



Ergon Energy Corporation Limited

Technical Specification for Composite Longrod Insulators

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Technical Specification for Composite Longrod Insulators



1. Purpose and Scope

This specification sets out the requirements for the manufacture, testing and delivery of **composite longrod insulators** for use on overhead electricity distribution and sub-transmission networks in a totally exposed environment. Insulators covered by this technical specification, are listed as follows:

ITEM No.	Description	STOCK CODE
1	Insulator composite longrod 11kV, 95kV BIL with tongue and clevis couplings	0560984
2	Insulator composite longrod 11kV, 95kV BIL with ball and socket couplings	TBA
3	Insulator composite longrod 22kV,150kV BIL with tongue and clevis couplings	0560992
4	Insulator composite longrod 22kV,150kV BIL with ball and socket couplings	TBA
5	Insulator composite longrod 33kV, 200kV BIL with tongue and clevis couplings	2402985
6	Insulator composite longrod 33kV, 200kV BIL with ball and socket couplings	TBA
7	Insulator composite longrod 66kV,350kV BIL with Y-clevis and tongue couplings	2400843
8	Insulator composite longrod 66kV,350kV BIL with ball and socket couplings	0104639

2. References

2.1 Applicable Standards

The insulators shall be designed, manufactured and tested in accordance with the relevant parts of the following Standards and all amendments issued from time to time except where varied by this specification.

STANDARD	TITLE
AS 1824	Insulation coordination (phase-to-earth and phase-to-phase, above 1 kV)
AS 1832	Iron castings - Malleable cast iron
AS 2947	Insulators – Porcelain and glass for overhead power lines- Voltages greater than 1000V
AS 4068	Flat pallets for materials handling
AS 4435	Insulators - Composite for overhead lines - Voltages Greater than 1000 V a.c.
AS 4680	Hot-dip galvanised (zinc) coatings on fabricated ferrous articles
AS/NZS ISO 31999-2009	Risk Management

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STANDARD	TITLE
AS60372	Locking devices for ball and socket couplings of string insulator units-Dimensions and tests
AS 60471	Dimensions of Clevis and Tongue couplings of string insulator units
AS 60120	Dimensions of Ball and Socket couplings of string insulator units
AS/NZS/ISO 9001	Quality management systems – Requirements

3. Drawings

3.1 Drawings by the Purchaser

There are no drawings attached to this specification.

4. Service Conditions

The insulators will be exposed to the following environmental conditions:

Temperatures	50 ⁰ C summer day time -20 ⁰ C winter night time
Solar Radiation Level	1 000 Wm ⁻² with high ultraviolet content
Precipitation	Tropical summer storms with high wind speeds, and an annual rainfall in excess of 1 500 mm
Humidity	Extended periods of relative humidity in excess of 90%
Pollution	Areas of coastal salt spray and/or industrial pollution with equivalent salt deposit densities in the range 2.0 to 3.0 gm ⁻²
Wind Velocity	210km/hr (58m/s)

5. Design and Construction

5.1 Mechanical Loadings

For the information of suppliers/manufacturers, the composite insulators shall be subjected to the following loads as defined in Appendix A of AS 4435.1:

Type	kN	°C
Ordinary Mechanical Load (OML)	23	15
Maximum Mechanical Load (MML)	70	15

These loads are shown graphically in Appendix A.

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5.2 Insulator Core

- 5.2.1 Composite insulators shall be constructed using a central member of solid high-density axially aligned glass-fibre-reinforced pultruded EPOXY resin rod. Hollow cores are **NOT** acceptable.
- 5.2.2 The core shall be of uniform cross-section and free of cracks and voids.

5.3 Shed Material

- 5.3.1 The sheds shall be moulded from a suitable elastomer which is stabilised against the effects of ultraviolet and other solar radiation and against the effects of airborne contaminants described in Clause 4 above. An epoxy resin will NOT be considered acceptable as a shed material. Preference will be given to silicon rubber compositions.
- 5.3.2 The tenderer shall provide evidence of the satisfactory performance of the shed material in these adverse environmental conditions.
- 5.3.3 The insulator housing shall be fully injection moulded.
- 5.3.4 The preferred colour for the shed material is grey.

