APPENDIX A

TECHNICAL SPECIFICATION FOR CABLE ACCESSORIES, TERMINATIONS AND JOINTING MATERIALS FOR UNDERGROUND CABLES WITH NOMINAL SYSTEM VOLTAGE UP TO 11kV

FIJI ELECTRICITY AUTHORITY

Revision History & Document Control

Rev no.	Notes	Prepared By	Reviewed By	Date of Issue
1	Issued for internal review	Rajiv Singh		22/01/18
2	Reviewed		Basant Kumar	9/02/18

Next Scheduled Revision

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

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1.0 Introduction

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

This document outlines the technical requirements for cable accessories, terminations and jointing materials for underground cables with nominal system voltage up to 11kV for use in FEA's electricity distribution networks.

The items covered under this specification are tabulated below.

No.	Stock Code	Item Description
1	I04705	LV SCOTCHCAST JOINT 16-35mm
2	I04704	LV SCOTCHCAST JOINT 35-70mm
3	I04693	LV RESIN KIT 4C 95-240mm
4	I04695	LV RESIN KIT 4C 150-300mm
5	I04690A	LV TERMINATION KIT I/D O/D 120-240mm
6	I04672N	11kV STRAIGHT INLINE JOINT 3C XLPE 185-300mm
7	I04672F	11kV TERMINATION KIT O/D 3C XLPE 95-240mm
8	I04672D	11kV TERMINATION KIT I/D 3C XLPE 95-240mm
9	I04672L	11kV TERMINATION KIT O/D 3C XLPE 120-300mm
10	I04672M	11kV TERMINATION KIT I/D 3C XLPE 120-300mm
11	I04675	11kV RIGHT ANGLE BUSHING SLEEVE XLPE 120-300mm
12	I04676	11kV INLINE BUSHING SLEEVE XLPE 120-300mm
13	I04685	11kV STRAIGHT JOINT 95-240mm
14	I04706	11kV TRANSITION JOINT 16-95mm
15	I04709	11kV TRANSITION JOINT 95-240mm
16	I04710	11kV TRANSITION JOINT 3C XLPE 150-300mm
17	I04677A	11kV TRIFURACTING KIT 3C XLPE FOR ABB SAFELINK S/G 95-240mm
18	I04677	11kV TRIFURACTING KIT 3C XLPE FOR ABB SAFELINK S/G 185-300mm

This Specification covers the general requirements of design, manufacture, testing, supply and delivery of heat shrink terminations for LV and 11kV cables. Included are ancillary equipment for 11kV single phase or triplex cables that may be used to connect to specific 11kV switchgears and transformers.

2.0 References

2.1 Applicable Standards

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

AS / NZS 1026	Electric cables – Impregnated paper insulated – For working voltage up to and including 19/33 (36)kV
AS / NZS 1125	Conductors in insulated electric cables and flexible cords
AS / NZS 1429.1	Electric cables – Polymeric insulated – For working voltages 1.9/3.3 (3.6) kV up to and including 19/33 (36)kV
AS / NZS 1660 All parts	Test methods for electric cables, cords and conductors
AS / NZS 3808	Insulating and sheathing materials for electric cables
AS / NZS 4026	Electric Cables – For underground residential distribution systems
AS / NZS 4325.1	Compression and mechanical connectors for power cables with copper or aluminum conductors – Test methods and requirements
AS / NZS 4805	Accessories for electric cables – Test requirements
AS / NZS 5000.1	Electric cables – Polymeric insulated – For working voltages up to and including 0.6/1 (1.2)kV
AS / NZS ISO 31000	Risk management – Principles and guidelines
AS / NZS ISO 9001	Quality management systems - Requirements
AS 1931	High-voltage test techniques
AS 4068	Flat pallets for materials handling
AS 4169	Electroplated coatings – Tin and tin alloys (ISO 2093:1986, MOD)
AS 60270	High-voltage test techniques – Partial discharge measurements
AS 62271.301	High voltage switchgear and controlgear – Dimensional standardization of terminals
IEC 60229	Electric cables - Tests on extruded oversheaths with a special protective function

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

2.2 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 FEA in compliance with all applicable laws (including all workplace health and safety and electrical safety legislations and codes of conduct).

