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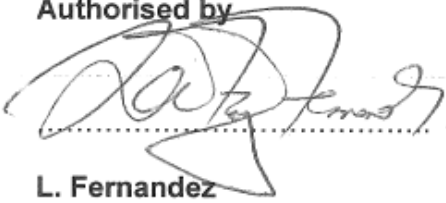

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## **1. INTRODUCTION**

This standard is intended to provide clear guidance in label requirements used in Eskom power plants for identification of equipment, components, buildings and structures. It includes the application of data matrix on plant labels for item identification and facilitating automatic data capture.

The implementation of data matrix on plant labels stemmed from the need to increase productivity through capturing information on a mobile device in real time or near real time and transferring data directly to the back-end systems. This eliminates the use of a paper based system to track and manage plant systems, equipment, and components during operation and maintenance. The Manual, paper-based system was a method prone to human errors and omissions.

## **2. SUPPORTING CLAUSES**

### **2.1 SCOPE**

This standard covers the requirements for the application of plant labels as part of plant identification process across Eskom Power Plants. It includes data matrix requirements on plant labels to ensure traceability application and subsequent verification of all systems, equipment and components.

#### **2.1.1 Purpose**

The purpose of this standard is to specify detailed labelling and data matrix requirements for all KKS compliant power stations projects to ensure that correct labelling and descriptions of plant, systems, equipment, components, buildings and structures are applied.

#### **2.1.2 Applicability**

This document shall be applicable to all new built and refurbishment projects in Generation division including Consultants and Contractors working on projects. It applies to all Eskom's KKS compliant coal, hydro, solar and gas power stations where plant identification is required.

### **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] VGB-B 105 E 2010 KKS Guidelines
- [3] VGB-B 106 E – KKS – Part A 2004 Application Commentaries
- [4] VGB-B 106 B1 E – KKS – Part B1 2004 Identification in Mechanical Engineering
- [5] VGB-B 106 B2 E – KKS – Part B2 2004 Identification in Civil Engineering
- [6] VGB-B 106 B3 E – KKS – Part B3 2004 Identification of Electrical and C&I Engineering
- [7] VGB-B 106 B4 E – KKS - Part B4 2004 Identification of Instrumentation and Control Tasks/Functions in Process System and Identification of functions in Instrumentation and Control System
- [8] 240-93576498 KKS Coding Standard
- [9] 240-109607332 – Eskom Plant Labelling Abbreviation Standard
- [10] 240-75655504 - Corrosion Protection Standard for New Indoor and Outdoor Eskom Equipment, Components, Materials and Structures Manufactured from Steel Standard.

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[11] SANS 1091: National Colour Standards for Paints

### 2.2.2 Informative

[12] ISO 10007 Guidelines for Configuration Management

[13] 36-681 Generation Plant Safety Regulations

[14] ISO/IEC 16022:2006: Information technology – Automatic Identification and Data Capture Techniques – Data Matrix Bar Code Symbology Specification

### 2.3 DEFINITIONS

Definition	Description
Basic colour	A colour that indicates the group of fluids to which the contents of a pipeline or vessel belongs.
Breakdown Level 0	Power station units, Non-unit-specific plant and extensions marked within location of a power station
Breakdown Level 1	Classification of systems and plants as per the KKS key part
Breakdown Level 2	Classification of mechanical equipment, electrical, civil and structures, control and instrumentation equipment as per the KKS key part
Breakdown Level 3	Classification of component, signals or signal applications as per the KKS key part
Clad/cladding	The external protective metal sheath of the insulation of a pipeline or vessel.
Colour code indicator(s)	One or two colours that are applied in addition to the basic colour to indicate the specific contents.
Data Matrix	Two-dimensional matrix symbology which may be printed as a square or a rectangular symbol made up of individual dots or squares encoded with data based upon pre-determined size. The dots or square modules are arranged within a perimeter finder pattern.
Description:	A description given to a process, structure, point of installation, component or equipment.
Ergonomic	The science of designing the workplace, keeping in mind the capabilities and limitations of the worker.
Label	Identification of process, structure, point of installation, component or equipment by means of approved fixing methods, materials and ergonomic requirements.
Lagged	Indicates an insulated pipe or vessel that has no external protective sheath.
Location Code	Identification of locations in structures, on floors and in rooms and also of fire areas
Key Part	PART is a Plant Classification system catalogue of codes to be used to classify power plant structures, systems, equipment and components
Plant	The power station as represented by its physical infrastructure and assets
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
Point of Installation	Identification of points of installation of electrical and control and instrumentation equipment in installation units (e.g. in cabinets, panels, consoles)
Stencil	A stencil is a thin sheet of material, such as paper, plastic, wood or metal, with

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Definition	Description
	letters or a design cut from it, used to produce the letters or design on an underlying surface by applying pigment through the cut-out holes in the material. The key advantage of a stencil is that it can be reused to repeatedly and rapidly produce the same letters or design.
Traceability	Process based on marking, reading, verification and communication of information.

### 2.3.1 Disclosure Classification

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

### 2.4 ABBREVIATIONS

Abbreviation	Description
C&I	Control and Instrumentation
CM	Configuration Management
CoE	Centre of Excellence
DC	Direct Current
ISO	International Organization for Standardization
KKS	Kraftwerk Kennzeichen System – German abbreviation for (Power Plant Classification system)
kV	Kilo Volt
LV	Low Voltage
MCB	Miniature Circuit Breaker
MV	Medium Voltage
P&ID	Piping and Instrumentation Diagram
PLC	Programmable logic controller
RACI	Responsible Accountable Consulted Informed
VGB	Technische Vereinigung Der Grosskraftwerks Betreiber E.V (Major Power Plant Users Association)

### 2.5 ROLES AND RESPONSIBILITIES

**Configuration Management Centre of Excellence (CM CoE):** Responsible for implementation and reviewing the contents of the labelling and coding standards.

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

**CM Practitioner:** Oversee verification exercise to ensure correct physical labelling of the plant.

### 2.6 PROCESS FOR MONITORING

Compliance to the standard will be monitored through Configuration Management (CM) internal compliance audits.

### 2.7 RELATED/SUPPORTING DOCUMENTS

N/A

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### 3. PLANT LABELLING

The purpose of plant labelling is to unambiguously distinguish between plant items and to ensure that a one to one correlation exist between the identification of the item on the plant and the identification of the item in the information systems and related documentation.

#### 3.1 LABEL MATERIAL

**Table 1: Materials for different plant areas**

PLANT AREA	LABEL MATERIAL TYPE	BACK PLATE MATERIAL TYPE
Boiler	Anodised Aluminium	Anodised Aluminium
Turbine	Anodised Aluminium	Anodised Aluminium
Ash Plant	Anodised Aluminium	Anodised Aluminium
Coal Plant	Anodised Aluminium	Anodised Aluminium
Water Treatment Plant	Stainless Steel	Stainless Steel
BOP and LP Services	Anodised Aluminium	Anodised Aluminium
Switchgear and Panels	White Graflux	Slide in aluminium holder
Internal panels/cubicles	Colour coded plastic	N/A
Transformers and structures	Cromadeck	Pre manufactured stand or wall mounted
Room Identification	Cromadeck	N/A
Buildings	Cromadeck	N/A

#### 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.
- Anodised Aluminium shall be of Aluminium grade 1050 tempered to H14 grade
- Stainless Steel shall be of grade 316
- The back plate size and shape should correspond to the size and shape of the label (only when it is needed)

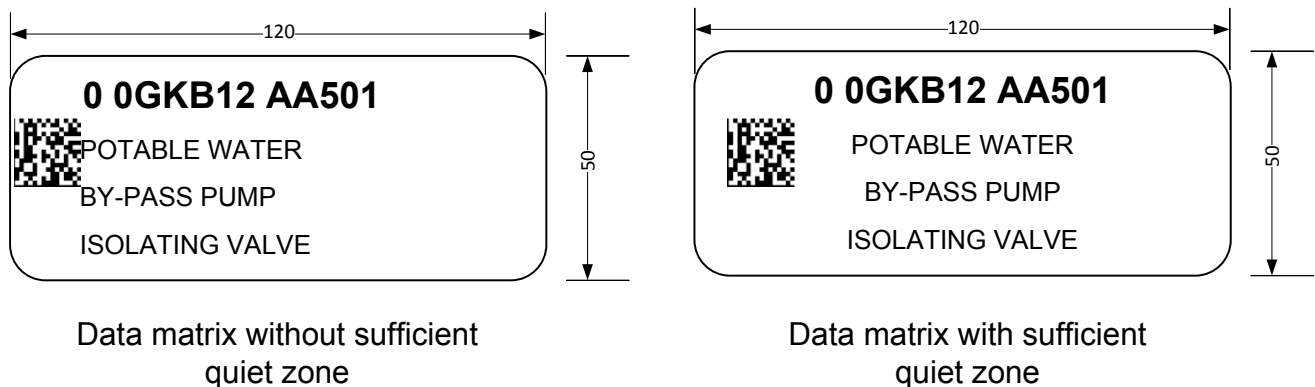
#### 3.2 ERGONOMIC REQUIREMENTS

- Consistency will be maintained when attaching labels on the plant.
- Labels shall be fitted in a manner not to hamper routine operation and maintenance activities.
- The label may not be fitted to a movable component e.g. valve hand wheels – it must be attached to a permanent structure nearest to the component.
- All equipment labels must be fitted as close as possible to the equipment but ideally not ON the equipment to prevent loss of the plant position label when equipment is removed for maintenance/repair purposes.

