

 Eskom	Standard	Technology
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Title: **TELECOMS CABLES AND
VARIOUS MATERIALS
SPECIFICATION**

Unique Identifier: **240-103792430**

Alternative Reference Number: **<n/a>**

Area of Applicability: **Engineering**

Documentation Type: **Standard**

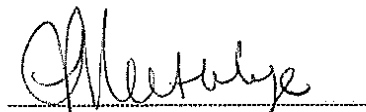
Revision: **2**

Total Pages: **91**

Next Review Date: **October 2024**

Disclosure Classification: **Controlled
Disclosure**

Compiled by

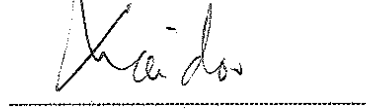


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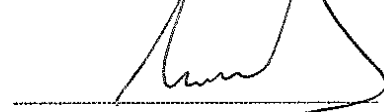


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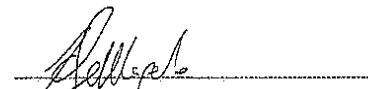


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Content

	Page
1. Introduction	5
2. Supporting clauses	5
2.1 Scope	5
2.1.1 Purpose	5
2.1.2 Applicability	5
2.2 Normative/informative references	5
2.2.1 Normative	5
2.2.2 Informative	6
2.3 Definitions	7
2.3.1 General	7
2.3.2 Disclosure classification	7
2.4 Abbreviations	7
2.5 Roles and responsibilities	8
2.6 Process for monitoring	9
2.7 Related/supporting documents	9
3. General Requirements	9
3.1 General interfaces characteristics	9
3.2 Converters	9
3.3 Surge protection equipment	9
3.4 Fibre cables and equipment	10
3.5 Copper cables and equipment	10
3.5.1 Miscellaneous materials	10
3.6 Roadmaps and MTBFs	11
3.7 Equipment housing	11
3.8 Power requirements	11
3.9 Environmental and EMI requirements	11
4. List of required cables and materials	12
4.1 Fibre cables and equipment	12
4.1.1 Patch Cords	12
4.1.2 Pigtails	14
4.1.3 Mid-couplers	14
4.1.4 Fibre Cables	15
4.1.5 HDPE Pipes	15
4.1.6 Dome Joints	15
4.1.7 Optical Distribution Frames / Patch Panels/Boxes	15
4.1.8 Fibre splice boxes	16
4.2 Copper Cables and equipment	16
4.2.1 Data (Copper) Distribution Frames / Patch Panels	16
4.2.2 PoE Injectors	16
4.2.3 RJ Connectors	17
4.2.4 CAT Connectors and Boots	17
4.2.5 DB Connectors	17
4.2.6 Passive Adapters	18
4.2.7 Converters	18

4.2.8	Telephone Cables	19
4.2.9	Disconnect modules and tools	20
4.2.10	X.21 Cables	20
4.2.11	Category 5 and 6 Cables	20
4.3	Data equipment surge protectors	21
4.3.1	Glands	22
4.4	Power cables and earthing	22
4.4.1	Power cables	22
4.4.2	Earth cables and earth bars	23
4.5	Miscellaneous materials	23
4.5.1	Line taps	23
4.5.2	Lugs	23
4.5.3	Cable ties	25
4.5.4	Heat Shrink	26
4.5.5	PVC Pipe	26
4.5.6	Rawl Bolts	26
4.5.7	Saddles	26
4.5.8	Threaded Bolts	27
4.5.9	Anchors	27
4.5.10	Multi-strand welding cable	27
4.5.11	Trunking	28
4.5.12	Rubber Tubing	28
4.5.13	Washer Bites	28
4.5.14	Strippers and Scissors	28
4.5.15	Racks and frames	29
4.5.16	Multipurpose materials	29
5.	Authorization	30
6.	Revisions	31
7.	Development team	31
8.	Acknowledgements	32
	Annex A – Schedule A/B	33

Tables

Table 1:	Specification for patch cords	12
Table 2:	Speciation for pigtails	14
Table 3:	Specification for mid-couplers	14
Table 4:	Specification for fibre cables	15
Table 5:	Specification for HDPE Pipes	15
Table 6:	Specification for dome joints	15
Table 7:	Specification for optical distribution frame/ Patch Panel/Boxes	15
Table 8:	Specification for fibre splice boxes	16
Table 9:	Specification for data (copper) distribution frames / patch panels	16
Table 10:	Specification PoE Injectors	16
Table 11:	Specification for RJ connectors	17

Table 12: Specification for CAT connectors and boots	17
Table 13: Specification for DB/Serial connectors	17
Table 14: Specification for DB passive adapters	18
Table 15: Specification for USB convertors	18
Table 16: Specification of other convertors	18
Table 17: Specification for telephone cables	19
Table 18: Specification for disconnect module and tool	20
Table 19: Specification for X.21 cable	20
Table 20: Specification for CAT 5 and 6 cables	20
Table 21: Specification surge protectors	21
Table 22: Specification for plastic glands	22
Table 23: Specification for power cables	22
Table 24: Specification for earth cables and bars	23
Table 25: Specification for line taps	23
Table 26: Specification for lugs	23
Table 27: Specification for cable ties	25
Table 28: Specification for heat shrink	26
Table 29: Specification for PVC pipe	26
Table 30: Specification for rawl bolts	26
Table 31: Specification for saddle	26
Table 32: Specification for thread bolts	27
Table 33: Specification for anchors	27
Table 34: Specification for multi-strand welding cable	27
Table 35: Specification for trunking	28
Table 36: Specification for rubber tubing	28
Table 37: Specification for washer bite	28
Table 38: Specification for strippers and scissors	28
Table 39: Specification for racks and frames	29
Table 40: List of multipurpose materials	29

1. Introduction

Eskom's telecommunications (ET) network fulfils a vital and strategic role in support of the power business. The ET network provides telecommunications services used for reliable operation and maintenance of power network. Cables and various material are required to enable ET to continue providing telecommunications services. It is a normal practice that all Cables and Materials used on the ET network are standardized for procuring purposes.

2. Supporting clauses

2.1 Scope

The scope of this document covers the telecommunications cables and various materials required for the ET Network.

2.1.1 Purpose

The purpose of this document is to outline the requirements for telecommunications cables and materials used in the ET Network.

2.1.2 Applicability

The document is applicable to all users of ET cables and various materials.

2.2 Normative/informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ANSI/TIA/EIA-232, Interface between Data Terminal Equipment and Data Communication equipment employing binary employing binary data interchanges.
- [2] ANSI/TIA/EIA-422 Electrical Characteristics of Balanced Voltage Digital Interface Circuits
- [3] ANSI/TIA/EIA-485 Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems
- [4] 240-102293163 - Optical line terminating equipment (OLTE) specification
- [5] ITU-T Rec G.703, Physical/electrical characteristics of hierarchical digital interfaces.
- [6] ITU-T G652, Characteristics of a single-mode optical fibre and cable
- [7] 240-72274830 - Multimode fibre optic duct cable specification
- [8] IEC 60793-2-10, Optical fibres - Part 2-10
- [9] 240-70733995 Optical distribution frame / patch panel / patch box
- [10] ANSI/TIA/EIA 568-B Commercial Building Telecommunications Cabling Standard
- [11] IEEE 1613, IEEE Standard Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations
- [12] 240-70732630, X.21 Surge Protection Equipment Specification
- [13] SANS 1411-1, Materials of insulated electric cables and flexible cords Part 1: Conductors
- [14] SANS 1411-2, Materials of insulated electric cables and flexible cords Part 2: Polyvinyl chloride (PVC)

-
- [15] SANS 1574-1, Electric flexible cables with solid extruded dielectric insulation Part 1, General
 - [16] SANS 1574-2, Electric flexible cables with solid extruded dielectric insulation Part 2: PVC insulated flexible cables for domestic, office and similar environments (cords)
 - [17] SANS 1507-03, Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V)
 - [18] SANS 1803-1 Lugs and ferrules for insulated electric cables, Part 1: Copper conductors

2.2.2 Informative

- [19] ISO 9001, Quality Management Systems.
- [20] SABS 0157 Quality management systems of Codes of practise.
- [21] TIA-606-B (Revision of TIA-606-A) Administration Standard for Telecommunications Infrastructure
- [22] SANS 60794-1-1 Optical fibre cables Part 1-1: Generic specification - General
- [23] Optical fibre cables Part 2: Indoor cables - Sectional specification
- [24] SANS 60794-3:2001 (Ed. 3.00), Optical fibre cables Part 3: Sectional specification - Outdoor cables
- [25] Optical fibre cables SANS 60794-1-2:2019 , IEC 60794-1-2:2017
- [26] SANS 60874 Connectors for optical fibres and cables
- [27] SANS 61282-1:2000 (Ed. 1.00) Fibre optic communication system design guides Part 1: Single-mode digital and analogue systems
- [28] SANS 60793-1-1:2008 (Ed. 3.00), Optical fibres Part 1-1: Measurement methods and test procedures - General and guidance
- [29] SANS 60794-1-2:2019 (Ed. 3.00) Optical fibre cables Part 1-2: Generic specification - Basic optical cable test procedures- General guidance
- [30] SANS 11801/ISO/IEC 11801, Information technology – Generic cabling for customer premises
- [31] SANS 61156-1:2009, IEC 61156-1:2009, Multicore and symmetrical pair/quad cables for digital communications
- [32] SANS 60811-4-2:2004 , IEC 60811-4-2:2004 Insulating and sheathing materials of electric and optical cables – Common test methods
- [33] SANS 10340-1:2006, Installation of telecommunication cables
- [34] SANS 60794-2:2003 (Ed. 2.00) , SANS 10340-2:2006 (Ed. 1.00) Installation of telecommunication cables Part 2: Outdoor fibre optic cables
- [35] SANS 1411-2:2014 (Ed. 2.04) Materials of insulated electric cables and flexible cords Part 2: Polyvinyl chloride (PVC)
- [36] SANS 1411-6:2008 (Ed. 2.01) Materials of insulated electric cables and flexible cords Part 6: Armour
- [37] SANS 1407:2013 (Ed. 2.02) Anodized coatings on aluminium (for general applications)
- [38] SANS 1507-1:2007 (Ed. 1.01) Electric cables with extruded solid dielectric insulation for fixed installations
- [39] 240-64813568 Standard indoor and outdoor telephone cable
- [40] 240-64813646 Data cable required for x.21 interfaces
- [41] 240-95399670 Telecommunications Network Interface Converter Standard
- [42] Definition of Eskom documents 32-9
- [43] Eskom documentation management standard 32-644

[44] Operating manual of the Steering Committee of Technologies (SCOT) 474-65

2.3 Definitions

2.3.1 General

Definition	Description
Cables	Refers to all cables asked for in this document
Materials	Refers to various miscellaneous materials asked for in this document

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
AC	Alternating Current
AL/MYL	Aluminium Mylar
APC	Angle Polished Connector
APL	Aluminium poly laminated
CAT Cable	Category "x" Cable
CTS	Clear To Send
CST	Corrugated Steel Tape
DC	Direct Current
DCE	Data Circuit-terminating Equipment
DTE	Data Terminal Equipment
E&M	Ear and Mouth
EIA	Electronic Industry Association
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMR	Electromagnetic Radiation
ET	Eskom Telecommunications
ETSI	European Telecommunications Standard Institute
F/UTP	Foil shielded cable, unshielded twisted pairs
FTP	Foil shielded twisted pairs
HDB	High Density Bipolar
HDD	Heavy Duty Duct
HDPE	High Density Polyethylene
IDF	Intermediate Distribution Frame
IEC	International Electro technical Commission

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IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol
LC connector	Lucent Connector
MM	Multimode
MOQ	Minimum Order Quantity
MTBF	Mean Time Between Failure
n/a	not applicable
NC	Normally closed
nm	Nano Meter
NO	Normally open
OEM	Original Equipment Manufacturer
OPGW	Optical Ground Wire
PKT	Packet
PoE	Power over Ethernet
PVC	Polyvinyl Chloride
RTS	Request to Send
SABS	South African Bureau of Standards
SANS	South African National Standards
SC connector	Standard connector
SCADA	Supervisory Control and Data Acquisition
SFP	Small Form-factor Pluggable
SM	Single Mode
ST connector	Straight tip connector
SWA	Steel wire armoured
S/FTP	Braided shielded cable/ Foil shielded twisted pairs
UHF	Ultra-High Frequencies
USB	Universal Serial Bus
UTP	Unshielded Twisted Pairs
U/UTP	Unshielded cable/ Unshielded twisted pairs
U/FTP	Unshielded cable/ Foil shielded twisted pairs
VDC	Voltage Direct Current
VHF	Very High Frequencies

2.5 Roles and responsibilities

ET is responsible for delivering telecommunications services in Eskom.

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2.6 Process for monitoring

Not applicable.

2.7 Related/supporting documents

Not applicable.

3. General Requirements

3.1 General interfaces characteristics

- a) The data interfaces shall support connection of synchronous and asynchronous data devices via X.21, EIA-422, EIA-232 and EIA-485 interfaces [1][2][2].
- b) These interfaces shall not be provided in a scaled down version, e.g. for EIA-232, all available functions shall be present (Rxd, Txd, DTE, DCE, RTS, CTS).
- c) For 2 Mbit/s (E1) systems, the data rate shall be 2 048 Mbit/s (± 50 ppm), with High Density Bipolar of Order 3 (HDB3) line coding [5] .
- d) E1 shall support 120 Ω balanced interfaces with RJ45 connectors for category 5e/6 cable.
- e) Equipment shall support both E1 HDB3 link external clock and internal clock.
- f) Ethernet ports shall comply with IEEE802 3u/af/ab standards.
- g) All the patch panels (fibre and copper) shall be provided with the details on the number of supported ports and pin layouts.
- h) E&M Interfaces shall be clean contacts which support +12Vdc to -48Vdc.
- i) UHF/VHF analogue radio repeaters TX/RX require an audio response 300-3000Hz with adjustable input/output levels of -4dBm to +4dBm.

3.2 Converters

- a) As a minimum, RS232/RS422/RS485 and any other DB serial interface convertors shall support 9600 and 19200 asynchronous baud rates and these are mandatory for SCADA services.
- b) The supplier shall indicate if the 200 and 1200 asynchronous baud rates are supported however, these data rates are not mandatory.
- c) RS232/RS422/RS485 converters shall strictly be port powered, requiring no external power supply.
- d) X.21 interface shall support 64kbps synchronous data rates and external clock which are required for teleprotection services.
- e) E1 to fibre converters shall comply with Eskom OLTE standard (including the power supplies specifications) [4].

