

 Eskom	Standard	Technology
--	-----------------	-------------------

Title: **SPECIFICATION FOR STATION CLASS METAL OXIDE SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Alternative Reference Number: **240-56062896 & 240-56030659**

Area of Applicability: **Engineering**

Documentation Type: **Standard**

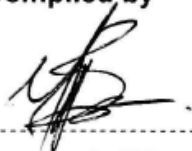
Revision: **5**

Total Pages: **132**

Next Review Date: **October 2025**

Disclosure Classification: **Controlled Disclosure**

Compiled by



Fernando Witbooi
Chief Technologist

Date: *9/10/2020*

Approved by



Kevin Kleinhans
Chief Engineer

Date: 09/10/2020

Authorized by



Bheki Ntshangase
Senior Manager – HV Plant Engineering

Date: 12 October 2020

Supported by SCOT/SC



Bheki Ntshangase
SCOT/SC Chairperson

Date: 12 October 2020

PCM Reference: <xxxxxxx>

SCOT Study Committee Number/Name: <Number or name>

Content

	Page
1. Introduction	4
2. Supporting Clauses	4
2.1 Scope	4
2.1.1 Purpose	4
2.1.2 Applicability	4
2.2 Normative/Informative References.....	4
2.2.1 Normative.....	4
2.2.2 Informative	4
2.3 Definitions.....	5
2.3.1 General	5
2.3.2 Disclosure Classification	6
2.4 Abbreviations.....	6
2.5 Roles and Responsibilities	7
2.6 Process for Monitoring	7
2.7 Related/Supporting Documents	7
3. Specification for Station Class Metal Oxide Surge Arresters	7
3.1 Requirements	7
3.1.1 Operating Conditions	7
3.1.2 General Requirements.....	7
3.1.3 Mechanical Requirements	8
3.2 Tests.....	12
3.2.1 General	12
3.2.2 Type Tests	12
3.2.3 Routine Tests	13
3.3 Documentation	14
3.3.1 Supporting Data	14
3.3.2 Characteristics Curves.....	14
3.3.3 Drawings Submitted with Tender	14
3.3.4 Drawings (Contractual)	14
3.3.5 Supporting Documentation	15
3.3.6 Electronic File structure	15
3.4 Marking and Packaging.....	16
3.4.1 Marking	16
3.4.2 Packaging	16
4. Authorization.....	17
5. Revisions	17
6. Development Team	18
7. Acknowledgements	18
Annex A – List of Items Offered.....	19
Annex B – Technical Schedules.....	22
Annex C – - Type test report summary sheet (To be completed per item)	127
Annex D – - Summary sheet of drawings, outlines and characteristic curves (To be completed per item) ...	130

ESKOM COPYRIGHT PROTECTED

Annex E – - Deviations and Declaration (To be completed per item)	132
---	-----

Figures

Figure 1: Drilling plan for surge arrester base mounting (66 kV, 88kV and 132 kV arresters).....	9
Figure 2: Tapered washer.....	10
Figure 3: Earth terminal, Examples 1 and 2	11
Figure 4: Phase to ground clearance limitation	12
Figure 5: Folder structure for electronic files	16

Tables

Table 1: Station Arrester Classification [2]	5
Table 2: Site Pollution Severity Class [3].....	5
Table 3: Operating Conditions	7
Table 4: Type test summary	13

1. Introduction

Surge arresters are installed in substations and on transmission lines to limit transient overvoltages that may lead to flashovers and failure of substation HV terminal equipment. To ensure that surge arresters perform satisfactorily in service, they must be designed, constructed and tested according to specified technical requirements. This specification sets out Eskom's requirements for the design, manufacture, testing, delivery and installation, where applicable, of non-linear metal oxide station class surge arresters for use on the Eskom network, excluding Line Surge Arresters.

2. Supporting Clauses

2.1 Scope

This specification sets out Eskom's requirements for the manufacture, testing, supply and delivery of station class, non-linear metal-oxide surge arresters for installation on 6,6kV, 11kV, 22kV, 33kV, 44kV, 66kV, 88kV, 132kV, 220kV, 275kV, 400kV and 765kV distribution, sub-transmission and transmission networks.

2.1.1 Purpose

The purpose of this specification is to ensure that station class metal oxide surge arresters for use in Eskom's distribution, sub-transmission and transmission network are designed, manufactured, tested, supplied, delivered and installed, where applicable, in accordance with Eskom's requirements to satisfy the desired technical performance.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

2.2 Normative/Informative References

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

2.2.1 Normative

- [1] ISO 9001: 2015 Quality Management Systems.
- [2] SANS/IEC 60099-4: 2014 Surge Arresters - Part 4: Metal-oxide surge arresters without gaps for a.c. systems
- [3] SANS 60815: 2009/IEC 60815: 2008 Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 1: Definitions, information and general principles - Part 3: Polymer insulators for a.c systems
- [4] SANS 121: 2011/ISO 1461:2009: Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods.
- [5] SANS 17025: 2018/IEC/ISO 17025: 2017, General requirements for the competence of testing and calibration laboratories

2.2.2 Informative

- [6] IEEE Std C62.11-1999: IEEE Standard for Metal-Oxide Surge Arresters for AC Power Circuits (> 1 kV)
- [7] IEC 60071-1:2006, Insulation co-ordination – Part 1: Definitions, principles and rules
- [8] Eskom Procedure, 240-95453610, Management of Manufacturers/Supplier Equipment Drawings, Revision 3.

ESKOM COPYRIGHT PROTECTED

2.3 Definitions

2.3.1 General

The Station class surge arresters are classified according to Table 1. The table is adopted from SANS/IEC60099-4:2014 and only shows the information relevant to Station class surge arresters.

Table 1: Station Arrester Classification [2]

Station Arrester class				
Typical nominal voltage in Eskom	765 kV	400 kV	132 kV – 275 kV	6.6 kV – 132 kV
Designation	SH	SH	SM	SL
Nominal discharge current	20 kA	20 kA	10 kA	10 kA
Switching impulse discharge current	2 kA	2 kA	1 kA	0.5 kA
Q_{rs} (C)	≥ 3.6	≥ 2.4	≥ 1.6	≥ 1
W_{th} (kJ/kV)	≥ 14	≥ 10	≥ 7	≥ 4
Line Discharge Class (IEC/SANS 60099-4: 2014)	5	4	3	2

Note: The letter “S” refers to Station class. Letters “H”, “M” and “L” in the designation stand for “High”, “Medium” and “Low” duty, respectively.

Table 2: Site Pollution Severity Class [3]

Site Pollution Severity Class (SPS)	Specific creepage distance for three-phase ac systems in mm/kV (SCD)	Unified Specific creepage distance for the rms voltage across the insulator in mm/kV (USCD)
Light	16	28
Medium	20	35
Heavy	25	44
Very Heavy	31	55
Extreme	38	66

Only the definitions related to the identification and classification of Station Class Metal Oxide Surge Arresters are provided in definitions. Refer to SANS/IEC60099-4:2014 for other related terms and definitions.

Definition	Description
Maximum continuous operating voltage (MCOV or U_c)	The highest r.m.s. power-frequency voltage that an arrester can withstand continuously.
Mean Breaking Load (MBL)	The average breaking load for porcelain or cast resin-housed arresters determined from tests
Nominal discharge current of an arrester (I_n)	The peak value of lightning impulse current which is used to classify an arrester.
Rated voltage of an arrester (U_r)	The maximum permissible 10 s power frequency r.m.s voltage that can be applied between its terminals at which it is designed to operate correctly under temporary overvoltage conditions as established in the operating duty tests. NOTE — The rated voltage is used as a reference parameter for the specification of operating characteristics.

ESKOM COPYRIGHT PROTECTED

Definition	Description
Repetitive Charge Transfer Rating (Q_{rs})	Maximum specified charge transfer capability of an arrester, in the form of a single event or group of surges that may be transferred through an arrester without causing mechanical failure or unacceptable electrical degradation to the Metal Oxide resistors. Note — The charge is calculated as the absolute value of current integrated over time. For the purpose of this standard this is the charge that is accumulated in a single event or group of surges lasting for not more than 2 s and which may be followed by a subsequent event at a time interval not shorter than 60 s.
Specified long-term load (SLL)	Force perpendicular to the longitudinal axis of an arrester, allowed to be continuously applied during service without causing any mechanical damage to the arrester
Specified short-term Load (SSL)	Greatest force perpendicular to the longitudinal axis of an arrester, allowed to be applied during service for short periods and for relatively rare events (for example, short-circuit current loads and extreme wind gusts) without causing any mechanical damage to the arrester
Thermal charge transfer rating (Q_{th})	Maximum specified charge that may be transferred through an arrester or arrester section within 3 minutes in a thermal recovery test without causing a thermal runaway. Only relevant for Distribution class arresters.
Thermal energy rating (W_{th})	Maximum specified energy (kJ/kV) as a function of the Rated voltage (U_r), that may be injected into an arrester or arrester section within 3 minutes in a thermal recovery test without causing a thermal runaway.

