ENERGY FIJI LIMITED

TECHNICAL SPECIFICATION FOR SUPPLY OF DIN FUSES

MR 190/2019

Revision History & Document Control

Rev No.	Notes	Prepared By	Reviewed & Approved By	Date of Issue
1	Prepared by	Rajiv Singh		31/01/19
2	Reviewed		Basant Kumar	04/02/19

Next Scheduled Revision

This technical specification is due for review in January 2022.

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1. INTRODUCTION AND SCOPE OF WORK

Energy Fiji Limited [EFL] is responsible for generation, transmission and distribution of electricity in Viti Levu, Vanua Levu, Ovalau and Taveuni in Fiji. By the end of 2018, EFL had 190,404 customers. This includes residential, commercial and institutional customers.

EFL is requesting proposal for the Preferred Supplier to supply item listed below for EFL's consumption to carryout repair, Construction and maintenance 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 DIN Fuses for use in EFL's distribution network.

The items covered by this specification are listed below:

No.	Stock Code	Item Description	Size
1	I02061	63A DIN FUSE	DIN 000/ NH 000
2	I02051	100A DIN FUSE	DIN 000/ NH 000
3	I02079	160A DIN FUSE	DIN 00/ NH 00
4	I02005A	80A DIN FUSE	DIN 1/ NH 1
5	I02006A	125A DIN FUSE	DIN 1/ NH 1
6	I02007A	160A DIN FUSE	DIN 1/ NH 1
7	I02008A	200A DIN FUSE	DIN 1/ NH 1
8	I02886C	100A DIN FUSE	DIN 2/ NH 2
9	I02886B	160A DIN FUSE	DIN 2/ NH 2
10	I02063	200A DIN FUSE	DIN 2/ NH 2
11	I02064	315A DIN FUSE	DIN 2/ NH 2
12	I02065	400A DIN FUSE	DIN 2/ NH 2
13	I02066	500A DIN FUSE	DIN 3/ NH 3
14	I02067	630A DIN FUSE	DIN 3/ NH 3
15	I02068	800A DIN FUSE	DIN 4a/ NH 4a

Table 1.1: Items Covered Under this Specification

This Specification covers the general requirements of design, manufacture, testing, supply and delivery of DIN Fuses to be used in EFLs distribution network.

2. REFERENCES

2.1. Applicable Standard

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 1856	Electroplated coatings- silver
AS 2700	Color standards for general purpose.
AS 4169	Electroplated coatings- tin and tin alloys
IEC 60269-1	Low Voltage Fuses – Part 1: General Requirements
IEC 60269-2	Low-Voltage Fuses - Part 2: Supplementary Requirements for Fuses for Use By Authorized Persons (Fuses Mainly for Industrial Application) - Examples Of Standardized Systems Of Fuses A to K
AS/NZS 60269	Low Voltage Fuses
AS/NZS ISO:9001	Quality Management Systems – model for quality assurance in design, development, production, installation and servicing

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

3. SERVICE CONDITIONS

3.1. Environmental Conditions

The DIN Fuses shall be suitable for installation indoors and shall be designed to withstand the following service conditions.

Description		**Conditions**
Atmosphere Pollution Level	:	Very heavy (IEC 815)
Ambient Temperature	:	Peak: 40°C 24 Hour Average: 30°C Annual Average: 22°C Minimum: 10°C
Relative Humidity (Average)	:	85%
Rainfall	:	Annual Average: 2663mm
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	240V/ 415V	11kV
System Highest Voltage	660V	12kV
System Frequency	50Hz	50Hz
Number of Phases	1 or 3	3
System Earthing	Effectively Earthed	Effectively Earthed
Impulse Withstand Voltage (peak)	-	95kV
Power Frequency Withstand Voltage	15kV	28kV (rms)

4. DESIGN AND CONSTRUCTION

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

4.1. DIN Fuses

The fuses shall comply with the requirements of the Australian Standards of the IEC 60269 series and shall have the following characteristics in particular:

