

 Eskom	Standard	Technology
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Title: **STANDARD FOR ENERGY
METER KIOSKS: SECURE
POLE-TOP MULTI-WAY
METERING KIOSKS**

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1. Introduction

This standard lists the requirements for the various options for pole-top multi-way metering kiosks for high-risk areas.

The options include:

- Two way single phase split pre-payment kiosk
- Four way single phase split pre-payment kiosk
- Six way single phase split pre-payment kiosk
- Eight way single phase split pre-payment kiosk
- Data concentrator kiosk

2. Supporting clauses

2.1 Scope

2.1.1 Purpose

This standard sets out Eskom's requirements for the manufacturing of secure multi-way single phase, low-voltage meter kiosks for small electrical power users for supplying adjacent customers in overhead electricity supply networks. This kiosk is intended for use with split prepayment meters in networks where the risk of electricity theft and vandalism is high.

2.1.2 Applicability

This document is applicable to Eskom Distribution Division.

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] ISO 9001, Quality Management Systems.
- [2] IEC 60898, Electrical accessories/circuit breakers for overcurrent protection for household and similar installations
- [3] SANS 1091, National colour standards for paint
- [4] SANS 1507, Electric cables with extruded solid dielectric insulation for fixed installations (300/500V to 1900/3000V).
- [5] SANS 1186-1, Symbolic safety signs Part 1: Standard signs and general requirements
- [6] SANS 60529, Degrees of protection for enclosures (IP code)
- [7] SANS 60947-7-1, Low-voltage switchgear and control gear Part 7: Ancillary equipment Section 1: Terminal blocks for copper conductors
- [8] SANS 556: 2004, Low-voltage switchgear and control gear Part 1: Circuit-breakers
- [9] 240-76628631, Standard for sealing metering equipment.
- [10] 240-76625601, Standard for particular requirements of prepayment meters.
- [11] Eskom's Technical instruction: 08 TI – 010: Meter kiosk numbering
- [12] 240-98195962 , Chemical treatment of 3CR12 kiosks.

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- [13] Eskom drawing D-DT-1030, Eskom manufacturing drawings: Two way pole-top SPU secure meter kiosk manufacturing details.
- [14] Eskom drawing D-DT-1031, Eskom manufacturing drawings: Four way pole-top SPU secure meter kiosk manufacturing details.
- [15] Eskom drawing D-DT-1032, Eskom manufacturing drawings: Six way pole-top SPU secure meter kiosk manufacturing detail.
- [16] Eskom drawing D-DT-1033, Eskom manufacturing drawings: Eight way pole-top SPU secure meter kiosk manufacturing details.
- [17] Eskom drawing D-DT-1034, Eskom manufacturing drawings: Data concentrator secure meter kiosk manufacturing details.

2.2.2 Informative

- [18] DIN 17441, Stainless steel: technical delivery conditions for cold rolled strip and slit strip and for plate and sheet cut there from

2.3 Definitions

2.3.1 General

Definition	Description
Metering Equipment	A collection of components in the metering installation, namely the instrument transformers, cables, meters, and any housing and ancillary equipment such as test blocks.
Metering Installation	All meters, fittings, equipment, wiring and installations used for measuring the flow of electrical power.

2.3.2 Disclosure classification

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

2.4 Abbreviations

Abbreviation	Description
3CR12	Low grade ferritic stainless steel containing 12% chromium
IP	Ingress Protection
MCB	Miniature Circuit-breaker
MCCB	Moulded Case Circuit-breaker
n/a	not applicable
PTM&C	Protection, Telecoms, Metering and Control

2.5 Roles and responsibilities

The relevant design sections within Eskom Distribution are responsible to implement the new designs according to the requirements as listed in this document.

2.6 Process for monitoring

Adherence to this document shall be monitored through routine inspections.

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2.7 Related/supporting documents

Not applicable.

3. Requirements

3.1 Meter kiosk construction

3.1.1 General

- a) The entire kiosk (kiosk shell, roof, doors and base) shall be manufactured from 2 mm thick (minimum thickness) 3CR12 steel.
- b) The kiosk shall have an Ingress Protection (IP) rating of 3 for protection against touching live parts, and it shall have an IP rating of 3 for protection against ingress of liquids (IP33).
- c) The kiosk shall be pole mounted with the use of stainless steel strapping. A bracket is provided for hanging the kiosk on a couch screw before applying the stainless steel strapping.
- d) The kiosks shall be designed and assembled in accordance with D-DT 1030, D-DT-1031, D-DT-1032, D-DT-1033 & D-DT-1034.

3.1.2 Box

- a) The doors' surrounds shall incorporate a splash-proof sill around the inner border of the door opening of the kiosk.
- b) DIN-rails for the fitment of the equipment shall be fitted onto the back of the kiosk using stainless steel bolts, nuts and spring washers or screws and spring washers or rivets. The DIN-rail may also be spot welded onto the back of the panel.

