Eskom	Standard	Technology

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PCM Reference : **240-44509543 Design System**
SCOT Study Committee Number/Name : **Data and Configuration Management SC**

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FIGURES

TABLES

1. INTRODUCTION

The need arose to consolidate all Eskom Drawing Office Standards to improve and streamline consistency in the Engineering Divisions.

SmartPlant is being deployed at Eskom to manage technical data and documents related to power Generation plants.

Distribution and Transmission plants are not in scope for the current programme.

An **engineering drawing**, a type of technical drawing, is used to fully and clearly define requirements for items to be engineered or manufactured.

Engineering drawing (the activity of drafting) produces engineering drawings. More than merely the drawing of pictures, it is also a type of language, a graphical language that communicates ideas and information from one mind to another. Most importantly, it communicates all needed information from the engineer who *designed* a part to the people who will *make* it.

2. SUPPORTING CLAUSES

2.1 SCOPE

This document defines general rules and code of practices to be followed by all designers and drafters to produce design drawings of consistent and professional quality. The accuracy and adequacy of the design and drafting work and its compliance with the applicable standards remain the responsibility of the designer or draftsperson. Nothing contained in this standard shall be construed as relieving the designer or drafter of the individual responsibility for producing quality drawings.

2.1.1 Purpose

The purpose of this document is to define the standard and requirements that must be followed by all internal Eskom Drawing offices(s) and Contractors, for production and control of all Eskom Drawings

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Soc Ltd – Generation, Plant Engineering and All Eskom Contractors

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.

2.2.2 Informative

[2] 240-83904158 – CADD Office Workflow Guideline

[3] 240-85194150 – EPSS CADD Office Work Request form

[4] 32-6 Eskom Documentation Management Procedure

[5] 36-1 Standard for Management Systems Document, Correspondence and Records

[6] 36-2 Writing and Controlling Management Systems Documents

[7] 240-109607662 Eskom Plant Labelling Abbreviation Standard

[8] 240-71432150 Plant Labelling Standard

[9] 240-73143217 Eskom RDS-PP Coding Standard

[10] 240-93576498 KKS Coding Standard

[11] 240-109607942 Eskom RDS-PP Key Part Standard

[12] 240-58552870 SmartPlant for Owner Operators (SPO) Document Metadata Standard

[13] 240-110409882 Functional Specification for SharePoint Portal in support of SPO Transmittal Management

[14] 240-110409934 User Requirements Specification (URS) for a Collaboration Platform to supplement SmartPlant

2.3 DEFINITIONS

Definition	Description
As Built Drawing	Drawing which is verified as an exact representation of a plant or a section of a plant that has been completely built.
Check Print	Drawing which is printed and utilized for verification of a drawing during the drawing checking procedure.
Contractor	A party appointed by Eskom to render services.
Data Mining	For the purposes of this standard Data Mining shall be the extraction of Text Tagged data from Computer-aided Drafting (CAD) drawings.
Controlled Copy	A copy of a document held by a documentation/satellite centre or by a designated individual that has the guarantee that it is the latest and current valid revision. This copy shall be clearly stamped in red 'CONTROLLED COPY'. All controlled documents that are printed will be considered valid for a maximum period of 24 hours. Users shall always reference back to the EDMS for the latest version of a document.
Deviation/Notification Process	This process is the initiator of engineering activities to permanently address plant deficiencies or incidents.
Draftsperson	A person responsible for the creation and updating of drawings, in accordance with this standard.
Functional Process Flow Diagram (FPFD)	Diagram showing all or a recognizable portion of the process, complete with a material and/or heat balance sheet. It contains details of operating parameters such as flow rate, temperature and pressure.
Piping and Instrumentation Diagram (P&ID)	Diagram which shows limited details of the mechanical and electrical components, pipework and ducting, and identifies all the measuring points and control elements that are necessary to measure and control that process.
Plant System	A collection of plant components connected in such a way that each will perform a unique process, thereby achieving specified performance parameters.
Preliminary	A drawing which is produced to convey ideas and proposals prior to approval and which has not been accepted for construction. The approved Preliminary drawings are used for the implementation on site, there after the as built drawings will be marked up and updated.
Primary Process Flow Diagram (PPFD)	Diagram which indicates the major process as well as the process values through all or most of the main plant items of a given power station or system.
Project Configuration Files	The customized set-up files that must be utilized in conjunction standard

Definition	Description
	Eskom tools Piping and Instrumentation Diagram/Process and Instrumentation Diagram (P&ID).
Secondary Process Flow Diagram (SPFD)	Secondary process flow diagram is similar to the Primary Process Flow Diagram (PPFD), except that it only deals with one particular system or subsystem of plant, and in more detail.
Text Tagging	For the purposes of this standard Text Tagging shall be the process of adding electronic text tags into a CAD drawing for the purpose of data mining.

2.3.1 Disclosure Classification

Public Domain: Published in any public forum without constraints (either enforced by law, or discretionary).

2.4 ABBREVIATIONS

Abbreviation	Description
AKZ	Anlagen Kenn Zeichnungs System (Identification System for Power Stations)
BU	Business Unit
CAD	Computer Aided Drafting
DGN	Bentley MicroStation Drawing File Extension
DWG/DXF-	AutoCAD Drawing File Extensions
ECSA	Engineering Council South Africa
EDMS	Electronic Document Management System
EPSS	Engineering Process & System Support
IEC	International Electrotechnical Commission
IT	Information Technology
KKS	Kraftwerk Kennzeichen System (Identification System for Power Stations)
MDL	Master Document List
MWP	Megawatt Park
NCR	Non-conformance Report
NEC	New Engineering Contract
OHSA	Occupational Health and Safety Act of 1993
PBS	Plant Breakdown Structure
PDF	Adobe Portable Document Format
Pr Eng	Professional Engineer registered in terms of the Engineering Profession Act, 2000
RDS-PP	Reference Designation Systems for Power Plant (Wind Farm)
RFQ	Request for Quote
RFT	Request for Tender
SoW	Scope of Work
TIC	Technical Information Change
TIFF	Tagged Image File Format

2.5 RELATED/SUPPORTING DOCUMENTS

2.5.1 Related Work Instructions

36-944	Latest	General Standard Instruction for General Drawing Software Configuration
36-945	Latest	Generation Standard Instruction for P&ID Drafting
36-946	Latest	Generation Standard Instruction for Electrical Drafting

2.5.2 Superseded Standards

The following Eskom Standards are superseded by this document.

