

	<p align="center"><b>WORK INSTRUCTION</b></p>	<p align="center"><b>Camden Power Station</b></p>
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Date: 27/06/2022.....

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## **1 INTRODUCTION**

This procedure is applicable for all plant and equipment at Camden Power Station to ensure the standardized application of plant coding, labelling and plant descriptions for effective use in all management information systems.

## **2 SUPPORTING CLAUSES**

### **2.1 Scope**

#### **2.1.1 Purpose**

The purpose of this standard is to specify the detail requirements of Camden Power Station in terms of Plant Coding, Labelling and the allocation of Plant Item Descriptions.

#### **2.1.2 Applicability**

This standard is applicable for all plant and equipment on Camden that will require plant coding and labelling. It includes existing plant as well as engineering changes or additions to plant.

#### **2.1.3 Effective date**

Same as authorization date

#### **2.1.4 Normative References (Eskom documents)**

The following document(s) are referenced in this text and comprise requirements within this document. At the time of publication, the edition indicated was valid. These documents are subject to revision and users are responsible to ensure that the most recent edition of the document listed below is used/referenced.

- (i) Plant Labelling and Equipment Description Standard 240-71432150

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## 2.2 Definitions

Definition	Description
Basic colour	A colour that indicates the group of fluids to which the contents of a pipeline or vessel belongs.
Label	Identification of process, structure, point of installation, component, or equipment by means of approved fixing methods, materials, and ergonomic requirements.
Location Code	Identification of locations in structures, on floors and in rooms and of fire area
Key Part	KKS KEY PART is a plant classification system catalogue of KKS codes to be used to classify power plant structures, systems, equipment, and components
Point of Installation	Identification of points of installation of electrical and control and instrumentation equipment in installation units (e.g., in cabinets, panels, consoles)
Process-Related Coding	Process-related identification of systems and items of equipment according to their functions in mechanical, civil, electrical and control and instrumentation engineering

## 2.3 Abbreviations

Abbreviation	Explanation
C&I	Control and Instrumentation
CM	Configuration Management
DC	Direct Current
KKS	Kraftwerk Kennzeichen System - German abbreviation for (Power Plant Classification System)
LV	Low Voltage
MV	Medium Voltage
P&ID	Piping and Instrumentation Diagram

## 2.4 Roles and Responsibilities

**Configuration Management:** Responsible for reviewing KKS coding and issuing of a KKS certificate on correct labelling of the plant.

**Design Authority:** Responsible for adding KKS codes on designs/project documents.

**System Engineer:** Responsible for reviewing and updating labelling of structures, system, equipment, and components on the plant.

## 2.5 Process for Monitoring

Compliance to the work instruction will be monitored through Configuration Management internal compliance audits

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**2.6 Related/Supporting Documents**

N/A

**3 CODING AND LABELLING SPECIFICATIONS**

**3.1 Plant Coding**

Plant coding, the cornerstone of all configuration management and other management information systems is of utmost importance and the standardized application thereof cannot be overemphasized.

The KKS plant coding system has been adopted by Eskom and will be used as the coding system at Camden Power Station (Corporate directive EVD 1085).

Notation of KKS code (General):

NUMBER OF BREAKDOWN LEVEL	0	1	2	3
DESIGNATION OF BREAKDOWN LEVEL	TOTAL PLANT	SYSTEM	EQUIPMENT UNIT	UNIT COMPONENT

**3.2 Plant to be coded**

There is no clear definition of which plant to code and to what level the plant should be coded. It has however been accepted by industry that a comprehensive plant breakdown structure is required, and that all operable and maintainable equipment should be included in that structure. This structure should include all equipment that other disciplines might require in their day to day operating, maintenance and engineering duties.

**3.3 Process (functional location breakdown)**

Process related coding is the coding of systems and items of equipment according to their functions in mechanical, civil, electrical and control and instrumentation engineering.

Structure of a process derived code:

SERIAL NUMBER BREAKDOWN LEVEL	0	1					2				3		
NAME OF BREAKDOWN LEVEL	Total Plant	SYSTEM					EQUIPMENT UNIT				COMPONENT		
DESIGNATION OF DATA CHARACTER	G	F0	F1	F2	F3	FN	A1	A2	AN	A3	B1	B2	BN
NATURE OF DATA CHARACTER	A or N	N	A	A	A	NN	A	A	NNN	A	A	A	NN
<b>Example</b>	<b>1</b>	<b>0</b>	<b>L</b>	<b>A</b>	<b>C</b>	<b>10</b>	<b>A</b>	<b>P</b>	<b>001</b>		<b>-</b>	<b>M</b>	<b>0</b>   <b>1</b>
UNIT 1 BFP SET 1 PUMP MOTOR													

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### 3.3.1 Point of Installation

This is the identification of points of installation of electrical and control and instrumentation equipment in installation units. (e.g., in cabinets, panels, consoles).

Structure of point of installation derived code:

SERIAL NUMBER BREAKDOWN LEVEL	0	1					2				3			
NAME OF BREAKDOWN LEVEL	TOTAL PLANT	INSTALLATION UNIT CODE					INSTALLATION TIER CODE				COMPONENT			
DESIGNATION OF DATA CHARACTER	G	F0	F1	F2	F3	FN	A1	A2	AN	A3	B1	B2	BN	
NATURE OF DATA CHARACTER	A or N	N	A	A	A	N	A	A	NNN	A	A	A	NN	
<b>Example</b>	<b>1</b>	<b>0</b>	<b>B</b>	<b>B</b>	<b>C</b>	<b>10</b>	<b>A</b>	<b>A</b>	<b>001</b>		<b>-</b>	<b>B</b>	<b>0</b>	<b>1</b>
UNIT 1 M.V. SWITCHGEAR TRANSDUCER														

### 3.3.2 Structure

Structure coding is the identification of the physical position of the process based or point of installation-based codes in enclosures. These will refer to locations in structures, on floors and in rooms and fire areas.