5.4 Interface between Insulator Core and Weather sheds and End Fittings

- 5.4.1 The interface between the rod and sheds, and between the rod, sheds and end fittings, shall be completely sealed against the atmosphere and moisture ingress so as to absolutely prevent the occurrence of electrical discharge along the interface.
- 5.4.2 The interface seal shall be maintained under all mechanical loading conditions applied to the insulators. The interface seal must also prevent ingress of moisture under loads subjected during high-pressure water jet washing while in service.
- 5.4.3 The tenderer shall provide information explaining the construction of the interface between core and housing and the core, housing and end fittings with respect to the elimination of moisture ingress and subsequent longitudinal tracking.

5.5 End Fittings

- 5.5.1 The type of end fittings provided with each insulator shall conform with the respective item description.

5.5.1.1 Tongue and Clevis type

The tongue and clevis type end fittings shall be in accordance with AS 60471 (designation 16L). The tongue shall be fitted on the lower end of the insulator and the clevis on the upper end. The clevis shall be fitted with a clevis pin in accordance with AS 60471 having a hump back stainless steel split pin.

5.5.1.2 Ball and Socket type

The ball and socket couplings shall conform to AS 60120. Socket coupling designation 16B to AS 60120 shall be provided on the upper end and a ball coupling designation 16 to AS 60120 on the lower end of the insulator. The socket coupling shall be provided with a 'W' clip type 16B in accordance with AS 60120.

5.5.1.3 Y Clevis and Eye type

The insulator where specified shall be fitted with a Y-clevis coupling designation 16 to Annexure C AS/NZS 4435.2 at the upper end and an Eye-coupling designation 17 to Annexure D of AS/NZS 4435.2 at the lower end. Y - clevis pin shall be fitted with a nut and a hump back split pin.

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- 5.5.2 The end fitting materials for 66kV and 33kV shall be hot-dipped galvanised forged steel or malleable cast iron grade AS 1832/W400-5, AS 1832/B350-10 or an approved equivalent. The zinc coating on hot dip galvanised forged fittings shall have a surface deposit density in accordance with that specified in AS 4680. The tenderer shall provide the details of galvanising in the **Attachment 1**.

Aluminium-based end fittings are NOT acceptable for the 66kV and 33kV units, but will be considered for lower voltage units provided full details of the material and the service performance are included with the tender documents for evaluation.

- 5.5.3 The metal fittings at both ends of all insulators shall be compressed on to the core material.
- 5.5.4 The supplier shall provide details concerning the method of attaching the end fittings to the core.

5.6 Electrical Stress

The insulators shall withstand the electrical stresses associated with operation at their respective voltage class under the environmental conditions described in Clause 4 above.

5.7 Coupling Lengths and Nominal Creepage Distances

The required coupling lengths and nominal creepage distances for the insulators are detailed in the **Attachment 1**.

5.8 Design Changes

Changes in insulator materials, dimensions, manufacturing process or any other design factors to the accepted design, shall invalidate the insulator design. Any insulator so modified shall be again subjected to the design tests of this specification before delivery under this contract.

5.9 Drawings

- 5.9.1 Tenderers' drawings shall show the outline of the insulators, together with all pertinent dimensions.
- 5.9.2 Drawings shall also show the details of the insulator longitudinal cross-section together with the interface between the housing and the core.

5.10 Markings

Each insulator shall be clearly and indelibly marked with the name or the trademark of the manufacturer, the year of manufacture and the specified mechanical load (SML).

6. Performance and Testing

6.1 General Requirements

Composite longrod insulators shall be tested in accordance with the requirements of AS 4435.1.

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6.2 Design and Type Tests

6.2.1 The schedule of tests and requirements for testing shall be in accordance with Clauses 5 and 6 of AS 4435.1.

The qualification tests shall be carried out for the W-clips and split pins provided with the items 4 and 5 in accordance with clauses 10 to 14 of AS60372 .