3.0 System Conditions

3.1 Environmental Conditions

The cable accessories, terminations and jointing materials shall be suitable for operating under the following conditions.

Description		**Conditions**
Installation	:	Installed directly buried in fine grain bedding material, or, in PVC conduits at a nominal depth of up to 1000 mm
Ambient Ground Temperature	:	Not exceeding 35°C
Annual average ambient temperature	:	22°C
Maximum ambient temperature	:	40°C
Maximum relative humidity	:	85%
Environmental conditions	:	Tropical Climate with populated atmosphere
Isokeraunic (Thunder day) level	:	60 thunder days per year

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 (rms)	15kV	28kV

4.0 Design and Construction

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

4.1 Cable Types in the FEAs System

The list of cables tabulated below show the current standard cables being installed in the FEAs network and existing cables in the network that require jointing and terminating in conjunction with network alterations, extensions and maintenance works.

No.	LV Cable Description
1	70mm Four Core Copper XLPE
2	95mm Four Core Copper PVC
3	120mm Four Core Copper PVC
4	185mm Four Core Copper PVC
5	185mm Single Core Al XLPE
6	240mm Single Core Copper PVC
7	240mm Four Core Copper XLPE
8	240mm Single Core Al XLPE
9	300mm Single Core AL XLPE
No.	**HV Cable Description**
10	95mm Three Core Al XLPE
11	240mm Three Core Al XLPE
12	300mm Three Core Al XLPE

Table 6.1: LV and HV Cables Used by FEA

4.2 11kV Joints and Terminations

4.2.1 General

All joints and terminations shall be of the heat-shrink type design, manufactured and tested to meet the requirements of the relevant Standards, including AS/NZS 4805 Parts 1 and 2 or equivalent, and shall be suitable for application to the FEAs 11kV cables as described in Table 6.1 of this specification.

All joint and termination kits shall be supplied complete in unit lots suitably packaged for storage containing all necessary materials. Full detailed installation instructions specific to the cables listed in Table 6.1 shall be supplied with the Tender and with the jointing kits that are subsequently supplied. The FEA will keep a copy of the instructions for their records and the supplier is to supply a copy of the instructions with each kit.

Preference will be shown to the Tender offering bi-metal range taking kits suitable for either aluminum or copper conductors and utilizing screwed connectors with shear head bolts or torque tightened bolts, in lieu of kits containing compression connectors.

All joints and termination kits shall be supplied with the required cleansing solvents, cloth and abrasives. Tenderers shall provide with their tender Safety Data Sheets (SDS) for nominated solvents. No unapproved solvents shall be provided without prior agreement of the Purchaser.

If required, sealants shall be supplied to effect seals on joints and terminations and shall be able to accommodate the creep or relaxation that may occur during installation of the accessories or during the normal cyclic loading of the cables. The sealant shall have adhesion properties to maintain hermetic seals at all times between components and the various cable sheath materials and connectors.

All joints and terminations shall be designed so that a phase cross can be made in the joint or termination without stressing the cable insulation or insulation components.

4.2.2 11kV Straight and Transition Joints

All joints shall have an outer serving which has mechanical strength properties equal to that of the High density polyethylene (HDPE) over-sheath of the cable.

The cable joint descriptions shall accommodate insect protection mechanisms. The preference is for a fine woven stainless steel mesh cylindrical sleeve that is applied over the joint and clamped to the cable insect protection layer each side of the joint by a constant force spring arrangement. An outer tube is then provided to finish the joint.

Details of full insect protection and the cost shall be separately submitted with full details and supporting evidence of performance including service history to FEA (Purchase).

Tenderers shall complete Appendix 15.2 to state overall length of the completed joint and the required cable pit length to make the joint.

4.2.3 11kV Terminations – Outdoor Type

All terminations shall meet the performance requirements specified in Clause 7.1 of this specification.

The polymeric stress control sleeve and sheds shall withstand the electrical stress associated with continuous operation at 12 kV under the system conditions described in Clauses 3.1 & 3.2.