3.3 Surge protection equipment

- a) Serial (RS232, X.21) surge protection equipment shall be passive without a requirement for power supplies.
- b) Only steel housing shall be used for surge protection equipment (not plastic).
- c) Serial surge protection equipment shall comply with Eskom standard 240-70732630 [12].
- d) CAT5e and CAT 6 surge protection equipment shall comply with IEEE802 3u/af/ab [10].

- e) At minimum, the supplier shall provide the following details for the proposed surge protection equipment
- 1) Clamping voltage for X.21, EIA-232 and IEEE802 3u/af/ab ports.
 - 2) Maximum discharge current and response time
 - 3) Specific protected data lines/pairs
 - 4) Supported maximum data rates
 - 5) Insertion Loss and return loss (in dB)
 - 6) Surge protector factory test results

3.4 Fibre cables and equipment

- a) All fibre equipment and cables shall comply with ITU-T G652D 9 /125 µm [6] single-mode fibre and 50/125 µm Multimode fibre [7].
- b) Optical Distribution Frames / Patch Panels/Boxes shall comply with Eskom standard 240-70733995 [9].
- c) Supplier shall indicate any other SABS/SANS standards they are compliant with.
- d) For equipment equipped with SFPs, supplier shall provide additional spare SFPs as separate line items for spare purposes.
- e) Supplier shall indicate if it is possible to loop back the fibre ports without using attenuators, without damaging the equipment receiver.
- f) Optical transceivers shall operate in the 1310 nm and 1 550 nm optical windows over single mode fibres conforming to ITU-T G.652D. The operating wavelengths within the given bands shall be stated.
- g) The maximum acceptable path loss and distance for optical transceivers without repeaters shall be stated for all optical interfaces.
- h) Suppliers shall specify their systems optical transmit power for all optical interfaces.
- i) Suppliers shall specify their systems' optical receive sensitivity in terms of minimum and maximum receive power levels.
- j) Where possible and not stated otherwise, optical connectors shall be SC-angle polished (SC-APC) connectors.

3.5 Copper cables and equipment

- a) CAT5e cables, CAT 6 cables, patch panels and connectors shall comply with TIA/EIA 568-B standard [10].
- b) Suppliers shall state all the SABS standards they are compliant with including the insulation standards.
- c) As part of the requirements, Eskom require galvanised Steel Wire Armoured (SWA) cables due to rodents in the substations.

3.5.1 Miscellaneous materials

- a) Suppliers shall state the standards which their miscellaneous equipment complies with.
- b) As part of technical evaluations, supplies will be required to submit samples and only good quality materials will be accepted.
- c) Lugs and ferrules shall comply with SANS 1803-1 [18].

3.6 Roadmaps and MTBFs

- a) Suppliers shall provide a roadmap for the proposed equipment and the roadmap shall clearly indicate the OEM release date of the proposed equipment.
- b) There shall be no end of sale notice issued against any of the proposed equipment.
- c) The supplier shall provide the Mean Time between Failure (MTBF) for all the proposed equipment including the related modules.
- d) Suppliers shall provide data sheets and manuals for all the proposed equipment.

3.7 Equipment housing

- a) Where applicable, suppliers shall include the OEM mounting brackets for the proposed equipment.
- b) Medium to large convertors (e.g. OLTEs) and patch panels shall fit in a 19" rack.
- c) Suppliers shall specify the exact dimensions of the proposed equipment and mounting options.

3.8 Power requirements

- a) Eskom Telecommunication's standard battery chargers will supply a rated voltage range of 48 V +20% -15%, positive earth and equipment requiring power supply shall operate within these VDC limits.
- b) The supplier shall specify the voltages outside these limits within which the equipment will still operate correctly and without damage.
- c) The supplier shall confirm that the proposed equipment will not be damaged in the event of a continually falling DC supply voltage.
- d) The supplier shall confirm that the proposed equipment will not be damaged in the inadvertent application of reverse polarity.
- e) Supplier shall indicate which of the supplied equipment supports the following non-mandatory voltages:
 - 1) 230 V AC (Range: 216.2 V to 243.8 V), and nominal frequency 50Hz (range 47.5 Hz to 52.5 Hz), mains power
 - 2) 110 VDC
- f) Power cables shall comply with SANS 1574, SANS 1411 and SANS 1507 [13][14][15][16][17].

3.9 Environmental and EMI requirements

- a) The equipment performance shall be guaranteed even when installed in a substation environment.
- b) The supplier shall indicate all the devices which are IEEE 1613 & IEC 61850-3 compliant and Exclusions must be clearly stated [11].
- c) The supplier shall provide the details on any other supported EMC standards.
- d) For equipment not compliant with the above standards, the supplier shall provide the details on how to harden the installation of such equipment in the high EMI and dusty substation environment
- e) Equipment shall be able to operate at altitude (above mean sea level): 0 m to 2500m.
- f) Operating temperature inside equipment enclosure: -5 °C to +55 °C
- g) Ambient relative humidity: 5 to 90% non-condensing.
- h) Barometric pressure: 75 kPa to 106 kPa.

4. List of required cables and materials**4.1 Fibre cables and equipment****4.1.1 Patch Cords****Table 1: Specification for patch cords**

Item Number	Description
A	Single Mode Patch Cords – 9/125
1)	10M Duplex patch cord LC-LC 9/125 rugged
2)	10M Duplex patch cord LC-SC/APC 9/125 rugged
3)	10M Duplex patch cord SC-SC/APC 9/125 rugged
4)	10M Duplex patch cord ST-SC/APC 9/125 rugged
5)	10M Duplex patch cord LC-SC/APC 9/125
6)	10M Duplex patch cord SC/SC 9/125
7)	10M Duplex patch cord ST-FC 9/125 rugged
8)	10M Duplex patch cord ST-LC 9/125 rugged
9)	10M Duplex patch cord ST-SC 9/125 rugged
10)	10M Duplex patch cord ST-ST 9/125 rugged
11)	15M Duplex patch cord LC-LC 9/125 Rugged
12)	15M Duplex patch cord LC-SC/APC 9/125 rugged
13)	15M Duplex patch cord ST-LC 9/125 Rugged
14)	15M Duplex patch cord ST-SC 9/125 rugged
15)	15M Duplex patch cord ST-SC/APC 9/125 rugged
16)	1M Duplex patch cord SC/APC-SC/APC 9/125
17)	1M Duplex Patch cord SC-SC/ APC 9/125
18)	1M Duplex Patch cord FC-SC / APC 9/125
19)	1M Duplex Patch cord ST-SC / APC 9/125
20)	1M Duplex Patch cord LC/LC 9/125
21)	1M Duplex patch cord SC/LC 9/125
22)	1M Duplex patch cord SC/SC 9/125
23)	1M Duplex patch cord ST-FC 9/125 rugged
24)	1M Duplex patch cord ST-LC 9/125 rugged
25)	1M Duplex patch cord ST-SC 9/125 rugged
26)	1M Duplex patch cord ST-ST 9/125 rugged
27)	2M Duplex patch cord LC-SC/APC 9/125 rugged
28)	2M Duplex patch cord SC/APC-SC/APC 9/125
29)	2M Duplex Patch cord SC-SC/ APC 9/125
30)	2M Duplex patch cord SC-SC/APC 9/125 rugged
31)	2M Duplex patch cord ST-SC/APC 9/125 rugged

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Item Number	Description
32)	2M Duplex Patch cord FC-SC / APC 9/125
33)	2M Duplex Patch cord ST-SC/ APC 9/125
34)	2M Duplex patch cord SC/LC 9/125
35)	2M Duplex patch cord SC/SC 9/125
36)	2M Duplex patch cord SC-SC/APC 9/125
37)	2M Duplex patch cord SL/LC 9/125
38)	2M Duplex patch cord ST-FC 9/125 rugged
39)	2M Duplex patch cord ST-LC 9/125 rugged
40)	2M Duplex patch cord ST-SC 9/125 rugged
41)	2M Duplex patch cord ST-ST 9/125 rugged
42)	2M Duplex patch cord FC –SC/APC 9/125 rugged
43)	3M Duplex patch cord LC/LC 9/125
44)	3M Duplex patch cord SC/LC 9/125
45)	3M Duplex patch cord SC/SC 9/125
46)	4M Duplex patch cord LC-SC/APC 9/125 rugged
47)	4M Duplex patch cord SC/APC-SC/APC 9/125
48)	4M Duplex patch cord SC-SC/APC 9/125 rugged
49)	4M Duplex patch cord ST-SC/APC 9/125 rugged
50)	4M Duplex patch cord ST-FC 9/125 rugged
51)	4M Duplex patch cord ST-LC 9/125 rugged
52)	4M Duplex patch cord ST-SC 9/125 rugged
53)	4M Duplex patch cord ST-ST 9/125 rugged
54)	5M Duplex Patch cord LC-SC/APC 9/125
55)	6M Duplex patch cord LC-LC 9/125 rugged
56)	6M Duplex patch cord LC-SC/APC 9/125 rugged
57)	6M Duplex patch cord ST-FC 9/125 rugged
58)	6M Duplex patch cord ST-LC 9/125 rugged
59)	6M Duplex patch cord ST-SC 9/125 rugged
60)	6M Duplex patch cord ST-ST 9/125 rugged
61)	25M Duplex patch cord LC-SC/APC9/125 rugged
62)	30M Duplex patch cord LC-SC/APC9/125 rugged
B	Multi Mode Patch Cords – 50/125
1)	10M Duplex patch cord ST-LC 50/125 rugged
2)	10M Duplex patch cord ST-SC 50/125 rugged
3)	10M Duplex patch cord ST-ST 50/125 rugged
4)	10M Duplex patch cord LC-LC 50/125 rugged
5)	1M Duplex patch cord SC/APC-SC/APC 50/125 rugged
6)	1M Duplex patch cord ST-LC 50/125 rugged

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Item Number	Description
7)	1M Duplex patch cord ST-SC 50/125 rugged
8)	1M Duplex patch cord ST-ST 50/125 rugged
9)	2M Duplex patch cord ST-LC 50/125 rugged
10)	2M Duplex patch cord ST-SC 50/125 rugged
11)	2M Duplex patch cord ST-ST 50/125 rugged
12)	4M Duplex patch cord ST-LC 50/125 rugged
13)	4M Duplex patch cord ST-SC 50/125 rugged
14)	4M Duplex patch cord ST-ST 50/125 rugged
15)	6M Duplex patch cord ST-LC 50/125 rugged
16)	6M Duplex patch cord ST-SC 50/125 rugged
17)	6M Duplex patch cord ST-ST 50/125 rugged

4.1.2 Pigtails

Table 2: Speciation for pigtails

Item Number	Description
1)	Fibre Pigtail 50/125 1M with ST connector
2)	Fibre pigtail 9/125 1M with ST connector
3)	Fibre pigtail 9/125 1M with SC-APC connector
4)	Fibre pigtail 9/125 1M with LC connector
5)	Fibre pigtail 9/125 1M with SC connector

4.1.3 Mid-couplers

Table 3: Specification for mid-couplers

Item Number	Description
1)	Duplex Mid coupler ST-ST ceramic, 9/125
2)	Duplex Mid coupler SC-APC/SCAPC ceramic, 9/125
3)	Duplex Mid coupler ST-ST 50/125
4)	Duplex Mid Coupler LC-LC 9/125
5)	Duplex Mid Coupler LC-LC 50/125
6)	Duplex Mid Coupler SC-SC 50/125
7)	Simplex Mid Coupler SC-SC 9/125
8)	Simplex Mid Coupler ST-ST 50/125
9)	Simplex Mid Coupler LC-LC 9/125

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4.1.4 Fibre Cables**Table 4: Specification for fibre cables**

Item Number	Description
1)	Single Mode Heavy duty Duct – 9/125
2)	CABLE; 8 FIBRE HDD 9/125, double sheath rodent resistant
3)	CABLE; 12 FIBRE HDD 9/125, double sheath rodent resistant
4)	CABLE; 24 FIBRE HDD 9/125, double sheath rodent resistant
5)	CABLE; 48 FIBRE HDD 9/125, double sheath rodent resistant
6)	MOQ 500M CABLE;12 FIBRE CST 9/125
7)	CABLE; 6 FIBRE HDD 9/125
8)	NO MOQ CABLE;24 FIBRE HDD 9/125
9)	MOQ 500M CABLE;24 FIBRE HDD 9/125
10)	Multi-Mode Heavy duty Duct – 50/125
11)	NO MOQ CABLE;12 FIBRE HDD 50/125

4.1.5 HDPE Pipes**Table 5: Specification for HDPE Pipes**

Item Number	Description (Nominal size, min wall thickness)
1)	HDPE pipe, 16 mm, 1.6mm orange
2)	HDPE pipe, 20 mm, 2mm orange
3)	HDPE pipe, 25 mm, 2.3mm orange
4)	HDPE pipe, 32 mm, 3mm orange

4.1.6 Dome Joints**Table 6: Specification for dome joints**

Item Number	Description
1)	12 Fibre dome joint with 4 entrances
2)	48 Fibre dome joint with 4 entrances

4.1.7 Optical Distribution Frames / Patch Panels/Boxes**Table 7: Specification for optical distribution frame/ Patch Panel/Boxes**

Item Number	Description
1)	19 inch Single mode Optical Distribution Frames / Patch Panels/Boxes
2)	12 core single mode fibre patch panel
3)	24 core single mode fibre patch panel
4)	48 core single mode fibre patch panel
5)	19 inch Multimode Optical Distribution Frames / Patch Panels/Boxes

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Item Number	Description
6)	12 core multimode fibre patch panel
7)	24 core multimode fibre patch panel
8)	Wall mount/ din rail Optical Distribution Frames / Patch Panels/Boxes
9)	6 core single mode fibre patch panel
10)	12 core multimode fibre patch panel

4.1.8 Fibre splice boxes

Table 8: Specification for fibre splice boxes

Item Number	Description
1)	Lockable 12 pair fibre splice through box, fully populated with IP54 Protection
2)	Lockable 12 pair fibre termination box, fully populated with IP54 Protection
3)	Lockable 24 pair fibre splice through box, fully populated with IP54 Protection
4)	Lockable 24 pair fibre termination box, fully populated with IP54 Protection
5)	Lockable 48 pair fibre splice through box, fully populated with IP54 Protection
6)	Lockable 48 pair fibre termination box, fully populated with IP54 Protection
7)	Splice junction box, Internal dimensions LxHxD (mm) +/- 190x140x70, IP56 Protection