2.3.2 Disclosure Classification

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

2.4 Abbreviations

Abbreviation	Description
μs	Microsecond
A	Ampere
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers
ISO	International Standardization Organisation
kA	kiloAmpere
kJ	kiloJoule
kV	kiloVolt
OEM	Original Equipment Manufacturer
PCD	Pitch Circle Diameter
SA	Surge Arrester
SANS	South African National Standard
SCD	Specific Creepage Distance
SPS	Site Pollution Severity Class

2.5 Roles and Responsibilities

The designated Technical Specialist shall ensure that this document is updated, renewed and current at all times. Any person in Eskom and its subsidiaries shall use this standard.

2.6 Process for Monitoring

Not applicable.

2.7 Related/Supporting Documents

The following documents have been superseded by this document and shall be archived for reference purposes only:

- 240-56062896: Specification for Outdoor Metal Oxide Surge Arresters Without Spark Gaps for System Voltages of 220kV and Above Standard (Alternative Reference Number: TSP 41-363)
- 240-56030659: Station Class, Metal-Oxide Surge Arresters Without Spark-Gaps Standard (Alternative Reference Number: 34-419)

3. Specification for Station Class Metal Oxide Surge Arresters

3.1 Requirements

3.1.1 Operating Conditions

Table 3: Operating Conditions

A.	Altitude	Up to 1800 m above Sea Level
B.	Average humidity	30% to 90%;
C.	Ambient temperature	Minimum: - 10 °C Maximum: + 40 °C
D.	Daily temperature variation	Maximum: 30 °C
E.	Solar radiation	1.1 kW/m ²
F.	IEC 60815 Pollution Severity Class	See Table 2
G.	Earthing	6.6 to 88 kV networks: Non-effectively earthed; 44 to 765 kV networks: Effectively earthed Note – Some 44 kV, 66 kV and 88 kV systems are Non-effectively earthed.
H.	System configuration	Three-phase, three wire
I.	Nominal system voltage (Un)	6.6, 11, 22, 33, 44, 66, 88, 132, 220, 275, 400, 765 kV;
J.	System frequency	50 Hz
K.	Seismic	0.3 G

3.1.2 General Requirements

For each Nominal System Voltage level, the major performance requirements are set out in the respective Schedule A. In addition to these requirements, the following should be met:

- Arresters will be able to withstand the effects of airborne contamination on the external surfaces of the arrester housing as specified and evaluated by clause 3.1.1.F.

ESKOM COPYRIGHT PROTECTED

-
- b) For Nominal System Voltages of 400 kV and below, only single column (series stack) arresters are acceptable.
- c) Internal components shall be dry at the time of assembly and arresters shall be permanently sealed. If elastomer gaskets or seals are used, precautions shall be taken to ensure adequate compression and that such gaskets or seals do not deteriorate in service as a result of exposure to the environment or electrical stresses.
- d) All ferrous, non-current carrying components exposed to the atmosphere shall be hot-dip galvanized in accordance with SANS 121.
- e) The SA will be mounted on a galvanised structure. The OEM shall ensure that no galvanic (bi-metal) corrosion can occur.
- f) Arresters shall withstand short-circuit currents without violent shattering, and shall have the ability to self-extinguish any fire caused by the arc. The short circuit performance of the arrester shall be as per IEC/SANS 60099-4, declared over a period of 200ms(0.2s)
- g) All SAs are to be housed in polymeric insulation, and profiles are to be designed in accordance with the requirements in IEC 60815 with no deviations. Open, flat profiles are preferred.
- h) Only conventional silicone rubber polymer will be accepted for the polymeric housing material. Non-conventional or exotic blends of material are not acceptable.
- i) Any design changes shall be verified by testing and shall be subject to Eskom's written approval.
- j) Samples, shall be available for inspection at the premises of the supplier. Eskom reserves the right to sample test any unit(s) available or so requested.
- k) Unique product code shall be assigned per arrester rating. The product codes shall also distinguish between arresters intended for heavy or very heavy applications, as well as mechanical load bearing applications.
- l) The guarantees of all major performance criteria stated in Schedule B shall be supported by evidence in the form of type test certificates.
- m) Grading rings, if required, and associated fittings must be securely attached without the possibility of coming loose during normal operation. The grading ring itself is preferred to be a single welded unit, but other designs of grading rings are allowed. Method of attachment must be submitted with tender returnables for approval by Eskom.
- n) Arresters shall be designed for an expected lifespan of 30 years.
- o) All information to be supplied in English.

3.1.3 Mechanical Requirements

3.1.3.1 Sealing

Sealing, except where the external housing is directly moulded on the internal components:

- Surge arresters will be permanently sealed. Dryness of internal components will be ensured by hermetic seals and moisture absorption devices e.g. silica gel.
- An approved routine test of seal integrity must be carried out on every assembled arrester or arrester unit.
- Technical details of the sealing arrangements and the routine seal test must be submitted for approval.
- The sealing requirement is not applicable where the external housing is directly moulded to the internal components of the surge arrester.

3.1.3.2 Mounting**3.1.3.1 Nominal System Voltages Greater than 220 kV**

- a) All arresters shall be isolated from the support structure by either an insulated base or support insulators. Support insulators may be constructed of epoxy or porcelain. Once installed, the arrester shall be able to stand upright without additional support and shall not slide off the support/insulated base insulators. Method and details of components supplied for mounting shall be submitted with tender returnables for approval by Eskom.

3.1.3.2 Nominal System Voltages from 6.6 kV to 44 kV

- a) The 6.6 kV to 44 kV arresters shall be arranged for base mounting.
- b) Eskom's mounting bracket is 70 mm wide and has a single 14 mm diameter mounting hole.
- c) A threaded stud (M12 x 50 mm), a nut, spring washer and two flat washers shall be supplied per arrester.

3.1.3.3 Nominal System Voltages from 66 kV to 132 kV

- a) The 66 kV to 132 kV arresters shall be arranged for base mounting and shall be compatible with the drilling plan specified in 1.
- b) A tripod base shall be provided.
- c) Eskom's mounting bracket is 15 mm thick, with 14 mm diameter mounting holes.
- d) Three mounting bolts shall be supplied per arrester. Each mounting bolt shall be supplied complete with a nut, tapered washer (See 2) and two flat washers.

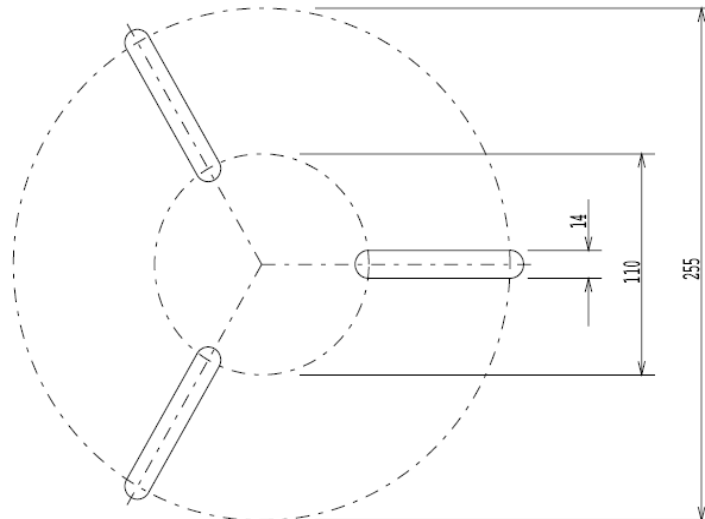


Figure 1: Drilling plan for surge arrester base mounting (66 kV, 88kV and 132 kV arresters)

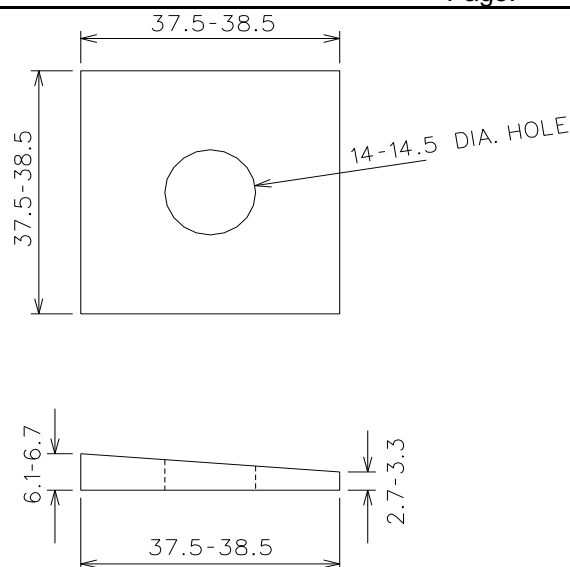


Figure 2: Tapered washer

3.1.3.3 Line and Earth End Terminals

3.1.3.3.1 Nominal System Voltages from 6.6 kV to 44 kV

On arresters equipped for service, there shall be no visible permanent deformation of the terminals of the arrester when a force of 100 N is applied for 1 minute to the tip of the terminal.

