

	SUBSTATION STANDARDS & SPECIFICATIONS INDEX	Template Identifier	240-129714553	Rev	1
		Document Identifier	ER00024-00-P05#3.7-00	Rev	0
		Authorisation Date	October 2019		
		Review Date	October 2024		

ASSET DESIGN				
3.7. SUBSTATION STANDARDS & SPECIFICATIONS INDEX (POWER PLANT ELECTRICAL)				
Project Name:	MAKHATHINI 132/22-kV SUBSTATION: 2 x 3MVAr 22kV CAPACITOR BANK C-TYPE FILTER ESTABLISH			
Project No.'s:	ID	ET-STM-1712-4442-01	WBS	CDE05363
Document Identifier:	PW	ER00024-00-P05#3.7-00	Rev	0
Division & Operating Unit:	Distribution – Kwa-Zulu Natal Operating Unit			
Section:	Asset Creation – Network Engineering and Design			
Department:	Asset Design			
Project Category:	Strengthening			
Project Lifecycle Phase:	Detail Design			

CONTROLLED DISCLOSURE

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Limited, Reg No 2002/015527/06.

3.7. Standards & Specifications Index Makhathini 22-kV Cap Bank Establish	Template Identifier	240-129714553	Rev	1
	Document Identifier	ER00024-00-P05#3.7-00	Rev	0

1.	SAFETY, HEALTH, ENVIRONMET, QUALITY AND SECURITY (SHEQS)			
NO.	DOCUMENT NO.	DOCUMENT TITLE	DATE	REV
1.1.	<u>32-727</u>	SAFETY, HEALTH, ENVIRONMENT, AND QUALITY (SHEQ) POLICY	JANUARY 2017	2
1.2.	240-64014170	PROJECT LIFE CYCLE GOVERNANCE	JUNE 2015	1
1.3.	<u>DPC 34-333</u>	OHS ACT REQUIREMENTS TO BE MET BY PRINCIPAL CONTRACTORS EMPLOYED BY ESKOM DISTRIBUTION	MAY 2007	1
1.4.	32-136	CONTRACTOR HEALTH AND SAFETY REQUIREMENTS STANDARD	MARCH 2018	4
1.5.	32-520	OCCUPATIONAL HEALTH & SAFETY RISK ASSESSMENT PROCEDURE	JUNE 2014	2
1.6.	<u>240-114967625</u>	OPERATING REGULATIONS FOR HIGH-VOLTAGE SYSTEMS	AUGUST 2019	2
1.7.	<u>240-86100853</u>	STANDARD FOR BARRICADING PROHIBITED AREA AND LIVE CHAMBER	FEBRUARY 2015	1
1.8.	<u>240-87605434</u>	PROCESS FOR THE CHECKING OF DISTRIBUTION SUBSTATION CONSTRUCTION BEFORE HANDING OVER FOR COMMERCIAL OPERATION	MARCH 2015	1
1.9.	240-44175038	CONTROL OF NON-CONFORMING PRODUCT OR SERVICE PROCEDURE	OCTOBER 2015	1
1.10.	SCSAGQBA0	GUIDE ON HOW TO GRADE SUBSTATION IN TERMS OF RISK TO THEFT	MAY 1999	0
1.11.	DST0045	STANDARD FOR SECURITY REQUIREMENTS AT DISTRIBUTION SUBSTATIONS AND BUILDINGS	FEBRUARY 2006	1

CONTROLLED DISCLOSURE

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Limited, Reg No 2002/015527/06.

3.7. Standards & Specifications Index Makhathini 22-kV Cap Bank Establish	Template Identifier	240-129714553	Rev	1
	Document Identifier	ER00024-00-P05#3.7-00	Rev	0