Document No.	Title
167A/143	Drawing Office Practice
GGG 0450	Guideline to Acceptance of Contract Drawings
GGS 0182	Process Flow Diagrams and Piping Instrumentation Diagrams
GGS 0315	Standard Drawing Practice
GGS 0441	Drawing Records System
GSE/94/Y004	Standard Drawing Practice
36-943	Generation Engineering Drawing Office and Engineering Documentation Standard
45-698	Engineering Computer Aided Design Drafting Standard

2.5.3 Consolidated Reference Standards

This document combined with the following standards and standard instructions:

Document No.	Revision	Title
36-943	Latest	Generation Engineering Drawing Office and Engineering Documentation Standard

3. GENERAL DRAWING STANDARD

3.1 PURPOSE

The purpose of this section is to define the requirements that must be followed by Eskom drawing office(s) and Contractor's drawing office staff when producing drawings for Eskom. The section specifically defines the procedures and standards for an electronic drawing office.

3.2 SCOPE

This section specifies the procedures and standards that must be adhered to while compiling and distributing engineering drawings and associated engineering documentation.

General Drawings are seen as drawings of General Arrangement, Sectional Views and Detail Drawings of the following:

- Architectural
- Civil
- Structural
- Mechanical

- Machining
- Welding Instructions
- Piping
- Heating, Ventilation and Air-conditioning (HVAC)
- Electrical
- Lighting & Small Power
- Control and Instrumentation (C&I)
- Text Tagging of existing drawings for data mining
- Mapping GIS

3.3 CODIFICATION

See Coding Standard for respective divisional codification requirements.

3.4 CAD SOFTWARE REQUIREMENT

Eskom standard CAD software to be used both internally and externally. (Microstation and SmartPlant Enterprise)

3.5 DOCUMENTATION

The requirements for specific drawing documents are specified in the following paragraphs.

- All drawings produced by Eskom and/or any of its contractors shall adhere to South African law and standards that are in force when the drawing is produced. This includes but is not limited to the use of internal approved standards.
- Drafting of General Drawings, including Text-Tagged Drawings shall be done in accordance with this standard.
- General Drawings shall be produced on the appropriate document size that will ensure legibility and clarity of users on the contents of the drawings.

The following best practice shall be applied in the creation of drawings:

- Drawings shall be properly planned and produced to ensure ease of interpretation and read-ability.
- Typical details are not to be duplicated. Appropriate references shall be used in the main drawing to indicate repetition of any typical details.
- The use of unnecessary views shall be eliminated.
- Application of a constant set of scales on sets of drawings.
- Avoidance of odd scales, use the most common scales such as 1:1, 1:50, 1:20, 1:10, 1:2, 2:2
- Provision of cross-reference information shall be provided on drawings, i.e. reference to other drawings as well as to design information/manuals as appropriate.
- Manufacturer’s information and datasheets shall be provided in a software format and version specified by Eskom.

3.6 CLASSIFCATION OF DRAWINGS

a) Drawings shall be classified according to the following information classification levels:

i. Class 1

Secret: Only for use within specified segments in the organization

ii. Class 2

Confidential: May not be disclosed outside of Eskom – represents a competitive advantage for the business.

iii. Class 3

Controlled Disclosure: Internal Information – controlled disclosure to any external parties – either enforced by law or discretionary

iv. Class 4

Public Domain/Non-classified: Published in any public forum without constraints, either enforced by law or discretionary

b) This classification shall form part of the document record Meta data and user access to the drawing(s) will be restricted accordingly.

3.7 DRAWING CHANGE REQUEST

All Eskom drawing offices as well as Contractor's drawings offices shall comply with the respective Divisional Work Instructions. This shall be documented clearly and must comply with Eskom's minimum change control rules.

For drawing changes a request and scope of work is supplied by the customer to the CADD Office. EPSS CADD Office Work Request form (240-85194150) will be completed in full and returned to customer for approval of time and costs. The customer will sign acceptance and return to the CADD office for commencement of work. On completion of work the draftsperson will send a copy to the customer for checking and approval. Once all work is complete the customer will receive a signed copy of the drawings and on receipt of these will sign off the original request form, that he received all work as per original request. The draftsperson shall send the drawings for archiving and storage.

3.8 DRAWING WORKFLOW

The issuing, updating and creating of drawings shall be done in accordance with the generic workflow as per attached in (240-83904158) or to a specific Divisional requirement.

3.9 REQUEST FOR DRAWINGS

Should any drawing be required by a Contractor or third party, the Eskom Non-Disclosure Confidentiality Agreement form must be signed off by the Contractor or third party and sent to the designated Eskom Drawing Office Document Controller prior to the drawing being issued?

3.10 ISSUING OF DRAWINGS/TRANSMITTALS

During plant design and development, as well as operations and maintenance of a plant, it is expected that numerous projects would be initiated for various purposes. These projects typically involve third-party contractors (EPCs, vendors, etc.), who work with and generate Eskom information. The exchange of information between Eskom and third-parties is typically carried out through Transmittal events. These Transmittals, as well as the associated drawings and documents, are captured in SmartPlant for Owner Operators (SPO) either as Incoming Transmittals (information being submitted to Eskom by third-party contractors), or as Outgoing Transmittals (information being submitted by Eskom to third-party contractors).

In order to centralise the storage and dissemination of information submitted to Eskom as part of transmittals, the business adopts a centralised collaboration platform where such information can be managed effectively prior to loading to the relevant destination system (SPO, Hyperwave, etc.).

