

**CENTLEC**



**CD 20/2023**

**SUPPLY AND DELIVERY OF POWER  
CABLES, PILOT CABLES AND  
ACCESSORIES**

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## **1. INVITATION**

CENTLEC (SOC) Ltd a Municipal Entity distributing electricity in Mangaung, and other Municipalities invites service providers for the supply and delivery of Power and Pilot Cables and Accessories as per specifications detailed below for a period of thirty-six (36) months.

## **2. MINIMUM SUBMISSION REQUIREMENTS**

**Any omission of the below listed items would render an automatic disqualification.**

**2.1** Supply unique security personal identification number (PIN) from SARS for TAX compliant status and a valid original tax clearance certificate.

**2.2** Supply municipal services (water, sanitation, rates, and electricity) clearance certificate or Lease Agreement with a current Bill and rates clearances, or hardware Current Bill of Account not owing more than 90 days. In a case where the services are paid by the Landlord, the signed lease agreement and statement of account must be submitted by the bidder.

**2.2.1** In an event that the Bidder utilizes prepaid services (e.g. Water or electricity) a valid municipal clearance certificate(s) must still be provided.

**2.3** Submit proof of registration on the National Treasury Centralized Supplier's Database.

## **3. SCOPE OF WORK**

This bid covers the supply and delivery of power and pilot cables and accessories as described in the specification and schedules. All equipment shall be suitable for use on the distribution systems of the Mangaung Metropolitan Municipality and CENTLEC the Regional Electrical Distributor.

## **4. SPECIAL CONDITIONS**

**4.1** Please note that CENTLEC reserves the right to appoint more than one bidder where applicable.

**4.2** The successful bidder will be expected to enter into a Service Level Agreement with CENTLEC.

## 5. TECHNICAL SPECIFICATION

- 5.1** The meteorological conditions for Bloemfontein and the Central and Southern Free State region are:

**Table 1: Climatological Data**

1. Outdoor temperatures in degrees Celsius	Annual mean – 24.4°C; Maximum = 40°C; Minimum = -10°C
2. Average relative humidity	At 08h00 = 76%; at 14h00 = 33%; at 20h00 = 48%  Minimum = 7% and Maximum = 98%
3. Thunder storm activity	Severe Thunderstorms
4. Height above sea level	1 400 meters
5. Normal Barometer pressure	0, 85 bar

The area is subject to severe lightning storms.

### 5.2 Nature of load

The load on the system will or may consist of static transformers, induction and synchronous motors, motor generators, rotary converters, motor converters, lighting, heating, electro-chemical work and arc-furnaces. Electrical networks comprises of underground cables, cables connected to overhead lines, all feeding substations and/or consumers.

### 5.3 Distribution System

The cables shall be suitable for service on the 33 000, 22 000, 11 000 volt and 400 volt, 3 phase, 50 Hz distribution systems of the Municipalities in the Central and Southern Free State region. The neutral point of the network is either directly earthed or through a resistor or reactor or a combination of both. The phase rotation of Bloemfontein is non-standard.

### 5.4 Full details of the equipment offered shall be submitted with bids.

With reference to cables the latest technical information on jointing and termination must be submitted. Where samples are required these must also be submitted.

### 5.5 Tests & Standards

All equipment shall be tested in accordance with:

SANS 1339: 2003, SANS 97: 2001, SABS 1507: 2002, SABS 1574: 2004, BSS 6480 or IEC 502, 540 and NRS 013, 028 & 053: 2007.

A document indicating that the equipment offered complies with SANS, IEC, BSS, NRS or other recognised standards, shall be annexed. Samples of the equipment offered shall be submitted on request.

**5.6** Immediately after the works test, both ends of every length shall be sealed in an approved manner and shall remain sealed until delivery.

**5.7** Drum lengths

Cable drums shall contain the maximum length of cable which length shall be given in the bid. Cable drums shall, however, not exceed the following dimensions and mass:

Drum diameter	:	2,5 m
Drum width	:	1,5 m
Drum mass	:	5,0 metric ton

**5.8** Drum marking

Drums shall be clearly marked with the following information: Drum number, type of cable, size, number of cores and voltage rating. Marking plates shall be stapled to the drum and weather resistant as some cable drums are stored for years in the open. Computer printed paper marking material are not acceptable.

**5.9** Cable marking

**5.9.1.** All PVC Cable outer sheaths to be clearly marked as follows;

- a) At intervals of  $\pm 600$  mm with the "CENTLEC logo" by imprint or embossed. Printing (Paint markings will not be acceptable) and
- b) Sequential length marking, with ink every 1 meter from the inside of the drum outwards.

**5.9.2. All stranded aluminium and copper cables / conductors must have a varnished sealed Polyethylene Terephthalate tape inserted in every conductor core with the following requirements;**

- Must contain a barcode and number
- Sequential
- Change every 100 mm
- Never repeat guarantee
- Immune to manufacturing fluids
- Can sustain high temperatures

**5.9.3.** All solid aluminium and copper cables / conductors on each core shall be clearly marked as follows; at intervals of  $\pm 100$  mm with CENTLEC's logo indent by imprint or embossing.

Example of CENTLEC's logo:



## **5.10 Specification for impregnated paper insulated Medium Voltage cables**

### **5.10.1. Standard specification**

The cable must comply to and be tested according to SANS 97: 2001 Impregnated paper-insulated metal-sheathed cables for rated voltages 3,3/3,3 kV to 19/33 kV (table 19) and NRS 013:2007.

### **5.10.2. Construction of cable**

The cable shall be paper insulated, lead sheathed, double steel tape armoured and served and be individually screened as specified in the schedules and shall be for general purpose duty on an earthed system. The outer covering shall be bedding between the lead sheath and the steel tape shall preferably be PVC bedding and this shall be stated in the bid.

### **5.10.3. Minimum standards**

- The voltage value of electrical equipment for which it is designed to be used is called nominal voltage.
- The maximum voltage that can be applied to equipment safely is called rated voltage.
- The voltage value at which equipment is being operated is called the operating voltage.

We can understand the nominal voltage, rated voltage, and operating voltage of electrical equipment by considering an example of an 11 kV power system. In this case, we have:

- Nominal voltage = 11 kV
- Rated voltage =  $11 \text{ kV} \pm 10\% = 9.9 \text{ kV to } 12.1 \text{ kV}$
- Operating voltage = It can be in the range of 9.9 kV to 12.1 kV.

- 3 phase fault current (3 seconds) 18 kA
- Earth fault current 8 kA for 3 sec
- Nominal Voltage (kV) E - 11 kV, E0- 6,35 kV
- Impulse Voltage (kV peak) 95 kV p
- Power frequency withstand voltage (1 minute) 28 kV
- Partial discharge 20 pC
- Maximum dielectric stress at rated voltage 5 kV/mm

#### 5.10.4. Conductors

The conductors shall consist of either plain aluminium wires or alternatively plain annealed copper wires as stated in Schedule A.

#### 5.10.5. Particulars

Bidders shall submit with their bids a manufacturer's communication giving full particulars of the cable offered, and shall complete the Form of bid and Table 3 – Medium Voltage Cables annexed thereto.

#### 5.10.6. Inspection and tests

During manufacture and prior to despatch the cable may, if required, be inspected at the manufacturer's works by the Engineer and the cable will be subjected to tests as specified in SABS 97 – 2001 as well as NRS 013:2007. And to such further tests which the Engineers may deem necessary. A "Functional" bending test shall be conducted on a sample of the cable.

### 5.11 Specification for XLPE cables

#### 5.11.1. Standard specifications

The cable shall conform to the requirements of **SANS 1339: 2007** for Cross-linked polyethylene (XLPE) insulated cables for rated voltages 3,8 / 6,6 kV to 19/33 kV and **NRS 013:2007**

#### 5.11.2. Construction of cable

Insulation	:	XLPE
Number of cores	:	Table 3 – Medium Voltage Cables
Type	:	Table 3 – Medium Voltage Cables
Screening	:	Individually screened as specified in schedules.
Conductor material	:	Shall be either aluminium or copper as specified in schedules.

Voltage rating : Table 3 – Medium Voltage Cables

Colour of outer PVC sheath : Table 3 – Medium Voltage Cables

## 5.12 Specification for PVC low voltage cables

### 5.12.1. Standard specification

The cable shall conform to SANS 1507: 2002 for Electric cables with extruded solid dielectric insulation for fixed installations -300/500 V to 1 900/3 300 V and SANS 1574: 2001 for Electric cables - Flexible cords and flexible cables.

### 5.12.2. Construction of cable

The construction of the cable shall be PVC/ PVC/ SWA/ PVC except for item 2p which shall be PVC only.

Voltage rating : 600/1000 Volt

Conductor material : Either aluminium or copper  
as specified in the schedules.

Armouring : Steel wire

Colour of outer sheath : Black

## 5.13 Specification for control cables

### 5.13.1 19 Core control cable (Supervisory) ;

The cable must be similar to Contronics Dekoron control cable type 1750.

This cable is without the Mylar aluminium shield.

Conductors: 19 cores x 1,5mm<sup>2</sup> of multiple strands of **numbered** copper wires.

Primary insulation : PVC

Outer jacket : PVC

Voltage rating : 600/1000 volt

### 5.13.2 Seven (7) core control cable

Pilot cables shall be for control, protection, communication and telemetry purpose. The pilot cables shall be suitable for lying with power cables.

#### 5.13.2.1 Basic specifications

Conductor	: 7 cores x 2,5mm <sup>2</sup> of multiple strands of <b>differently coloured</b> or <b>numbered</b> copper wires. Plain annealed copper class 2 Stranded to BS EN 60228.
Insulation	: Thermosetting XLPE Type GP8 to BS 7655-1.3
Bedding	: Compatible Polymeric Material (PVC)
Steel Wire Armour	: Galvanized Steel Wire
Sheathing	: PVC Type 9 to BS 7655-4.2

Manufactured to BS 5467

#### 5.13.2.2 More detailed specifications

Number of Cores	: 7
Cross Sectional Area	: 2.5 mm <sup>2</sup>
Screened/Unscreened	: Screened
Length	: Standard drum length can be specified
Sheath Colour	: Black
Screen Type	: Galvanized Steel Braid
Maximum Operating Temperature	: +90°C
Core Strands	: 7/0.67 mm
Sheath Material	: Polyvinyl Chloride PVC
Voltage Rating	: 600/1000 V
Standards Met	: BASEC
Minimum Operating Temperature	: -15°C
Conductor Material	: Annealed Copper

#### 5.13.3 Twelve (12) core control cable

Pilot cables shall be for control, protection, communication and telemetry purpose. The pilot cables shall be suitable for lying with power cables.

##### 5.13.3.1 Basic specifications

Conductor	: 12 cores x 2,5mm <sup>2</sup> of multiple strands of <b>numbered</b> copper wires. Plain annealed copper class 2 Stranded to BS EN 60228
Insulation	: Thermosetting XLPE Type GP8 to BS 7655-

## 1.3

Bedding : Compatible Polymeric Material (PVC)

Steel Wire Armour : Galvanized Steel Wire

Sheathing : PVC Type 9 to BS 7655-4.2

Manufactured to BS 5467

**5.13.3.2 More detailed specifications**

Number of Cores : 12  
Cross Sectional Area : 2.5 mm<sup>2</sup>  
Screened/Unscreened : Screened  
Length : Standard drum length can be specified  
Sheath Colour : Black  
Screen Type : Galvanized Steel Braid  
Maximum Operating Temperature : +90°C  
Core Strands : 7/0.67 mm  
Sheath Material : Polyvinyl Chloride PVC  
Voltage Rating : 600/1000 V  
Standards Met : BASEC  
Minimum Operating Temperature : -15°C  
Conductor Material : Annealed Copper

**5.13.4 Nineteen (19) core control cable**

Pilot cables shall be for control, protection, communication and telemetry purpose. The pilot cables shall be suitable for lying with power cables.

**5.13.4.1 Basic specifications**

Conductor : 19 cores x 1,5mm<sup>2</sup> of multiple strands of **numbered** copper wires. Plain annealed copper class 2 Stranded to BS EN 60228  
Insulation : Thermosetting XLPE Type GP8 to BS 7655-1.3  
Bedding : Compatible Polymeric Material (PVC)  
Steel Wire Armour : Galvanized Steel Wire

Sheathing : PVC Type 9 to BS 7655-4.2

Manufactured to BS 5467

#### 5.13.4.2 More detailed specifications

Number of Cores	: 19
Cross Sectional Area	: 1.5 mm <sup>2</sup>
Screened/Unscreened	: Screened
Length	: Standard drum length can be specified
Sheath Colour	: Black
Screen Type	: Galvanized Steel Braid
Maximum Operating Temperature	: +90°C
Core Strands	: 7/0.67 mm
Sheath Material	: Polyvinyl Chloride PVC
Voltage Rating	: 600/1000 V
Standards Met	: BASEC
Minimum Operating Temperature	: -15°C
Conductor Material	: Annealed Copper

#### 5.13.5 Twenty seven (27) core control cable

Pilot cables shall be for control, protection, communication and telemetry purpose. The pilot cables shall be suitable for lying with power cables.

##### 5.13.5.1 Basic specifications

Conductor	: 27 cores x 1,5mm <sup>2</sup> of multiple strands of <b>numbered</b> copper wires. Plain annealed copper class 2 Stranded to BS EN 60228
Insulation	: Thermosetting XLPE Type GP8 to BS 7655-1.3
Bedding	: Compatible Polymeric Material (PVC)
Steel Wire Armour	: Galvanized Steel Wire
Sheathing	: PVC Type 9 to BS 7655-4.2
Manufactured to BS 5467	

##### 5.13.5.2 More detailed specifications

Number of Cores	: 27
Cross Sectional Area	: 1.5 mm <sup>2</sup>
Screened/Unscreened	: Screened
Length	: Standard drum length can be specified
Sheath Colour	: Black
Screen Type	: Galvanized Steel Braid
Maximum Operating Temperature	: +90°C
Core Strands	: 7/0.67 mm
Sheath Material	: Polyvinyl Chloride PVC
Voltage Rating	: 600/1000 V
Standards Met	: BASEC
Minimum Operating Temperature	: -15°C
Conductor Material	: Annealed Copper

#### **5.13.6 19 Pair twisted pair control cable (Pilots)**

Pilot cables shall be for control, protection, communication and telemetering purpose. The pilot cables shall be suitable for lying with power cables.

The conductor cross-sectional area shall be not less than 1mm<sup>2</sup> and the material shall be copper complying with BS 6360 as applicable.

The insulation shall consist of a thermoplastic compound complying with either BS 6746 for PVC or BS 6234 compound type 03 for polythene.

The laid-up cables shall be screened, have a PVC bedding, steel wire armouring complying with BS 1442 and PVC serving of at least 2mm<sup>2</sup> radial thickness.

The cables shall be designed to withstand a test voltage of 5 kV AC for 15 minutes between conductors and between each conductor and all other conductors and the armour which shall be earthed.

The cores shall be laid up in twisted pairs and identified by a standard colour coding system. The lay of conductors forming a pair shall differ for adjacent pairs, and shall not exceed 200mm. In multilayer constructions the direction of lay for successive layers shall alternate.

Filters shall be non-hygroscopic material compatible with the conductor insulation. Polythene cables shall be provided with a suitable barrier tape before application of the PVC bedding.

Finished cables ends shall be sealed after completion of tests to prevent ingress of moisture.

