

 <b>Eskom</b>	<b>Standard</b>	<b>Technology</b>
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Title: **SPECIFICATION FOR PANEL LABELLING STANDARDS**

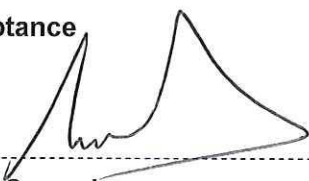
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COE Acceptance



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Date: **29/1/2019**

Date: **04/02/2019**

This document is **STABILISED**. The technical content in this document is not expected to change because the document covers: *(Tick applicable motivation)*

1	A specific plant, project or solution	
2	A mature and stable technical area/technology	
3	Established and accepted practices.	X

PCM Reference: **PCM System Design 240 - 62629353**

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	<b>Standard</b>	<b>Technology</b>
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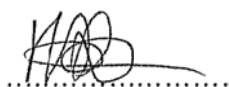
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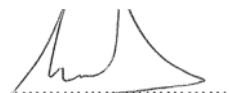
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### CONTROLLED DISCLOSURE

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## Executive Summary

The standard describes the common labelling requirements in terms of materials, methods of engraving/printing and fixing, and character sizes of equipment labels supplied for use on relay panels, process interface unit, junction boxes, within marshalling/mechanism boxes of power plant equipment and other indoor/outdoor equipment. It also describes the standard protection schemes layout to be adopted for new protection schemes.

## 1. Introduction

This standard is required to ensure various protection schemes layouts are standardized and that consistent labelling is used.

## 2. Supporting clauses

### 2.1 Scope

The standard covers labelling requirements for new protection and control schemes and supersedes the following documents:

- DSP 34-1513: Specification for Control Panel Labels and Cable Markers (Distribution).
- TST41-267: Standard for Labelling of Secondary Plant Equipment (Transmission).

#### 2.1.1 Purpose

The purpose of this standard is to specify standardised labelling type, size; colour and font, panel abbreviations with full text explanations that shall be used on all secondary plant indoor and outdoor equipment.

#### 2.1.2 Applicability

The standard shall apply throughout Eskom Transmission and Distribution secondary plant equipment.

### 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

Parties using this standard shall apply the most recent edition of the documents listed below.

##### International document(s):

Not Applicable

##### South African National document(s):

SABS 1091: National Colour Standards for Paints

##### Eskom National document(s):

32-9: Definition of Eskom documents.

32-644: Eskom documentation management standard.

474-65: Operating Manual of the Steering Committee of Wires Technologies (SCOWT)

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**Eskom Divisional documents(s):**

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

DISASAAN0 (DST 34-1439): Standard for the labelling of Substations and Networks

ISO 9001: Quality Management Systems

TST41-1062: Standard for Electronic Protection and Fault Monitoring Equipment for Power Systems.

TSP41-1009: Standard for the Labelling of High Voltage Equipment for Eskom Transmission Substations.

**2.2.2 Informative**

Not Applicable

**2.3 Definitions****2.3.1 General**

Definition	Description
<b>Label</b>	An inscription attached to equipment whether on separate material or directly printed (e.g. on the control panel faceplate) and giving information about the equipment.
<b>Marker</b>	An inscription attached to cables, giving information about the cable
<b>Secondary Plant</b>	Protection, Measurements & Metering, Telecommunications, Telecontrol and DC systems equipment

**2.3.2 Disclosure classification**

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

**2.4 Abbreviations**

Abbreviation	Description
<b>DC</b>	Direct Current
<b>DX</b>	Distribution
<b>EHV</b>	Extra High Voltage
<b>I/O</b>	Input/output
<b>IED</b>	Intelligent Electronic Device
<b>kVAh</b>	kilovolt Ampere hour
<b>LED</b>	Light Emitting Diode
<b>mm</b>	Millimetres
<b>PIU</b>	Process Interface Unit
<b>PTMC</b>	Protection, Telecommunications, Measurements and Control

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Abbreviation	Description
QA	Quality Assurance
SABS	South African Bureau of Standards
TX	Transmission
UV	Ultra-Violet

## 2.5 Roles and responsibilities

- Power Delivery Engineering is responsible for ensuring that the requirements stipulated in this standard are adhered to.
- Quality Assurance is responsible for ensuring that all equipment are labelled according to this standard before they leave the manufacturer's factory.
- Eskom Grids/Operational units are responsible for ensuring that correct labels are used before commissioning the secondary plant equipment

## 2.6 Process for monitoring

QA is responsible for monitoring that the standard is adhered to at all times and making use of a check list to assess all the equipment stipulated in this document.