Microsoft ® SharePoint™ ("SharePoint") will be leveraged to enhance Transmittal Management, by providing a supplemental platform for receiving information submitted to Eskom through traditional channels (hard-copy, CD/flash drives, email) as well as a new mechanism for direct upload of information to Eskom. The information is required to be managed prior to loading into the relevant destination system. SharePoint will also serve as an externally accessible platform to enhance the security and traceability of data submission to third-party contractors once downloaded from the source Eskom system, and to automate the submission of a download link to the third party contractor. Generation Technology makes use of a SharePoint Transmittal Management system. Acknowledgement of receipt will happen automatically within the SharePoint environment. See Doc Number 240-110409882 and 240-110409934 for further details.

Third-party contractors' will continue to submit files in hard copy or on removable media (e.g. CD) to Eskom due to file sizes, network constraints, etc. that prevent the submission of information to Eskom via email channels or through the new SharePoint site.

3.11 ISSUING OF NEW DRAWING NUMBERS

a) Request for drawing number shall be requested in writing to the designated Eskom Document controller. All drawing numbers will be centrally allocated for all plants and projects with a designated document/drawing controller that will assign the drawing numbers.

b) Under no circumstance will the requester be allowed to change drawing titles or the drawing for a purpose other than what was requested, without approval from Eskom allocated document controllers.

3.12 SUPERSEDED OR CANCELLED DRAWINGS

a) A superseded drawing is one that is no longer in use.

b) It is important to note that when a drawing has been registered and an identification number has been allocated, this cannot be changed once it has been distributed or authorized. This changed status of the document must be captured in the MRI (master Record Index) of drawings for the relevant status, and if it is a controlled copy, the necessary notification that the drawing has been cancelled or superseded must be issued as part of the process. All superseded drawings shall be marked clearly 'superseded by the new drawing number'. Conversely, a drawing which supersedes another must clearly state the number of that drawing which it supersedes. A revision must be added.

c) All superseded or cancelled drawings are to be retained in the archive system.

d) A superseded or cancelled drawing numbers shall never be used for any other created drawings. These numbers will remain dormant.

e) If drawing number are allocated as a batch the requestor must provide Eskom with a Fully Detailed MDL providing all the required meta-data needed to complete the drawing record in the SPO system.

3.13 DRAWING CHECKING PROCEDURE

The following is a guideline to be followed to check all drawings:

a) Once the draftsperson has completed a drawing, a check print must be issued to the responsible engineer or Chief Draftsperson. The check print must be clearly stamped 'CHECK PRINT'.

The responsible engineer or Chief Draftsperson must check the drawing against the relevant marked up drawing. This should be done with the relevant stakeholders to ensure due process and standards have been applied and the physical drawing content is acceptable. If the electronic functionality like SPO "View and Mark-up" are used the same rules for mark/correction will apply. Checks include:

i. With the codification officer to ensure that all tagged items comply with the site codification system as required.

ii. The check by an alternate draftsperson is performed to ensure that the drawing standards are adhered to and that all the marked-up items have been incorporated as required.

iii. A standard checklist for drawings APPENDIX B: DRAWING CHECKLIST shall be used as a basis for checking that the drawing standards are adhered to.

iv. The checks done by the Drawing Office checkers, the data controllers and the responsible engineer are to ensure that the design changes are incorporated as required.

v. Once the responsible engineer or draftsperson has completed checking a drawing, the check print must be signed and dated and the full name of the checker must be recorded on the drawing.

vi. The drawing must then be returned to the responsible draftsperson. All discrepancies or queries must be clearly marked up utilizing the following colour code system, and reviewed with the responsible draftsperson:

- Red - Corrections or Add info
- Yellow - Delete
- Blue - Comments (will not be drafted)
- Green - Correct

b) The draftsperson must back-draft the 'CHECK PRINT' drawing and reissue the drawing to the responsible engineer or DO Supervisor as a revised 'CHECK PRINT' for rechecking. Once no more discrepancies are marked up on the 'CHECK PRINT' by the responsible engineer or DO Supervisor and he/she has signed off the drawing, the drawing is ready for issue to Eskom for the required approval**.**

c) If required, the drawing must be issued to Eskom for checking in accordance with paragraph 3.11

d) Each drawing issued to Eskom for checking must be issued together with a Transmittal Form relating to the drawings. Issues that arise that Eskom must be resolve a NCRs must be created for all drawings, capturing each and every issue that can be resolved.

e) Each drawing issued to Eskom for checking must be clearly stamped 'CHECK PRINT'.

f) A responsible engineer or draftsperson to check the drawing and resolve all the items listed on the NCR.

g) If required, the drawing must be issued to the Contractor drawing or responsible Drawing Office for updating/back-drafting

h) Once a checked drawing is received, the responsible draftsperson will review any non-conformance marked up on the drawing or recorded on the NCR with Eskom if required, and revise the drawing accordingly.

i) The drawing must then be rechecked in accordance with this procedure.

[15] Once all the drawing's non-conformances marked up on the drawing or recorded on the NCR have been resolved by Eskom, the drawing will be reviewed, authorized and approved in accordance with the applicable workflow stipulated in 240-83904158 - CADD Office Workflow Guideline.

3.14 NONCONFORMANCE REPORTING

To be done according to Eskom Approved NCR process as outlined by ISO9001.

3.15 ELECTRONIC FORMAT OF DRAWINGS ISSUED TO ESKOM

a) All drawings submitted to Eskom shall comply with Eskom Standard drawing applications version, at that specific time.

b) All drawings must be issued to Eskom in both native CADD format and PDF/TIF format.

c) Drawings issued to Eskom may not be “Write Protected” or encrypted as Eskom has to do the necessary configuration management on these documents upon receipt.

