



**Ergon Energy Corporation Limited**

# **Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable**

**ETS04-02-01**

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable



## Contents

<b>1. Purpose and Scope</b> .....	<b>1</b>
1.1 General.....	1
1.2 Goods to be Supplied .....	1
1.3 Installation Design Parameters .....	1
<b>2. References</b> .....	<b>1</b>
2.1 Applicable Standards .....	1
<b>3. Drawings</b> .....	<b>2</b>
3.1 Drawings by the Purchaser.....	2
3.2 Drawings by the Tenderer.....	2
<b>4. Service Conditions</b> .....	<b>2</b>
<b>5. Design and Construction</b> .....	<b>3</b>
5.1 General.....	3
5.2 Core Conductors.....	3
5.3 Insulation.....	3
5.4 Insulation Screen .....	4
5.5 Water Blocking.....	4
5.6 Moisture Barrier .....	4
5.7 Metallic Screen .....	4
5.8 Non-Metallic Sheath.....	4
5.9 Insect Protection .....	4
5.10 Cable Markings.....	5
5.11 Sealing of Cable Ends .....	5
5.12 Optic Fibres.....	5
<b>6. Performance and Testing</b> .....	<b>7</b>
6.1 General.....	7
6.2 Tests on Completed Cable.....	7
6.3 Fibre Optic Test .....	7
<b>7. Risk Assessment</b> .....	<b>8</b>
<b>8. Quality Assurance</b> .....	<b>8</b>



# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable

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8.1	Purchasers Policy .....	8
8.2	Documentary Evidence .....	8
<b>9.</b>	<b>Samples .....</b>	<b>8</b>
9.1	Production Samples .....	8
<b>10.</b>	<b>Packaging and Marking .....</b>	<b>8</b>
10.1	General .....	8
<b>11.</b>	<b>Service Performance .....</b>	<b>9</b>
<b>12.</b>	<b>Reliability .....</b>	<b>10</b>
12.1	Service Life .....	10
12.2	Evidence in Support of Reliability .....	10
<b>13.</b>	<b>Training .....</b>	<b>10</b>
<b>14.</b>	<b>Environmental Considerations .....</b>	<b>10</b>
<b>15.</b>	<b>Information to be Provided .....</b>	<b>10</b>
15.1	Specific Technical Requirements .....	10
15.2	Checklist of Supporting Documentation .....	10
<b>16.</b>	<b>Attachment 1 – Technical Details .....</b>	<b>11</b>
<b>17.</b>	<b>Attachment 2 – Underground Cable Current Rating .....</b>	<b>15</b>
<b>18.</b>	<b>Attachment 3 – Technical Documentation Checklist .....</b>	<b>16</b>

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable

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## 1. Purpose and Scope

### 1.1 General

This specification sets out the technical requirements for the design, manufacture, testing at works, supply and delivery of single core 19 / 33kV Copper / TR-XLPE underground cable.

### 1.2 Goods to be Supplied

Cables to be supplied:

**Item (1)** – 1 Core 630mm<sup>2</sup> Cu 19/33 (36) kV TR-XLPE insulated underground cable incorporating optic fibres with 13.7kA nominal short circuit duty of cable screen.

**Item (2)** – 1 Core 630mm<sup>2</sup> Cu 19/33 (36) kV TR-XLPE insulated underground cable without optic fibres with 13.7kA nominal short circuit duty of cable screen.

**Item (3)** – 1 Core 630mm<sup>2</sup> Cu 19/33 (36) kV TR-XLPE insulated underground cable incorporating optic fibres with 25kA nominal short circuit duty of cable screen.

**Item (4)** – 1 Core 630mm<sup>2</sup> Cu 19/33 (36) kV TR-XLPE insulated underground cable without optic fibres with 25kA nominal short circuit duty of cable screen.