The termination shall be suitable for terminating cables on to a low mount substation structure and on to a pole using a bracket mounted with 12kV surge arresters for support of the cable tails. The tail lengths of the terminating kits for three phase cables shall be a minimum of 800mm long to allow a phase cross to be installed on the cable.

Shorter lengths may be considered provided an assessment by the FEA field personnel indicate that the kits can be installed without undue difficulty and without stressing the cable insulation.

The kits shall be supplied with phase identification components which can be applied to the phase cores and which are compatible with the terminating materials.

Terminal connectors, preferably with shear head bolts, are to be supplied with the kits and shall be of the following type: -

- XLPE insulated cables shall have bi-metal lugs or tinned aluminum shear bolt connectors for the phase conductors and tinned copper or brass lugs for the screen wires.
- Lug palms shall be supplied with fully sealed palms.
- Lugs shall meet the test requirements of AS/NZS 4325.1
- Lugs shall have a clearance hole suitable for a 12mm bolt for cable up to 300mm^2 and a clearance hole suitable for a 16mm bolt for larger cables

4.2.4 11kV Terminations – Indoor Type

All terminations shall meet the requirements of AS/NZS 4325.1 and the performance requirements specified in Clause 7.1 of this specification.

The terminating kits shall be suitable for terminating in cable boxes of the switchgear listed in Table 6.2 below.

Switchgear Manufacturer	Type	Cable Sizes
ABB	SafeLink	25mm to 300mm
ABB	SDAF	25mm to 300mm
ABB	SD2	25mm to 300mm
ABB	SD	25mm to 300mm
Crawford & Company (Manchester)	Long & Crawford	25mm to 300mm

Table 6.2: 11kV Switchgears Used by FEA

4.2.4.1 11kV Termination to Open Bushing

The tail lengths of the terminating kits for three phase cables shall be of sufficient length to allow a phase cross to be installed on the cable.

All 11 kV single core cable kits shall have a maximum length of 330mm.

Where the phase to phase and phase to earth clearance of the switchgear cable boxes are not sufficient for air clearance, tenderers shall supply a system of insulating the terminal and lug connection which suits both the cables listed in Table 6.1 and the switchgear listed in Table 6.2. The insulating system for the terminals shall be capable of withstanding an impulse level of 95kV BIL with the largest cable size from Table 6.1 terminated in the cable box. The insulating system offered should be of heat shrink type.

Where insulating boots are required these shall be supplied as separate items and listed in the offer under ancillary equipment.

The kits shall be supplied with phase identification components which can be applied to the phase cores and which are compatible with the terminating materials.

Terminal lugs, preferably with shear head bolts, are to be supplied with all kits and shall be of the following type: -

- XLPE Insulated cables shall have bi-metal or tinned aluminum lugs for the phase conductors and tinned copper or brass lugs for the screen wires.
- Lug palms shall be supplied with fully sealed palms.

Lugs shall meet the test requirements of AS/NZS 4325.1.

4.3 LV Joints and Terminations

4.3.1 General

All joints and terminations shall meet the performance requirements of Clause 7.1 of this specification and shall be suitable for application to the FEAs LV cables as described in Table 6.1 of this specification.

Sealants shall be used to effectively seal joints and terminations and the properties of the sealants shall be able to accommodate the creep or relaxation that may occur during installation of the accessories or

during the normal cyclic loading of the cables. The sealants shall have adhesion properties to maintain hermetic seals at all times between components and the various cable sheath materials and connectors.

All joints and terminations shall be designed so that a phase cross can be made in the joint or termination without stressing the cable insulation or insulation components.

Connectors shall be supplied with the kits. Connectors utilizing a mechanical connection with shear head bolts with a range taking ability are preferred to compression connectors. Where compression connectors are supplied the connectors shall be capable of being installed using a standard Hydraulic Crimper.

Connectors shall meet the test requirements of AS/NZS 4325.1.

All joint and terminations kits shall be supplied complete in unit lots suitably packaged for storage containing all necessary materials including cleansing solvents, cloths and abrasives. Tenderers shall provide with their tender Safety Data Sheets (SDS) for nominated solvents. No unapproved solvents shall be provided without prior agreement of the Purchaser. Full detailed installation instructions specific to the cables listed in Table 6.1 shall be supplied with the jointing kits. The FEA will keep a copy of the instructions for their records and the supplier is to supply a copy of the instructions with each kit.