## 2.7 Related/supporting documents

- DSP 34-1513: Specification for Control Panel Labels and Cable Markers.
- TST41-267: Standard for Labelling of Secondary Plant Equipment.
- TSP41-1009: Standard for the Labelling of High Voltage Equipment for Eskom Transmission Substations.
- DISASAAN0 (DST 34-1439), Standard for the labelling of Substations and Networks.

# 3. Labelling Requirements

## 3.1 General

All external and internal labels on equipment shall bear inscriptions in English. Label inscription schedules shall be referred to Eskom for approval before label manufacture commences, as usages not approved by Eskom shall be rejected. Eskom will assist with translations, spelling and standard approved abbreviations to be used on the relay panels and control panels. Labels on indoor equipment, internal and external labels on outdoor equipment shall comply with drawing 0.00/5007

This standard does not cover labels in vitreous enamel for high voltage switchyards. All labels shall be horizontal and parallel to each other and to the equipment with which they are associated. All labels which are not approved by Eskom shall be rejected. The lettering shall be permanent and visible. A label shall be provided for each control panel. In cases where more than one scheme or module is fitted into a panel, each scheme/module shall be uniquely identified. The different lamps, switches, LEDs, push buttons etc. on each panel shall be labelled in accordance with this standard. All labels shall provide positive identification of individual components, i.e. control switches, relays or IED's, pushbuttons, etc. on relay panels. All abbreviations used shall not conflict with any other labelling on the panels.

All IED front panel LEDs shall be pre-labelled in the factory to a professional standard with a clear description and/or a clarification of the specific colours. The method of labelling and the label inscriptions shall be subject to Eskom approval. A label stating the IED firmware version shall be fixed to the front fascia of each IED.

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### 3.2 Requirements for Indoor Equipment and Outdoor Equipment labels

Unless otherwise specified, all control panels in relay rooms, switchgear, individual/remote control stations, junction boxes or PIU and similar equipment for indoor use shall be provided with front and back labels having black lettering on a white background or white lettering on a red background.

Subject to Eskom approval, labels may be produced by a photographic or print (inkjet & screen printing) process, or made from white/black/white sandwich board engraved through one white layer, or made from white opal Perspex with black-filled lettering provided that the medium used for filling is black brushing cellulose lacquer. Filling waxes are not acceptable.

Engraved labels other than those produced by a photographic or print (inkjet & screen printing) process shall have a minimum thickness of 1.5mm. Labels shall not discolour nor distort in service due to i.e. exposure to ultra violet radiation and shall have straight, unclipped edges. Chamfering is not essential. All labels for exterior located on outdoor equipment shall be of metal of not less than 1.5mm thickness. The characters shall be engraved and filled with black brushing cellulose lacquer. Non-metallic labels may be accepted, subject to Eskom approval.

#### 3.2.1 Engraving

The lettering shall be legible when viewed from an angle of approximately 45 degrees from any position (above, below, horizontal) with respect to the label. The width of exposed black in standard labels shall not be less than one seventh of the centre height of the letter.

Standard vertical, medium lettering shall be used. Narrow (condensed) or broad (extended) type faces are not acceptable. Upper case letters shall be used, except where conventional abbreviations or symbols require the use of both upper and lower case letters (e.g. kVAh)

#### 3.2.2 Colours

Standard type labels shall be in the following colours as specified:

- Warning labels: White lettering on a red background
- All other function designations: black lettering on a white background.
- For specific applications, as per Eskom's approval, white lettering on a black background is permissible (e.g. breaker-and-a-half Tie Bay mimic labels).

#### 3.2.3 Fixing

Labelling fixing devices shall not penetrate the equipment housing or constitute a potential source of corrosion. Surfaces should be clear and wiped off effectively to ensure proper adhesion.

