract, meet any relevant Australian Standard and industry best practice;
f) Be free of design defects;
g) Be, unless otherwise agreed, new.

If the Supplier is in breach of any of the warranties in this clause 9, the Purchaser may, in addition to the Purchaser's other rights and remedies, at any time give 7 days' written notice to the Supplier to rectify such breach, and if the Supplier fails to comply with such notice, the Purchaser may employ others to carry out works required to satisfy the warranty. The cost thereby incurred shall be moneys due and payable to the Purchaser.

The representation and warranties in this clause survive the completion or earlier termination of the Contract and each warranty in this clause is independent of, and is not limited by, reference to any other warranty.

The Supplier shall obtain all warranties relevant to the goods from manufacturer or suppliers or as otherwise specified in the Contract, including any warranties that are provided by any sub-contract and ensure that the Purchaser has the benefit of those warranties. "

19. Delivery

Add the following to 19.1 Date and Place for Delivery, at the end,

"The Supplier must ensure that all goods are properly, safely and securely packaged and labeled for identification and safety as follows:

a) The goods must be individually packaged for transport so that they are protected from all reasonably foreseeable condition which might cause corrosion, deterioration or physical or bearing damage during handlings and transport. All packaging and preservation materials must be supplied by the Supplier; and

b) Each package must be clearly and indelibly inscribed with the Purchaser's name, the address of the delivery place, the Purchaser's contract number and any safety warnings for the contents."

24. Payment

Under 24.1 Invoices and Time for Payment, make the following change.

Replace

"Within 14 days after receiving an invoice under this Sub-clause, the Purchaser shall pay to the Supplier the amount then due to the Supplier pursuant to the Contract."

With

"Within 30 days after receiving an invoice under this Sub-clause, the Purchaser shall pay to the Supplier the amount then due to the Supplier pursuant to the Contract."

28. Dispute Resolution

Replace "28.2 Conference" and contents with the following:

"28.2 Conference

Within 14 days after receiving a notice of dispute, the parties shall confer at least once to resolve the dispute or to agree on methods of doing so, including, but not limited to, mediation, conciliation, binding expert determination and arbitration, of the whole of any part of the dispute. Where arbitration is agreed method of resolution, the arbitration shall be conducted in accordance with the rules of Item 38(b) and the arbitrator, unless otherwise agreed, shall be nominated by the President of the Fiji Institute of Engineers.

At every such conference, each part shall be represented by a person having authority to agree to such resolution or methods. All aspects of every such conference except the fact of occurrence shall be privileged.

If the dispute has not been resolved nor a method of resolution agreed within 56 days of service

of the notice of dispute, that dispute shall be dealt with in accordance with subclause 28.3."

Replace "28.3 Arbitration" and contents with the following

"*28.3 Elevation of Disputes*
If the parties are unable to resolve the dispute or agree a method of resolution in accordance with sub clause 28.2:

a) the dispute shall be referred to the Chief Executive Officer, or a duly authorized representative, of the Purchaser and the Chief Executive Officer/Managing Director, or a duly authorized representative, of the Supplier to resolve the dispute or agree on a method of resolution;
b) the individuals referred to in sub clause 28.3 (a) shall meet within 14 days after referral of the dispute in an effort to resolve the dispute or agree a method of resolution;
c) if the individuals referred to in sub clause 28.3 (b) are unable to resolve the dispute but agree at that meeting on a method of resolution, they shall also nominate a timeframe for the commencement and conclusion of the method of resolution; and
d) if the individuals so referred to in sub clause 28.3(b) are unable to resolve the dispute or agree a method of resolution, each within 14 days of the dispute being referred, either parts may give written notice to the other stating that the parties have been unable to resolve the dispute or agree a method of resolution.

Where arbitration is the agreed method of resolution, the arbitration shall be conducted in accordance with the Rules stated in Item 38(b) and the arbitrator, unless otherwise agreed, shall be nominated by the President of the Fiji Institute of Engineers."

Replace "28.4 Summary Relief" and the contents with the following:

"28.4 Instituting Proceedings
Neither party shall proceed to resolve a dispute by instituting court proceedings until issuing to, or receiving from, the other party, a notice in accordance with sub clause 28.3(d)."

Add the following after 28.4 Institutional Proceedings

"*28.5 Summary Relief*
Nothing herein shall prejudice the right of a party to institute proceedings to enforce payment due under the Contract or to seek injunctive or urgent declaratory relief."

Annexure A

Replace Annexure A Part A with the form provided in Schedule B.

5 REFERENCES

5.1 Applicable Standards

Transformers shall be designed, manufacture and tested in accordance with the following Australian Standards and all amendments issued prior to the date of closing of tenders except where varied by this Specifications.

AS 1100	Drawing Practice Scales – Part 7
AS 1194	Winding Wires Parts 1 – 4
AS 1265	Bushings for Alternating Voltages Above 1 000 V
AS 1580	Methods for Test for Paints and Other Related Materials
AS 1627	Metal Finishing – Preparation and Pretreatment of Surfaces
AS 1650	Galvanized Coatings
AS 1767	Insulating Oil for Transformer and Switchgear
AS 1824	Insulation Co-Ordination
AS 1931	High Voltage Testing Techniques – Part 1
AS 2312	Guide to Protection of Iron and Steel Against Exterior Atmospheric Corrosion
AS 2374	Power Transformers – Part 1 to 3, 5, 6 and 7
AS 60076	Power Transformers – all Parts
AS 2700	Colour Standards for General Purpose
AS 2768	Electrical Insulating Materials
AS/NZS 3750	Paints for Steel Structures
AS 4398	Insulators – Ceramic or Glass – Station Post for Indoor and Outdoor Use – Voltages greater than 1 000V a.c.
ISO 9001	Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing

ENA DOC 007-2006 – Specification for Polemounting Distribution Transformers

Should inconsistencies be defined between Standards and this Specifications, this Specification will take precedence. However, significant inconsistencies shall be referred to EFL for resolution.

The bidders shall take note that the successful bidder shall provide EFL with the copies of the relevant standards used in the design, manufacture and testing of the Pole-mounted and platform-mounted distribution transformers prior to award of the tender as a mandatory requirement. This cost shall be included in the bid submission.

5.2 Applicable Laws

The Bidder warrants (without limiting any other warranties or conditions implied by law) that all Goods have been produced, sold and delivered to EFL in compliance with all applicable laws (including all

workplace health and safety and electrical safety legislations and codes of conduct).

6 SERVICE CONDITIONS

6.1 Environmental Conditions

The transformers shall be suitable for mounting outdoors on poles and shall be designed to withstand the service conditions of Clause 1.2 of AS 2374 (Part 1), with the following additions.

Height above sea level	:	not exceeding 1000 m	
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)	:	90%	
Annual Average Rainfall	:	1900 mm	
Wind Speed	:	Sustained :	55 m/s
	:	Gusts :	70 – 110 m/s
Isokeraunic 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.