Copies of the design, type and qualification test reports for the insulators offered MUST be submitted with the tender.

6.2.2 The Design and Type tests shall have been undertaken at a NATA registered testing authority.

Note : Should tenderers be unable to provide Design and Type Test reports from a NATA registered testing authority, then evidence SHALL be provided that the testing authority is:

- INDEPENDENT of the manufacturer; and
- NATIONALLY ACCREDITED to carry out the relevant tests.

6.2.3 Test certificates to another nationally recognised standard may be considered acceptable providing that the supplier submits a full and complete detailed comparison of the testing requirements of that standard with AS 4435.1.

6.3 Sampling and Routine Tests

6.3.1 The schedule of tests and requirements for testing shall be in accordance with Clauses 7 and 8 of AS 4435.1.

6.3.2 The Sample and Routine tests shall have been undertaken at a Nationally registered testing authority.

6.3.3 All tests specified by AS 4435.1 shall be carried out by the tenderer, and the contractor shall submit, with the delivery of each batch of insulators, one copy of test certificates covering ALL special and routine tests required by AS 4435.1.

7. Risk Assessment

There is no requirement for manufacturer provided safety risk assessments for the items covered in this specification.

8. Quality Assurance

8.1 Purchasers Policy

It is the Purchaser's policy to procure goods, equipment and services from sources that demonstrate the ability to supply quality products.

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8.2 Documentary Evidence

Tenderers are required to submit evidence that the design and manufacture of the cable is 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 Tenderer, the documentary evidence shall include the quality system certifications of both the Tenderer and the manufacturer.

9. Samples

9.1 Production Samples

When requested, production samples of each item offered shall be submitted to assist in the evaluation of the offer.

9.2 Sample Delivery

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

Name of Supplier and this Contract No
Contract Item Numbers
Any supporting data on features or characteristics

10. Packaging and Marking

10.1 General

The successful tenderer(s) shall take all necessary precautions to ensure safe handling of all products supplied. In particular:

- Individual pack sizes shall not weigh more than 20kg.
- Palletised goods shall be supplied on standard wooden pallets although specially designed pallets will be acceptable where additional stability is required.
- Palletised goods are to be secured and stabilised with no overhang to facilitate unloading
- Goods shall not exceed 1100mm in height.

10.2 Pallet Conformance

The pallets shall conform to the requirements of AS 4068.

10.3 Packaged Lots

Each packaged lot shall be marked with the following information:

Item Description
ERGON Stock Code
Purchase Order Number
Manufacturers Name
Pack Size
Pack Weight

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10.4 Quarantine Requirements

Should the insulators be supplied from overseas manufacturers, then it is mandatory that all conditions and inspections required by the Australian Quarantine Act be met and that all these costs be included in the tendered price. In particular, timber crates must be fumigated with methyl bromide with a concentration of 48 grams per cubic metre for 24 hours at 21°C. The supplier shall ensure that the procedure does not produce any deleterious effects to the insulators or the crates.

11. Service Performance

Suppliers shall state:

- (a) the period of service achieved by the items offered within Australian service conditions;
- (b) Australian electricity supply authorities who have a service history of the items offered; AND
- (c) Contact names and phone numbers of relevant employees of those supply authorities who can verify the service performance claimed.

In the absence of relevant Australian Service performance, the information required in (a), (b) and (c) above shall be stated for service history in overseas countries. Priority shall be given to performance in environments similar to those described in Clause 4 above.

12. Reliability

12.1 Service Life

Suppliers 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.

12.2 Evidence in Support of Reliability

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

13. Training

Training material in the form of drawings, instructions and/or audio visuals may be required to be provided for the items accepted under the offer.

Tenders shall state the availability of training materials which should include but is not limited to the following topics:

- Handling
- Storage
- Application (particularly in areas of heavy coastal pollution)
- Installation
- Maintenance
- Environmental performance
- Electrical performance

- Mechanical performance
- Disposal

14. 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 disposability at the end of service life.