### 1.3 Installation Design Parameters

For purposes of calculation the following installation parameters may be assumed:

- Cables will be direct buried in a touching trefoil arrangement or in separate PVC conduits
- The cables may be single-point bonded or solidly bonded.
- Depth of burial will be - 1200mm
- Maximum Soil Temperature will be - 350C
- Maximum ambient air Temperature - 450C
- Soil Thermal Resistivity will be – 1.2 0C-m/watt
- Nominal Short Circuit Duty of Cable Screen – 13.7kA for 1 second or 25kA for 1 second as nominated in Items (1) to (4) above.

Also refer to the Clause 4, Service Conditions.

## 2. References

### 2.1 Applicable Standards

The cables shall be constructed, 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.

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

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable



STANDARD	TITLE
AS1125	Conductors in insulated electric cables and flexible cords
<b>AS1429</b>	<b>Electric cables - Polymeric insulated</b>
AS1660	Test methods for electric cables, cords and conductors
AS1931	High-voltage test techniques
TS 008	ACA Technical Standard 008 – Requirements for Authorised Cabling Products.
	International Telecommunications Union – Telecommunications (ITU-T) Recommendation G.652
AS2857	Timber drums for insulated electric cables and bare conductors
AS3983	Metal drums for insulated electric cables and bare conductors
AS/NZS 3808	Insulation and sheathing materials for electric cables
AS/NZS ISO 9001	Quality management systems – requirements
ASTM D1603	Carbon black in ethylene plastics

## 3. Drawings

### 3.1 Drawings by the Purchaser

There are no drawings attached to this specification.

### 3.2 Drawings by the Tenderer

The tenderer shall supply with the Offer, drawings, sketches or pamphlets showing the cross sections of the cable and the various components of the cable shall be labelled. The overall diameter of the cable and the diameter over each of the various components shall be given.

## 4. Service Conditions

The conditions under which the cables will be required to operate are:

<b>Ambient Air Temperatures</b>	45°C summer day time -5°C winter night time
<b>Ambient Ground Temperatures</b>	Not exceeding 35°C
<b>Solar Radiation Level</b>	1100 watts per square metre with high ultraviolet content
<b>Precipitation</b>	Tropical summer storms with gust wind speeds above 160km/h, and an annual rainfall in excess of 1500 mm
<b>Humidity</b>	Extended periods of relative humidity in excess of 90% R.H. combined with high air temperatures specified above

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable



<b>Atmospheric Classifications</b>	Areas of coastal salt spray and/or industrial pollution with equivalent salt deposit densities in the range of 2.0 - 3.0 g/m <sup>2</sup> .
<b>Altitude</b>	Not exceeding 1000 metres above sea level
<b>Installation</b>	Directly buried in fine grain bedding material or in PVC conduits at a nominal depth of up to 1200 mm, with cable ends rising up concrete or timber poles and exposed to direct sunlight.

The power cable will operate in Ergon Energy's three phase, 50 Hertz 33kV sub-transmission network which has the star point effectively earthed. The lightning impulse insulation withstand level of the system is 200 kVp.

## 5. Design and Construction

### 5.1 General

The cable shall be constructed and manufactured in accordance with AS1429.1 except where specified otherwise in this specification.

During the contract period the Supplier shall not change the design, manufacturing process or compounding of the materials without the written approval of the Purchaser.

### 5.2 Core Conductors

The conductor shall have a cross-sectional area of 630mm<sup>2</sup>.

The conductor shall be comprised of multi-stranded circular, compacted or compressed, plain annealed copper wires.

Individual wires shall be of the same nominal diameter before stranding into the compacted circular formation.

Successive layers of wires shall have opposite directions of lay.

Any lubricants used during compaction of the conductor shall be removed from the conductors prior to application of the core screen. Greasing of the conductors is not permitted.

### 5.3 Insulation

The insulation shall be tree-retardant cross-linked polyethylene (TR-XLPE) to AS/NZS 3808 applied by an extrusion process; simultaneously with the semi-conductive conductor and insulation screens within one crosshead.

It is desirable that the process has facilities at the point of extrusion to monitor and control the thickness of the extruded screens and insulation and the concentricity of the cable (this may be done by X-Ray scanning and control or similar techniques).