6.2 System Conditions

The rated frequency of EFL's power system is 50 Hz.

Each unit shall be suitable for use on its respective system position.

Highest (Equivalent) System Voltage:	12kV	36kV
Number of phases:	1 or 3	3
Impulse Withstand voltage (peak):	28kV	70kV
Power frequency withstand voltage:	95kV (peak)	200kV (peak)
Nominal system voltage:	11kV	33kV
System highest voltage:	12kV	36kV
System earthing:	Effectively earthed	

6.3 Mounting

The transformers shall be suitable for mounting outdoors on reinforced-concrete or wooden poles. In addition, each transformer rated 100 kVA and above shall be suitable for mounting on a horizontal platform. In either case the inaccuracy in mounting will be limited not to exceed 20mm (measured as vertical difference between any extreme edges of transformer base).

7 DESIGN AND PERFORMANCE CRITERIA

7.1 Loadings

The transformer shall be loaded in service in accordance with the following:

Normal cyclic	1.5pu
Long-time Emergency Cyclic	1.8pu
Short-time Emergency	2.0pu

The overloads are in accordance with AS 2374, Part 7 and apply to well ventilated situations. Any limitations to loading above 'normal cyclic', as per Clause 1.5 of AS 2374, Part 7, shall be stated in the tender.

7.2 Winding Connections

7.2.1 General

All transformers shall have electrically separate high voltage and low voltage windings. Winding connections shall be in accordance with AS 2374, Part 1.

7.2.2 Pole Mounted Single Phase Transformers

Single phase transformers shall have two low voltage windings able to be connected in either series or parallel, the ends of the windings being brought out to external porcelain bushing terminals so that either a 3 wire 415/240 volt or 2 wire 240 volt supply can be selected.

The requisite external links to effect series or parallel connection of the winding shall be provided with the transformer. The links shall be free from sharp edges which may cause injury to personnel. The transformer shall be supplied with the links configured to 240 volt operation.

With one low voltage winding supplying a load equal to half of the transformer rating and the other low voltage winding open circuited, the voltage regulation of either low voltage winding shall not exceed the guaranteed figure with due allowance for tolerances as permitted by AS 2374.

7.2.3 Pole Mounted Three Phase Transformers

Three phase pole mounded transformers shall be connected in accordance with vector group symbol as detailed in Attachment 'A' – "Specific Requirements".

7.3 Tapping's

Each transformer shall be capable of off-circuit tap changing by means of an externally operated switch. The tapping switch shall have a permanent overload capacity of 50 percent. The tapping switch shall be located near the top of the transformer for ease of access and to readily facilitate untanking of the transformer.

Tapping shall be provided on high voltage winding. The principal tapping shall correspond to rated voltage. The tapping range for each applicable rating shall be as detailed in Appendix A with step voltages of 2.5 percent.

The tapping selector switch shall be capable of being locked into each of the positions. The locking arrangement shall be such that it is not possible to lock the switch between taps. The tap switch shall be provided with the same number of positions as tapings. However, if a tap selector switch with more positions (via extra undefined positions) is used, it shall be provided with stop pins (or similar) to prevent tap rotation into non-tap positions. Stop pins shall be of the permanently fixed type, i.e. bolts, etc. shall not be used.

Each tapping selector switch position shall be identified by a number clearly and indelibly stamped or cast onto either the switch operating handle or the transformer tank.

Tap position No. 1 shall correspond to full winding in circuit.

The tap position selector switch shall be manufactured in such a way that it may be coupled with its operating handle only in the correct manner, not 180^{o} out of adjustment. This shall be done so no inadvertent open or short circuit can occur due to incorrect assembly following out of tank repair/inspection.

A sealing gland shall be provided on the tapping selector switch operating shaft where it passes through the transformer tank or prevent any breathing or leaking along the shaft.

The tapping switch shall be mounted on the side of the transformer where the neutral bushing is positioned.

7.4 Sound Level

The design and construction of each transformer shall be such that the sound level of the transformer, measured in accordance with the AS 2374.6, shall be no greater than the applicable 'reduced limit' as per Appendix AA of AS 2374.6.

7.5 Impedance Voltage

The impedance voltage at rated current on principal tapping shall be specified in submission by Bidder as per Guaranteed Performance Schedules in this document.

7.6 Cooling

The method of cooling each transformer shall be ONAN.

Each transformer shall be supplied with standard mineral insulating oil that meets the requirements of AS 1767 and be proven to be non-corrosive by Method B of ASTM D1275-06 Standard Test Method for Corrosive Sulphur in Electrical Insulating Oils and, IEC 62535 Ed. 1.0: Insulating liquids – Test method for detection of potentially corrosive sulphur in used and unused insulating oil.

The oil shall be new, supplied direct from the oil refinery and its bulk delivery shall be certified to contain less than 1 ppm of PCBs. The supplier shall follow approved quality procedures to ensure that the oil cannot be contaminated while under their control. The Bidder shall supply full identification, specifications and test results for any and each oil offered.

The quality of any offered insulating oil at the time of filling (i.e. on release from supplier) is such as to have a moisture content of at least <20 ppm and a Breakdown Voltage of >50kV.

The cold oil level shall be above the radiator inlet point (if radiators fitted).

7.7 Drying Out and Oil Filling before Delivery

The transformers shall be thoroughly dried out at the manufacturer's works and shall be delivered filled with oil to the correct level and ready for service. All transformers shall be vacuum filled. The degree of vacuum applied to the production units shall be identical to that applied to the units that are type tested. The moisture content of the oil shall be less than 25 ppm at time of filling.

7.8 Type – Sealed

Transformers shall be of the sealed tank construction type.

Sealed transformers shall be in accordance with AS 2374, Part 1, Cause 8.2, but not pressurized, nor incorporating gasses other than air. Diaphragm sealing is not acceptable.

7.9 Radio and Television interference

The design and construction of each transformer shall be such that it will not cause unacceptable radio or television interference.

7.10 Terminals

7.10.1 Description

The bushings shall be of outdoor type and shall comply with the relevant requirements of AS 1265.

The disposition of the HV and LV bushing shall be typically as shown in Drawing No. TX-1 of ENA Doc 007-2006. All HV bushings shall be lid mounted.

To minimize keeping of spare parts, only standard bushings as shown on ENA Doc 007-2006 Drawing No. TX-4 or equivalent acceptable to EFL shall be fitted.

Unless otherwise indicated on ENA Doc 007-2006 Drawing No. TX-4 the internal surfaces of bushings shall be fully immersed in oil at all times.

All porcelain components shall be glazed in a silver color N24 to AS 2700 and fully vitrified.