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- The location of labels on an item should ensure readability during normal operation of plant without compromising identity of exact equipment. If not possible, consult Eskom CM CoE.
- 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.
- In case of space constraints, labels shall be mounted vertically, the method of text reading will be from bottom to top. This excludes cable labels.
- All valve labels must be strapped on pipe next to the valve and if not possible consult Eskom CM who will investigate and provide guidance on how labelling should be executed.
- In the event where mimics are used, contact Eskom CM for further specifications and requirements as to how it is used and what is allowable.
- Only the identification code (KKS code) for the item must be encoded in the Data-matrix symbol.
- Data matrix shall be applied to identification labels on the plant by following the recommended marking according to each label specified in section 4: Plant Labels
- A clear space (“quiet zone”) must be left around the outside of the symbol in order to successfully decode a data matrix as indicated below



**Figure 1: Data matrix spacing**

### 3.3 ENVIRONMENTAL FACTORS

All plant labels shall be as permanent as the normal life expectancy of the plant and be capable of withstanding the following environmental conditions:

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

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### 3.4 NOTATION OF KKS CODE

Single spacing between unit, system, equipment and components as per VGB-B 106 E – KKS – Part A 2004 shall be used in all labels.

Description	Small spacing
With Blank Spaces	N NAAANN AANNNA AANN

A – Alpha characters

N – Numeric characters

### 3.5 ENGRAVING

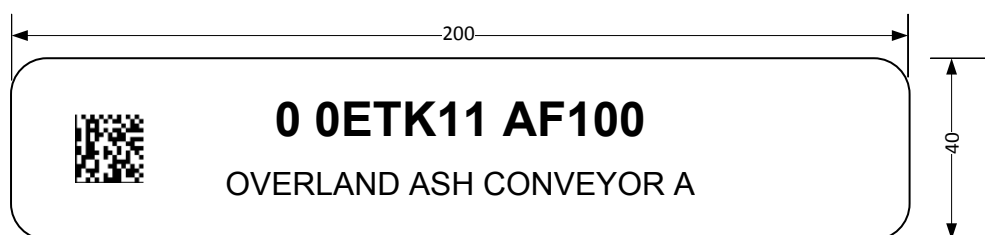
- Arial font to be used on all labels.
- Standard vertical characters will be used.
- Narrow (condensed), broad (extended) characters are not acceptable.
- Horizontal lines will be evenly spaced amongst the height of the label.
- If the label description is too long to fit in one line and requires to go over multiple lines, it should be spread evenly across the height of the label.
- All labels shall have character fill in black
- All label descriptions shall have a maximum of 60 (<=60) characters

## 4. PLANT LABELS

For a summary list of application of the label types described below, refer to Appendix A.

### 4.1 LABEL TYPE GA

Mechanical Plant Identification Label. Used for labelling drive trains for example conveyor, pump, compressor, pump, fan and blower units.



**Figure 2: GA**

### Engraving

- Alphanumeric Characters: 7mm High.
- Description Characters: 5mm High.
- Data matrix: 15 mm high and wide
- White background

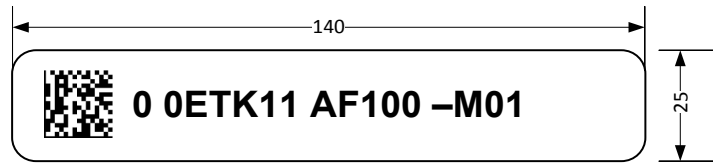
Only when using back plates, holes should be site drilled to suit back plate.

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## 4.2 LABEL TYPE GB

Mechanical Plant Component Identification Label. This is used for individual components on drive train units, for example Gearbox, Clutch, Coupling and Motor.



**Figure 3: GB**

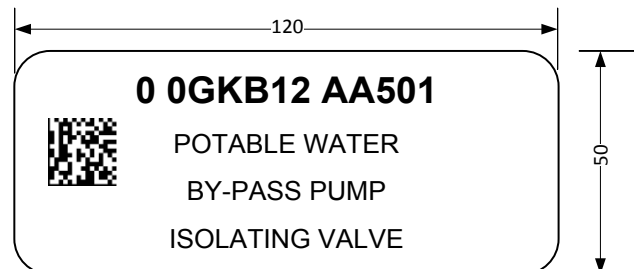
### Engraving:

- Alphanumeric Characters: 7mm High.
- Data matrix: 15 mm high and wide
- White background

Only when using back plates, holes should be site drilled to suit back plate.

## 4.3 LABEL TYPE GC

Equipment Identification Label. This is used for field equipment and measuring circuits, for example Valves, Tanks and pressure transmitters.



**Figure 4: GC**

### Engraving:

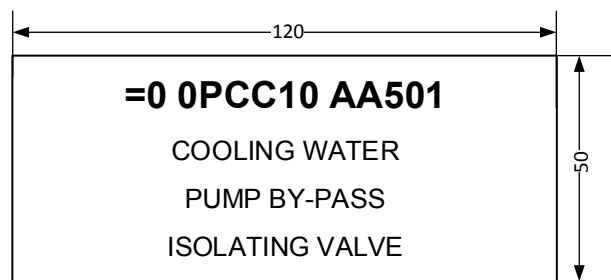
- Alphanumeric Characters: 7mm High.
- Description Characters: 5mm High.
- Data matrix: 15 mm high and wide
- White background

Only when using back plates, holes should be site drilled to suit back plate.

## 4.4 LABEL TYPE GD

Process code labels for process control equipment on local and control panels.

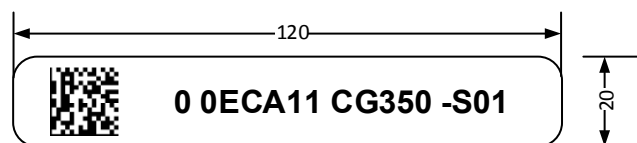
### CONTROLLED DISCLOSURE

**Figure 5: GD****Engraving:**

- Alphanumeric Characters: 7mm High
- Description Characters: 5mm High
- White background
- Data matrix: Not applicable – label not used to identify specific component

**4.5 LABEL TYPE GE**

Field device label for process control equipment identification

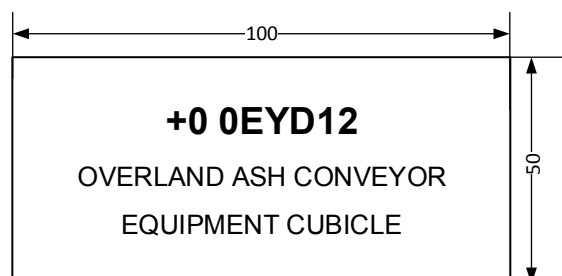
**Figure 6: GE****Engraving:**

- Alphanumeric Characters: 4mm High.
- White background
- Data matrix: 15 mm high and wide

Only when using back plates, holes should be site drilled to suit back plate

**4.6 LABEL TYPE GH**

Point of Installation Code Labels for Process Control and Electrical Equipment PLC's Measurement Panels, Protection Panels, Measurement Racks, Local Alarm Panels.