4.3.2 LV Straight Joints

All joints shall have an outer serving which has a mechanical strength equal to that of the over- sheath of the cable. The outer serving shall provide a minimum insulation resistance of 1000MΩ.

4.3.3 LV Terminations – Indoor and Outdoor Type

All terminations shall meet the performance requirements specified in Clause 7.1.

The tail lengths of the terminating kits shall be of sufficient length to allow a phase cross to be installed on the cable. The minimum length for tails shall be 400 mm.

- Terminal connectors are to be supplied with the kits and shall be of the following type:-
- Cable terminations with copper conductors shall have tinned copper lugs whilst aluminum conductor shall have aluminum lugs.
- Lug palms shall be supplied with fully sealed palms.
- For cables up to 300 mm^2 lug palms shall not exceed 35 mm in width and shall have a clearance hole suitable for a 12 mm bolt.

Lugs shall meet the test requirements of AS/NZS 4325.1.

Connectors utilizing a mechanical connection with shear head bolts with a range taking ability are preferred to compression connectors. Where offered, compression terminal connectors shall be capable of being installed using a standard Hydraulic Crimper.

5.0 Ancillary Equipment

All items necessary to this specification and not included in the items previously specified shall be termed “Ancillary Equipment”.

The Tenderer shall list such items. A quantity and price shall be shown for each individual item to allow a review of requirements at the time of ordering.

6.0 Quality Assurance

The manufacture shall submit evidence that the design and manufacture of the jointing and termination kits with accessories are in accordance with AS/NZS ISO 9001 and shall include the Capability Statement associated with the Quality System Certification.

7.0 Performance and Testing

7.1 Joint and Termination Performance Requirement

7.1.1 Electrical

The Tenderer shall supply joints and terminations that meet the test requirements of the relevant Standards, including AS/NZS 4085 Part 1 and 2, AS/NZS 1600 – All Parts, AS/NZS 4325.1 and IEC61442, and shall complete Appendix 15.1 to Appendix 15.4 inclusive.

The joints and terminations shall withstand the electrical stress associated with continuous operation at the highest system voltage under the system conditions described in Clause 3.2 of this specification.

7.1.2 Test Certificates

The Tenderer shall provide test Certificates in duplicate for all test undertaken by the manufacturer under this specification.

Such test certificates shall be signed by a properly authorized person and forwarded to the FEA.

The FEA may appoint a representative to be present for inspection and witnessing of tests at any time during the manufacture of the accessories.

7.2 Type Test Compliance

Copies of original Type Test certificates / reports shall be included in full in accordance with IEC 60502-4 (including all drawings, revisions and test results as stipulated in the applicable standards as specified in this Specification) with the tender regardless of whether or not the equipment has been supplied previously to the FEA. Where company details have changed with regard to the original Type Testing, and the original Type Testing is submitted, these company details changes shall be detailed in the tender submission, for every company change up to the time of submission of tender. Type Test certificates/reports shall be complete and copies of front pages only shall not be acceptable.

Where items of a similar design to that previously tested are offered, consideration may be given to accepting previous Type Test reports. Tenderers are requested to substantiate their claims of equivalent Type Test performance with written engineering evaluation, where full Type Test documentation is not submitted for each of the items offered. Such evaluation must provide all relevant details such that the FEA can establish the validity of existing Type Tests.

The FEA requires that all Type Test (for items offered) are certified by a laboratory accredited by an Accreditation Entity. An Accreditation Entity is a signatory to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA), for example; the National Association of Testing Authorities, Australia (NATA). Full accreditation details of the Type Testing facilities and the accreditation certifying entity and any mutual recognition arrangements with other accreditation entities shall be provided by the tenderer.

The FEA may request repeat of Type Tests to prove compliance to this technical specification where the materials used in the equipment offered and / or the manufacturing process and / or the place of manufacture have changed since the equipment was originally type tested.

7.3 Batch and Routine Tests

If tenderers propose to offer items tested to Standards other than those specified in this Specification, full details of these Standards are to be provided at the time of tendering.