7.10.2 HV Bushings

The orientation of the HV bushing terminal palms shall be vertical, while the HV bushings shall be arranged such that the palm hole centers are aligned (with due allowance for round tank units and units with pocket mounted bushings). The HV bushings shall be designed to limit tracking, ionization or corona discharges which can lead to deterioration of their surface coating in their vicinity. The bushing shown in Drawing No. TX-4 in ENA Doc 007-2006 shall have an extended creepage distance to allow for typical climate conditions in Fiji. However, in certain severe marine or industrial conditions, higher pollution rated bushings may be required.

7.10.3 LV Bushings

The LV bushings shall be mounted horizontally beside one another in groups of two and the alms shall be in a horizontal arrangement.

7.10.4 External Clearances

The taut-string metal to metal clearances of the bushing (and surge arrester) terminals, both line to line and line to ground, shall not be less than the values listed in the following table.

Highest (Equivalent) System Voltage:	12kV
Clearance line to line (mm)	250
Clearance line to ground (mm)	160

For single phase units, the LV bushing to bushing clearance shall be a minimum of 75mm between energized parts.

7.10.5 Marking of Terminals

The appropriate designation letter assigned to the windings and tapping in accordance with AS 2374 shall be permanently marked on the tank adjacent to the respective terminals. The use of adhesives to attach marking plates will not be accepted.

7.11 Construction

7.11.1 General

The transformers shall be of robust construction and shall be capable of being transported, installed, removed or dismantled for repair by accepted methods without damage. The capability of being transported must be interpreted in context to Fiji regarding the distances and state of the roads.

All bolts (fasteners, studs, etc.) nuts and washers shall be to the Australian metric standards. External bolts, nuts and washers shall be Grade 304 stainless steel or (except for earthing) hot dipped galvanized steel. Compatibility, with regard to corrosion prevention, between the fasteners and the parts being fastened shall be observed. A compound or lubricant preventing seizing shall be applied to the threads of the stainless steel bolts.

The bearing surface of all bolt heads and nuts shall be parallel to the surface onto which they tighten. Where necessary, angled washers shall be provided to meet the requirement.

All sharp points on transformer exterior shall be removed to prevent injury.

Where fitted, transformer fins shall be located clear of the surge arrestor brackets to allow vented/ failed surge arrestors to be seen clearly from ground level.

Any fins on the pole side of the transformer should be arranged to allow adequate clearance to pass a body belt between the transformer and the pole (allowing of pole of 450 mm diameter).

7.11.2 Core and Windings

Bidders may offer transformers with either copper or aluminum windings.

HV connection to the tapping switch shall be by means of bolted or crimped connections. Spade type connectors are not acceptable.

The core and winding assembly shall be supported by the main tank and not by cover.

Means shall be provided at both the top and bottom of the core and coil assembly for locating the transformer core centrally in the tank and securing it in position to prevent movement, particularly during transport.

The core and all metalwork shall be electrically bonded to the tank. The bonding of 3 phase core/cores shall be brought to one point only.

7.11.3 Tanks and Lids

All surfaces shall be designed to prevent the accumulation of water.

On the external areas of the tank, welding of horizontal and vertical joints shall be on both sides of the joint. Welding in all cases shall be continuous.

All seams shall be electrically welded and they shall be oil tight.

All metal work shall be electrically bonded to the tank to permit earthing by EFL. If a part cannot be adequately bonded it shall be constructed from a suitable insulating material instead of metal.

The tanks shall be so designed that with a top oil temperature of 105^{o} C, the oil level in the tank will be below the tank lid flange.

The tanks shall be designed to withstand without permanent distortion at least the internal pressure due to maximum permissible overload. This pressure may be calculated from temperature/ volume change of expansion space while neglecting flexing of walls or it may be established experimentally, at Bidder's preference

The tank lid shall, where appropriate, be capable of supporting up to 100 kg of a person's weight without deformation.

The cover of each tank shall be bolted or clamped using suitable gaskets and surfaces to achieve a seal which prevents moisture ingress, oil leaks and the exchange of air between the inside of the tank and the external atmosphere.

7.11.4 Joints and Gaskets

All joints shall be oil tight. Holes shall not be punched through dovetail joints in gaskets.

Gaskets shall be manufactured from synthetic rubber or a synthetic and cork composition which is resistant to both corona discharge and transformer oil (including additives if applicable). Gaskets exposed to UV radiation shall be UV stabilized. All gasket seals should last the intended life of the transformer.

7.11.5 Dimensional Limitations

The 11kV transformers shall be designed so they do not exceed the following dimensions:

EFL Stock Code	Dimension (LxWxH) in mm
I04360A	450 x 610 x 820
I04361	480 x 840 x 660
I04371	580 x 610 x 830
I04372	730 x 710 x 850
I04373	950 x 680 x 1010
I04374	950 x 730 x 1090
I04375	1140 x 850 x 1310
I04376	1130 x 960 x 1350
I04377A	1240 x 1020 x 1540

7.12 Fittings

The transformers shall be supplied with fittings as detailed below:

7.12.1 Rating/Terminal Marking Plate

The rating/Terminal Marking Plate shall be in accordance with Clause 7 and Appendix ZC of AS 2374, Part 1, and shall include a Voltage Vector Diagram. In addition it shall state:

- That the transformer is 'sealed'
- Temperature rises (even though normal values apply)
- Type of insulating oil (even though it is mineral oil)
- Impedance on principal tap only.

All quantities on the rating/terminal marking plate shall be stated in metric units.

The EFL item stock code and Corrosion Protection Category shall be shown on the plate or the separate tag permanently attached in close proximity to rating/terminal marking plate.

The display of Corrosion Protection Category may be omitted on unplanned fully hot dipped galvanized units. For painted units the indication of the standard (refer clause 5.14) or heavy duty protection shall be given.

The rating/terminal marking plate shall be located on the side of the transformer, preferably near the tapping switch, in a position that can be easily read when the transformer is in service.

The rating/ diagram plate shall be manufactured from stainless steel with the lettering etched or otherwise formed in relief and colored black (except for values which vary from nameplate to nameplate) such that the lettering is in sharp contrast with the background.

7.12.2 Lifting and Transport Facilities

Lifting lugs shall be provided with a minimum hole diameter of 32 mm for:

a. Lifting the transformer when filled with oil and ready for service, and,
b. Holding down the transformer during transport.

The transformer tank walls shall be strengthened to allow the above. The lugs shall be positioned so that:

a. They are suitable for connection to lifting beams;
b. They are suitable for attaching slings, each 1 m in length. The slings may be shortened such that transformers will require the holes in the lifting lugs to be spaced not more than 1.2 m apart. The maximum enclosed angle of the slings would be 120^{o} during any lifting procedure.
c. Any beams or slings attached during lifting or transporting shall not foul any part of the transformer and when suspended by them the transformer shall hang by acting through the center of gravity, with a maximum angle of tilt of 2.5 degrees from the plane of the mounting brackets.

The base of each transformer shall be raised above ground level by a suitable supporting structure so that protective coating of the main transformer tank cannot be damaged during reasonable storage or transport.