## Twisted pair pilot cable - general particulars - cable design parameters

DESCRIPTION	PARTICULARS
i. Standard to which cables Manufactured	<b>SABS 1507: 2002 &amp; NRS 011: 2001</b>
ii. Conductor material	Multi stranded Copper
iii. Minimum conductor size	1,5mm <sup>2</sup>
iv. Number of pairs	19
v. Type of conductor insulation	PVC or polythene
vi. Minimum thickness of conductor insulation	0,5mm
vii. Mutual capacitance of pairs	48 max nF/km
viii. Minimum insulation resistance	5 meg ohms/km
ix. Maximum conductor resistance	20 ohms per km loop at 20°C
x. Normal attenuation at:	
(a) 300 Hz	0,4 max dB/km
(b) 1 000 Hz	0,6 max dB/km
(c) 2 000 Hz	0,8 max dB/km
(d) 2 400 Hz	0,9 max dB/km
xi. Power frequency withstand voltage 15 minutes	
(a) Between pairs	5 kV
(b) Between conductors and armouring	5 kV
xii. Cross talk between pairs at 1 000 Hz better than 70 db when terminated with 600 ohm load at each end.	
xiii. Minimum thickness of armour bedding	1,2mm
xiv. Type of armour	Steel wire
xv. Type of serving	PVC
xvi. Minimum thickness of serving	2,0mm
xvii. As laid serving test voltage	10 kV dc

### 5.13.7 Eight(8) core data cable

Data cables shall be for control, protection, communication and telemetry purpose.

#### 5.13.7.1 Basic specifications

Conductor	:	Tinned annealed copper(Stranded :7wires of 0.2mm <sup>2</sup> for each core)
Insulation	:	Polyethylene (PE)
Twinning	:	Two insulated conductors are twisted together to form a pair

#### 5.13.7.2 More detailed specifications

Number of Cores	:	8(Stranded :7wires of 0.2mm <sup>2</sup> for each core)
Cross Sectional Area	:	Stranded :7 wires of 0.2mm <sup>2</sup> for each core
Screened/Unscreened	:	Screened
Length	:	Standard drum length can be specified
Sheath Colour	:	Grey
Screen Type	:	Aluminium –Polyester(Mylar)
Maximum Operating Temperature	:	+70°C
Core Strands	:	8
Sheath Material	:	Polyvinyl Chloride PVC
Voltage Rating	:	300 V
Standards Met	:	
Minimum Operating Temperature	:	-15°C
Conductor Material	:	Tinned annealed copper

#### 5.13.8 Fourty (40) pair indoor telephone cable

Indoor telephone cables shall be for communication and telemetry purposes.

##### 5.13.8.1 Basic specifications

Conductor	:	Annealed copper
Insulation	:	Polyethylene (PE)
Twinning	:	Two insulated conductors are twisted together to form a pair

Steel Wire Armour : Not applicable

Sheathing : PVC

Manufactured to BS 5467

#### 5.13.8.2 More detailed specifications

Number of Cores	:	80
Conductor diameter	:	0.5mm
Screened/Unscreened	:	Screened
Length	:	Standard drum length can be specified
Sheath Colour	:	White
Screen Type	:	Aluminium –PolyesterL
Maximum Operating Temperature	:	+70°C
Core Strands	:	80 cores
Sheath Material	:	Polyvinyl Chloride PVC
Voltage Rating	:	Spark test 4.5KV
Standards Met	:	BS 6746:1990
Minimum Operating Temperature	:	-15°C
Conductor Material	:	Tinned annealed copper

#### 5.13.9 RG 213 Coaxial Cable

Coaxial cables shall be for communication and telemetry purposes.

##### 5.13.9.1 Basic specifications

Conductor	:	Copper
Dielectric Type	:	Polyethylene (PE)
Dielectric diameter(mm)	:	7.24
Jacket material and colour	:	PVC black
Jacket diameter(mm)	:	10.29mm
Shield Diameter(mm)	:	7.98mm

Number of Strands (Inner Conductor) :	7
Diameter(mm)	: 2.29mm
Shielded/Unshielded	: Shielded
Length	: Standard drum length can be specified
Jacket Colour	: Black
Shield Material	: Copper Braid

### **Electrical Specifications by Frequency**

#### **Frequency 1**

Frequency (MHz)	: 100
Attenuation ,dB/100m	: 6.89

#### **Frequency 2**

Frequency (MHz)	: 400
Attenuation ,dB/100m	: 15.75

#### **Frequency 3**

Frequency (MHz)	: 1000
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Maximum Operating Frequency :MHz	1000
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### **5.13.10 RG 58 Flexible Coaxial Cable**

Coaxial cables shall be for communication and telemetry purposes.

#### **5.13.10.1 Basic specifications**

Conductor	: Stranded Tin Copper
Dielectric Type	: Polyethylene (PE)
Dielectric diameter(mm)	: 3.6mm
Outer diameter(mm)	: 4.95mm
Jacket material and colour	PVC black
Shield Material	: Tinned Copper Braid

Number of Strands (Inner Conductor) :	Stranded 19 x 0.18mm
Outer diameter (mm)	4.95mm
Shielded/Unshielded	: Shielded
Length	: Standard drum length can be specified
Jacket Colour	: Black
Shield Material	: Tinned Copper Braid
Maximum Operating Temperature :	+70°C
Electrical Specifications by Frequency	
Frequency 1	:
Frequency (MHz)	: 200
Attenuation ,dB/100m	: 23
Frequency 2	:
Frequency (MHz)	: 400
Attenuation ,dB/100m	: 32
Frequency 3	:
Frequency (MHz)	: 1000
Attenuation ,dB/100m	: 98

- 5.13.11.** Technical specifications of overhead long span ADSS cable that must be used on 11, 33 and 132kV overhead structures

#### **5.13.11.1 Optical fibres**

Single Mode All Dielectric Self Supporting optical fibre cable (ADSS) is required.

These shall be mode fibres in accordance with ITU-T Recommendations G. 652, and IEC 60793-1, IEC 60793-2 and IEC 60794-2, unless otherwise specified. The required number of loose-buffered single mode fibres to be incorporated in the cable will be specified in Part 5.13.11.6. Each fibre shall be uniquely identified in an approved manner.

The cladding of the fibres shall comply with ITU-T recommendations G. 652 as specified. The fibres shall be capable of operating in both the 1310 nm and 1550 nm wavelengths, depending on specific link requirements. The attenuation and both the chromatic dispersion

coefficient and polarisation mode dispersion (PMD) characteristics of the fibres will be specified in Part 5.13.11.6

#### **5.13.11.2 Fibre carrier**

The fibre carrier shall house the optical fibres and protect them from damage caused by large temperature variations as a result of moisture ingress and mechanical forces such as crushing, bending, twisting, tensile stress and Aeolian vibration. The detail requirements will be specified in Part 5.13.11.6

The fibre carrier design shall be such that no moisture shall be able to penetrate and come in contact with the fibres.

The fibre carrier shall be designed to minimise hydrogen absorption by the fibres.

#### **5.13.11.3 Environmental, electrical and mechanical**

The environmental, electrical and mechanical characteristics shall be specified in Part 5.13.11.6

When a cable is installed, no fibre shall be under any strain when the cable is subjected to operating conditions.

There shall be no fibre splices in any individual drum length of cable.

Full details of the cable construction shall be provided, including the details of the measures taken to minimise hydrogen absorption and water ingress to the fibres.

If mechanical stripping is recommended, then a suitable stripping device shall be specified.

The tenderer shall complete schedule B in Part 5.13.11.6, providing all the relevant technical particulars of the cables being offered.

#### **5.13.11.4 Type tests**

The cables shall successfully pass the following type tests: (Type testing of optic fibre cable may be waived if type test results of cable of the same type and similar rating are available and not older than five years.)

Copies of these type test reports shall be provided as part of the tender document.

##### **5.13.11.4.1 Optical Tests**

During manufacture, each fibre shall be tested as per ITU-T Recommendation G 652 both 1 300 nm and 1 550 nm range for attenuation. Measurement of the refractive index and dispersion characteristics shall be performed on a sampling to be done to prove the suitability of the manufacturing process. The results shall be supplied to

the Engineer on request. The PMD design value, PMDsubQ, shall be as specified in Part 5.13.11.6, Schedule A with the probability of 0.0001 that this value be exceeded for a numerical concatenation of 20 cables. (See IEC 60794-2 Ed 3, Annex A, Method 1).

During manufacture, or subsequent works testing, the entire length of each fibre shall be subjected to a proof test of at least 1% elongation for 1 s.

Each fibre shall be measured for continuity and length, while the cable is on a drum, prior to delivery. CENTLEC representative may require an inspector to be present when these final measurements are performed. This inspection shall not relieve the supplier of his responsibility for the satisfactory performance of the cable during subsequent testing at and thereafter to the end of the warranty period.

The macro-bend resistance shall be tested by a method specified in the relevant specification. During testing, the attenuation increase shall be less than the value specified in Schedule A in Part 5.13.11.6. For the G 652 fibre, 100 turns shall be placed on a 60 mm diameter mandrel.

The Supplier is required to submit sample test results with the tender to prove compliance. The sample test results are to be on fibre that is of the same design as the fibre that is to be supplied.

#### **5.13.11.4.2 Mechanical Tests**

##### **i. Stress-strain test**

A stress-strain test shall be performed to prove the capability of the cable under load conditions. The test shall be performed in accordance with annex B of IEC 61089, and the measuring techniques shall be as specified in IEC 60794-1-E1. The test shall be performed on samples of at least 10 m in length, and the end fittings shall be the system fittings, unless otherwise specified by the Engineer.

After the test there shall be no visual change to the cable. (Fibre strain shall be stress less than 0.05 % at 50 % of the ultimate tensile stress (UTS) of the cable). There shall be no permanent change in the fibre attenuation at 1 550 nm after the test.

##### **ii. Tensile performance test**

This test shall be performed using load conditions in accordance with annex B of IEC 61089, and the measuring techniques as specified in IEC 60794-1-E1. This test is intended to determine the optical unit's performance under tensile load.

There shall be no permanent change in the fibre attenuation at 1 550 nm, between the pre-test and post-test measurements, while the change in attenuation during the test shall be less than 0.05 dB/km from no load to 50 % of the UTS of the cable.

**iii. Impact test**

This test shall be performed by placing the end of a 20 mm diameter steel mandrel on the cable and dropping a 4 kg weight from a height of 100 mm onto the mandrel, repeated 20 times. There shall be no measurable permanent changes in optical attenuation at 1 500 nm while any temporary change in attenuation shall be less than 0.1 dB.

**iv. Aeolian vibration test**

The objective of this test is to assess the fatigue resistance of the cable under characteristic wind induced vibration. The test length of the cable shall be at least 100 m. The test sample shall be subjected to a minimum of 107 vibration cycles, at the nearest resonant frequency produced by a 4.5 m/s wind. The peak-to-peak amplitude of the antinodes shall be maintained at a level equal to one third of the conductor diameter. A final optical test shall be performed at least 2 hours after the completion of the vibration test. The optical attenuation increase shall be less than 0.25 dB/km at 1 550 nm. Any significant damage to the components of the cable will constitute failure of the test.

**v. Conductor creep test**

The manufacturer shall submit records of a long-term (>1 000 h) elongation test, with extrapolation to 30 years of a cable sample tensioned at 25 % UTS. The test shall be conducted as in IEC 61395.

**vi. Temperature cycle test**

The temperature cycle test shall be performed by measuring the changes in optical attenuation when 5 successive temperature cycles of between - 20°C and +70°C in a 10 hour period, are imposed on the fibre carrier. While a temporary increase of 0.1 dB/km at 1 550 nm in optical attenuation will be permitted, any permanent change in fibre attenuation at a nominal temperature of 25°C shall constitute a failure of the test.

**vii. Water ingress test**

The fibre carrier shall be tested for water ingress resistance in accordance with IEC 60794-1-F5.

**5.13.11.5 Packaging, labelling and documentation**

**5.13.11.5.1 Packaging and Labelling**

The cable shall be supplied tightly and uniformly wound onto wooden cable reels. The reel shall be of such construction that no damage to the cable will occur during shipping and handling.

A water resistant wrapping over the exposed surface shall protect the outer layer of the cable on the reel, to prevent ingress of moisture and dirt during shipping and handling.

Each end of the cable shall be properly sealed to prevent the ingress of moisture into the optical fibre unit during shipment or storage.

Each reel shall be labelled with at least one water resistant tag, containing the following minimum information:

- i. Manufacturer's name
- ii. Place of manufacture
- iii. Cable size and number of fibres
- iv. Cable shipped length (standard or specified)
- v. Gross tare and net weight
- vi. Drum number
- vii. Order/Contract number
- viii. Type of cable
- ix. Destination
- x. Unless the manufacturer guarantees that the drum or reel may be laid flat without damage to the cable, the warning "Not to be laid flat".
- xi. Unless the manufacturer guarantees that the drum or reel may be rolled in either direction without damage to the cable, an arrow with the words "Roll this way" (to indicate the direction in which the drum or reel is to be rolled in order to prevent the cable from unwinding)

The ends of the cable shall be accessible for testing purposes.

#### **5.13.11.5.2 Documentation**

All documentation called for shall be provided in hard-covered ring files that can open flat on any page and shall comply with the following requirements:

- i. All documentation, including type test reports, is to be supplied in an electronic format in English, subject to approval. All documentation shall be in standard A4
- ii. Any drawings and descriptions included shall conform to the standard A4 size (295 mm × 210 mm). Drawings that must be folded in two directions are not acceptable. Larger drawings shall be folded in a single panel along the 210 mm axis; and
- iii. Different sections of the documentation shall be separated by means of thumb-tag file separators.

The documentation to be supplied shall also include the following:

- i. Index
- ii. Cable type test reports
- iii. Routine test reports
- iv. Detail of cable design
- v. Details of fibre numbering and colour coding

#### **5.13.11.6 ADSS schedule**

Schedule A: Requirements

Schedule B: Particulars of equipment to be supplied

**Table 2: ADSS schedule**

No.	Description	Schedule A	Schedule B
1	No. of Fibres	12	
2	Type of Fibres	Single mode	
3	Mode Field Diameter <ul style="list-style-type: none"> <li>At 1 310 nm</li> <li>At 1 550 nm</li> </ul>	9.2 +/- 0.4 $\mu$ m 10.50 +/- 1.0 $\mu$ m	
4	Cladding Diameter	125 $\mu$ m +/- 1.0 $\mu$ m	
5	Mode Field Concentricity Error	$\leq 0.5 \mu$ m	
6	Cladding Non-circularity	$\leq 1.0 \%$	
7	Cladding Configuration		
8	Attenuation Coefficient <ul style="list-style-type: none"> <li>At 1 290-1 340 nm</li> <li>At 1 550 nm</li> </ul>	$\leq 0.4$ dB/km $\leq 0.5$ dB/km	
9	Chromatic Dispersion Coefficient <ul style="list-style-type: none"> <li>At 1 310 nm</li> <li>At 1 550 nm</li> </ul>	$\leq 3.5$ ps/nm.km $\leq 20$ ps/nm.km	
10	Proof Test (1 second)	$\geq 1\%$	
11	Polarisation Mode Dispersion (PMD)	$\leq 0.5$ ps/km <sup>1/2</sup>	
12	Fibre Curl (ROC)	$\geq 4.0$ m	
13	Macrobend test on fibre at 1 550 nm	$\leq 0.05$ dB	
14	OPERATION ENVIRONMENT		
14.1	Pollution Level		
14.2	Max. Temperature	70°C	
14.3	Min. Temperature	-20°C	
14.4	Max Wind Speed		
14.5	Route Altitude		
15	GENERAL		
15.1	Name of Manufacturer		
15.2	Place of Manufacture		
15.3	Manufacturer's Reference Number		
15.4	Standard to which ADSS complies	IEC 60794-1	
15.5	Type of Fibre Carrier	Long span ADSS	
15.6	Fibre Carrier Gel	Yes	
16	MECHANICAL CHARACTERISTICS		
16.1	Nominal cross-section of ADSS		
16.2	Maximum overall diameter of ADSS	13.2mm	
16.3	Maximum mass of ADSS		
16.4	Ultimate tensile strength (UTS) of ADSS		
16.5	Initial modulus of elasticity of ADSS		
16.6	Final modulus of elasticity		
16.7	Maximum drum length		

**5.14 Specification for medium voltage cable joints and terminations**

All cable joints and terminations of the heat shrinkable type shall comply with **NRS 053: 2008**. IEC 55/1, IEC 55/2, VDE 0278 Part 1 - 6, ESI 09 - 13 will be applicable for items not covered in the NRS spec. The prescribed performance tests to evaluate these accessories should be based on SABS IEC 61442: 1997 - Electric cables, Test methods for accessories for power cables with rated voltages from 6 kV ( $U_m = 7,2 \text{ kV}$ ) up to 30 kV ( $U_m = 36 \text{ kV}$ ). Copies of which should accompany the bid offered.