- "Slip-in" holders (Aluminium Ticket Holder) shall be used for all labels exceeding 100mm in length. Where slip-in holders are used, the labels shall not be screwed or fixed in any way and shall depend only on the label frames to hold them firmly in position. Masking of the label by the holder shall not exceed 3mm per edge.
- Labels of 100mm or less in length may be fixed by screws, provided that these do not have sharp points, e.g. hammer driven or type Z self-tapping screws are acceptable, but type A self-tapping screws are not acceptable. Labels fixed by adhesive will be acceptable, provided that Eskom's approval has been obtained for the type and make of adhesive to be used.
- Double sided adhesive tape is not acceptable as a means of securing engraved labels (unless approval is granted by Eskom).
- Photographic labels, where used, may be secured by glue.
- Labelling shall be fitted on the front and rear to identify the equipment.

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### 3.2.4 Character and Label Sizes

Unless otherwise specified or approved by Eskom, overall heights of characters shall be as per drawing 0.00/5007 according to the purpose of the label.

The lettering shall be legible when viewed from an angle of approximately 45 degrees from any position (above, below, horizontal) with respect to the label. The width of exposed "black" in standard labels shall not be less than one seventh of the height

**Table 1: Character and Label Sizes**

Label type	Label size	Lettering type
Suit Single line inscription	Dimensions not fixed to suit specified inscription	38 mm
Suit Double line inscription	Dimensions not fixed to suit specified inscription.	20 mm
Main Double line inscription	50 X 300 mm	15 mm
Sub-main Single line inscription	35 X 150 mm	10 mm
Sub-main Double line inscription	35 X 150 mm	10 mm
Instructional and operational	Dimensions not fixed-to-suit specified inscriptions	5 mm
Identification double or single line inscription.	Dimensions not fixed-to- suit specified inscriptions	3 mm
Switch escutcheon plates inscriptions to be in accordance with standard switch sketches.	75 X 75 mm	3 mm

### 3.2.5 Material

- Minimum thickness 1.5mm
- 3 layer sandwich board
- Trafolyte or PVC UV.
- Subject to Eskom approval, labels may be made from any of the following:
  - White on black flexible plastic suitable for engraving through the white layer
  - White opal Perspex with black-filled lettering provided that the medium used for filling is black brushing cellulose lacquer.
  - Painted

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### 3.2.6 Protection Schemes Abbreviations

The following table shows the common abbreviations which were extracted from various protection schemes. The description of each abbreviation is provided in the table. These abbreviations shall be used for all the protection schemes where applicable.

**Table 2: Protection Schemes Abbreviations**

Labelling	Description
3CYCLE(L1)	Line 1 - 3 Cycle Reclose Selected - Push Button with Indication
3CYCLE(L2)	Line 2 - 3 Cycle Reclose Selected - Push Button with Indication
3PFAST(L1)	Line 1 - 3 Fast Auto Reclose Selected - Push Button with Indication
3PFAST(L2)	Line 2 - 3 Fast Auto Reclose Selected - Push Button with Indication
3PSLOW(L1)	Line 1 - 3 Pole Slow Auto Reclose Selected - Push Button with Indication
3PSLOW(L2)	Line 2 - 3 Pole Slow Auto Reclose Selected - Push Button with Indication
5CYCLE(L1)	Line 1 - 5 Cycle Reclose Selected - Push Button with Indication
5CYCLE(L2)	Line 2 - 5 Cycle Reclose Selected - Push Button with Indication
A	Amps
AC PLUG/Socket	230 Volt AC 15 Amp Plug /Socket
ARC	Auto Reclose
APT	Anti - Pump Timer
ARC(1&3P)	1&3 Pole Auto Reclose Selected - Push Button with Indication A suffix to identify the specific line ( L1/L2) shall be added for breaker & half application
ARC(1P)	1 Pole Auto Reclose Selected - Push Button with Indication A suffix to identify the specific line ( L1/L2) shall be added for breaker & half application
ARC(3P)	3 Pole Auto Reclose Selected - Push Button with Indication A suffix to identify the specific line ( L1/L2) shall be added for breaker & half application
ARC(OFF)	Auto Reclose OFF Selected - Push Button with Indication A suffix to identify the specific line ( L1/L2) shall be added for breaker & half application
ARC(ON)	Auto Reclose ON Selected - Push Button with Indication A suffix to identify the specific line ( L1/L2) shall be added for breaker & half application
B#BCR	Bay # Breaker Closed Indication Relay
B#BOR	Bay # Breaker Open Indication Relay
B1BC	Bay 1 Breaker Closed Indication (Red)
B1BCS	Bay 1 Breaker Control Switch
B1BO	Bay 1 Breaker Open Indication (Green)
B2BO	Bay 2 Breaker Open Indication (Green)
B2BC	Bay 2 Breaker Closed Indication (Red)
B2BCS	Bay 2 Breaker Control Switch