All heavy parts of the transformer, including the core/coil assembly, which must be removed for inspection or repair shall be fitted with lifting facilities suitable for use with slings and shackles. (Note that an exception shall be allowed for single phase transformer provided slings can be fitted under the coil to allow for lifting).

7.12.3 Oil Level Indicator

Oil level indication shall be provided on the inside of all transformer tanks (visible from the filler cap for rectangular tank units). The indication inside the tank shall take form of horizontal 50 mm long stenciled mark in contrasting colour. This indication shall include safety margin, permitting inaccuracy in mounting as per clause 4.3.

No external indicator is required.

7.12.4 Thermometer Pocket
Transformer shall not be fitted with a thermometer pocket.

7.12.5 Drain Orifice
A drain orifice of any type is not required

7.12.6 Filler Cap
Rectangular tank transformers with multiple lid shall be fitted with a filler cap (or plug) on the lid as near as possible to one corner of the cover, such that if moisture did enter it would drop to the bottom of the tank.

Gaskets or thread sealing may be used to prevent water drops being inhaled into the transformer.

7.12.7 Transformer Mounting Brackets
All transformers are to be supplied with standard mounting brackets welded to the rear wall of the Transformer tank. It shall be possible to easily pass a body belt between the pole and the transformer tank.

The brackets and tank wall are to be of adequate strength to limit distortion, when mounted. Both the top and bottom brackets shall be suitable to carry the total weight of the transformer on their own.

Brackets shall be suitable for M20 pole bolts and shall be in accordance with Drawing No. TX-2 of ENA Doc 007-2006.

Transformers having a mass greater than 2000 Kg shall be hung on M20 High Tension bolts.

7.12.8 Surge Arrestor Brackets
Brackets shall be attached to each transformer tank (not to the Lid), one adjacent to each HV bushing, to enable EFL to mount surge arresters. The surge arrester brackets shall be used as the connection point for the arrester earth. The brackets shall have unpainted corrosion resistant metal connecting zone which has the capability to conduct surge arrester current.

The brackets shall be constructed so as to accommodate the mounting of polymeric housed surge arresters. The arresters shall be mounted onto the bracket either directly or via their integral insulating brackets.

The Bidder shall submit the drawing for the mounting arrangements which satisfy specification requirements and the criteria given on Drawing No TX – 3 of ENA Doc 007-2006.

7.12.9 Surge Arrestors
The Bidders shall offer transformers supplied with HV surge arresters (including wildlife guards and other accessories) as an option, if they have the capability to supply the transformers with these.

Where the surge arrestors are offered, the surge arrester shall be designed and constructed in accordance with IEC 60099-4, IEEE Std C62.22 and the requirements of this specification. It shall be suitable for overvoltage protection of distribution and sub-transmission networks. The surge arrester shall have one non-linear metal-oxide resistors with highly non-linear voltage-current characteristics, connected in series, but having no integrated series or parallel spark gaps.

The metal-oxide used shall be of quality to ensure thermal stability under service duty of the surge arrester and shall be single column; self-supported and be installed between phase and earth.

The guaranteed protection characteristics of the surge arrester based on IEC 60099-5 and ANSI/IEEE Std C62.11. Selection formulas shall be required to comply during tests, with all the withstand capabilities stated under system and environmental conditions and the general arrangement of the surge arrester with all the features and accessories.

The housing of the surge arrester shall be made of high quality reinforced high temperature vulcanized (HTV) silicone rubber based on dimethyl siloxane, which exhibit hydrophobicity with the capability to transfer hydrophobicity to the layer of pollution.

The reinforced HTV silicone rubber shall have a Shore 'A" hardness of not less than 60 as per ISO 48 and the track resistance of the sheath and shed materials shall meet the requirements of IEC 60587 Method 1 Class 1A4.5 or 1B4.5 or Method 2 Class 2A4.5.

The housings shall meet the requirements of IEEE Std. 592-1990 by demonstrating shield resistance of less than 5000Ω and capability of initiating two consecutive fault- current arcs to ground.

The surge arrester shall be designed and constructed in a manner so as to prevent explosive shattering relief capability (short circuit) as per Table 1.

The entire insulator housing shall have the rated withstand voltage given in Table 1 based on IEC 60099-4 clause 6.1 with creepage distance shall be based on system conditions under clause 3.2 and tested as per IEC 60507.

Insulator sheds shall be open type, designed to minimize trapping of contamination. It shall be made of polymer having glazed brown or gray color. The silicon rubber housing shall be made by direct molding method.

The surge arrester shall be sealed (end caps) with a controlled permanent seal to ensure no moisture absorption or deterioration of the metal-oxide element of the surge arrester.

The supplier shall describe the moisture sealing system used and shall state his own experience with the design offered. The method of factory testing of the sealing shall be described.

7.12.10 Earthing Location

An earthing location of at least 50 x 40 x 5 mm with an M14 hole drilled near the center of the location shall be provided near the bottom of the tank as close as practical vertically below the LV neutral terminal (where applicable, otherwise on bottom pole bolt bracket). The earth location shall be fitted with an M12 x 40 mm grade 304 stainless steel bolt, nut, locknut, and two flat washers. Anti-seizing lubricant shall be used on the thread of the stainless steel bolt to prevent binding.

The earth location shall be welded direct to the tank or to a bracket which itself welded to the tank, i.e. there are to be no bolted connections in the electrical path between the location and the tank. Painting and other non-conductive coatings are unacceptable.

On sub 100kVA units where the tank is fully galvanized, the earthing location may be galvanized mild steel. Such arrangement shall be subjected to agreement between EFL and the Bidder. On all other units, the earthing locations shall be of stainless steel Grade 304.

7.12.11 Tank Markings

The transformer capacity and EFL's identification number (stock code) shall be stenciled in black numerals onto the tank where it can be easily seen from the ground with the transformer mounted on a pole. Each numeral shall be 75 mm high and have a body width of not less than 12 mm.

7.13 Spark Gaps

No HV spark gaps are required.

7.14 Protective Coating

EFL requires all internal and external surfaces to be protected against corrosion.

The external corrosion protection for all items shall suit Long Term Corrosion Protection in Atmospheric Classifications of "Mild", "Moderate" and "Tropical" per clause 2.2 of AS 2312.

EFL intend to use transformers in severely populated industrial or marine environments, therefore the Bidder should provide the additional costs (if any) associated with additional heavy duty protective coating.

The final colour, except when surface is galvanized and unpainted, shall be storm grey, N42 to AS 2700.

The paint system must be a proven one, fully documented and applied by trained and experienced personnel.

The Bidder shall guarantee protective coating system for a minimum period of fifteen (15) years from commissioning against corrosion which would require repair/replacement of the transformer. In such case, the normal warranty provision shall apply, with all associated costs to be borne by the manufacturer. Warranty provisions would only apply if the transformers are installed in the appropriate environment.