Cable through-joint kits and cable terminations must be able to withstand the phase to phase voltage (E) and phase to earth voltages ( $E_o$ ) as specified for the medium voltage cables in the schedules.

All cable joints must be suitable for **the cable screen to be bonded across the joint** so that the resistance of the bond shall be not less than that of an equivalent length of cable screen. **See NRS 053: 2008 item 4.1.3.3**

All cable through-joint kits and cable termination kits must include full jointing or terminating instructions with each kit. The kits shall be complete with all materials necessary for joining or terminating including tongue shear lugs and ferrules and bonding material.

The termination and through joint material must be suitable for use with torque shear ferrules and lugs.

Cable terminals shall be designed to preclude the ingress of moisture and to restrict the internal and external voltage gradients to a safe value under both normal and polluted conditions of the external surface. Facilities shall be provided to insulate the sheath of the cable to restrict the flow of earth fault current. All materials employed in the construction of offered equipment shall not suffer harmful effect under direct sunlight. Drawings and illustrations as well as type test certificates must be submitted with this bid.

All containers must be labelled with the following information:

- 1) Name of Manufacturer
- 2) Item code or Catalogue number
- 3) Cable size and number of cores
- 4) System voltage
- 5) For indoor or outdoor use

No kits will be accepted where all the individual components are not appropriately marked with the manufacturers name, batch code, part number and size where applicable.

Heat shrinkable type indoor terminations shall have a tail length of at least 650mm. **Outdoor terminations shall make provision for a tail length of at least 1200mm with rain skirts.**

Training facilities: The Bidder must submit a letter of commitment for training and ability to provide training and/or demonstrations to personnel of CENTLEC's personal if so required. This must be for the duration of the contract.

**5.15 Lugs and ferrules for copper and aluminum conductors**

**5.15.1.** Lugs and ferrules shall be in accordance with National Rationalized Specification NRS 028: 1993 with sizes, barrel lengths and palm hole diameter as specified in the schedules.

**5.15.2.** Torque-shear ferrules shall comply fully with the requirements of NRS 075.

**5.15.2.1. Three (3) Core cable palm lugs with single 13mm hole**

**5.15.2.2. Single core cable palm lugs with 4 x 13mm holes.**

**5.15.3.** The palm of Torque-shear lugs shall be permanently marked on the non-contacting side with the manufacturers name and the cable size.

**5.15.4.** The ferrules shall be similarly marked on the outside of the barrel.

**5.15.5.** The open end of the barrel shall be slightly flared or reamed to ensure easy insertion of the conductor.

**5.15.6.** The outside edges on the ends of the large aluminium ferrules and lugs shall be machined off to ensure no sharp edges would damage the insulation material.

## MEDIUM VOLTAGE CABLES

Table 3: Medium Voltage Cables

	DESCRIPTION OF MEDIUM VOLTAGE CABLES:									MANUFACTURER	STANDARDS
Item 1	Conductor Size in mm <sup>2</sup>	Conductor material Stranded (Cu) or stranded (Al)	No. of cores	XLPE or PILAC	TYPE	SCREENING	NOMINAL VOLTAGE in kV		COLOUR OF OUTER SHEATH	MANUFACTURER OR BRAND NAME	RELEVANT STANDARDS: SABS, NRS, ECT.
							E	Eo			
a	16	Copper	3	PILAC		Individually	11	6,35	Black		
b	35	Copper	3	PILAC		Individually	11	6,35	Black		
c	35	Copper	3	XLPE	A	Individually	11	6,35	Black		
d	70	Copper	3	XLPE	A	Individually	11	6,35	Black		
e	70	Copper	3	PILAC		Individually	11	6,35	Black		
f	70	Copper	3	XLPE		Individually	15	8,7	Orange		
g	70	Copper	3	PILAC		Individually	22	11,2	Orange		
h	70	Copper	3	XLPE	A	Individually	15	8,7	Orange		
i	95	Copper	3	PILAC		Individually	11	6,35	Black		
j	120	Copper	3	PILAC		Individually	11	6,35	Black		
k	120	Aluminium	3	PILAC		Individually	11	6,35	Yellow		
l	150	Copper	3	XLPE	A	Individually Screened	11	6,35	Black		
m	185	Copper	3	PILAC		Individually Screened	11	6,35	Black		
n	185	Aluminium	3	PILAC		Individually Screened	11	6,35	Yellow		

**MEDIUM VOLTAGE CABLES**

	DESCRIPTION OF MEDIUM VOLTAGE CABLES:									MANUFACTURER	STANDARDS
Item 1	Conductor Size in mm²	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	No. of cores	XLPE or PILAC	TYPE	SCREENING	NOMINAL VOLTAGE in kV		COLOUR OF OUTER SHEATH	MANUFACTURER OR BRAND NAME	RELEVANT STANDARDS: SABS, NRS, ETC.
							E	Eo			
<b>o</b>	185	Aluminium	3	PILAC		Individually Screened	15	8,7	Orange		
<b>p</b>	185	Aluminium	3	PILAC		Individually Screened	22	11,2	Orange		
<b>q</b>	185	Aluminium	3	XLPE	A	Individually Screened	11	6,35	Yellow		
<b>r</b>	185	Copper	3	XLPE	A	Individually	11	6,35	Black		
<b>s</b>	240	Copper	3	PILAC		Individually	11	6,35	Black		
<b>t</b>	240	Aluminium	3	PILAC		Individually	11	6,35	Yellow		
<b>u</b>	240	Copper	3	XLPE	A	Individually	11	6,35	Black		
<b>v</b>	300	Copper	3	PILAC		Individually	11	6,35	Black		
<b>w</b>	300	Aluminium	3	PILAC		Individually	11	6,35	Yellow		
<b>x</b>	300	Aluminium	3	XLPE	A	Individually	11	6,35	Black		
<b>y</b>	800	Aluminium	1	PILAC		Screened - 0,2mm thick	11	6,35	Black & Graphite		
<b>z</b>	800	Aluminium	1	XLPE	A2	Screened - 0,2mm thick	11	6,35	Black & Graphite		

## MEDIUM VOLTAGE CABLES

	DESCRIPTION OF MEDIUM VOLTAGE CABLES:									MANUFACTURER	STANDARDS
Item 1	Conductor Size in mm <sup>2</sup>	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	No. of cores	XLPE or PILAC	TYPE	SCREENING	NOMINAL VOLTAGE in kV		COLOUR OF OUTER SHEATH	MANUFACTURER OR BRAND NAME	RELEVANT STANDARDS: SABS, NRS, ETC.
							E	Eo			
aa	630	Copper	1	XLPE	A2	Screened - 0,2mm thick	11	6,35	Black & Graphite covered		
ab	120	Aluminium	1	PILAC		Screened - 0,2mm thick	11	6,35	Black & Graphite		
ac	300	Copper	1	PILAC		Individually	33	19	Black		
ad	300	Copper	1	XLPE	A	Individually	33	19	Black		
ae	400	Aluminium	1	XLPE	A	Individually	33	19	Black		
af	500	Aluminium	1	PILAC		Individually	33	19	Black		
ag	500	Aluminium	1	XLPE	A	Individually	33	19	Black		

**LOW VOLTAGE DISTRIBUTION CABLES****Table 4: Low Voltage Distribution Cables**

Item 2	DESCRIPTION OF LOW VOLTAGE CABLES:						MANUFACTURER	STANDARDS
	Conductor Size in mm <sup>2</sup>	No. of core s	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	INSULATION AND ARMOURING	NOMINAL VOLTAGE		MANUFACTURER OR BRAND NAME	RELEVANT STANDARDS: SABS, NRS, ETC.
					E	E o		
<b>a</b>	10	2	Stranded Copper	PVC PVC SWA PVC	1 000	600		
<b>b</b>	10	3	Stranded Copper	PVC PVC SWA PVC	1 000	600		
<b>c</b>	10	4	Stranded Copper	PVC PVC SWA PVC	1 000	600		
<b>d</b>	16	2	Stranded Copper	PVC PVC SWA PVC	1 000	600		
<b>e</b>	16	4	Stranded Copper	PVC PVC SWA PVC	1 000	600		
<b>f</b>	25	4	Stranded Copper	PVC PVC SWA PVC	1 000	600		
<b>g</b>	35	4	Stranded Copper	PVC PVC SWA PVC	1 000	600		
<b>h</b>	70	4	Stranded Copper	PVC PVC SWA PVC	1 000	600		
<b>i</b>	95	4	Stranded Copper	PVC SWA PVC	1000	600		
<b>j</b>	120	4	Solid Aluminium	PVC PVC SWA PVC	1 000	600		
<b>k</b>	120	4	Stranded Copper	PVC PVC SWA PVC	1 000	600		
<b>l</b>	185	4	Solid Aluminium	PVC PVC SWA PVC	1 000	600		
<b>m</b>	185	4	Stranded Copper	PVC PVC SWA PVC	1 000	600		

## LOW VOLTAGE DISTRIBUTION CABLES

Item 2	DESCRIPTION OF LOW VOLTAGE CABLES:						MANUFACTURER	STANDARDS
	Conductor Size in mm <sup>2</sup>	No. of cores	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	INSULATION AND ARMOURING	VOLTAGE		MANUFACTURER OR BRAND NAME	RELEVANT STANDARDS: SABS, NRS, ETC.
					E	E o		
n	300	4	Solid Aluminium	PVC PVC SWA PVC	1 000	600		
o	300	4	Stranded Aluminium	PVC PVC SWA PVC	1 000	600		
p	300	4	Stranded Copper	PVC PVC SWA PVC	1 000	600		
q	300	1	Stranded Copper	PVC	1 000	600		

**LOW VOLTAGE CONTROL CABLES****Table 5: Low Voltage Control Cables**

Item 3A	DESCRIPTION OF LOW VOLTAGE CABLES:					MANUFACTURER		STANDARDS	
	Conductor Size in mm <sup>2</sup>	No. of cores	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	INSULATION AND ARMOURING	NOMINAL VOLTAGE		MANUFACTURER OR BRAND NAME	RELEVANT STANDARDS: SABS, NRS, ETC.	
					E	E o			
<b>a</b>	1,5	19	See detailed specification - item 5.13.1	PVC PVC Separately numbered 1-19	1 000	600			
<b>b</b>	1,5	19	See detail specification - item 5.13.4	PVC PVC SWA PVC Separately numbered 1-19	1 000	600			
<b>c</b>	1.5	27	See detail specification - item 5.13.5	PVC PVC SWA PVC Separately numbered 1-27	1 000	600			
<b>d</b>	1.5	19 pair	See detail specification - item 5.13.6	PVC PVC SWA PVC colour coded or numbered	1 000	600			
<b>e</b>	2,5	2	Stranded Copper	PVC PVC SWA PVC	1 000	600			
<b>f</b>	2,5	4	Stranded Copper	PVC PVC SWA PVC	1 000	600			
<b>g</b>	2,5	7	See detailed specification - item 5.13.2	PVC PVC SWA PVC differently coloured or numbered	1 000	600			
<b>h</b>	2,5	12	See detailed specification - item 5.13.3	PVC PVC SWA PVC Separately numbered 1–12	1 000	600			
<b>i</b>	4	2	Stranded Copper	PVC PVC SWA PVC colours (red and black)	1 000	600			
<b>j</b>	4	4	Stranded Copper	PVC PVC SWA PVC colours (red, yellow, blue and black)	1 000	600			
<b>k</b>	1,5	19	See detailed specification - item 5.13.1	PVC PVC Separately numbered 1-19	1 000	600			

**DATA COMMUNICATION CABLES****Table 6: Data Communication Cables**

Item 3 B	DESCRIPTION OF DATA COMMUNICATION CABLES:					MANUFACTURER		STANDARDS
	Conductor Size in mm <sup>2</sup>	No. of cores	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	INSULATION AND ARMOURING	VOLTAGE		MANUFACTURER OR BRAND NAME	RELEVANT STANDARDS: SABS, NRS, ETC.
					E	E o		
<b>a</b>	0.2	8 core	See detailed specification - item 5.13.7	Polyethylene	110V	63.5V		
<b>b</b>	0.2	80 cores (40 pair)	See detailed specification - item 5.13.8	Polyethylene	110V	63.5V		
<b>c</b>	4.11	1	See detailed specification - item 5.13.9	Polyethylene	N/A	N/A		
<b>d</b>	0.35	1	See detail specification - item 5.13.10	Polyethylene	N/A	N/A		
<b>e</b>	13,2mm diameter	12	See detail specification - item 5.13.11 with table at 5.13.11.6		N/A	N/A		

**MEDIUM VOLTAGE CABLE TERMINATIONS AND JOINTS****Table 7: Through Joints – XLPE - Heat Shrink Type**

Item	DESCRIPTION OF ITEM	MANUFACTURER	ITEM CODE	STANDARDS
4				
		Name of Manufacturer or brand name	Product number or code	Tested & comply to:
a	<b>THROUGH JOINTS - XLPE - Heat shrink type</b> <b>16mm<sup>2</sup> - 35mm<sup>2</sup> Cu x 3, 11kV XLPE SWA PVC -</b> Through joint for 3 Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 16 - 35mm <sup>2</sup> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.			
b	<b>70mm<sup>2</sup> Cu x 3, 15kV XLPE SWA PVC -</b> Through joint for 3 Core XLPE SWA PVC sheathed individually screened 15/8.7 kV cable with 70mm <sup>2</sup> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.			
c	<b>150mm<sup>2</sup> Cu x 3, 11kV XLPE SWA PVC -</b> Through joint for 3 Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 150mm <sup>2</sup> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.			
d	<b>240mm<sup>2</sup> Cu x 3, 11kV XLPE SWA PVC -</b> Through joint for 3 Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 240mm <sup>2</sup> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.			
e	<b>630mm<sup>2</sup> Cu, 11kV XLPE SWA PVC -</b> Through joint for S/Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 630mm <sup>2</sup> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.			

f	<b>70mm<sup>2</sup> Cu x 3, 11kV PILAC DSTA to XLPE SWA -</b> Transition joint for a screened 3 Core <b>70mm<sup>2</sup></b> PILAC DSTA to a screened XLPE SWA cable with earthing sock and CFS clamps, complete with torque-shear ferrules.			
g	<b>150mm<sup>2</sup> Cu x 3, 11kV PILAC DSTA to XLPE SWA -</b> Transition joint for a screened 3 Core <b>150mm<sup>2</sup></b> PILAC DSTA to a screened XLPE SWA cable with earthing sock and CFS clamps, complete with torque-shear ferrules.			
h	<b>185mm<sup>2</sup> Cu x 3, 11kV PILAC DSTA to XLPE SWA -</b> Transition joint for a screened 3 Core <b>185mm<sup>2</sup></b> PILAC DSTA to a screened XLPE SWA cable with earthing sock and CFS clamps, complete with torque-shear ferrules.			
i	<b>240mm<sup>2</sup> Cu x 3, 11kV PILAC DSTA to XLPE SWA -</b> Transition joint for a screened 3 Core <b>240mm<sup>2</sup></b> PILAC DSTA to a screened XLPE SWA cable with earthing sock and CFS clamps, complete with torque-shear ferrules.			
j	<b>300mm<sup>2</sup> Cu x 3, 11kV PILAC DSTA to XLPE SWA -</b> Transition joint for a screened 3 Core <b>300mm<sup>2</sup></b> PILAC DSTA to a screened XLPE SWA cable with earthing sock and CFS clamps, complete with torque-shear ferrules.			