- Utilization category: Type 'gG' (fuse-links with a full-range breaking capacity for general application).
- Rated current: As per item descriptions in Table 1.1.
- The required minimum breaking capacity for different fuse groupings will be specified below. If, due to historical and or manufacturing reasons, or due to conflict in meeting other fuse-link characteristic requirements in this technical specification, such minimum rated breaking capacity cannot be achieved for a particular fuse-link type then Tenderers are encouraged to submit their highest rated breaking capacity alternative offer for that item/ fuse type including full details of the item/s.
- The current- time characteristics of the fuses offered shall be included in the tender.
- Fuse elements shall be of pure silver. Should any other material be used, evidence to indicate that deterioration will not occur in the long term shall be offered.
- All metallic components of the fuse shall be resistant to corrosive influences that may occur in normal use.
- All components of the fuse shall be sufficiently resistant to mechanical stresses that may occur in normal use as well as abnormal heat and fire.
- Markings shall be provided on the fuses as required under the Clause 6.2 of IEC 60269-1.

4.1.1. Electrical Characteristics – DIN Fuse

- Rated voltage: Minimum of 500V.
- Rated breaking capacity shall not be less than 80kA.
- Maximum rated power dissipation levels shall not be greater than the values given in Section I, Figure 1(I*) of IEC 60269-1.
- Time-current characteristics shall comply with Section I, sub-clause 5.6 of IEC 60269-1.
- I^2t characteristics shall comply with Section I, sub-clause 7.7 of IEC 60269-1 and the fuses offered shall be provided with the tender documentation in (MS Office) Excel format).
- I^2t characteristics of the fuses offered shall be provided with the tender documentation in (MS Office) Excel format).
- Dimensions in accordance with Section I, Figure 1(I) of IEC 60269-1.

4.2. Color

The background color of the DIN Fuses supplied under this specification shall be in accordance with AS 2700 and table below.

Item	Color	Color as per AS 2700
DIN Fuses	N14 White or similar	In accordance with the requirements of AS 2700

4.3. Marking

The permanent marking of all items shall meet the requirements specified in IEC 60269-1 Clause 6.2. The following shall be marked on the DIN fuses:

- Name of the manufacture or a trade mark by which he may be readily identified
- Manufacturers identification reference enabling all the characteristics listed in IEC 60269-1 Clause 5.1.2 to be found
- Rated voltage
- Rated current
- Breaking range and utilization category (letter code), where applicable
- Kind of current and, if applicable, rated frequency

All marking on the DIN fuses shall be permanent for the service life of the product offered. Evidence shall be provided by the tenderers for/during evaluation.

5. PERFORMANCE AND TESTING

5.1. General

The products covered in this specification shall withstand the electrical/mechanical stress associated with continuous operation at the highest system voltage under the service conditions described in Clause 3.

5.2. Testing

Fuses offered shall be tested in accordance with Section 8 of IEC 60269.1. Consider the following:

No.	Description of Test	Test Method Reference
1	Verification of the insulating properties and of the suitability for isolation	IEC 60269.1 Clause 8.2
2	Verification of temperature rise and power dissipation	IEC 60269.1 Clause 8.3
3	Verification of operation	IEC 60269.1 Clause 8.4
4	Verification of the breaking capacity	IEC 60269.1 Clause 8.5
5	Verification of the cut-off current characteristics	IEC 60269.1 Clause 8.6
6	Verification of I^2t characteristics and overcurrent selectivity	IEC 60269.1 Clause 8.7
7	Verification of the degree of protection of enclosures	IEC 60269.1 Clause 8.8
8	Verification of resistance to heat	IEC 60269.1 Clause 8.9
9	Verification of non-deterioration of contacts	IEC 60269.1 Clause 8.10
10	Mechanical and miscellaneous tests	IEC 60269.1 Clause 8.11

Note to Tenderers: Listed above are type test requirements from IEC 60269.1. EFL has only stated the Clauses to which the test are relevant too. Any sub-clauses from IEC 60269.1 has not been mentioned. The tenderers are advised to follow IEC 60269.1 and provide the list of type test reports as stated in the above table.