If dissimilar metals are used for the arrester terminals and conductor clamping arrangements, proof shall be provided of the galvanic compatibility of these materials.

The line terminal of the 6,6 kV to 44 kV arresters shall consist of a threaded stud (M12 x 50 mm), a nut, two flat washers and spring washer (for application of a crimped lug, M12 hole).

Line terminals shall be centred on the surge arrester.

No additional earth terminal is required on the 6,6 kV to 44 kV arresters.

3.1.3.3.2 Nominal System Voltages from 66 kV to 132 kV

On arresters equipped for service, there shall be no visible permanent deformation of the terminals of the arrester when a force of 100 N is applied for 1 min to the tip of the terminal.

If dissimilar metals are used for the arrester terminals and conductor clamping arrangements, proof shall be provided of the galvanic compatibility of these materials.

The line terminal of the 66 kV to 132 kV arresters shall consist of a 26 mm x 100 mm aluminium stem (for application of a K-clamp). Terminals must be constructed out of a solid piece of material. Screw-on extensions used for increasing the diameter of terminal up to the required diameter are not acceptable.

Line terminals shall be centred on the surge arrester.

An earth terminal in accordance with Example 1 or Example 2 of 3 shall be provided for the 66 kV to 132 kV arresters. The earth termination shall accommodate a 3 mm x 50 mm copper strap.

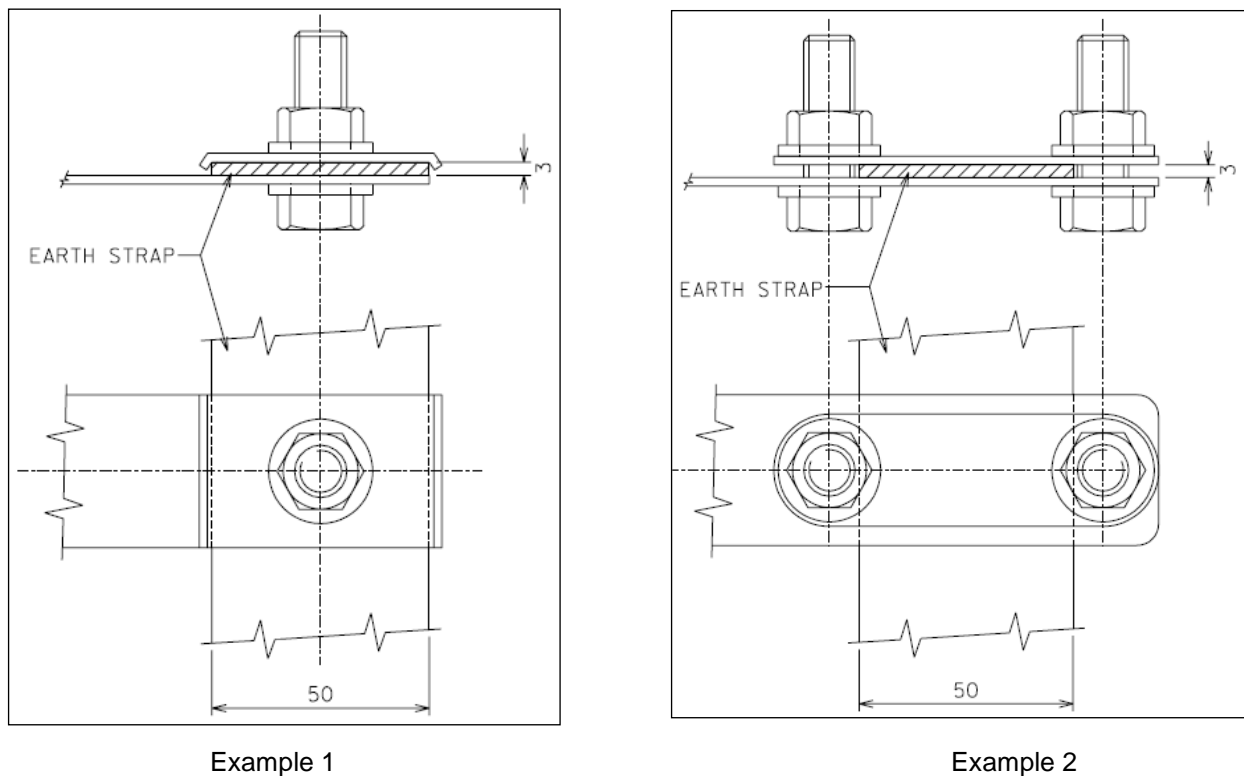


Figure 3: Earth terminal, Examples 1 and 2

3.1.3.3.3 Nominal System Voltages of and Greater than 220 kV

Both line and earth-lead terminations shall be suitable for the standard conductor of dimensions and materials specified in Schedule A.

Terminals shall be of sufficient strength to withstand forces arising during installation and service. Such forces shall not overstress the components of the arrester, particularly the sealing system. If dissimilar metals are used for the arrester terminals and conductor clamping arrangements, proof shall be provided of the galvanic compatibility of these materials.

All line terminals shall be 38 mm in diameter. Terminals shall be constructed out of a solid piece of material. Screw-on extensions used for increasing the diameter of terminal up to the required diameter are not acceptable.

3.1.3.4 Finish

All ferrous components exposed to the atmosphere, excluding those of stainless steel and aluminium, will be hot-dip galvanized in accordance with SANS 121. This includes earth terminals and holding-down bolts.

3.1.3.5 Dimension limitations for 132 kV Surge Arrestors

This specification caters for two applications for 132 kV surge arrester installations;

- a) The installation of surge arresters on the transformer mounted bracket. The grading rings for these surge arresters shall not exceed 160mm in diameter.

Note: If the grading ring exceeds the 160mm diameter, the phase to phase clearance of 1650mm will be breached. This measurement is based on the minimum bracket phase spacing of 1815mm.

- b) All other installations within the substation. The grading rings for these surge arresters are not limited to a certain diameter.

The dimension between the absolute base and the closest live point shall not exceed 1200mm.

The Eskom Substation Layout Design Guide requires a vertical working clearance of 3.7 m for 132 kV installations. In order to accommodate the standard 2500mm medium equipment support, the SA needs to be at least 1200mm from bottom to nearest live point to accommodate the 3700mm requirement.

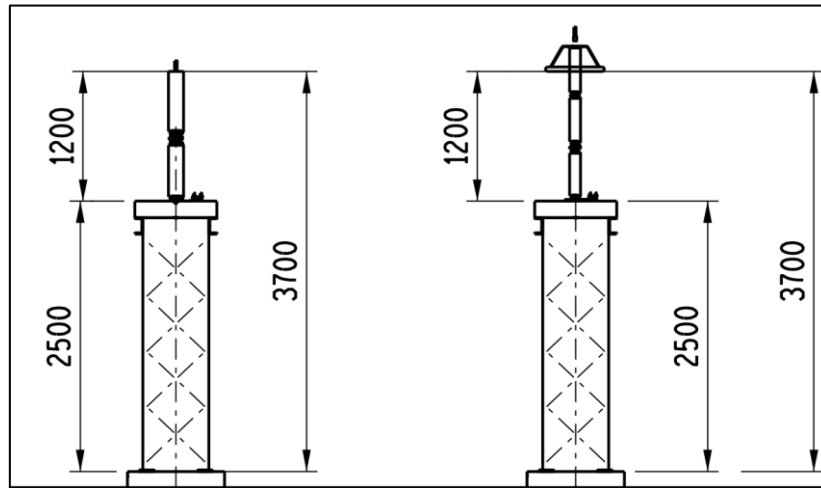


Figure 4: Phase to ground clearance limitation

3.2 Tests

3.2.1 General

- a) All type and routine tests on arresters, or where applicable pro-rata sections, identical to those stipulated in Technical Schedule A and offered in Technical Schedule B of an enquiry document, shall be conducted in accordance with SANS 60099-4: 2014.
- b) Single copies of type test reports (in English) shall be submitted with a tender. If all the required type test reports are not submitted, the tender will be rated incomplete and will be excluded. If required, any special test reports will be submitted as soon as possible and at least three months before dispatch of the arresters.
- c) Type tests reports from in-house testing laboratories must be compliant to ISO/IEC 17025 and have been witnessed by an independent accredited body to assess the validity of such tests.
- d) Eskom reserves the right to demand test reports from an accredited testing laboratory should any problems arise that question the validity of the in-house test reports. An accredited testing laboratory is defined as that which is ISO/IEC 17025 accredited and/or which holds valid certification issued by ILAC (International Laboratory Accreditation Corporation) or one of its members.
- e) Eskom reserves the right to appoint a representative to inspect the arresters at any stage of manufacture and to witness and sanction any tests. If inspection or witnessing of tests is required, Eskom will advise the contractor who will then give at least eight weeks notice of the date on which impending inspection or testing will take place.
- f) Any design change must be verified by tests wherever applicable and shall be subject to Eskom's approval.