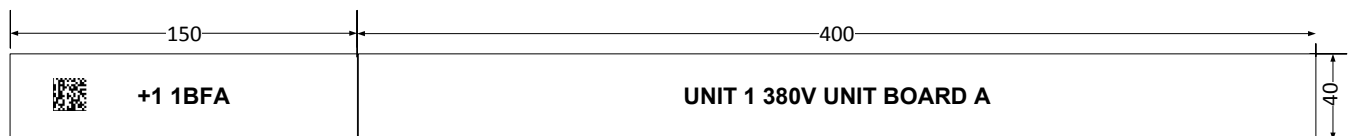
**Figure 7: GH****CONTROLLED DISCLOSURE**

**Engraving:**

- Alphanumeric Characters: 10mm High.
- Description Characters: 5mm High.
- White background
- Data matrix: Not applicable – label not used to identify specific component

**4.7 LABEL TYPE EA**

Board Main Label

**Figure 8: EA**

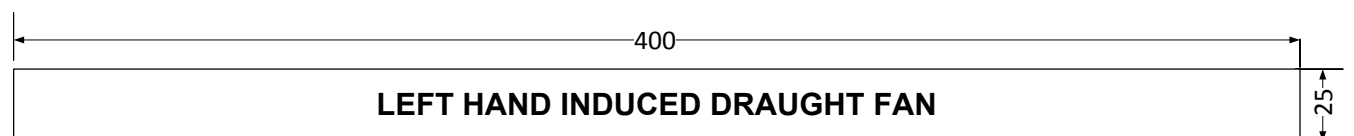
Fixing Method: Aluminium sliding holder, no drilling into electrical or process control panels

**Engraving:**

- Alphanumeric Characters: 20mm High.
- Description Characters: 15mm High.
- Data matrix: 15 mm high and wide
- White background

**4.8 LABEL TYPE EB**

Electrical board sub section

**Figure 9: EB**

Fixing Method: Aluminium sliding holder, no drilling into electrical or process control panels.

**Engraving:**

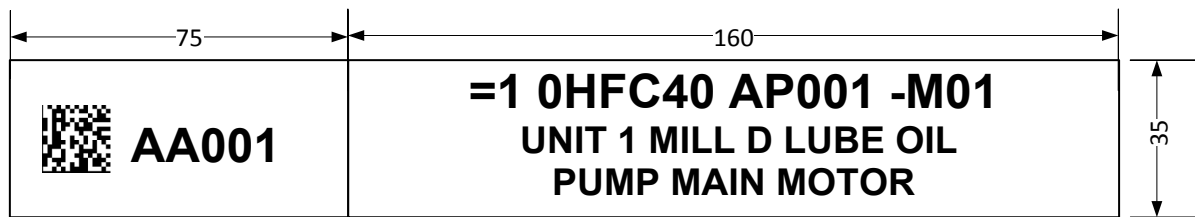
- Alphanumeric Characters: 15mm High.
- Data matrix: Not applicable – Item not identified with a KKS code
- White background

**4.9 LABEL TYPE EC**

Isolator Labels

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**Figure 10: EC**

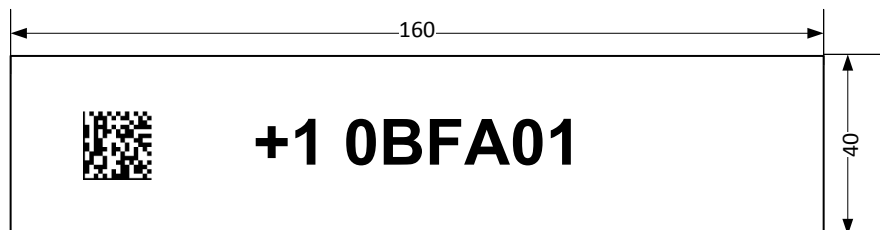
Fixing Method: Aluminium sliding holder, no drilling into electrical or process control panels

**Engraving:**

- Alphanumeric Characters: 10mm High.
- Description Characters: 10mm High.
- Data matrix: 15 mm high and wide
- White background

**4.10 LABEL TYPE ED**

Cubicle Identification Labels

**Figure 11: ED**

Fixing Method: Aluminium sliding holder, no drilling into electrical or process control panels

**Engraving:**

- Alphanumeric Characters: 20mm High.
- Data matrix: 15 mm high and wide
- White background

**4.11 LABEL TYPE EE**

Terminal Label with Tier Co-ordinate (back of panel)

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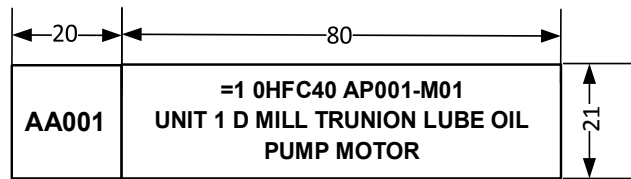


Figure 12: EE

Fixing Method: Aluminium sliding holder, no drilling into electrical or process control panels.

**Engraving:**

- Alphanumeric Characters: 3mm High
- Description Characters: 3mm High.
- Data matrix: Not applicable
- White background
- Data matrix: Not applicable – label not used to identify specific component

**4.12 LABEL TYPE EF**

Lighting Distribution Board Label

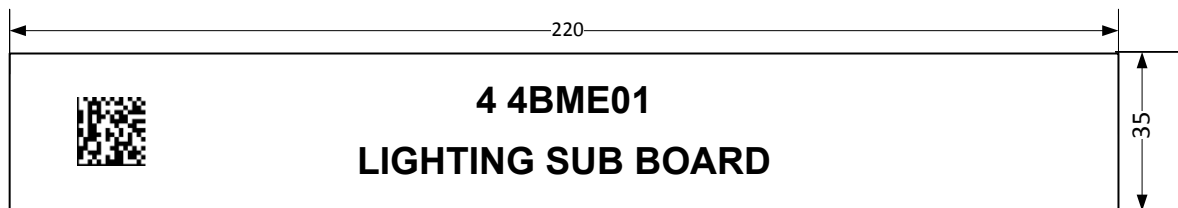


Figure 13: EF

Fixing Method: Adhesive

**Engraving:**

- Alphanumeric Characters: 10mm High
- Description Characters: 10mm High
- Data matrix: 15 mm high and wide
- White background

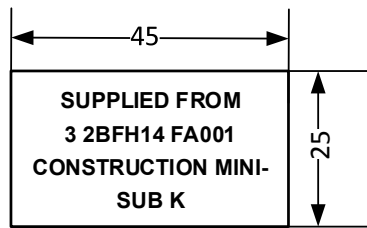
**4.13 LABEL TYPE EG**

Distribution Boards Information Labels

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**Figure 14: EG**

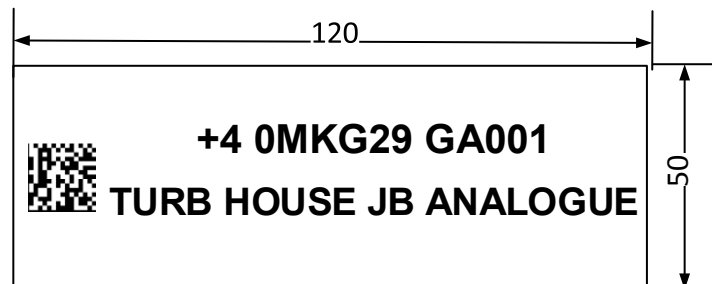
Fixing Method: Adhesive

**Engraving:**

- Alphanumeric Characters: 4mm High.
- Description Characters: 3mm High.
- Data matrix: Not applicable
- White background
- Data matrix: Not applicable – label not used to identify specific component

**4.14 LABEL TYPE EH**

Junction Box Label

**Figure 15: EH**

Fixing Method: Adhesive

**Engraving:**

- Alphanumeric Characters: 10mm High
- Description Characters: 10mm High.
- Data matrix: Not applicable
- White background
- Data matrix: Not applicable – label not used to identify specific component

**4.15 LABEL TYPE EI**

MCB process code Label

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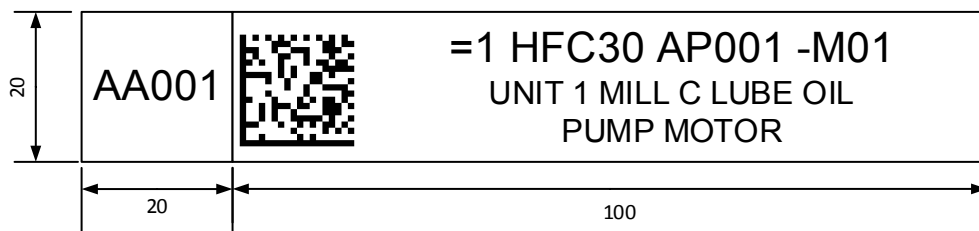