3.1.3 Roof

- a) The roof shall form part of the box and shall not be a separate item.
- b) Indents shall be made to the roof to create a slight pitch on the roof to allow water to run off.

3.1.4 Doors

- a) The doors shall be fitted with stainless steel internal hinges situated on the left side of the kiosk.
- b) The kiosk shall be lockable by means of an 8 mm diameter shackle padlock.
- c) A one-way lever locking mechanism system shall be installed on the two-way kiosks.
- d) A three-way lever locking mechanism system shall be installed on the four, six and eight-way kiosks.
- e) A box shall be installed over the lever lock to protect the locking mechanism from vandalism. The box shall have 5 × 20 mm slotted holes over the top and side surfaces of the box.
- f) A sturdy door stay shall be provided on the door to ensure that the door can be kept in a 90° open position. The door stay shall be manufactured from a non-ferrous metal.
- g) The gap between the sides of the door and the kiosk door frame shall not exceed 5 mm.

3.1.5 Bottom of enclosure

- a) Supply and service cable glands shall be provided for the fitment of cables.

3.1.5.2 Earthing details

- a) An earth stud shall be provided as indicated in the drawings. The earth stud shall be an M8 35mm stainless steel set screw (welded onto the bottom), spring washer and nut.
- b) The neutral bar shall be effectively connected to this earth stud by a green/yellow 10mm² PVC insulated earthing conductor.
- c) All earth connections shall be as short as possible and shall not be coiled.

3.2 Fabrication of 3CR12 steel kiosks

- a) All cutting, forming, forging, machining, welding, fastening, annealing, stress relieving, post weld cleaning and coating shall comply with the internal standards of the manufacturer of 3CR12 steel.

3.2.2 Cutting

- a) In all cutting operations, whether thermal or mechanical, carried out on 3CR12 steel, no contamination by ferrous (iron or steel) material or particles shall take place.
- b) Sharp or rough edges shall be removed by manual grinding or filing.

3.2.3 Bending

- a) It is important to ensure that there is no contamination of the 3CR12 steel from mild steel particles adhering to the tooling. It is recommended that the tooling be thoroughly cleaned before running 3CR12 steel.

3.2.4 Welding

- a) For Manual Metal Arc (MMA) welding type 309L electrodes are recommended for welding 3CR12 steel, although E308L and E316L may also be used.
- b) For Tungsten Inert Gas (TIG), Metal Inert Gas (MIG) and Plasma arc welding (PAW) the recommended welding consumables are AWS A5.9 ER309L, ER308L or ER316L.
- c) When welding stainless steel studs, bolts or nuts onto 3CR12 steel it is recommended that the weld consumable shall be the AWS class 309L to avoid excessive weld metal dilution.
- d) Where the manufacturer is using stud welding onto 3CR12 steel then 304L stainless steel studs shall be used.
- e) Spot welding (resistance welding) shall only be used on parts of the kiosk that are not directly in contact with the outside atmosphere.

3.2.5 Post weld cleaning (pickling and passivation)

Post weld cleaning, pickling and passivation shall be done according to Technical bulletin 240-98195962 - chemical treatment of 3CR12 kiosks.

3.2.6 Powder coating

- a) Before powder coating can take place it is very important to ensure that there is no oil present on the kiosk. The kiosk shall be degreased before powder coating.
- b) The kiosk shall be powder coated with light navy grey polyester powder (SABS colour code G35) and the thickness shall be between 60µm and 80µm.

3.3 Meter kiosk electrical equipment

3.3.1 General

- a) All equipment used within the kiosk (meters, circuit-breakers and terminals) shall be touch-safe, i.e. have enclosed terminals, recessed screws, etc. They shall comply with clause 8.2 of IEC 60898, which states all the requirements for equipment to be touch-safe.
- b) Where equipment is used that does not allow for the touch-safe requirement, then they shall be protected by suitable covers.
- c) Any live part of the equipment shall have at least 20 mm of clearance from metal parts that are connected to earth.

3.3.2 Wiring

- a) The supply cable wiring shall be done in 16 mm² stranded copper Polyvinyl Chloride (PVC) insulated conductor, which shall comply with SANS 1507 and SANS 1411.
- b) The supply cables shall be connected onto the Miniature Circuit-breakers (MCBs) and neutral terminals. The customer's cables shall be connected onto the meter and neutral terminals.
- c) The internal wiring (wiring between MCBs, neutral bars and meters) shall be done in 10 mm² colour coded Polyvinyl Chloride (PVC) insulated conductor, which shall comply with SANS 1507.
- d) The neutral from Eskom's side will be hard-wired, by way of a 10 mm² square green and yellow cable, onto the earth stud inside the kiosk.
- e) There shall be no joints or splices in the wiring.
- f) No bare wiring shall be exposed at termination points on the MCBs, meters and terminals.
- g) No individual wire numbering is required.
- h) The internal conductors shall be of adequate length to fit into the terminals of any of the approved Eskom split meters, and shall be stripped to the appropriate length.