3.2.2 Type Tests

- a) Test certificates and reports shall be provided to prove that the surge arresters comply fully with the provisions of SANS 60099-4:2014 for polymer-housed arresters as well as for any further requirements as stipulated in this specification as well as the relevant Technical Schedule A.

ESKOM COPYRIGHT PROTECTED

- b) Should such evidence not be available, the relevant type tests shall be performed and the costs thereof paid by the manufacturer or supplier.
- c) Type test reports shall be arranged and numbered in the order set out in Annex B and shall be marked clearly with the identification and description of the relevant test number in Annex B.
- d) Should the product naming convention used in the type test report differ from that of the product offered, clear unambiguous explanation must be given indicating how the product tested is applicable to that offered.
- e) The following type tests shall be conducted as per SANS 60099-4:2014 and submitted for review:

Table 4: Type test summary

Test		SANS/IEC60099-4 Reference Section
1	Insulation withstand test on the arrester housing	Lighting Impulse 10.8.2 Switching Impulse 10.8.2 Power Frequency 10.8.2
2	Residual voltage test	Steep Current 10.8.3 Switching Impulse 10.8.3 Power Frequency 10.8.3
3	Test to verify long term stability under continuous operating voltage	10.8.4
4	Repetitive charge transfer withstand	10.8.5
5	Heat dissipation behaviour verification of test sample	10.8.6
6	Operating duty test	10.8.7
7	Power-frequency voltage versus time	10.8.8
8	Short-circuit tests	10.8.10
9	Bending moment test	10.8.11
10	Seal leak rate (Applicable to housings having an enclosed gas volume)	10.8.13
11	Radio interference voltage (RIV) test	10.8.14
12	Test to verify the dielectric withstand of internal components(where applicable)	10.8.15
13	Weather ageing	10.8.17
	NB! Alternative pollution tests for polymer arresters at 132kV and below only, per 3.2.2 (f) applies	

- f) For polymer arresters with voltage level at 132kV and below and to be utilised in Very Heavy pollution site severities(as defined in SANS/IEC60815) , thus requiring specific creepage distances of 31mm/kV(USCD of 55mm/kV) or higher, test reports in accordance with one of the following alternative technical standards or guidelines can be provided;

- Cigre TB 555, Solid Layer pollution test with preconditioning (without recovery)
- Cigre TB 691, Rapid flashover test with artificial pollution and without recovery
- IEC TR 62730, 5000hr multistress test

The test must relate to products that share similar shed profiles, creepage and material composition.

3.2.3 Routine Tests

Routine tests shall be performed on the arresters in accordance with SANS 60099-4:2014 clause 9.

3.2.3.1 Measure reference voltage (Uref)

ESKOM COPYRIGHT PROTECTED

The test shall be conducted in accordance with IEC60099-4, clause 9.1.a.

3.2.3.2 Residual voltage test

The test shall be conducted in accordance with IEC60099-4, clause 9.1.b.

3.2.3.3 Internal partial discharge test

The tests shall be conducted in accordance with IEC60099-4, clause 9.1.c.

3.2.3.4 Leakage check

The tests shall be conducted in accordance with IEC60099-4, clause 9.1.e where required.

3.3 Documentation

3.3.1 Supporting Data

Supporting data in the form of marketing brochures or catalogues stating the electrical characteristics of the arresters on offer shall be included with the tender. Deviations between the published data and the completed Technical Schedule B shall be pointed out and clarified.

3.3.2 Characteristics Curves

The manufacturer of the metal oxide surge arresters shall furnish Eskom with the following characteristic data per item:

- a) V-I characteristics (protective level characteristics) at 8/20 μ s, 30/60 μ s and 1/2 μ s (steep current) impulses
- b) Temporary overvoltage withstand capability curve with and without prior duty.
- c) AC voltage-resistive current curves from 20°C to 180°C

Note: These curves shall be submitted as drawings that contain the manufacturers name, logo and a unique drawing number as a minimum. Clear unambiguous definitions of rated voltage, reference voltage and protective level must be provided. Curves submitted as part of a test report and/or data sheet are not acceptable. Items a and b are mandatory requirements, items c and d may be required before contract award or to be made available during factory inspection.

3.3.3 Drawings Submitted with Tender

Single copies of drawings shall be submitted as part of the original tender showing the following details:

- a) Overall dimensions, including mounting details with drilling plan.
- b) Line conductor and earth conductor clamping arrangements.
- c) Line and earth terminal type details and physical dimensions.
- d) Minimum electrical clearances.
- e) Details of special items such as the disconnecting device or overpressure relief device.
- f) Insulating base type details and physical dimensions (where applicable).
- g) Total creepage and SCD.

3.3.4 Drawings (Contractual)

Outline drawings, electronic copies in scale PDF and acceptable CAD format, will be submitted and must contain the following information as a minimum:

- a) Overall dimensions, including mounting details
- b) Plan view of a three phase layout of the surge arrester application with dimensions indicating edge-to-edge of the surge arrester grading rings (where applicable) and between phases.
- c) Details of main and earthing terminals and conductor clamping arrangements

ESKOM COPYRIGHT PROTECTED

- d) Mass of complete arrester, and if applicable, individual arrester sections
- e) Minimum electrical clearances
- f) Creepage distances
- g) A drawing indicating the position of the identification rating plate and the detail that will be provided on the rating plate.
- h) Surge arrester electrical and mechanical ratings

Drawings will be submitted not later than one month from contract award date for approval. Once the drawings have been approved by Eskom, the contractor will be notified and supplied with an Eskom drawing number and additional details (if required). The Eskom drawing number as well as additional details (if required) must then be incorporated in the approved drawing and sent back to Eskom for acceptance and archiving.

3.3.5 Supporting Documentation

Single copies of the following documentation will be submitted as part of the original tender:

- a) Product catalogue.
- b) Transport, storage and installation procedure.
- c) Compliance to ISO 9001 and IEC/ ISO 17025 certificates.
- d) Customer reference list for each item type tendered for.
- e) Factory location, facility name, production start date and routine test failure rate for each item tendered for.

3.3.6 Electronic File structure

For electronic/softcopy files submitted as part of the technical component of the tender submission, the folder structure given in Figure 5 is preferred. The folder structure should be arranged per item offered and should contained all relevant information relating to that item.