15. Information to be Provided

15.1 Specific Technical Requirements

The specific technical requirements for the items offered shall be as stated in **Attachment 1** of this specification. The supplier shall provide all details requested by **Attachment 1** and shall guarantee such data.

15.2 Checklist of Supporting Documentation

Attachment 2 details a checklist of supporting technical documentation which is required to be submitted with the offer.

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16. Attachment 1 – Technical Details

Item1: 11 kV Composite Longrod Insulator with Tongue and Clevis Couplings	Specified Requirement	Guaranteed Value
Manufacturer's Name & Address		
Country of Manufacture		
Manufacturer's Catalogue No.		
Manufacturer's Drawing No.		
Design Test Certificate No.		
Type Test Certificate No.		
Relevant Standard for Tests		
Shed and Housing Material	Silicon Rubber	
Maximum shed diameter (mm)		
Shed spacing (mm)		
Housing thickness over core (mm)		
Core material	Epoxy Resin	
Core Diameter (mm)		
End Fitting Material		
Grade of malleable cast iron		
Thickness of galvanising of metal end fittings (µm)		
Coupling Length (mm)	300 ± 30	

SIGNATURE OF TENDERER: _____

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ATTACHMENT 1 - TECHNICAL DETAILS...(Cont'd)

Item 1: 11 kV Composite Longrod Insulator with Tongue and Clevis Couplings	Specified Requirement	Guaranteed Value
Specified Mechanical Load (SML) (kN)		
Routine Test Load (RTL) (kN)		
1 minute Failing Load (kN)		
96 hour Withstand Load (kN)		
Maximum Mechanical Load (MML) (kN)		
Minimum Arc Distance (mm)		
Minimum Creepage Distance (mm)	350	
Power Frequency Wet Withstand Voltage		
(a) Horizontal (kV rms)	38	
(b) Vertical (kV rms)	38	
Power Frequency Dry Withstand Voltage (kV rms)		
Minimum Power Frequency Wet Flashover Voltage (kV rms)		
Minimum Power Frequency Dry Flashover Voltage (kV rms)		
Impulse Withstand Voltage (kV pk)	95	
Minimum Impulse Flashover Voltage (kV pk)		
RI Applied Voltage: (kV)	7	
RIV measured across 300 Ω at 1 MHz (μ V)		
Clevis Opening: (mm)	18.5 nominal	
Tongue Width: (mm)	12.7 nominal	
Clevis pin ref 16/P fitted with humpback s/s split pin ref HP/A to Fig 3.2 AS2947.3 supplied with Clevis end fitting.	Yes	
Pack Size		
Pack Weight (kg)		

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators

ATTACHMENT 1 - TECHNICAL DETAILS... (Cont'd)

Item 2: 11 kV Composite Longrod Insulator with Ball and Socket Couplings	Specified Requirement	Guaranteed Value
Manufacturer's Name & Address		
Country of Manufacture		
Manufacturer's Catalogue No.		
Manufacturer's Drawing No.		
Design Test Certificate No.		
Type Test Certificate No.		
Relevant Standard for Tests		
Shed and Housing Material	Silicon Rubber	
Maximum shed diameter (mm)		
Shed spacing (mm)		
Housing thickness over core (mm)		
Core material	Epoxy Resin	
Core Diameter (mm)		
End Fitting Material		
Material designation		
Thickness of galvanising of metal end fittings (if applicable) (µm)		
Coupling Length (mm)		

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators

ATTACHMENT 1 - TECHNICAL DETAILS (Cont'd)