Copies of the Type Test Certificates confirming the following fuse characteristics for each item offered shall be supplied with the tender.

- Time-current characteristics plotted on a scaled drawing or a transparency having the same scales as used in Figure 1 of IEC 60269.1 Manufacturing tolerances applicable to the above curves shall also be stated.

- I^2t characteristics (for arcing and operating), Cut-off characteristics and Power dissipation characteristics of the fuses offered shall be submitted with the tender in (MS Office) Excel format.

Note to Tenderers:

The successful Tenderer shall provide the routine and batch test certificates when requested by EFL during the tender evaluation or contract period.

Preference will be given to fuses having the certifications of ASTA or any other recognized international testing authority.

5.3. Acceptance Tests

The EFL may carry out acceptance test on equipment to prove it conforms to the requirements of this Specification. Any equipment showing evidence of failure to comply with the requirements of this specification will be liable to rejection.

5.4. 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. The return-air travel, accommodation, meals and other expense related to test witnessing shall be borne by the Bidder as a value adding service.

5.5. Compliance

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

6. RELIABILITY

6.1. 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 by specifying the guaranteed service life in the **Appendix of Technical Details.**

6.2. Evidence in Support of Reliability

Where the specified guaranteed service life is less than 35 years Suppliers are required to provide comment and submit evidence in support of the reliability and performance claimed including detailed information on Failure Mode and Effect Analysis.

7. ENVIRONMENTAL CONSIDERATIONS

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

8. 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. .

Each packaged lot shall be marked with the following information:

- Manufactures Name
- Purchase Order Number
- Contact No.
- EFL Stock Code
- Item Description
- Applicable standards
- Pack Size
- Pack Weight

9. QUALITY REQUIREMENTS

Tenderers are required to submit evidence that the design and manufacture of DIN Fuses are in accordance with AS/NZS ISO 9001 and shall include the Capability Statement associated with the Quality System Certification.

If the Tenderer is a non-manufacturing supplier, the documentary evidence shall include the quality system certifications of both the supplier and the manufacturer.

10. 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 DIN Fuses will depend on the EFL's project works and for operation and maintenance purposes. An estimate movement of the item are outlined in the table below but it will not be purchase as a lump sum quantity at once. Hence, the successful bidder will be required to carry a consignment / safety stock at times to meet EFL's demand within the three year contract period.

No.	Stock Code	Item Description	Size	Approximate 3 Year Stock Movement
1	I02061	63A DIN FUSE	DIN 000/ NH 000	185
2	I02051	100A DIN FUSE	DIN 000/ NH 000	244
3	I02079	160A DIN FUSE	DIN 00/ NH 00	152
4	I02005A	80A DIN FUSE	DIN 1/ NH 1	9
5	I02006A	125A DIN FUSE	DIN 1/ NH 1	120
6	I02007A	160A DIN FUSE	DIN 1/ NH 1	9
7	I02008A	200A DIN FUSE	DIN 1/ NH 1	39
8	I02886C	100A DIN FUSE	DIN 2/ NH 2	3
9	I02886B	160A DIN FUSE	DIN 2/ NH 2	27
10	I02063	200A DIN FUSE	DIN 2/ NH 2	331
11	I02064	315A DIN FUSE	DIN 2/ NH 2	300
12	I02065	400A DIN FUSE	DIN 2/ NH 2	511
13	I02066	500A DIN FUSE	DIN 3/ NH 3	260
14	I02067	630A DIN FUSE	DIN 3/ NH 3	156
15	I02068	800A DIN FUSE	DIN 4a/ NH 4a	3

11. PRODUCT WARRANTY PERIOD

The bidders are 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.

12. INFORMATION TO BE SUPPLIED BY THE BIDDER

12.1. Documentation to be supplied with the tender

To enable the EFL to fully evaluate the DIN Fuses offered, (in addition to the completed Specification Requirement and Guaranteed Performance schedule) the bidder shall submit the following information with their tender:

- List showing similar equipment supplied to or on order for other utilities in Australia or New Zealand or the Oceania region for the past 5 years
- Typical arrangement drawings and full details of the dimensions
- Type test certificates as per Clause 5.2
- End of service life disposal methods
- Evidence of Quality Management Systems
- 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 DIN Fuses.
- 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)

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

12.2. Samples

When requested, production samples of each item shall be submitted with the offer.