Figure 16: EI

Fixing Method: Adhesive / Sliding holder

**Engraving:**

- Alphanumeric Characters: 4mm High.
- Description Characters: 3mm High.
- Data matrix: 15 mm high and wide
- White background

#### 4.16 LABEL TYPE EJ

MCB point of installation Labels

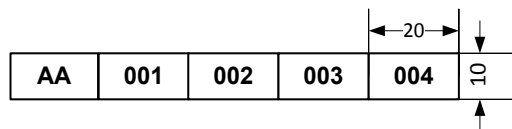


Figure 17: EJ

Fixing Method: Adhesive

**Engraving:**

- Alphanumeric Characters: 3mm High.
- White background

#### 4.17 ELECTRICAL AND C&I COMPONENT LABELS

##### 4.17.1 Label Type EK

Terminal Label

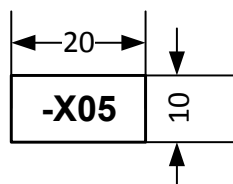


Figure 18: EK

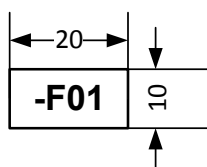
Fixing Method: Adhesive

#### CONTROLLED DISCLOSURE

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**Engraving:**

- Alphanumeric Characters: 3mm High.
- White background

**4.17.2 Label Type EL****Electrical Component****Figure 19: EL**

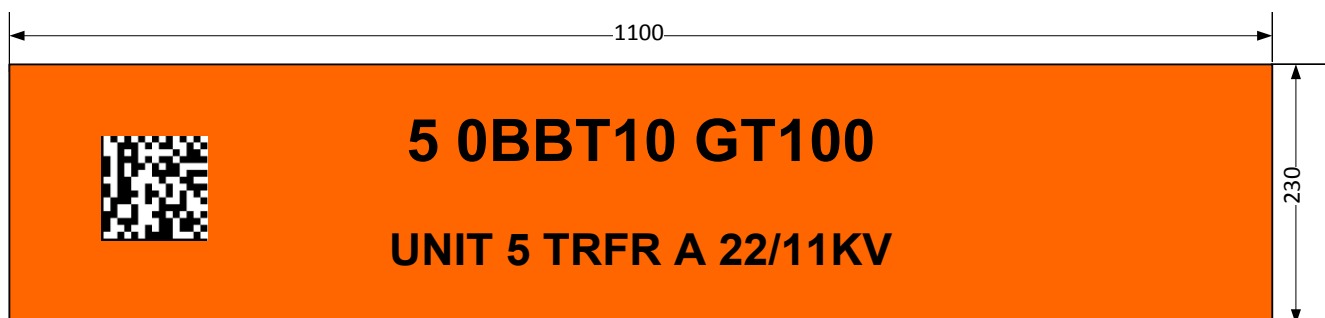
Fixing Method: Adhesive

**Engraving:**

- Alphanumeric Characters: 3mm High.
- White background

**4.18 LABEL TYPE EM**

Transformer, Electrical related Building Identification Label

**Figure 20: EM****Text:**

- Cut out characters
- Characters in Black Engineering Grade 7 Years Vinyl.
- Alphanumeric Characters: 60mm High.
- Description Characters: 40mm High.
- Orange background
- Data matrix: 15 mm high and wide

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#### 4.19 LABEL TYPE EM.1

Structure related label (Not electrical switchgear)

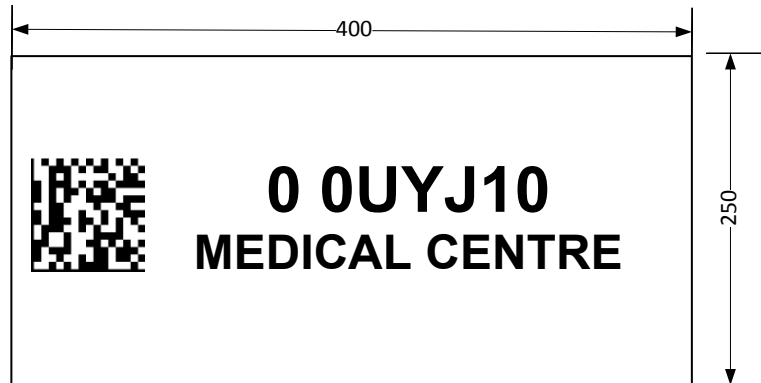


Figure 21: EM.1

- Cut out characters
- Characters in Black Engineering Grade 7 Years Vinyl.
- KKS code characters: 60 mm High
- Description text characters: 40 mm High
- Data matrix: 15 mm high and wide
- White background

#### 4.20 LABEL TYPE EM.2

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

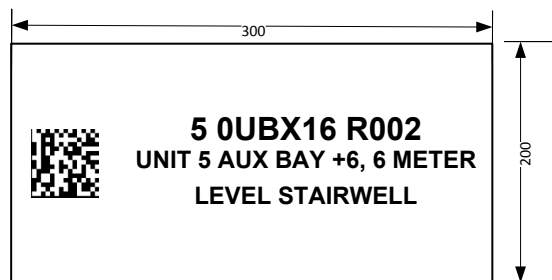


Figure 22: EM.2

**Text:**

- Cut out characters
- Characters in Black Engineering Grade 7 Years Vinyl.
- KKS code characters: 30 mm High
- Description text characters: 20 mm High
- Data matrix: 15 mm high and wide
- White background

**CONTROLLED DISCLOSURE**

#### 4.21 LABEL TYPE EM.3

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

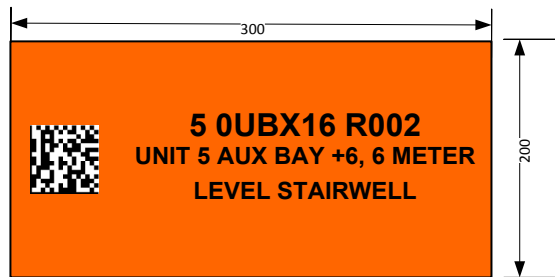


Figure 23: EM.3

##### Text:

- Cut out characters
- Characters in Black Engineering Grade 7 Years Vinyl.
- KKS code characters: 30 mm High
- Description text characters: 20 mm High
- Data matrix: 15 mm high and wide
- Orange background

#### 5. BACK PLATES

The back plate size and shape shall be set to fit the specification (size and shape) of the respective label as shown in Figure 24.

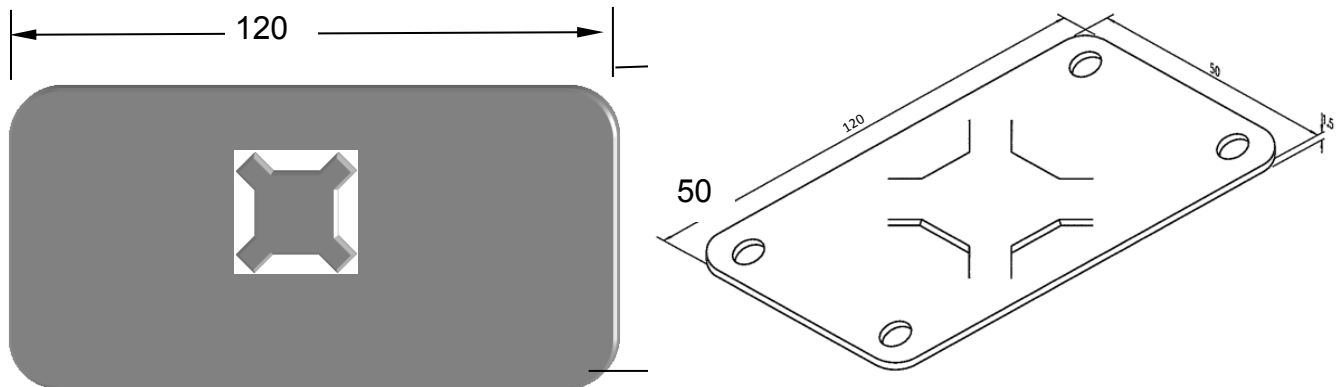


Figure 24: Back plate for a GC label

##### 5.1 BACK PLATE STRAP

- The strap of stainless steel strapping and size to fit in pressed out slot.