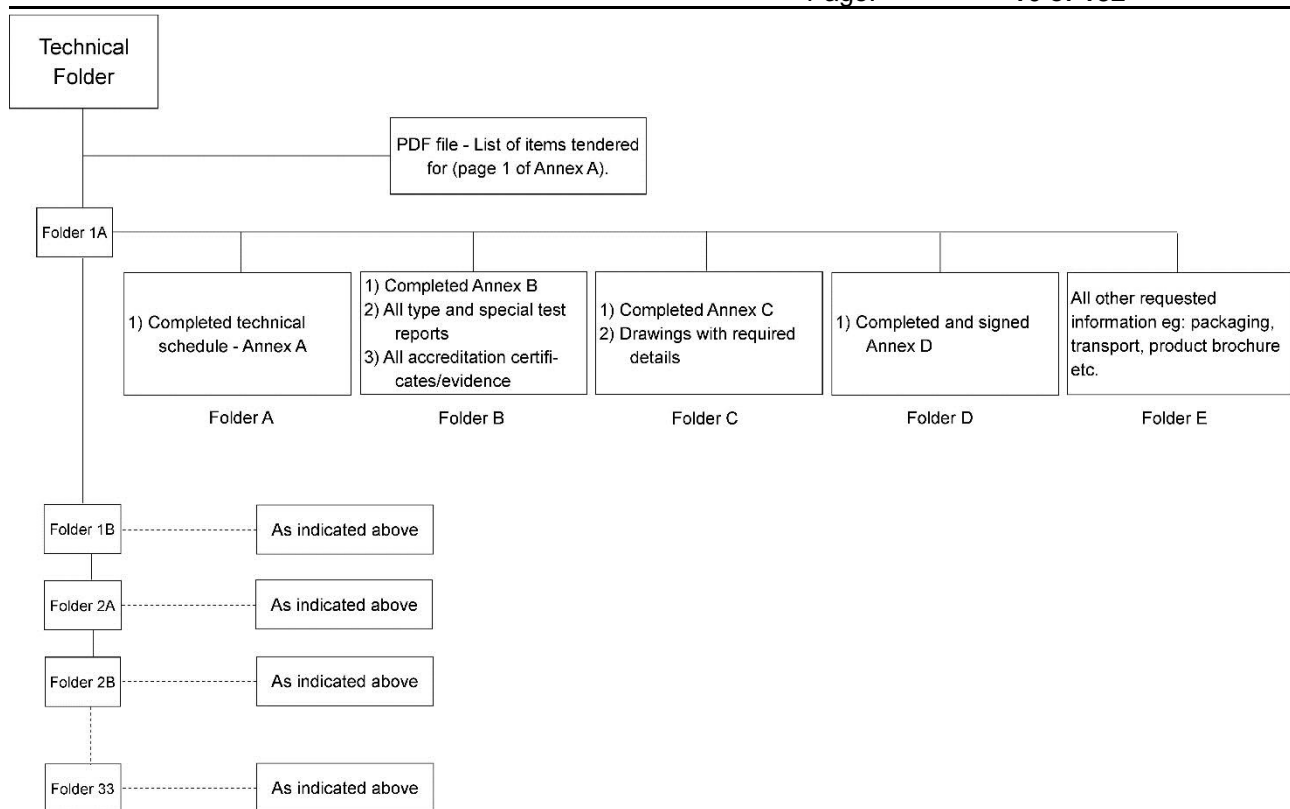


Figure 5: Folder structure for electronic files

3.4 Marking and Packaging

3.4.1 Marking

The minimum required information as per clause 4.1 shall appear on a rating plate permanently attached to the arrester. In addition the following shall appear:

- Repetitive charge transfer rating, Qrs.
- Contamination withstand level or specific creepage distance in mm/kV.
- Name of Manufacturer.

3.4.2 Packaging

All packaging shall be such as to protect the arrester and its components against corrosion and damage during normal handling, uncarting and transportation.

The crate must be able to be lifted using forklifts and/or slings. Lifting positions must be marked. Crates must be designed such that inspections of the contents can be undertaken without damaging the crate.

It is preferred that the packing should allow for surge arresters to be transported and stored on a horizontal position which would prevent toppling over during transportation and storage.

The packing should protect the profile of the shed from deformity or damage during transport and for both outdoor and indoor storage

Further, for arresters to be used on systems ≥ 132 kV, the arrester shall be packaged in crates and enable outdoor storage for a period up to two years.

- Marking of packaging shall be such as to permit easy identification of the components without their removal from the packing.

ESKOM COPYRIGHT PROTECTED

- b) Each crate shall bear the following information on the outside of the crate:
- Product description;
 - Product code or part number;
 - Name of manufacturer and contact details;
 - Number of components of each type in the container;
 - Address of the destination;
 - Eskom's purchase order number;
 - Eskom's material SAP number(s).
- c) If the product is supplied by a third party supplier (e.g. importers, agents, etc.) the crate shall additionally bear the following information:
- Name of the supplier;
 - Contact details of the supplier.
- d) Where arresters are supplied with grading rings, the arrester, its corresponding grading ring and associated fittings must be housed in a single package or alternatively in uniquely numbered packages identifying each arrester, its corresponding grading ring and associated fittings. It is not acceptable to have multiple arresters, grading rings and or fittings in one package. The method of packaging and numbering must be submitted for approval.
- e) Assembly diagrams and installation/instruction manual must be supplied with each arrester and associated fittings in weather proof housing to ensure correct usage and installation at site.

4. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Bheki Ntshangase	Senior Manager: PDE – High Voltage Plant
Kevin Kleinhans	Chief Engineer

5. Revisions

Date	Rev	Compiler	Remarks
Oct 2020	5	F Witbooi	Complete alignment with SANS/IEC60099-4:2014. Remove KIPTS requirements and items. Revised Technical Schedules, included additional parameters including mechanical load ratings.
April 2015	4	T Govender	Revision and updates to general requirements, type test requirements, materials, schedules and annexes.
June 2014	3	T Govender	Changes undertaken to comply with new procurement policy. Non-KIPTS items included. RIV and pollution test requirements detailed further.
May 2014	2	T Govender	Torsional load values for mechanical load bearing units increased. Extreme pollution environment items included.

ESKOM COPYRIGHT PROTECTED

6. Development Team

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

- M Sekgobela
- K Kleinhans
- F Witbooi
- P Seboco
- P.J Schutte
- K Naidoo
- M Khan
- M Pepper

7. Acknowledgements

The Insulation Coordination Care Group members are acknowledged for their input in compiling this document.

Annex A – List of Items Offered

Item Nr	Description Nominal system voltage and earthing philosophy	Application SCD and mechanical load bearing requirements	Offered (Y/N)
Surge Arresters for Nominal Voltages that includes only Non-Effectively earthed systems			
1A	6.6 kV Nominal Voltage Non-Effectively earthed	31 mm/kV	
2A	11 kV Nominal Voltage Non-Effectively earthed	31 mm/kV	
3A	22 kV Nominal Voltage Non-Effectively earthed	31 mm/kV	
4A	33 kV Nominal Voltage Non-Effectively earthed	31 mm/kV	
Surge Arresters for Nominal Voltages that includes both Effectively and Non-Effectively earthed systems			
5A	44 kV Nominal Voltage Non-Effectively earthed	31 mm/kV	
5B	44 kV Nominal Voltage Effectively earthed	31 mm/kV	
6A	66 kV Nominal Voltage Non-Effectively earthed	31 mm/kV	
6B		31 mm/kV and mechanical load bearing	
6C	66 kV Nominal Voltage Effectively earthed	31 mm/kV	
6D		31 mm/kV and mechanical load bearing	
7A	88 kV Nominal Voltage Non-Effectively earthed	31 mm/kV	
7B		31 mm/kV and mechanical load bearing	
7C	88 kV Nominal Voltage Effectively earthed	31 mm/kV	
7D		31 mm/kV and mechanical load bearing	

ESKOM COPYRIGHT PROTECTED

Surge Arresters for Nominal Voltages that includes only Effectively earthed systems			
8A	132 kV Nominal Voltage	31 mm/kV	
8B		Extreme Pollution Environment	
8C		31 mm/kV and mechanical load bearing	
8D		Extreme Pollution Environment and mechanical load bearing	
8E		31mm/kV Transformer application with max 160mm diameter grading ring	
9A	220 kV Nominal Voltage	25 mm/kV	
9B		31 mm/kV	
9C		25 mm/kV and mechanical load bearing	
9D		31 mm/kV and mechanical load bearing	
10A	275 kV Nominal Voltage	25 mm/kV	
10B		31 mm/kV	
10c		25 mm/kV and mechanical load bearing	
10D		31 mm/kV and mechanical load bearing	
11A	400 kV Nominal Voltage	25 mm/kV	
11B		31 mm/kV	
11C		25 mm/kV and mechanical load bearing	
11D		31 mm/kV and mechanical load bearing	
11E		Extreme Pollution Environment	
11F		Extreme Pollution Environment and mechanical load bearing	
12A	765 kV Nominal Voltage	25 mm/kV	
12B		31 mm/kV	

Operating Conditions

The following table details the standard service conditions which the surge arresters must be rated for:

1	Operating conditions:		xxxxxxxxx	Confirm compliance(Yes/No)
1.1	Altitude	m	1800	
1.2	Average humidity	%	30 to 90	
1.3	Minimum ambient temperature	°C	-10	
1.4	Maximum ambient temperature	°C	40	
1.5	Maximum diurnal variation	°C	30	
1.6	Intensity of solar radiation	kW/m ²	1.1	
1.7	System configuration		3 phase, 3 wire	

Annex B – Technical Schedules**Technical Schedule: Surge Arresters for Nominal Voltages that includes only Non-Effectively earthed systems****Item 1A : 6.6 kV Nominal voltage Non-Effectively Earthed (31 mm/kV)**

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXXX	
1.3	Product code		XXXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class		Very Heavy	
2.2	System earthing		Non-effective	
2.3	Nominal system voltage (U_n)	kV	6.6	
2.4	Maximum system voltage	kV	7.3	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level(LIWL)	kV _(peak)	75	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	22	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxxx	
3.6	MCOV (U_c)	kV	7.3	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	27	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV_r	4	
4	Arrester housing		XXXXXXXXXX	XXXXXXXXXX