Item 2: 11 kV Composite Longrod Insulator with Ball and Socket Couplings	Specified Requirement	Guaranteed Value
Specified Mechanical Load (SML) (kN)		
Routine Test Load (RTL) (kN)		
1 minute Failing Load (kN)		
96 hour Withstand Load (kN)		
Maximum Mechanical Load (MML) (kN)		
Minimum Arc Distance (mm)		
Minimum Creepage Distance (mm)	350	
Power Frequency Wet Withstand Voltage		
(a) Horizontal (kV rms)	38	
(b) Vertical (kV rms)	38	
Power Frequency Dry Withstand Voltage (kV rms)		
Minimum Power Frequency Wet Flashover Voltage (kV rms)		
Minimum Power Frequency Dry Flashover Voltage (kV rms)		
Impulse Withstand Voltage (kV pk)	95	
Minimum Impulse Flashover Voltage (kV pk)		
RI Applied Voltage: (kV)	7	
RIV measured across 300 Ω at 1 MHz (μ V)		
Ball coupling designation to AS2947.3 (mm)	16	
Socket coupling designation to AS2947.3	16 B	
Socket coupling fitted with W-clip to Fig 4.3 AS 2947.3 supplied with insulator	Yes	
Pack Size		
Pack Weight (kg)		

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators

ATTACHMENT 1 - TECHNICAL DETAILS... (Cont'd)

Item 3: 22 kV Composite Longrod Insulator with Tongue and Clevis Couplings	Specified Requirement	Guaranteed Value
Manufacturer's Name & Address		
Country of Manufacture		
Manufacturer's Catalogue No.		
Manufacturer's Drawing No.		
Design Test Certificate No.		
Type Test Certificate No.		
Relevant Standard for Tests		
Shed and Housing Material	Silicon Rubber	
Maximum shed diameter (mm)		
Shed spacing (mm)		
Housing thickness over core (mm)		
Core material	Epoxy Resin	
Core Diameter (mm)		
End Fitting Material		
Material designation		
Thickness of galvanising of metal end fittings (if applicable) (µm)		
Coupling Length (mm)	350 ± 30	

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators

ATTACHMENT 1 - TECHNICAL DETAILS ...(Cont'd)

Item 3: 22 kV Composite Longrod Insulator with Tongue and Clevis Couplings	Specified Requirement	Guaranteed Value
Specified Mechanical Load (SML) (kN)		
Routine Test Load (RTL) (kN)		
1 minute Failing Load (kN)		
96 hour Withstand Load (kN)		
Maximum Mechanical Load (MML) (kN)		
Minimum Arc Distance (mm)		
Minimum Creepage Distance (mm)	600	
Power Frequency Wet Withstand Voltage		
(a) Horizontal (kV rms)	50	
(b) Vertical (kV rms)	50	
Power Frequency Dry Withstand Voltage (kV rms)		
Minimum Power Frequency Wet Flashover Voltage (kV rms)		
Minimum Power Frequency Dry Flashover Voltage (kV rms)		
Impulse Withstand Voltage (kV pk)	150	
Minimum Impulse Flashover Voltage (kV pk)		
RI Applied Voltage: (kV)	15	
RIV measured across 300 Ω at 1 MHz (μ V)		
Clevis Opening: (mm)	18.5 nominal	
Tongue Width: (mm)	12.7 nominal	
Clevis pin ref 16/P fitted with humpback s/s split pin ref HP/A to Fig 3.2 AS 2947.3 supplied with Clevis end fitting.	Yes	
Pack Size		
Pack Weight (kg)		

SIGNATURE OF TENDERER: _____

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ATTACHMENT 1 - TECHNICAL DETAILS (Cont'd)

Item 4: 22 kV Composite Longrod Insulator with Ball and Socket Couplings	Specified Requirement	Guaranteed Value
Manufacturer's Name & Address		
Country of Manufacture		
Manufacturer's Catalogue No.		
Manufacturer's Drawing No.		
Design Test Certificate No.		
Type Test Certificate No.		
Relevant Standard for Tests		
Shed and Housing Material	Silicon Rubber	
Maximum shed diameter (mm)		
Shed spacing (mm)		
Housing thickness over core (mm)		
Core material	Epoxy Resin	
Core Diameter (mm)		
End Fitting Material		
Material designation		
Thickness of galvanising of metal end fittings (if applicable) (µm)		
Coupling Length (mm)	292 Nominal	