SERIAL NUMBER BREAKDOWN LEVEL	0	1					2			
NAME OF BREAKDOWN LEVEL	TOTAL PLANT	STRUCTURE CODE					ROOM/CO-ORDINATE			
DESIGNATION OF DATA CHARACTER	G	F0	F1	F2	F3	FN	A1	A2	AN	A3
NATURE OF DATA CHARACTER	A or N	N	A	A	A	NN	A	A	NNN	A
<b>Example</b>	<b>1</b>	<b>0</b>	<b>U</b>	<b>M</b>	<b>A</b>	<b>02</b>				
TURBINE HOUSE LEVEL 2										

**CONTROLLED DISCLOSURE**

### 3.3.3 Signal

Signal coding is the identification of signal and signal applications. Structure of code: See annexure for more detail.

SERIAL NUMBER BREAKDOWN LEVEL	0	1					2				3		
NAME OF BREAKDOWN LEVEL	Total Plant	SYSTEM					EQUIPMENT UNIT				SIGNAL AREA NUMBER		
DESIGNATION OF DATA CHARACTER	G	F0	F1	F2	F3	FN	A1	A2	AN	A3	B1	B2	BN
NATURE OF DATA CHARACTER	A or N	N	A	A	A	NN	A	A	NNN	A	A	A	NN
NATURE OF DATA CHARACTER	A or N	N	A	A	A	NN	A	A	NNN	A	A	A	NN

### 3.3.4 Cable

Cable coding is the identification of cables according to origin and voltage application of the cable.

Cable NO Format:

Classifying Element	Numbering Element
Process Related Code	Cable Number
NNAAA i.e. 00ETK	NNNN i.e. 8001
OR	
Point of Installation Code	Cable Number
NNAAA i.e. 00EYG	NNNN i.e. 8001

## 4 PLANT LABELLING

Plant labelling is the physical label that is fixed to the plant. The purpose of a plant label is to unambiguously distinguish between plant items and to ensure that a one-to-one correlation exists between the identification of the item on the plant and the identification of the item in the management information systems and documentation.

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Process for Installation of Plant Labels:

- Requester completes Annexure A (Produce own attachment of codes to be installed)
- Relevant System Engineer Accepts the change
- Manufactured Labels are accepted by Configuration Management team
- Labels are installed in the plant by Configuration management team or contractor.
- Installed labels are checked and correctness is verified
- All documents are filed and stored

**4.1 Labels**

Because of the diversity of plant that has to be labelled one cannot standardise on the material, size and type of label. This standard will therefore distinguish between the different plant areas and types of labels to be used for that specific plant.

**4.2 Label Material**

**4.2.1 Table 1: The following material will be used for the different plant areas**

<b>Plant Area</b>	<b>Label Material Type</b>
Boiler	Anodised Aluminium
Turbine	Anodised Aluminium
Ash Plant	Anodised Aluminium
Coal Plant	Anodised Aluminium
Water Treatment Plant	Anodised Aluminium
Switchgears and Panels	White Graflux
Internal panels/cubicles	Colour Coded Plastic
Transformers and Structures	Chromadeck
Buildings	Anodised Aluminium
Switchgear Panel doors (Arc-flash)	Chromadek

**Notes:**

- Label thickness 1.5mm, Corners round 4mm radius
- Fixing holes 4mm to be drilled only when fitted with a back plate.
- Fixing holes 7.5mm from sides

**4.3 Ergonomic Requirements**

- Consistency will be maintained when fitting new labels regarding material, method of fitting, etc
- Labels will be fitted in such a manner as not to hamper routine Operations and maintenance activities.
- Labels should be fitted in a position where they can be easily seen without compromising identity of the exact component.
- Labels will as far as possible not be attached to removable equipment (i.e. Lagging) but rather to non-removable structures as near to it as possible, without compromising identity of exact equipment.
- All labels to be mounted on a vertical plane to minimize dirt build-up

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- All labels will be mounted so that the text runs in a horizontal plane, reading from left to right to the nearest fixed point that is being described.
- For labels that must be mounted vertically due to space constraints, the method of text reading will be from bottom to top. This excludes cable labels.
- Label fixing devices e.g., rivets, self-tappers, adhesives, etc will not penetrate the equipment housing or constitute a potential source of corrosion.
- All labels will be secure, i.e., not move under reasonable pressure.
- Labels or back plates/brackets will not have sharp edges or protrude in such a way as to pose a safety risk.
- Valve labels will not be installed on hand wheels and labels will not cover equipment specification plates.
- The use of mimics can be considered where space constraints apply.

#### **4.4 Environmental factors**

All labels will be able to withstand the following for at least 20 years:

- Rain
- Hail
- Temperature variance as required by plant
- Wind and Dust erosion
- Ultraviolet rays (sun)
- Corrosion

### **5 GENERAL PLANT LABELS**

#### **5.1 Label Type GA and GH**

- **GA** - Mechanical Plant Identification Label
- **GH** – Point of installation code labels for process control and electrical equipment PLC's, measurement panels, protection panels measurement racks, local alarm panels, etc.



Material: See Paragraph 4.2

Thickness: 1.5 mm

Fixing Holes: 4 holes of 4 mm  
7.5 mm from Sides

#### **Engraving**

Characters Fill In Colour: Black Alphanumeric

Characters: 7 mm High Description

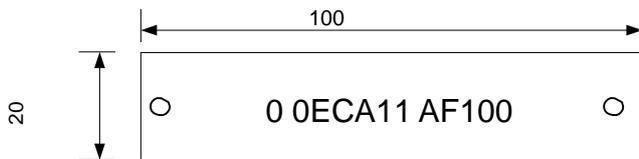
Characters: 5 mm High

**CONTROLLED DISCLOSURE**

Standard vertical characters to be used. (Narrow (condensed), broad (extended) characters are not acceptable)

### 5.2 Label Type GB, GE, GG & GI

- **GB** - Mechanical Plant Identification Tags
- **GE** - Field device tags for process control equipment
- **GG** - Point of installation codes tags for process control equipment local control stations, marshalling boxes, junction boxes etc.
- **GI** - Point of installation tags for process control panels and equipment



Material: See Paragraph 4.2

Thickness: 1.5 mm Thick

Fixing Holes: 2 holes of 4 mm diameter  
7.5 mm from sides

#### Engraving

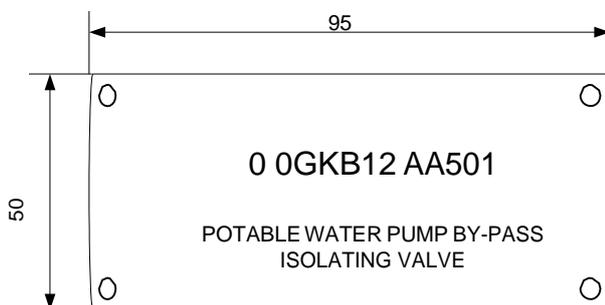
Characters Fill In Colour: Black

Alphanumeric Characters: 7 mm High

Standard vertical characters to be used. (Narrow (condensed), broad (extended) characters are not acceptable.)