**Table 8: Terminations – Indoor & Outdoor for PILAC & XLPE**

Item	DESCRIPTION OF ITEM	MANUFACTURER	ITEM CODE	STANDARDS
5				
		Name of Manufacturer or brand name	Product number or code	Tested & comply to:
	<b>TERMINATIONS - INDOOR PILAC</b>			
a	<b>16mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Indoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>16mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			
b	<b>35mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Indoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable for <b>35mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			
c	<b>70mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Indoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable for <b>70mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			
d	<b>185mm<sup>2</sup> AL x 3, 11kV PILAC PVC</b> - Indoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable for <b>185mm<sup>2</sup></b> stranded aluminium conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			
e	<b>240mm<sup>2</sup> AL x 3, 11kV PILAC PVC - Indoor termination</b> for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 240mm<sup>2</sup> stranded aluminium</b> conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			

f	<b>240mm<sup>2</sup> Cu x 3, 11kV PILAC PVC - Indoor termination</b> for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 240mm<sup>2</sup> stranded copper</b> conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			
g	<b>300mm<sup>2</sup> AL x 3, 11kV PILAC PVC - Indoor termination</b> for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 300mm<sup>2</sup> stranded aluminium</b> conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			
h	<b>300mm<sup>2</sup> Cu x 3, 11kV PILAC PVC - Indoor termination</b> for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 300mm<sup>2</sup> stranded copper</b> conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			
i	<b>TERMINATIONS - INDOOR XLPE</b>  <b>70mm<sup>2</sup> Cu x 3, 11kV XLPE PVC - Indoor termination</b> for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 11/6,35 kV cable for <b>70mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			
j	<b>185mm<sup>2</sup> Cu x 3, 11kV XLPE PVC - Indoor termination</b> for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 11/6,35 kV cable for <b>185mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			
k	<b>240mm<sup>2</sup> Cu x 3, 11kV XLPE PVC - Indoor termination</b> for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 11/6,35 kV cable for <b>240mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.			

l	<b>TERMINATIONS -OUTDOOR XLPE</b>  <b>70mm<sup>2</sup> Cu x 3, 15kV XLPE PVC</b> - Outdoor termination for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 15/8,7 kV cable for <b>70mm<sup>2</sup></b> stranded copper with 1200mm tails, complete, including earthing kit and torque-shear lugs.			
m	<b>185mm<sup>2</sup> Cu x 3, 15kV XLPE PVC</b> - Outdoor termination for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 15/8,7 kV cable for <b>150mm<sup>2</sup></b> stranded copper with 1200mm tails, complete, including earthing kit and torque-shear lugs.			
n	<b>240mm<sup>2</sup> Cu x 3, 15kV XLPE PVC</b> - Outdoor termination for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 15/8,7 kV cable for <b>240mm<sup>2</sup></b> stranded copper with 1200mm tails, complete, including earthing kit and torque-shear lugs.			
o	<b>630mm<sup>2</sup> Cu, 11kV XLPE SWA PVC</b> - Outdoor termination for S/Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 630mm <sup>2</sup> stranded copper conductor complete with 70mm <sup>2</sup> braided earth strap, CFS clamps , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			
p	<b>TERMINATIONS - OUTDOOR PILAC</b>  <b>35mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Outdoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable for <b>16 - 35mm<sup>2</sup></b> stranded copper conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.			
q	<b>70mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Outdoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6.35 kV cable for <b>70mm<sup>2</sup>- 95mm<sup>2</sup></b> stranded copper conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.			

r	<b>70mm<sup>2</sup> Cu x 3, 15kV PILAC PVC</b> - Outdoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 15/8.7 kV cable for <b>70mm<sup>2</sup></b> stranded copper conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.			
s	<b>185mm<sup>2</sup> AL x 3, 15kV PILAC PVC</b> - Outdoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 15/8.7 kV cable for <b>185mm<sup>2</sup></b> stranded aluminium conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.			
t	<b>240mm<sup>2</sup> AL x 3, 11kV PILAC PVC</b> - Outdoor termination for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, 11/6,35 kV cable with <b>240mm<sup>2</sup></b> stranded aluminium conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.			
u	<b>240mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Outdoor termination for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 240mm<sup>2</sup> stranded copper</b> conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.			
v	<b>300mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> – Outdoor termination for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 300mm<sup>2</sup> stranded copper</b> conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.			

**Table 9: Through Joints – PILC - Heat Shrink Type**

Item	DESCRIPTION OF ITEM	MANUFACTURER	ITEM CODE	STANDARDS
6		Name of Manufacturer or brand name	Product number or code	Tested & comply to:
a	<b>THROUGH JOINTS - PILC</b> - Heat shrink type <b>16mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>16mm<sup>2</sup></b> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules			
b	<b>35mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>35mm<sup>2</sup></b> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.			
c	<b>70mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>70mm<sup>2</sup></b> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules .			
d	<b>185mm<sup>2</sup> Al x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>185mm<sup>2</sup></b> stranded aluminium conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.			
e	<b>240mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>240mm<sup>2</sup></b> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules			
f	<b>300mm<sup>2</sup> Al x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>300mm<sup>2</sup></b> stranded aluminium conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.			

**Table 10: Through Joints & Terminations - Single Core Cables - Heat Shrink Type**

Item	DESCRIPTION OF ITEM	MANUFACTURER	ITEM CODE	STANDARDS
7				
		Name of Manufacturer or brand name	Product number or code	Tested & comply to:
<b>a</b>	<b>JOINTS - SINGLE CORE</b>  <b>Joint 800mm², 11kV, PILAC S/Core Unarmoured -</b> Underground through joint kit for a 11/6.35kV, 800mm² Aluminium, single core, screened <b>paper</b> insulated, lead alloy covered, unarmoured, graphite covered PE sheathed cable (SANS 97 - Tbl) Complete with 70mm² braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			
<b>b</b>	<b>630mm² Cu, 11kV XLPE SWA PVC -</b> Underground through joint kit for S/Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 630mm² stranded copper conductor complete with 70mm² braided earth strap, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			
<b>c</b>	<b>Joint 120mm², 11kV, PILAC S/Core Unarmoured -</b> Outdoor kit for a 11/6.35kV Aluminium, single core, screened paper insulated, lead alloy covered, unarmoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl ) Complete with 70mm² x 500mm long braided earth strap, CFS clamps, with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			
<b>d</b>	<b>Joint 500mm², 33kV, PILAC S/Core Unarmoured -</b> Underground through joint kit for a 33/19kV, 500mm² Aluminium, single core, screened <b>paper</b> insulated, lead alloy covered, unarmoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm² braided earth sock, CFS, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			

e	<b>Joint 500mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Underground through joint kit for a 33/19kV, 500mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			
f	<b>Joint 400mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Underground through joint kit for a 33/19kV, 400mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			
g	<b>Joint 300mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Underground through joint kit for a 33/19kV, 300mm <sup>2</sup> Copper, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			
h	<b>Joint 300mm<sup>2</sup>, 33kV, PILAC S/Core Unarmoured -</b> Underground through joint kit for a 33/19kV, 300mm <sup>2</sup> Copper, single core, screened <b>paper</b> insulated, lead alloy covered, unarmoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			
i	<b>Joint 240mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Underground through joint kit for a 33/19kV, 240mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			

j	<b>Joint 240mm<sup>2</sup>, 33kV, PILAC S/Core Unarmoured</b> - Underground through joint kit for a 33/19kV, 240mm <sup>2</sup> Copper, single core, screened <b>paper</b> insulated, lead alloy covered, unarmoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			
k	<b>TERMINATION KITS - SINGLE CORE</b>  <b>Termination 800mm<sup>2</sup>, 11kV, PILAC S/Core Unarmoured</b> - Outdoor termination kit for a 11/6.35kV, 800mm <sup>2</sup> aluminium, single core screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth strap, CFS clamps , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			
l	<b>Termination 630mm<sup>2</sup>, 11kV, PILAC S/Core Unarmoured</b> - Outdoor termination kit for a 11/6.35kV, 630mm <sup>2</sup> copper, single core screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl ) Complete with 95mm <sup>2</sup> braided earth strap, CFS clamps, complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			
m	<b>Termination 500mm<sup>2</sup>, 33kV PILAC S/Core Unarmoured</b> - Outdoor termination kit for a 33/19kV, 500mm <sup>2</sup> aluminium, single core screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth strap, CFS clamps, complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			
n	<b>Termination 500mm<sup>2</sup>, 33kV, XLPE S/Core Armoured</b> - Outdoor kit for a 33/19kV, 500mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			

<b>o</b>	<b>Termination 400mm<sup>2</sup>, 33kV, XLPE S/Core Armoured</b> - Outdoor kit for a 33/19kV, 400mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			
<b>p</b>	<b>Termination 300mm<sup>2</sup>, 33kV, XLPE S/Core Armoured</b> - Outdoor kit for a 33/19kV, 300mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			
<b>q</b>	<b>Termination 300mm<sup>2</sup>, 11kV, PILAC S/Core Unarmoured</b> - Outdoor termination kit for a 11/6.35kV, 300mm <sup>2</sup> copper, single core screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl ) Complete with 70mm <sup>2</sup> braided earth strap, CFS clamps, complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			
<b>r</b>	<b>Termination 240mm<sup>2</sup>, 33kV, XLPE S/Core Armoured</b> - Outdoor kit for a 33/19kV, 240mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			
<b>s</b>	<b>Termination 240mm<sup>2</sup>, 11kV, PILAC S/Core Unarmoured</b> - Outdoor termination kit for a 11/6.35kV, 240mm <sup>2</sup> copper, single core screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl ) Complete with 70mm <sup>2</sup> braided earth strap, CFS clamps, complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			
<b>t</b>	<b>Termination 120mm<sup>2</sup>, 11kV, PILAC S/Core Armoured</b> - Outdoor kit for a 11/6.35kV Aluminium, single core, screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl ) Complete with 70mm <sup>2</sup> x 500mm long braided earth strap, CFS clamps, with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>			

**Table 11: Splicing Kits / Joints For Armoured LV Cables**

ITEM	DESCRIPTION OF LV CABLE ACCESSORIES			MANUFACTURER	ITEM CODE	STANDARDS
	Conductor size in mm <sup>2</sup>	No. of cores	Conductor material	Name of Manufacturer or brand name	Series number or type	Tested & comply to:
<b>8</b>	<b>SPLICING KITS / JOINTS FOR <u>ARMOURED</u> LV CABLES - For the following 1000/600V PVC SWA PVC cables (heat shrink or resin types)</b>					
<b>a</b>	<b>10</b>	<b>4</b>	Stranded copper			
<b>b</b>	<b>16</b>	<b>4</b>	Stranded copper			
<b>c</b>	<b>35</b>	<b>4</b>	Stranded copper			
<b>d</b>	<b>70</b>	<b>4</b>	Stranded copper			
<b>e</b>	<b>120</b>	<b>4</b>	Solid aluminium			
<b>f</b>	<b>185</b>	<b>4</b>	Solid aluminium			
<b>g</b>	<b>300</b>	<b>4</b>	Stranded or solid aluminium			
<b>h</b>	<b>6</b>	<b>2</b>	Stranded copper			

**Table 12: Termination Boots**

ITEM	DESCRIPTION OF LV CABLE ACCESSORIES			MANUFACTURER	ITEM CODE	STANDARDS
	Conductor size in mm <sup>2</sup>	No. of cores	Conductor material	Name of Manufacturer or brand name	Series number or type	Tested & comply to:
<b>9</b>	<b>TERMINATION BOOTS (heat shrink type) for the following 1 000 V/600 V PVC PVC SWA PVC cables</b>					
<b>a</b>	<b>16</b>	<b>4</b>	Stranded copper			
<b>b</b>	<b>35</b>	<b>4</b>	Stranded copper			
<b>c</b>	<b>70</b>	<b>4</b>	Stranded copper			
<b>d</b>	<b>95</b>	<b>4</b>	Stranded copper			
<b>e</b>	<b>120</b>	<b>4</b>	Solid aluminium			
<b>f</b>	<b>185</b>	<b>4</b>	Solid aluminium			
<b>g</b>	<b>240</b>	<b>4</b>	Stranded Copper			
<b>h</b>	<b>300</b>	<b>4</b>	Stranded aluminium			
<b>i</b>	<b>300</b>	<b>4</b>	Stranded copper			

**Table 13: Cable end Caps**

Item	<b>CABLE END CAPS ( heat shrink type adhesive lined), for the following cable sizes:</b>					
10	Supplied Inside Diameter	Fully Shrunk Inside Diameter	Size Offer	Name of Manufacturer Or Brand name	Product or Item Code	STANDARDS - Tested & comply to:
a	35mm	15mm				
b	55mm	25mm				
c	75mm	30mm				
d	100mm	45mm				
e	120mm	70mm				

**Table 14: Cable Outdoor PVC End Boxes**

ITEM	<b>CABLE OUTDOOR PVC END BOXES - type lxac or similar cold shrink end caps for:</b>				
11	TO FIT CABLES:	NAME OF MANUFACTURER	MANUFACTURER ITEM CODE	SABS YES/NO	BROCHURES INCLUDED YES/NO
a	10mm <sup>2</sup> - 16mm <sup>2</sup> x 4 core cables				
b	35mm <sup>2</sup> - 70mm <sup>2</sup> x 4 core cables				

**Table 15: Heat Shrink Tubes Without Adhesive**

ITEM	<b>HEAT SHRINK TUBES WITHOUT ADHESIVE</b> (thick wall type) state tube length					
12	SHRINK SIZE	TUBE LENGTH	NAME OF MANUFACTURER	MANUFACTURER ITEM CODE	SABS YES/NO	BROCHURES INCLUDED YES/NO
a	10mm to 3,8mm					
b	19mm to 5,6mm					
c	28mm to 9,5mm					
d	38mm to 12,7mm					
e	51mm to 19mm					
f	76mm to 32mm					
g	90mm to 36mm					

**Table 16: Heat Shrink Tubes Adhesive Lined**

13	<b>HEAT SHRINK TUBES ADHESIVE LINED</b> (Thick wall type state tube length)					
		TUBE LENGTH	NAME OF MANUFACTURER	MANUFACTURER ITEM CODE	SABS YES/NO	BROCHURES INCLUDED YES/NO
a	10mm to 3.8mm					
b	13mm to 5.8mm					
c	28mm to 9.5mm					
d	38mm to 12.7mm					
e	51mm to 19mm					
f	76mm to 32mm					
g	90mm to 36mm					

**HEAT SHRINK WRAP AROUND TUBES** ADHESIVE LINED (THICK WALL TYPE STATE TUBE LENGTH) - RAP-A-ROUND EQUIVALENT TO RAYTECH CODE CRSM

		TUBE LENGTH	NAME OF MANUFACTURER	MANUFACTURER ITEM CODE	SABS YES/NO	BROCHURES INCLUDED YES/NO
<b>h</b>	84mm / 20mm (1500 x 232)					
<b>i</b>	143mm / 36mm (1500 x 232)					