3.16 REGISTRATION OF DRAWINGS

a) All drawings must be registered by Eskom on the Electronic Document Management System (EDMS) See paragraph 6.1 Minimum Drawing Meta-data required. See Doc 240-58552870

b) Contractors shall maintain a Drawing Register which records at least the following information in line with SPO/EDMS requirements:

- Eskom Drawing Number.
- Contractor Drawing Number
- Eskom Change Request Number.
- Drawing Title.
- Filename.
- Contractor Revision.
- Eskom Revision.

c) The Contractor’s drawing register must be made available to Eskom for audit on request.

3.17 REVISION CONTROL

The drawing revision shall be clearly identified by placing a Revision Triangle and Revision Letter or Number, in the revised area(s) of the drawing. A brief but informative statement of the revision made, and where applicable the appropriate change order, project or other reference code, shall be shown in revision block. It is to be noted NO preceding “0” is required before revs 0-9. The system sequentially counts for this.

3.17.1 Drawing and Revision Status

Iteration	Action	**Document State**	**Rev 0**	**Rev 1**	**Rev 2**
			Rev State	**Rev State**	**Rev State**
0	New Document is	Reserved	Working		
1	Sign Off Document	Issued	Current		
2	Revise Document	ISSUED_WKG	Current	Working	
3	Sign Off Document	Issued	Superceded	Current	
4	Revise Document	ISSUED_WKG	Superceded	Current	Working
5	Sign Off Document	Issued	Superceded	Superceded	Current

See Document 240-58552870

3.17.2 Drawing Status Stamps

The use of drawing “status stamps” a watermark, rubber stamp, or cell may be used. Only the following list of stamps shall be used:

- PRELIMINARY
- ISSUED FOR CONTRUCTION
- AS BUILT
- CONTROLLED COPY
- SUPERSEDED
- CANCELLED
- Controlled Copy

  Issued to:

  Date of Issue:
- CHECK PRINT

  Signature:

  Date:
- Drawing Revision Numbers
- The Eskom revision number will be revised by the Draftsman and captured by the designated Eskom Document Controller once a change has been registered and closed out in accordance with the Eskom EDMS requirements.
- All Eskom drawings revisions must be numeric. No alpha characters will be used with drawing numbers
- Eskom revision numbers cannot be created or changed by Contractors.
- Each revision of the drawing shall increase the revision number sequentially.

3.17.3 Revision Information which is to be recorded in the Eskom Section of the Title Block

The following information must be completed each time a drawing is revised by Eskom. (Where Dx or Tx do not code their drawings – this may be left blank.

- Accredited drawing office abbreviation.
- Revision number.
- Date of revision.
- Detailed short description of the revision.
- Draftsperson’s initials.
- Checker’s initials.
- Authorizer’s initials.
- Approver’s initials.
- Codification approver’s initials.

3.17.4 Revision Information which is to be recorded in the Contractor Section of the Title Block

The following information must be completed each time a drawing is revised by a Contractor:

- Revision number.
- Date of revision.
- Short description of the revision.
- Draftsperson's initials.
- Checker's initials.
- Authorizer's initials.
- Approver's initials.

3.18 CONTRACTOR INFORMATION BACKUP

a) The Contractor must ensure that all drawing data is backed up on a regular basis.

b) The Contractor shall advise Eskom which backup methodology will be utilized, and this backup methodology must be in a format accessible to Eskom.

c) The maximum period between backups must not exceed 24 hours.

d) The backups must be carried out utilizing an off-site rotating backup system.

e) Contractor/Consultant to hand approved as commissioned drawings to Eskom as well as the commissioned red/yellow mark ups for Eskom to verify all drawings have been marked up correctly.

3.19 STANDARD SEED FILES

It is imperative all contractors/sub-contractor and Eskom staff makes use of the Eskom Standard Drawing Seed in creation of all drawings.

3.19.1 Layer, Colours and Line Weights

The draftsperson must ensure that the layers as stipulated in 0 are adhered to.

Should the named levels not be sufficient to complete, the spare drawing layers can be utilised or to the specific Divisional requirements. Colour and line weights should be done according to discipline and Divisional specification.

3.19.2 Standard Text

a) The standard font used for all text is ESKOMFT80, ESKOMFT81 or ESKOMFT82.

b) The draftsperson must ensure that the correct layer is selected when placing text.

c) The text size must be adjusted in the text style once the draftsperson has selected the final drawing size and scale.

d) The text style settings specified in Table 1 must be used for A4 and A3 drawings in accordance with the drawing scales specified:

Table 1: Text Style Settings for A4 and A3 Drawings

Drawing Scale	Text Detail		Text Headings	
	Height (mm)	Width (mm)	Height (mm)	Width (mm)
1:1	2.5	2.0	3.5	2.5

Drawing Scale	Text Detail		Text Headings	
	Height (mm)	Width (mm)	Height (mm)	Width (mm)
1:5	12.5	10.0	17.5	12.5
1:10	25.0	20.0	35.0	25.0
1:20	50.0	40.0	70.0	50.0
1:25	62.5	50.0	87.5	62.5
1:50	125.0	100.0	175.0	125.0
1:100	250.0	200.0	350.0	250.0

e) The text style settings specified in Table 2 must be used for A2, A1 and A0 drawings in accordance with the drawing scales specified:

Table 2: Text Style Settings for A2, A1 and A0 Drawings

Drawing Scale	Text Detail		Text Headings	
	Height (mm)	Width (mm)	Height (mm)	Width (mm)
1:1	3.5	2.5	5.0	3.5
1:5	17.5	12.5	25.0	17.5
1:10	35.0	25.0	50.0	35.0
1:20	70.0	50.0	100.0	70.0
1:25	87.5	62.5	125.0	87.5
1:50	175.0	125.0	250.0	175.0
1:100	350.0	250.0	500.0	350.0
1:200	700.0	500.0	1 000.0	700.0
1:250	875.0	625.0	1 250.0	875.0
1:500	1 750.0	1 250.0	2 500.0	1 750.0
1:1000	3 500.0	2 500.0	5 000.0	3 500.0

3.19.3 Standard Dimension Style

a) The draftsperson must use the standard dimension style ‘StdDim’ for all dimensioning.

b) The dimension style uses the ‘TextDetail’ text style and will therefore be adjusted to the same settings.

c) The draftsperson must ensure that the correct layer is selected when placing dimensions.