### 5.3. Label Type GC & GD

- **GC** - Component identification label
- **GD** - Process code labels for; Process control equipment, Local control panels & Mimics.



Material: See Paragraph 4.2

Thickness: 1.5 mm

Fixing Holes: 4 holes of 4 mm diameter  
7.5 mm from sides to holes

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**Engraving**

Characters Fill In Colour: Black

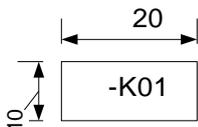
Alphanumeric Characters: 7 mm High

Description Characters: 5 mm High

Standard vertical characters to be used (Narrow (condensed), broad (extended) characters are not acceptable)

**5.4. Label Type GF**

Identification Tags within process control and electrical equipment



Material: White Graflux with Black Characters

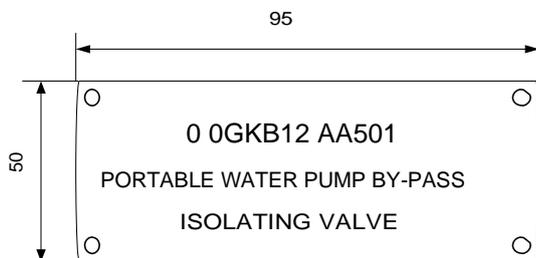
Material Thickness: 1.5 mm

**Engraving**

Alphanumeric Characters: 3 mm High

Standard vertical characters to be used Narrow (condensed), broad (extended) characters are not acceptable.

**5.5. Label Type EH - Junction box label**



Material: White Graflux

Alphanumeric Characters: 10 mm high

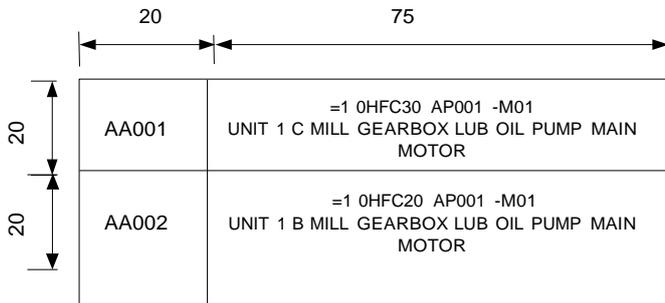
Description Characters: 9 mm high

Standard vertical characters to be used (Narrow (condensed), broad (extended) characters are not acceptable)

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**5.6. Label Type EI: MCB process code label**

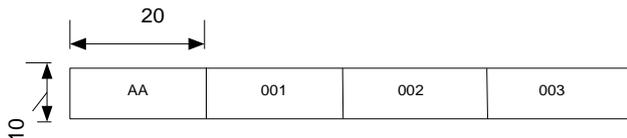


Alphanumeric: 4 mm High

Characters Description: 3 mm High Characters

Material: Graflux/Traffolite

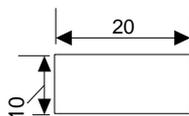
**5.7 Label Type EJ: MCB point of installation labels**



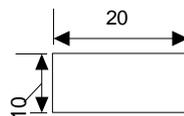
Material: White Graflux

Characters: 3 mm high

**5.8 Label Type EK & Label Type EL: Terminal Tag / Electrical component label**



Characters: 3 mm high  
Material: Graflux



Characters: 3 mm high  
Material: Graflux

**5.9 Label Type EM: Transformer and structure identification label**



Material: Chromadek

Thickness: 1 mm

Fixing Holes: 4 off 10 mm diameter

Background: Orange Characters fill in 7.5 mm from sides

Characters Fill In Colour: Black

Alphanumeric Characters: 60 mm high

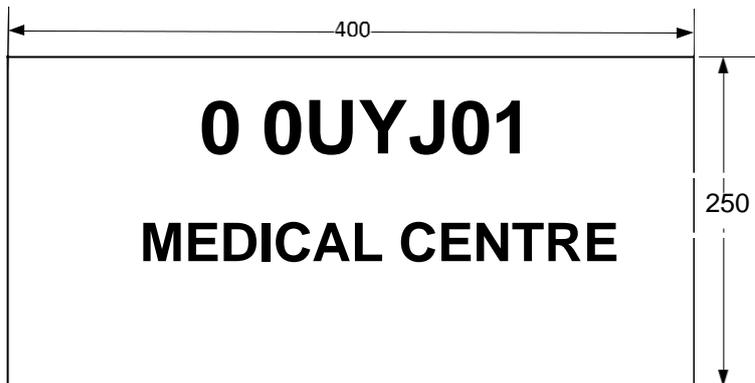
**CONTROLLED DISCLOSURE**

Characters: 40 mm high

Standard vertical characters to be used (Narrow (condensed), broad (extended) characters are not acceptable)

### 5.9.1 Label Type EM.1

Structure related label (Not electrical switchgear)



Material: Anodised Aluminium

Thickness: 1.5mm

Background: White

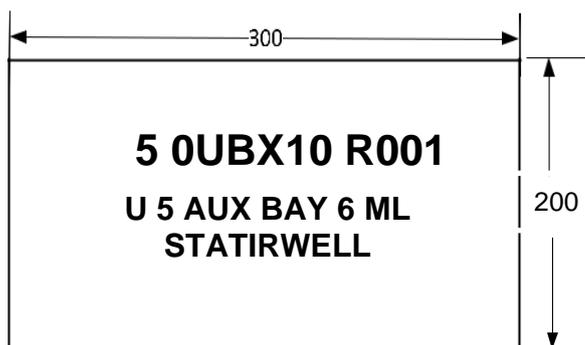
Characters engraving Colour: Black

Alphanumeric Characters: 60 mm high

Description Characters: 40 mm high

### 5.9.2 Label Type EM.2

Label to be used inside buildings where a description is required on a room/area.