ESKOM COPYRIGHT PROTECTED

4.1	Housing material		Silicone Polymer	
4.2	Minimum external creepage distance [Um x 31 mm/kV]	mm	226	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		xxxxxxxxx	xxxxxxxxx
5.1	Orientation		Vertical	
5.2	Method of mounting		Base	
5.3	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal		xxxxxxxxx	xxxxxxxxx
6.1	Type		Threaded	
6.2	Diameter		M12	
6.3	Minimum length	mm	50	
6.4	Orientation		Vertical	
6.5	Supplied with: M12 nut, two flat washers and spring washer		Yes	
6.6	Material		xxxxxx	
6.7	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal		xxxxxxxxx	xxxxxxxxx
7.1	Type		Threaded	
7.2	Diameter		M12	
7.3	Minimum length	mm	50	
7.4	Orientation		Vertical	
7.5	Supplied with nut, two flat washers and spring washer		Yes	
7.6	Material		xxxxxx	
7.7	Reference number of drawing showing details of line terminal		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail):		xxxxxxxxx	xxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	

9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Minimum external flashover distance	mm	200	
10.3	External diameter of arrester housing	mm	xxxxxx	
11	Miscellaneous		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	300	
12.2	Minimum Specified Short-term Load(SSL)	Nm	400	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 2A : 11 kV Nominal Voltage Non-Effectively Earthed (31 mm/kV)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXXXXXX	
1.3	Product code		XXXXXXXXXX	
2	Electrical Characteristics			
2.1	IEC 60815 Pollution class		Very Heavy	
2.2	System earthing		Non-effective	
2.3	Nominal system voltage (U_n)	kV	11	
2.4	Maximum system voltage	kV	12	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit(LIWL)	kV _(peak)	95	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	28	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXXXXXX	
3.6	MCOV (U_c)	kV	12	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	45	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV_r	4	
4	Arrester housing		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material		Silicone Polymer	
4.2	Minimum external creepage distance[Um x 31 mm/kV]	mm	372	
4..3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **26 of 132**

5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Base	
5.3	Reference number of drawing showing mounting details		xxxxxxx	
6	Arrester line terminal		XXXXXXXXXX	XXXXXXXXXX
6.1	Type		Threaded	
6.2	Diameter		M12	
6.3	Minimum length	mm	50	
6.4	Orientation		Vertical	
6.5	Supplied with: M12 nut, two flat washers and spring washer		Yes	
6.6	Material		xxxxxxx	
6.7	Reference number of drawing showing details of line terminal		xxxxxxx	
7	Arrester earth terminal			
7.1	Type		Threaded	
7.2	Diameter		M12	
7.3	Minimum length	mm	50	
7.4	Orientation		Vertical	
7.5	Supplied with nut, two flat washers and spring washer		Yes	
7.6	Material		xxxxxxx	
7.7	Reference number of drawing showing details of line terminal		xxxxxxx	
8	Drawings to be submitted with tender		XXXXXXXXXX	XXXXXXXXXX
	Single copies of drawings shall be submitted as part of the original tender showing the following detail:			
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required			
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		XXXXXXXXXX	XXXXXXXXXX
10.1	Overall height of arrester	mm	xxxxxxx	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Revision: **5**

Page: **27 of 132**

10.2	Minimum external flashover distance	mm	200	
10.3	External diameter of arrester housing	mm	xxxxxx	
11	Miscellaneous		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	300	
12.2	Minmum Specified Short-term Load (SSL)	Nm	400	
12.3.	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

Item 3A : 22 kV Nominal voltage Non-Effectively Earthed (31 mm/kV)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class		Very Heavy	
2.2	System earthing		Non-effective	
2.3	Nominal system voltage (U_n)	kV	22	
2.4	Maximum system voltage	kV	24	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit(LIWL)	kV _(peak)	150	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	50	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	24	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	85	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance[Um x 31 mm/kV]	mm	744	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		XXXXXXXXXX	
5	Arrester mounting details:		XXXXXXXXXX	XXXXXXXXXX

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **29 of 132**

5.1	Orientation		Vertical	
5.2	Method of mounting		Base	
5.3	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal:			
6.1	Type		Threaded	
6.2	Diameter		M12	
6.3	Minimum length	mm	50	
6.4	Orientation		Vertical	
6.5	Supplied with: M12 nut, two flat washers and spring washer		Yes	
6.6	Material		xxxxxx	
6.7	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal:		xxxxxxxxxx	xxxxxxxxxx
7.1	Type		Threaded	
7.2	Diameter		M12	
7.3	Minimum length	mm	50	
7.4	Orientation		Vertical	
7.5	Supplied with nut, two flat washers and spring washer		Yes	
7.6	Material		xxxxxx	
7.7	Reference number of drawing showing details of line terminal		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail):		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters:		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Minimum external flashover distance	mm	320	
10.3	External diameter of arrester housing	mm	xxxxxx	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Revision: **5**

Page: **30 of 132**

11	Miscellaneous:		XXXXXXXXXX	XXXXXXXXXX
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	300	
12.2	Minimum Specified Short-term Load (SSL)	Nm	400	
12.3.	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

Item 4A : 33 kV Nominal voltage Non-Effectively Earthed (31 mm/kV)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Operating conditions		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Non-effective	
2.3	Nominal system voltage (U_n)	kV	33	
2.4	Maximum system voltage	kV	36	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level(LIWL)	kV _(peak)	200	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	70	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Electrical characteristics of arrester:		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxxx	
3.6	MCOV (U_c)	kV	36	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	125	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 32 of 132

4.2	Minimum external creepage distance: [Um x 31 mm/kV]	mm	1488	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details:		xxxxxxxxxx	xxxxxxxxxx
5.1	Orientation		Vertical	
5.2	Method of mounting		Base	
5.3	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal:		xxxxxxxxxx	xxxxxxxxxx
6.1	Type		Threaded	
6.2	Diameter		M12	
6.3	Minimum length	mm	50	
6.4	Orientation		Vertical	
6.5	Supplied with: M12 nut, two flat washers and spring washer		Yes	
6.6	Material		xxxxxx	
6.7	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal:		xxxxxxxxxx	xxxxxxxxxx
7.1	Type		Threaded	
7.2	Diameter		M12	
7.3	Minimum length	mm	50	
7.4	Orientation		Vertical	
7.5	Supplied with nut, two flat washers and spring washer		Yes	
7.6	Material		xxxxxx	
7.7	Reference number of drawing showing details of line terminal		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail):		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	

ESKOM COPYRIGHT PROTECTED

10	Physical dimensions of arresters:		XXXXXXXXXX	XXXXXXXXXX
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Minimum external flashover distance	mm	400	
10.3	External diameter of arrester housing	mm	xxxxxxx	
11	Miscellaneous:		XXXXXXXXXX	XXXXXXXXXX
11.1	Total mass of assembled unit	Kg	xxxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxxx	xxxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	300	
12.2	Minmum Specified Short-term Load (SSL)	Nm	400	
12.3.	Test report confirming mechanical characteristics		Report reference number	

Technical Schedule: Surge Arresters for Nominal Voltages that includes both Effectively and Non-Effectively earthed systems**Item 5A : 44 kV Nominal voltage Non-Effectively Earthed (31 mm/kV)**

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Operating conditions		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Non-effective	
2.3	Nominal system voltage (U_n)	kV	44	
2.4	Maximum system voltage	kV	48	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level (LIWL)	kV _(peak)	250	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	70	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Electrical characteristics of arrester:		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxx	
3.6	MCOV (U_c)	kV	48	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	125	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing		XXXXXXXXXX	XXXXXXXXXX

ESKOM COPYRIGHT PROTECTED

4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance:Um x 31 mm/kV	mm	1488	xxxxxxxxxx
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details:		xxxxxxxxxx	xxxxxxxxxx
5.1	Orientation		Vertical	
5.2	Method of mounting		Base	
5.3	Reference number of drawing showing mounting details		xxxxxxx	
6	Arrester line terminal:		xxxxxxxxxx	xxxxxxxxxx
6.1	Type		Threaded	
6.2	Diameter		M12	
6.3	Minimum length	mm	50	
6.4	Orientation		Vertical	
6.5	Supplied with: M12 nut, two flat washers and spring washer		Yes	
6.6	Material		xxxxxxx	
6.7	Reference number of drawing showing details of line terminal		xxxxxxx	
7	Arrester earth terminal:		xxxxxxxxxx	xxxxxxxxxx
7.1	Type		Threaded	
7.2	Diameter		M12	
7.3	Minimum length	mm	50	
7.4	Orientation		Vertical	
7.5	Supplied with nut, two flat washers and spring washer		Yes	
7.6	Material		xxxxxxx	
7.7	Reference number of drawing showing details of line terminal		xxxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	

9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters:		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Minimum external flashover distance	mm	400	
10.3	External diameter of arrester housing	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	300	
12.2	Minimum Specified Short-term Load (SSL)	Nm	400	
12.3.	Test report confirming mechanical characteristics		Report reference number	