4.2 Copper Cables and equipment

4.2.1 Data (Copper) Distribution Frames / Patch Panels

Table 9: Specification for data (copper) distribution frames / patch panels

Item Number	Description
1)	Data patch panel fully populated 32 way, CAT5E, RJ45
2)	Data patch panel fully populated 32 way, CAT6, RJ45
3)	Data patch panel fully populated 24 way, CAT5E, RJ45
4)	Data patch panel fully populated 24 way, CAT6, RJ45
5)	Data patch panel fully populated 16 way, CAT5E, RJ45
6)	Data patch panel fully populated 16 way, CAT56, RJ45

4.2.2 PoE Injectors

Table 10: Specification PoE Injectors

Item Number	Description
1)	1 port 10/100/1000, PoE Injector, AC input adapter, power output: min of 30 Watts per port
2)	2 port 10/100/1000, PoE Injector, AC input adapter, power output: min of 30 Watts per port

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Item Number	Description
3)	1 port 10/100/1000, PoE Injector, DC Input voltage on a terminal block, power output: min of 30 Watts per port
4)	2 port 10/100/1000, PoE Injector, DC input voltage on a terminal block, power output: min of 30 Watts per port
5)	4 port 10/100/1000, PoE Injector, DC input voltage on a terminal block, power output: min of 30 Watts per port

4.2.3 RJ Connectors

Table 11: Specification for RJ connectors

Item Number	Description
1)	Connector RJ9
2)	Connector RJ11
3)	Connector RJ12
4)	RJ11 wall jack

4.2.4 CAT Connectors and Boots

Table 12: Specification for CAT connectors and boots

Item Number	Description
1)	RJ45 CAT 5E connector
2)	RJ45 CAT6 connector
3)	RJ45 CAT 5E connector, shielded
4)	RJ45 CAT6 connector, shielded
5)	RJ45 CAT 5E rubber boot
6)	RJ45 CAT6 rubber boot
7)	RJ45 single outlet box

4.2.5 DB Connectors

Table 13: Specification for DB/Serial connectors

Item Number	Description
1)	DB 9 Pin connector cover steel
2)	DB 9 pin female connector
3)	DB 9 pin male connector
4)	DB 15 Pin connector cover steel
5)	DB 15 pin male connector
6)	DB 15 pin female connector
7)	DB 25 Pin connector cover steel
8)	DB 25 pin male connector
9)	DB 25 pin female connector

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Item Number	Description
10)	DB 37 pin connector cover steel
11)	DB 37 pin connector male
12)	DB 37 pin connector female

4.2.6 Passive Adapters

Table 14: Specification for DB passive adapters

Item Number	Description
1)	DB25 male to DB15 female adapter
2)	DB25 female to DB15 male adapter
3)	DB25 Male to DB9 female` adapter
4)	DB25 Female to DB9 Male adapter
5)	DB9 Female to DB9 female adapter
6)	DB15 male to DB9 female adapter
7)	DB15 female to DB9 male adapter
8)	DB15 female to DB15 female adapter
9)	RJ45 to DB9 Female adapter
10)	RJ45 to DB25 male adapter
11)	RJ45 to DB25 female adapter
12)	Female to female Ethernet coupler jack (must support both CA5E and CAT6)

4.2.7 Converters

4.2.7.1 USB Convertors

Table 15: Specification for USB convertors

Item Number	Description
1)	USB 2.0 to RJ11 56K V.92 / V.90 External Data Modem
2)	USB to RS232 DB9 serial converter for local craft terminal

4.2.7.2 Fibre, Ethernet and serial converters

Table 16: Specification of other convertors

Item Number	Description
1)	RS232/RS422/RS485 (terminal block) to fibre MM (ST/SC), 5km, port powered only
2)	RS232/RS422/RS485/ POTS (RJ11 FXS/FXO) to fibre MM (ST/SC), 5km, DC power supply if not port powered
3)	RS232/RS422/RS485 (terminal block) to fibre SM (ST/SC), 40km, port powered only

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Item Number	Description
4)	RS232/RS422/RS485 (terminal block) to fibre SM (ST/SC), 80km, port powered only
5)	RS232 DB 9/ terminal block to RS422/RS485, port powered only
6)	X.21, 60Kbps, synchronous to fibre MM (ST/SC), 5km, must support external clock, DC power supply if not port powered
7)	X.21/ POTS (RJ11 FXS/FXO) to fibre MM (ST/SC), 5km, must support external clock, DC power supply if not port powered
8)	C37.94 to Ethernet converter, LC MM, DC power supplies if not port powered.
9)	4 port E1 (balanced) + 1 Ethernet to fibre convertor MM ST/SC
10)	4 port E1 (balanced) + 1 Ethernet to fibre convertor SM ST/SC
11)	16 port E1 (balanced) + 2 Ethernet to fibre convertor MM ST/SC
12)	16 port E1 (balanced) + 2 Ethernet to fibre convertor SM ST/SC
13)	4 port E1 (balanced) to 10/100/1000BaseT converter
14)	4 port 10/100/1000BaseT to E1 (balanced) converter
15)	8 port 10/100/1000BaseT to E1 (balanced) converter
16)	Type V 4Wire E&M to Ethernet radio (UHF/VHF) over IP
17)	10/100/1000BaseT to fibre MM, ST/SC
18)	10/100/1000BaseT to fibre SM, ST/SC
19)	POTS (RJ11 FXS/FXO) to fibre MM, ST/SC 5Km
20)	RS232 DB25 Distance extender over 4 wire (RJ45) twisted pair, 5KM, port powered only
21)	Ethernet distance extender over 4 wire (RJ45) twisted pair, 5KM, port powered only

4.2.8 Telephone Cables

Table 17: Specification for telephone cables

Item Number	Description – diameter in mm
1)	Telephone cable, 0.5 mm x 10 pair indoor
2)	Telephone cable, 0.5 mm x 10 pair outdoor, SWA
3)	Telephone cable, 0.6 mm x 10 pair outdoor, SWA
4)	MOQ 500m, Telephone cable 0.5 mm x 20 pair indoor
5)	No MOQ, Telephone cable, 0.5 mm x 20 pair indoor
6)	Telephone cable, 0.5 mm x 25 pair indoor
7)	Telephone cable, 0.5 mm x 30 pair indoor
8)	Telephone cable, 0.5 mm x 40 pair indoor
9)	Telephone cable, 0.5 mm x 50 pair indoor
10)	MOQ 500m, Telephone cable, 0.6 mm x 10 pair
11)	Telephone cable , 0.6 mm x 25 pair indoor
12)	Telephone cable, 0.6 mm x 50 pair indoor

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Item Number	Description – diameter in mm
13)	2 pair drop telephone cable, 0.6 mm
14)	Jumper wire red/black on 200m roll, 0.5mm
15)	Jumper wire red/black on 200m roll, 0.6mm
16)	Telephone plug with gas arrestor
17)	Curly cord, cream 1.2m
18)	Telephone cable, 0.5 mm x 2 pair indoor

4.2.9 Disconnect modules and tools

Table 18: Specification for disconnect module and tool

Item Number	Description
1)	10 pair disconnect module, PKT10
2)	Disconnect module fixed label holder
3)	Disconnect module hinged label holder
4)	Disconnect module surge gas arrestor magazine holder with 3 poles
5)	Disconnect module punch down tool
6)	Indoor telephone distribution box , 10-20 pair
7)	Clip On Alphabet A- Z, Diameter 1.5mm
8)	Clip On Numbers 0 To 9, Diameter 1.5mm
9)	1600 ohm 4dB 10 way disconnect modules attenuators/pads with 0.2 dB accuracy
10)	600 ohm 8dB 10 way disconnect modules attenuators/pads with 0.2 dB accuracy
11)	600 ohm 16dB 10 way disconnect modules attenuators/pads with 0.2 dB accuracy

4.2.10 X.21 Cables

Table 19: Specification for X.21 cable

Item Number	Description
1)	Data cable X21 indoor 7 strands of 0.22mm diameter per strand, Aluminium Mylar shielded Individual and overall screen twisted 6 pair
2)	Data cable X21 SWA 7 strands of 0.22mm diameter per strand, Aluminium Mylar shielded Individual and overall screen twisted 6 pair

4.2.11 Category 5 and 6 Cables

Table 20: Specification for CAT 5 and 6 cables

Item Number	Description
1)	CAT5E U/UTP, Solid
2)	CAT5E U/UTP, Stranded

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Item Number	Description
3)	CAT6 U/UTP, Solid
4)	CAT6 U/UTP, Stranded
5)	CAT5E U/FTP, Solid
6)	CAT5E U/FTP, Stranded
7)	CAT6 U/FTP, Solid
8)	CAT6 U/FTP, Stranded
9)	CAT5E S/FTP, Solid
10)	CAT5E S/FTP, Stranded
11)	CAT6 S/FTP, Solid
12)	CAT6 S/FTP, Stranded
13)	CAT6A FTP, Solid
14)	CAT6A FTP, Stranded
15)	CAT5E U/FTP, Solid, SWA
16)	CAT5E U/FTP, Stranded, SWA
17)	CAT6 U/FTP, Solid, SWA
18)	CAT6 U/FTP, Stranded, SWA

4.3 Data equipment surge protectors

Table 21: Specification surge protectors

Item Number	Description
1)	1 port 10/100/1000, CAT5E, RJ45, surge protector
2)	1 port 10/100/1000 PoE, CAT5E, RJ45, surge protector
3)	2 port 10/100/1000, CAT5E, RJ45, surge protector
4)	2 port 10/100/1000 PoE, CAT5E, RJ45, surge protector
5)	12 port 10/100/1000, CAT5E, RJ45, surge protector, 19 inch
6)	12 port 10/100/1000 PoE, CAT5E, RJ45, surge protector, 19 inch
7)	24 port 10/100/1000, CAT5E, RJ45, surge protector, 19 inch
8)	24 port 10/100/1000 PoE, CAT5E, RJ45, surge protector, 19 inch
9)	48 port 10/100/1000, CAT5E, RJ45, surge protector, 19 inch
10)	48 port 10/100/1000 PoE, CAT5E, RJ45, surge protector, 19 inch
11)	1 port 10/100/1000, CAT6, RJ45, surge protector
12)	1 port 10/100/1000 PoE, CAT6, RJ45, surge protector
13)	2 port 10/100/1000, CAT6, RJ45, surge protector
14)	2 port 10/100/1000 PoE, CAT6, RJ45, surge protector
15)	12 port 10/100/1000, CAT6, RJ45, surge protector, 19 inch
16)	12 port 10/100/1000 PoE, CAT6, RJ45, surge protector, 19 inch
17)	24 port 10/100/1000, CAT6, RJ45, surge protector, 19 inch
18)	24 port 10/100/1000 PoE, CAT6, RJ45, surge protector, 19 inch

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Item Number	Description
19)	48 port 10/100/1000, CAT6, RJ45, surge protector, 19 inch
20)	48 port 10/100/1000 PoE, CAT6, RJ45, surge protector, 19 inch
21)	16 port RS232 DB25, modular passive surge protector, 19 inch
22)	Single module for 19 inch 16 port RS232 DB25 surge protection
23)	Empty rack with copper earth bar for 19 inch 16 port RS232 DB25 surge protector
24)	One port RS232 DB25 surge protector, din rail mount
25)	16 port X.21 DB15, modular passive surge protector, 19 inch
26)	Single module for 16 port X.21 DB15 surge protector
27)	Empty rack with copper earth bar for 19 inch 16 port X.21 DB15 surge protector
28)	One port X.21 DB15 surge protector, din rail mount
29)	Subscriber line surge protector for 10 pair Krone block
30)	RJ11 Telephone Line Protection

4.3.1 Glands

Table 22: Specification for plastic glands

Item Number	Description
A	Steel Glands
1)	Steel gland shroud size 2 PKT20
2)	Steel gland shroud size 1 PKT20
3)	Steel gland size 3
4)	Steel gland shroud size 0 PKT20
5)	Steel gland size 2
6)	Steel gland size 0
7)	Steel gland Compression size 0
8)	Steel gland Compression size 1
9)	Steel gland Compression size 2
10)	Steel gland size 1

4.4 Power cables and earthing

4.4.1 Power cables

Table 23: Specification for power cables

Item Number	Description
1)	Power cable 16mm ² 4 Core SWA
2)	Power cable 2,5mm ² 2 Core SWA
3)	Power cable 4mm ² 2 Core SWA
4)	Power cableround 6 mm ² 2 Core 100M

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Item Number	Description
5)	Cabtyre black 2,5mm ² x 2 Core, 100m
6)	Cabtyre black 1,5mm ² x 2 Core, 100m
7)	Cabtyre black 1,5mm ² x 3 Core, 100m
8)	Cabtyre black 2,5mm ² x 3 Core, 100m

4.4.2 Earth cables and earth bars

Table 24: Specification for earth cables and bars

Item Number	Description
1)	Earth cable green/yellow 25mm ² 100m roll
2)	Earth cable green/yellow 35mm ² 100m roll
3)	Earth cable green/yellow 4mm ² 100m roll
4)	Solid copper rod with clamp 16mm ² X 1.5m
5)	Earth cable green/yellow 16mm ² 100m roll
6)	Earth cable green/yellow 120mm ² 100m roll
7)	Earth cable green/yellow 70mm ² 100m roll
8)	25mm X 3mm flat copper bars 50m
9)	50mm X 3mm flat copper bars 50m

4.5 Miscellaneous materials

4.5.1 Line taps

Table 25: Specification for line taps

Item Number	Description
1)	Line taps 16 mm ²
2)	Line taps 35 mm ²
3)	Line taps 70 mm ²
4)	Line taps 120 mm ²

4.5.2 Lugs

Table 26: Specification for lugs

Item Number	Description	Cables Size mm ²	Stud Size mm
1)	Lugs Galvanised Ring, PKT100	25	16
2)	Lugs Galvanised Ring, PKT100	16	10
3)	Lugs Galvanised Ring, PKT100	35	10
4)	Lugs Galvanised Ring , PKT50	50	6
5)	Lugs Galvanised Ring, PKT50	95	8
6)	Lugs Galvanised Ring, PKT50	95	10