Warrant claims would cover any transformer requiring replacement due to corrosion as well as the repair of rusty tanks in situ to prevent the premature need to replace units. Repairs in situ would normally be performed by EFL. Providing one week notice is given to Bidder to investigate, all labour and material costs (but excluding consequential costs) would be passed from EFL to the Bidder on a recoverable basis.

The successful Bidder shall provide details on the method of protective coating repair to allow EFL to carry out touch-up (before commissioning) and field maintenance.

The surface coating inside the transformer tank shall not react with unpassivated transformer mineral oil (including additives if applicable).

7.15 Transformer Losses

Guaranteed load and no-load loss figures are to be specified in the Schedules.

Load losses are to be corrected to a reference temperature of 75deg C.

7.15.1 Guaranteed Losses

In evaluating the tenders, EFL will capitalize the guaranteed losses and so determine the economic advantages of the transformers offered. Capitalization of losses will be based on the guaranteed losses at the required power rating for each item as stated in the Schedules. Load losses will be those specified on the principal tapping. For this contract, the following values will be used for the purpose of making a fair economic comparison.

8 TESTING

8.1 Type Test Obligations

All units of the same design shall be identical in all respects relating to materials, design and manufacture.

A copy of the type test certificates shall be provided upon request, free of charge, to EFL for any item purchased against this specification. If a specific item was not tested in the past, EFL shall allow the tests to be performed on units purchased at the Supplier's expenses.

Should EFL require any test(s) to be repeated despite the earlier certificate being available for an identical (or similar, as allowed below) unit, the cost of such test will be borne by EFL.

Where units are offered of a similar design to those previously tested, EFL may consider (in accordance with AS 2374, Part 1, Para 3.11.2) to accepting previous type test reports. The Bidder shall state if such tests, that would qualify for consideration exist.

The Bidder may be requested during the tender evaluation period to substantiate that claim with written engineering evaluation. Such evaluation shall provide all relevant details permitting EFL to establish validity of existing type tests.

Any modification, resulting from a type test failure or change of design instigated by the Supplier or change of design to comply with the specification, which could affect the result of earlier type tests, shall require a repeat of such earlier type test. Any repeat type tests to provide compliance with the Standard's requirements shall be to the Supplier's cost.

The insulation of the HV winding shall be capable of withstanding impulse voltage testing including chopped waves in accordance with AS 2374, Part 3, Clauses 13 and 14.

The lightening impulse withstand voltage and power frequency withstand voltage of the HV windings and connected parts shall be specified in the Specification Requirement.

Extrapolations of temperature rise for guaranteed load and no-load losses shall be incorporated in the test report to verify conformance. During the test, sealing around thermometers, etc. shall be adequate to ensure the units are sealed during the test. Also, tap switch operation shall be free, i.e. not over tightened during the test. Internal pressures shall be measured and recorded.

Bidders are required to conduct an overload temperature rise type test on the same unit which underwent the temperature rise type test to verify that the maximum hot spot winding temperature of 140º C is not exceeded when the ambient is 25º C for an overload condition of 1.5 times the normal rated load on any tapping for up to 2 hours after continuous operation at 0.6 times the normal rated load. Internal pressure shall be measured and recorded. The result of this test shall be incorporated in

the test reports for temperature rise. Bidders shall state in the schedule the guaranteed top oil/winding temperature rise for this condition.

Oil leaks during temperature rise tests would constitute failure of the test.

A short-circuit test in accordance with AS 2374, Part 5 shall be carried out on transformers rated 100 kVA and above. Should a unit fail test, subsequent tests to provide compliance with the standard's requirements shall be to the Supplier's costs. At the conclusion of tests to EFL's account, EFL reserves the right to attend the out of tank inspection at the testing premises.

8.2 Type Test on Each Design

The following type tests, as specified in AS 2374 or elsewhere in the specification, shall be conducted on each design of the distribution transformer:

AS2374	Clause No.
1. Temperature rise test	Part 2 – Clause 5
2. Impulse voltage withstand test	Part 3 – Clause 13
3. Impulse voltage withstand test including chopped wave test	Part 3 – Clause 14
4. Sound level tests	Part 6 – Clauses 5, 6, 7
5. Pressure test on sealed transformer	Clause 6.4 of specs

In addition to the above tests, the following type tests, as specified in AS 2374 shall be conducted on all ratings 100 kVA and above:

AS2374	Clause No.
1. Short circuit test	Part 5

Where surge arrestors are offered, the surge arrestor type tests shall be conducted in accordance with IEC 60099 and shall comply. Copies of type test reports to be submitted with the tender (by bidder) for evaluation shall be as per Table 3 of IEC 60099-4 tests and as stated:

a. Insulation withstand of the arrester housing
b. Residual voltage tests
c. Long duration current impulse withstand tests
d. Operation duty tests
    i. Accelerated ageing tests
    ii. Verification of thermal section
    iii. Switching surge operating duty test
e. Pressure relief tests
f. Test of arrester disconnectors/fault indicators
g. Artificial pollution tests
h. Partial discharge tests
i. Seal leakage tests
j. Current distribution tests
k. Temporary overvoltage tests
l. Radio interference voltage (RIV)

8.3 Pressure Tests on Sealed Transformers

To prove the sealed transformers are adequately designed and sealed, the following type test shall be required on each fully assembled transformer:

- Establish and monitor internal transformer pressure. The test pressure shall equal the maximum pressure stated on the rating plate.
- If, after 30 minutes, the pressure has not dropped more than 2 kPa, the transformer will be considered to have passed the test.

Ambient temperature variation shall be within ± 2^{o} C.

8.4 Routine Tests on Each Transformer

The following tests, as specified in AS 2374, shall be carried out:

AS2374	Clause No.
1. Measurement of winding resistance	Part 1 – Clause 10.2
2. Ratio and phase relationship checks	Part 1 – Clause 10.3
3. Impedance voltage, short circuit impedance and load losses	Part 1 – Clause 10.4
4. No load loss and currents	Part 1 – Clause 10.5
5. Induced over-voltage withstand	Part 3 – Clause 12
6. Separate-source voltage withstand	Part 3 – Clause 11
7. Insulation resistance	Part 3 – Clause 16
8. Calculated MEPS efficiency	

8.5 Batch Tests

All conductors shall have been inspected and tested in accordance with AS 1194.

The dielectric strength of oil is to be tested in accordance with AS 1767.

8.6 Porosity tests

Porosity tests shall be carried out by the Supplier or their subcontractor for porcelain components in accordance with the requirements of Clause 5.6 of AS 4398, Part 2.

8.7 Acceptance tests

EFL reserves the right to repeat any or all tests (subject to AS 2374 provisions and at EFL's Cost) during their acceptance test stage.

8.8 Witnessing of tests

The Bidder shall make allowance for two EFL's Engineers to witness the type tests which shall be requested to be performed. All costs for the witnessing of such type tests shall be borne by the Bidder.