7.4 Acceptance Tests

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

7.5 Witnessing of Test

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

7.5.1 Electrical

The Tenderer shall supply joints and terminations that meet the test requirements of the relevant Standards, including AS / NZS 4085 Part 1 and 2 or equivalent, AS / NZS 1660 – All Parts, AS / NZS 4325.1 and IEC61442, and shall complete Attachments.

The joints and terminations shall withstand the electrical stress associated with continuous operation at the highest system voltage under the system conditions described in Clause 3.2 of this specification.

8.0 Additional requirements

8.1 Packaging Requirements

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 handing at each location during loading and unloading.

8.2 Marking Requirements

Each packaged lot and each kit within the packaged lot to be marked with the following information:

1. Marking required on each kit
    a. Names of supplier/ manufacture
    b. Product code
    c. Item description
    d. Purchasers stock code
    e. Quantity: 1 kit
    f. Date of manufacture
    g. Use before date if applicable
2. Marking required on each packaged lot
    a. Names of supplier/ manufacture
    b. Product code
    c. Item description
    d. Purchasers stock code
    e. Pack size: No. of kits
    f. Date of manufacture
    g. Pack Mass (kg)

8.3 Storage

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

9.0 Information to be supplied

9.1 General

The specific technical requirements for the items offered shall be as stated in Appendix 15.1 to Appendix 15.4 inclusive of this specification. The Tenderer shall provide all details requested by Appendix 15.1 to Appendix 15.4 and shall guarantee such data.

In addition to the completed schedules, Tenders shall submit with their tender one copy of a general jointing instruction together with drawings of not less than ¼ scale fully describing the joints offered.

The general jointing instructions shall state the shelf life of the joint kit.

Tenderers shall supply one copy of a general terminating instruction including drawings of not less than ¼ scale fully describing the cable terminations with the tender documents. The information shall be of sufficient detail to identify what existing components can be re-used or whether modifications to or new components are required.

Tenderers shall provide an estimate of labor hours to complete each joint and termination after cutting of cable(s), in a workshop situation, using experienced jointers.

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

9.2 Drawings & Information to be supplied by the Successful Tenderer

All information to be supplied under this specification shall be in the English language and all drawings shall be dimensioned in metric units in accordance with AS ISO 1000. Where a drawing is dimensioned in imperial units, the equivalent metric units shall be shown in brackets adjacent to it.

When requested by the Purchaser, the Supplier shall:

- Provide within two (2) weeks of the date of the formal execution of the Standing Order, a comprehensively detailed program of works indicating timing for all activities required to achieve contract performance.
- Within six (6) weeks from the date of the formal execution of the Standing Order, the Supplier will provide three copies of drawings and information necessary to enable the Purchaser to examine the general design and arrangement.

The Purchaser will comment on drawings supplied under this contract in relation to how the equipment interfaces with the Purchaser's design, construction, operation, maintenance and other requirements.

Comments about drawings by the Purchaser will not in any way absolve the Supplier of responsibility for the safety and reliability aspects of the plant or equipment supplied. The Supplier will amend the drawings as directed and resubmit them to the Purchaser within one (1) week.

In the event of the Supplier proceeding with work before such comment has been given in writing, any necessary alterations and modifications will be carried out at the Tenderer's own expense.

Drawings will include a fully dimensioned general arrangement drawing.

If the drawings submitted for approval require modification by either the Supplier or the Purchaser, the Supplier shall carry out the modifications and submit the modified drawings for comment. This procedure shall continue until the Purchaser notifies the Supplier that the drawings are acceptable.

When requested by the Purchaser, the Supplier shall supply no later than four weeks prior to the date of dispatch of the equipment from the supplier the following:

- Final copies of all drawings listed in this section of the specification.
- Final Inspection and Test Plan covering at minimum the manufacturing and packaging procedures.
- Certified copies of test reports called for in this specification verifying compliance with this specification.