3.19.4 Abbreviations

[16] Abbreviations shall only be used when necessary due to space limitations and shall follow Eskom standard abbreviation guidelines. See Document 240-109607662 Eskom Plant Labelling Abbreviation Standard

3.19.5 Projections

Unless directed otherwise, all drawings shall be prepared using Third Angle Projection. Any view deviating from Third Angle shall be clearly titled.

3.19.6 Section and detail labelling

All sections shall be indicated as per Eskom specification within relevant discipline or Division

3.19.7 Titling of Drawings

It is most important that the drawing title accurately describes what appears on the drawing since the title will be used as the basis for any electronic search in the Drawing Management System in the future. Generic titles or generalisations should be avoided. Be specific and use words in the title that will help to identify the drawing at a later time.

To ensure compatible, consistent and meaningful titles are used, titles shall consist of a minimum of three lines as follows:

1st line – Plant Name

2nd line – Equipment, Type or Service Description

3rd line – Specific description of the items or detail depicted by the drawing

3.19.8 Scan Resolution

All scanned documents and drawings are to be clear and legible to a minimum resolution of 200dpi for documents and 300dpi for drawings.

4. STANDARD DRAWING SHEETS AND TITLE BLOCKS

4.1 USE OF MULTIPLE SHEETS

Drawing sheets are used for cases when a group of drawings logically belongs together and should be read in conjunction with each other. Examples would Logic Diagrams, Functional Control Diagrams, Civil Reinforcing drawings and Schedules, etc.

Where sheets are used, the title block should contain the number of sheet. Sheets numbers are numerical e.g.: 0.63/45626 SHEET 1

All Eskom drawings sheets sizes shall comply with the ISO standard A0, A1, A2, A3, and A4. Figures 1 and 2. Is to be used unless specified otherwise by the Divisional or Discipline requirements.

A title block is the form on which the actual drawing is a section. The title block includes the border and the various sections for providing quality, administrative and technical information. The importance of the title block cannot be minimized as it includes all the information which enables the drawing to be interpreted, identified and archived.

The title shall include sufficient information to identify the type of drawing e.g. general arrangement, or detail. It shall also clearly describe in a precise way what the drawing portrays.

The notes below relate to the title boxes included in the title block to convey the necessary information.

The basic requirements for a title block located at the bottom right hand corner of a drawing are:

- These items shall be written in a rectangle which is at the most 170mm wide.
- The title block shall also include boxes for the legal signatures of the originator and other persons involved production of the drawing to the required quality.

- The drawing shall also include a symbol identifying the projection. The main scale and the linear dimension units if other than “mm”.

