

 <b>Eskom</b>	<b>Standard</b>	<b>Technology</b>
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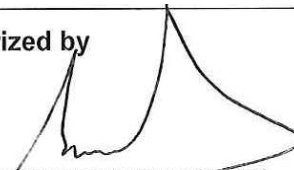
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## **1. Introduction**

This specification covers the manufacture, testing at works, user documentation, supply and delivery to Eskom's sites and off-loading of Optical Distribution Frames or Patch Panels/Boxes.

**Note:** The requirements of this specification override any other available Recommendation or Specification. Only exceptions to the requirements as detailed in Annex B (Statement of Non-compliance) and agreed to, in writing, by Eskom will be accepted.

## **2. Supporting clauses**

### **2.1 Scope**

#### **2.1.1 Purpose**

This specification defines Eskom's requirements for Optical Distribution Frames / Patch Panels/Boxes, for:

- Option A: A patch panel for mounting in 19 inch cabinets, for the terminating of 12, 24 or 48 single mode fibre cables,
- Option B: A patch panel for the mounting in 19 inch cabinets for the terminating of 12 or 24 core multimode cables,
- Option C: A patch box for mounting on walls or in other cabinets with a din rail for either 12 core multimode or 6 core single mode cables.

An enquiry based on this specification will call for the manufacture, testing at works, delivery to site, off-loading and, if called for, installation and commissioning of the ODF/Patch Panel or Box at Eskom installations. The equipment is to be installed into 19" or other cabinets and enclosures provided by Eskom.

#### **2.1.2 Applicability**

This document shall apply throughout Eskom Transmission and Distribution Divisions.

### **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] 240-75655504: Corrosion protection standard for new indoor and outdoor Eskom equipment, components, materials and structures manufactured from steel
- [2] 0.54/09000: Fibre Patch Panel Drawing
- [3] 0.54/09002: Fibre Patch Box Drawing

#### **2.2.2 Informative**

- [4] QM 58 – Supplier Contract Quality Requirements Specification
- [5] 240-60725641 Specification for Standard(19 inch) Equipment Cabinet

## 2.3 Definitions

### 2.3.1 General

Definition	Description
Technical Terms	For the purpose of this specification, technical terms used shall be as defined in the documents listed in clause 2.2.1 (Normative References)

### 2.3.2 Disclosure classification

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

## 2.4 Abbreviations

Abbreviation	Description
APC	Angle Polished Connector
GRP	Glass Reinforced Plastic
LC	Lucent Connector
mm	millimetre
ODF	Optical Distribution Frame (or Patch Panel)
SANS	South African National Standards
SC-APC	Standard Connector – Angled Polished Connector
µm	micrometre

## 2.5 Roles and responsibilities

Installation, if required by the contractor is to be supervised by the Projects Department. Acceptance testing is to be performed by the Works Planning and Centralised Services Department or as otherwise specified. On-going maintenance is the responsibility of the relevant Grid.

## 2.6 Process for monitoring

Not applicable.

## 2.7 Related/supporting documents

Not applicable.

## 3. Optical Distribution Frame / Patch Panel Requirements

### 3.1 Mechanical Characteristics of Option A – 1U Patch Panel for Single Mode fibre optic cables

- The ODF shall be of an enclosed metal or mild steel outer case with a hard plastic organiser and shall be capable of being mounted in a 19" cabinet.
- The ODF shall adhere to 240-75655504 Eskom's Corrosion Protection Standard.
- The unit shall be maximum 1U high for 12 to 48 fibre cores. A 1U brush tray can be used for storage of the leads, if necessary.