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Item Number	Description	Cables Size mm ²	Stud Size mm
7)	Lugs Galvanised Ring, PKT20	35	16
8)	Lugs Galvanised Butt, PKT100	10	6
9)	Lugs Pre-ins Bullet, female Yellow, PKT20	6	5
10)	Lugs Pre-ins Bullet, male Yellow, PKT20	6	5
11)	Lugs Pre-insulated Ring Blue, PKT20	4	6
12)	Lugs Pre-insulated Spade Blue, PKT20`	4	4
13)	Lugs Pre-insulated Spade Red , PKT20	1.5	6
14)	Lugs Pre-insulated Spade Yellow , PKT20	6	4
15)	Lugs Pre-insulated Spade Yellow, PKT20	2.5	6
16)	Lugs Galvanised Ring , PKT20	16	6
17)	Lugs Galvanised Ring , PKT20	25	6
18)	Lugs Galvanised Ring, PKT20	25	8
19)	Lugs Pre-insulated Ring Yellow, PKT20	6	4
20)	Lugs Pre-insulated Ring Yellow , PKT20	6	8
21)	Lugs Pre-insulated Hook Blade Yellow, PKT20	6	4.6
22)	Lugs Pre-insulated Spade Red 4mm Size 1	2.5	5
23)	Lugs Galvanised Ring, PKT20	16	8
24)	Lugs Galvanised Ring, PKT20	35	6
25)	Lugs Galvanised Ring , PKT20	70	10
26)	Lugs Pre-insulated Ring Blue PKT20	4	4
27)	Lugs Pre-insulated Ring Blue PKT20	4	8
28)	Lugs Pre-insulated Ring Red PKT20	1.5	6
29)	Lugs Pre-insulated Ring Red PKT20	1.5	8
30)	Lugs Galvanised Ring PKT20	16	16
31)	Lugs Pre-insulated Flat Blade Yellow PKT20	6	10
32)	Lugs Galvanised Ring PKT20	35	8
33)	Lugs Pre-insulated Spade Blue PKT20	4	6
34)	Lugs Pre-insulated Pin Red PKT20	2.5	8
35)	Lugs Pre-insulated Pin Blue PKT20	4	8
36)	Lugs Pre-insulated Hook Blade Blue PKT20	4	4.6
37)	Lugs Pre-insulated Hook Blade Red PKT20	2.5	4.6
38)	Lugs Pre-insulated Pin Red PKT20	2.5	10
39)	Lugs Pre-insulated Pin Yellow PKT20	6	10
40)	Lugs Pre-insulated Flat Blade Blue PKT20	4	10
41)	Lugs Pre-insulated Flat Blade Red PKT20	2.5	10
42)	Pre-insulated lugs flat blade red PKT20	2.5	10
43)	Pre-insulated lugs flat blade blue PK20	4	10

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Item Number	Description	Cables Size mm ²	Stud Size mm
44)	Pre-insulated lugs flat blade yellow PKT20	6	10
45)	Lugs Galvanised Ring, PKT100	25	10
46)	Lugs Galvanised Ring, PKT100	16	12
47)	Lugs Galvanised Ring , PKT100	10	12
48)	Lugs Galvanised Ring, PKT100	35	12
49)	Lugs Galvanised Ring, PKT50	50	8
50)	Lugs Galvanised Ring, PKT50	50	10
51)	Lugs Galvanised Ring, PKT50	50	12
52)	Lugs Galvanised Ring, PKT50	70	6
53)	Lugs Galvanised Ring, PKT50	70	8
54)	Lugs Galvanised Ring, PKT50	70	12
55)	Lugs Galvanised Ring, PKT50	95	8
56)	Lugs Galvanised Ring, PKT50	95	12
57)	Lugs Galvanised Ring, PKT20	120	8
58)	Lugs Galvanised Ring, PKT25	120	10
59)	Lugs Galvanised Ring, PKT25	120	12
60)	Lugs Galvanised Ring, PKT20	185	10
61)	Lugs Galvanised Ring, PKT20	185	12
62)	Lugs Galvanised Ring, PKT25	185	16
63)	Lugs Galvanised Ring, PKT25	185	20

4.5.3 Cable ties

Table 27: Specification for cable ties

Item Number	Description
1)	Stainless steel cable ties with ball-lock: 200 x 8 x 0.3 mm (LxWxT) 100/PKT
2)	Stainless steel cable ties with ball-lock: 520 x 4.5 x 0.3 mm (LxWxT) 100/PKT
3)	Stainless steel cable ties with ball-lock: 127x4.6 x 0.3 mm (LxWxT) 100/PKT
4)	Stainless steel cable ties with ball-lock: 360 x 8x 0.3mm (LxWxT) 100/PKT
5)	Stainless steel cable ties with ball-lock: 520 x 8x 0.3 mm (LxWxT) 100/PKT
6)	Stainless steel cable ties with ball-lock: 360 x 4.5 x 0.3 mm (LxWxT) 100/PKT
7)	Stainless steel cable ties with ball-lock: 680 x 8 x 0.3 mm (LxWxT) 100/PKT
8)	Stainless steel cable ties with ball-lock: 200 x 4.5 x 0.3mm (LxWxT) 100/PKT

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Item Number	Description
9)	Outdoor UV resistant high quality plastic cable Tie 760x7.6 x 1.8 mm (LxWxT), black
10)	Indoor high quality plastic cable Tie 760x7.6 x 1.8 mm (LxWxT), black
11)	High quality plastic cable Tie 200 x 4.6x 0.1 mm (LxWxT), black
12)	300x 4.6mm X 1.2 (LxWxT) mm

4.5.4 Heat Shrink

Table 28: Specification for heat shrink

Item Number	Description
1)	Heat shrink clear 12.7mm
2)	Heat shrink clear 12mm
3)	Heat shrink clear 6.4mm
4)	Heat shrink clear 9.5mm
5)	Heat shrink clear 9.5mm

4.5.5 PVC Pipe

Table 29: Specification for PVC pipe

Item Number	Description
1)	PVC pipe 20mm slow bend
2)	PVC pipe 20mm x 4m (diam x length)

4.5.6 Rawl Bolts

Table 30: Specification for rawl bolts

Item Number	Description
1)	Rawl Bolts M6
2)	Rawl Bolts M8
3)	Rawl Bolts M10

4.5.7 Saddles

Table 31: Specification for saddle

Item Number	Description
A.	Steel galvanized saddle
1)	Steel galvanised saddle 15mm PKT100
2)	Steel galvanised saddle 20mm PKT100
3)	Steel galvanised saddle 25mm PKT100
B.	Plastic Saddle
1)	Saddle plastic 4mm flat PKT100
2)	Saddle plastic 4mm round PKT100

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Item Number	Description
3)	Saddle plastic 5mm round PKT100
4)	Saddle plastic 10mm round PKT100
5)	Saddle plastic 13mm round PKT100
6)	Saddle plastic 6mm round PKT100
7)	Saddle plastic 8mm round PKT100

4.5.8 Threaded Bolts

Table 32: Specification for thread bolts

Item Number	Description
1)	Threaded bolt 6x30mm with nut-spring PKT20
2)	Threaded bolt 6 x 25 mm with nut, spring
3)	Threaded bolt 8 x 30 mm with nut, spring
4)	Threaded bolt 8 x 55 mm with nut, spring

4.5.9 Anchors

Table 33: Specification for anchors

Item Number	Description
1)	Anchors 8x55mm PKT50
2)	Anchors 5x45mm PKT100
3)	Anchors 6x55mm PKT100

4.5.10 Multi-strand welding cable

Table 34: Specification for multi-strand welding cable

Item Number	Description
1)	16 mm ² multi-strand welding cable red
2)	16 mm ² multi-strand welding cable black
3)	35 mm ² multi-strand welding cable red
4)	35 mm ² multi-strand welding cable black
5)	50 mm ² multi-strand welding cable red
6)	50 mm ² multi-strand welding cable black
7)	95 mm ² multi-strand welding cable red
8)	95 mm ² multi-strand welding cable black
9)	120 mm ² multi-strand welding cable red
10)	120 mm ² multi-strand welding cable black
11)	185 mm ² multi-strand welding cable red
12)	185 mm ² multi-strand welding cable black

4.5.11 Trunking**Table 35: Specification for trunking**

Item Number	Description
1)	Trunking 100mm x 40mm end cap
2)	Trunking 100mm x 40mm white 3m
3)	Trunking 16mm x 25mm white 3m
4)	Trunking 25mm x 40mm white 3m
5)	Trunking 40mm x 40mm white 3m
6)	Trunking 25mm x 40mm end cap
7)	Trunking 40mm x 40mm end cap
8)	Trunking 16mm x 40mm white 3m
9)	Trunking 16mm x 16mm end cap
10)	Trunking 16mm x 16mm white 2m

4.5.12 Rubber Tubing**Table 36: Specification for rubber tubing**

Item Number	Description
1)	Rubber Tubing, chloroprene 3.0 x 0.8 mm (Diam x Thickness)
2)	Rubber Tubing, chloroprene 7.5 x 1.3 mm (Diam x Thickness)
3)	Rubber Tubing, chloroprene 5.0 x 1 mm (Diam x Thickness)

4.5.13 Washer Bites**Table 37: Specification for washer bite**

Item Number	Description
1)	Washer bite 10 mm PKT20
2)	Washer bite 8 mm PKT20
3)	Washer bite 6 mm PKT20

4.5.14 Strippers and Scissors**Table 38: Specification for strippers and scissors**

Item Number	Description
1)	Fibre optic Stripper
2)	Wire Stripper
3)	Cable sheath Stripper (6mm to 28mm cable)
4)	Fibre optic cable cutter scissors

4.5.15 Racks and frames**Table 39: Specification for racks and frames**

Item Number	Description
1)	Frame 80 Way back mount rack
2)	Cage nut fully populated
3)	Self-tapping screws assorted
4)	IDF frame 80 way 800 pair
5)	Tray 19" rack mount 1U
6)	19 inch stainless steel back mount frame
7)	DIN Rail slotted 2m

4.5.16 Multipurpose materials**Table 40: List of multipurpose materials**

Item Number	Description
1)	Exothermic Copper Bonding Materials And
2)	Air Duster
3)	Alcohol Spray
4)	Alcohol Wipes
5)	Complete Cleaning Kit In Dust Free Container
6)	Control Voltage Isolated Dc-Dc Converter (36-72vdc Input, 48vdc Output)
7)	Draw Wire 4mm ² Per 100m
8)	Exothermic Copper bonding materials to join copper earth bars
9)	Fibre air blaster can/ cleaner
10)	Fibre attenuator SC-APC single mode 10 dB
11)	Gas Arrestor 230V 3 Pole
12)	Hi Gel Re-enterable Encapsulant
13)	High performance mechanical splice for 125 µm cladding single mode and multimode with key (supplier to provide detailed splice performance test results)
14)	Isopropyl 99,7% Pure In Small Dispenser
15)	Isopropyl 99,7% Pure Per Litre
16)	Isopropyl Aerosol Spray 99.7% Pure
17)	Lint Free wipes
18)	Lint Free Cotton Buds 2.5 Mm
19)	Lint Free Cotton Buds 1.25 Mm
20)	Mutton Cloth Per 1Kg
21)	Pin 220V AC 2 Pin Top Plug Adaptor
22)	Plug 3 Pin 220 V AC
23)	Scotch cast (for cable sealing, insulation, jointing, cable repair,

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Item Number	Description
	encapsulation and protection)
24)	Scotch locks (100 pieces)
25)	Self-Adhesive Labelling With Chevron
26)	Smouv 45 mm
27)	Smouv 60 mm
28)	Joint enclosure for 50-200 pairs copper telephone cable
29)	Joint enclosure for 5-30 pairs copper telephone cable
30)	Sprag Orange 20mm 50M Roll
31)	Stainless Steel Tube Cutter For OPGW
32)	Stretching sealing tape to seal coaxial feeder/cable connectors on towers
33)	Twin Flex White 0.5mm Per 100M
34)	Wrapped Swabs (For Cleaning Coupling Connectors)
35)	Bandit Strap 30m 12mm
36)	Bandit Strap buckle 12mm 100 pieces
37)	RM Kit for 19 inch Installation of 8.5" RAD Unit(s)- RM-33-2
38)	RM Kit for Installation of One 19-inch RAD Unit - RM-34
39)	SFP-1 Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
40)	SFP-2 Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
41)	SFP-3 Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
42)	SFP4 - Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)
43)	<p>4 Wire Type V E&M Interposing relay required to allow the 12V (wetting voltage) E&M radios to connect to a 48V E&M multiplexer/ router module::</p> <ul style="list-style-type: none"> Coil voltage: -48 V & +12 V Contact arrangement: 5no 5nc Contact rating: 50-110 v Enclosure rating: IP67

5. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Barry Clayton	Chief Engineer- Tx Secondary Plant, Work Planning and Centralized Services
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6. Revisions

Date	Rev	Compiler	Remarks
Oct 2019	2	J. Mataboge	Revised specification for cables and connectors for ET: Items are categorised in accordance with functionality Items that no longer form part of ET requirements were removed. New items that form part of requirements were added. Additional reference standards were added.
Feb 2016	1	M. Shangase	First specification for Cable and Materials

7. Development team

The following people were involved in the development of this document:

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- Zwelandile Mbebe

8. Acknowledgements

Not applicable

Annex A – Schedule A/B

Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
3	General Requirements			
3.1	General interfaces characteristics			
a)	The data interfaces shall support connection of synchronous and asynchronous data devices via X.21, EIA-422, EIA-232 and EIA-485 interfaces [1][2][2].	State Compliance & Provide Evidence		
b)	These interfaces shall not be provided in a scaled down version, e.g. for EIA-232, all available functions shall be present (Rxd, Txd, DTE, DCE, RTS, CTS).	State Compliance & Provide Evidence		
c)	For 2 Mbit/s (E1) systems, the data rate shall be 2 048 Mbit/s (± 50 ppm), with High Density Bipolar of Order 3 (HDB3) line coding [5] .	State Compliance & Provide Evidence		
d)	E1 shall support 120 Ω balanced interfaces with RJ45 connectors for category 5e/6 cable.	State Compliance & Provide Evidence		
e)	Equipment shall support both E1 HDB3 link external clock and internal clock.	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
f)	Ethernet ports shall comply with IEEE802 3u/af/ab standards.	State Compliance & Provide Evidence		
g)	All the patch panels (fibre and copper) shall be provided with the details on the number of supported ports and pin layouts.	State Compliance & Provide Evidence		
h)	E&M Interfaces shall be clean contacts which support +12Vdc to -48Vdc.	State Compliance & Provide Evidence		
i)	UHF/VHF analogue radio repeaters TX/RX require an audio response 300-3000Hz with adjustable input/output levels of -4dBm to +4dBm.	State Compliance & Provide Evidence		
3.2	Converters			
a)	As a minimum, RS232/RS422/RS485 and any other DB serial interface convertors shall support 9600 and 19200 asynchronous baud rates and these are mandatory for SCADA services.	State Compliance & Provide Evidence		
b)	The supplier shall indicate if the 200 and 1200 asynchronous baud rates are supported however, these data rates are not mandatory.	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
c)	RS232/RS422/RS485 converters shall strictly be port powered, requiring no external power supply.	State Compliance & Provide Evidence		
d)	X.21 interface shall support 64kbps synchronous data rates and external clock which are required for teleprotection services.	State Compliance & Provide Evidence		
e)	E1 to fibre converters shall comply with Eskom OLTE standard (including the power supplies specifications) [4].	State Compliance & Provide Evidence		
3.3	Surge protection equipment			
a)	Serial (RS232, X.21) surge protection equipment shall be passive without a requirement for power supplies.	State Compliance & Provide Evidence		
b)	Only steel housing shall be used for surge protection equipment (not plastic).	State Compliance & Provide Evidence		
c)	Serial surge protection equipment shall comply with Eskom standard 240-70732630 [12].	State Compliance & Provide Evidence		
d)	CAT5e and CAT 6 surge protection equipment shall comply with IEEE802 3u/af/ab [10]	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
e)	At minimum, the supplier shall provide the following details for the proposed surge protection equipment	State Compliance & Provide Evidence		
1)	Clamping voltage for X.21, EIA-232 and IEEE802 3u/af/ab ports.	State Compliance & Provide Evidence		
2)	Maximum discharge current and response time	State Compliance & Provide Evidence		
3)	Specific protected data lines/pairs	State Compliance & Provide Evidence		
4)	Supported maximum data rates	State Compliance & Provide Evidence		
5)	Insertion Loss and return loss (in dB)	State Compliance & Provide Evidence		
6)	Surge protector factory test results	State Compliance & Provide Evidence		
3.4	Fibre cables and equipment			
a)	All fibre equipment and cables shall comply with ITU-T G652D 9 /125 µm [6] single-mode fibre and 50/125 µm Multimode fibre [7].	State Compliance & Provide Evidence		
b)	Optical Distribution Frames / Patch Panels/Boxes shall comply with Eskom standard 240-70733995 [9].	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
c)	Supplier shall indicate any other SABS/SANS standards they are compliant with.	State Compliance & Provide Evidence		
d)	For equipment equipped with SFPs, supplier shall provide additional spare SFPs as separate line items for spare purposes.	State Compliance & Provide Evidence		
e)	Supplier shall indicate if it is possible to loop back the fibre ports without using attenuators, without damaging the equipment receiver.	State Compliance & Provide Evidence		
f)	Optical transceivers shall operate in the 1310 nm and 1 550 nm optical windows over single mode fibres conforming to ITU-T G.652D. The operating wavelengths within the given bands shall be stated.	State Compliance & Provide Evidence		
g)	The maximum acceptable path loss and distance for optical transceivers without repeaters shall be stated for all optical interfaces.	State Compliance & Provide Evidence		
h)	Suppliers shall specify their systems optical transmit power for all optical interfaces.	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
i)	Suppliers shall specify their systems' optical receive sensitivity in terms of minimum and maximum receive power levels.	State Compliance & Provide Evidence		
j)	Where possible and not stated otherwise, optical connectors shall be SC-angle polished (SC-APC) connectors.	State Compliance & Provide Evidence		
3.5	Copper cables and equipment			
a)	CAT5e cables, CAT 6 cables, patch panels and connectors shall comply with TIA/EIA 568-B standard [10].	State Compliance & Provide Evidence		
b)	Suppliers shall state all the SABS standards they are compliant with including the insulation standards.	State Compliance & Provide Evidence		
c)	As part of the requirements, Eskom require galvanised Steel Wire Armoured (SWA) cables due to rodents in the substations.	State Compliance & Provide Evidence		
3.5.1	3.5.1 Miscellaneous materials			
a)	Suppliers shall state the standards which their miscellaneous equipment complies with.	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
b)	As part of technical evaluations, supplies will be required to submit samples and only good quality materials will be accepted.	State Compliance & No Evidence required		
c)	Lugs and ferrules shall comply with SANS 1803-1 [18]	State Compliance & No Evidence required		
3.6	Roadmaps and MTBFs			
a)	Suppliers shall provide a roadmap for the proposed equipment and the roadmap shall clearly indicate the OEM release date of the proposed equipment.	State Compliance & Provide Evidence		
b)	There shall be no end of sale notice issued against any of the proposed equipment.	State Compliance & Provide Evidence		
c)	The supplier shall provide the Mean Time between Failure (MTBF) for all the proposed equipment including the related modules	State Compliance & Provide Evidence		
d)	Suppliers shall provide data sheets and manuals for all the proposed equipment.	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
3.7	Equipment housing			
a)	Where applicable, suppliers shall include the OEM mounting brackets for the proposed equipment.	State Compliance & Provide Evidence		
b)	Medium to large convertors (e.g. OLTEs) and patch panels shall fit in a 19" rack.	State Compliance & Provide Evidence		
c)	Suppliers shall specify the exact dimensions of the proposed equipment and mounting options.	State Compliance & Provide Evidence		
3.8	Power requirements			
a)	Eskom Telecommunication's standard battery chargers will supply a rated voltage range of 48 V +20% -15%, positive earth and equipment requiring power supply shall operate within these VDC limits.	State Compliance & Provide Evidence		
b)	The supplier shall specify the voltages outside these limits within which the equipment will still operate correctly and without damage.	State Compliance & Provide Evidence		
c)	The supplier shall confirm that the proposed equipment will not be damaged in the event of a continually falling DC supply voltage.	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
d)	The supplier shall confirm that the proposed equipment will not be damaged in the inadvertent application of reverse polarity.	State Compliance & Provide Evidence		
e)	Supplier shall indicate which of the supplied equipment supports the following non-mandatory voltages:			
1)	230 V AC (Range: 216.2 V to 243.8 V), and nominal frequency 50Hz (range 47.5 Hz to 52.5 Hz), mains power	State Compliance & Provide Evidence		
2)	110 VDC	State Compliance & Provide Evidence		
f)	Power cables shall comply with SANS 1574, SANS 1411 and SANS 1507 [13][14][15][16][17]	State Compliance & Provide Evidence		
3.9	Environmental and EMI requirements			
a)	The equipment performance shall be guaranteed even when installed in a substation environment.	State Compliance & Provide Evidence		
b)	The supplier shall indicate all the devices which are IEEE 1613 & IEC 61850-3 compliant and Exclusions must be clearly stated [11].	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
c)	The supplier shall provide the details on any other supported EMC standards.	State Compliance & Provide Evidence		
d)	For equipment not compliant with the above standards , the supplier shall provide the details on how to harden the installation of such equipment in the high EMI and dusty substation environment	State Compliance & Provide Evidence		
e)	Equipment shall be able to operate at altitude (above mean sea level): 0 m to 2500m.	State Compliance & Provide Evidence		
f)	Operating temperature inside equipment enclosure: -5 °C to +55 °C	State Compliance & Provide Evidence		
g)	Ambient relative humidity: 5 to 90% non-condensing.	State Compliance & Provide Evidence		
h)	Barometric pressure: 75 kPa to 106 kPa.	State Compliance & Provide Evidence		
4	List of required cables and materials			
4.1	Fibre cables and equipment			
4.1.1	Patch Cords			
Table 1	Specification for patch cords			