Material: Anodised Aluminium

Thickness: 1.5mm

Background: White

Characters engraving Colour: Black

Alphanumeric Characters: 30mm high

Description Characters: 20 mm high

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**5.10 Label Type EN: Cable Identification**



1 0 B F A 1 0 0 8

All cables to be labelled with standard PVC K Type flexible cable markers on 10-digit carrier strips and attached on both ends with suitable cable ties (T18R or T30R depending on cable thickness)

**5.11 Label Type EO: Cable Identification**

Material: Aluminium  
 Thickness: 1.5mm  
 Fixing Holes: 2 of 4 mm diameter



The alternative cable identification to be used where there is a risk of fire or high temperatures is the punched aluminium strip.

**5.12 Label Type EP: Mimic**

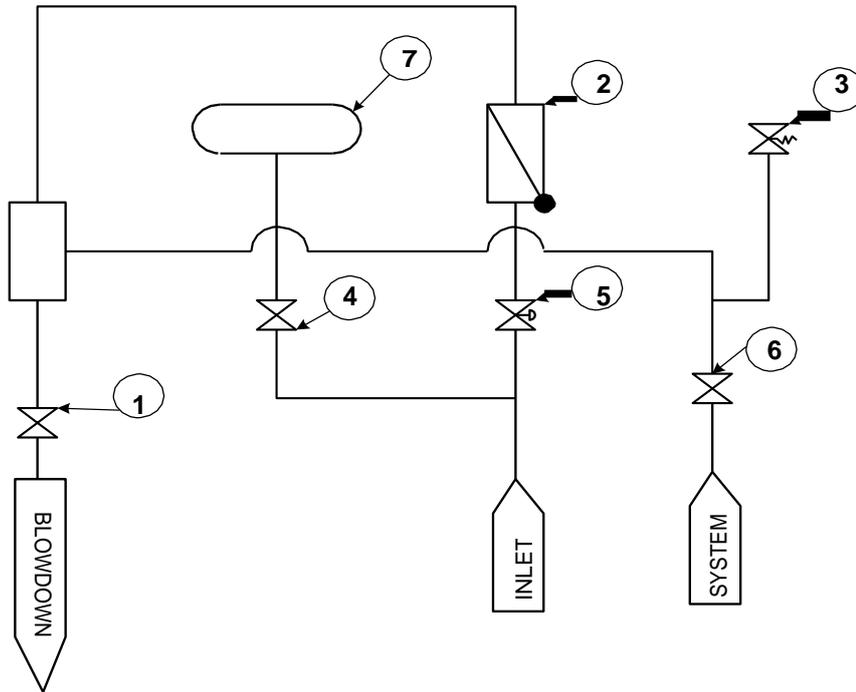
Identification mimic is a graphical representation of a small plant area where, due to space constraints normal plant labels can't be installed. A legend for the drawing must be included and each component must be labelled with the legend number to ensure there is no ambiguity in component identification.

***EP (a) Mimic***

Material: Graflux

Engraved Graphical representation: Eskom drawing standards & symbols must be used, fill colour black.

### N2 VALVE PANEL



- 1) 10HFC23AA401 U1 MILL B RAM CYL DRN VLV
- 2) 10HFC23AA301 U1 MILL B RAM CYL GAS PRESS IND IV
- 3) 10HFC23AA501 U1 MILL B RAM CYL GAS REG VLV
- 4) 10HFC23AA601 U1 MILL B RAM CYL GAS NRV
- 5) 10HFC23AA502 U1 MILL B RAM CYL GAS IV
- 6) 10HFC23AA602 U1 MILL B RAM CYL GAS PRESS RELIEF VLV
- 7) 10HFC23CP501 U1 MILL B RAM CYL GAS PRESS IND

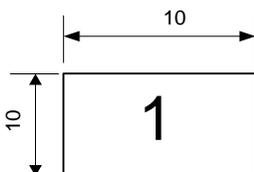
**Legend for the drawing**

Characters Fill in Colour: Black

Code & Description Characters: 7 mm High

Standard vertical characters to be used (Narrow (condensed), broad (extended) characters are not acceptable)  
 The size of the Mimic will be dependent on space constraints.

**EP (b) Component Numbering**



Material: Graflux

Characters Fill In Colour: Black

Number: 5 mm high

Standard vertical characters to be used (Narrow (condensed), broad (extended) characters are not acceptable)

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### 5.13 Back Plates

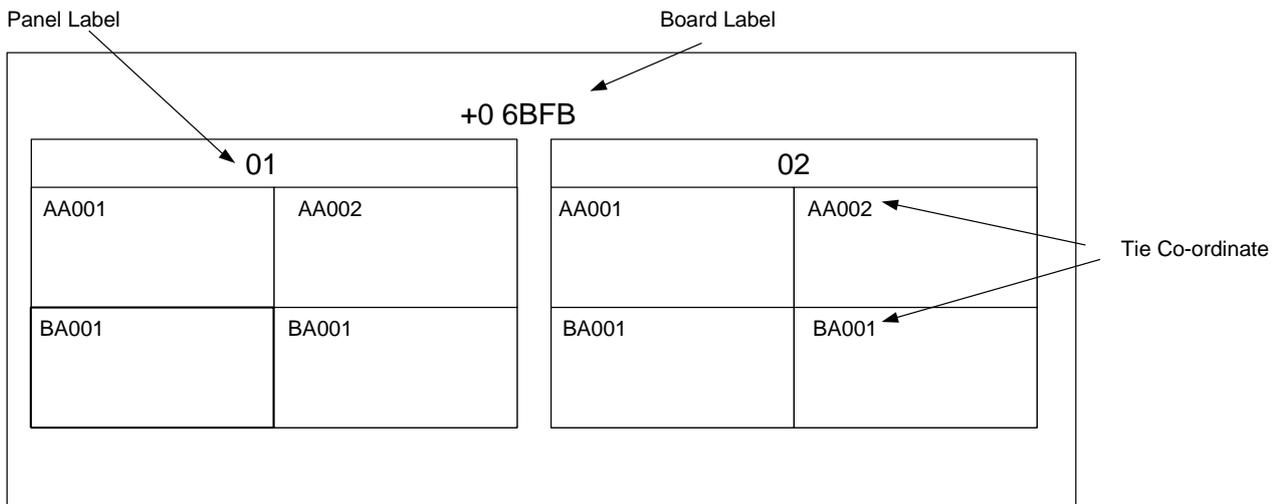
Back plates will be used for labels requiring a back plate. The label size and shape will follow the size and shape of the label