3.3.3 Circuit-breakers

- a) The 20A supplies shall either have a 40A hydraulic magnetic MCB or 50A thermal magnetic MCB and shall comply to the following:
 - DIN rail mounted
 - 5kA short circuit breaking capacity
 - 230V rated voltage
 - The 50A thermal magnetic MCBs shall comply with the following requirements and SANS 556-1:
 - full discrimination with a 20A standard curve MCB up to 1000A.
 - tripping curve which conforms to the limits given in the graph in Annex C
- b) The 60A supplies shall either have individual 63A hydraulic magnetic MCBs or thermal magnetic curve C MCBs and shall comply to the following:
 - DIN rail mounted
 - 5kA short circuit breaking capacity
 - 230V rated voltage
- c) Only Eskom-approved MCBs shall be used.

3.3.4 Meters

- a) The kiosks are designed primarily for use with split prepayment meters.
- b) The kiosks shall be supplied without meters.

3.4 Notices, labeling and packaging

3.4.1 Notices

- a) Notices shall be provided as required by the Occupational Health and Safety Act. All notices shall be fastened to the kiosks by self-tapping stainless steel screws or by rivets.
- b) A standard "Danger" notice in accordance with SANS 1186 shall be provided and placed on the front of the locking mechanism's securing box.

3.4.2 Labels

- a) A label showing the name of the manufacturer, the date of manufacture and the various quality checks shall be placed on the inside of the kiosk door. The label shall be durable preferably of metal.

3.4.3 Kiosk identification

- a) The kiosks shall be marked with a permanent black marker (pen) on the outside, top, left side of the door (front door). A stencil that represents an Arial font size 72 (\pm 18-25mm high) shall be used. The kiosk shall have the mark "2-Way, 4-Way, 6-Way or 8-Way" on the door.
- b) A barcode label indicating the type of the kiosk and the Eskom SAP number shall be placed on the inside of the kiosk door and on the outside of the packaging material of the kiosk.
- c) The kiosk shall also have a unique number as specified in Eskom's Technical instruction: 08 TI – 010: Meter kiosk numbering.

3.4.4 Packaging

- a) Each kiosk shall be wrapped in bubble wrapping or cardboard before shipping to Eskom stores. This covering shall protect the kiosk and its components from reasonable transport related wear and tear from the supplier's works to the end customer. The cabinet shall be clearly labelled as follows:
 - Full delivery address
 - Detailed content description as stated on the order
 - Dispatch date
 - Eskom and supplier order number

Note: (Label shall also be placed inside the cabinet. This helps when the packaging is damaged.)

3.5 Quality inspections

- a) To ensure that the requirements are met as specified in this document, quality inspections and tests shall be done before shipment of the kiosk to Eskom stores.
- b) Details of the manufacturer inspection label are shown in table B1 in annex B.

4. Authorization

This document has been seen and accepted by:

Name and surname	Designation
M Songo	Senior Manager: Distribution PTM&C (Acting)
S Mkhabela	Senior Manager: Distribution Maintenance and Operations
D van Rooi	Metering, DC & Security Technology Manager – PTM&C
M Omar	Metering and Measurements Study Committee Chairperson

5. Revisions

Date	Rev.	Compiled by	Clause	Remarks
April 2020	3	HPD Groenewald	3.2.4	Pickling and passivating process revised
			3.3.3	Amended the details for the MCBs
			3.4.3	Added kiosk numbering details
			Annex C	Deleted technical schedules – will be developed for tender processes in Excel format.
			Annex C	Added tripping curve details for the 50A MCB.
Nov 2015	2	HPD Groenewald	3.1.1.a)	Thickness of 3CR12 decreased to 2mm
			3.1.1.c)	Additional bracket specified to hang kiosk onto couch screw.
			3.1.4.c)	A one-way lever lock specified for the two way kiosk
			3.1.5.1	Earthing requirements specified.
			3.3.2.c)	Internal wiring specified
			3.3.2	Removed requirements for the insulation of wiring ends by end caps
			3.3.4	Split pre-payment meter must not be supplied by the kiosk manufacturer.
			3.4.3	Added details on packaging.
Feb 2013	1	HPD Groenewald		First draft

6. Development team

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

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- E Makwarela Group Technology, PTM&C
- B Mofu Standards Implementation (GOU)

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7. Acknowledgements

Not applicable.