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- d) The casing shall allow for mounting on adjustable brackets, if necessary, so that the ODF can be mounted at various depths into a cabinet.
  - e) The ODF shall provide a facility for splice organization or a splice cassette of dimensions of reasonable proportions to accommodate the number of cores to be spliced.
  - f) The casing shall have a swivel tray that can move out of the main bracket (but not totally detached from it) for easy access to the fibres and shall not disturb the other patch leads.
  - g) Two 1U ODFs shall be able to be mounted one below the other with full access to the fibres with the swivel tray function.
  - h) The ODF unit shall also have built-in pigtail guides in the swivel portion of the case.
  - i) A cable terminating clamp shall be fixed to the rear of the non-movable portion of the ODF.
  - j) The clamping device shall also come with a jubilee clamp, a strain relief clamp (for the GRP-strength member) and a sealing rubber piece, or any other similar means for firmly securing the duct fibre cable of varying diameters.
  - k) Transport tubes shall be provided for protecting the fibre from the clamping device to the splice organiser.
  - l) The splice cassette shall be mounted with sufficient space to access the mid couplers for removal.
  - m) The spacing of the holes on the faceplate shall be such that there is enough space to connect or disconnect the pig-tails to the mid couplers.
  - n) The casing finish shall be smooth enough such that the utilisation of adhesive labels for all labelling purposes might be facilitated.
  - o) Mid couplers shall be of high quality, suitable for reliable single mode connections. Details of connectors shall be submitted to Eskom for approval.
  - p) The faceplate shall be supplied with the full complement of SC-APC D-hole mounting mid couplers fitted - all to be supplied with installed dust caps.
  - q) Mid couplers shall be SC-APC, ceramic insert type.
  - r) The patch panel shall be supplied with SC-APC pigtails.

### **3.2 Mechanical Characteristics of Option B – 1U Patch Panel for Multimode fibre optic cables**

- a) The mechanical characteristics of Option B are the same as that of Option A above, points a) to n).
- b) Option B shall adhere to the specifications of the Eskom approved drawing 0.54/09000.
- c) The patch panel shall be supplied with 50/125µm multimode LC pigtails.
- d) The faceplate shall be supplied with the full complement of 6 or 12 duplex LC mid couplers - all to be supplied with installed dust caps.
- e) The patch panel shall have an M6x15 earthing stud to allow for earthing to the earth bar

### **3.3 Mechanical Characteristics of Option C – Side/Wall Mount Patch Box**

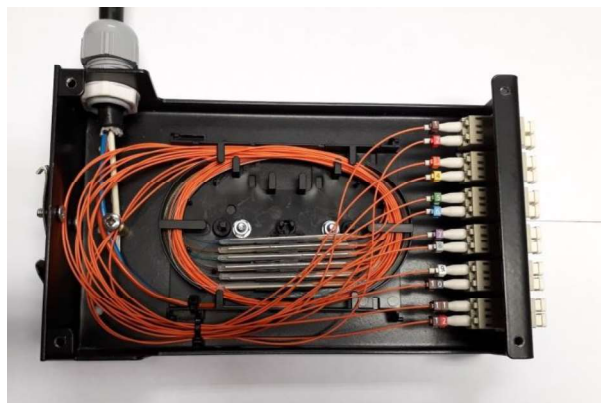
- a) The patch box shall be a closed mild steel case with a slide out cover as per the Eskom approved drawing 0.54/09002 and shall adhere to 240-75655504 Eskom's Corrosion Protection Standard.
- b) It should have an approximate size of 200 mm x 120mm x 45mm.
- c) The casing shall allow for mounting on a wall or on the side panel of a cabinet with a din rail facility.
- d) The patch box shall have accessories for securing and organising the fibre and splice cassette.
- e) The splice cassette with an approximate size of 120mm x 100mm x 10mm shall have a cover that can be snapped on and off.

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- f) The patch box shall be supplied with 12 x 50/125µm multimode LC pigtails for multimode cable and be supplied with 6 x SC/APC pigtails for single mode cable.
- g) The box shall provide a mounting plate with 6 duplex LC mid couplers installed on it for multimode or 6 single SC/APC mid couplers for single mode.
- h) The patch box shall allow for a suitable gland to secure the unarmoured cable entering the patch box.
- i) The patch box shall also provide a strain relief clamp to secure the Glass Reinforced Plastic strength member.
- j) The casing finish shall be smooth enough such that an adhesive label can be attached for labelling.
- k) The patch box shall have an M6x15 earthing stud to allow for earthing to the earth bar.
- l) The drawings below give an indication of what the patch box shall look like.



**Figure 1: Empty Closed Patch Box**



**Figure 2: Equipped Patch Box**

### **3.4 Additional Requirements**

- a) The Supplier shall provide a sample of the patch panel/box to the Purchaser for evaluation and acceptance.
- b) The Supplier shall provide detailed installation instructions as per Eskom's requirements.