Each sample shall be delivered freight free (Delivery Duty Paid (DDP)), suitably packaged and labelled with the following information:

- Name of supplier and the contact number
- Tender number
- Any supporting data on features or characteristics

12.3. Training

Training material in the form of drawings, instructions and/or audio visuals (in CD format) are required to be provided for the items accepted under the tender. The Tenderers shall allow the cost of production and delivery of training material in the tendered prices.

The training materials should include but not be limited to the following topics:

- Handling
- Storage
- Application
- Installation
- Maintenance
- Environmental performance

- Electrical performance
- Mechanical performance
- Disposal

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

13. APPENDIX

13.1. Price Schedule

Bidders are required to complete the following price schedule and submit with the offer. EFL requires the biding prices to be in CIF incoterms.

No.	Stock Code	Item Description	Size	Unit Price (CIF)
1	I02061	63A DIN FUSE	DIN 000/ NH 000	
2	I02051	100A DIN FUSE	DIN 000/ NH 000	
3	I02079	160A DIN FUSE	DIN 00/ NH 00	
4	I02005A	80A DIN FUSE	DIN 1/ NH 1	
5	I02006A	125A DIN FUSE	DIN 1/ NH 1	
6	I02007A	160A DIN FUSE	DIN 1/ NH 1	
7	I02008A	200A DIN FUSE	DIN 1/ NH 1	
8	I02886C	100A DIN FUSE	DIN 2/ NH 2	
9	I02886B	160A DIN FUSE	DIN 2/ NH 2	
10	I02063	200A DIN FUSE	DIN 2/ NH 2	
11	I02064	315A DIN FUSE	DIN 2/ NH 2	
12	I02065	400A DIN FUSE	DIN 2/ NH 2	
13	I02066	500A DIN FUSE	DIN 3/ NH 3	
14	I02067	630A DIN FUSE	DIN 3/ NH 3	
15	I02068	800A DIN FUSE	DIN 4a/ NH 4a	

13.2. Technical Details – DIN Fuses

This schedule shall be completed and submitted with the offer. A separate schedule shall be provided for each item offered:

Particulars	Units	Requirements	Tenderers Response
EFL Stock Code			
Manufactures Name			
Origin of materials used for manufacturing of DIN Fuses			
Country of manufacture			
Manufactures type test certificate number			
Applicable Standards		IEC 60269.1	
Rated voltage	V	Min. of 500	
Rated current	A	Bidder to state	
Breaking capacity	kA	80	
Conventional non-fusing current	X rated current	Bidder to state	
Conventional fusing current	X rated current	Bidder to state	
Conventional time	Hours	Table 2 in IEC 60269.1	
Category of duty		Bidder to state	
Power dissipation at rated current	W	Figure 1(I*) of Section I in IEC 60269.1	
DC resistance measured at no load at 40^{o}C	Ω	Bidder to state	
Has the fuse been fully tested to IEC 60269.1 by an accredited testing authority	Yes/No		
Name of testing authority			
Overall length	mm	Figure 1(I) of Section I in IEC 60269.1	
Length of Blade	mm		
Width of Blade	mm		
Height of Blade	mm		
Body Length	mm		
Body Width	mm		
Body Height	mm		
Body material		Bidder to state	

Blade corrosion protection		Bidder to state	
Fuse element material		Refer to Clause 4.1	
Fusing factor		Bidder to state	
Dimensional drawings of the fuses offered	Yes/ No		
Time-current characteristics of fuse links	Yes/ No		
Weight of fuse	kg	Bidder to state	
Weight per crate	kg	Bidder to state	
Number of fuses per crate			