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## 6. PIPE LABELS

### 6.1 NON-LAGGED PIPING LESS THAN OR EQUAL TO 35MM

Pipelines of diameter less than or equal to 35mm shall be painted in the basic colour over their full length. Colour code indicator bands shall be superimposed around the pipes with a suitable mechanical label to be strapped around the pipes and a direction of flow be painted as showed in Figure 25 below.

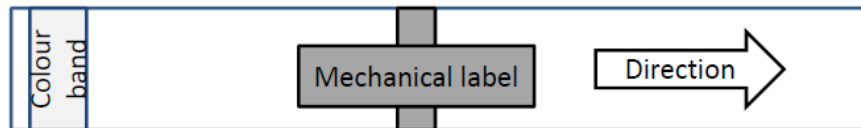


Figure 25: Piping label

The indicators shown in Figure 25 above are to be placed at 10 m intervals nominally along the length of the pipe and adjacent to valves, wall and floor penetrations. The direction of flow arrows are of white colour with dimensions in accordance with Figure 26. For the length of the arrow please refer to Table 2

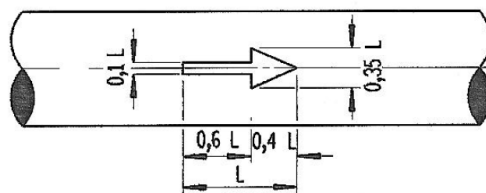


Figure 26: Direction of flow

Table 2: Legend dimensions for pipelines and vessels

Outside diameter mm	Legend height mm	Chemical hazard legend height mm	Direction of flow arrow
			Length mm
Up to 50	20	20	75
51 to 100	25	25	100
101 to 150	38	50	150
151 to 225	50	100	200
226 to 300	75	150	300
301 to 600	100	150	300
Above 600	150	150	300

➤ Font type - Arial

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## 6.2 NON-LAGGED PIPING GREATER THAN 35MM

Pipelines of diameter greater than 35mm shall be painted in the basic colour over their full length. In cases of long exposed sections of large diameter pipes, due consideration shall be given to the costs incurred with regard to the use of a basic colour over the full length. Colour code indicator bands are to be superimposed around the pipes, a KKS code label shall be stencilled along the pipe length, a medium description to be stencilled along the pipe length and a direction of flow to be stencilled as showed in Figure 27 below.



**Figure 27: Pipeline label (Greater than 35mm)**

The height of the letters used on the KKS code and medium description stencilling is superimposed on a 'rectangular area' in accordance with Table 2. The direction of flow arrows are of white colour with dimensions in accordance with Table 2. The indicators shown in Figure 27 above are to be placed at 10 m intervals nominally along the length of the pipe and adjacent to valves, wall and floor penetrations.

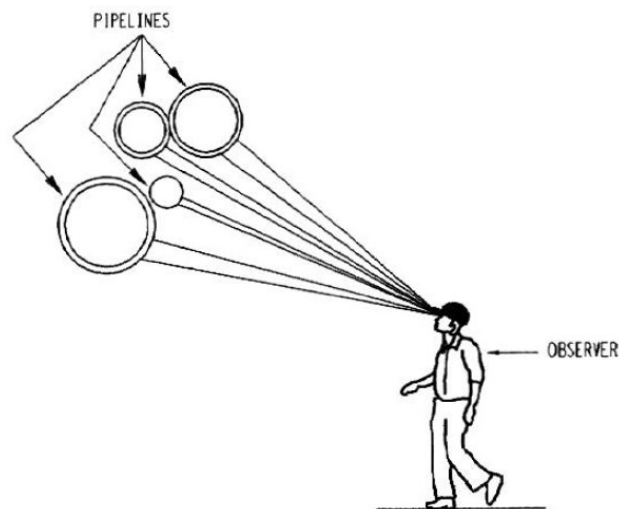
## 6.3 LAGGED PIPING PROTECTED WITH CLADDING

Pipelines lagged and protected with cladding do not require painting in basic colour over their full length, however colour code indicator bands are to be superimposed around the cladding. A KKS code label shall be stencilled/labelled along the cladding length, and medium description shall stencilled/labelled along the cladding length as well as direction of flow shall stencilled/labelled as shown in Figure 27 above. The height of the letters used on the KKS code and medium description stencilling is superimposed on a 'rectangular area' in accordance with Table 2. The indicators shown in Figure 27 above shall be placed at 10 m intervals nominally along the length of the pipe and adjacent to valves, wall and floor penetrations.

For the basic colour and colour code indicator band paint specification please refer to [10] 240-75655504 - Corrosion Protection Standard for New Indoor and Outdoor Eskom Equipment, Components, Materials and Structures Manufactured from Steel Standard.

## 6.4 MULTIPLE-PIPELINE RUNS

Colour identification, descriptive identification and labels are positioned on multi-pipeline runs such that the identification of all pipes in the run is clearly visible from an observation position as shown in Figure 28 below.



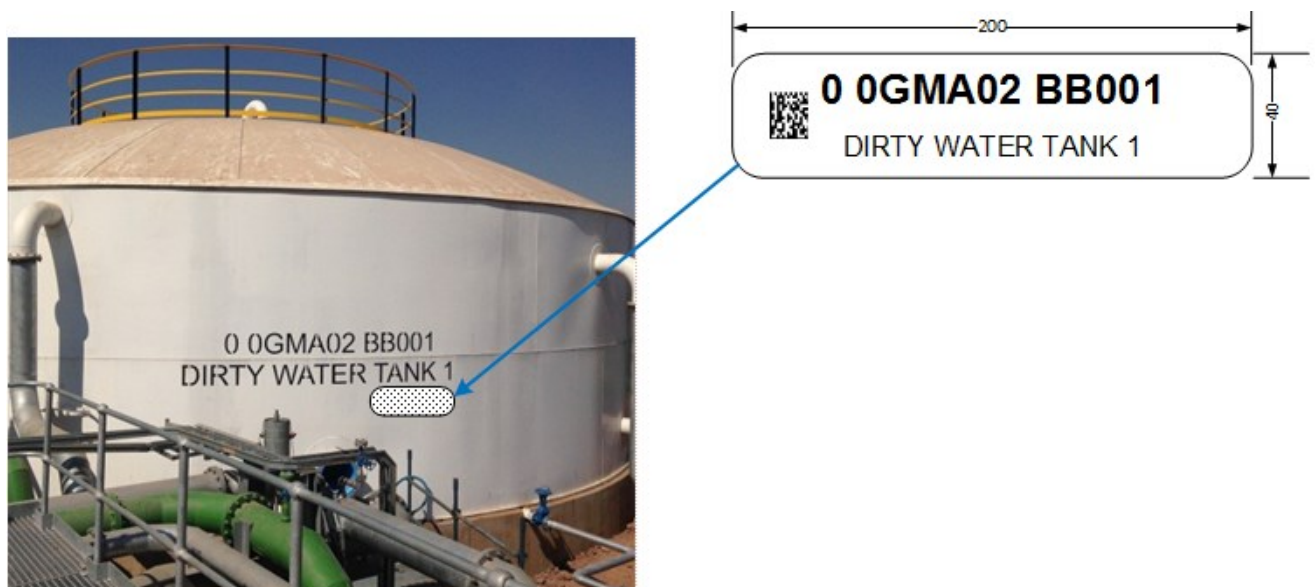
NOTE — Extract from SABS 0140-3:1992.

**Figure 28: Pipelines observation position**

## 7. VESSELS

### 7.1 ROUND VESSELS

Round vessels shall be stencilled as showed below. The height of the letters used on the KKS code and medium description stencilling is superimposed on a 'rectangular area' in accordance with Table 2: Legend dimensions for pipelines and vessels. A label type GA bearing data matrix shall be attached beside the stencilled section on the vessel as illustrated below.



**Figure 29: Round vessel label**

For the stenciling paint specifications for the vessels refer to [10] 240-75655504 - Corrosion Protection Standard for New Indoor and Outdoor Eskom Equipment, Components, Materials and Structures Manufactured from Steel Standard.

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## 7.2 SQUARE VESSELS

Square vessels shall be labelled using label type GA as shown in Figure 30 below. An identification label shall be fixed on a flat surface of the vessel using adhesive or to be fixed on a bracket using rivets.



Figure 30: Square vessel label

## 8. CABLE RACKS

Cable rack/tray coding is the identification of cable racks/trays according to the location, voltage level and type of rack/tray. The cable rack/tray number format shall be as follows:

Table 3: Cable rack number format

TOTAL PLANT	SYSTEM CODE	EQUIPMENT UNIT CODE
0	0 UGB 11	BQ 101
0	0 UGB 21	BQ 101
0	0 UGB 31	BQ 101

The KKS code for the rack/tray to be stencilled and clearly visible from an observation position as shown in Figure 31.