## 6 PIPE LABELLING

Pipes smaller than 10cm diameter to be labelled using the mechanical label type namely GC.  
 Pipes bigger than 10cm diameter to be stencilled. The lettering and numbering used to stencil shall be proportional to the size of the pipe i.e. size 2/3rds of the size of the pipe to a maximum size of 20cm. All pipes must be labelled at the source and destination if the entire pipe is not visible. For extremely long pipes a plant label must be placed every 20m.

## 7 POSITIONING OF LABELS ON PANELS

Each cubicle consists of a combination of the board, panel and tier co-ordinate to form the KKS code for the cubicle.



KKS Codes shown in the diagram above.

Board + 6 0BFB

Panel 01

Panel 02

6 0BFB01AA001

6 0BFB02AA001

6 0BFB01AA002

6 0BFB02AA002

6 0BFB01BA001

6 0BFB02BA001

6 0BFB01BA002

6 0BFB02BA002

Positioning of the labels should be as follows and should be fixed as shown in the diagram above.

- The board is identified by the '+' sign in front of the code. This label should be positioned in the middle on top of the board.
- The panel number should be in the centre middle of the panel without the '+' sign.
- The tier co-ordinate (cubicle) should have its' identification on the top left-hand corner, e.g. AA001 BA001 etc

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- The complete 'installation' and 'process' code should be fixed to the right-hand bottom corner of the cubicle door. This must be consistent for all boards, panels, and cubicles.
- If one panel feeds to a transformer the process code will be that of the transformer but if it enters the next (lower voltage) board the transformer code will have to be descriptive as label type EG in the procedure.

## 8 MV, LV AND DC SWITCHGEAR AND TRANSFORMER LABELS

### 8.1 Label Type EA: Board Main Label on Centre / Top of Board



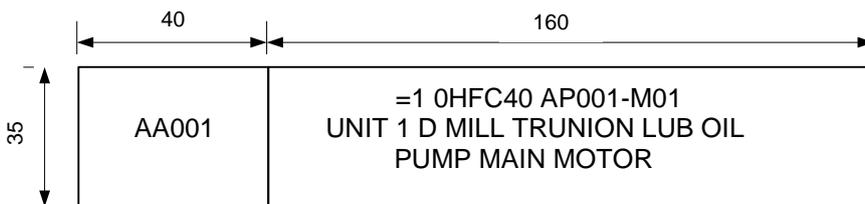
Characters: 20 mm high

### 8.2 Label Type EB: Sub-section Labels



Characters: 15 mm high

### 8.3 Label Type EC: Isolator label



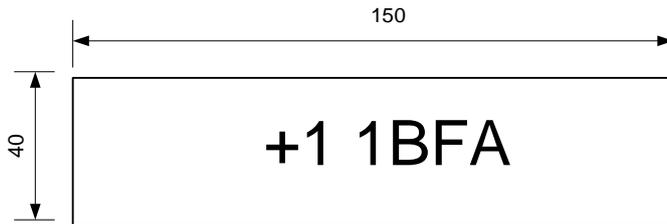
Alphanumeric Description: 7 mm high

Characters Description: 5 mm high

Material: Graflux

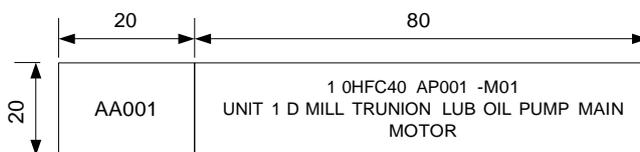
**CONTROLLED DISCLOSURE**

**8.4 Label Type ED: Cubicle Identification Labels**



Font size: 20mm high character. Will also be fitted on non-interchangeable removeable covers

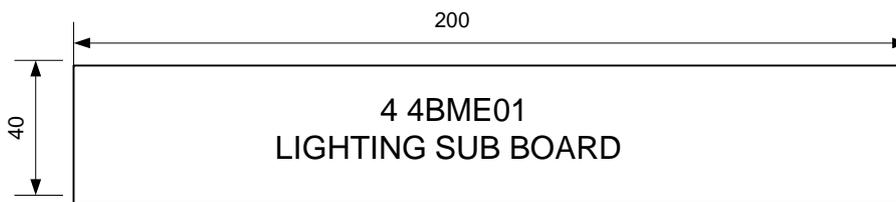
**8.5 Label Type EE: Terminal Label with Tier co-ordinate/Cubicle**



Font size: 3 mm High Characters

Material: Graflux

**8.6 Label Type EF: Lighting Distribution board label**

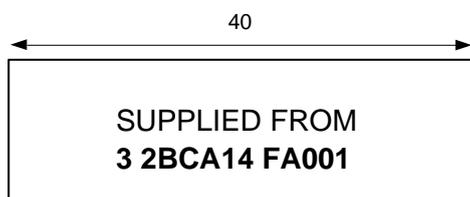


Alphanumeric Characters: 10 mm High

Characters Description: 10 mm High

Material: Graflux

**8.7 Label Type EG: Distribution boards Information labels**



Alphanumeric Characters: 4 mm High

Characters Description: 3 mm High Character

Material: Graflux

**CONTROLLED DISCLOSURE**

## 9 PLANT

### 10 DESCRIPTIONS

Polymerizing vinyl chloride material of 100x40 mm will be handwritten with codes and descriptions using permanent markers to label plant items as per labelling process on emergency cases, only for temporal period, there-after permanent labelling will be put as soon as possible and the temporal labelled removed. Cable ties will be used to tie those.

Although the plant code is sufficient to uniquely identify the plant, the need still exists to describe the plant with a plant functional description. The KKS code does not clearly differentiate between eg. left hand and right hand or between pump inlet or outlet. These problems could be overcome by forcing the users to always refer to the P&ID. It is a possible solution but not very practical.