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**3.5 Documentation**

- a) The following documentation shall be supplied:
- 1) All outline drawings and details of construction of ODF/Patch panel and Patch box.
  - 2) Details of splice organisers.
  - 3) Installation instructions.
  - 4) All specifications of mid couplers
- b) All documentation called for shall conform to the following:
- 1) Supplied in English.
  - 2) A4 Paper Size.
  - 3) Of a construction that can open flat on any page.
  - 4) Any drawings and descriptions included shall conform to the A4 series (295 mm x 220 mm). Larger drawings shall be folded in a single panel along the 200 mm axis of the standard A4 size. Drawings which must be folded in two directions are not acceptable.
  - 5) Different sections of the documentation shall be separated by means of thumb-tag separators.
  - 6) All hard-copy documentation must be supplied in duplicate and in black and white only (to facilitate copying) and where possible a software copy shall be supplied.
- c) Three copies of the documentation shall be sent to:
- [\*\*The Member of Staff responsible for order\*\*] as per the enquiry documentation.

**4. Statement of Compliance or Deviation**

The tenderer must state compliance with, or deviation from, the requirements of this specification, on a section by section and clause by clause basis (see Annex B).

**5. Authorization**

This document has been seen and accepted by:

Name and surname	Designation
Danie Du Plessis	Senior Manager - Grids
Sikelela Mkhabela	Senior Manager - DX
Prudence Madiba	Senior Manager - GX
Joe Manyisa	Senior Manager - Eskom Telecommunications (Acting)
Anthea Solomon	Middle Manager - TX Secondary Plant
Lloyd Chego	Senior Manager - Group Security
Oliva Muwanga-Zake	Senior Manager - GIT

**6. Revisions**

Date	Rev	Compiler	Remarks
March 2018	2	V Naidu	Including of referencing to Eskom specific drawings of the 1U patch panel and patch box.

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<b>Date</b>	<b>Rev</b>	<b>Compiler</b>	<b>Remarks</b>
March 2015	1	V Naidu	Including patch box requirements Formatted to S C O T-New Standard Template_20 August 2013. Correction of typing errors Document number changed
April 2010	1	V Naidu	Change of document layout. Change ST to SC-APC midcouplers.
Dec 2006	0		Renumbering of old specification TRMSC0015

## **7. Development team**

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

- D C Smith
- T Gosai
- A Pereira
- I Naicker
- D Gojela
- R Hariram

## **8. Acknowledgements**

Not applicable.



**Annex A – Schedule A/B - Technical Particulars**

Clause No	Description of Clause	Schedule A (Eskom's Requirement)	Schedule B (Tenderer's Compliance and Supporting Evidence)
	Option A or Option B or Option C	<i>indicate which Option is required</i>	
<b>Complete if either Option A or Option B</b>			
3.1 a)	Enclosed metal or mild steel case and hard plastic organiser	<i>comply</i>	
3.1 a)	Mounted in a 19" cabinet	<i>comply</i>	
3.1.b)	Adhere to 240-75655504 Eskom's Corrosion Protection Standard	<i>comply</i>	
3.1 c)	1U high (for 12 and 24 fibre) including storage for patch leads.	<i>comply</i>	
3.1 c)	1U brush tray shall be used for storage of the leads required.	<i>comply</i>	
3.1 d)	Mounting on adjustable brackets, if necessary.	<i>comply</i>	
3.1 e)	Splice organization or a splice cassette of dimensions to accommodate fibre core splices of 12 to 48.	<i>comply/specify number of cores</i>	
3.1 f)	Swivel tray that can move out of the main bracket.	<i>comply</i>	
3.1 g)	Two 1U ODFs should be able to be mounted one below the other with full access to the fibres with the swivel tray function	<i>comply</i>	
3.1 h)	Built-in pigtail guides in the swivel portion of the case	<i>comply</i>	
3.1 i)	A cable terminating clamp should be fixed to the rear of the non-movable portion of the ODF.	<i>comply</i>	
3.1 j)	Firmly able to secure the duct fibre cable with varying diameter.	<i>comply</i>	
3.1 k)	Transport tubes should be provided for protecting the fibre.	<i>comply</i>	
3.1 l)	Splice cassette shall be mounted with sufficient space.	<i>comply</i>	
3.1 m)	Spacing of the holes on the faceplate - enough space to connect or disconnect the pig-tails	<i>comply</i>	
3.1 n)	Casing finish shall be smooth for adhesive labelling	<i>comply</i>	