Suppliers must state in the tender submission how they will control the concentricity of the cable and the thickness of the extruded cable screens and the cable insulation. This will be considered in assessing tenders.

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable

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## 5.4 Insulation Screen

The insulation shall be hand strippable without preconditioning in accordance with clause 2.4.3 of AS1429.1.

## 5.5 Water Blocking

Semi conducting water blocking tapes shall be applied over the insulation screen and, where a copper wire metallic screen is required, under the Cu wire. Water blocking tapes may be applied over the copper wire metallic screen if required.

The Tenderer shall submit with their tender submission the results of tests carried out in accordance with Appendix D of AS 1429.1 demonstrating the effectiveness of water-blocking method and materials proposed.

## 5.6 Moisture Barrier

The metal sheath comprising the moisture barrier shall be lead alloy E in accordance with Section 2.9 of AS1429.1.

## 5.7 Metallic Screen

The metallic screen shall be designed and constructed for a system fault level of 13.7kA for 1 second for items (1) and (2) and 25kA for 1 second for items (3) and (4).

Should a Cu wire screen be required it shall be applied over the semi conducting water blocking tapes.

## 5.8 Non-Metallic Sheath

The non-metallic sheath of the cable shall be a composite sheath consisting of an inner layer of 5V-90 PVC and an outer layer of HDPE in accordance with Clause 2.13 of AS1429.1

The HDPE sheath shall have a minimum shore D hardness of 60 and a density of not less than 0.955 gm/cm<sup>3</sup> and shall be black in colour.

The layer of insect protection (refer clause 5.9 below) shall be situated between the PVC and HDPE layers of the composite sheath described above.

A graphite coating shall be applied on the over-sheath to allow for present and future testing of the integrity of the cable sheath.

## 5.9 Insect Protection

The insect protection layer consists of a continuous UV stabilised nylon jacket (polyamide 12) of radial thickness of not less than 0.8mm. It must have a smooth glossy surface, free from defects of scratches. Full details of nylon insect protection jacket shall be included with the tender including evidence of effectiveness.

The jacket must be capable of being removed without damage to the PVC sheath. The jacket colour shall be black.

Double brass tape insect protection will not be accepted.

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable



## 5.10 Cable Markings

Cable identification markings and meter markings shall be provided on the outer sheath of the cable in accordance with Clauses 2.16 and 2.17 respectively of AS 1429.1.

## 5.11 Sealing of Cable Ends

Cables shall be free of water or corrosion at the time of dispatch from the manufacturer's premises.

All cable ends shall be sealed to prevent moisture ingress. This shall seal the individual layers of the cable construction from one another to avoid water transfer to the conductor strands in the event of damage to the outer sheaths

Tenderers shall provide full details of the method used for sealing the cable ends with the tender documentation.

## 5.12 Optic Fibres

### 5.12.1 General

The offered cables shall be completely metal free and shall comply with the product approval requirements of ACA Technical Standard 008.

The optical fibre cable as specified shall have optical fibres in accordance with ITU-T Recommendation G.652.

The cable shall incorporate 4 optic fibres. The fibres should be laid up together with strengthening member/s and a protective covering in the lay of the copper screen wires.

The inclusion of the optic fibre cable shall not cause any protrusion of the external profile of the completed power cable that would attract damage to the optic fibre during cable installation.

The tenderer shall provide detail of the means employed to ensure integrity of fibre during cable installation.

Alternative arrangements for incorporating the fibres into the cable may be considered and the tenderer must provide full details of any alternative offer in the tender submission

### 5.12.2 Optical Fibre Requirements

The cable will be comprised of 2 multi mode and 2 single mode fibres with the following characteristics.