10.0 Stock Availability

The bidder is required to show the size of his/her stock holding and the ability to meet the required estimate quantity per annum. The movement of the Straight Inline joint Kits will depend on the FEA's project works and for operation and maintenance purposes. An estimate movement of Straight Inline joint Kits is outlined in the table below:

FEA Stock Code	Item Description	3 Year Stock Movement
I04705	LV SCOTCHCAST JOINT 16-35mm	36
I04704	LV SCOTCHCAST JOINT 35-70mm	11
I04693	LV RESIN KIT 4C 95-240mm	21
I04695	LV RESIN KIT 4C 150-300mm	28
I04690A	LV TERMINATION KIT I/D O/D 120-240mm	9
I04672N	11kV STRAIGHT INLINE JOINT 3C XLPE 185-300mm	78
I04672F	11kV TERMINATION KIT O/D 3C XLPE 95-240mm	115
I04672D	11kV TERMINATION KIT I/D 3C XLPE 95-240mm	308
I04672L	11kV TERMINATION KIT O/D 3C XLPE 120-300mm	23
I04672M	11kV TERMINATION KIT I/D 3C XLPE 120-300mm	54
I04675	11kV RIGHT ANGLE BUSHING SLEEVE XLPE 120-300mm	87
I04676	11kV INLINE BUSHING SLEEVE XLPE 120-300mm	97
I04685	11kV STRAIGHT JOINT 95-240mm	148
I04706	11kV TRANSITION JOINT 16-95mm	180
I04709	11kV TRANSITION JOINT 95-240mm	204
I04710	11kV TRANSITION JOINT 3C XLPE 150-300mm	78
I04677A	11kV TRIFURACTING KIT 3C XLPE FOR ABB SAFELINK S/G 95-240mm	119
I04677	11kV TRIFURACTING KIT 3C XLPE FOR ABB SAFELINK S/G 185-300mm	49

11.0 Environmental Considerations

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

12.0 Reliability

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

Tenderers shall provide evidence in support of the reliability and performance claimed including information of Failure Mode and Effect Analysis with the tender.

13.0 Samples and Lead Time to Delivery

Tenderers must submit, when requested, one (1) production samples of each item tendered to assist in the evaluation of the tender. Samples shall be delivered to the address nominated within ten (10) working days of the request.

The requirements for samples may be waived for the following conditions:

- The tendered item is currently under contract or has previously been supplied to the FEA under contract and there have been no changes to the design or material.
- The tendered items have been supplied to the FEA for approval prior to this tender and there have been no changes to the design or material.

Each sample shall be delivered freight free, suitably packaged and labelled with the following information:

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

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

14.0 Training

Training material in the form of jointing and terminating kits, drawings, instructions and / or audio visuals may be required for the items accepted under this offer. This material shall include but is not limited to the following topics:

- Handling
- Storage
- Application (particularly in areas of heavy coastal pollution)
- Installation (including insect protection where applicable)
- Maintenance
- Environmental performance
- Electrical performance
- Mechanical performance
- Disposal

Tenderers shall provide at their cost, qualified training instructors to undertake training of the Purchaser's cable jointers and other personnel at the commencement of the contract. The training shall be competency based with the successful tenderer being responsible for ensuring that trainees have obtained the required skill for installation of the jointing and terminating materials and that an accreditation certificate is issued to indicate successful completion of the training program.

15.0 Appendix

15.1 Technical Details – 11kV Terminations (Indoor & Outdoor)

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

	Response
Item No.	
Manufacturer's Name and Address	
Country of Manufacturers	
Type Test Certificate No.	

Particulars	Unit	Specified Value / Requirement	Response / Guaranteed Value
Type Offered	Heat / Premoulded		
Rated Voltage	kV		
15 minute dry A.C. Voltage Withstand	15 min at 2.5 U_0 (15kV)	No breakdown or flashover	
5 minute dry A.C. Voltage Withstand	5 min. at 4.5 U_0 (27kV)	No breakdown or flashover	
(Outdoor Only) A.C. Voltage withstand wet	1 min at 4 U_0 (24kV)	No breakdown or flashover	
15 minute dry D.C. Voltage Withstand	15 min at 4 U_0 (24kV)	No breakdown or flashover	
Partial Discharge – maximum	1.73 U_0 (10kV)	10 pC max.	
Impulse Level	95kV	No breakdown or flashover	
Type of Lug	Mechanical / Compression		
Lug Manufacturer			
Lug Manufacturer's part number			