The allocation of item descriptions is useless if it does not clearly describe the function of the item eg, "isolating valve" instead of "pump inlet isolating valve".

At Camden there are several applications where plant descriptions are used eg. plant labels, information systems etc. and the need therefore exists to standardize on the application thereof. This standard deals with the allocation of descriptions for plant labels and information systems.

Misplaced or removed labels will be collected through specially crafted bins positioned at designated areas across the station to minimize loss of labels and maintain plant identification integrity. During outages or maintenance activities, sometimes labels get removed and must be accounted for. Technicians will retrieve such labels get removed and must be accounted for. Technicians will retrieve such labels monthly or less as the situation demands.

#### 10.1 Long Plant Description

##### 10.1.1 The format of the long description

- Descriptions shall be in English
- The description shall clearly describe the function of the item
- Descriptions shall be as short as possible without compromising on description accuracy

The format of the description shall generally follow the format of the KKS code and is compiled as follows:

Zero	First					Second				Third		
Total Plant	System					Equipment Unit				Component		
G	F0	F1	F2	F3	FN	A1	A2	AN	A3	B1	B2	BN
A or N	N	A	A	A	NN	A	A	NNN	A	A	A	NN
<b>1</b>	<b>0</b>	<b>L</b>	<b>A</b>	<b>C</b>	<b>10</b>	<b>A</b>	<b>P</b>	<b>001</b>		<b>-</b>	<b>M</b>	<b>01</b>

#### 10.2 Short Plant Descriptions Information Systems

All short descriptions will be derived from the long plant description using the Eskom Plant Labelling Abbreviation Standard. Due to information system requirements, there may be a limit on the number of characters to be used in the short description. Where an abbreviation of a word exists, it must be used. This implies that should the information system allow for a description to be fully written (number of characters), it will still be abbreviated to ensure consistency.

### CONTROLLED DISCLOSURE

### 10.3 Short Plant Descriptions – Plant Labels

The exact short plant description reflected in the master database will be used on all plant labels.

## 11 CABLE CODING AND LABELLING

### 11.1 Cable Number Structure

A cable number comprises of 3 distinct portions which form its unique identification code in accordance with the KKS coding manual.

A typical cable number 1 1BCA 0076 is broken down as follows:

1        2        3

This number discerns between units 1 to 8(1-8) and station or common plant with the digit 0, in the example unit 1.

This portion identifies the origin or source from which the cable is laid, in this case 6.6 kV board A.

These 4 numerals represent the consecutive cable number depending on the voltage level for grouping purposes within the cable number. Grouping of cable numbers are recommended to keep agreements on the allocation of cable numbers during planning to a minimum and to prevent multiple allocations of cable numbers. The first digit of the four numeric data characters serve to identify the application area in terms of voltage rating of the cable, the three other numeric data characters to number cables within that area:

- 0001 – 0999 = Power Cables > 1 kV
- 1001 – 1999 = Power Cables < or = 1 kV
- 2001 – 3999 = Control Cables > 60V
- 3001 – 3999 = Control and Instrumentation cables > 60V
- 4001 – 7000 = Control Cables < or = 60V
- 8001 – 9999 = Control and Instrumentation Cables < or = 60V

Computer cables, i.e., optic fibre, will fall in the “8” series.

### 10.2 Cable Information

The following table represents the fields within the Cable Database and needs to be captured with each newly allocated or revised cable number.

REF	FIELD DESCRIPTION	WHERE TO FIND THE INFORMATION
1	Drawing number	Old System - Old printed cable schedules New System – Cable detail schedule
2	Drawing rev number	Not applicable in new system
3	Cable number	See cable number section above.
4	Statistical int. order nr.	
5	Cable type	See Attachment 2, 3 & 4.

**CONTROLLED DISCLOSURE**

6	KKS code from	Plant KKS.
7	KKS code to	Plant KKS.
8	Cable rev type	See Attachment 5.
9	Cable rev number	The next sequential number.
10	Contractor identification	See Attachment 6. (Applicable during construction period)
11	Remarks	Any additional information.
12	Description from	Plant description

**ANNEXURE 1: Section Codes or Classification**

SECTION	DESCRIPTION	REMARKS
A01 - A08 A00	Ash Plant (unit) Ash Plant (non unit)	Boiler coarse ash conveyor elevator, sicon conveyor  Transverse conveyor, overland conveyor, conditioner, stackers
B01 - B08	Burners	Injector's igniters
C01 - C08 C00	Coal Plant (unit) Coal Plant (non unit)	Vibrators, mills, dampers, oil pump  Overland conveyor. stackers, silo conveyors, incline conveyor
D01 - D08 D00	Draught Group (unit) Draught Group (non unit)	FD fans, PA fans, ID fan, dampers, air heaters  Chimney equipment
E01 - E08 E00	Emergency Power/DC (unit) Emergency Power/DC (non unit)	Batteries, battery chargers, inverter, diesel generators  Batteries, battery chargers, diesel generators
F01 - F08 F00	Fuel Oil Plant (unit) Fuel Oil Plant (non unit)	Inline heaters, HP pumps, trace heating  Tank heaters, off-loading pumps, trace heating
G01 - G08	Generator	Generator breaker, generator CT's, generator earth switch, unit generator H2 system.
H00	132/400 kV HV Yard	i.e. excluding Station TRFR yard
J01 - J08 J00	CW Plant (unit) CW Plant (non unit)	Cooling water plant  Cooling water plant

**CONTROLLED DISCLOSURE**

K00	Sewage Plant	
L01 - L08	Lighting (unit)	Turbine house, boiler house, auxiliary bay, air cooled condenser
L00	Lighting (non unit)	Substations, workshops and stores, fuel oil plant, coal silo, ash, and coal conveyors
M00	Low Pressure Services	Auxiliary cooling, air compressors, H2 plant, raw water
N01 - N08	General Auxiliary System (unit)	Unit board supplies, cranes
N00	General Auxiliary System (non unit)	Station board supplies, lifts, workshops
P01 - P08	Fabric Filter Plant	
Q01 - Q08	Feed Water	Boiler feed pumps, condensate polishing plant, extraction pumps
R01 - R08	Air Conditioning (unit) Air	Air conditioning plant and ventilation
R00	Conditioning (non unit)	
S01 - S08	Soot Blowers	
T01 - T08	Turbine (unit) Turbine (non unit)	Includes turbine lubrication system
T00		
U01 - U08	General C and I	
V01 - V08	Spare	
W00	Water Treatment Plant	Including regen plant
X00	Construction Cabling and Auxiliary Boiler	
Y01 - Y08	Telecoms and Metering (unit)	
Y00	Telecoms and Metering (non unit)	
Z	Spare Cables	For cable transferred to stores