#### 5.12.2.1 Multi Mode

The multi mode cable will be used for Distributed Temperature Sensing (DTS). Alternative characteristics may be considered if the tenderer can demonstrate better performance for DTS. The tenderer must provide full details of any alternative offer in the tender submission

Transmission wavelength	850 nm and suitable for 1300 nm
Mode field diameter	50 ± 0.µm at a transmission wavelength of 850 nm.
Bandwidth	>500Mhz at 850 nm and >500Mhz at 1300 nm



# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable



Numerical aperture	0.2 ± 0.015
Attenuation	Not greater than 3.0 dB/km at an optical wavelength of 850 nm and 1.0 dB/km at 1300 nm
Core Eccentricity	Less than 6%
Optical cladding diameter	125 µm ± 2.0µm
Life span	Greater than 50 years

## 5.12.2.2

### Single Mode

The characteristics of each single mode optical fibre in the optical fibre cable will adhere to the ITU-T's recommendation G.652 and as follows:

<b>Transmission wavelength</b>	1 310 nm and suitable for 1 550 nm
<b>Mode field diameter</b>	9.2 ± 0.4µm at a transmission wavelength of 1310 nm.
	10.4 ± 0.8µm at a transmission wavelength of 1550nm.
<b>Attenuation</b>	Not greater than 0.40 dB/km at an optical wavelength of 1310 nm and 0.30 dB/km at 1550 nm
<b>Total dispersion</b>	Not greater than 6 ps/(nm · km) at optical wavelength in the range 1270 nm to 1360 nm for a zero dispersion wavelength of 1310 nm and 20 ps/ (nm · km) at 1550 nm
<b>Optical cladding diameter</b>	125 µm ± 2.0µm
<b>Life span</b>	Greater than 50 years

### 5.12.3 Fibre Coatings

The secondary coating is required to be a tight UV Acrylate coating and shall be easily removed by mechanical means for jointing purposes. Preference is likely to be given to fibres, which have a primary buffer coating of 250 ± 15 micron low modulus UV, cured Acrylate material. Thus tenderers are encouraged to offer prices for totally UV cured Acrylate coated fibres where possible.

Tenderers may offer more than one primary, buffer coating material. In such cases Tenderers should provide as much information as possible regarding the physical, mechanical, and transmission performance of such fibres, with particular regard to the relative susceptibility to hydrogen degradation compared with UV Acrylate coated fibre.

### 5.12.4 Identification of Individual Fibres

The colours of individual fibres as well as other cable components shall allow for the unique identification of individual fibres within the cable.

### 5.12.5 Factory Joints

The fibres shall not be jointed within any un-installed cable length without prior approval by the Purchaser.

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable

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## 5.12.6 Point Loss in Un-Installed Cable

### 5.12.6.1 Multi Mode

For the un-installed optical fibre cable there shall be no point loss (of any cause) in any single fibre, whose average two way attenuation exceeds 0.05 dB at 850 nm and 1300 nm.

### 5.12.6.2 Single Mode

For the un-installed optical fibre cable there shall be no point loss (of any cause) in any single fibre, whose average two way attenuation exceeds 0.05 dB at 1310 nm and 1550 nm.

## 6. Performance and Testing

### 6.1 General

The cable shall be tested in accordance with the section 3 of AS1429.1

Type Test Certificates to AS/NZS1429.1 shall be submitted with the tender.

The contactor must advise Ergon Energy's responsible officer of any changes in the composition of the materials and processes used for manufacture of the cables and Ergon Energy's responsible officer will decide on the necessity for a new Type Test.

Sample and Routine test certificates to AS/NZS1429.1 shall be supplied with each delivery. In addition the supplier is required to submit all Sample and Routine test certificates relating to the cables supplied under the contract, including the Purchaser's Order Numbers and the associated cable drum numbers and lengths recorded on a compact disc on completion of the contract.

### 6.2 Tests on Completed Cable

The following Routine tests will be carried out, on each completed drum of cable, in addition to those required by A/NZS1429.1.

- An insulation resistance test between the cable conductor core and the metallic screen. The test will be carried out at a voltage level of 10kV DC and the results recorded after 10 minutes.
- An insulation resistance test between the metallic screen and the graphite coating covering the outer sheath cable. The test will be carried out at a voltage level of 2.5kV DC and the results recorded after 10 minutes.

The results will be recorded and submitted with the results of other "Routine" tests.