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
Table 1- A	Single mode Patch Cord – 9/125			
1)	10M Duplex patch cord LC-LC 9/125 rugged	State Compliance & Provide Evidence		
2)	10M Duplex patch cord LC-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
3)	10M Duplex patch cord SC-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
4)	10M Duplex patch cord ST-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
5)	10M Duplex patch cord LC-SC/APC 9/125	State Compliance & Provide Evidence		
6)	10M Duplex patch cord SC/SC 9/125	State Compliance & Provide Evidence		
7)	10M Duplex patch cord ST-FC 9/125 rugged	State Compliance & Provide Evidence		
8)	10M Duplex patch cord ST-LC 9/125 rugged	State Compliance & Provide Evidence		
9)	10M Duplex patch cord ST-SC 9/125 rugged	State Compliance & Provide Evidence		
10)	10M Duplex patch cord ST-ST 9/125 rugged	State Compliance & Provide Evidence		
11)	15M Duplex patch cord LC-LC 9/125 Rugged	State Compliance & Provide Evidence		
12)	15M Duplex patch cord LC-SC/APC 9/125 rugged	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
13)	15M Duplex patch cord ST-LC 9/125 Rugged	State Compliance & Provide Evidence		
14)	15M Duplex patch cord ST-SC 9/125 rugged	State Compliance & Provide Evidence		
15)	15M Duplex patch cord ST-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
16)	1M Duplex patch cord SC/APC-SC/APC 9/125	State Compliance & Provide Evidence		
17)	1M Duplex Patch cord SC-SC/ APC 9/125	State Compliance & Provide Evidence		
18)	1M Duplex Patch cord FC-SC / APC 9/125	State Compliance & Provide Evidence		
19)	1M Duplex Patch cord ST-SC / APC 9/125	State Compliance & Provide Evidence		
20)	1M Duplex Patch cord LC/LC 9/125	State Compliance & Provide Evidence		
21)	1M Duplex patch cord SC/LC 9/125	State Compliance & Provide Evidence		
22)	1M Duplex patch cord SC/SC 9/125	State Compliance & Provide Evidence		
23)	1M Duplex patch cord ST-FC 9/125 rugged	State Compliance & Provide Evidence		
24)	1M Duplex patch cord ST-LC 9/125 rugged	State Compliance & Provide Evidence		
25)	1M Duplex patch cord ST-SC 9/125 rugged	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
26)	1M Duplex patch cord ST-ST 9/125 rugged	State Compliance & Provide Evidence		
27)	2M Duplex patch cord LC-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
28)	2M Duplex patch cord SC/APC-SC/APC 9/125	State Compliance & Provide Evidence		
29)	2M Duplex Patch cord SC-SC/APC 9/125	State Compliance & Provide Evidence		
30)	2M Duplex patch cord SC-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
31)	2M Duplex patch cord ST-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
32)	2M Duplex Patch cord FC-SC / APC 9/125	State Compliance & Provide Evidence		
33)	2M Duplex Patch cord ST-SC/APC 9/125	State Compliance & Provide Evidence		
34)	2M Duplex patch cord SC/LC 9/125	State Compliance & Provide Evidence		
35)	2M Duplex patch cord SC/SC 9/125	State Compliance & Provide Evidence		
36)	2M Duplex patch cord SC-SC/APC 9/125	State Compliance & Provide Evidence		
37)	2M Duplex patch cord SL/LC 9/125	State Compliance & Provide Evidence		
38)	2M Duplex patch cord ST-FC 9/125 rugged	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
39)	2M Duplex patch cord ST-LC 9/125 rugged	State Compliance & Provide Evidence		
40)	2M Duplex patch cord ST-SC 9/125 rugged	State Compliance & Provide Evidence		
41)	2M Duplex patch cord ST-ST 9/125 rugged	State Compliance & Provide Evidence		
42)	2M Duplex patch cord FC – SC/APC 9/125 rugged	State Compliance & Provide Evidence		
43)	3M Duplex patch cord LC/LC 9/125	State Compliance & Provide Evidence		
44)	3M Duplex patch cord SC/LC 9/125	State Compliance & Provide Evidence		
45)	3M Duplex patch cord SC/SC 9/125	State Compliance & Provide Evidence		
46)	4M Duplex patch cord LC-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
47)	4M Duplex patch cord SC/APC-SC/APC 9/125	State Compliance & Provide Evidence		
48)	4M Duplex patch cord SC-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
49)	4M Duplex patch cord ST-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
50)	4M Duplex patch cord ST-FC 9/125 rugged	State Compliance & Provide Evidence		
51)	4M Duplex patch cord ST-LC 9/125 rugged	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
52)	4M Duplex patch cord ST-SC 9/125 rugged	State Compliance & Provide Evidence		
53)	4M Duplex patch cord ST-ST 9/125 rugged	State Compliance & Provide Evidence		
54)	5M Duplex Patch cord LC-SC/APC 9/125	State Compliance & Provide Evidence		
55)	6M Duplex patch cord LC-LC 9/125 rugged	State Compliance & Provide Evidence		
56)	6M Duplex patch cord LC-SC/APC 9/125 rugged	State Compliance & Provide Evidence		
57)	6M Duplex patch cord ST-FC 9/125 rugged	State Compliance & Provide Evidence		
58)	6M Duplex patch cord ST-LC 9/125 rugged	State Compliance & Provide Evidence		
59)	6M Duplex patch cord ST-SC 9/125 rugged	State Compliance & Provide Evidence		
60)	6M Duplex patch cord ST-ST 9/125 rugged	State Compliance & Provide Evidence		
61)	25M Duplex patch cord LC-SC/APC9/125 rugged	State Compliance & Provide Evidence		
62)	30M Duplex patch cord LC-SC/APC9/125 rugged	State Compliance & Provide Evidence		
Table 1- B	Multi Mode Patch Cords – 50/125			
1)	10M Duplex patch cord ST-LC 50/125 rugged	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
2)	10M Duplex patch cord ST-SC 50/125 rugged	State Compliance & Provide Evidence		
3)	10M Duplex patch cord ST-ST 50/125 rugged	State Compliance & Provide Evidence		
4)	10M Duplex patch cord LC-LC 50/125 rugged	State Compliance & Provide Evidence		
5)	1M Duplex patch cord SC/APC-SC/APC 50/125 rugged	State Compliance & Provide Evidence		
6)	1M Duplex patch cord ST-LC 50/125 rugged	State Compliance & Provide Evidence		
7)	1M Duplex patch cord ST-SC 50/125 rugged	State Compliance & Provide Evidence		
8)	1M Duplex patch cord ST-ST 50/125 rugged	State Compliance & Provide Evidence		
9)	2M Duplex patch cord ST-LC 50/125 rugged	State Compliance & Provide Evidence		
10)	2M Duplex patch cord ST-SC 50/125 rugged	State Compliance & Provide Evidence		
11)	2M Duplex patch cord ST-ST 50/125 rugged	State Compliance & Provide Evidence		
12)	4M Duplex patch cord ST-LC 50/125 rugged	State Compliance & Provide Evidence		
13)	4M Duplex patch cord ST-SC 50/125 rugged	State Compliance & Provide Evidence		
14)	4M Duplex patch cord ST-ST 50/125 rugged	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
15)	6M Duplex patch cord ST-LC 50/125 rugged	State Compliance & Provide Evidence		
16)	6M Duplex patch cord ST-SC 50/125 rugged	State Compliance & Provide Evidence		
17)	6M Duplex patch cord ST-ST 50/125 rugged	State Compliance & Provide Evidence		
4.1.2	Pigtails			
Table 2	Specification for pigtails			
1)	Fibre Pigtail 50/125 1M with ST connector	State Compliance & Provide Evidence		
2)	Fibre pigtail 9/125 1M with ST connector	State Compliance & Provide Evidence		
3)	Fibre pigtail 9/125 1M with SC-APC connector	State Compliance & Provide Evidence		
4)	Fibre pigtail 9/125 1M with LC connector	State Compliance & Provide Evidence		
5)	Fibre pigtail 9/125 1M with SC connector	State Compliance & Provide Evidence		
4.1.3	Mid-couplers			
Table 3	Specification for mid-couplers			
1)	Duplex Mid coupler ST-ST ceramic, 9/125	State Compliance & Provide Evidence		
2)	Duplex Mid coupler SC-APC/SCAPC ceramic, 9/125	State Compliance & Provide Evidence		
3)	Duplex Mid coupler ST-ST 50/125	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
4)	Duplex Mid Coupler LC-LC 9/125	State Compliance & Provide Evidence		
5)	Duplex Mid Coupler LC-LC 50/125	State Compliance & Provide Evidence		
6)	Duplex Mid Coupler SC-SC 50/125	State Compliance & Provide Evidence		
7)	Simplex Mid Coupler SC-SC 9/125	State Compliance & Provide Evidence		
8)	Simplex Mid Coupler ST-ST 50/125	State Compliance & Provide Evidence		
9)	Simplex Mid Coupler LC-LC 9/125	State Compliance & Provide Evidence		
4.1.4	Fibre Cables			
Table 4	Specification for fibres cables			
Table 4 - A	Single Mode Heavy duty Duct – 9/125			
1)	CABLE; 8 FIBRE HDD 9/125, double sheath rodent resistant	State Compliance & Provide Evidence		
2)	CABLE; 12 FIBRE HDD 9/125, double sheath rodent resistant	State Compliance & Provide Evidence		
3)	CABLE; 24 FIBRE HDD 9/125, double sheath rodent resistant	State Compliance & Provide Evidence		
4)	CABLE; 48 FIBRE HDD 9/125, double sheath rodent resistant	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
5)	MOQ 500M CABLE;12 FIBRE CST 9/125	State Compliance & Provide Evidence		
6)	CABLE; 6 FIBRE HDD 9/125	State Compliance & Provide Evidence		
7)	NO MOQ CABLE;24 FIBRE HDD 9/125	State Compliance & Provide Evidence		
8)	MOQ 500M CABLE;24 FIBRE HDD 9/125	State Compliance & Provide Evidence		
Table 4 - B	Multi-Mode Heavy duty Duct – 50/125			
1)	NO MOQ CABLE;12 FIBRE HDD 50/125	State Compliance & Provide Evidence		
4.1.5	HDPE Pipes			
Table 5	Description (Nominal size, min wall thickness)			
1)	HDPE pipe, 16 mm, 1.6mm orange	State Compliance & Provide Evidence		
2)	HDPE pipe, 20 mm, 2mm orange	State Compliance & Provide Evidence		
3)	HDPE pipe, 25 mm, 2.3mm orange	State Compliance & Provide Evidence		
4)	HDPE pipe, 32 mm, 3mm orange	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
4.1.6	Dome Joints			
Table 6	Specification for dome joints			
1)	12 Fibre dome joint with 4 entrances	State Compliance & Provide Evidence		
2)	48 Fibre dome joint with 4 entrances	State Compliance & Provide Evidence		
4.1.7	Optical Distribution Frames / Patch Panels/Boxes			
Table 7	Specification for optical distribution frame/ Patch Panel/Boxes			
Table 7 - A	19 inch Single mode Optical Distribution Frames / Patch Panels/Boxes			
1)	12 core single mode fibre patch panel	State Compliance & Provide Evidence		
2)	24 core single mode fibre patch panel	State Compliance & Provide Evidence		
3)	48 core single mode fibre patch panel	State Compliance & Provide Evidence		
Table 7 - B	19 inch Multimode Optical Distribution Frames / Patch Panels/Boxes			
1)	12 core multimode fibre patch panel	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
2)	24 core multimode fibre patch panel	State Compliance & Provide Evidence		
Table 7 - C	Wall mount/ din rail Optical Distribution Frames / Patch Panels/Boxes			
1)	6 core single mode fibre patch panel	State Compliance & Provide Evidence		
2)	12 core multimode fibre patch panel	State Compliance & Provide Evidence		
4.1.8	Fibre splice boxes			
Table 8	Specification for fibre splice boxes			
1)	Lockable 12 pair fibre splice through box, fully populated with IP54 Protection	State Compliance & Provide Evidence		
2)	Lockable 12 pair fibre termination box, fully populated with IP54 Protection	State Compliance & Provide Evidence		
3)	Lockable 24 pair fibre splice through box, fully populated with IP54 Protection	State Compliance & Provide Evidence		
4)	Lockable 24 pair fibre termination box, fully populated with IP54 Protection	State Compliance & Provide Evidence		
5)	Lockable 48 pair fibre splice through box, fully populated with IP54 Protection	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
6)	Lockable 48 pair fibre termination box, fully populated with IP54 Protection	State Compliance & Provide Evidence		
7)	Splice junction box, Internal dimensions LxHxD (mm) +/- 190x140x70, IP56 Protection	State Compliance & Provide Evidence		
4.2	Copper Cables and equipment			
4.2.1	Data (Copper) Distribution Frames / Patch Panels			
Table 9	Specification for data (copper) distribution frames / patch panels			
1)	Data patch panel fully populated 32 way, CAT5E, RJ45	State Compliance & Provide Evidence		
2)	Data patch panel fully populated 32 way, CAT6, RJ45	State Compliance & Provide Evidence		
3)	Data patch panel fully populated 24 way, CAT5E, RJ45	State Compliance & Provide Evidence		
4)	Data patch panel fully populated 24 way, CAT6, RJ45	State Compliance & Provide Evidence		
5)	Data patch panel fully populated 16 way, CAT5E, RJ45	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
6)	Data patch panel fully populated 16 way, CAT56, RJ45	State Compliance & Provide Evidence		
4.2.1	PoE Injectors			
Table 10	Specification PoE Injectors			
1)	1 port 10/100/1000, PoE Injector, AC input adapter, power output: min of 30 Watts per port	State Compliance & Provide Evidence		
2)	2 port 10/100/1000, PoE Injector, AC input adapter, power output: min of 30 Watts per port	State Compliance & Provide Evidence		
3)	1 port 10/100/1000, PoE Injector, DC Input voltage on a terminal block, power output: min of 30 Watts per port	State Compliance & Provide Evidence		
4)	2 port 10/100/1000, PoE Injector, DC input voltage on a terminal block, power output: min of 30 Watts per port	State Compliance & Provide Evidence		
5)	4 port 10/100/1000, PoE Injector, DC input voltage on a terminal block, power output: min of 30 Watts per port	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
4.2.2	RJ Connectors			
Table 11	Specification for RJ connectors			
1)	Connector RJ9	State Compliance & Provide Evidence		
2)	Connector RJ11	State Compliance & Provide Evidence		
3)	Connector RJ12	State Compliance & Provide Evidence		
4)	RJ11 wall jack	State Compliance & Provide Evidence		
4.2.3	CAT Connectors and Boots			
Table 12	Specification for CAT connectors and boots			
1)	RJ45 CAT 5E connector	State Compliance & Provide Evidence		
2)	RJ45 CAT6 connector	State Compliance & Provide Evidence		
3)	RJ45 CAT 5E connector, shielded	State Compliance & Provide Evidence		
4)	RJ45 CAT6 connector, shielded	State Compliance & Provide Evidence		
5)	RJ45 CAT 5E rubber boot	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
6)	RJ45 CAT6 rubber boot	State Compliance & Provide Evidence		
7)	RJ45 single outlet box	State Compliance & Provide Evidence		
4.2.4	DB Connectors			
Table 13	Specification for DB/Serial connectors			
1)	DB 9 Pin connector cover steel	State Compliance & Provide Evidence		
2)	DB 9 pin female connector	State Compliance & Provide Evidence		
3)	DB 9 pin male connector	State Compliance & Provide Evidence		
4)	DB 15 Pin connector cover steel	State Compliance & Provide Evidence		
5)	DB 15 pin male connector	State Compliance & Provide Evidence		
6)	DB 15 pin female connector	State Compliance & Provide Evidence		
7)	DB 25 Pin connector cover steel	State Compliance & Provide Evidence		
8)	DB 25 pin male connector	State Compliance & Provide Evidence		
9)	DB 25 pin female connector	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
10)	DB 37 pin connector cover steel	State Compliance & Provide Evidence		
11)	DB 37 pin connector male	State Compliance & Provide Evidence		
12)	DB 37 pin connector female	State Compliance & Provide Evidence		
4.2.5	Passive Adapters			
Table 14	Specification for DB passive adapters			
1)	DB25 male to DB15 female adapter	State Compliance & Provide Evidence		
2)	DB25 female to DB15 male adapter	State Compliance & Provide Evidence		
3)	DB25 Male to DB9 female` adapter	State Compliance & Provide Evidence		
4)	DB25 Female to DB9 Male adapter	State Compliance & Provide Evidence		