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BAY 1 SIS	Bay 1 Supervisory Isolating Switch
BAY 2 SIS	Bay 2 Supervisory Isolating Switch
BB(TB)(M#)	Main # Bay Breaker Test Block
BCD	Bay Control Device
BF	Breaker fail
Bø	Blue Phase
RTU	Remote Terminal Unit
BSS	Bypass of switching relay
BZ-X	Buszone auxiliary relay
CBC	Circuit Breaker Closed Indication
CBCS	Circuit Breaker Control Switch
CBO	Circuit Breaker Open Indication
DCD	Diameter Control Device
DCF	DC Fail
DCI (C)	Control DC Isolating MCB
DCI(B1)(CL)	Bay 1 Closing DC Isolating MCB
DCI(B1)(I)	Bay 1 Indication DC Isolating MCB
DCI(B1)(MI)	Bay 1 Motorised Isolator DC Isolating MCB
DCI(B2)(CL)	Bay 2 Closing DC Isolating MCB
DCI(B2)(I)	Bay 2 Indication DC Isolating MCB
DCI(B2)(MI)	Bay 2 Motorised Isolator DC Isolating MCB
DCI(BB)(M#)	Main # Bay Breaker Tripping DC Isolating MCB
DCI(DCD)	Diameter Control Device DC Isolating MCB
DCI(ETHSW)(M#)	Ethernet Switch Main # DC Isolating MCB
DCI(HVBB)(M#)	Main # HV Bay Breaker Tripping DC Isolating MCB
DCI(HVTBB)(M#)	Main # HV Tie Bay Breaker Tripping DC Isolating MCB
DCI(ICONV)	Indication Converter DC Isolating MCB
DCI(M#)	Main # DC Isolating MCB
DCI(M#)	Main # DC Isolating MCB
DCI(MV)(CL)	MV Breaker Closing DC Isolating MCB
DCI(MV)(I)	MV Breaker Indication DC Isolating MCB
DCI(MV)(MI)	MV Breaker Motorised Isolator DC Isolating MCB
DCI(MVBB)(M#)	Main # MV Bay Breaker Tripping DC Isolating MCB

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DCI(MVTBB)(M#)	Main # MV Tie Bay Breaker Tripping DC Isolating MCB
DCI(SS)(M#)	Main # Secure Supply DC Isolating MCB
DCI(TB)(CL)	Tie Bay Closing DC Isolating MCB
DCI(TB)(I)	Tie Bay Indication DC Isolating MCB
DCI(TB)(MI)	Tie Bay Motorised Isolator DC Isolating MCB
DCI(TBB)(M#)	Main # Tie Bay Breaker Tripping DC Isolating MCB
DCI(TC)(CTRL)	DC Isolating MCB Tap Change Control
DCI(TC)(PROT)	DC Isolating MCB Tap Change Protection
DIPNH	Diameter interface panel not healthy indication
DR(TB)	External Disturbance Recorder Test Block
DU#	Diode Unit #
ETHSW	Ethernet Switch
ETPB	Emergency Trip Push Button
HIRL#(M#)	Main # High Impedance Resistor - Line #
HVBB(TB)(M#)	Main # HV Bay Breaker Test Block
HVCBCS	HV Circuit Breaker Control Switch
HVTIEB(TB)(M#)	Main # HV TIE Bay Breaker Test Block
JB	Junction Box
kV	Kilovolt
L/S BKR	Local supply breaker
LCD	Local Control Disabled
LCE	Local Control Enabled
LCPB	Lamp Check Push Button
LCPB	Lamp Check Push Button
LINE(TB)(M#)	Main # Line Test Block
LOAD ISOL	Load isolator
LOR(B#)	Bay # Breaker Local Off Remote Switch
LOR(TBB)	Tie Bay Breaker Local Off Remote Switch
LV	Low Voltage
M S/S vs.	Mini Substation
MCB(AC)	230V AC Supply MCB
MFI	Master Follower Independent Switch
ML#(M#)	Main # Metrosil-Line #
MVBB1ICS	Busbar 1 MV Isolator Control Switch
MVBB2ICS	Busbar 2 MV Isolator Control Switch
MVBC	MV Breaker Closed Indication