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Clause No	Description of Clause	Schedule A (Eskom's Requirement)	Schedule B (Tenderer's Compliance and Supporting Evidence)
<b>Complete if Option A</b>			
3.1 o)	Mid couplers shall be of high quality	<i>provide specification</i>	
3.1 p)	Full complement of SC-APC D-hole mounting mid couplers fitted - all to be supplied with installed dust caps	<i>comply</i>	
3.1 q)	Mid couplers shall be SC-APC, ceramic insert type.	<i>comply</i>	
3.1 r)	Supplied with SC/APC pigtails	<i>comply</i>	
<b>Complete if Option B</b>			
3.2 b)	Comply to specifications of the Eskom approved drawing 0.54/09000	<i>comply</i>	
3.2 c)	Splice cassette shall be supplied with 50/125µm multimode LC pigtails	<i>comply</i>	
3.2 d)	Full complement of 6 or 12 duplex LC mid couplers - all to be supplied with installed dust caps	<i>comply/specify #mid-couplers</i>	
3.2 e)	Supplied with M6x15 earthing stud	<i>comply</i>	

Clause No	Description of Clause	Schedule A (Eskom's Requirement)	Schedule B (Tenderer's Compliance and Supporting Evidence)
<b>Complete if Option C</b>			
3.3 a)	Patch box shall be a closed mild steel case with a slide out cover	<i>comply</i>	
3.3 a)	Comply to specifications of the Eskom approved drawing 0.54/09002	<i>comply</i>	
3.3 a)	Adhere to 240-75655504 Eskom's Corrosion Protection Standard.	<i>comply</i>	
3.3 b)	Approximate size of 200 mm x 120mm x 45mm	<i>comply</i>	
3.3 c)	Mounting on a wall or on the side panel of a cabinet with din rail facility.	<i>comply</i>	
3.3 d)	Accessories for securing and organising the fibre and splice cassette	<i>comply</i>	

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3.3 e)	Splice cassette with an approximate size of 120mm x 100mm x 10mm	<i>comply</i>	
3.3 f)	Supplied with 12 x 50/125µm multimode LC pigtails or 6 x SC/APC single mode pigtails	<i>State which pigtails</i>	
3.3 g)	A mounting plate with 6 duplex LC mid couplers or 6 single SC/APC mid couplers	<i>State which mid coupler. Tenderer to supply specification</i>	
3.3 h)	Suitable gland to secure the unarmoured cable	<i>comply</i>	
3.3 i)	Provide a strain relief clamp to secure the Glass Reinforced Plastic strength member	<i>comply</i>	
3.3 l)	Casing finish shall be smooth for adhesive labelling	<i>comply</i>	
3.3 m)	Supply M6x15 earthing stud	<i>comply</i>	
3.3 n)	Drawings	<i>comply</i>	

Clause No	Description of Clause	Schedule A (Eskom's Requirement)	Schedule B (Tenderer's Compliance and Supporting Evidence)
<b>Additional Requirements -Complete for all Options</b>			
3.4 a)	Provide a sample of the patch panel/box	<i>comply</i>	
3.4 b)	Provide detailed installation instructions	<i>comply</i>	
<b>Documentation - Complete for all Options</b>			
3.5 a) 1)	All outline drawings for ODF/Patch panel & Patch box	<i>provide details/drawings</i>	
3.5 a) 2)	Details of splice organisers	<i>provide details/drawings</i>	
3.5 a) 3)	Installation instructions	<i>provide installation document</i>	
3.5 a) 4)	All specifications of mid couplers	<i>provide specifications</i>	
3.5 b)	Note documentation conformance	<i>comply</i>	
3.5 c)	Three copies of documentation to be supplied	<i>comply</i>	
<b>Statement of Compliance or Deviation</b>			
3.6	Annex B completed	<i>comply</i>	

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**Annex B – Statement of Non-compliance**

The equipment supplied on this contract complies in all respects with the requirements of the specification and Schedule A/B, with the exemption of the following points:

**Table B.1: Statement of Non-Compliance - Specification**

Page	Paragraph	Details of Deviation or Non-compliance

**Table B.2: Statement of Non-Compliance - Schedule A/B**

Caption Page	Paragraph	Details of Deviation or Non-compliance

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