The Bidder shall also make allowance for witnessing of routine tests by two EFL Engineers.

Where applicable, the Supplier shall give EFL not less than four (4) weeks' notice of when each and every type test will be carried out.

8.9 Test certificates

Two certified copies of all test results shall be supplied to EFL. Electronic copies shall also be submitted.

All test certificates shall include the manufacturer's serial number. On allocation, the corresponding EFL transformer number or stock code, the order number, contract number, item number, specification number and guaranteed losses must be added to the certificate, or attachment to the test report.

The successful bidder shall be required to setup an online portal for recording and sharing of all transformer test reports over the duration of the contract. EFL, at time of contract execution, shall provide a list of personnel who shall be allowed to access this portal from EFL. Each transformer factory test reports shall be stored by its serial number and shall be accessible to EFL via this online portal at any time. The cost of setup, hosting and maintenance of this portal shall be borne by the successful bidder.

9 RELIABILITY

9.1 Service Life

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

9.2 Spare Parts and Maintenance

The Supplier shall supply a list of recommended spare parts, special tools and appliances required for the whole of life operation and maintenance of the transformer installation. The list, together with prices, shall be indicated in the appropriate schedule. The Supplier must also provide details (if required) of the recommended maintenance and the frequency at which it must be carried out. Details of the manufacturers repair capability and options shall be provided

9.3 Evidence in Support of Reliability

The Supplier shall indicate and provide updates to EFL the mean time between failures (MTBF) of the transformer and its components including the recommended maintenance regime and maintenance tasks and intervals. This regime shall be based on the mean time between failure (MTBF) and the critical failure modes identified by the failure mode, effects and criticality analysis (FMECA) of the equipment. Details substantiating the FMECA analysis shall be included in the offer.

Such comments will include evidence in support of the reliability and performance claimed including information on Failure Mode and Effect Analysis.

10 ENVIRONMENTAL CONSIDERATIONS

Bidders are required to comment on the environmental soundness of the design and material used in the manufacture of the items offered. In particular, comments should address such issues as recyclability and disposal at end of service life.

Bidders are required to provide with the tender, EMF levels at transformer normal (balanced) maximum load. Such EMF levels are required at a point midway along each side, and diagonally out from each corner, at a distance of 1m above and beyond the base.

EFL may require, after the evaluation and award of the Tender, to visit the Supplier's factory for compliance checks on various Environmental protection practices in the design, manufacturing, testing and supply of transformers.

11 PACKAGING AND MARKING

The packaging of items by the Bidder must ensure that they are capable of being delivered undamaged giving due consideration to the quantity, distance of transportation and the preferred method of handling at each location.

The Bidder shall take all necessary precautions to ensure safe handling of all transformers and associated accessories supplied.

12 QUALITY SYSTEM REQUIREMENTS

Bidders are required to submit evidence that the design, manufacture and testing of the transformers are in accordance with ISO 9001.

Documentary evidence shall be provided concerning the level of Quality System Certification associated with the supplier and or manufacturer. This documentation shall include the Capability Statement associated with the Quality System Certification.

EFL may require, after the evaluation and award of the Tender, to visit the Supplier's factory for compliance checks on various quality management practices in the design, manufacturing, testing and supply of transformers.

13 OCCUPATIONAL HEALTH AND SAFETY SYSTEMS

Tenderers are required to submit copies of certification to occupational health and safety management system, such as AS 4801 or to equivalent international standard. Such information is deemed mandatory bid submission and lack of it will result in disqualification of bid.

In addition to this, Bidders also need to submit health and safety plans implemented in factories for design, manufacture and testing transformers, which will be used in this project.

14 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 (usage) of the pole-mounted and platform-mounted transformers is as outlined in the table below.

EFL Stock Code	Item Description	Movement in Last 3 Years
I04360A	5kVA, 6.35kV/240V, 1-phase, SWER	8
I04361	5kVA, 11kV/240V, 1-phase	109

I04371	16kVA, 11kV/240V, 1-phase	184
I04372	30kVA, 11kV/240V, 1-phase	106
I04373	30kVA, 11kV/433V, 3-phase	27
I04374	50kVA, 11kV/433V, 3-phase	57
I04375	100kVA, 11kV/433V, 3-phase	29
I04376	200kVA, 11kV/433V, 3-phase	33
I04377A	300kVA, 11kV/433V, 3-phase	36
I04415	50kVA, 33kV/433V, 3-phase	1
I04416	200kVA, 33kV/11kV, 3-phase	1
I04422	300kVA, 33kV/433V, 3-phase	1

In addition to this, the successful bidder shall be required to provide monthly reports on the number of transformers held in stock for EFL, and those under order to be delivered.

15 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.

16 INFORMATION TO BE SUPPLIED BY THE BIDDER

16.1 Documentation to be supplied with the tender

To enable EFL to fully evaluate the transformer(s) offered, (in addition to the completed Specification Requirement and Guaranteed Performance schedules) the Bidder will submit the following information with their tender:

- List showing similar equipment supplied to or on order for other utilities for at least the past ten years
- Typical arrangement drawings and full details of the dimensions of the transformers
- Type test certificates for the transformers offered, or transformers of similar design and rating (if available)
- Typical loading curves (for loading transformers in accordance with AS 2374, Part 7)
- Short circuit test details for equipment of similar design and rating
- Sample inspection and test plans for the transformers
- Typical installation and maintenance manuals
- End of service life disposal method
- Calculations for MEPS efficiencies
- Full details of the protective coatings offered
- A list of all departures of the tender from this specification
- Evidence of quality management systems used in manufacture, testing and supply
- Evidence of Health, Safety and Environmental plans
- Evidence of financial ability to provide the level of service and support
- Origin of materials used in manufacture of the transformer
- Detailed procedure for receiving, handling, lifting and storage
- Names and resumes of key team members who will be assigned to work with EFL upon successful award of the three-year supply contract (if Bidder is successful).

Where sub-contractors are used, the Bidder shall provide the above information for the sub-contractors as well.

Bidders may be asked to provide additional information during tender assessment period or following award of contract.

16.2 Documentation to be supplied during the course of the contract

Within two (2) weeks of the placing of the order, the successful Bidder shall supply copies of the following:

a) A certified outline drawing for each rating of transformer with:
   i. Centre lines and centers of gravity
   ii. An electrical clearance table
   iii. Overall dimensions
   iv. Surge arrester mounting positions

b) A drawing showing the rating and terminal marking plates for each rating of transformer (may be incorporated in the outline drawing).

The Bidder must exercise reasonable diligence in the design of items in order to satisfy EFL's specific integration requirements between the Bidder's offered item and EFL's requirement for the item to be utilized in its electricity distribution network.