Figure 31: Cable rack label

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The height of the letters used on the KKS code is to be '50% of the width of rack/tray and black in colour and Arial font.

The KKS codes are to be placed at 10 m intervals nominally along the length of the horizontal and vertical racks/ trays as well as adjacent to T-junctions as shown below.

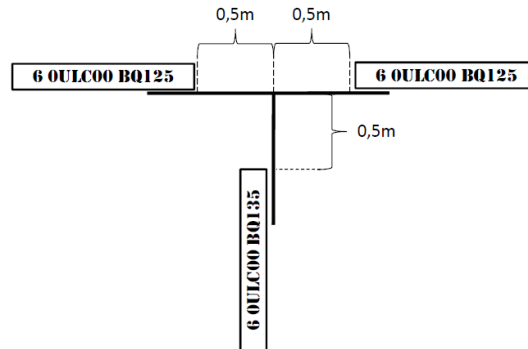


Figure 32

When the rack/tray is changing direction or penetrating a floor or wall opening the KKS code is to be placed as shown below.

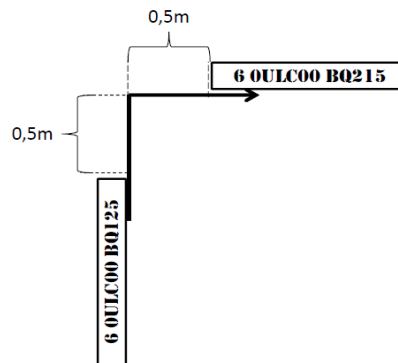


Figure 33

For the stencilling paint specifications for the rack/tray please refer to 240-75655504 - Corrosion Protection Standard for New Indoor and Outdoor Eskom Equipment, Components, Materials and Structures Manufactured from Steel Standard..

## 9. CRANES, CRAWL BEAM AND SEMI-PORTAL LABELS

Cranes, crawl beams and semi-portals shall be stencilled with the KKS code in black and shall be clearly visible from an observation position as shown in Figure 34. Label type GA bearing the code and the data matrix shall be used by adhering to the specifications below:

- Cranes shall have GA labels attached to the stairs leading to the cabins
- Semi-portals shall have GA labels on the beams running on the rails on the floor levels and,
- Crawl beams shall have GA labels on the structure where the beams are attached to.

### CONTROLLED DISCLOSURE



**Figure 34: Crane and crawl beam stencilling**

**Text:**

- Stencilled characters
- Characters in Black Engineering Grade 7 Years Vinyl.
- KKS code characters: 50% of the beam breadth
- Orange background (crane colour)

For the stencilling paint specifications to be used for the crane or crawl beam please refer to [10] 240-75655504 - Corrosion Protection Standard for New Indoor and Outdoor Eskom Equipment, Components, Materials and Structures Manufactured from Steel Standard..

## **10. STAIRWELL, CAT LADDERS & PIPE SUPPORT LABELS**

### **10.1 STAIRWELLS**

Stairwells to be labelled using label Type EM.2. The label is to be installed on stairwell points of entry.

### **10.2 CAT LADDERS**

Cat ladders will be labelled using GC mechanical label in this specification. The label is to be installed on cat ladder points of entry.

### **10.3 PIPE SUPPORTS**

Pipe supports to be labelled using GC mechanical label in this specification.

## **11. CABLE LABELS**

### **11.1 INTERNAL CABLES**

#### **11.1.1 Label Type EN**

1	0	B	F	A	1	0	0	8	B	B	C	C
---	---	---	---	---	---	---	---	---	---	---	---	---

**Figure 35: EN**

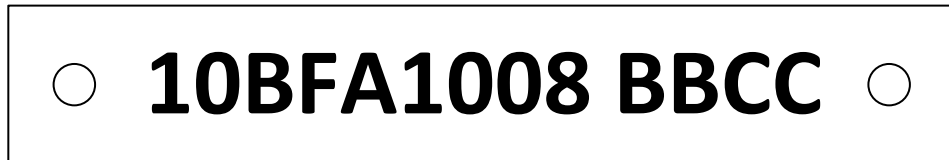
### **CONTROLLED DISCLOSURE**

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All internal cables shall be labelled with standard PVC K Type flexible cable markers and more than 13-digit carrier strips and attached on both ends with suitable cable ties (T18R or T30R, depending on cable thickness). Data matrix do not apply for this type of label.

## 11.2 EXTERNAL CABLES

### 11.2.1 Label Type EP



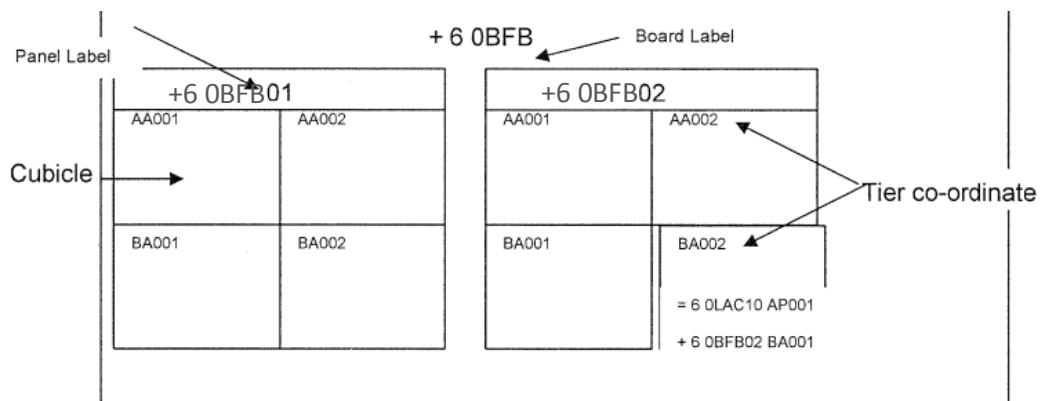
**Figure 36: EP**

Note:

- Label size: 10x90mm
- Alphanumeric Characters: 5mm
- Material: Stainless Steel
- Thickness: 0.6mm
- Fixing Holes: 2 holes, size 4mm diameter
- All cables must be labeled on both sides of wall and cabinet penetrations.
- Data Matrix: Not applicable

## 12. POSITIONING OF LABELS ON ELECTRICAL BOARDS

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



**Figure 37: Electrical Board label**

KKS codes as illustrated in Figure 37:

Board +6 0BFB	
6 0BFB01AA001	6 0BFB02AA001
6 0BFB01AA002	6 0BFB02AA002

**CONTROLLED DISCLOSURE**

6 0BFB01BA001    6 0BFB02AA001  
6 0BFB01BA002    6 0BFB02AA002

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

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. The tier co-ordinate (cubicle) should have its identification on the top left hand corner of door, e.g. AA001 BA001 etc. 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.

### 13. LABELS OUTSIDE POWER PLANT PERIMETERS

It is crucial to maintain consistency in labelling of all plant areas managed by Eskom including areas outside power plant perimeters. For labelling of structures, buildings, systems, equipment and components outside power plant perimeter (e.g. raw water supply pipelines), the following labels shall apply:

#### 13.1 LABEL TYPE KW01

Structure identification label e.g. chamber structure for housing components

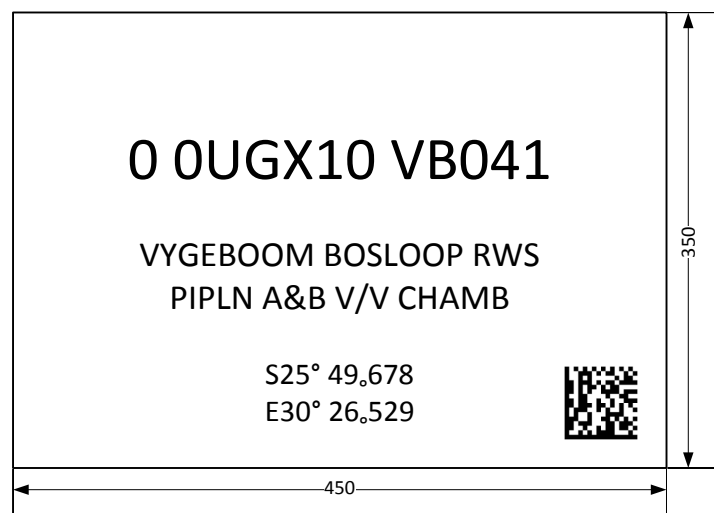


Figure 38: KW01 label

Label material: Traffolite

Engraving:

- KKS code characters: 30mm high by 30mm wide
- Description characters: 20mm high by 15mm high
- Co-ordinates: 20mm high by 15mm high
- Data Matrix: 15 mm by 15 mm high and wide
- White background

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### 13.2 LABEL TYPE KW02

Mechanical plant components identification label. For labelling components e.g. housed in a chamber.