2.	GENERAL SUBSTATION STANDARDS			
NO.	DOCUMENT NO.	DOCUMENT TITLE	DATE	REV
2.1.	240-43327398	ENGINEERING POLICY	APRIL 2019	2
2.2.	240-71062174	GENERIC SUBSTATION DESIGN	SEPT 2019	2
2.3.	240-151556303	DISTRIBUTION SUBSTATION CONFIGURATION STANDARD	SEPT 2020	1
2.4.	240-66917056	STANDARD FOR PASSIVE FIRE PROTECTION IN DISTRIBUTION SUBSTATION YARDS	APRIL 2016	1
2.5.	240-120804300	STANDARD FOR THE LABELLING OF ELECTRICAL EQUIPMENT WITHIN ESKOM WIRES NETWORKS	OCT 2018	2
2.6.	240-76628689	DISTRIBUTION GROUP'S SPECIFIC REQUIREMENTS FOR THE USE OF FURNITURE IN SUBSTATION BUILDINGS	APRIL 2019	1
2.7.	240-87658920	DISTRIBUTION GROUP'S SPECIFIC REQUIREMENTS FOR STANDARD DRAWING PRACTICE FOR CAD USERS	MARCH 2019	1
2.8.	240-83563472	DRAWING STANDARD FOR SUBSTATIONS: POWER PLANT	JUNE 2018	1
2.9.	240-100907733	GUIDELINE FOR THE APPLICATION OF STRANDED FLEXIBLE CONDUCTOR VS ROUND TUBULAR CONDUCTOR IN SUBSTATION DESIGN	FEBRUARY 2016	1
2.10.	240-68972408	STANDARD FOR FLEXIBLE AND TUBULAR CONDUCTOR HEIGHTS AND PHASE SPACING	OCTOBER 2015	1
2.11.	240-105644353	SUBSTATION INSULATION COVERS TO PREVENT WILDLIFE CONTACT	JULY 2017	1
2.12.	NERSA	RSA DISTRIBUTION GRID CODE	JULY 2014	6

CONTROLLED DISCLOSURE

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Limited, Reg No 2002/015527/06.

3.7. Standards & Specifications Index Makhathini 22-kV Cap Bank Establish	Template Identifier	240-129714553	Rev	1
	Document Identifier	ER00024-00-P05#3.7-00	Rev	0

3.	EARTHING AND LIGHTNING PROTECTION STANDARDS			
NO.	DOCUMENT NO.	DOCUMENT TITLE	DATE	REV
3.1.	240-134369472	SUBSTATION EARTH GRID DESIGN STANDARD	MARCH 2019	1
3.2.	240-96393507	SOIL RESISTIVITY TESTING FOR SUBSTATION APPLICATIONS	AUGUST 2015	2
3.3.	240-101940513	SUBSTATION EARTH ELECTRODE RESISTANCE MEASUREMENT	DECEMBER 2015	2
3.4.	240-84854974	CONTINUITY MEASUREMENT OF SUBSTATION EARTH GRID SYSTEMS	SEPTEMBER 2019	2
3.5.	240-76624507	STANDARD FOR NEUTRAL EARTHING OF TRANSMISSION AND DISTRIBUTION NETWORKS	MARCH 2016	1
3.6.	240-103693534	USE OF COPPER-CLAD STEEL AS EARTH TAILS IN DISTRIBUTION SUBSTATIONS	FEBRUARY 2016	1
3.7.	240-170000153	COPPER CONDUCTORS USED FOR EARTHING IN SUBSTATIONS	SEPTEMBER 2020	1
3.8.	240-170000349	COPPER CLADDED STEEL CONDUCTORS USED FOR EARTHING	FEBRUARY 2021	1
3.9.	240-108982466	STANDARD FOR HV YARD STONE	FEBRUARY 2017	1
3.10.	240-64100247	STANDARD FOR EARTHING OF SECONDARY PLANT EQUIPMENT IN SUBSTATIONS	MARCH 2017	2
3.11.	240-109589380	DIRECT LIGHTNING STROKE PROTECTION OF SUBSTATIONS	NOVEMBER 2016	2
3.12.	240-101573908	MEASURE TO TAKE WHEN EARTHING CONDUCTORS IN A SUBSTATION ARE COMPROMISED	NOVEMBER 2015	1
3.13.	240-155611012	RISK AWARENESS WHEN WORKING ON A LIVE SUBSTATION EARTH MAT	JUNE 2020	1

CONTROLLED DISCLOSURE

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Limited, Reg No 2002/015527/06.

3.7. Standards & Specifications Index Makhathini 22-kV Cap Bank Establish	Template Identifier	240-129714553	Rev	1
	Document Identifier	ER00024-00-P05#3.7-00	Rev	0