4.2 ESKOM STANDARD TITLE BLOCK

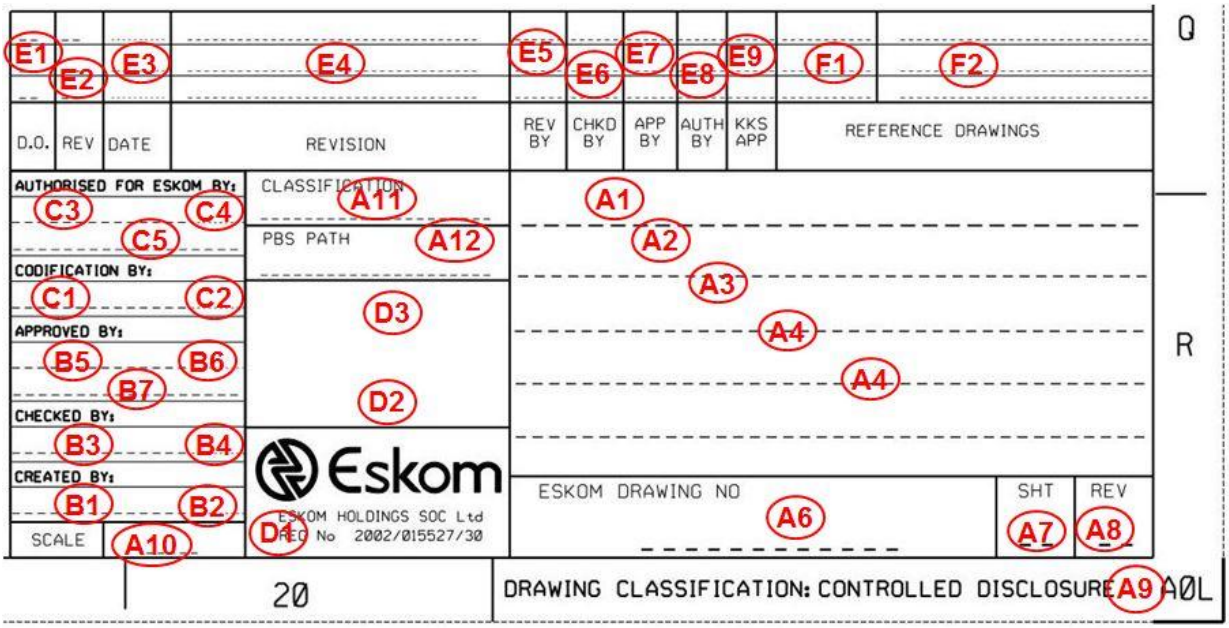

Figure 1: Standard Title Block

4.3 CONTRACTORS TITLE BLOCK

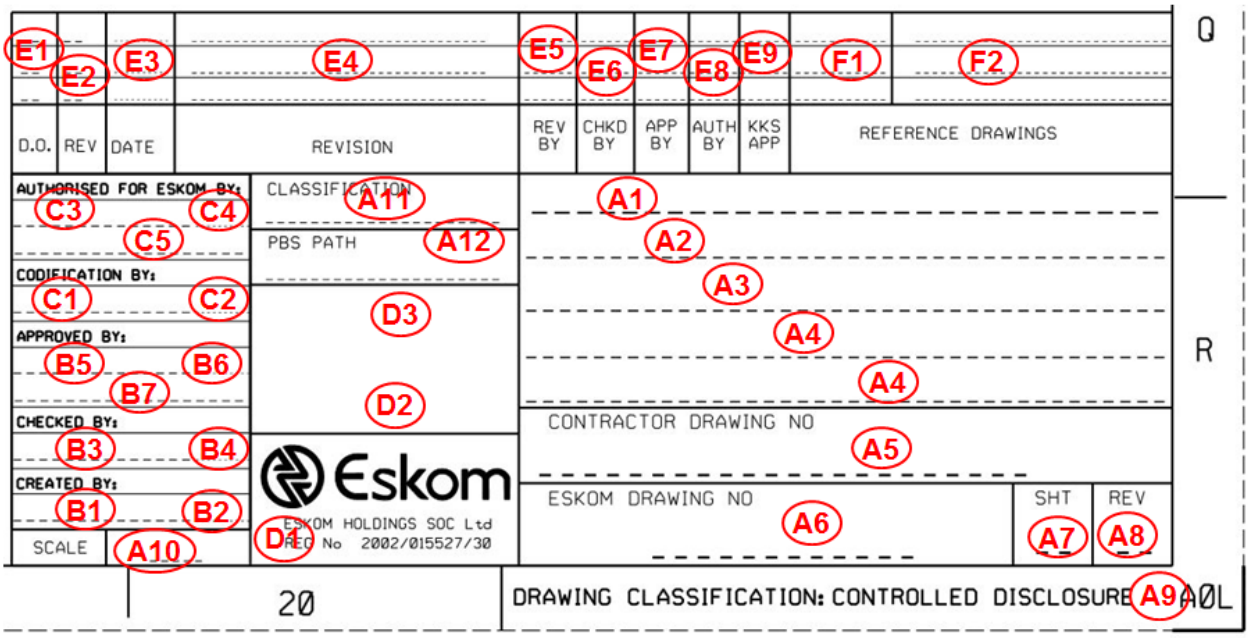

Figure 2: Contractors Title Block

4.4 DESCRIPTION FOR COMPLETING TITLE BLOCK

Table 3: Description detail for Title Block

Item No	Field Description
DRAWING INFORMATION	
A1	POWER STATION NAME / SUB STATION NAME OR DISTIBUTION STATION NAME e.g. MEDUPI POWER STATION
A2	DRAWING TYPE Indicates the type of drawing: P&ID, ISO, GA, etc.
A3	UNIT XX / AREA Indicates the Unit Number and/or plant area
A4	TITLE LINE 01-02-03 It should be as descriptive as possible and should preferably not contain any abbreviations.
A5	CONTRACTORS DRAWING, SHEET NO AND REVISION NO The contractors unique drawing number
A6	ESKOM DRAWING NO This is the unique Eskom drawing number. If a sequence of drawing numbers has been issued to the contractor, the contractor will complete this field. Alternatively this field will be completed by Eskom.
A7	ESKOM SHT NO The sheet number of the contractors drawing.
A8	ESKOM REV NO The number of the contractors drawing revision.
A9	PAPER SIZE The paper size of the original drawing. This is field is completed to indicate the paper size to which the scale is applicable.
A10	SCALE Indicates the scale to which the drawing has been created.
A11	CLASSIFICATION The Document Class number in accordance with IEC 61355
A12	PBS PATH Field indicates the PBS node, e.g. 6 0LAC10.
ESKOM CHECKING AND APPROVAL	
B1	CREATED BY Name and Surname of the person who created the drawing and the date that the drawing was created. (Contractor). The second part of this field is the date drawn.
B2	Date Created The date the drawing was created.
B3	CHECKED BY Name and Surname of the person who checked the drawing and the date that the

	drawing was checked. (Contractor)
B4	Date Checked The date the drawing was checked.
B5	APPROVED BY The Signature, Name, Surname of the professional registered engineer who approved the drawing. (Contractor)
B6	Date Approved The second part of this field is the date the drawing was approved.
B7	Professional Engineering Registration Number of the professional registered engineer who approved the drawing. (Contractor)
ESKOM CHECKING AND APPROVAL	
C1	CODIFICATION BY Name and Surname of the person who codified the drawing and the date that the drawing was codified. If the contractor is not in a position to provide the codification this should be performed by the responsible ESKOM person.
C2	Date Codified The date the drawing was codified.
C3	AUTHORISED FOR ESKOM BY The Signature, Name, Surname of the professional registered ESKOM engineer who authorised the drawing.
C4	Date Authorised The date the drawing was authorised.
C5	Professional Engineering Registration Number of the professional registered ESKOM engineer who authorised the drawing.
COMPANY LOGOS	
D1	ESKOM LOGO This field is reserved for the ESKOM logo
D2	CONTRACTORS LOGO This field is reserved for the contractors logo
D3	SUB CONTRACTORS LOGO This field is reserved for the sub-contractor's logo if required
REVISION HISTORY The data displayed in this section shall reflect the complete history of the drawing.	
E1	D.O. Drawing office number where the revision originated. For ESKOM use only.
E2	REV. The revision number of the drawing.
E3	DATE The date the drawing is revised.
E4	REVISION DESCRIPTION

	Information describing the changes to drawing.
E5	REVISED BY Initials of the person performing the changes.
E6	CHKD BY Initials of the person who checked the changes to the drawing.
E7	APPR BY Initials of the professional registered engineer who approved the changes to the drawing. (Contractor)
E8	AUTH BY Initials of the professional registered ESKOM engineer who authorised the changes to the drawing.
E9	KKS/AKZ/RDS_PP or Coding APPR (IF APPLICABLE) Initials of the person who codified the drawing. If the contractor is not in a position to provide the codification this should be performed by the responsible ESKOM person.
	REFERENCE DRAWINGS
F1	DRAWING NUMBER The number of the reference drawing
F2	REFERENCE DRAWING DESCRIPTION The description of the reference drawing

5. PAPER SIZES

The standard for drawing sheet sizes is the A series. The basic size in this series is the A0 size (1189mm x 841mm) which has an area of about 1-m3. The sides of every size in the series are in the ratio Sqrt (2) = 1.414: 1 and each size is half the area of the next larger size.