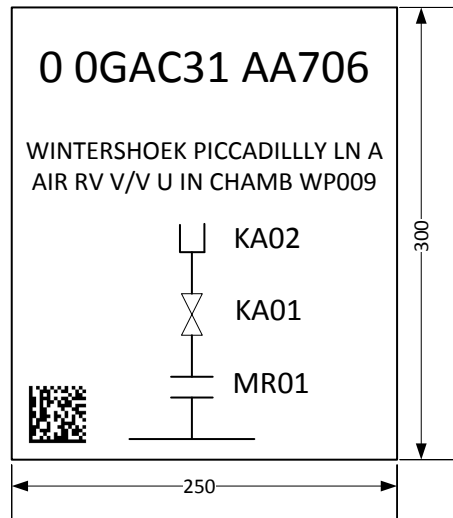


Figure 39: KW02 label

Label material: Traffolite

Engraving:

- KKS code characters: 25mm high by 20mm wide
- Description characters: 12mm high by 10mm high
- Data Matrix: 15 mm by 15 mm high and wide
- White background

### 13.3 LABEL TYPE KW03

Structure identification label for structures such as gates, culverts and low-level bridges.

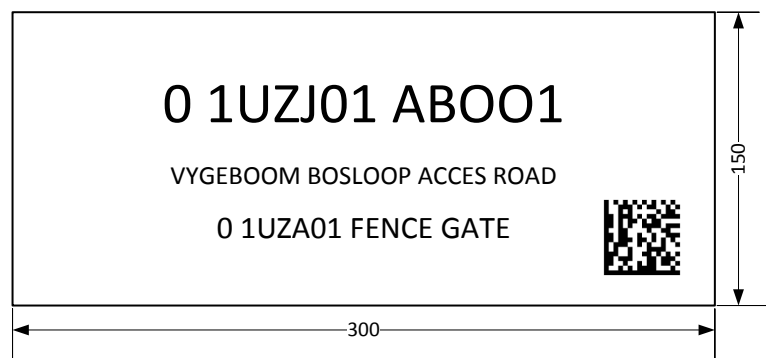


Figure 40: KW03 label

Label material: Traffolite

**CONTROLLED DISCLOSURE**

Engraving:

- KKS code characters: 25mm high by 25mm wide
- Description characters: 12mm high by 10mm high
- Data Matrix: 15 mm by 15 mm high and wide
- White background

## 14. PLANT DESCRIPTIONS

Plant functional description provides supplementary identification information along with the plant classification codes. This include critical information such as direction of flow or inlet and outlet parts of an equipment which clearly describe the function of an item. Standard application of plant description is imperative especially on plant labels and information systems.

### 14.1 PLANT LABEL DESCRIPTION REQUIREMENTS

For effective and standard application of plant descriptions on plant labels, the following requirements shall be adhered to:

- Descriptions on plant labels shall be in English.
- The description shall clearly describe the plant, systems, equipment, components, building or structure.
- Descriptions shall be as short as possible without compromising on description accuracy.
- All abbreviations used in descriptions shall be in accordance with approved abbreviation standard [9] 240-109607332 – Eskom Plant Labelling Abbreviation Standard. This standard must be adhered to all times in abbreviating descriptions.
- Descriptions shall only be used after review and approval by Configuration Management on a label list.
- All descriptions shall be in capital letters
- The first line of text shall always be the KKS code, followed by the description text, where applicable, on the second, third and fourth lines.
- The description shall contain and be formulated in the sequence: plant, plant number, system, equipment function and equipment type.
- The format of the description text shall follow the format of the KKS code.

### 14.2 FORMAT OF LABEL DESCRIPTIONS

The format of the description shall follow the format of the KKS code on the label. It is important that the descriptions must always be unique and should be compiled as shown below:

#### 14.2.1 Drives and actuators

<b>Plant code</b>	<b>1 0HDW61 AP001 -M01</b>
<b>Description</b>	UNIT 1 BLR ASH REMV S/PMP & HPR SLNG PMP MTR
<b>Plant code</b>	<b>1 0HLA10 AA204</b>
<b>Description</b>	UNIT 1 LH H/AIR RECIRC DMPR
<b>Plant code</b>	<b>2 0PCC10 AP001 -M01</b>

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<b>Description</b>	UNIT 2 CLG WTR PMP 1 MTR
--------------------	--------------------------

**14.2.2 Instruments**

<b>Plant code</b>	<b>1 0LAC20 CT301</b>
<b>Description</b>	UNIT 1 FD WTR PMP 2 DE BRG TSW
<b>Plant code</b>	<b>1 0HAH30 CT001</b>
<b>Description</b>	UNIT 1 LH SEC S/HTR INL HDR TT
<b>Plant code</b>	<b>0 0ECB31 CH302</b>
<b>Description</b>	COAL OVRL CONV BELT 31 TRIP SW 2

**14.2.3 Electrical**

<b>Plant code</b>	<b>0 0BBA</b>
<b>Description</b>	3.3kV COAL CONV BD
<b>Plant code</b>	<b>0 0BBT10</b>
<b>Description</b>	3.3kV COAL CONV BD TRFR

**14.2.4 Civil**

<b>Plant code</b>	<b>0 0UBA</b>
<b>Description</b>	COAL STK-YD SS

**14.2.5 Mechanical**

<b>Plant code</b>	<b>0 0GMA10 BB001</b>
<b>Description</b>	CLN DRN RECOV STILL BSN

**15. AUTHORISATION**

This document has been seen and accepted by:

<b>Name &amp; Surname</b>	<b>Designation</b>
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John Bartlett	Configuration Management Coding Technician
Peter Macnamara	Configuration Management Tools Specialists

## 16. REVISIONS

Date	Rev.	Compiler	Remarks
March 2015	0	J. Mathebula	Updated first Draft Document
March 2015	0.1	J. Mathebula	Final Draft for Comments Review Process
April 2015	0.2	J. Mathebula	Updated Draft from comments Review
April 2015	1	J. Mathebula	Final Document for Authorisation and Publication
May 2016	1.1	J. Mathebula	Title change and updated introduction to suit KKS
June 2016	1.2	J. Mathebula	Final Draft for Comments Review Process (Rev 1.2)
June 2016	1.3	J. Mathebula	Updated comments by the Compiler
July 2016	1.4	J Mathebula	Jabulane requested document for changes
July 2016	2	J. Mathebula	Final Document for Authorisation and Publication
January 2017	2.1	Nomvuyo Luthuli	Confirmed updated document ****
January 2017	2.2	Nomvuyo Luthuli	Draft Document for Comments Review
April 2017	3	Nomvuyo Luthuli	Final Document for Authorisation and Publication Rev 3

## 17. DEVELOPMENT TEAM

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

- Jabulane Mathebula
- Andell Kannemeyer
- Renier Smal

## 18. ACKNOWLEDGEMENTS

- None

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**APPENDIX A: LABEL TYPE PER EQUIPMENT**