4.	EQUIPMENT SPECIFICATIONS			
NO.	DOCUMENT NO.	DOCUMENT TITLE	DATE	REV
4.1.	ISOLATORS (DISCONNECTORS)			
4.1.1.	240-56063815	HIGH VOLTAGE OUTDOOR DISCONNECTORS AND EARTHING SWITCHES STANDARD	DECEMBER 2015	3
4.2.	SWITCHGEAR (OUTDOOR)			
4.2.1.	240-56063756	OUTDOOR CIRCUIT BREAKERS FOR SYSTEM WITH NOMINAL VOLTAGES FROM 6.6KV UP TO AND INCLUDING 765KV STANDARD	SEPTEMBER 2015	6
4.2.2.	240-69125210	DISTRIBUTION GROUP'S SPECIFIC REQUIREMENTS FOR 11kV, 22kV AND 33kV OUTDOOR KIOSK TYPE SWITCHGEAR	OCTOBER 2019	2
4.2.3.	240-129000817	TECHNICAL BULLETIN OF MV CIRCUIT BREAKERS, CORP 3318	OCTOBER 2018	4
4.2.4.	240-68972898	STANDARD FOR THE CHOICE OF SINGLE AND THREE MECHANISM CIRCUIT BREAKERS	OCTOBER 2015	1
4.3.	SWITCHGEAR (INDOOR)			
4.3.1.	240-56065131	THE DX AND TX SPECIFICATION FOR 6.6 kV TO 33 kV WITHDRAWABLE INDOOR METAL-ENCLOSED SWITCHGEAR	SEPTEMBER 2019	3
4.3.2.	240-56062704	SPECIFICATION FOR 11 kV TO 33 kV FIXED PATTERN METAL-ENCLOSED INDOOR PRIMARY SWITCHGEAR	FEBRUARY 2020	3
4.3.3.	240-107059560	CORP 2826 MV INDOOR PRIMARY SWITCHGEAR TECHNICAL EVALUATION REPORT	MARCH 2016	1
4.3.4.	10TB-010	MV INDOOR METALCLAD SWITCHGEAR – ON-BOARD PROTECTION / CONTROL SCHEMES	APRIL 2010	0
4.3.5.	10TB-021	MV METALCLAD INDOOR SWITCHGEAR EVALUATION	SEPT 2011	2
4.4.	SURGE ARRESTORS			
4.4.1.	240-56062768	DISTRIBUTION CLASS METAL OXIDE SURGE ARRESTERS WITHOUT SPARK GAPS SPECIFICATION	JUNE 2014	1
4.4.2.	240-75540566	SPECIFICATION FOR STATION CLASS METAL OXIDE SURGE ARRESTERS	APRIL 2015	4
4.5.	CLAMPS			
4.5.1.	240-53113923	SPECIFICATION FOR SUBSTATION CLAMPS FOR TUBE ALUMINIUM CONDUCTORS	NOVEMBER 2018	2
4.5.2.	240-53113927	SPECIFICATION FOR SUBSTATION CLAMPS FOR STRANDED ALUMINIUM CONDUCTORS	FEBRUARY 2017	1
4.6.	NECRT's			
4.6.1.	240-57648848	SPECIFICATION FOR COMBINED THREE-PHASE NEUTRAL ELECTROMAGNETIC COUPLERS (NEC'S) WITH NEUTRAL EARTHING RESISTERS (NER'S) AND AUXILIARY POWER TRANSFORMERS	MARCH 2015	1

CONTROLLED DISCLOSURE

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Limited, Reg No 2002/015527/06.

3.7. Standards & Specifications Index Makhathini 22-kV Cap Bank Establish	Template Identifier	240-129714553	Rev	1
	Document Identifier	ER00024-00-P05#3.7-00	Rev	0