5)	DB9 Female to DB9 female adapter	State Compliance & Provide Evidence		
6)	DB15 male to DB9 female adapter	State Compliance & Provide Evidence		
7)	DB15 female to DB9 male adapter	State Compliance & Provide Evidence		
8)	DB15 female to DB15 female adapter	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
9)	RJ45 to DB9 Female adapter	State Compliance & Provide Evidence		
10)	RJ45 to DB25 male adapter	State Compliance & Provide Evidence		
11)	RJ45 to DB25 female adapter	State Compliance & Provide Evidence		
12)	Female to female Ethernet coupler jack (must support both CA5E and CAT6)	State Compliance & Provide Evidence		
4.2.6	Converters			
4.2.6.1	USB Convertors			
Table 15	Specification for USB convertors			
1)	USB 2.0 to RJ11 56K V.92 / V.90 External Data Modem	State Compliance & Provide Evidence		
2)	USB to RS232 DB9 serial converter for local craft terminal	State Compliance & Provide Evidence		
4.2.6.2	Fibre, Ethernet and serial converters			
Table 16	Specification of other convertors			
1)	RS232/RS422/RS485 (terminal block) to fibre MM (ST/SC), 5km, port powered only	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
2)	RS232/RS422/RS485/ POTS (RJ11 FXS/FXO) to fibre MM (ST/SC), 5km, DC power supply if not port powered	State Compliance & Provide Evidence		
3)	RS232/RS422/RS485 (terminal block) to fibre SM (ST/SC), 40km, port powered only	State Compliance & Provide Evidence		
4)	RS232/RS422/RS485 (terminal block) to fibre SM (ST/SC), 80km, port powered only	State Compliance & Provide Evidence		
5)	RS232 DB 9/ terminal block to RS422/RS485, port powered only	State Compliance & Provide Evidence		
6)	X.21, 60Kbps, synchronous to fibre MM (ST/SC), 5km, must support external clock, DC power supply if not port powered	State Compliance & Provide Evidence		
7)	X.21/ POTS (RJ11 FXS/FXO) to fibre MM (ST/SC), 5km, must support external clock, DC power supply if not port powered	State Compliance & Provide Evidence		
8)	C37.94 to Ethernet converter, LC MM, DC power supplies if not port powered.	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
9)	4 port E1 (balanced) + 1 Ethernet to fibre convertor MM ST/SC	State Compliance & Provide Evidence		
10)	4 port E1 (balanced) + 1 Ethernet to fibre convertor SM ST/SC	State Compliance & Provide Evidence		
11)	16 port E1 (balanced) + 2 Ethernet to fibre convertor MM ST/SC	State Compliance & Provide Evidence		
12)	16 port E1 (balanced) + 2 Ethernet to fibre convertor SM ST/SC	State Compliance & Provide Evidence		
13)	4 port E1 (balanced) to 10/100/1000BaseT converter	State Compliance & Provide Evidence		
14)	4 port 10/100/1000BaseT to E1 (balanced) converter	State Compliance & Provide Evidence		
15)	8 port 10/100/1000BaseT to E1 (balanced) converter	State Compliance & Provide Evidence		
16)	Type V 4Wire E&M to Ethernet radio (UHF/VHF) over IP	State Compliance & Provide Evidence		
17)	10/100/1000BaseT to fibre MM, ST/SC	State Compliance & Provide Evidence		
18)	10/100/1000BaseT to fibre SM, ST/SC	State Compliance & Provide Evidence		
19)	POTS (RJ11 FXS/FXO) to fibre MM, ST/SC 5Km	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
20)	RS232 DB25 Distance extender over 4 wire (RJ45) twisted pair, 5KM, port powered only	State Compliance & Provide Evidence		
21)	Ethernet distance extender over 4 wire (RJ45) twisted pair, 5KM, port powered only	State Compliance & Provide Evidence		
4.2.7	Telephone Cables			
Table 17	Specification for telephone cables –diameter in mm			
1)	Telephone cable, 0.5 mm x 10 pair indoor	State Compliance & Provide Evidence		
2)	Telephone cable, 0.5 mm x 10 pair outdoor, SWA	State Compliance & Provide Evidence		
3)	Telephone cable, 0.6 mm x 10 pair outdoor, SWA	State Compliance & Provide Evidence		
4)	MOQ 500m, Telephone cable 0.5 mm x 20 pair indoor	State Compliance & Provide Evidence		
5)	No MOQ, Telephone cable, 0.5 mm x 20 pair indoor	State Compliance & Provide Evidence		
6)	Telephone cable, 0.5 mm x 25 pair indoor	State Compliance & Provide Evidence		
7)	Telephone cable, 0.5 mm x 30 pair indoor	State Compliance & Provide Evidence		
8)	Telephone cable, 0.5 mm x 40 pair indoor	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
9)	Telephone cable, 0.5 mm x 50 pair indoor	State Compliance & Provide Evidence		
10)	MOQ 500m, Telephone cable, 0.6 mm x 10 pair	State Compliance & Provide Evidence		
11)	Telephone cable , 0.6 mm x 25 pair indoor	State Compliance & Provide Evidence		
12)	Telephone cable, 0.6 mm x 50 pair indoor	State Compliance & Provide Evidence		
13)	2 pair drop telephone cable, 0.6 mm	State Compliance & Provide Evidence		
14)	Jumper wire red/black on 200m roll, 0.5mm	State Compliance & Provide Evidence		
15)	Jumper wire red/black on 200m roll, 0.6mm	State Compliance & Provide Evidence		
16)	Telephone plug with gas arrestor	State Compliance & Provide Evidence		
17)	Curly cord, cream 1.2m	State Compliance & Provide Evidence		
18)	Telephone cable, 0.5 mm x 2 pair indoor	State Compliance & Provide Evidence		
4.2.8	Disconnect modules and tools			
Table 18	Specification for disconnect module and tool			
1)	10 pair disconnect module, PKT10	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
2)	Disconnect module fixed label holder	State Compliance & Provide Evidence		
3)	Disconnect module hinged label holder	State Compliance & Provide Evidence		
4)	Disconnect module surge gas arrestor magazine holder with 3 poles	State Compliance & Provide Evidence		
5)	Disconnect module punch down tool	State Compliance & Provide Evidence		
6)	Indoor telephone distribution box , 10-20 pair	State Compliance & Provide Evidence		
7)	Clip On Alphabet A- Z, Diameter 1.5mm	State Compliance & Provide Evidence		
8)	Clip On Numbers 0 To 9, Diameter 1.5mm	State Compliance & Provide Evidence		
9)	600 ohm 4dB 10 way disconnect modules attenuators/pads with 0.2 dB accuracy	State Compliance & Provide Evidence		
10)	600 ohm 8dB 10 way disconnect modules attenuators/pads with 0.2 dB accuracy	State Compliance & Provide Evidence		
11)	600 ohm 16dB 10 way disconnect modules attenuators/pads with 0.2 dB accuracy	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
	X.21 Cables			
Table 19	Specification for X.21 cable			
1)	Data cable X21 indoor 7 strand, 0.22mm diameter per strand, Aluminium Mylar shielded Individual and overall screen twisted 6 pair	State Compliance & Provide Evidence		
2)	Data cable X21 SWA 7 strand, 0.22mm diameter per strand, Aluminium Mylar shielded Individual and overall screen twisted 6 pair	State Compliance & Provide Evidence		
4.2.10	Category 5 and 6 Cables			
Table 19	Specification for CAT 5 and 6 cables			
1)	CAT5E U/UTP, Solid	State Compliance & Provide Evidence		
2)	CAT5E U/UTP, Stranded	State Compliance & Provide Evidence		
3)	CAT6 U/UTP, Solid	State Compliance & Provide Evidence		
4)	CAT6 U/UTP, Stranded	State Compliance & Provide Evidence		
5)	CAT5E U/FTP, Solid	State Compliance & Provide Evidence		
6)	CAT5E U/FTP, Stranded	State Compliance & Provide		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
		Evidence		
7)	CAT6 U/FTP, Solid	State Compliance & Provide Evidence		
8)	CAT6 U/FTP, Stranded	State Compliance & Provide Evidence		
9)	CAT5E S/FTP, Solid	State Compliance & Provide Evidence		
10)	CAT5E S/FTP, Stranded	State Compliance & Provide Evidence		
11)	CAT6 S/FTP, Solid	State Compliance & Provide Evidence		
12)	CAT6 S/FTP, Stranded	State Compliance & Provide Evidence		
13)	CAT6A FTP, Solid	State Compliance & Provide Evidence		
14)	CAT6A FTP, Stranded	State Compliance & Provide Evidence		
15)	CAT5E U/FTP, Solid, SWA	State Compliance & Provide Evidence		
16)	CAT5E U/FTP, Stranded, SWA	State Compliance & Provide Evidence		
17)	CAT6 U/FTP, Solid, SWA	State Compliance & Provide Evidence		
18)	CAT6 U/FTP, Stranded, SWA	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
4.3	Data equipment surge protectors			
Table 21	Specification surge protectors			
1)	1 port 10/100/1000, CAT5E, RJ45, surge protector	State Compliance & Provide Evidence		
2)	1 port 10/100/1000 PoE, CAT5E, RJ45, surge protector	State Compliance & Provide Evidence		
3)	2 port 10/100/1000, CAT5E, RJ45, surge protector	State Compliance & Provide Evidence		
4)	2 port 10/100/1000 PoE, CAT5E, RJ45, surge protector	State Compliance & Provide Evidence		
5)	12 port 10/100/1000, CAT5E, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		
6)	12 port 10/100/1000 PoE, CAT5E, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		
7)	24 port 10/100/1000, CAT5E, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		
8)	24 port 10/100/1000 PoE, CAT5E, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		
9)	48 port 10/100/1000, CAT5E, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		
10)	48 port 10/100/1000 PoE, CAT5E, RJ45, surge protector,	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
	19 inch			
11)	1 port 10/100/1000, CAT6, RJ45, surge protector	State Compliance & Provide Evidence		
12)	1 port 10/100/1000 PoE, CAT6, RJ45, surge protector	State Compliance & Provide Evidence		
13)	2 port 10/100/1000, CAT6, RJ45, surge protector	State Compliance & Provide Evidence		
14)	2 port 10/100/1000 PoE, CAT6, RJ45, surge protector	State Compliance & Provide Evidence		
15)	12 port 10/100/1000, CAT6, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
16)	12 port 10/100/1000 PoE, CAT6, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		
17)	24 port 10/100/1000, CAT6, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		
18)	24 port 10/100/1000 PoE, CAT6, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		
19)	48 port 10/100/1000, CAT6, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		
21)	48 port 10/100/1000 PoE, CAT6, RJ45, surge protector, 19 inch	State Compliance & Provide Evidence		
22)	16 port RS232 DB25, modular passive surge protector, 19 inch	State Compliance & Provide Evidence		
23)	Single module for 19 inch 16 port RS232 DB25 surge protection	State Compliance & Provide Evidence		
24)	Empty rack with copper earth bar for 19 inch 16 port RS232 DB25 surge protector	State Compliance & Provide Evidence		
25)	One port RS232 DB25 surge protector, din rail mount	State Compliance & Provide Evidence		
26)	16 port X.21 DB15, modular passive surge protector, 19 inch	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
27)	Single module for 16 port X.21 DB15 surge protector	State Compliance & Provide Evidence		
28)	Empty rack with copper earth bar for 19 inch 16 port X.21 DB15 surge protector	State Compliance & Provide Evidence		
29)	One port X.21 DB15 surge protector, din rail mount	State Compliance & Provide Evidence		
31)	Subscriber line surge protector for 10 pair Krone block	State Compliance & Provide Evidence		
32)	RJ11 Telephone Line Protection	State Compliance & Provide Evidence		
4.3.1	Glands			
Table 22	Specification for glands			
1)	Steel gland shroud size 2 PKT20	State Compliance & Provide Evidence		
2)	Steel gland shroud size 1 PKT20	State Compliance & Provide Evidence		
3)	Steel gland size 3	State Compliance & Provide Evidence		
4)	Steel gland shroud size 0 PKT20	State Compliance & Provide Evidence		
5)	Steel gland size 2	State Compliance & Provide Evidence		
6)	Steel gland size 0	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
7)	Steel gland Compression size 0	State Compliance & Provide Evidence		
8)	Steel gland Compression size 1	State Compliance & Provide Evidence		
9)	Steel gland Compression size 2	State Compliance & Provide Evidence		
10)	Steel gland size 1	State Compliance & Provide Evidence		
4.4	Power cables and earthing			
4.4.1	Power cables			
Table 23	Specification for power cables			
1)	Power cable 16 mm ² 4 Core SWA	State Compliance & Provide Evidence		
2)	Power cable 2,5 mm ² 2 Core SWA	State Compliance & Provide Evidence		
3)	Power cable 4 mm ² 2 Core SWA	State Compliance & Provide Evidence		
4)	Power cable 6 mm ² 2 Core 100M	State Compliance & Provide Evidence		
5)	Cabtyre black 2,5 mm ² x 2 Core, 100m	State Compliance & Provide Evidence		
6)	Cabtyre black 1,5 mm ² x 2 Core, 100m	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
7)	Cabtyre black 1,5 mm ² x 3 Core, 100m	State Compliance & Provide Evidence		
8)	Cabtyre black 2,5 mm ² x 3 Core, 100m	State Compliance & Provide Evidence		
4.4.2	Earth cables and earth bars			
Table 24	Specification for earth cables and bars			
1)	Earth cable green/yellow 25 mm ² 100m roll	State Compliance & Provide Evidence		
2)	Earth cable green/yellow 35 mm ² 100m roll	State Compliance & Provide Evidence		
3)	Earth cable green/yellow 4 mm ² 100m roll	State Compliance & Provide Evidence		
4)	Solid copper rod with clamp 16 mm ² X 1.5m	State Compliance & Provide Evidence		
5)	Earth cable green/yellow 16 mm ² 100m roll	State Compliance & Provide Evidence		
6)	Earth cable green/yellow 120 mm ² 100m roll	State Compliance & Provide Evidence		
7)	Earth cable green/yellow 70 mm ² 100m roll	State Compliance & Provide Evidence		
8)	25mm X 3mm flat copper bars 50m	State Compliance & Provide Evidence		
9)	50mm X 3mm flat copper bars 50m	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
4.5	Miscellaneous materials			
4.5.1	Line taps			
Table 25	Specification for line taps			
1)	Line taps 16 mm ²	State Compliance & Provide Evidence		
2)	Line taps 35 mm ²	State Compliance & Provide Evidence		
3)	Line taps 70 mm ²	State Compliance & Provide Evidence		
4)	Line taps 120 mm ²	State Compliance & Provide Evidence		
4.5.2	Lugs			
Table 26	Specification for lugs, Cables sizes(mm²), Stud sizes (mm)			
1)	Lugs Galvanised Ring, PKT100, 25, 16	State Compliance & Provide Evidence		
2)	Lugs Galvanised Ring, PKT100, 16, 10	State Compliance & Provide Evidence		
3)	Lugs Galvanised Ring, PKT100, 35, 10	State Compliance & Provide Evidence		
4)	Lugs Galvanised Ring , PKT50, 50, 6	State Compliance & Provide Evidence		
5)	Lugs Galvanised Ring, PKT50, 95, 8	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
6)	Lugs Galvanised Ring, PKT50, 95, 10	State Compliance & Provide Evidence		
7)	Lugs Galvanised Ring, PKT20, 35, 16	State Compliance & Provide Evidence		
8)	Lugs Galvanised Butt, PKT100, 10, 6	State Compliance & Provide Evidence		
9)	Lugs Pre-ins Bullet, female Yellow, PKT20, 6, 5	State Compliance & Provide Evidence		
10)	Lugs Pre-ins Bullet, male Yellow, PKT20, 6, 5	State Compliance & Provide Evidence		
11)	Lugs Pre-insulated Ring Blue, PKT20, 4, 6	State Compliance & Provide Evidence		
12)	Lugs Pre-insulated Spade Blue, PKT20, 4, 4`	State Compliance & Provide Evidence		
13)	Lugs Pre-insulated Spade Red , PKT20, 1.5, 6	State Compliance & Provide Evidence		
14)	Lugs Pre-insulated Spade Yellow , PKT20, 6, 4	State Compliance & Provide Evidence		
15)	Lugs Pre-insulated Spade Yellow, PKT20, 2.5, 6	State Compliance & Provide Evidence		
16)	Lugs Galvanised Ring , PKT20, 16, 6	State Compliance & Provide Evidence		
17)	Lugs Galvanised Ring , PKT20, 25, 6	State Compliance & Provide Evidence		
18)	Lugs Galvanised Ring, PKT20, 25, 8	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
19)	Lugs Pre-insulated Ring Yellow, PKT20, 6, 4	State Compliance & Provide Evidence		