Annex A – List of drawings

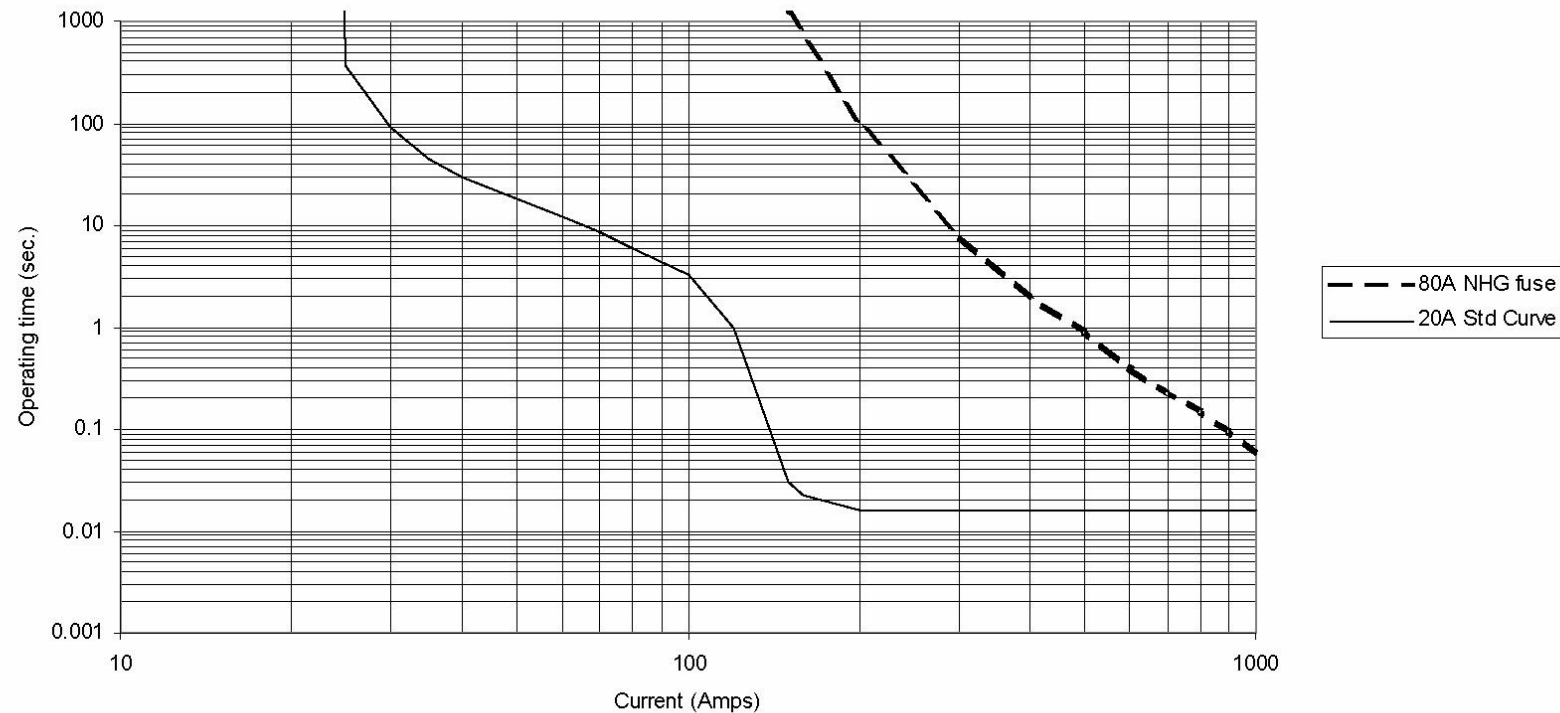
The following drawing forms part of this annex:

- [19] Eskom drawing D-DT-1030, Eskom manufacturing drawings: Two way pole-top SPU secure meter kiosk manufacturing details.
- [20] Eskom drawing D-DT-1031, Eskom manufacturing drawings: Four way pole-top SPU secure meter kiosk manufacturing details.
- [21] Eskom drawing D-DT-1032, Eskom manufacturing drawings: Six way pole-top SPU secure meter kiosk manufacturing detail.
- [22] Eskom drawing D-DT-1033, Eskom manufacturing drawings: Eight way pole-top SPU secure meter kiosk manufacturing details.
- [23] Eskom drawing D-DT-1034, Eskom manufacturing drawings: Remote Access Terminal (RAT) secure meter kiosk manufacturing details.

Annex B – Manufacturer inspection label

Name of manufacturer:	
Date of manufacture:	
Order number:	
Name of manufacturer's quality inspector:	
Correct MCBs installed?	
Correct conductors installed?	
Correct neutral bars installed?	
Wiring checked?	
Tightness checks done on wiring?	
Powder coating checked?	

Annex C – 50A MCB tripping curve limits



10 100 1000 Current (Amps)

The 50A MCB must have a tripping curve range between the upper limit of a 20A curve MCB and the lower limit of a 80A NHG fuse.

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