### 6.3 Fibre Optic Test

#### 6.3.1 General

Cables shall be tested in accordance with the requirements of the relevant Australian Standards.

#### 6.3.2 Routine Test

Each fibre of a manufactured lot shall be tested for integrity and continuity immediately after drawing and cladding.

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable

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Integrity of the fibre shall be tested by measuring the total attenuation by using a:

- 850 nm & 1310 nm light source at one end of the fibre for multi mode fibres
- 1310 nm & 1550 nm light source at one end of the fibre for single mode fibre;
- An optical level metre at the other end.

Continuity shall be tested at 850 nm & 1310 nm for multi mode fibres and 1310 nm & 1550 nm for single mode fibres, by measuring backscattered light using an Optical Time Domain Reflectometer (OTDR), which is adjusted to see the whole length of the fibre. This measurement shall be done from both ends of each fibre.

The overall attenuation and the OTDR traces shall be recorded and shall form part of the test certificates.

## 7. Risk Assessment

There is no requirement for manufacturer provided safety risk assessments for the items covered by 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.

### 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 supplier, the documentary evidence shall include the quality system certifications of both the supplier and the manufacturer.

Tenderer's attention is drawn to the [MP000801F100](#) : Management Systems Information Schedule (Form) which forms an integral part of this specification.

## 9. Samples

### 9.1 Production Samples

When requested production(s) shall be submitted delivered freight free to assist in the evaluation of the offer.

## 10. Packaging and Marking

### 10.1 General

Cable may be supplied on either timber drums complying with the requirements of AS2857 or steel drums complying with the requirements of AS3983. The spare length of cable shall be supplied on a steel drum and the cost of this steel drum shall be included in the tender price.

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable



The nominal length of cable on each drum shall be 500m for tendering purposes. The lengths of cable required on each drum will be specified on the order.

The cable drums shall be sufficiently sturdy to ensure that the cable is delivered undamaged, giving due consideration to the method of transportation and the distances involved.

The cable on the drum shall be protected by suitable external lagging to ensure that it is delivered undamaged giving due consideration to the methods and distance of transportation and handling.

The Tenderer shall provide details concerning the method of lagging to be used.

Drums must be of suitable quality to withstand without deterioration a minimum of twenty four (24) months exposure to all types of weather conditions during outdoor storage.

Each drum of cable shall be indelibly and legibly marked on both flanges with the following information:

- a) Manufacturer's name
- b) Drum reference number
- c) ERGON ENERGY
- d) Contract number (to be advised)
- e) Size and complete description of the cable
- f) Year of Manufacture
- g) Length of the cable wound onto the drum
- h) The gross weight of the cable and the drum
- i) An arrow with the words "ROLL THIS WAY" to indicate the direction the drum may be rolled on its flanges if relevant)
- j) Any special handling or storage instructions

Should the cable 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 drums 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 cable supplied on the drum.

## 11. Service Performance

Tenderers shall state:

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

**The suppliers are also requested to submit proposals for improving the service life of the cables.**

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable

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## 12. Reliability

### 12.1 Service Life

Tenderers are required to comment on the reliability and performance of the items offered for a minimum service life of 50 years under the specified environmental conditions.

### 12.2 Evidence in Support of Reliability

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

## 13. Training

The successful tenderer shall provide any training materials in the form of drawings, instructions and / or audio visual necessary to ensure the performance of the items offered under this specification.

This material shall include but is not limited to the following topics:

- a) Handling
- b) Storage
- c) Application guide
- d) Installation
- e) Maintenance
- f) Environmental performance
- g) Mechanical performance
- h) Disposal
- i) Cable rating software

## 14. Environmental Considerations

Tenderers 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 **Attachments 1 and 2** of this specification. The tenderer shall fill in all data requested by these Attachments and shall guarantee such data.

### 15.2 Checklist of Supporting Documentation

**Attachment 3** details a checklist of supporting technical documentation which is required to be submitted with the tender.

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable



## 16. Attachment 1 – Technical Details

The Tenderer shall copy this Attachment as necessary and provide a separate response for each item offered.