**Table 17: Heat Shrink Tubes - Medium Voltage, Non-Tracking For Busbars****Item HEAT SHRINK TUBES - MEDIUM VOLTAGE, NON-TRACKING FOR BUSBARS ( state tube length)**

<b>14</b>	SHRINK SIZE	TUBE LENGTH	NAME OF MANUFACTURER	MANUFACTURER ITEM CODE	SABS YES/NO	BROCHURES INCLUDED YES/NO
<b>a</b>	30mm to 12mm					
<b>b</b>	48mm to 18mm					
<b>c</b>	80mm to 31mm					
<b>d</b>	100mm to 40mm					
<b>e</b>	120mm to 50mm					

**Table 18: Glands & Shrouds for PVC. PVC. SWA. PVC cables**

ITEM	<b>GLANDS &amp; SHROUDS for PVC. PVC. SWA. PVC cables (shroud must be included)</b>					
<b>15</b>	STANDARD GLAND SIZE NR:	NAME OF MANUFACTURER	MANUFACTURER ITEM CODE	SABS YES/NO	LOCAL CONTENT %	BROCHURES INCLUDED YES/NO
<b>a</b>	No. 0					
<b>b</b>	No. 1					
<b>c</b>	No. 2					
<b>d</b>	No. 3					
<b>e</b>	No. 4					
<b>f</b>	No. 5					
<b>g</b>	No. 6					

**Table 19: Aluminium Crimping Ferrules**

ITEM	NAME OF MANUFACTURER	MANUFACTURER ITEM CODE	COMPLY TO NRS YES/NO	BROCHURES INCLUDED YES/NO
<b>16</b>	<b>ALUMINIUM CRIMPING FERRULES</b> for 4 core solid <u>sectoral</u> core aluminium cables (600/1 000 V) Samples must be submitted.			
<b>a</b>	120mm <sup>2</sup>			
<b>b</b>	185mm <sup>2</sup>			
<b>c</b>	300mm <sup>2</sup>			
	<b>ALUMINIUM CRIMPING FERRULES</b> for 4 core <u>stranded</u> aluminium cable (600/1 000 V) Samples must be submitted.			
<b>d</b>	120mm <sup>2</sup>			
<b>e</b>	185mm <sup>2</sup>			
<b>f</b>	300mm <sup>2</sup>			
	<b>ALUMINIUM CRIMPING FERRULES</b> for <u>3 core stranded</u> aluminium cable (11/6.35kV) Samples must be submitted.			
<b>g</b>	185mm <sup>2</sup> (MV cable)			

**Table 20: Terminal Crimping Lugs for Solid Sectoral Core Cables**

ITEM	<b>TERMINAL CRIMPING LUGS</b> for 4 core solid <b>sectoral</b> core cable (600/1 000 V) Samples must be submitted.				
17	To fit core size & Palm hole DIA		NAME OF MANUFACTURER	MANUFACTURER ITEM CODE	BROCHURES INCLUDED YES/NO
a	120mm <sup>2</sup>	13mm			
b	185mm <sup>2</sup>	13mm			
c	300mm <sup>2</sup>	17mm			

**Table 21: Terminal Crimping Lugs for Solid Stranded Core Cables**

ITEM	To fit core size & Palm hole DIA		NAME OF MANUFACTURER	MANUFACTURER ITEM CODE	BROCHURES INCLUDED YES/NO
18	<b>LUGS ALUMINIUM - TERMINAL CRIMPING LUGS</b> for <b>stranded</b> aluminium cables. Samples must be submitted.				
a	120mm <sup>2</sup> - 3 core 11 kV PILAC	13mm			
b	185mm <sup>2</sup> - 3 core 11 kV PILAC	13mm			
c	240mm <sup>2</sup> - 3 core 11 kV PILAC	17mm			
d	300mm <sup>2</sup> - 4 core PVC PVC SWA PVC 600/1 000 V	17mm			
e	500mm <sup>2</sup> - Single core 33 kV with <b>straight palm</b>	No hole			
f	800mm <sup>2</sup> - Single core 11 kV with <b>straight palm</b>	No hole			

**Table 22: Tinned Copper Crimping Ferrules**

ITEM	<b>TINNED COPPER CRIMPING FERRULES</b> for the following stranded copper conductor sizes: Samples must be submitted.					
19	TO FIT CORE SIZE AND MINIMUM BARREL LENGTH	NAME OF MANUFACTURER	MANUFACTURER ITEM CODE	COMPLY TO NRS YES/NO	DELIVERY IN WEEKS	BROCHURES INCLUDED YES/NO
a	1,5mm <sup>2</sup> Length not less than 12mm					
b	2,5mm <sup>2</sup> Length not less than 15mm					
c	4,0mm <sup>2</sup> Length not less than 15mm					
d	6,0mm <sup>2</sup> Length not less than 15mm					
e	10mm <sup>2</sup> Length not less than 25mm					
f	16mm <sup>2</sup> Length not less than 30mm					
g	35mm <sup>2</sup> Length not less than 40mm					
h	70mm <sup>2</sup> Length not less than 45mm					
i	95mm <sup>2</sup> Length not less than 60mm					
j	120mm <sup>2</sup> Length not less than 60mm					
k	150mm <sup>2</sup> Length not less than 60mm					
l	185mm <sup>2</sup> Length not less than 60mm					
m	240mm <sup>2</sup> length not less than 75mm					
n	300mm <sup>2</sup> Length not less than 80mm					

**Table 23: Tinned Pre-Insulated Copper Crimping Ferrules**

ITEM	<b>Tinned PRE-INSULATED COPPER CRIMPING FERRULES</b> for the following stranded copper conductor sizes: <b>Samples must be submitted.</b>						
<b>20</b>	<b>DESCRIPTION: SIZE WIRE TO FIT &amp; COLOUR OF INSULATION</b>		<b>NAME OF MANUFACTURER</b>	<b>MANUFACTURER ITEM CODE</b>	<b>COMPLY TO NRS YES/NO</b>	<b>LOCAL CONTENT %</b>	<b>BROCHURES INCLUDED YES/NO</b>
<b>a</b>	1,5mm <sup>2</sup>	Red					
<b>b</b>	2,5mm <sup>2</sup>	Blue					
<b>c</b>	4mm <sup>2</sup>	Yellow					
<b>d</b>	6mm <sup>2</sup>	As per standard					

**Table 24: Tinned Solid Centre Copper Crimping Ferrules And Solid End Lugs for 70mm<sup>2</sup> Copper Conductors**

ITEM	<b>Tinned SOLID CENTRE COPPER CRIMPING FERRULES</b> and solid end lugs for 70mm <sup>2</sup> copper conductors. <b>Samples must be submitted.</b>						
<b>21</b>	<b>DESCRIPTION</b>	<b>NAME OF MANUFACTURER</b>	<b>MANUFACTURER ITEM CODE</b>	<b>COMPLY TO NRS YES/NO</b>	<b>LOCAL CONTENT %</b>	<b>DELIVERY IN WEEKS</b>	<b>BROCHURES INCLUDED YES/NO</b>
<b>a</b>	Lug S/E - 70mm <sup>2</sup> X 12mm hole						
<b>b</b>	Ferrule S/C - 70mm <sup>2</sup>						

**Table 25: Lugs Copper - Tinned Copper Crimping Lugs for the Sizes Specified**

ITEM	<b>LUGS COPPER - Tinned copper crimping lugs for the sizes specified. Samples must be submitted.</b>							
<b>22</b>	<b>Conductor size</b>	<b>Barrel length not less than</b>	<b>Palm hole diameter</b>	<b>NAME OF MANUFACTURER</b>	<b>BARREL LENGTH</b>	<b>COMPLY TO NRS YES/NO</b>	<b>LOCAL CONTENT %</b>	<b>BROCHURES INCLUDED YES/NO</b>
<b>a</b>	1,5mm <sup>2</sup>	7mm	6mm					
<b>b</b>	2,5mm <sup>2</sup>	7mm	6mm					
<b>c</b>	4,0mm <sup>2</sup>	7mm	6mm					
<b>d</b>	6,0mm <sup>2</sup>	10mm	6mm					
<b>e</b>	10mm <sup>2</sup>	15mm	6mm					
<b>f</b>	10mm <sup>2</sup>	15mm	10mm					
<b>g</b>	10mm <sup>2</sup>	15mm	12mm					
<b>h</b>	16mm <sup>2</sup>	15mm	6mm					
<b>i</b>	16mm <sup>2</sup>	15mm	10mm					
<b>j</b>	16mm <sup>2</sup>	15mm	12mm					
<b>k</b>	35mm <sup>2</sup>	20mm	12mm					
<b>l</b>	35mm <sup>2</sup>	20mm	16mm					
<b>m</b>	35mm <sup>2</sup>	20mm	25mm					
<b>n</b>	70mm <sup>2</sup>	25mm	12mm					
<b>o</b>	70mm <sup>2</sup>	25mm	16mm					
<b>p</b>	70mm <sup>2</sup>	25mm	20mm					
<b>q</b>	95mm <sup>2</sup>	30mm	12mm					

<b>r</b>	95mm <sup>2</sup>	30mm	16mm					
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**Table 26: Tinned Copper Crimping Lugs for the Sizes Specified**

ITEM	<b>Tinned COPPER CRIMPING LUGS for the sizes specified. Samples must be submitted.</b>							
<b>23</b>	Conductor size	Barrel length not less than	Palm hole diameter	NAME OF MANUFACTURER	BARREL LENGTH	COMPLY TO NRS YES/NO	LOCAL CONTENT %	BROCHURES INCLUDED YES/NO
<b>a</b>	120mm <sup>2</sup>	35mm	12mm					
<b>b</b>	120mm <sup>2</sup>	35mm	16mm					
<b>c</b>	150mm <sup>2</sup>	35mm	12mm					
<b>d</b>	150mm <sup>2</sup>	35mm	16mm					
<b>e</b>	185mm <sup>2</sup>	40mm	16mm					
<b>f</b>	300mm <sup>2</sup>	50mm	18mm					
<b>g</b>	500mm <sup>2</sup>	60mm <sup>2</sup>	18mm					
<b>h</b>	630mm <sup>2</sup>	70mm	18mm					

**Table:27 General Material and Equipment.**

Item	Description	NAME OF MANUFACTURER	COMPLY TO NRS YES/NO
1.	Black Cable Ties R30 150 mm x 3,5 mm,100 in a pack		
2.	Black Cable Ties LK 5 540 mm x 13,0 mm, 50 in a pack		
3.	Compound Plastic  This compound shall be suitable for moulding around terminals for insulating purpose and shall be sufficiently firm for moulding, but non-hardening. Bidders must state dielectric strength per mil.		
4.	Resin Oil 11kV  This oil is for insulation of through joints and end boxes on 11 kV paper insulated cables, and shall be supplied in tins or drums sealed off from the atmosphere. A full specification of electrical properties, viscosity at operating temperature ranges and boiling point must be stated. Price per 20Liter Drum.		
5.	Resin Oil 33kV  This oil is for insulation of through joints and end boxes on 11 kV and 33 kV paper insulated cables, and shall be supplied in tins or drums sealed off from the atmosphere. A full specification of electrical properties, viscosity at operating temperature ranges and boiling point must be stated. Price per 20Liter Drum.		
6.	Insulating Tape PVC adhesive tape 19mm (Black) 1000Volts <b>P S - CENTLEC would prefer 3M type 1710 or equivalent.</b>		
7.	Insulating Tape PVC adhesive tape 19mm (Red) 1000Volts <b>P S - CENTLEC would prefer 3M type 1710 or equivalent.</b>		
8.	Insulating Tape PVC adhesive tape 19mm (Blue) 1000Volts <b>P S - CENTLEC would prefer 3M type 1710 or equivalent.</b>		
9.	Insulating Tape PVC adhesive tape 19mm (Yellow) 1000Volts <b>P S - CENTLEC would prefer 3M type 1710 or equivalent.</b>		

10.	Insulating Tape PVC adhesive tape 19mm (Green) 1000Volts <b>P S - CENTLEC would prefer 3M type 1710 or equivalent.</b>		
11.	Terylene Tape - 19mm wide for 11 kV paper cable Work: 19 mm x 10m (Specify the thickness)		
12.	CREPE PAPER TAPE IN OIL 25mmx 10m (Specify the thickness)		
13.	SELF FUSING BLACK RUBBER TAPE (23 tape),  Corona resistant, ozone resistant, 0,75mm thick, 18mm wide and with a dielectric strength of at least 30 kV/mm.		
14.	INSULATION FILLING TAPE –(Scots fill or equivalent) Must be black elastic type putty in tape form, non-corrosive 3,0 mm thick, 38 mm wide and with a dielectric strength of at least 20 kV/mm.		
15.	BLACK CORROSION RESISTANCE TAPE  Min 50mm wide, 0.19mm thickness & for use at not more than 600V or 80°C.		
16.	HEAVY DUTY VINYL ELECTRICAL TAPE -  38mm wide x 0.25mm thick x 13 m long roll - 600V/105°C		
17.	DENZO TAPE -  Wax impregnated cotton gauze tape, 40mm wide x 10m rolls, individually wrapped or plastic bagged		
18.	BUCKLES  This equipment is required for strapping cables to poles. Buckles and strap shall be of stainless steel metal with a minimum thickness of 0.7mm.  BUCKLES – 19mm to take 2 x 0.7mm strapping		
19.	BUCKLES  This equipment is required for strapping cables to poles. Buckles and strap shall be of stainless steel metal with a minimum thickness of 1mm  BUCKLES - 19mm to take 2 x 1.0mm strapping		

20.	<b>STRAPPING</b>  This equipment is required for strapping cables to poles. Buckles and strap shall be of stainless steel metal with a minimum thickness of 0.7mm. Strapping material shall be 19mm and 12mm wide and buckles shall be suitable for use with this strapping. Roll of 20 meters.		
21.	<b>PVC PIPES FOR CABLE PROTECTION</b>  Pipes offered must be rigid or ribbed black PVC type for underground use and must be supplied in lengths of not less than 3 meter. Jointing must be by means of yellow slip-on collars. (Specify the thickness.) 75 mm Inside Diameter		
22.	<b>PVC PIPES FOR CABLE PROTECTION</b>  Pipes offered must be rigid or ribbed black PVC type for underground use and must be supplied in lengths of not less than 6 meter. Jointing must be by means of yellow slip-on collars. (Specify the thickness.) 100mm Inside Diameter		
23.	<b>PVC PIPES FOR CABLE PROTECTION</b>  Pipes offered must be rigid or ribbed black PVC type for underground use and must be supplied in lengths of not less than 6 meter. Jointing must be by means of yellow slip-on collars. (Specify the thickness.) 150mm Inside Diameter		

## 6. EVALUATION CRITERIA

All proposals submitted will be evaluated in accordance with the criteria set out in the policy of Supply Chain Management of the Entity.

The most suitable candidate will then be selected. Please take note that CENTLEC is not bound to select any of the bidders' submitting proposals.

Furthermore, technical competence is the principal selection criteria. CENTLEC will evaluate the technical criteria first and will only look at the price and specified goals if it is satisfied with the technical evaluation. As a result of this, CENTLEC does not bind itself in any way to select the bidder offering the lowest price.