No.	Description of Test	Test Method Reference	Type Test Report Provided and Number
1	Verification of the insulating properties and of the suitability for isolation	IEC 60269.1 Clause 8.2	
2	Verification of temperature rise and power dissipation	IEC 60269.1 Clause 8.3	
3	Verification of operation	IEC 60269.1 Clause 8.4	
4	Verification of the breaking capacity	IEC 60269.1 Clause 8.5	
5	Verification of the cut-off current characteristics	IEC 60269.1 Clause 8.6	
6	Verification of I^2t characteristics and overcurrent selectivity	IEC 60269.1 Clause 8.7	
7	Verification of the degree of protection of enclosures	IEC 60269.1 Clause 8.8	
8	Verification of resistance to heat	IEC 60269.1 Clause 8.9	
9	Verification of non-deterioration of contacts	IEC 60269.1 Clause 8.10	
10	Mechanical and miscellaneous tests	IEC 60269.1 Clause 8.11	

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

13.3. Submission Requirements

All tenderers are required to complete and submit a copy of the submission requirements with their bid submissions. ***Note that details below are mandatory requirements***.

Requirements	Response from Bidders
Validity of bid (180 days required) (Yes/No)	
Detailed reference list of customers already using equipment offered during the last 5 years with particular emphasis on units of similar design and rating.	
List of type test certificates provided. (As per Clause 5.2)	
Minimum warranty period from time of acceptance of item required is 24 months.	
Completed price and technical schedules (Clause 13.1 and 13.2) (Yes/No)	
Complete dimensional drawing provided.	
The biding pricing to be in CIF incoterm.	
Lead time of delivery after tender award.	
Price review period after award of tender. (months)	
Bidders company profile outlining financial, technical and production capabilities.	
Disposal method after service life.	
Witnessing included as part of bid (Clause 5.4). (Yes/No)	
Quality management system used in the production of hardwood cross-arms, attached certificate.	

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

Complete the following schedule as part of the bid:

Stock Codes	Items	Sizes	Country of Manufacture	Manufacturer of product	Brand Offered	Manufactured to standards	ISO Certification of Manufacturer
I02061	63A DIN FUSE	DIN 000/ NH 000					
I02051	100A DIN FUSE	DIN 000/ NH 000					
I02079	160A DIN FUSE	DIN 00/ NH 00					
I02005A	80A DIN FUSE	DIN 1/ NH 1					
I02006A	125A DIN FUSE	DIN 1/ NH 1					
I02007A	160A DIN FUSE	DIN 1/ NH 1					
I02008A	200A DIN FUSE	DIN 1/ NH 1					
I02886C	100A DIN FUSE	DIN 2/ NH 2					
I02886B	160A DIN FUSE	DIN 2/ NH 2					
I02063	200A DIN FUSE	DIN 2/ NH 2					
I02064	315A DIN FUSE	DIN 2/ NH 2					
I02065	400A DIN FUSE	DIN 2/ NH 2					
I02066	500A DIN FUSE	DIN 3/ NH 3					
I02067	630A DIN FUSE	DIN 3/ NH 3					
I02068	800A DIN FUSE	DIN 4a/ NH 4a					

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

13.4. 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 4.00pm (**1600hrs Fiji Time) Wednesday 3rd July, 2019**.

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 additional, 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 190/2019 – Preferred Supplier for Supply of Din Fuses

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 4.00pm (1600hrs Fiji Time) Wednesday 3rd July, 2019.**

- Will not be considered.

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

It is the responsibility of the bidder to pay courier chargers and all other cost associated with the delivery of the hard copy of the Tender submission.

TENDER SUBMISSION CHECK LIST

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

Tender Number _____

Tender Name _____

1. Full Company Name: _____

   (Attach copy of Registration Certificate)

2. Director/Owner(s): _____
3. Postal Address: _____
4. Phone Contact: _____
5. Fax Number: _____
6. Email address: _____
7. Office Location: _____
8. TIN Number: _____

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

9. Company Registration Number: _____

   (Attach copy of the Business License)

10. FNPF Employer Registration Number: _____

    (For Local Bidders only)

11. Contact Person: _____

I declare that all the above information is

correct. Name: _____

Position: _____

Sign: _____ Date: _____