Table 4: Sheets Sizes

Drawing Sheet Size	Size in millimeters
A0	1189 x 841
A1	841 x 594
A2	594 x 420
A3	420 x 297
A4	297 x 210
A5	210 x 148
A6	148 x 105

6. ARCHIVING AND RECORDS STORAGE OF DRAWINGS AND ENGINEERING INFORMATION AND DOCUMENTATION

All storage and archiving of drawing records and engineering documentation/information shall be in line with EPC0001 (Eskom Documentation Management Procedure), 36-1 (Standard for Management System Documents, Correspondence and Records) and 36-2 (Writing and Controlling Management System Documents).

6.1 META DATA REQUIRED

6.1.1 Drawing Meta Data

The drawing Meta data in Table 5 is mandatory for capture with each engineering record that is generated. All Meta data shall be captured using Excel and aligned to the SPO meta-data Specification and requirements. See Doc 240-58552870

Table 5: Drawing Meta Data

Meta Data	Example		
Eskom Drawing Number:	0.57/12342		
Full Drawing Title:	Duvha Power Station, Coal Milling Plant, Service Air P&ID		
Drawing Sheet:	2 of 5		
Sub-sheet:	-		
Latest Revision:	12		
Sheet Print Size:	A0		
Information Classification:	Level 3 – Controlled Disclosure		
Design Classification:	Level 2		
Discipline:	Mechanical		
Drawing Status:	As Built and Approved		
Authorized Date:	2000/01/10		
Authorized by:	D van Rensburg – D&S Manager		
Functional Responsibility (Information Owner):	Boiler Plant Engineering Section Duvha Power Station		
Cross Reference Drawing No. and Title	0.57/6789	Unit #1 Boiler House Floor Lay-Out	
	0.57/14555	Milling Plant Service Air Supply Compressor	
	0.57/1433	Coal Milling Plant General Arrangement	
Relevant Plant Code(s)	01NM30D050 01NM20D050		
Manufacturer's/OEM Name:	Babcock & Wilcox		
Manufacturer's/OEM Drawing No.:	1433/13257889		
Construction Contract No.:	OPY11282		
Media Format:	MicroStation – DGN		
Index Reference:	C 4.1		
Power Station/BU/Site:	Duvha Power Station		
Station ID:	0.57		
Office of Origin:	Duvha Site Drawing Office		
Location of Original:	MWP Archives		
Retention Period:	Station Life		

Meta Data	Example
Superseded By Drawing No.:	(e.g. if drawings were combined to become 1)
Drawing Review Date:	
Drawing Master Copies Distributed to:	Duvha Power Station CED
Latest Revision Originator:	Duvha PS -24
Site Modification/Deviation No.:	DEV1432-B-1
MWP Work Request No.:	DUV.001.004

7. AUTHORISATION

This document has been seen and accepted by:

Name & Surname	Department
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Jackie Herndler	GPE– SI
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8. REVISIONS

Date	Rev.	Compiler	Remarks
November 2014	0.1	J.H. Herndler	Standardise Eskom Drawings
November 2014	0.2	J.H. Herndler	Draft Document for Comments Review
November 2014	1	J.H. Herndler	Final Document Authorised for Publication
March 2016	1.1	C.C Makhanya	Added paragraph 3.19.8 Scanning and resolutions
April 2016	1.2	C.C Makhanya	Draft Document for Comments Review
June 2016	1.3	J.H. Herndler	Consolidation of Care Group Comments
July 2016	1.4	J.H. Herndler	Draft Document for Comments Review 2nd round
August 2016	1.5	J.H. Herndler	Consolidation of Study Group
August 2016	2	J.H. Herndler	Final Document Authorised for Publication
May 2017	2.1	J.H. Herndler	Document updated to align new referenced document numbers
May 2017	3	J.H. Herndler	Final Document Authorised for Publication (Rev 3)

9. DEVELOPMENT TEAM

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

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Tony Haupt	PED - SI
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Melton Mothoni	Gx - ENG - D & S
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10. ACKNOWLEDGEMENTS

- Riekie Swanepoel Gx – ENG – SI. All previous standards background work and valuable comments added.

11. APPENDIX A: STANDARD LAYERS

Basic Standard Drawing Layers to be used unless stipulated by Dx & Tx Work Instructions

Layer Name	Layer Number	Layer Description
Default	0	MicroStation Default Level
Civil_Ceilings	1	Ceilings
Civil_NonBrickWalls	2	Non Brick Walls
Civil_Columns	3	Cast Concrete Columns
Civil_DoorsWindows	4	Doors And Windows
Civil_DrainsCovers	5	Floor Drains, Covers And Man Ways
Civil_Existing	6	Existing Buildings
Civil_Foundations	7	Foundations
Civil_Floors	8	Floors
Civil_Plinths	9	Plinths
Civil_Reinforcing	10	Bending Schedules And Reinforcing Details
Civil_Roof	11	Roof Sheeting
Civil_StairCases	12	Concrete Stair Cases
Civil_Slabs	13	Slabs
Civil_Walls	14	Walls
Civil_CustomLayers01	15	Customized Civil Level 01
Civil_CustomLayers02	17	Customized Civil Level 02
Civil_CustomLayers03	18	Customized Civil Level 03
Civil_CustomLayers04	19	Customized Civil Level 04
Civil_CustomLayers05	20	Customized Civil Level 05
Clouds	21	Clouds
Dimensions	22	Dimensions
Electrical_HV_CableRoutes	23	HV Cable Routes
Electrical_LV_CableRoutes	24	LV Cable Routes
Electrical_Computers	25	Computer Points
Electrical_Existing	26	Existing Electrical
Electrical_Lightings	27	Lighting & Switch Points