4.7.	TRANSFORMERS			
4.7.1.	<u>240-68973110</u>	SPECIFICATION FOR POWER TRANSFORMERS RATED FOR 1.25MVA AND ABOVE AND WITH HIGHEST VOLTAGE OF 2.2KV OR ABOVE	JULY 2017	2
4.7.2.	<u>240-56062529</u>	SPECIFICATION FOR DEHYDRATING BREATHERS FITTED TO TRANSFORMERS, REACTORS AND ON-LOAD TAP CHANGERS	NOVEMBER 2012	1
4.8.	INSTRUMENT TRANSFORMERS			
4.8.1.	<u>240-56062765</u>	INDUCTIVE VOLTAGE TRANSFORMERS: ESKOM SPECIFIC REQUIREMENTS UP TO 132KV IN ACCORDANCE WITH NRS 030	JULY 2014	1
4.8.2.	<u>240-56062864</u>	CURRENT TRANSFORMERS: ESKOM SPECIFIC REQUIREMENTS FOR VOLTAGES UP TO 132KV IN ACCORDANCE WITH NRS029	FEBRUARY 2013	1
4.9.	SECURITY FENCES			
4.9.1.	<u>DSP0024</u> <u>240-100183119</u>	SPECIFICATION FOR SECURITY FENCES AT DISTRIBUTION SUBSTATIONS AND BUILDINGS	FEBRUARY 2005	0
4.10.	POST INSULATORS			
4.10.1.	<u>240-56030435</u>	SPECIFICATION FOR OUTDOOR CERAMIC STATION POST INSULATORS FOR SYSTEMS WITH NOMINAL VOLTAGES UP TO 765kV	OCTOBER 2015	4
4.11.	CABLE SYSTEMS			
4.11.1.	<u>240-56063710</u>	MV CABLING IN SUBSTATIONS STANDARD	NOVEMBER 2012	1
4.11.2.	<u>240-56030640</u>	GENERAL INFORMATION AND REQUIREMENTS FOR HIGH-VOLTAGE CABLE SYSTEMS	NOVEMBER 2012	1
4.11.3.	<u>240-56030635</u>	GENERAL INFORMATION AND REQUIREMENTS FOR MEDIUM-VOLTAGE CABLE SYSTEMS	DECEMBER 2013	1
4.11.4.	<u>240-56030637</u>	GENERAL INFORMATION AND REQUIREMENTS FOR LOW-VOLTAGE CABLE SYSTEMS	NOVEMBER 2012	1
4.11.5.	<u>240-56030619</u>	ACCESSORIES FOR MEDIUM VOLTAGE POWER CABLES FOR SYSTEMS WITH NOMINAL VOLTAGES OF 11KV AND 22KV	FEBRUARY 2017	2
4.11.6.	<u>240-56179027</u>	SAFETY MEASURES AGAINST THE THERMAL HAZARD OF AN ELECTRICAL ARC FOR METAL-ENCLOSED SWITCHGEAR (UP TO 36KV) STANDARD	SEPTEMBER 2018	2
4.11.7.	<u>03TI-015</u>	MEDIUM VOLTAGE CABLE TERMINATIONS & SURGE ARRESTERS IN METAL CLAD SWITCHGEAR	SEPTEMBER 2003	0

CONTROLLED DISCLOSURE

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Limited, Reg No 2002/015527/06.

3.7. Standards & Specifications Index Makhathini 22-kV Cap Bank Establish	Template Identifier	240-129714553	Rev	1
	Document Identifier	ER00024-00-P05#3.7-00	Rev	0

4.12.	OTHER			
4.12.1.	DST 34-1692 SCSSCAAQ4	DISTRIBUTION GROUPS SPECIFIC REQUIREMENTS FOR THE WIRING OF BREAKERS AND IN-BUILT CURRENT TRANSFORMERS REV 6		
4.12.2.	240-75883896	OUTDOOR POST AND LONG ROD INSULATORS FOR NEW AND REFURBISHED POWER LINES FOR 66KV AND 132KV STANDARD	MARCH 2016	1
4.12.3.	240-94743192	STANDARD FOR FABRICATION STEELWORK USED IN ESKOM TRANSMISSION SUBSTATIONS	JULY 2015	1
4.12.4.	240-108982466	STANDARD FOR HV YARD STONES IN ESKOM SUBSTATIONS	FEBRUARY 2017	1
4.12.5.	240-136590700	MOBILE SUBSTATION STORAGE, TRANSPORT, INSTALLATION, COMMISSIONING, OPERATING & DECOMMISSIONING	FEBRUARY 2020	0
4.12.6.	QAM 9.1	SUPERVISION & CONTROL OF COMPRESSION CONNECTIONS ON SUBSTATION PROJECTS		

5.	SOUTH AFRICAN NATIONAL STANDARDS (ELECTRICAL)			
5.1.	SANS 10142-1	THE WIRING OF PREMISES PART 1: LOW VOLTAGE INSTALLATIONS		

6.	ADDITIONAL STANDARDS & SPECIFICATIONS			
6.1.	SCOT Documents	REFER TO SCOT INDEX ON DT WEBSITE		
6.2.	ehpum.eskom.co.za	ESKOM HIGH PERFORMANCE UTILITY MODEL (EHPUM) AND PROCESS CONTROL MANUALS (PCM)		

*For quick and easy access of documents from Hyperwave, enter document number after link:
<https://hyperwave.eskom.co.za>*

CONTROLLED DISCLOSURE

No part of this document may be reproduced without the expressed consent of the copyright holder, Eskom Holdings SOC Limited, Reg No 2002/015527/06.