SIGNATURE OF TENDERER: _____

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ATTACHMENT 1 - TECHNICAL DETAILS... (Cont'd)

Item 4: 22 kV Composite Longrod Insulator with Ball and Socket Couplings	Specified Requirement	Guaranteed Value
Specified Mechanical Load (SML) (kN)		
Routine Test Load (RTL) (kN)		
1 minute Failing Load (kN)		
96 hour Withstand Load (kN)		
Maximum Mechanical Load (MML) (kN)		
Minimum Arc Distance (mm)		
Minimum Creepage Distance (mm)	600	
Power Frequency Wet Withstand Voltage		
(a) Horizontal (kV rms)	50	
(b) Vertical (kV rms)	50	
Power Frequency Dry Withstand Voltage (kV rms)		
Minimum Power Frequency Wet Flashover Voltage (kV rms)		
Minimum Power Frequency Dry Flashover Voltage (kV rms)		
Impulse Withstand Voltage (kV pk)	150	
Minimum Impulse Flashover Voltage (kV pk)		
RI Applied Voltage: (kV)	15	
RIV measured across 300 Ω at 1 MHz (μ V)		
Ball coupling designation to AS2947.3 (mm)	16	
Socket coupling designation to AS2947.3	16 B	
Socket coupling fitted with W-clip to Fig 4.3 AS 2947.3 supplied with insulator	Yes	
Pack Size		
Pack Weight (kg)		

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators



ATTACHMENT 1 - TECHNICAL DETAILS ...(Cont'd)

Item 5: 33 kV Composite Longrod Insulator with Tongue and Clevis Couplings	Specified Requirement	Guaranteed Value
Manufacturer's Name & Address		
Country of Manufacture		
Manufacturer's Catalogue No.		
Manufacturer's Drawing No.		
Design Test Certificate No.		
Type Test Certificate No.		
Relevant Standard for Tests		
Shed and Housing Material	Silicon Rubber	
Maximum shed diameter (mm)		
Shed spacing (mm)		
Housing thickness over core (mm)		
Core material	Epoxy Resin	
Core Diameter (mm)		
End Fitting Material		
Grade of malleable cast iron		
Thickness of galvanising of metal end fittings (µm)		
Coupling Length (mm)	450 ± 50	

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators

ATTACHMENT 1 - TECHNICAL DETAILS ...(Cont'd)

Item 5: 33 kV Composite Longrod Insulator with Tongue and Clevis Couplings	Specified Requirement	Guaranteed Value
Specified Mechanical Load (SML) (kN)		
Routine Test Load (RTL) (kN)		
1 minute Failing Load (kN)		
96 hour Withstand Load (kN)		
Maximum Mechanical Load (MML) (kN)		
Minimum Arc Distance (mm)		
Minimum Creepage Distance (mm)	900	
Power Frequency Wet Withstand Voltage		
(a) Horizontal (kV rms)	70	
(b) Vertical (kV rms)	70	
Power Frequency Dry Withstand Voltage (kV rms)		
Minimum Power Frequency Wet Flashover Voltage (kV rms)		
Minimum Power Frequency Dry Flashover Voltage (kV rms)		
Impulse Withstand Voltage (kV pk)	200	
Minimum Impulse Flashover Voltage (kV pk)		
RI Applied Voltage: (kV)	21	
RIV measured across 300 Ω at 1 MHz (μ V)		
Clevis Opening: (mm)	18.5 nominal	
Tongue Width: (mm)	12.7 nominal	
Clevis pin ref 16/P fitted with humpback s/s split pin ref HP/A to Fig 3.2 AS 4927.3 supplied with Clevis end fitting.	Yes	
Pack Size		
Pack Weight (kg)		

SIGNATURE OF TENDERER: _____

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ATTACHMENT 1 - TECHNICAL DETAILS ...(Cont'd)