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MVBCS	MV Breaker Control Switch
MVBO	MV Breaker Open Indication
MVCBCS	MV Circuit Breaker Control Switch
N/O	Normally open
NEC	Neutral Earthing Compensator
NECR	Neutral Earthing Compensator & Resistor
NECRT	Neutral Earthing Compensator and Auxiliary Transformer
NER	Neutral Earthing Resistor
NERT	Neutral Earthing Resistor and auxiliary transformer
NETWK	Network
NEUT	Neutral
No	Number
ø	Phase
O/C	Overcurrent
OLTC	On-Load Tap Changer
PP(M#)	Main # Primary Protection Device
PRNH	Protection relay not healthy
R	Red
REG	Regulator
Rø	Red Phase
RTU	Remote Terminal Unit
RU#	Resistor Unit #
RX vs.	Reactor
S/S	Substation
SECL	Sectionalizer
SECT	Section
SEF	Sensitive Earth Fault
SIS	Supervisory Isolating Switch
SUP	Supervisory
SVC	Static Var/Compensator
SW	Switch
SWER	Single Wire Earth Return
SWER ISOL TRFR	Single Wire Earth Return Isolating Transformer
T/C	Tap Changer
T/T	Trip Test
TBB(TB)(M#)	Main # Tie Bay Breaker Test Block

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TBBC	Tie Bay Breaker Closed Indication (Red)
TBBCR	Tie Bay Breaker Closed Indication Relay
TBBCS	Tie Bay Breaker Control Switch
TBBO	Tie Bay Breaker Open Indication (Green)
TBBOR	Tie Bay Breaker Open Indication Relay
TC	Trip Counter
TCAPB	Tap Change Auto Push Button & Indication
TCETPB	Tap Change Emergency Trip Push Button with Cover
TCETPB	Tap Change Emergency Trip Push Button
TCLORPB	Tap Change Lock-Out Indication & Reset Push Button
TCLPB	Tap Change Lower Push Button & Indication
TCMPB	Tap Change Manual Push Button & Indication
TCMPT	Tap Change Motor Protection Trip Indication
TCRPB	Tap Change Raise Push Button & Indication
TCSIS	Tap Change Supervisory Isolating Switch
TIE BAY SIS	Tie Bay Supervisory Isolating Switch
TNS	Test Normal Switch
TNS(M#)	Main # Test Normal Switch
TPE(M#)	Main # Teleprotection Interface
TPI	Tap Position Indication
TPIS(M#)	Main # Teleprotection Isolating Switch
TPIS(MCB)(M#)	Main # Teleprotection DC Isolating MCB
TPIS(MCB)(M#)	Main # Teleprotection DC Isolating MCB
TPK NORMAL(L1)	Line 1 - TPK Normal - Push Button with Indication
TPK NORMAL(L2)	Line 2 - TPK Normal - Push Button with Indication
TPK OT(L1)	Line 1 - TPK On Transfer - Push Button with Indication
TPK OT(L2)	Line 2 - TPK On Transfer - Push Button with Indication
TRANS B/B	Transfer Busbar
TRFR	Transformer
TRFR(TB)(M#)	Main # Transformer Test Block
TRFRETPB	Transformer Emergency Trip Push Button with Cover
TTPB(B)(B1B)	Bay 1 Breaker Blue Phase Trip Test Push Button with Cover
TTPB(B)(B2B)	Bay 2 Breaker Blue Phase Trip Test Push Button with Cover
TTPB(B)(TBB )	Tie Bay Breaker Blue Phase Trip Test Push Button with Cover
TTPB(R)(B1B)	Bay 1 Breaker Red Phase Trip Test Push Button with Cover
TTPB(R)(B2B)	Bay 2 Breaker Red Phase Trip Test Push Button with Cover