<b>BDL 2</b>	<b>DESCRIPTION OF BREAKDOWN LEVEL 2</b>	<b>LABEL TYPE</b>
<b>A</b>	<b>Mechanical equipment (machinery including driven or hand operated)</b>	
AA	Valve , damper including actuator , rupture disk , equipment ,also manual etc.	GC
AB	Isolating element (access gates, doors, locks etc.)	GC
AC	Heat exchanger , heat transfer surface	GA
AE	Turning , driving , lifting and slewing unit (manipulators also)	GA
AE	Overhead Cranes, Hoist, Crawl beams	See par 9 and GA.
AF	Continuous conveyor unit (escalator)	GA
AG	Generator unit	GA
AH	Heating , cooling and air conditioning unit	GA
AJ	Size reduction equipment , (crushing milling plant)	GA
AK	Pressing and packaging unit	GA
AM	Mixer , agitator , vibrating unit	GA
AN	Compressor, fan and blower unit	GA
AP	Pump unit	GA
AS	Positioning and tensioning equipment # for non-electrical variable	GA
AT	Purifying, drying, filtering, separating and screening unit, steam trap, equip. other than "BT"	GA
AU	Brake , coupling and gearbox unit , not electrical converter	GA
AV	Combustion unit	GA
AW	Fixed workshop equipment	GA
AX	Testing control and monitoring equipment (e.g. weighing devices)	GA
<b>B</b>	<b>MECHANICAL EQUIPMENT</b>	
BB	Storage equipment (vessel , tank , dam)	GA, Note 2
BE	Tunnel and trench (e.g. inspection/cable access)	GC
BF	Foundation	Not labelled
BG	Boiler-heating surface	Not
BN	Ejector , injector , jet pump (attemporator)	GA
BP	Flow restricting limiter , orifice (not for metering)	GC
BQ	Hanger , support , frame , rack , pipe penetration , cable tray	GA, Stencilled
BR	Piping , duct and channel	Stencilled
BS	Sound absorber (silencer)	GC
BT	Flue gas catalytic converter module	GC
BU	Insulation , cladding	GC
BY	Mechanically operated controlling unit	GC
<b>C</b>	<b>DIRECT MEASURING CIRCUIT</b>	
CD	Density	GC
CE	Electrical quantities (e.g. current , voltage , power , electrical frequency)	GC
CF	Flow , mass flow	GC
CG	Distance , length , position , direction of rotation	GC
CH	Manual input (as manually operated sensor , e.g. fire detector)	GC

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BDL 2	DESCRIPTION OF BREAKDOWN LEVEL 2	LABEL TYPE
CJ	Power (mechanical or heat , not electrical)	GC
CK	Time	GC
CL	Level (also for dividing line)	GC
CM	Humidity (moisture)	GC
CP	Pressure	GC
CQ	Quality quantities (analysis , material characteristic other than "CD", "CM" and "CV")	GC
CR	Radiation quantities	GC
CS	Rotational speed , velocity , frequency , acceleration (mechanical)	GC
CT	Temperature	GC
CU	Combined quantities	GC
CV	Viscosity	GC
CW	Weight , force , mass	GC
CX	Neutron flux (reactor power measurement)	GC
CY	Vibration , expansion	GC
<b>D</b>	<b>CLOSED LOOP CONTROL CIRCUIT</b>	
DD	Density	GC
DE	Electrical quantities (e.g. current, voltage, power, electrical frequency)	GC
DF	Flow, mass flow	GC
DG	Distance, length, position direction of rotation	GC
DJ	Power (mechanical or heat, not electrical)	GC
DK	Time	GC
DL	Level (also for dividing line)	GC
DM	Humidity (moisture)	GC
DP	Pressure	GC
DQ	Quality quantities (analysis, material characteristic other than "DD", "DM" and "DV")	GC
DR	Radiation quantities	GC
DS	Rotational speed, velocity frequency, acceleration mechanical)	GC
DT	Temperature	GC
DU	Combined quantities	GC
DV	Viscosity	GC
DW	Weight, force, mass	GC
DX	Neutron flux (reactor power closed loop control )	GC
DY	Vibration, expansion	GC
<b>E</b>	<b>ANALOGUE AND BINARY SIGNAL CONDITIONING</b>	
EG	Alarm/annunciation	Not labelled
EK	Process computer (also for operating and monitoring)	Not labelled
EM	Process computer (also for operating and monitoring)	EH
EN	Process computer (also for operating and monitoring)	EH
EP	Process computer (also for operating and monitoring)	EH
EQ	Reactor protection	EH

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BDL 2	DESCRIPTION OF BREAKDOWN LEVEL 2	LABEL TYPE
ER	Combined analogue and binary signal processing	Not labelled
EU	Protection	Not labelled
EZ	INDIRECT MEASURING CIRCUIT	Not labelled
<b>G</b>	<b>ELECTRICAL EQUIPMENT</b>	
GA	Sub-distributor/penetration	GH
GB	Sub-distributor/penetration	GH
GC	Sub-distributor/penetration	GH
GD	Sub-distributor/penetration	GH
GE	Sub-distributor/penetration	GH
GF	Sub-distributor/penetration general	GH
GG	Penetration - cable cover	GH
GH	Cubicle , box for process control and electrical	GH
GK	Periphery equipment for information preparation	GA
GM	Sub-distributor for GPO telecommunication system	GG
GP	Sub-distributor for lighting	EF
GQ	Power socket	EF
GR	Direct current power source device (battery)	GC
GS	Switchgear equipment (not process related)	GA
GT	Transformer winding	GA
GU	Converter equipment including battery charger	GH
GV	Structure related earthing and lightning protection, surge arrestor	GC
GW	Actuating device for electrical quantities e.g. (tap changer)	GA
GX	Actuating equipment for electrical variables	GA
GY	Sub-distributor for telecommunication system (not GPO)	GH
<b>H</b>	<b>SUB-ASSEMBLY OF MAIN AND HEAVY MACHINE</b>	
HA	Machine static assembly	GA
HB	Machine rotating assembly	GA
HD	Bearing assembly	GA
<b>K</b>	<b>MECHANICAL UNIT COMPONENT (PRODUCTION)</b>	
	Gate valve, globe valve, cock, damper, rupture disk, orifice etc.	
KB	Gate , door , dam door	GB
KC	Heat exchanger , cooler	GB
KD	Vessel , storage tank , surge tank	GB
KE	Turning , driving , lifting , and slewing devices	GB
KF	Endless conveyor , (escalator , conveyor)	GB
KH	Heating and cooling device	GB
KJ	Crushing device	GB
KK	Pressing and packaging device	GB
KM	Mixer , stirrer	GB
KN	Compressor , fan , blower , ventilator	GB
KP	Pump	GB

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BDL 2	DESCRIPTION OF BREAKDOWN LEVEL 2	LABEL TYPE
KT	Purifier , drier , filter , separator	GB
KU	Converter	GB
KV	Burner	GB
KW	Workshop device	GB
KX	Stationary testing device	GB
KZ	Special mechanical device (production)	GB
<b>M</b>	<b>MECHANICAL UNIT COMPONENT (AUXILIARY)</b>	
MB	Brake	GB
MF	Foundation	GB
MG	Gearbox	GB
MK	Clutch and coupling	GB
MM	Engine (not electric)	GB
MR	Piping part , ducting component	GB
MS	Positioning drive (not electric)	GB
MT	Turbine	GB
MU	Transmission device , other than coupling and gearbox	GB
<b>Q</b>	<b>UNIT COMPONENT (NOT ELECTRICAL) FOR CONTROL AND INSTRUMENTATION</b>	<b>Note1</b>
QB	Sensor/transducer (only , if not integrated in "QP")	Note1
QH	Annunciation system	Note1
QN	Controller , fly bolt governor	Note1
QP	Measuring device (transmitter) testing equipment	Note1
QR	Impulse pipework	Not labelled
QS	Equalising chamber	EL
QT	Protection tube , thermo well (only for protection of the sensor)	Not labelled
QU	Converter	
<b>-</b>	<b>ELECTRICAL UNIT COMPONENT</b>	
-A	Assembly and sub-assembly	EL
-B	Transducer for non-electric to electric quantities and reverse, vice-versa	EL
-C	Capacitor	EL
-D	Binary element, time delay equipment, memory equipment	EL
-E	Special unit component	EL
-F	Protection equipment	EL
-G	Generator, power supply	EL
-H	Annunciation system	EL
-K	Relay, miniature circuit breaker	EL
-L	Inductance	EL
-M	Electrical motor	GB
-N	Amplifier , controller	EL
-P	Measuring device , testing equipment	EL
-Q	Power switching device (contactors)	EL
-R	Resistance	EL

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BDL 2	DESCRIPTION OF BREAKDOWN LEVEL 2	LABEL TYPE
-S	Switch , selector	EL
-T	Transformer	EL
-U	Modulator , transducer from electric to electric quantities	EL
-V	Vacuum tube, semi-conductor	EL
-W	Current transmission system, wave guide antennae	EL
-X	Terminal, plug , socket outlet	EL
-Y	Electric actuated equipment, e.g. magnet, solenoid not electric motor	GB
-Z	Cable termination, compensating equipment, filter, limiter	EL

**Note1:** GE if situated on plant process. EL if situated inside a control/marshalling cubicle.

**Note2:** Large tanks like BFO should be stencilled and label type GA attached beside the stencilled section.

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