Item 6: 33 kV Composite Longrod Insulator with Ball and Socket Couplings	Specified Requirement	Guaranteed Value
Manufacturer's Name & Address		
Country of Manufacture		
Manufacturer's Catalogue No.		
Manufacturer's Drawing No.		
Design Test Certificate No.		
Type Test Certificate No.		
Relevant Standard for Tests		
Shed and Housing Material	Silicon Rubber	
Maximum shed diameter (mm)		
Shed spacing (mm)		
Housing thickness over core (mm)		
Core material	Epoxy Resin	
Core Diameter (mm)		
End Fitting Material		
Grade of malleable cast iron		
Thickness of galvanising of metal end fittings (µm)		
Coupling Length (mm)	440 Nominal	

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators

ATTACHMENT 1 - TECHNICAL DETAILS ...(Cont'd)

Item 5: 33 kV Composite Longrod Insulator with Tongue and Clevis Couplings	Specified Requirement	Guaranteed Value
Specified Mechanical Load (SML) (kN)		
Routine Test Load (RTL) (kN)		
1 minute Failing Load (kN)		
96 hour Withstand Load (kN)		
Maximum Mechanical Load (MML) (kN)		
Minimum Arc Distance (mm)		
Minimum Creepage Distance (mm)	900	
Power Frequency Wet Withstand Voltage		
(a) Horizontal (kV rms)	70	
(b) Vertical (kV rms)	70	
Power Frequency Dry Withstand Voltage (kV rms)		
Minimum Power Frequency Wet Flashover Voltage (kV rms)		
Minimum Power Frequency Dry Flashover Voltage (kV rms)		
Impulse Withstand Voltage (kV pk)	200	
Minimum Impulse Flashover Voltage (kV pk)		
RI Applied Voltage: (kV)	21	
RIV measured across 300 Ω at 1 MHz (μ V)		
Ball coupling designation to AS2947.3 (mm)	16	
Socket coupling designation to AS2947.3	16 B	
Socket coupling fitted with W-clip to Fig 4.3 AS 2947.3 supplied with insulator	Yes	
Pack Size		
Pack Weight (kg)		

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators

ATTACHMENT 1 - TECHNICAL DETAILS ...(Cont'd)

Item 7: 66 kV Composite Longrod Insulator 350kV BIL with Y-Clevis and Eye Couplings	Specified Requirement	Guaranteed Value
Manufacturer's Name & Address		
Country of Manufacture		
Manufacturer's Catalogue No.		
Manufacturer's Drawing No.		
Design Test Certificate No.		
Type Test Certificate No.		
Relevant Standard for Tests		
Shed and Housing Material	Silicon Rubber	
Maximum shed diameter (mm)		
Shed spacing (mm)		
Housing thickness over core (mm)		
Core material	Epoxy Resin	
Core Diameter (mm)		
End Fitting Material		
Grade of malleable cast iron		
Thickness of galvanising of metal end fittings (µm)		
Coupling Length (mm)	870 ± 30	

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators

ATTACHMENT 1 - TECHNICAL DETAILS ...(Cont'd)

Item 7: 66 kV Composite Longrod Insulator 350kV BIL with Y-Clevis and Eye Couplings	Specified Requirement	Guaranteed Value
Specified Mechanical Load (SML) (kN)		
Routine Test Load (RTL) (kN)		
1 minute Failing Load (kN)		
96 hour Withstand Load (kN)		
Maximum Mechanical Load (MML) (kN)		
Minimum Arc Distance (mm)		
Minimum Creepage Distance (mm)	1800	
Power Frequency Wet Withstand Voltage		
(a) Horizontal (kV rms)	140	
(b) Vertical (kV rms)	140	
Power Frequency Dry Withstand Voltage (kV rms)		
Minimum Power Frequency Wet Flashover Voltage (kV rms)		
Minimum Power Frequency Dry Flashover Voltage (kV rms)		
Impulse Withstand Voltage (kV pk)	350	
Minimum Impulse Flashover Voltage (kV pk)		
RI Applied Voltage: (kV)	45	
RIV measured across 300 Ω at 1 MHz (μ V)		
Y-Clevis Opening: (mm)	30 nominal	
Coupling Pin Diameter: (mm)	16 nominal	
Eye Coupling :Width (mm)	17 nominal	
:Length (mm)	30 nominal	
Clevis pin ref 16/P fitted with humpback s/s split pin ref HP/A to Fig 3.2 AS 2947.3 supplied with Y-Clevis end fitting.	Yes	
Pack Size		
Pack Weight (kg)		