**6.1 The relative technical weighting of the criteria is as follows:****Table 28: Evaluation Criteria**

<b>No.</b>	<b>Criteria</b>	<b>Description</b>	<b>Points</b>
1.	Track record and experience	Submit reference letters on company's letterhead confirming previous services related to the scope of work. Letters must be signed by a duly authorized person (Executive Manager or HOD). i) Two (2) reference letters = <b>20 Points</b>  ii) Three (3) or more reference letters = <b>30 Points</b>	30
2.	Quality and compliance to SANS requirements as specified in the technical specifications	Submit standards certificates for all items that needs to comply with such standards.  i) Certificates submitted for at least: ISO 9001 certificate as obtained from the manufacturer = <b>25 points</b>  ii) Relevant SANS Certificates as per technical specification as obtained from manufacturers = <b>25 points</b>	50
3.	Local Mangaung Metropolitan Municipality operational capability and economic investment	Does the bidder have an existing and established local office (CENTLEC distribution area) = <b>20 points</b>  <b>Bidder must submit pictures of the premises. The Bid Evaluation Committee has the right to verify the existence of premises before the allocation of points.</b>  If not (Within South Africa) = <b>10 points</b>	20
	<b>TOTAL</b>		<b>100</b>

A bidder who gets a minimum of 80 points and above on will qualify to the next stage. Individual tenders would have to be evaluated according to the preferential point system.

The bidder must score minimum points as follows:

Item 1 - 20 points

Item 2 - 50 points

Item 3 - 10 points

## 6.2 Price and referential points scoring – stage 2 (Price and Specified Goals)

All Bidders that have passed the technical evaluation threshold of 80 points would also be scored based the 90/10 principle where 90 Points is for the Price and 10 points for specified goals as per the detail given below.

### 6.3 Points awarded for price.

A maximum of 90 Points is allocated for price on the following basis:

$$\text{Where } P_s = 90 \left[ 1 - \frac{P_t - P_{\min}}{P_{\min}} \right]$$

$P_s$  = Points Scored for comparative price of bid under consideration

$P_t$  = Comparative Price of bid under consideration

$P_{\min}$  = Comparative Price of lowest acceptable bid

### 6.4 Points awarded for Specified Goals Requirement

In terms of Regulation 3.(1) An organ of state must, in the tender documents, stipulate— (a) the applicable preference point system as envisaged in regulations 4, 5, 6 or 7; (b) the specific goal in the invitation to submit the tender for which a point may be awarded, and the number of points that will be awarded to each goal, and proof of the claim for such goals in accordance with the table below;

**Table 29: Specified Goals for Preferential Point System**

Specified Goals	Points Allocation
50% Black owned	6
50% Women owned	2
50% Youth owned <35 years	2
<b>Total Points</b>	<b>10</b>

**7. PRICE BASIS**

- 7.1** In instances where there are items which may be affected by the rate of exchange, Bidders must complete table 30 below.
- 7.2** Bidders not completing the price basis schedule might be penalized.
- 7.3** The bid price(s) adjustment shall be SEIFSA based priced.
- 7.4** Price(s) increase shall be subject to negotiation. The increase shall be negotiated after 12 months into the contract.

The price quoted is based on the following price per metric ton:

**Table 30: Price Basis Schedule**

DESCRIPTION	PRICE
ALUMINIUM (99.7 EC Grade Rod)	R
COPPER WIRE BARS	R
COPPER ROD 7.90MM	R
PVC COMPOUND	R
XLPE	R
LEAD	R
STEEL TAPE: 0.8mm Thickness	R
STEEL TAPE: 1.0mm Thickness	R
STEEL WIRE: 1,25 mm diameter	R
STEEL WIRE: 1,60 mm diameter	R
STEEL WIRE: 2,00 mm diameter	R
STEEL WIRE: 2,50 mm diameter	R
STEEL WIRE: 3,15 mm diameter	R
STEEL WIRE: 3,55 mm diameter	R

Based on SIEFSA indices for \_\_\_\_\_ (month) \_\_\_\_\_ (year)

**8. PRICING SCHEDULES****PRICE VARIATIONS FOR SCHEDULE 1: MEDIUM VOLTAGE CABLES****Table: 31 Price Variations For Schedule 1: Medium Voltage Cables**

PRICE VARIATIONS (IF APPLICABLE)												
	ALUMINIUM		COPPER		PVC COMPOUND		XLPE		LEAD		STEEL WIRE	
ITEM	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)
1a												
1b												
1c												
1d												
1e												
1f												
1g												
1h												
1i												
1j												
1k												
1l												
1m												
1n												

**PRICE VARIATIONS FOR SCHEDULE 1: MEDIUM VOLTAGE CABLES (CONTINUE)**

PRICE VARIATIONS (IF APPLICABLE)												
	ALUMINIUM		COPPER		PVC COMPOUND		XLPE		LEAD		STEEL WIRE	
ITEM	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)
1o												
1p												
1q												
1r												
1s												
1t												
1u												
1v												
1w												
1x												
1y												
1z												

## PRICE VARIATIONS FOR SCHEDULE 1: MEDIUM VOLTAGE CABLES (CONTINUE)

PRICE VARIATIONS (IF APPLICABLE)												
	ALUMINIUM		COPPER		PVC COMPOUND		XLPE		LEAD		STEEL WIRE	
ITEM	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)
1aa												
1ab												
1ac												
1ad												
1ae												
1af												
1ag												

**PRICE VARIATIONS FOR SCHEDULE 2: LOW VOLTAGE CABLES****Table 32 – Price Variations for Schedule 2: Low Voltage Cables**

PRICE VARIATIONS (IF APPLICABLE)												
	ALUMINIUM		COPPER		PVC COMPOUND		XLPE		LEAD		STEEL WIRE	
ITEM	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)
2a												
2b												
2c												
2d												
2e												
2f												
2g												
2h												
2i												
2j												
2k												
2l												
2m												
2n												
2o												
2q												

**PRICE VARIATIONS FOR SCHEDULE 3: LOW VOLTAGE CONTROL CABLES****Table 33: Price Variations For Schedule 3: Low Voltage Control Cables**

PRICE VARIATIONS (IF APPLICABLE)												
	ALUMINIUM		COPPER		PVC COMPOUND		XLPE		LEAD		STEEL WIRE	
ITEM	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)	Mass/ 100 m (kg)	Variation in price/ 100m (R)
3A												
3a												
3b												
3c												
3d												
3e												
3f												
3g												
3h												
3i												
3j												
3k												

**PRICING SCHEDULE 1: MEDIUM VOLTAGE CABLES****Table 34: Pricing Schedule 1: Medium Voltage Cables**

	DESCRIPTION OF MEDIUM VOLTAGE CABLES:									UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
Item 1	Conductor Size in mm²	Conductor material Stranded (Cu) or stranded (Al)	No. of cores	XLPE or PILAC	TYPE	SCREENING	VOLTAGE in kV		COLOUR OF OUTER SHEATH			
							E	Eo				
a	16	Copper	3	PILAC		Individually	11	6,35	Black	per meter		
b	35	Copper	3	PILAC		Individually	11	6,35	Black	per meter		
c	35	Copper	3	XLPE	A	Individually	11	6,35	Black	per meter		
d	70	Copper	3	XLPE	A	Individually	11	6,35	Black	per meter		
e	70	Copper	3	PILAC		Individually	11	6,35	Black	per meter		
f	70	Copper	3	PILAC		Individually	15	8,7	Orange	per meter		
g	70	Copper	3	PILAC		Individually	22	11,2	Orange	per meter		
h	70	Copper	3	XLPE	A	Individually	15	8,7	Orange	per meter		
i	95	Copper	3	PILAC		Individually	11	6,35	Black	per meter		
j	120	Copper	3	PILAC		Individually	11	6,35	Black	per meter		
k	120	Aluminium	3	PILAC		Individually	11	6,35	Yellow	per meter		
l	150	Copper	3	XLPE	A	Individually Screened	11	6,35	Black	per meter		
m	185	Aluminium	3	PILAC		Individually Screened	11	6,35	Yellow	per meter		
n	185	Aluminium	3	PILAC		Individually Screened	11	6,35	Yellow	per meter		

## PRICING SCHEDULE 1: MEDIUM VOLTAGE CABLES

	DESCRIPTION OF MEDIUM VOLTAGE CABLES:									UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
Item 1	Conductor Size in mm²	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	No. of cores	XLPE or PILAC	TYPE	SCREENING	VOLTAGE in kV		COLOUR OF OUTER SHEATH			
							E	Eo				
o	185	Aluminium	3	PILAC		Individually Screened	15	8,7	Orange	per meter		
p	185	Aluminium	3	PILAC		Individually Screened	22	11,2	Orange	per meter		
q	185	Aluminium	3	XLPE	A	Individually Screened	11	6,35	Yellow	per meter		
r	185	Copper	3	XLPE	A	Individually	11	6,35	Black	per meter		
s	240	Copper	3	PILAC		Individually	11	6,35	Black	per meter		
t	240	Aluminium	3	PILAC		Individually	11	6,35	Yellow	per meter		
u	240	Copper	3	XLPE	A	Individually	11	6,35	Black	per meter		
v	300	Copper	3	PILAC		Individually	11	6,35	Black	per meter		
w	300	Aluminium	3	XLPE		Individually	11	6,35	Yellow	per meter		
x	300	Copper	3	XLPE	A	Individually	11	6,35	Black	per meter		
y	800	Aluminium	1	PILAC		Screened - 0,2mm thick	11	6,35	Black & Graphite	per meter		
z	800	Aluminium	1	XLPE	A2	Screened - 0,2mm thick	11	6,35	Black & Graphite covered	per meter		

**PRICING SCHEDULE 1: MEDIUM VOLTAGE CABLES**

	DESCRIPTION OF MEDIUM VOLTAGE CABLES:									UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
Item 1	Conductor Size in mm²	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	No. of cores	XLPE or PILAC	TYPE	SCREENING	VOLTAGE in kV		COLOUR OF OUTER SHEATH			
							E	Eo				
aa	630	Copper	1	XLPE	A2	Screened - 0,2mm thick	11	6,35	Black & Graphite covered			
ab	120	Aluminium	1	PILAC		Screened - 0,2mm thick	11	6,35	Black & Graphite			
ac	300	Copper	1	PILAC		Individually	33	19	Black			
ad	300	Copper	1	XLPE	A	Individually	33	19	Black			
ae	400	Aluminium	1	XLPE	A	Individually	33	19	Black			
af	500	Aluminium	1	PILAC		Individually	33	19	Black			
ag	500	Aluminium	1	XLPE	A	Individually	33	19	Black			

**PRICING SCHEDULE 2: LOW VOLTAGE DISTRIBUTION CABLES**

	DESCRIPTION OF LOW VOLTAGE CABLES:						UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
Item 2	Conductor Size in mm²	No. of core s	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	INSULATION AND ARMOURING	VOLTAGE				
					E	E o			
a	10	2	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
b	10	3	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
c	10	4	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
d	16	2	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
e	16	4	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
f	25	4	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
g	35	4	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
h	70	4	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
i	95	4	Stranded Copper	PVC SWA PVC	1000	600	per meter		
j	120	4	Solid Aluminium	PVC PVC SWA PVC	1 000	600	per meter		
k	120	4	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
l	185	4	Solid Aluminium	PVC PVC SWA PVC	1 000	600	per meter		
m	185	4	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		

**PRICING SCHEDULE 2: LOW VOLTAGE DISTRIBUTION CABLES****Table 35: Pricing Schedule 2: Low Voltage Distribution Cables**

	DESCRIPTION OF LOW VOLTAGE CABLES:						UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
Item	Conductor Size in mm²	No. of cores	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	INSULATION AND ARMOURING	VOLTAGE				
2					E	E o			
n	300	4	Solid Aluminium	PVC PVC SWA PVC	1 000	600	per meter		
o	300	4	Stranded Aluminium	PVC PVC SWA PVC	1 000	600	per meter		
p	300	4	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
q	300	1	Stranded Copper	PVC	1 000	600	per meter		

**PRICING SCHEDULE 3A: LOW VOLTAGE CONTROL CABLES****Table 36: Pricing Schedule 3A: Low Voltage Control Cables**

Item 3A	DESCRIPTION OF LOW VOLTAGE CABLES:						UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
	Conductor Size in mm²	No. of cores	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	INSULATION AND ARMOURING	VOLTAGE				
					E	E o			
a	1,5	19	See detailed specification - item 5.13.1	PVC PVC Separately numbered 1-19	1 000	600	per meter		
b	1,5	19	See detail specification - item 5.13.4	PVC PVC SWA PVC Separately numbered 1-19	1 000	600	per meter		
c	1.5	27	See detail specification - item 5.13.5	PVC PVC SWA PVC Separately numbered 1-27	1 000	600	per meter		
d	1.5	19 pair	See detail specification - item 5.13.6	PVC PVC SWA PVC colour coded or numbered	1 000	600	per meter		
e	2,5	2	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
f	2,5	4	Stranded Copper	PVC PVC SWA PVC	1 000	600	per meter		
g	2,5	7	See detailed specification - item 5.13.2	PVC PVC SWA PVC differently coloured or numbered	1 000	600	per meter		
h	2,5	12	See detailed specification - item 5.13.3	PVC PVC SWA PVC Separately numbered 1–12	1 000	600	per meter		
i	4	2	Stranded Copper	PVC PVC SWA PVC colours (red and black)	1 000	600	per meter		
j	4	4	Stranded Copper	PVC PVC SWA PVC colours (red, yellow, blue and black)	1 000	600	per meter		
k	1,5	19	See detailed specification - item 5.13.1	PVC PVC Separately numbered 1-19	1 000	600	per meter		

**PRICING SCHEDULE 3B: DATA COMMUNICATION CABLES****Table 37: Pricing Schedule 3B: Data Communication Cables**

Item 3 B	DESCRIPTION OF DATA COMMUNICATION CABLES:						SPECIFIC UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
	Conductor Size in mm²	No. of cores	Conductor material Stranded copper (Cu) or stranded Aluminium (Al)	INSULATION AND ARMOURING	VOLTAGE				
					E	E o			
a	0.2	8 core	See detailed specification - item 5.13.7	Polyethylene	110V	63.5V	per meter		
b	0.5	80 cores (40 pair)	See detailed specification - item 5.13.8	Polyethylene	110V	63.5V	per meter		
c	2.29	1	See detailed specification - item 5.13.9	Polyethylene			per meter		
d		1	See detail specification - item 5.13.10	Polyethylene			per meter		
e		12	See detail specification - item 5.13.11 with table at 5.13.11.6				per meter		

## PRICING SCHEDULE FOR MEDIUM VOLTAGE CABLE TERMINATIONS AND JOINTS

Table 38: Pricing Schedule 5: Through Joints – XLPE - Heat Shrink Type

Item	DESCRIPTION OF ITEM	SPECIFIC UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
4				
a	<b>THROUGH JOINTS - XLPE - HEAT SHRINK TYPE</b> <b>16mm<sup>2</sup> - 35mm<sup>2</sup> Cu x 3, 11kV XLPE SWA PVC -</b> Through joint for 3 Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 16 - 35mm <sup>2</sup> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
b	<b>70mm<sup>2</sup> Cu x 3, 15kV XLPE SWA PVC -</b> Through joint for 3 Core XLPE SWA PVC sheathed individually screened 15/8.7 kV cable with 70mm <sup>2</sup> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
c	<b>150mm<sup>2</sup> Cu x 3, 11kV XLPE SWA PVC -</b> Through joint for 3 Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 150mm <sup>2</sup> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
d	<b>240mm<sup>2</sup> Cu x 3, 11kV XLPE SWA PVC -</b> Through joint for 3 Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 240mm <sup>2</sup> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
e	<b>630mm<sup>2</sup> Cu, 11kV XLPE SWA PVC -</b> Through joint for S/Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 630mm <sup>2</sup> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		

f	<b>70mm<sup>2</sup> Cu x 3, 11kV PILAC DSTA to XLPE SWA -</b> Transition joint for a screened 3 Core <b>70mm<sup>2</sup></b> PILAC DSTA to a screened XLPE SWA cable with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
g	<b>150mm<sup>2</sup> Cu x 3, 11kV PILAC DSTA to XLPE SWA -</b> Transition joint for a screened 3 Core <b>150mm<sup>2</sup></b> PILAC DSTA to a screened XLPE SWA cable with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
h	<b>185mm<sup>2</sup> Cu x 3, 11kV PILAC DSTA to XLPE SWA -</b> Transition joint for a screened 3 Core <b>185mm<sup>2</sup></b> PILAC DSTA to a screened XLPE SWA cable with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
i	<b>240mm<sup>2</sup> Cu x 3, 11kV PILAC DSTA to XLPE SWA -</b> Transition joint for a screened 3 Core <b>240mm<sup>2</sup></b> PILAC DSTA to a screened XLPE SWA cable with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
j	<b>300mm<sup>2</sup> Cu x 3, 11kV PILAC DSTA to XLPE SWA -</b> Transition joint for a screened 3 Core <b>300mm<sup>2</sup></b> PILAC DSTA to a screened XLPE SWA cable with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		