PARTICULARS		RESPONSE ITEM No.
Rated Voltage	(kV)	
Conductor material		
Cross-sectional area of conductor core	(mm <sup>2</sup> )	
Number and size of strands in each conductor core		
Nominal diameter of conductor core	(mm)	
Extruded semi-conductive conductor screen material		
Average radial thickness of semi-conductive conductor screen	(mm)	
Minimum average radial thickness of TR-XLPE insulation	(mm)	
TR-XLPE material designation		
Method of curing insulation		
Semi-conductive screen material over the insulation		
Average radial thickness of the semi-conductive insulation screen	(mm)	
Nominal diameter over insulation	(mm)	
Water blocking tape material		
Average thickness of water blocking tape	(mm)	
Metallic sheath material		
Thickness of the metal sheath	(mm)	
Number and size of strands in the copper wire screen (if provided)	(No/dia)	
Is the material annealed copper	Yes/No	
Average thickness of water blocking tape under copper wire screen	(mm)	
Is water blocking tape provided over the copper wire screen	Yes/No	
Average thickness of water blocking tape over copper wire screen	(mm)	
Minimum radial thickness of the composite sheath	(mm)	
Grade of PVC		
Radial thickness of PVC sheath		
Shore D hardness of HDPE material		
Density of HDPE material	(g/cm <sup>3</sup> )	
Temperature at which density was measured	(°C)	
Radial thickness of HDPE sheath	(mm)	

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable

PARTICULARS		RESPONSE ITEM No.
Minimum radial thickness of nylon jacket	(mm)	
Grade of Nylon		
Maximum continuous conductor operating temperature of the cable	(°C)	
Three-phase symmetrical fault rating of conductor for one second	(kA)	
D.C. Resistance of conductor at 20°C	(Ohms/km)	
A.C. Resistance at maximum conductor operating temperature	(Ohms/km)	
DC resistance of the copper wire screen at 20°C	(Ohms/km)	
Inductance per conductor when installed in trefoil and touching	(mH/km)	
Capacitance of conductor to screen at 20°C	(mF/km)	
Positive sequence impedance per phase in R+jX format @ maximum conductor operating temperature when installed trefoil and touching	(Ohms/km)	
Zero sequence impedance per phase in R+jX format @ maximum conductor operating temperature when installed in trefoil and touching	(Ohm/km)	
Fault rating of screen for one second	(kA)	
Power frequency withstand voltage five minutes	(kVrms)	
Overall diameter of cable (single core)	(mm)	
Overall diameter of 3 single core cables in trefoil formation	(mm)	
Minimum bending radius		
(a) pulling	(mm)	
(b) setting	(mm)	
Maximum pulling tension - Stocking grip on sheaths:		
(a) Straight pull	(kN)	
(b) At minimum bending radius	(kN)	
Mass of cable	(tonnes/km)	
Cable drum size	(F x B x W)	
Cable route length per drum	(m)	
Spindle hole diameter	(mm)	
Gross mass	(kg)	
<b>Fibre Optic</b>		
Multi Mode:		
Mode field diameter at 850 nm	(µm)	
& Tolerance	(%)	
Attenuation (at zero fibre tension)		
At 850 nm	(dB/km )	

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable

PARTICULARS		RESPONSE ITEM No.
At 1300 ps/km.nm	(dB/km)	
Maximum permissible fibre strain	(% strain)	
Fibre Proof test strain	(% strain)	
Attenuation (at Maximum permissible fibre strain)		
At 850 nm	(dB/km)	
At 1300 nm	(dB/km)	
Optical cladding diameter	( $\mu$ m)	
& Tolerance	(%)	
Dispersion		
1270 to 1340 nm	(ps/km.nm)	
1550 nm	(ps/km.nm)	
Maximum continuous operating temperature	( $^{\circ}$ C)	
Minimum bending radius for coated optical fibre		
Under no tension		
Under maximum tension	(mm)	
<b>Single Mode:</b>		
Mode field diameter at 1310 nm	(mm)	
and Tolerance	(%)	
Attenuation (at zero fibre tension)		
At 1310 nm	(dB/km)	
At 1550 nm	(dB/km)	
Maximum permissible fibre strain	(% strain)	
Fibre Proof test strain	(% strain)	
Attenuation (at Maximum permissible fibre strain)		
At 1310 nm	(dB/km)	
At 1550 nm	(dB/km)	
Optical cladding diameter	( $\mu$ m)	
& Tolerance	(%)	
Dispersion		
1270 to 1340 nm	(ps/km.nm)	
1 550 nm	(ps/km.nm)	
Maximum continuous operating temperature		





# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable

PARTICULARS	RESPONSE ITEM No.
Minimum bending radius for coated optical fibre Under no tension (mm)	
Under maximum tension (mm)	
Manufactures Name	
Manufacturers Address	

**SIGNATURE OF TENDERER:** \_\_\_\_\_

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable



## 17. Attachment 2 – Underground Cable Current Rating

The tenderer shall provide details of the "Summer" and "Winter" current ratings, for each cable offered, under the installation conditions specified below:

INSTALLATION CONDITIONS		
Ground Thermal Resistivity	1.2°C m/w	
Ground Temperature	35°C	Summer
	20°C	Winter
Air Temperature	45°C	Summer
	25°C	Winter
Burial Depth	1200 mm	

**Note:** Tenderers are required to nominate the designed maximum continuous current rating of the cable

Tenderers are also required to additionally nominate the Emergency rating of the cables which is defined as the maximum current carrying capacity of the cable for a period of 2 hours immediately following having been loaded for 70% of the nominated maximum continuous load.

ITEM No.	SEASON	SINGLE CIRCUIT, DIRECT BURIED		SINGLE CIRCUIT, BURIED in CONDUIT *		DOUBLE CIRCUIT, DIRECT BURIED @ 1.0 M SPACING		DOUBLE CIRCUIT, BURIED in CONDUIT @ 1.0 M SPACING *		
		Maximum Continuous Current Rating (amps)	Emergency current rating (amps)	Maximum Continuous Current Rating (amps)	Emergency current rating (amps)	Maximum Continuous Current Rating (amps)	Emergency current rating (amps)	Maximum Continuous Current Rating (amps)	Emergency current rating (amps)	
a	Solid bonded screen									
	Summer									
	Winter									
b	Summer									
	Winter									
a	Single point bonded screen									
	Summer									
	Winter									
	b	Summer								
		Winter								

\*Calculations to be based on installed in trefoil arrangement in light duty PVC conduits of 150 nominal size.

**SIGNATURE OF TENDERER:** \_\_\_\_\_

# Technical Specification for Single Core 19/33kV Copper / TR-XLPE Underground Cable



## 18. Attachment 3 – Technical Documentation Checklist

CLAUSE Ref.	PARTICULARS	Response
Have full and comprehensive details been submitted <b>WITH</b> the tender documents associated with each of the following items?		
3.2	Drawings showing the details of the cables offered	Yes/No
5.3	Method of controlling the thickness and concentricity of screen/insulation	Yes/No
5.5	Details of water blocking systems including test reports	Yes/No
5.9	Evidence in support of insect protection for cables	Yes/No
5.11	Sealing of cable ends	Yes/No
6	Type test reports included in tender documentation Availability of routine and sample test reports on CD	Yes/No Yes/no
8	Quality Systems of <b>BOTH</b> the <b>TENDERER</b> and the <b>MANUFACTURER</b>	Yes/No
10	Method of cable protection on the drum	Yes/No
11	Service Performance <b>including any proposals for improving the service life of the cable</b>	Yes/No
12	Reliability	Yes/No
13	Training Materials	Yes/No
14	Environmental Considerations	
15	Technical Details- Completed <b>Attachments 1 and 2</b>	Yes/No

NAME OF TENDERER:

ADDRESS OF TENDERER: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ FOR AND ON BEHALF OF TENDERER

DATE: \_\_\_\_\_