20)	Lugs Pre-insulated Ring Yellow , PKT20, 6, 8	State Compliance & Provide Evidence		
21)	Lugs Pre-insulated Blade Hook Yellow, PKT20, 6, 6	State Compliance & Provide Evidence		
22)	Lugs Pre-insulated Spade Red 4mm Size 1, 2.5, 5	State Compliance & Provide Evidence		
23)	Lugs Galvanised Ring, PKT20, 16, 8	State Compliance & Provide Evidence		
24)	Lugs Galvanised Ring, PKT20, 35, 6	State Compliance & Provide Evidence		
25)	Lugs Galvanised Ring , PKT20, 70, 10	State Compliance & Provide Evidence		
26)	Lugs Pre-insulated Ring Blue PKT20, 4, 4	State Compliance & Provide Evidence		
27)	Lugs Pre-insulated Ring Blue PKT20, 4, 8	State Compliance & Provide Evidence		
28)	Lugs Pre-insulated Ring Red PKT20, 1.5, 6	State Compliance & Provide Evidence		
29)	Lugs Pre-insulated Ring Red PKT20, 1.5, 8	State Compliance & Provide Evidence		
30)	Lugs Galvanised Ring PKT20, 16, 16	State Compliance & Provide Evidence		
31)	Lugs Pre-insulated Flat Blade Yellow PKT20, 6, 10	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
32)	Lugs Galvanised Ring PKT20, 35, 8	State Compliance & Provide Evidence		
33)	Lugs Pre-insulated Spade Blue PKT20, 4, 8	State Compliance & Provide Evidence		
34)	Lugs Pre-insulated Pin Red PKT20, 2.5, 8	State Compliance & Provide Evidence		
35)	Lugs Pre-insulated Pin Blue PKT20, 4, 8	State Compliance & Provide Evidence		
36)	Lugs Pre-insulated Blade Hook Blue PKT20, 4,4.6	State Compliance & Provide Evidence		
37)	Lugs Pre-insulated Blade Hook Red PKT20, 2.5, 4.6	State Compliance & Provide Evidence		
38)	Lugs Pre-insulated Pin Red PKT20, 2.5, 10	State Compliance & Provide Evidence		
39)	Lugs Pre-insulated Pin Yellow PKT20, 6, 10	State Compliance & Provide Evidence		
40)	Lugs Pre-insulated Flat Blade Blue PKT20, 4, 10	State Compliance & Provide Evidence		
41)	Lugs Pre-insulated Flat Blade Red PKT20, 2.5, 10	State Compliance & Provide Evidence		
42)	Pre-insulated lugs flat blade red PKT20, 2.5, 10	State Compliance & Provide Evidence		
43)	Pre-insulated lugs flat blade blue PK20, 4, 10	State Compliance & Provide Evidence		
44)	Pre-insulated lugs flat blade yellow PKT20, 6, 10	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
45)	Lugs Galvanised Ring, PKT100, 25, 10	State Compliance & Provide Evidence		
46)	Lugs Galvanised Ring, PKT100, 16, 12	State Compliance & Provide Evidence		
47)	Lugs Galvanised Ring, PKT100, 10, 12	State Compliance & Provide Evidence		
48)	Lugs Galvanised Ring, PKT100, 35, 12	State Compliance & Provide Evidence		
49)	Lugs Galvanised Ring, PKT50, 50, 8	State Compliance & Provide Evidence		
50)	Lugs Galvanised Ring, PKT50, 50, 10	State Compliance & Provide Evidence		
51)	Lugs Galvanised Ring, PKT50, 50, 12	State Compliance & Provide Evidence		
52)	Lugs Galvanised Ring, PKT50, 70, 6	State Compliance & Provide Evidence		
53)	Lugs Galvanised Ring, PKT50, 70, 8	State Compliance & Provide Evidence		
54)	Lugs Galvanised Ring, PKT50, 70, 12	State Compliance & Provide Evidence		
55)	Lugs Galvanised Ring, PKT50, 95, 8	State Compliance & Provide Evidence		
56)	Lugs Galvanised Ring, PKT50, 95, 12	State Compliance & Provide Evidence		
57)	Lugs Galvanised Ring, PKT20, 120, 8	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
58)	Lugs Galvanised Ring, PKT25, 120, 10	State Compliance & Provide Evidence		
59)	Lugs Galvanised Ring, PKT25, 120, 12	State Compliance & Provide Evidence		
60)	Lugs Galvanised Ring, PKT20 185, 10	State Compliance & Provide Evidence		
61)	Lugs Galvanised Ring, PKT20, 185, 12	State Compliance & Provide Evidence		
62)	Lugs Galvanised Ring, PKT25, 185,16	State Compliance & Provide Evidence		
63)	Lugs Galvanised Ring, PKT25, 185, 20	State Compliance & Provide Evidence		
4.5.3	Cable ties			
Table 27	Specification for cable ties			
1)	Stainless steel cable ties with ball-lock: 200 x 8 x 0.3 mm (LxWxT) 100/PKT	State Compliance & Provide Evidence		
2)	Stainless steel cable ties with ball-lock: 520 x 4.5 x 0.3 mm (LxWxT) 100/PKT	State Compliance & Provide Evidence		
3)	Stainless steel cable ties with ball-lock: 127x4.6 x 0.3 mm (LxWxT) 100/PKT	State Compliance & Provide Evidence		
4)	Stainless steel cable ties with ball-lock: 360 x 8x 0.3mm (LxWxT) 100/PKT	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
5)	Stainless steel cable ties with ball-lock: 520 x 8x 0.3 mm (LxWxT) 100/PKT	State Compliance & Provide Evidence		
6)	Stainless steel cable ties with ball-lock: 360 x 4.5 x 0.3 mm (LxWxT) 100/PKT	State Compliance & Provide Evidence		
7)	Stainless steel cable ties with ball-lock: 680 x 8 x 0.3 mm (LxWxT) 100/PKT	State Compliance & Provide Evidence		
8)	Stainless steel cable ties with ball-lock: 200 x 4.5 x 0.3mm (LxWxT) 100/PKT	State Compliance & Provide Evidence		
9)	Outdoor UV resistant high quality plastic cable Tie 760x7.6 x 1.8 mm (LxWxT), black	State Compliance & Provide Evidence		
10)	Indoor high quality plastic cable Tie 760x7.6 x 1.8 mm (LxWxT), black	State Compliance & Provide Evidence		
11)	High quality plastic cable Tie 200 x 4.6x 0.1 mm (LxWxT), black	State Compliance & Provide Evidence		
12)	300x 4.6mm X 1.2 (LxWxT) mm	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
4.5.4	Heat Shrink			
Table 28	Specification for heat shrink			
1)	Heat shrink clear 12.7mm	State Compliance & Provide Evidence		
2)	Heat shrink clear 12mm	State Compliance & Provide Evidence		
3)	Heat shrink clear 6.4mm	State Compliance & Provide Evidence		
4)	Heat shrink clear 9.5mm	State Compliance & Provide Evidence		
5)	Heat shrink clear 9.5mm	State Compliance & Provide Evidence		
4.5.5	PVC Pipe			
Table 29	Specification for PVC pipe			
1)	PVC pipe 20mm slow bend	State Compliance & Provide Evidence		
2)	PVC pipe 20mm x 4m	State Compliance & Provide Evidence		
4.5.6	Rawl Bolts			
Table 30	Specification for raw bolts			
1)	Rawl Bolts M6	State Compliance & Provide Evidence		
2)	Rawl Bolts M8	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
3)	Rawl Bolts M10	State Compliance & Provide Evidence		
4.5.7	Saddles			
Table 31	Specification for saddle			
Table 31 - A	Steel galvanized saddle			
1)	Steel galvanised saddle 15mm PKT100	State Compliance & Provide Evidence		
2)	Steel galvanised saddle 20mm PKT100	State Compliance & Provide Evidence		
3)	Steel galvanised saddle 25mm PKT100	State Compliance & Provide Evidence		
Table 31 - B	Plastic Saddle			
1)	Saddle plastic 4mm flat PKT100	State Compliance & Provide Evidence		
2)	Saddle plastic 4mm round PKT100	State Compliance & Provide Evidence		
3)	Saddle plastic 5mm round PKT100	State Compliance & Provide Evidence		
4)	Saddle plastic 10mm round PKT100	State Compliance & Provide Evidence		
5)	Saddle plastic 13mm round PKT100	State Compliance & Provide Evidence		
6)	Saddle plastic 6mm round PKT100	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
7)	Saddle plastic 8mm round PKT100	State Compliance & Provide Evidence		
4.5.8	Threaded Bolts			
Table 31	Specification for thread bolts			
1)	Threaded bolt 6x30mm with nut-spring PKT20	State Compliance & Provide Evidence		
2)	Threaded bolt 6 x 25 mm with nut, spring	State Compliance & Provide Evidence		
3)	Threaded bolt 8 x 30 mm with nut, spring	State Compliance & Provide Evidence		
4)	Threaded bolt 8 x 55 mm with nut, spring	State Compliance & Provide Evidence		
4.5.9	Anchors			
Table 33	Specification for anchors			
1)	Anchors 8x55 PKT50	State Compliance & Provide Evidence		
2)	Anchors 5x45 PKT100	State Compliance & Provide Evidence		
3)	Anchors 6x55 PKT100	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
4.5.10	Multi-strand welding cable			
Table 34	Specification for multi-strand welding cable			
1)	16 mm ² multi-strand welding cable red	State Compliance & Provide Evidence		
2)	16 mm ² multi-strand welding cable black	State Compliance & Provide Evidence		
3)	35 mm ² multi-strand welding cable red	State Compliance & Provide Evidence		
4)	35 mm ² multi-strand welding cable black	State Compliance & Provide Evidence		
5)	50 mm ² multi-strand welding cable red	State Compliance & Provide Evidence		
6)	50 mm ² multi-strand welding cable black	State Compliance & Provide Evidence		
7)	95 mm ² multi-strand welding cable red	State Compliance & Provide Evidence		
8)	95 mm ² multi-strand welding cable black	State Compliance & Provide Evidence		
9)	120 mm ² multi-strand welding cable red	State Compliance & Provide Evidence		
10)	120 mm ² multi-strand welding cable black	State Compliance & Provide Evidence		
11)	185 mm ² multi-strand welding cable red	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
12)	185 mm ² multi-strand welding cable black	State Compliance & Provide Evidence		
4.5.11	Trunking			
Table 35	Specification for trunking			
1)	Trunking 100 x 40 end cap	State Compliance & Provide Evidence		
2)	Trunking 100 x 40 white 3m	State Compliance & Provide Evidence		
3)	Trunking 16 x 25 white 3m	State Compliance & Provide Evidence		
4)	Trunking 25 x 40 white 3m	State Compliance & Provide Evidence		
5)	Trunking 40 x 40 white 3m	State Compliance & Provide Evidence		
6)	Trunking 25 x 40 end cap	State Compliance & Provide Evidence		
7)	Trunking 40 x 40 end cap	State Compliance & Provide Evidence		
8)	Trunking 16 x 40 white 3m	State Compliance & Provide Evidence		
9)	Trunking 16 x 16 end cap	State Compliance & Provide Evidence		
10)	Trunking 16 x 16 white 2m	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
4.5.12	Rubber Tubing			
Table 36	Specification for rubber tubing			
1)	Rubber Tubing, chloroprene 3.0 x 0.8 mm (DxT)	State Compliance & Provide Evidence		
2)	Rubber Tubing, chloroprene 7.5 x1.3 mm (DxT)	State Compliance & Provide Evidence		
3)	Rubber Tubing, chloroprene 5.0 x 1 mm (DxT)	State Compliance & Provide Evidence		
4.5.13	Washer Bites			
Table 37	Specification for washer bite			
1)	Washer bite 10 mm PKT20	State Compliance & Provide Evidence		
2)	Washer bite 8 mm PKT20	State Compliance & Provide Evidence		
3)	Washer bite 6 mm PKT20	State Compliance & Provide Evidence		
4.5.14	Strippers and Scissors			
Table 38	Specification for strippers and scissors			
1)	Fibre optic Stripper	State Compliance & Provide Evidence		
2)	Wire Stripper	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
3)	Cable sheath Stripper (6mm to 28mm cable)	State Compliance & Provide Evidence		
4)	Fibre optic cable cutter scissors	State Compliance & Provide Evidence		
4.5.15	Racks and frames			
Table 39	Specification for racks and frames			
1)	Frame 80 Way back mount rack	State Compliance & Provide Evidence		
2)	Cage nut fully populated	State Compliance & Provide Evidence		
3)	Self-tapping screws assorted	State Compliance & Provide Evidence		
4)	IDF frame 80 way 800 pair	State Compliance & Provide Evidence		
5)	Tray 19" rack mount 1U	State Compliance & Provide Evidence		
6)	19 inch stainless steel back mount frame	State Compliance & Provide Evidence		
7)	Rail din slotted 2m	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
4.5.16	Multipurpose materials			
Table 40	List of multipurpose materials			
1)	Exothermic Copper Bonding Materials And	State Compliance & Provide Evidence		
2)	Air Duster	State Compliance & Provide Evidence		
3)	Alcohol Spray	State Compliance & Provide Evidence		
4)	Alcohol Wipes	State Compliance & Provide Evidence		
5)	Complete Cleaning Kit In Dust Free Container	State Compliance & Provide Evidence		
6)	Control Voltage Isolated Dc-Dc Converter (36-72vdc Input, 48vdc Output)	State Compliance & Provide Evidence		
7)	Draw Wire 4mm Per 100m	State Compliance & Provide Evidence		
8)	Exothermic Copper bonding materials to join copper earth bars	State Compliance & Provide Evidence		
9)	Fibre air blaster can/ cleaner	State Compliance & Provide Evidence		
10)	Fibre attenuator SC-APC single mode 10 dB	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
11)	Gas Arrestor 230V 3 Pole	State Compliance & Provide Evidence		
12)	Hi Gel Re-enterable Encapsulant	State Compliance & Provide Evidence		
13)	High performance mechanical splice for 125 µm cladding single mode and multimode with key (supplier to provide detailed splice performance test results)	State Compliance & Provide Evidence		
14)	Isopropyl 99,7% Pure In Small Dispenser	State Compliance & Provide Evidence		
15)	Isopropyl 99,7% Pure Per Litre	State Compliance & Provide Evidence		
16)	Isopropyl Aerosol Spray 99.7% Pure	State Compliance & Provide Evidence		
17)	Lint Free wipes	State Compliance & Provide Evidence		
18)	Lint Free Cotton Buds 2.5 Mm	State Compliance & Provide Evidence		
19)	Lint Free Cotton Buds 1.25 Mm	State Compliance & Provide Evidence		
20)	Mutton Cloth Per 1Kg	State Compliance & Provide Evidence		
21)	Pin 220V AC 2 Pin Top Plug Adaptor	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
22)	Plug 3 Pin 220 V AC	State Compliance & Provide Evidence		
23)	Scotch cast (for cable sealing, insulation, jointing, cable repair, encapsulation and protection)	State Compliance & Provide Evidence		
24)	Scotch locks (100 pieces)	State Compliance & Provide Evidence		
25)	Self-Adhesive Labelling With Chevron	State Compliance & Provide Evidence		
26)	Smouv 45 mm	State Compliance & Provide Evidence		
27)	Smouv 60 mm	State Compliance & Provide Evidence		
28)	Joint enclosure for 50-200 pairs copper telephone cable	State Compliance & Provide Evidence		
29)	Joint enclosure for 5-30 pairs copper telephone cable	State Compliance & Provide Evidence		
30)	Spragg Orange 20mm 50M Roll	State Compliance & Provide Evidence		
31)	Stainless Steel Tube Cutter For OPGW	State Compliance & Provide Evidence		
32)	Stretching sealing tape to seal coaxial feeder/cable connectors on towers	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
33)	Twin Flex White 0.5mm Per 100M	State Compliance & Provide Evidence		
34)	Wrapped Swabs (For Cleaning Coupling Connectors)	State Compliance & Provide Evidence		
35)	Bandit Strap 30m 12mm	State Compliance & Provide Evidence		
36)	Bandit Strap buckle 12mm 100 pieces	State Compliance & Provide Evidence		
37)	RM Kit for 19 inch Installation of 8.5" RAD Unit(s)- RM-33-2	State Compliance & Provide Evidence		
38)	RM Kit for Installation of One 19-inch RAD Unit - RM-34	State Compliance & Provide Evidence		
39)	SFP-1 Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)	State Compliance & Provide Evidence		
40)	SFP-2 Fast Ethernet/STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)	State Compliance & Provide Evidence		
41)	SFP-3 Fast Ethernet/STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)	State Compliance & Provide Evidence		
42)	SFP4 - Fast Ethernet/STM-1, 1550 nm, single mode, laser, 80 km (49.7 mi)	State Compliance & Provide Evidence		

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Clause Number	Description	Schedule A (Eskom's requirement statement)	Schedule B (Supplier's compliance statement)	Reference/Comment (Supporting evidence)
43)	4 Wire Type V E&M Interposing relay: <ul style="list-style-type: none">• Coil voltage: 48 V• Contact arrangement: 5no 5nc• Contact rating: 50-110 v• Enclosure rating: IP67	State Compliance & Provide Evidence		

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