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators



ATTACHMENT 1 - TECHNICAL DETAILS ...(Cont'd)

Item 8: 66 kV Composite Longrod Insulator 350kV BIL with Ball and Socket Couplings	Specified Requirement	Guaranteed Value
Manufacturer's Name & Address		
Country of Manufacture		
Manufacturer's Catalogue No.		
Manufacturer's Drawing No.		
Design Test Certificate No.		
Type Test Certificate No.		
Relevant Standard for Tests		
Shed and Housing Material	Silicon Rubber	
Maximum shed diameter (mm)		
Shed spacing (mm)		
Housing thickness over core (mm)		
Core material	Epoxy Resin	
Core Diameter (mm)		
End Fitting Material		
Grade of malleable cast iron		
Thickness of galvanising of metal end fittings (µm)		
Coupling Length (mm)	730 Nominal	

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators



ATTACHMENT 1 - TECHNICAL DETAILS ...(Cont'd)

Item 8: 66 kV Composite Longrod Insulator 350kV BIL with Ball and Socket Couplings	Specified Requirement	Guaranteed Value
Specified Mechanical Load (SML) (kN)		
Routine Test Load (RTL) (kN)		
1 minute Failing Load (kN)		
96 hour Withstand Load (kN)		
Maximum Mechanical Load (MML) (kN)		
Minimum Arc Distance (mm)		
Minimum Creepage Distance (mm)	1800	
Power Frequency Wet Withstand Voltage		
(a) Horizontal (kV rms)	140	
(b) Vertical (kV rms)	140	
Power Frequency Dry Withstand Voltage (kV rms)		
Minimum Power Frequency Wet Flashover Voltage (kV rms)		
Minimum Power Frequency Dry Flashover Voltage (kV rms)		
Impulse Withstand Voltage (kV pk)	350	
Minimum Impulse Flashover Voltage (kV pk)		
RI Applied Voltage: (kV)	45	
RIV measured across 300 Ω at 1 MHz (μ V)		
Ball coupling designation to AS2947.3 (mm)	16	
Socket coupling designation to AS2947.3	16 B	
Socket coupling fitted with W-clip to Fig 4.3 AS 2947.3 supplied with insulator	Yes	
Pack Size		
Pack Weight (kg)		

SIGNATURE OF TENDERER: _____

Technical Specification for Composite Longrod Insulators



17. Attachment 2 – Technical Document Checklist

CLAUSE Ref.	PARTICULARS	UNITS
Have full and comprehensive details been submitted WITH the tender documents associated with each of the following items?		
5.3.2	Performance in adverse environmental conditions	Yes/No
5.4.3	Core - Shed interface construction (including drawings of cross-section)	Yes/No
5.5.4	Method of attachment of end fittings to core	Yes/No
5.9	Drawings (including outline and cross sections)	Yes/No
6.2.1	Design & Type test certificates	Yes/No
6.2.2	Certification of testing authority for Design & Type tests	Yes/No
6.3.2	Certification of testing authority for Sample and Routine tests	Yes/No
11	Service Performance	Yes/No
12	Reliability	Yes/No
13	Training materials	Yes/No
14	Environmental considerations	Yes/No
15	Completed Attachment 1 and 2	Yes/No

NAME OF TENDERER:

ADDRESS OF TENDERER: _____

SIGNATURE: _____ FOR AND ON BEHALF OF TENDERER

DATE: _____