EFL will comment on the drawings supplied under the contract in relation to how the equipment interfaces with EFL's design, construction, operation, maintenance and other requirements. Comments about drawings by EFL shall not in any way absolve the Supplier of responsibility for the safety and reliability aspects of the plant or equipment supplied. The Supplier shall amend the drawings as directed and resubmit them to EFL within one week.

Drawings shall be to scale and in accordance with AS 1100. The contract number shall be shown prominently on all contract drawings. All drawings shall be produced on standard EFL borders, which shall be issued to the Supplier upon award of contract.

An inspection and test plan for transformers shall be provided and EFL's comments (if any) shall be addressed and resolved before commencement of manufacture.

16.3 Samples

Samples of typical units may be required during the tender assessment period. Sample will be required only from Bidders who have previously not supplied transformers to the EFL.

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

EFL may at its discretion either purchase the samples at the tendered price or return the samples to the respective Bidder after the contract has been awarded.

16.4 Training

Training sessions shall be delivered, as per table below, in EFL's Kinoya and Navutu depots, to an audience of 30 persons. This shall include engineers and technicians.

Target Group	Description	Number and locations
Distribution engineers, technicians, O&M engineers and technicians, Network Design technicians and engineers	Full training on design, installation, testing and commissioning	2x sessions – 1x Kinoya and 1x Navutu
Distribution engineers, technicians, O&M technicians	Commissioning	1x session in the field for commissioning each at Kinoya and Navutu
Stores Personnel	Handling and storage of units	2x sessions – Kinoya and Navutu

The comprehensive training shall be delivered at the beginning of the contract period.

Refresher trainings) shall be provided once a year, from the time the comprehensive training is delivered.

Training material in the form of drawings, instructions and/or audio visuals shall be provided for all the items offered and accepted by EFL. This material shall include but is not limited to the following topics:

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

It is preferred that all training material and product-related documentation is also put on the online portal where the transformer test results will be stored for EFL staff to view at any time.

16.5 Tools and Handling Equipment

The successful bidder shall be required to provide all necessary tools and special handling equipment to handle the transformers in EFL stores and in the field. Two sets of tools and special handling equipment shall be provided for each stores location (There are three stores locations – Kinoya and Navutu in Viti Levu and Labasa in Vanua Levu).

SCHEDULE A: LIST OF EXPERIENCE, PERSONNEL & FINANCIAL STATEMENTS

Previous Experience

The Bidder is to submit a list of Projects worked under with a similar scope, involving the design, manufacture, testing and supply of distribution transformers and above, in chronological order of year completed.

Client	Scope and Description	Quantity of Distribution Transformers Supplied	Contact Person

Personnel

The Bidder is to submit list of personnel who will be allocated to work with EFL for the contract period and also provide their resumes in its bid.

Name	Designation	Duration of Employment with Company	Years of Experience

Financial Statements

The Bidder shall also submit past three years audited financial statements and records showing its financial ability to undertake this project.

SCHEDULE B: AS 4912 ANNEX A (TO BE SUBMITTED BY BIDDER)

Item		
1	Purchaser (Clause 1)	Energy Fiji Limited
2	Purchaser's Address	2 Marlow Street, Suva
3	Supplier (clause 1)	Supplier to provide
4	Supplier's Address	Supplier to provide
5	Stated purposes (clause 1 definition of acceptable)	As stated in tender specifications and/or purchase order
6	a) Jurisdiction (legislative requirements)	Fiji
	b) Governing Law	Laws of Fiji
7	a) Currency (clause 1(g))	Supplier to state
	b) Place for payments (clause 1 (g))	Same as Item 2
	c) Place of Business of bank (clause 1(c)- definition of security)	
8	Term (clause 1)	3 years
9	The Goods clause 1	As stated in tender specifications
10	Minimum *purchase* order quantity subclause 2.2 (a)(i)	One (1)
11	Minimum reorder intervals subclause 2.2 (a)(i)	Not applicable
12	Maximum *purchase* order quantity subclause 2.2 (b)(ii)	Supplier to state
13	Minimum quantity to be ordered during term subclause 2.2 (a)(iii)	Not applicable
14	Maximum quantity to be ordered during term subclause 2.2 (b)(iii)	Not applicable
15	Supply lead time subclause 2.3(c)	Supplier to provide
17	Supplier's security	Not Applicable
18	Purchaser's security	Not Applicable
19	Purchaser – Supplied documents (subclause 6.2)	As stated in tender specifications
20	Supplier- supplied documents (subclause 6.3)	As stated in tender specifications
21	Time for Purchaser's direction about documents (sub clause 6.3 (b))	14 days
22	Legislative requirements, those expected (subclause 10.1)	Not applicable
23	Reference date (subclause 10.2 (b))	Date of closing of Tender
24	Time by which the insurance cover of goods is to be effected (subclause 13.1)	Time at which order is placed
25	Public and product liability insurance (subclause 13.2)	Supplier to provide
26	Qualifying causes of delay, causes of delay for which EOTs will not be granted	Not Applicable

27	Liquidated damages, rate (subclause 17.5)	0.5% per day upto 10% of the purchase order value
28	Delay Damages	As assessed by EFL
29	Date for completion of acceptance testing (subclause 18.1 and 21.1)	As stated in tender specification
30	Party responsible for unloading the *goods (subclause 19.1)*	Supplier
31	a) When risk in the *goods* passes (subclause 20.1)	At time of acceptance by Purchaser.
	b) Time at which ownership of the *goods passes* to the Purchaser (subclause 20.2)	Upon payment of the purchase order value
32	Period for *Purchaser's* notice that *goods* are rejected (subclause 21.1)	14 calendar days
33	Period for *Purchaser's* notice accepting or rejecting *Supplier's* proposal (subclause 21.4)	14 calendar days
34	Defects liability period (clause 22)	24 months
35	Invoice (subclause 24.1) Time for Invoice	Within 30 days of delivery
36	Interest rate on overdue payments (subclause 24.3)	Nil.
37	Supplier's default (subclause 25.2 (c))	28 days
38	Arbitration (subclause 28.3) a) Person to nominate an arbitrator	President of Fiji Institute of Engineers
	b) Rules for arbitration	Laws of Fiji
39	The Supplier's liability is limited as follows (clause 29)	Purchase order value
40	The Purchaser's liability is limited as follows (clause 29)	Purchase order value