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TTPB(R)(TBB)	Tie Bay Breaker Red Phase Trip Test Push Button with Cover
TTPB(W)(B1B)	Bay 1 Breaker White Phase Trip Test Push Button with Cover
TTPB(W)(B2B)	Bay 2 Breaker White Phase Trip Test Push Button with Cover
TTPB(W)(TBB )	Tie Bay Breaker White Phase Trip Test Push Button with Cover
V	Voltmeter
VR	Voltage Regulator
VT	Voltage Transformer
W	White
Wø	White Phase

### 3.2.7 Wording

With the exception of the approved labelling abbreviations as indicated on DSP 34-1439 and TSP41-1009, no abbreviations are allowed. It is important for the user to refer to the two above mentioned documents to enables the control plant equipment labels to match the power plant label descriptions. The wording on these documents shall be applied and complied with fully. As such, bays shall be named in the following order:

- Firstly identify the name of the bay and the number
- Secondly identify the voltage
- Thirdly identify the function (e.g. Tap Change (T/C))

**NOTE:** Item (c) is usually not applicable to control panels as the function: protection, telecontrol etc., is usually self-evident. On power plant equipment labels, the function category is used to identify the specific plant: circuit-breaker, isolator etc.

Examples demonstrating the application of the above wording conventions are given on the following table below:

**Table 3: Examples of Relay Panel Naming Conversion**

Panel Type	Example Label
Transformer protection panel	TRANSFORMER 1 765/400/33kV
Tap change protection and control panel	TRANSFORMER 1 765/400/33kV TAP CHANGE CONTROL
Feeder panel	MERCURY 1 765kV FEEDER 3
Transformer Feeder protection panel	TRANSFORMER 1 BEESHOEK 1 132/11 kV
Reactor protection and control panel	765kV BUSBAR REACTOR 1
Line reactor protection panel	MERCURY 1 765kV REACTOR
Capacitor protection and control panel	400 kV CAPACITOR BANK 1

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Metering panel	METERING 1 22kV*
Diameter interface panel	765kV DIAMETER MC

\* Voltage will only apply when one voltage level is planned for.

Any other naming convention used shall be as per Eskom's approval (i.e. TRFR instead of Transformer, RX instead of Reactor or BB instead of Busbar ...etc.)

To ensure consistency, the control panel drawing description shall match the applicable panel label as well as the corresponding power plant equipment label(s). Equipment whose function is to render inoperative a particular function such as breaker fail, shall be labelled as for example, Breaker Fail isolate in lieu of Breaker Fail Isolator. Similarly for DC isolate and not DC isolator switch.

#### 4. Authorisation

This document has been seen and accepted by:

Name and surname	Designation
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Brian Mtshali	Tshwane Control Plant Maintenance Manager
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## 5. Revisions

Date	Rev.	Compiler	Remarks
March 2014	1	HA Mtshali	First Issue
March 2011	0	H Sithole	Distribution Specification for Control panel labels and cable markers(DSP34-1513)
June 2010	0	HA Mtshali	Transmission standard for labelling of secondary plant equipment (TST-41-627)
1988	0		"Specification for labels on control panels, relay panels and other indoor and outdoor equipment (NWS 1582)

## 6. Development team

The compiler of the original document is unknown. The latest revision of the Distribution standard was compiled by Haggai Sithole. The latest revision of the Transmission standard was compiled by Amelia Mtshali. Both the Distribution and the Transmission documents were combined to form one standardised document which is this document.

## 7. Acknowledgements

Everyone who has given comments on the document.

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**Annex A – Drawing for Panel Labelling Requirements 0.00/5007**

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