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**ANNEXURE 2: Standard Power and Control Cable Code**

REF	VOLTAGE GRADE	INSULATION	FINISH CONSTRUCTION	NO OF CORES	CORE AREA mm <sup>2</sup>	CONDUCTOR MATERIAL	SERVING OR PROTECTION
A	300/500		Aluminium sheath		0,5	Stranded aluminium	
B	600/1000				0,75	Solid aluminium	
C	3,300		Copper sheath		1,5	Stranded copper	
D	6,600		Single core leads		2,5	Solid copper	
E	11,000		As for "G" plus single steel wire armouring		4		
F	22,000		Flame retardant PVC bedding		6		Flame retardant PVC sheathed
G	33,000		Individual copper screen tape		10		
H	66,000		Individual brass screen tape		16		
J	88,000	Halogen free low smoke material	Halogen free, low smoke flame retardant bedding				Halogen free, low smoke flame retardant sheathed
K	132,000		As for "G" plus double steel wire armouring		25		
L	275,000		Lead covered		35		
M		Mineral	Low halogen PVC bedding		50		Low halogen PVC sheathed
N		Neoprene			70		Neoprene
P	330,000	Paper	Screen over all cores and single wire armoured		95		
Q	400,000	Polyethylene			120		Polyethylene sheathed

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R		Rubber	Rubber covered		150		Rubber sandwich
S		Paper Screened	Screen over all cores		185		
T	Refer to Attachment 4 Telephone		Lead covered double wire armoured		240		
U	Refer to Attachment 3 Control		Double steel tape armour		300		
V	Refer to Attachment 3 Control	General PVC	General PVC covered		400		General PVC sheathed
W	Fibre Optic		Lead covered single wire armoured		500		Heat resistant PVC sheathed
X		Cross linked Polyethylene (xlpe)	single wire armoured		630		High impact PVC sheathed
Y					800		
Z	Special	Special	Special	Special	Special	Special	Special

**NOTES:**

No. of cores: The number of cores is denoted in the fourth and fifth numerals of the code: 04-denotes 4 cores or 3,5 cores.

\* Semi-conducting extruded conductor screen and Semi-conducting extruded core screen

The reference letter “Z” should not be used unless for special conductors or construction methods which should be fully detailed.

**CONTROLLED DISCLOSURE**

The ESKOM cable type code.

The position of the letter indicates the column, and the letter indicates the row

	<b>Alpha/Numeric</b>	<b>Description</b>	<b>Example</b>
1	A	cable voltage rating, phase to phase voltage	C
2	A	type of core insulation	P
3	A	construction around the cores	W
4	N	no. of cores in the cable	0
5	N		3
6	Installation of 2 plugs in	individual core area in mm <sup>2</sup> .	N
7	A	conductor material and construction	C
8	A	outer serving or protection	V

Example: - CPW03NCV - 3,300V, Paper insulated, Lead covered single wire armoured, 3 core, 70mm<sup>2</sup>, Stranded copper conductor, PVC sheathed.

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**ANNEXURE 3: Instrument Cable Code**

REF	Voltage Grade	Core	Construction	Rate Core Dimension		Conductor	Finish or
	Type			Insulation	Area mm <sup>2</sup>		
A				0,5	0,8		Asbestos braid or asbestos tape
B				0,75	1,0		
C			Untwisted, unscreened, with overall 0,19mm tinned copper Braid Screen	1,5	1,38	Stranded copper	
D			Untwisted, unscreened	2,5	1,78	Solid copper	Ducting
E			Untwisted, unscreened with overall metallic tape screen	4	2,25	14 Strands of tinned copper	
F			Twisted pairs, unscreened	6	2,75	Copper/Platinum	Fireproofed textiles
G			Twisted pairs, overall metallic tape screen	10	3,56	Copper/Constant	
H	Reserved for		Twisted pairs, individual and overall metallic tape screen	16	4,51	Iron/Constantan	Oil resistant PVC sheath
J	power cables		Twisted triples, unscreened			Nickel/Chrom e nickel	Steel wire armouring & oil resistant pvc sheath
K	see Attachment 2	PTFE (Teflon)	Twisted triples, overall metallic tape screen		single mode	Glass fibre	PTFE (TEFLON) sheath
L					multi-mode	Glass fibre	

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M			Twisted triples, individual and overall screens	0,22	0,2	7 Strands of tinned copper	No armouring, low smoke & low halogen sheath
N		Neoprene	Untwisted, asbestos braid cover and tinfoil screen				Aluminium wire armour, low smoke & low halogen sheath
P			Twisted, asbestos braid cover and tinfoil screen				Steel wire armoured, low smoke & low halogen sheath
Q		Polythene	Untwisted, asbestos braid cover and galvanised steel screen				No armouring polythene sheath
R			Twisted, asbestos braid cover and galvanised steel screen				Aluminium wire armoured PVC sheath
S			Untwisted, glass fibre cover and tinfoil screen				Steel wire armoured fire retardant PVC sheath
T	Tele cable see Attachment 4		Twisted, glass fibre cover and tinfoil screen				No armouring fire retardant PVC sheath
U	300/500V cont. & instrument.		Untwisted, glass fibre cover and galvanised steel screen				No armouring polyurethane
V	600/1000V cont. & instrument	PVC	Twisted, glass fibre cover and				No armouring PVC sheath
			galvanised steel screen				
W	Thermocouple compensate. cable						Aluminium wire armoured fire retardant PVC sheath
X		Cross-linked Polythene					Steel wire armoured PVC sheathed.