**Table 39: Pricing Schedule 6: Terminations – Indoor & Outdoor for PILAC & XLPE**

Item	DESCRIPTION OF ITEM	SPECIFIC UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
5	<b>TERMINATIONS - INDOOR PILAC</b>			
a	<b>16mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Indoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>16mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		
b	<b>35mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Indoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable for <b>35mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		
c	<b>70mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Indoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable for <b>70mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		
d	<b>185mm<sup>2</sup> AL x 3, 11kV PILAC PVC</b> - Indoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable for <b>185mm<sup>2</sup></b> stranded aluminium conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		
e	<b>240mm<sup>2</sup> AL x 3, 11kV PILAC PVC - Indoor termination</b> for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 240mm<sup>2</sup> stranded aluminium</b> conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		

f	<b>240mm<sup>2</sup> Cu x 3, 11kV PILAC PVC - Indoor termination</b> for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 240mm<sup>2</sup> stranded copper</b> conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		
g	<b>300mm<sup>2</sup> AL x 3, 11kV PILAC PVC - Indoor termination</b> for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 300mm<sup>2</sup> stranded aluminium</b> conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		
h	<b>300mm<sup>2</sup> Cu x 3, 11kV PILAC PVC - Indoor termination</b> for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 300mm<sup>2</sup> stranded copper</b> conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		
i	<b>TERMINATIONS - INDOOR XLPE</b> <b>70mm<sup>2</sup> Cu x 3, 11kV XLPE PVC - Indoor termination</b> for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 11/6,35 kV cable for <b>70mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		
j	<b>185mm<sup>2</sup> Cu x 3, 11kV XLPE PVC - Indoor termination</b> for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 11/6,35 kV cable for <b>185mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		
k	<b>240mm<sup>2</sup> Cu x 3, 11kV XLPE PVC - Indoor termination</b> for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 11/6,35 kV cable for <b>240mm<sup>2</sup></b> stranded copper conductors with 650mm tails, complete, including earthing kit and torque-shear lugs.	Each		

l	<b>TERMINATIONS -OUTDOOR XLPE</b>  <b>70mm<sup>2</sup> Cu x 3, 15kV XLPE PVC</b> - Outdoor termination for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 15/8,7 kV cable for <b>70mm<sup>2</sup></b> stranded copper with 1200mm tails, complete, including earthing kit and torque-shear lugs.	Each		
m	<b>185mm<sup>2</sup> Cu x 3, 15kV XLPE PVC</b> - Outdoor termination for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 15/8,7 kV cable for <b>150mm<sup>2</sup></b> stranded copper with 1200mm tails, complete, including earthing kit and torque-shear lugs.	Each		
n	<b>240mm<sup>2</sup> Cu x 3, 15kV XLPE PVC</b> - Outdoor termination for terminating 3 Core <b>XLPE</b> Individually screened, single wire armour, 15/8,7 kV cable for <b>240mm<sup>2</sup></b> stranded copper with 1200mm tails, complete, including earthing kit and torque-shear lugs.	Each		
o	<b>630mm<sup>2</sup> Cu, 11kV XLPE SWA PVC</b> - Outdoor termination for S/Core <b>XLPE SWA</b> PVC sheathed individually screened 11/6,35 kV cable with 630mm <sup>2</sup> stranded copper conductor complete with 70mm <sup>2</sup> braided earth strap, CFS clamps , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>	Each		
p	<b>TERMINATIONS - OUTDOOR PILAC</b>  <b>35mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Outdoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable for <b>16 - 35mm<sup>2</sup></b> stranded copper conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.	Each		
q	<b>70mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Outdoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6.35 kV cable for <b>70mm<sup>2</sup>- 95mm<sup>2</sup></b> stranded copper conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.	Each		

<b>r</b>	<b>70mm<sup>2</sup> Cu x 3, 15kV PILAC PVC</b> - Outdoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 15/8.7 kV cable for <b>70mm<sup>2</sup></b> stranded copper conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.	Each		
<b>s</b>	<b>185mm<sup>2</sup> AL x 3, 15kV PILAC PVC</b> - Outdoor termination for terminating 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 15/8.7 kV cable for <b>185mm<sup>2</sup></b> stranded aluminium conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.	Each		
<b>t</b>	<b>240mm<sup>2</sup> AL x 3, 11kV PILAC PVC</b> - Outdoor termination for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, 11/6,35 kV cable with <b>240mm<sup>2</sup></b> stranded aluminium conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.	Each		
<b>u</b>	<b>240mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Outdoor termination for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 240mm<sup>2</sup> stranded copper</b> conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.	Each		
<b>v</b>	<b>300mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> – Outdoor termination for 3 Core <b>paper</b> insulated, lead covered, steel tape armour, PVC sheathed, individually screened, <b>11/6,35 kV cable with 300mm<sup>2</sup> stranded copper</b> conductors with 1200mm tails, complete, including earthing kit and torque-shear lugs.	Each		

**Table 40: Pricing Schedule 7: Through Joints – PILC - Heat Shrink Type**

Item	DESCRIPTION OF ITEM	UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
6				
a	<b>THROUGH JOINTS - PILC - Heat shrink type</b> <b>16mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>16mm<sup>2</sup></b> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules	Each		
b	<b>35mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>35mm<sup>2</sup></b> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
c	<b>70mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>70mm<sup>2</sup></b> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules .	Each		
d	<b>185mm<sup>2</sup> Al x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>185mm<sup>2</sup></b> stranded aluminium conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
e	<b>240mm<sup>2</sup> Cu x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>240mm<sup>2</sup></b> stranded copper conductors with earthing sock and CFS clamps, complete with torque-shear ferrules	Each		

f	<b>300mm<sup>2</sup> Al x 3, 11kV PILAC PVC</b> - Through joint for 3 Core <b>paper</b> insulated, lead covered steel tape armour, PVC sheathed individually screened 11/6,35 kV cable with for <b>300mm<sup>2</sup></b> stranded aluminium conductors with earthing sock and CFS clamps, complete with torque-shear ferrules.	Each		
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**Table 41: Pricing Schedule 8: Through Joints & Terminations - Single Core Cables - Heat Shrink Type**

Item	DESCRIPTION OF ITEM	UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
7	<b>JOINTS - SINGLE CORE</b>			
a	<b>Joint 800mm<sup>2</sup>, 11kV, PILAC S/Core Unarmoured</b> - Underground through joint kit for a 11/6.35kV, 800mm <sup>2</sup> Aluminium, single core, screened <b>paper</b> insulated, lead alloy covered, unarmoured, graphite covered PE sheathed cable (SANS 97 - Tbl) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>	Each		
b	<b>630mm<sup>2</sup> Cu, 11kV XLPE SWA PVC</b> - Underground through joint kit for S/Core XLPE SWA PVC sheathed individually screened 11/6,35 kV cable with 630mm <sup>2</sup> stranded copper conductor complete with 70mm <sup>2</sup> braided earth strap, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>			
c	<b>Joint 120mm<sup>2</sup>, 11kV, PILAC S/Core Unarmoured</b> - Outdoor kit for a 11/6.35kV Aluminium, single core, screened paper insulated, lead alloy covered, unarmoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl ) Complete with 70mm <sup>2</sup> x 500mm long braided earth strap, CFS clamps, with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>	Each		

d	<b>Joint 500mm<sup>2</sup>, 33kV, PILAC S/Core Unarmoured -</b> Underground through joint kit for a 33/19kV, 500mm <sup>2</sup> Aluminium, single core, screened <b>paper</b> insulated, lead alloy covered, unarmoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>	Each		
e	<b>Joint 500mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Underground through joint kit for a 33/19kV, 500mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>	Each		
f	<b>Joint 400mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Underground through joint kit for a 33/19kV, 400mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>	Each		
g	<b>Joint 300mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Underground through joint kit for a 33/19kV, 300mm <sup>2</sup> Copper, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>	Each		
h	<b>Joint 300mm<sup>2</sup>, 33kV, PILAC S/Core Unarmoured -</b> Underground through joint kit for a 33/19kV, 300mm <sup>2</sup> Copper, single core, screened <b>paper</b> insulated, lead alloy covered, unarmoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>	Each		
i	<b>Joint 240mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Underground through joint kit for a 33/19kV, 240mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>	Each		

j	<b>Joint 240mm<sup>2</sup>, 33kV, PILAC S/Core Unarmoured</b> - Underground through joint kit for a 33/19kV, 240mm <sup>2</sup> Copper, single core, screened <b>paper</b> insulated, lead alloy covered, unarmoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS clamps, complete with torque-shear ferrules and instructions. <b>(Raychem type preferred)</b>	Each		
k	<b>TERMINATION KITS - SINGLE CORE</b>  <b>Termination 800mm<sup>2</sup>, 11kV, PILAC S/Core Unarmoured</b> - Outdoor termination kit for a 11/6.35kV, 800mm <sup>2</sup> aluminium, single core screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth strap, CFS clamps , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>	Each		
l	<b>Termination 630mm<sup>2</sup>, 11kV, PILAC S/Core Unarmoured</b> - Outdoor termination kit for a 11/6.35kV, 630mm <sup>2</sup> copper, single core screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl ) Complete with 95mm <sup>2</sup> braided earth strap, CFS clamps, complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>	Each		
m	<b>Termination 500mm<sup>2</sup>, 33kV PILAC S/Core Unarmoured</b> - Outdoor termination kit for a 33/19kV, 500mm <sup>2</sup> aluminium, single core screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth strap, CFS clamps, complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>	Each		
n	<b>Termination 500mm<sup>2</sup>, 33kV, XLPE S/Core Armoured</b> - Outdoor kit for a 33/19kV, 500mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>	Each		

<b>o</b>	<b>Termination 400mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Outdoor kit for a 33/19kV, 400mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>	Each		
<b>p</b>	<b>Termination 300mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Outdoor kit for a 33/19kV, 300mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>	Each		
<b>q</b>	<b>Termination 300mm<sup>2</sup>, 11kV, PILAC S/Core Unarmoured -</b> Outdoor termination kit for a 11/6.35kV, 300mm <sup>2</sup> copper, single core screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl ) Complete with 70mm <sup>2</sup> braided earth strap, CFS clamps, complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>	Each		
<b>r</b>	<b>Termination 240mm<sup>2</sup>, 33kV, XLPE S/Core Armoured -</b> Outdoor kit for a 33/19kV, 240mm <sup>2</sup> Aluminium, single core, screened XLPE insulated, Armoured, graphite covered PE sheathed cable (SANS 97 - Tbl 12) Complete with 70mm <sup>2</sup> braided earth sock, CFS , complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>	Each		
<b>s</b>	<b>Termination 240mm<sup>2</sup>, 11kV, PILAC S/Core Unarmoured -</b> Outdoor termination kit for a 11/6.35kV, 240mm <sup>2</sup> copper, single core screened paper insulated, lead alloy covered, un-armoured, graphite covered Poly Ethylene sheathed cable ( SANS 97 - Tbl ) Complete with 70mm <sup>2</sup> braided earth strap, CFS clamps, complete with torque-shear lugs and instructions. <b>(Raychem type preferred)</b>	Each		

**Table 42: Pricing Schedule 9: Splicing Kits / Joints for Armoured LV Cables**

ITEM	DESCRIPTION OF LV CABLE ACCESSORIES			UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
	Conductor size in mm²	No. of cores	Conductor material			
8	SPLICING KITS / JOINTS FOR <u>ARMOURED</u> LV CABLES - For the following 1000/600V PVC SWA PVC cables (heat shrink or resin types)					
a	10	4	Stranded copper	each		
b	16	4	Stranded copper	each		
c	35	4	Stranded copper	each		
d	70	4	Stranded copper	each		
e	120	4	Solid aluminium	each		
f	185	4	Solid aluminium	each		
g	300	4	Stranded or solid aluminium	each		
h	6	2	Stranded copper	each		

**Table 43: Pricing Schedule 10: Termination Boots**

Item	DESCRIPTION OF LV CABLE ACCESSORIES			UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
	Conductor size in mm²	No. of cores	Conductor material			
9	TERMINATION BOOTS (heat shrink type) for the following 1 000 V/600 V PVC PVC SWA PVC cables					
a	16	4	Stranded copper	each		
b	35	4	Stranded copper	each		
c	70	4	Stranded copper	each		
d	95	4	Stranded copper	each		
e	120	4	Solid aluminium	each		
f	185	4	Solid aluminium	each		
g	240	4	Stranded Copper	each		
h	300	4	Stranded aluminium	each		
i	300	4	Stranded copper	each		

**Table 44: Pricing Schedule 11: Cable End Caps**

Item	<b>CABLE END CAPS ( heat shrink type adhesive lined), for the following cable sizes:</b>					
10	Supplied Inside Diameter	Fully Shrunk Inside Diameter	Size Offer	SPECIFIC UNIT OF MEASUREMENT	PRICE PER ITEM	DELIVERY PERIOD IN WEEKS
a	35mm	15mm		each		
b	55mm	25mm		each		
c	75mm	30mm		each		
d	100mm	45mm		each		
e	120mm	70mm		each		

**Table 45: Pricing Schedule 12: Cable Outdoor PVC End Boxes**

Item	<b>CABLE OUTDOOR PVC END BOXES - type Ixac or similar cold shrink end caps for:</b>			
11	TO FIT CABLES:	Specific unit of measurement	Price per item	Delivery period in weeks
a	10mm <sup>2</sup> - 16mm <sup>2</sup> x 4 core cables	each		
b	35mm <sup>2</sup> - 70mm <sup>2</sup> x 4 core cables	each		

**Table 46: Pricing Schedule 13: Heat Shrink Tubes Without Adhesive**

Item	HEAT SHRINK TUBES WITHOUT ADHESIVE (thick wall type) state tube length			
12	Shrink size	Specific unit of measurement	Price per item	Delivery period in weeks
a	10mm to 3,8mm	each		
b	19mm to 5,6mm	each		
c	28mm to 9,5mm	each		
d	38mm to 12,7mm	each		
e	51mm to 19mm	each		
f	76mm to 32mm	each		
g	90mm to 36mm	each		

**Table 47: Pricing Schedule 14: Heat Shrink Tubes Adhesive Lined & Wrap Around Tubes**

Item	HEAT SHRINK TUBES ADHESIVE LINED (Thick wall type state tube length)			
13	Shrink size	Specific unit of measurement	Price per item	Delivery period in weeks
a	10mm to 3.8mm	each		
b	13mm to 5.8mm	each		
c	28mm to 9.5mm	each		
d	38mm to 12.7mm	each		
e	51mm to 19mm	each		
f	76mm to 32mm	each		
g	90mm to 36mm	each		