(Compression Lug Only) Across Flat Distance of the Die	mm		
Lug Conductor diameter range	mm		
Tail Lengths	mm		
Creepage Distance	mm		
Color of housing / Sheds			
Diameter over cable insulation range	mm		
Detailed Instructions to suit type and voltage included in kits	Yes / No		
(Indoor Only) Terminal insulation available to suit all switchgear listed in Table 6.2 and cable sizes listed in Table 6.1, plus compatible with cable termination components	Yes / No		
Terminal insulation removable and reusable for testing of switchgear	Yes / No		
Pack Size			
Pack Mass	kg		
Shelf Life	Years		
Labour estimate to complete termination	hours		

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

15.2 Technical Details – 11kV Joints

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

	Response
Item No.	
Manufacturer's Name and Address	
Country of Manufacturers	
Type Test Certificate No.	

Particulars	Unit	Specified Value / Requirement	Response / Guaranteed Value
Type Offered	Heat / Premoulded		
Rated Voltage	kV		
15 minute dry A.C. Voltage Withstand	15 min at 2.5 U_0 (15kV)	No breakdown or flashover	
5 minute dry A.C. Voltage Withstand	5 min. at 4.5 U_0 (27kV)	No breakdown or flashover	
15 minute dry D.C. Voltage Withstand	15 min at 4 U_0 (24kV)	No breakdown or flashover	
Partial Discharge – maximum	1.73 U_0 (10kV)	10 pC max.	
Impulse Level	95kV	No breakdown or flashover	
Type of Connector	Mechanical / Compression		
Connector Manufacturer			
Connector Manufacturer's part number			
(Compression Connector Only) Across Flat Distance of the Die	mm		

Connector Conductor diameter range	mm		
Creepage Distance	mm		
Color of housing / Sheds			
Diameter over cable insulation range	mm		
Overall Length	mm		
Required Pit Length	mm		
Detailed Instructions to suit type and voltage included in kits	Yes / No		
Pack Size			
Pack Mass	kg		
Shelf Life	Years		
Labour estimate to complete termination	hours		

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

15.3 Technical Details – LV Terminations

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

	Response
Item No.	
Manufacturer's Name and Address	
Country of Manufacturers	
Type Test Certificate No.	

Particulars	Unit	Specified Value / Requirement	Response / Guaranteed Value
Type Offered	Heat / Premoulded		
Rated Voltage	kV		
5 minute dry A.C. Voltage Withstand	5 min. at 3.5kV	No breakdown or flashover	
Insulation Resistance	MΩ	1000 MΩ	
Type of Connector	Mechanical / Compression		
Connector Manufacturer			
Connector Manufacturer's part number			
(Compression Connector Only) Across Flat Distance of the Die	mm		
Connector Conductor diameter range	mm		
Creepage Distance	mm		
Color of housing / Sheds			

Diameter over cable insulation range	mm	[redacted]	
Detailed Instructions to suit type and voltage included in kits	Yes / No	[redacted]	
Pack Size	[redacted]	[redacted]	
Pack Mass	kg	[redacted]	
Shelf Life	Years	[redacted]	
Labour estimate to complete termination	hours	[redacted]	

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

15.4 Technical Details – LV Joints

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

	Response
Item No.	
Manufacturer's Name and Address	
Country of Manufacturers	
Type Test Certificate No.	

Particulars	Unit	Specified Value / Requirement	Response / Guaranteed Value
Type Offered	Heat / Premoulded		
Rated Voltage	kV		
5 minute A.C. Voltage Withstand	5 min. at 3.5kV	No breakdown or flashover	
Insulation Resistance	MΩ	1000 MΩ	
Type of Connector	Mechanical / Compression		
Connector Manufacturer			
Connector Manufacturer's part number			
(Compression Connector Only) Across Flat Distance of the Die	mm		
Connector Conductor diameter range	mm		
Creepage Distance	mm		
Color of housing / Sheds			

Diameter over cable insulation range	mm		
Overall Length	mm		
Required Pit Length	mm		
Detailed Instructions to suit type and voltage included in kits	Yes / No		
Pack Size			
Pack Mass	kg		
Shelf Life	Years		
Labour estimate to complete termination	hours		

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____