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Z	Special		Optic fibre			Special	
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**NOTES:**

The reference letter "Z" should not be used unless for special conductors or construction methods which should be fully detailed.

This document should be read in conjunction with specification NWS 1525.

Conduit requirements specified in contract.

All cores shall be individually insulated.

EXAMPLE: - UVH12ACX = 300 VOLT INSTRUMENT CABLE PVC INSULATED, INDIVIDUAL INSULATED CORES, TWISTED PAIRS, INDIVIDUAL AND OVERALL METALLIC TAPE SCREENS, WITH 12 PAIRS OF 0,5 mm<sup>2</sup> STRANDED COPPER CONDUCTORS, STEEL WIRE ARMoured AND PVC SHEATHED.

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**ANNEXURE 4: Telephone Cable Code For General Purpose Cables**

REF.	Type	Insulation of conductors	Construction	No of pairs	Conductors Dia. (mm)	Finish or protection (see notes below)
A					0,5	APL - SAA - LH
B					0,6	APL - SWA -
C					0,63	
D					0,9	
E					1,25	
F						
G			Twisted pairs			
H			Twisted pairs overall			
J			Twisted pairs			APL - GP Black
K			Twisted pairs	SM	GF	
L				MM	GF	
M						
N						GP Black PVC
P						
Q		Polyethylene				
R						Aluminium wire
S						AVL - FR Black
T	Telephone					
U	Control					APL - Double
V		PVC				White PVC
W						
X						Steel wire
Y						
Z	Special	Special	Optic cable		Special	Special

**KEY TO FINISH OR PROTECTION**

APL ALUMINIUM POLYETHYLENE LAMINATE (INNER SHEATH)

AVL ALUMINIUM VINYL LAMINATE (INNER SHEATH)

SWA SINGLE STEEL WIRE ARMOUR

SAA SINGLE ALUMINIUM WIRE ARMOUR

STA STEEL TAPE ARMOUR

FR FIRE RETARDANT

HF HALOGEN FREE

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LH      LOW HALOGEN  
MT      MICA TAPE  
GP      GENERAL PURPOSE

**NOTES:**

Cables ordered to the codes on this sheet are PVC insulated & sheathed in accordance with specification NWS 1523 for general-purpose applications.

For special purpose cables having fire retardant, low halogen or halogen free properties refer to sheet 2 and specification NWS 1524.

Typical code: -

1. TVH20BR - TELEPHONE CABLE, PVC INSULATED CONDUCTORS, 20 PAIRS, OVERALL SCREENED, 20 PAIRS, 0.6 mm CONDUCTORS, ALUMINIUM/POLYETHYLENE INNER SHEATH, SINGLE ALUMINIUM WIRE ARMoured, BLACK PVC OUTER SHEATH.
2. UVW06KKV - CONTROL/INSTRUMENT CABLE, PVC, OPTIC FIBRE, PRS, SINGLE MODE, FIBRE UNARMoured.
3. UVW06LLX - MULTI MODE, FIBRE ARMoured.
4. FIBRE OPTIC CABLE - CODE DESCRIPTION: -
  - UVW-KKV (SINGLE MODE)
  - UVW-LLX (MULTI MODE)
5. TYPICAL CODE FIBRE OPTIC CABLE
6. NUMBER OF FIBRES
  - "K" - SINGLE OF MODE, GLASS FIBRE
  - "U" - CONTROL CABLE
  - "V" - PVC SHEATH, UNARMoured PVC SHEATH
  - "Z" - OPTIC FIBRE

FIBRE OPTIC CABLE NUMBERING: FROM -- CYZ7900 TO – 7999

7. DATA HARDWIRE FROM: CCZ7000 TO – CY

**CONTROLLED DISCLOSURE**

**Annexure A: Request form**

	<b>CAMDEN POWER STATION Design and Spec Request Form</b>		Doc No : 240-129021108
	Discipline: Engineering	Rev: 0	
	Doc Type: FORM	Page 1 of 3	
	Effective Date: 03/07/17		

Requester: .....  
 Unique No.: .....  
 Date: .....  
 Request: .....  
 Target Date: .....  
 System Engineer Responsible Accepts: .....

**ACCEPTANCE OF MANUFACTURED LABELS**

Configuration Technician: .....  
 Unique No.: .....  
 Date: .....  
 Signature: .....

Supervisor: .....  
 Unique No.: .....  
 Date: .....  
 Signature: .....

**ACCEPTANCE OF INSTALLED LABELS**

Requester: .....  
 Unique No.: .....  
 Date: .....  
 Signature: .....

System Engineer: .....  
 Unique No.: .....  
 Date: .....  
 Signature: .....

**FINAL ACCEPTANCE**

Engineering Line Manager: .....  
 Unique No.: .....  
 Date: .....  
 Signature: .....

### 11 DOCUMENT ACCEPTANCE (STAKEHOLDERS)

This document has been seen and accepted by:

Name	Designation
[REDACTED]	Outage Manager
[REDACTED]	C&I Engineering Manager
[REDACTED]	Compliance Manager
[REDACTED]	Boiler Engineering Manager
[REDACTED]	Performance and Testing Engineering Manager
[REDACTED]	Common Plant Engineering Manager
[REDACTED]	Operating Manager
[REDACTED]	Electrical Engineering Manager
[REDACTED]	Projects Manager
[REDACTED]	Turbine Engineering Manager

### 12. REVISIONS

Date	Rev.	Remarks	Compiler/Reviewer
June 2022	4	Due for next review Changes on the next references: Changes on Page 14 (Building labelling added)	[REDACTED]
26 June 2019	3	It was due for next Review. No changes done	[REDACTED]
24 April 2017	2	It was due for next Review, changes on the references; Changes on Section 4.1,4.2,5.1,5.3,5.6,5.9,5.11 and 10.1. on Section 4 Request for Plant labelling process was added and label request form added on Annexure A	[REDACTED]
30 May 2015	1	It was due for next Review, changes on the next references; changes on Pages 5,14, and 17	[REDACTED]
01 May 2013	0	Original Issue	[REDACTED]

### 13. DEVELOPMENT TEAM

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

[REDACTED]

**CONTROLLED DISCLOSURE**

## 14. ACKNOWLEDGEMENTS

[REDACTED]

[REDACTED]

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