SCHEDULE C: SPECIFICATION REQUIREMENTS

Ref.	Particulars	Units	I04361	I04371	I04372
1	Transformer Description		Distribution transformer for 11kV network		
2	Rated Power	kVA	5	16	30
3	Number of Phases		1	1	1
4 4.1 4.2	Rated Voltages: HV winding: LV winding:	 V V			
5	Winding inter-connection vector group symbol		Dyn11		
6	Impedance voltage at rated current on principal tapping				
7	Tap Changer Type				
8	% Tap Change				
9	No load Loss	kW			
10	Load Loss @ 75 Deg C	kW			
11	Power Frequency Insulation Level (HV/LV)	kV rms			
12	Impulse Withstand Voltage (1.2/50 micro-sec)	kVp			
13	Insulation Class				
14 14.1 14.2	Winding Conductor Type High Voltage: Low Voltage:				
15	Magnetizing Current (% of full load)				
16	Sound Power Level	dB (A)	56		
17	Volume of Insulation Oil	liters			
18	Maximum Total Mass	kg			
19 19.1 19.2	Temperature rise limits Winding Top Oil	 Deg C Deg C	 65 60		
20	Tappings		6 HV winding taps, rated, -7.5%, -5%, -2.5%, 0, +2.5%, +5%		
21	Country of Manufacture of complete transformer				
22	Dimensions	mm			

Ref.	Particulars	Units	I04373	I04374	I04375	I04376	I04377A
1	Transformer Description		Distribution transformer for 11kV network				
2	Rated Power	kVA	30	50	100	200	300
3	Number of Phases		3	3	3	3	3
4 4.1 4.2	Rated Voltages: HV winding: LV winding:	 V V					
5	Winding inter-connection vector group symbol		Dyn11				
6	Impedance voltage at rated current on principal tapping						
7	Tap Changer Type						
8	% Tap Change						
9	No load Loss	kW					
10	Load Loss @ 75 Deg C	kW					
11	Power Frequency Insulation Level (HV/LV)	kV rms					
12	Impulse Withstand Voltage (1.2/50 micro-sec)	kV					
13	Insulation Class						
14 14.1 14.2	Winding Conductor Type High Voltage: Low Voltage:						
15	Magnetizing Current (% of full load)						
16	Sound Power Level	dB (A)	56				
17	Volume of Insulation Oil	litres					
18	Maximum Total Mass	Kg					
19 19.1 19.2	Temperature rise limits Winding Top Oil	 Deg C Deg C	65 60				
20	Tappings		6 HV winding taps, rated, -7.5%, -5%, -2.5%, 0, +2.5%, +5%				
21	Country of Manufacture of complete transformer						
22	Dimensions	mm					

SCHEDULE D: GUARANTEED PERFORMANCE

The following is to be filled for each unit tendered for by the Bidder.

Ref	Particulars	Units	EFL Stock Code
1 1.1 1.2	Losses on Principal tap at 75℃ Load: No Load	 W W	
2	Temperature Rise limits during overload conditions Top Oil: Winding (by resistance)	 ℃ ℃	
3	Minimum insulation resistance at 20℃ (1 kV test after 1 minute) for: HV winding: LV winding:	Mega Ohms	
4	Continuous permissible overvoltage at any tap	%	
5	Power efficiency at 50% load	%	
6	Rated power at 40deg C ambient temperature	kVA	
7	Positive sequence impedance as vector coordinates: (Rectangular form: Z(Ω)=R(Ω)+jX(Ω))		
8	Zero sequence impedance as vector coordinates: (Rectangular form: Z(Ω)=R(Ω)+jX(Ω))		

SCHEDULE E: EVALUATION CRITERIA

Tender Evaluation Criteria	
Category	**Criteria**
Bid Responsiveness	General responsiveness of bid, compliance to submission requirements and documentation
Health, Safety & Environment	Assessment of Tenderer's compliance to health, safety and environmental requirements detailed within the technical specification. Past performance of Tenderers. Manufacturer holds third party accreditation to ISO 14001 and ISO 45001.
Quality Assurance	Manufacturer holds third party Quality Assurance accreditation to ISO/AS/NZS 9001:2015. Tenderer has Quality Management systems in place that are acceptable to Energy Fiji Limited.
Technical Compliance	Does the Tender meet Energy Fiji Limited's minimum technical requirements as outlined in the Technical Specification? • Design of equipment and all components • Performance of equipment and all components • Sustainability and ease of operation • Reliability data • Independent accreditation and type test certification • Comprehensiveness of proposal, composition of tenderer's team • Risk management plan and mitigation of foreseeable risks • Past experience • Ability to deliver on time / delivery timframe
Commercial Compliance	Tenderer holds the required current insurance provisions and has provided evidence through valid insurance certificates of currencies. Has the Tenderer submitted Departures to the Terms and Conditions? If so is it likely that Energy Fiji Limited will be able to negotiate agreement without undue delay? Assessment of the Tenderers operational risks including conflicts of interest. Tenderer must comply with statutory requirements, such as that enforced by FRCS, FNPF, FNU, etc. and provide evidence of compliance as required in the specifications.
Energy Fiji Limited Procedures	Tenderer must comply with all relevant Energy Fiji Limited safety and environmental procedures. This is indicated by the Tenderer signing the Form of Tender Schedule, acknowledging all applicable procedures. Tenderer must also comply with the requirements of Electricity Act (2017), Electricity Regulations (2019).
Financial Stability	Assessment of Tenderer's current financial stability and ability to remain financially stable.
Price Evaluation	• Base tendered prices; • Price escalation formula (foreign exchange and commodity based rise and fall formula or similar review mechanism); • TOC • Other value adding options.

SCHEDULE F: DEPARTURE FROM SPECIFICATIONS

The Bidder shall nominate the Clause or relevant section of the tender specification and describe the departure.

Tender Specification Reference	Departure

[i] Where possible, the Tender shall refer to the specific clause of the tender specification.

TENDER CHECKLIST

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

Tender Number _____

Tender Name _____

1. Full Company / Business 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 (Mandatory)

9. FNPF Employer Registration Number: _____ **(For Local Bidders only) (Mandatory)**

10. **Provide a copy of Valid FNPF Compliance Certificate (Mandatory- Local Bidders only)**
11. **Provide a copy of Valid FRCS (Tax) Compliance Certificate (Mandatory Local Bidders only)**
12. **Provide a copy of Valid FNU Compliance Certificate (Mandatory Local Bidders only)**

13. Contact Person: _____

I declare that all the above information is correct.

Name: _____

Position: _____

Sign: _____

Date: _____

Tender submission

Bidders are requested to upload electronic copies via Tender Link by registering their interest at: https://www.tenderlink.com/efl

EFL will not accept any hard copy submission to be dropped in the tender box at EFL Head Office in Suva.

This tender closes at 4.00pm (1600hrs) on Wednesday 10th April, 2024.

For further information or clarification please contact our Supply Chain Office on phone **(+679) 3224360 or (+679) 9992400** or email us on tenders@efl.com.fj

The bidders must ensure that their bid is inclusive of all Taxes payable under Fiji Income Tax Act. Bidders are to clearly state the percentage of VAT that is applicable to the bid prices.

The lowest bid will not necessarily be accepted as the successful bid.

The Tender Bids particularly the "Price" must be typed and not hand written.

Any request for the extension of the closing date must be addressed to EFL in writing three (3) working days prior to the tender closing date.

Tender Submission via email or fax will not be accepted.