Electrical_PanelsCabinets	28	Electrical Panels And Cabinets
Electrical_PowerPoints	29	Power Points
Electrical_Telephone	30	Telephone Points
Electrical_CustomLayers01	31	Customized Electrical Level 01
Electrical_CustomLayers02	32	Customized Electrical Level 02
Electrical_CustomLayers03	33	Customized Electrical Level 03
Electrical_CustomLayers04	34	Customized Electrical Level 04
Electrical_CustomLayers05	35	Customized Electrical Level 05
Equipment_Existing	36	Existing Plant Equipment
Equipment_MajorRotating	37	Major Rotating Equipment
Equipment_MajorStatic	38	Major Static Equipment
Equipment_MinorRotating	39	Minor Rotating Equipment
Equipment_MinorStatic	40	Minor Static Equipment
HatchPatterns	41	Hatch Patterns
HVAC_Existing	42	Existing HVAC Equipment
HVAC_RotatingEquipment	43	HVAC Rotating Equipment
HVAC_VentilationDucting	44	HVAC Ventilation Ducts
HVAC_VentilationVentGrids	45	HVAC Ventilation Grids
Instrument_Existing	46	Existing Instrumentation
Instrument_New	47	New Instrumentation
Instrument_CableRoutes	48	Instrumentation Cable Routes
MTO	49	Material Take Off
Structural_BeamsColumns	50	Steel Beams And Columns
Structural_Bracing	51	Steel Bracing
Structural_Existing	52	Existing Steel Structures
Structural_FloorGrating	53	Steel Floor Grating Or Plate
Structural_GrabRails	54	Grab Rails
Structural_HandRailStanchions	55	Stanchions
Supports_Existing	56	Existing Supports
Supports_New	57	New Supports

TextCallOut	58	Call Out Bubbles
TextDetail	59	Detailing Text
TextHeading	60	Text Headings
TitleBlock	61	Drawing Title Block
TitleBlockContractor	62	Drawing Title Block For Contractors
Level 1	63	
Level 2	64	
Level 3	65	
Level 4	66	
Level 5	67	
Level 6	68	
Level 7	69	
Level 8	70	
Level 9	71	
Level 10	72	
Level 11	73	
Level 12	74	
Level 13	75	
Level 14	76	
Level 15	77	
Level 16	78	
Level 17	79	
Level 18	80	
Level 19	81	
Level 20	82	
Level 21	83	
Level 22	84	
Level 23	85	
Level 24	86	
Level 25	87	

Level 26	88	
Level 27	89	
Level 28	90	
Level 29	91	
Level 30	92	
Level 31	93	
Level 32	94	
Level 33	95	
Level 34	96	
Level 35	97	
Level 36	98	
Level 37	99	
Level 38	100	
Level 39	101	
Level 40	102	
Level 41	103	
Level 42	104	
Level 43	105	
Level 44	106	
Level 45	107	
Level 46	108	
Level 47	109	
Level 48	110	
Level 49	111	
Level 50	112	
Level 51	113	
Level 52	114	
Level 53	115	
Level 54	116	
Level 55	117	

Level 56	118	
Level 57	119	
Level 58	120	
Level 59	121	
Level 60	122	
Level 61	123	
Level 62	124	
Level 63	125	

12. APPENDIX B: DRAWING CHECKLIST

Eskom	**DRAWING CHECKLIST**	**CHECKLIST No.**
		DATE
Drawing No.:		
Revision:		
Date:		

No.	Description	Complies	Does Not Comply
1	**Eskom section of the title block**:		
	Power Station Name		
	Unit number	☐	☐
	System Plant Group (AKZ/KKS/RDS_PP)/Description	☐	☐
	Drawing Type	☐	☐
	Drawing Number in accordance with 240-128353314	☐	☐
	Drawing classification in accordance with clause A.11.0	☐	☐
	Drawing Scale	☐	☐
	Accredited drawing office abbreviation (if revised by Eskom)	☐	☐
	Revision No.	☐	☐
	Date of revision	☐	☐
	Description of revision	☐	☐
	Drawn by: Draftsperson	☐	☐
	Checked by: Responsible Engineer or Draftsperson	☐	☐
	Authorized by: Designer	☐	☐
	Codification by: Codification Officer	☐	☐
	Approved by: Pr Eng including ECSA Pr Eng Registration No	☐	☐
2	**Contractor section of the title block where applicable**:		
	Company information including contract details	☐	☐
	Revision No.	☐	☐
	Date of revision	☐	☐
	Description of revision	☐	☐
	Drawn by: Draftsperson	☐	☐
	Checked by: Responsible Engineer or Draftsperson	☐	☐
	Authorized by: Designer	☐	☐
	Approved by: Pr Eng including ECSA Pr Eng Registration No.	☐	☐
3	All applicable reference drawings are indicated in the reference drawings section.	☐	☐
4	All applicable notes are indicated in the notes drawing section.	☐	☐
5	Text:		

	• in accordance with the standard	☐	☐
	• spelling is correct	☐	☐
	• standard approved abbreviations are used and applied consistently	☐	☐
	• words spelled out where possible	☐	☐
6	Dimensions:		
	• in accordance with the standard	☐	☐
	• indicated showing clear intent	☐	☐
	• do not overlap with other drawing elements	☐	☐
7	The following drawing symbology in accordance with the standard:		
	• lines	☐	☐
	• layers	☐	☐
	• levels	☐	☐
8	Drawing is legible with no overlapping lines	☐	☐
9	All marked-up items have been incorporated as required	☐	☐

CHECKED BY:

NAME	DESIGNATION/COMPANY	DATE	SIGNATURE

RECEIVED BY:

NAME	DESIGNATION	DATE	SIGNATURE