<b>HEAT SHRINK WRAP AROUND TUBES</b> ADHESIVE LINED (THICK WALL TYPE STATE TUBE LENGTH) - RAP-A-ROUND EQUIVALENT TO RAYTECH CODE CRSM				
<b>h</b>	84mm / 20mm (1500 x 232)	each		
<b>i</b>	143mm / 36mm (1500 x 232)	each		

**Table 48 – Pricing Schedule 15: Heat Shrink Tubes - Medium Voltage, Non-Tracking For Busbars**

<b>Item</b>	<b>HEAT SHRINK TUBES - MEDIUM VOLTAGE, NON-TRACKING FOR BUSBARS ( state tube length)</b>			
<b>14</b>	<b>Shrink size</b>	<b>Specific unit of measurement</b>	<b>Price per item</b>	<b>Delivery period in weeks</b>
<b>a</b>	30mm to 12mm	each		
<b>b</b>	48mm to 18mm	each		
<b>c</b>	80mm to 31mm	each		
<b>d</b>	100mm to 40mm	each		
<b>e</b>	120mm to 50mm	each		

**Table 49: Pricing Schedule 16: Glands & Shrouds for PVC. PVC. SWA. PVC Cables**

<b>Item</b>	<b>GLANDS &amp; SHROUDS for PVC. PVC. SWA. PVC cables (shroud must be included)</b>			
<b>15</b>	<b>Standard gland size nr:</b>	<b>Specific unit of measurement</b>	<b>Price per item</b>	<b>Delivery period in weeks</b>
<b>a</b>	No. 0	each		
<b>b</b>	No. 1	each		
<b>c</b>	No. 2	each		

<b>d</b>	No. 3	each		
<b>e</b>	No. 4	each		
<b>f</b>	No. 5	each		
<b>g</b>	No. 6	each		

**Table 50: Pricing Schedule 17: Aluminium Crimping Ferrules**

Item	To fit core size	Specific unit of measurement	Price per item	Delivery period in weeks
<b>16</b>	<b>ALUMINIUM CRIMPING FERRULES for 4 core solid <u>sectoral</u> core aluminium cables (600/1 000 V) Samples must be submitted.</b>			
<b>a</b>	120mm <sup>2</sup>	each		
<b>b</b>	185mm <sup>2</sup>	each		
<b>c</b>	300mm <sup>2</sup>	each		
	<b>ALUMINIUM CRIMPING FERRULES for 4 core <u>stranded</u> aluminium cable (600/1 000 V) Samples must be submitted.</b>			
<b>d</b>	120mm <sup>2</sup>	each		
<b>e</b>	185mm <sup>2</sup>	each		
<b>f</b>	300mm <sup>2</sup>	each		
	<b>ALUMINIUM CRIMPING FERRULES for <u>3 core stranded</u> aluminium cable (11/6.35kV) Samples must be submitted.</b>			

<b>g</b>	185mm <sup>2</sup> (MV cable)	each		
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**Table 51: Pricing Schedule 18: Terminal Crimping Lugs**

<b>Item</b>	<b>TERMINAL CRIMPING LUGS</b> for 4 core solid <b>sectoral</b> core cable (600/1 000 V) Samples must be submitted.				
<b>17</b>	<b>To fit core size</b>	<b>Palm hole DIA</b>	<b>Specific unit of measurement</b>	<b>Price per item</b>	<b>Delivery period in weeks</b>
<b>a</b>	120mm <sup>2</sup>	12mm	each		
<b>b</b>	185mm <sup>2</sup>	12mm	each		
<b>c</b>	300mm <sup>2</sup>	16mm	each		

**Table 52: Pricing Schedule 19: Terminal Crimping Lugs**

<b>Item</b>	<b>To fit core size</b>	<b>Palm hole DIA</b>	<b>Specific unit of measurement</b>	<b>Price per item</b>	<b>Delivery period in weeks</b>
<b>18</b>	<b>LUGS ALUMINIUM - TERMINAL CRIMPING LUGS</b> for <b>stranded</b> aluminium cables. Samples must be submitted.				
<b>a</b>	120mm <sup>2</sup> -3 core 11 kV PILAC	12mm	each		
<b>b</b>	185mm <sup>2</sup> - 3 core 11 kV PILAC	12mm	each		
<b>c</b>	240mm <sup>2</sup> - 3 core 11 kV PILAC	16mm	each		
<b>d</b>	300mm <sup>2</sup> -4 core PVC PVC SWA PVC 600/1 000 V	16mm	each		

<b>e</b>	500mm <sup>2</sup> - Single core 33 kV with <b>straight palm</b>	No hole	each		
<b>f</b>	800mm <sup>2</sup> -Single core 11 kV with <b>straight palm</b>	No hole	each		

**Table 53: Pricing Schedule 20: Tinned Copper Crimping Ferrules**

<b>Item</b>	<b>TINNED COPPER CRIMPING FERRULES</b> for the following stranded copper conductor sizes: Samples must be submitted.				
<b>19</b>	<b>To fit core size and minimum barrel length</b>	<b>Specific unit of measurement</b>	<b>Price per item</b>	<b>Delivery period in weeks</b>	
<b>a</b>	1,5mm <sup>2</sup> Length not less than 12mm				
<b>b</b>	2,5mm <sup>2</sup> Length not less than 15mm				
<b>c</b>	4,0mm <sup>2</sup> Length not less than 15mm				
<b>d</b>	6,0mm <sup>2</sup> Length not less than 15mm				
<b>e</b>	10mm <sup>2</sup> Length not less than 25mm				
<b>f</b>	16mm <sup>2</sup> Length not less than 30mm				
<b>g</b>	35mm <sup>2</sup> Length not less than 40mm				
<b>h</b>	70mm <sup>2</sup> Length not less than 45mm				
<b>i</b>	95mm <sup>2</sup> Length not less than 60mm				
<b>j</b>	120mm <sup>2</sup> Length not less than 60mm				
<b>k</b>	150mm <sup>2</sup> Length not less than 60mm				
<b>l</b>	185mm <sup>2</sup> Length not less than 60mm				
<b>m</b>	240mm <sup>2</sup> length not less than 75mm				
<b>n</b>	300mm <sup>2</sup> Length not less than 80mm				

**Table 54: Pricing Schedule 21: Tinned Pre-Insulated Copper Crimping Ferrules**

Item	<b>Tinned PRE-INSULATED COPPER CRIMPING FERRULES</b> for the following stranded copper conductor sizes: <b>Samples must be submitted.</b>				
<b>20</b>	<b>Description: size wire to fit</b>	<b>Colour of insulation</b>	<b>Specific unit of measurement</b>	<b>Price per item</b>	<b>Delivery period in weeks</b>
<b>a</b>	1,5mm <sup>2</sup>	Red			
<b>b</b>	2,5mm <sup>2</sup>	Blue			
<b>c</b>	4mm <sup>2</sup>	Yellow			
<b>d</b>	6mm <sup>2</sup>	As per standard			

**Table 55: Pricing Schedule 22: Tinned Solid Centre Copper Crimping Ferrules and Solid End Lugs For 70mm<sup>2</sup> Copper Conductors**

Item	<b>TINNED SOLID CENTRE COPPER CRIMPING FERRULES AND SOLID END LUGS FOR 70MM<sup>2</sup> COPPER CONDUCTORS.</b> <b>Samples must be submitted.</b>			
<b>21</b>	<b>Description</b>	<b>Specific unit of measurement</b>	<b>Price per item</b>	<b>Delivery period in weeks</b>
<b>a</b>	Lug S/E - 70mm <sup>2</sup> X 12mm hole			
<b>b</b>	Ferrule S/C - 70mm <sup>2</sup>			

**Table 56 – Pricing Schedule 23: Lugs Copper - Tinned Copper Crimping Lugs for the Sizes Specified**

<b>Item</b>	<b>LUGS COPPER - Tinned copper crimping lugs for the sizes specified. Samples must be submitted.</b>					
<b>22</b>	<b>Conductor size</b>	<b>Barrel length not less than</b>	<b>Palm hole dia</b>	<b>Specific unit of measurement</b>	<b>Price per item</b>	<b>Delivery period in weeks</b>
<b>a</b>	1,5mm <sup>2</sup>	7mm	6mm			
<b>b</b>	2,5mm <sup>2</sup>	7mm	6mm			
<b>c</b>	4,0mm <sup>2</sup>	7mm	6mm			
<b>d</b>	6,0mm <sup>2</sup>	10mm	6mm			
<b>e</b>	10mm <sup>2</sup>	15mm	6mm			
<b>f</b>	10mm <sup>2</sup>	15mm	10mm			
<b>g</b>	10mm <sup>2</sup>	15mm	12mm			
<b>h</b>	16mm <sup>2</sup>	15mm	6mm			
<b>i</b>	16mm <sup>2</sup>	15mm	10mm			
<b>j</b>	16mm <sup>2</sup>	15mm	12mm			
<b>k</b>	35mm <sup>2</sup>	20mm	12mm			
<b>l</b>	35mm <sup>2</sup>	20mm	16mm			
<b>m</b>	35mm <sup>2</sup>	20mm	25mm			
<b>n</b>	70mm <sup>2</sup>	25mm	12mm			
<b>o</b>	70mm <sup>2</sup>	25mm	16mm			
<b>p</b>	70mm <sup>2</sup>	25mm	20mm			

<b>q</b>	95mm <sup>2</sup>	30mm	12mm			
<b>r</b>	95mm <sup>2</sup>	30mm	16mm			

**Table 57 – Pricing Schedule 24: Tinned Copper Crimping Lugs for the Sizes Specified**

<b>Item</b>	<b>Tinned COPPER CRIMPING LUGS for the sizes specified. Samples must be submitted.</b>					
<b>23</b>	<b>Conductor size</b>	<b>Barrel length not less than</b>	<b>Palm hole dia</b>	<b>Specific unit of measurement</b>	<b>Price per item</b>	<b>Delivery period in weeks</b>
<b>a</b>	120mm <sup>2</sup>	35mm	12mm			
<b>b</b>	120mm <sup>2</sup>	35mm	16mm			
<b>c</b>	150mm <sup>2</sup>	35mm	12mm			
<b>d</b>	150mm <sup>2</sup>	35mm	16mm			
<b>e</b>	185mm <sup>2</sup>	40mm	16mm			
<b>f</b>	300mm <sup>2</sup>	50mm	18mm			
<b>g</b>	500mm <sup>2</sup>	60mm <sup>2</sup>	18mm			
<b>h</b>	630mm <sup>2</sup>	70mm	18mm			

## General material and equipment

Table 58 – Pricing Schedule for General Material and Equipment

Item	Description	Specific unit of measurement	Price per item	Delivery period in weeks
1.	Cable Ties R30 150 mm x 3,5 mm,100 in a pack			
2.	Cable Ties LK 5 540 mm x 13,0 mm, 50 in a pack			
3.	Compound Plastic  This compound shall be suitable for moulding around terminals for insulating purpose and shall be sufficiently firm for moulding, but non-hardening. Bidders must state dielectric strength per mil.			
4.	Resin Oil 11kV  This oil is for insulation of through joints and end boxes on 11 kV paper insulated cables, and shall be supplied in tins or drums sealed off from the atmosphere. A full specification of electrical properties, viscosity at operating temperature ranges and boiling point must be stated. Price per 20Liter Drum.			
5.	Resin Oil 33kV  This oil is for insulation of through joints and end boxes on 11 kV and 33 kV paper insulated cables, and shall be supplied in tins or drums sealed off from the atmosphere. A full specification of electrical properties, viscosity at operating temperature ranges and boiling point must be stated. Price per 20Liter Drum.			
6.	Insulating Tape PVC adhesive tape 19mm (Black) 1000Volts. <b>P S - CENTLEC would prefer 3M type 1710 or equivalent.</b>			
7.	Insulating Tape PVC adhesive tape 19mm (Red) 1000Volts. <b>P S - CENTLEC would prefer 3M type 1710 or equivalent.</b>			

8.	Insulating Tape PVC adhesive tape 19mm (Blue) 1000Volts. <b>P S - CENTLEC would prefer 3M type 1710 or equivalent.</b>			
9.	Insulating Tape PVC adhesive tape 19mm (Yellow) 1000Volts. <b>P S - CENTLEC would prefer 3M type 1710 or equivalent.</b>			
10.	Insulating Tape PVC adhesive tape 19mm (Green) 1000Volts. <b>P S - CENTLEC would prefer 3M type 1710.</b>			
11.	Terylene Tape - 19mm wide for 11 kV paper cable Work: 19 mm x 10m (Specify the thickness)			
12.	CREPE PAPER TAPE IN OIL 25mmx 10m (Specify the thickness)			
13.	SELF FUSING BLACK RUBBER TAPE,  Corona resistant, ozone resistant, 0,75mm thick, 18mm wide and with a dielectric strength of at least 30 kV/mm.			
14.	INSULATION FILLING TAPE –(Scots fill or equivalent) Must be black elastic type putty in tape form, non-corrosive 3,0 mm thick, 38 mm wide and with a dielectric strength of at least 20 kV/mm.			
15.	BLACK CORROSION RESISTANCE TAPE  Min 50mm wide, 0.19mm thickness & for use at not more than 600V or 80°C.			
16.	HEAVY DUTY VINYL ELECTRICAL TAPE -  38mm wide x 0.25mm thick x 13 m long roll - 600V/105°C			
17.	DENZO TAPE -  Wax impregnated cotton gauze tape, 40mm wide x 10m rolls, individually wrapped or plastic bagged.			

18.	<p>BUCKLES</p> <p>This equipment is required for strapping cables to poles. Buckles and strap shall be of stainless steel metal with a minimum thickness of 0.7mm.</p> <p>BUCKLES – 19mm to take 2 x 0.7mm strapping</p>			
19.	<p>BUCKLES</p> <p>This equipment is required for strapping cables to poles. Buckles and strap shall be of stainless steel metal with a minimum thickness of 1mm</p> <p>BUCKLES - 19mm to take 2 x 1.0mm strapping</p>			
20.	<p>STRAPPING</p> <p>This equipment is required for strapping cables to poles. Buckles and strap shall be of stainless steel metal with a minimum thickness of 0.7mm. Strapping material shall be 19mm and 12mm wide and buckles shall be suitable for use with this strapping. Roll of 20 meters.</p>			
21.	<p>PVC PIPES FOR CABLE PROTECTION</p> <p>Pipes offered must be rigid or ribbed black PVC type for underground use and must be supplied in lengths of not less than 3 meter. Jointing must be by means of yellow slip-on collars. (Specify the thickness.) <b>75 mm Inside Diameter</b></p>			
22.	<p>PVC PIPES FOR CABLE PROTECTION</p> <p>Pipes offered must be rigid or ribbed black PVC type for underground use and must be supplied in lengths of not less than 3 meter. Jointing must be by means of yellow slip-on collars. (Specify the thickness.) <b>100mm Inside Diameter</b></p>			

23.	<p>PVC PIPES FOR CABLE PROTECTION</p> <p>Pipes offered must be rigid or ribbed black PVC type for underground use and must be supplied in lengths of not less than 3 meter. Jointing must be by means of yellow slip-on collars. (Specify the thickness.) <b>150mm Inside Diameter</b></p>			
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## **9. CONTACT INFORMATION**

- 9.1** For any further technical information regarding the document contents please contact Mr Andre Oelofse e-mail: [Andre.Oelofse@centlec.co.za](mailto:Andre.Oelofse@centlec.co.za) such queries must be done in writing, the email address provided serves this purpose. The answer to one question will be sent to all the other prospective bidders that have bought the bid documents.
- 9.2** For Supply Chain Related questions, please contact Mrs. Palesa Makhele at 051 412 2753 or at [Palesa.Makhele@centlec.co.za](mailto:Palesa.Makhele@centlec.co.za)