Item 5B : 44 kV Nominal voltage Effectively Earthed (31 mm/kV)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Operating conditions		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	System configuration		3 phase, 3 wire	
2.4	Nominal system voltage (U_n)	kV	44	
2.5	Maximum system voltage	kV	48	
2.6	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit (LIWL)	kV _(peak)	250	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	70	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Electrical characteristics of arrester:		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxx	
3.6	MCOV (U_c)	kV	36	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	125	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **38 of 132**

4.2	Minimum external creepage distance: [Um x 31 mm/kV]	mm	1488	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details:		xxxxxxxxxx	xxxxxxxxxx
5.1	Orientation		Vertical	
5.2	Method of mounting		Base	
5.3	Reference number of drawing showing mounting details		xxxxxxx	
6	Arrester line terminal:		xxxxxxxxxx	xxxxxxxxxx
6.1	Type		Threaded	
6.2	Diameter		M12	
6.3	Minimum length	mm	50	
6.4	Orientation		Vertical	
6.5	Supplied with: M12 nut, two flat washers and spring washer		Yes	
6.6	Material		xxxxxxx	
6.7	Reference number of drawing showing details of line terminal		xxxxxxx	
7	Arrester earth terminal:		xxxxxxxxxx	xxxxxxxxxx
7.1	Type		Threaded	
7.2	Diameter		M12	
7.3	Minimum length	mm	50	
7.4	Orientation		Vertical	
7.5	Supplied with nut, two flat washers and spring washer		Yes	
7.6	Material		xxxxxxx	
7.7	Reference number of drawing showing details of line terminal		xxxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail):		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters:		xxxxxxxxxx	xxxxxxxxxx

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Revision: **5**

Page: **39 of 132**

10.1	Overall height of arrester	mm	xxxxxx	
10.2	Minimum external flashover distance	mm	400	
10.3	External diameter of arrester housing	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	300	
12.2	Minimum Specified Short-term Load (SSL)	Nm	400	
12.3.	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

Item 6A : 66 kV Nominal voltage Non-Effectively Earthed (31 mm/kV)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Non-Effective	
2.3	Nominal system voltage (U_n)	kV	66	
2.4	Maximum system voltage	kV	73	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level(LIWL)	kV _(peak)	350	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	90	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxx	
3.6	MCOV (U_c)	kV	62	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	165	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	2263	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **41 of 132**

5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal		xxxxxxxxxx	xxxxxxxxxx
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail):		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters:		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Minimum external flashover distance	mm	450	
10.3	External diameter of arrester housing	mm	xxxxxx	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Revision: **5**

Page: **42 of 132**

11	Miscellaneous:		XXXXXXXXXX	XXXXXXXXXX
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	800	
12.2	Minimum Specified Short-term Load (SSL)	Nm	1000	
12.3.	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

Item 6B : 66 kV Nominal voltage Non-Effectively Earthed (31 mm/kV and mechanical load bearing)

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Operating conditions		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Non-Effective	
2.3	Nominal system voltage (U_n)	kV	66	
2.4	Maximum system voltage	kV	73	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level(LIWL)	kV _(peak)	350	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	90	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Electrical characteristics of arrester		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxxx	
3.6	MCOV (U_c)	kV	62	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	165	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	2263	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 44 of 132

5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal		xxxxxxxxxx	xxxxxxxxxx
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (<i>Single copies of drawings shall be submitted as part of the original tender showing the following detail</i>)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters:		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Minimum external flashover distance	mm	450	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Revision: **5**

Page: **45 of 132**

10.3	External diameter of arrester housing	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	2000	
12.2	Minimum Specified Short-term Load (SSL)	Nm	3000	
12.3.	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

When downloaded from the WEB, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorized version on the WEB.

Item 6C : 66 kV Nominal voltage Effectively Earthed (31 mm/kV)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	66	
2.4	Maximum system voltage	kV	73	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit(LIWL)	kV _(peak)	350	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	90	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxx	
3.6	MCOV (U_c)	kV	48	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	165	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	2263	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **47 of 132**

5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal		xxxxxxxxxx	xxxxxxxxxx
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	

ESKOM COPYRIGHT PROTECTED

10	Physical dimensions of arresters:		XXXXXXXXXX	XXXXXXXXXX
10.1	Overall height of arrester	mm	XXXXXX	
10.2	Minimum external flashover distance	mm	450	
10.3	External diameter of arrester housing	mm	XXXXXX	
11	Miscellaneous:		XXXXXXXXXX	XXXXXXXXXX
11.1	Total mass of assembled unit	Kg	XXXXXX	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		XXXXXX	XXXXXX
12.1	Minimum Specified Long-term Load (SLL)	Nm	800	
12.2	Minimum Specified Short-term Load (SSL)	Nm	1000	
12.3.	Test report confirming mechanical characteristics		Report reference number	

Item 6D : 66 kV Nominal voltage Effectively Earthed (31 mm/kV and mechanical load bearing)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	66	
2.4	Maximum system voltage	kV	73	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit(LIWL)	kV _(peak)	350	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	90	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxx	
3.6	MCOV (U_c)	kV	48	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	165	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	2263	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 50 of 132

5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal		xxxxxxxxxx	xxxxxxxxxx
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (<i>Single copies of drawings shall be submitted as part of the original tender showing the following detail</i>)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters:		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	

ESKOM COPYRIGHT PROTECTED

10.2	Minimum external flashover distance	mm	450	
10.3	External diameter of arrester housing	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	2000	
12.2	Minimum Specified Short-term Load (SSL)	Nm	3000	
12.3.	Test report confirming mechanical characteristics		Report reference number	

Item 7A : 88 kV Nominal voltage Non-Effectively Earthed (31 mm/kV)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Non-Effective	
2.3	Nominal system voltage (U_n)	kV	88	
2.4	Maximum system voltage	kV	97	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit(LIWL)	kV _(peak)	380	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}		
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXX	
3.6	MCOV (U_c)	kV	77	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20μs)	kV	249	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX

ESKOM COPYRIGHT PROTECTED

4.1	Housing material		Silicone Polymer	
4.2	Minimum external creepage distance: [Um x 31 mm/kV]	mm	3007	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details:		xxxxxxxxx	xxxxxxxxx x
5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal:		xxxxxxxxx	xxxxxxxxx x
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxxxxx	xxxxxxxxx x
7	Arrester earth terminal:		xxxxxxxxx	xxxxxxxxx x
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxx	xxxxxxxxx x
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (<i>Single copies of drawings shall be submitted as part of the original tender showing the following detail</i>)		xxxxxxxxx	xxxxxxxxx x
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	

8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters:		xxxxxxxxx	xxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Minimum external flashover distance	mm	900	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
12	Miscellaneous:		xxxxxxxxx	xxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	800	
12.2	Minimum Specified Short-term Load (SSL)	Nm	1000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 7B : 88 kV Nominal voltage Non-Effectively Earthed (31 mm/kV and mechanical load bearing)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Non-Effective	
2.3	Nominal system voltage (U_n)	kV	88	
2.4	Maximum system voltage	kV	97	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit(LIWL)	kV _(peak)	380	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	150	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxx	
3.6	MCOV (U_c)	kV	77	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	249	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material		Silicone Polymer	
4.2	Minimum external creepage distance:		XXXXXXXXXX	XXXXXXXXXX
4.2.1	SCD [$U_m \times 31 \text{ mm/kV}$]	mm	3007	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 56 of 132

5	Arrester mounting details:		xxxxxxxxx	xxxxxxxxx
5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal:		xxxxxxxxx	xxxxxxxxx
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxxxxx	xxxxxxxxx
7	Arrester earth terminal:		xxxxxxxxx	xxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxx	xxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxx	xxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters:		xxxxxxxxx	xxxxxxxxx

ESKOM COPYRIGHT PROTECTED

10.1	Overall height of arrester	mm	xxxxxx	
10.2	Minimum external flashover distance	mm	900	
10.3	External diameter of arrester housing	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	2000	
12.2	Minimum Specified Short-term Load (SSL)	Nm	3000	
12.3.	Test report confirming mechanical characteristics		Report reference number	

Item 7C : 88 kV Nominal voltage Effectively Earthed (31 mm/kV)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	88	
2.4	Maximum system voltage	kV	97	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit(LIWL)	kV _(peak)	380	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	150	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXX	
3.6	MCOV (U_c)	kV	56	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	210	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX

ESKOM COPYRIGHT PROTECTED

4.1	Housing material		Silicone Polymer	
4.2	Minimum external creepage distance: [Um x 31 mm/kV]	mm	3007	XXXXXXXXX x
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details:		XXXXXXXXX	XXXXXXXXX x
5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal:		XXXXXXXXX	XXXXXXXXX x
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		XXXXXXXXX	XXXXXXXXX x
7	Arrester earth terminal:		XXXXXXXXX	XXXXXXXXX x
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		XXXXXXXXX	XXXXXXXXX x
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		XXXXXXXXX	XXXXXXXXX x
8.1	Outline dimensions of arrester, fit as for service		Referenc e Number:	

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **60 of 132**

8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters:		xxxxxxxxx	xxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Minimum external flashover distance	mm	900	
10.3	External diameter of arrester housing	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxx	xxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	800	
12.2	Minimum Specified Short-term Load (SSL)	Nm	1000	
12.3	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

Item 7D : 88 kV Nominal voltage Effectively Earthed (31 mm/kV and mechanical load bearing)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	88	
2.4	Maximum system voltage	kV	97	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit (LIWL)	kV _(peak)	380	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	150	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		2	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxx	
3.6	MCOV (U_c)	kV	56	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	210	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	4	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	3007	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details:		XXXXXXXXXX	XXXXXXXXXX

ESKOM COPYRIGHT PROTECTED

5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal:		xxxxxxxxxx	xxxxxxxxxx
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxxxxxx	xxxxxxxxxx
7	Arrester earth terminal:		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (<i>Single copies of drawings shall be submitted as part of the original tender showing the following detail</i>)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
9	Arrester characteristic data required:		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters:		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	

10.2	Minimum external flashover distance	mm	900	
10.3	External diameter of arrester housing	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	2000	
12.2	Minimum Specified Short-term Load (SSL)	Nm	3000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Technical Schedule: Surge Arresters for Nominal Voltages that includes only Effectively earthed systems**Item 8A : 132 kV Nominal Voltage (31 mm/kV)**

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	132	
2.4	Maximum system voltage	kV	145	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit(LIWL)	kV _(peak)	550	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	230	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	84	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	300	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	4495	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **65 of 132**

5	Arrester mounting details		xxxxxxxxxx	xxxxxxxxxx
5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	

ESKOM COPYRIGHT PROTECTED

10	Physical dimensions of arresters		XXXXXXXXXX	XXXXXXXXXX
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Preferred external flashover distance	mm	1100	
10.3	External diameter of arrester housing	mm	xxxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxxx	
11	Miscellaneous:		XXXXXXXXXX	XXXXXXXXXX
11.1	Total mass of assembled unit	Kg	xxxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxxx	xxxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	800	
12.2	Minimum Specified Short-term Load (SSL)	Nm	1000	
12.3.	Test report confirming mechanical characteristics		Report reference number	

Item 8B : 132 kV Nominal Voltage (Extreme Pollution Environment)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class		Extreme	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	132	
2.4	Maximum system voltage	kV	145	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit(LIWL)	kV _(peak)	550	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	230	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxxx	
3.6	MCOV (U_c)	kV	84	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	300	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance [$U_m \times 38 \text{ mm/kV}$]	mm	5510	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 68 of 132

5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxxx	
7	Arrester earth terminal		xxxxxxxxx	xxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxx	xxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxx	xxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxx	xxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Preferred external flashover distance	mm	1100	
10.3	External diameter of arrester housing	mm	xxxxxxx	

ESKOM COPYRIGHT PROTECTED

10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	800	
12.2	Minimum Specified Short-term Load (SSL)	Nm	1000	
12.3.	Test report confirming mechanical characteristics		Report reference number	

Item 8C : 132 kV Nominal Voltage (31 mm/kV and mechanical load bearing)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	132	
2.4	Maximum system voltage	kV	145	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit(LIWL)	kV _(peak)	550	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	230	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	84	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	300	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance:		XXXXXXXXXX	XXXXXXXXXX
4.2.1	Specific Creepage Distance [$U_m \times 31 \text{ mm/kV}$]	mm	4495	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **71 of 132**

5.1	Orientation		Vertical	
5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender(<i>Single copies of drawings shall be submitted as part of the original tender showing the following detail</i>)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	

ESKOM COPYRIGHT PROTECTED

10	Physical dimensions of arresters		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	1100	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	2000	
12.2	Minimum Specified Short-term Load (SSL)	Nm	3000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 8D : 132 kV Nominal Voltage (Extreme Pollution Environment and mechanical load bearing)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Extreme	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	132	
2.4	Maximum system voltage	kV	145	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit (LIWL)	kV _(peak)	550	
2.7	Power Frequency Withstand Voltage (wet)	kV _{rms}	230	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Characteristics		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	84	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	300	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 38 \text{ mm/kV}$]	mm	5510	XXXXXXXXXX
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 74 of 132

5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **75 of 132**

10	Physical dimensions of arresters		XXXXXXXXXX	XXXXXXXXXX
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Preferred external flashover distance	mm	1100	
10.3	External diameter of arrester housing	mm	xxxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxxx	
11	Miscellaneous:		XXXXXXXXXX	XXXXXXXXXX
11.1	Total mass of assembled unit	Kg	xxxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxxx	xxxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	2000	
12.2	Minimum Specified Short-term Load (SSL)	Nm	3000	
12.3	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

When downloaded from the WEB, this document is uncontrolled and the responsibility rests with the user
to ensure it is in line with the authorized version on the WEB.

Item 8E : 132 kV Transformer Application (31 mm/kV)

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		xxxxxxxxxx	xxxxxxxxxx
1.1	Supplier		xxxxxx	
1.2	Manufacturer, physical address and name of factory		xxxxxx	
1.3	Product code:		xxxxxx	
2	Electrical Characteristics		xxxxxxxxxx	xxxxxxxxxx
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	132	
2.4	Maximum system voltage	kV	145	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Limit (LIWL)	$kV_{(peak)}$	550	
2.7	Power Frequency Withstand Voltage (wet)	kV_{rms}	230	
2.8	Short Circuit current rating	kA_{rms}	40	
3	Surge Arrester Characteristics		xxxxxxxxxx	xxxxxxxxxx
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	$kA_{(peak)}$	1	
3.5	Arrester rated voltage (U_r)	kV	xxxxxx	
3.6	MCOV (U_c)	kV	84	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	300	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		xxxxxxxxxx	xxxxxxxxxx
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31$ mm/kV]	mm	4495	xxxxxxxxxx
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		xxxxxxxxxx	xxxxxxxxxx
5.1	Orientation		Vertical	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **77 of 132**

5.2	Method of mounting		Tripod base	
5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	110 - 255	
5.5	Supplied with: 3 bolts, 3 nuts, 3 tapered washers and 6 flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter		26	
6.3	Minimum length	mm	100	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender(<i>Single copies of drawings shall be submitted as part of the original tender showing the following detail</i>)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxxx	xxxxxxxxxx

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**Unique Identifier: **240-75540566**Revision: **5**Page: **78 of 132**

10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	1100	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Maximum diameter of voltage grading rings	mm	160	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	800	
12.2	Minimum Specified Short-term Load (SSL)	Nm	1000	
12.3.	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

When downloaded from the WEB, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorized version on the WEB.

Item 9A : 220 kV Nominal Voltage (25mm/kV)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	220	
2.4	Maximum system voltage (U_m)	kV	242	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1050	
2.7	Power Frequency Withstand Voltage(wet)	kV _{rms}	460	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	154	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	300	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 25$ mm/kV]	mm	6050	XXXXXXXXXX
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting (Insulated or Earthed)		Insulated	
5.3	Diameter of mounting holes in base	mm	XXXXXX	

ESKOM COPYRIGHT PROTECTED

5.4	PCD	mm	110-255	
5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
7	Arrester earth terminal		xxxxxxxx	xxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxx	xxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
8	Drawings to be submitted with tender(<i>Single copies of drawings shall be submitted as part of the original tender showing the following detail</i>)		xxxxxxxx	xxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxx	xxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxx	xxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	1850	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxx	xxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	

12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	2500	
12.2	Minmum Specified Short-term Load (SSL)	Nm	4000	
12.3.	Test report confirming mechanical characteristics		Report reference number	

Item 9B : 220 kV Nominal Voltage (31mm/kV)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	220	
2.4	Maximum system voltage (U_m)	kV	242	
2.5	Supply frequency	Hz	50	
2.6	Minimum Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1050	
2.7	Minimum Power Frequency Withstand Voltage	kV _{rms}	460	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	154	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	300	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	7502	XXXXXXXXXX
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting (Insulated or Earthed)		Insulated	
5.3	Diameter of mounting holes in base	mm	XXXXXX	
5.4	PCD	mm	110-255	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 83 of 132

5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	1850	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx

ESKOM COPYRIGHT PROTECTED

12.1	Minimum Specified Long-term Load (SLL)	Nm	2500	
12.2	Minimum Specified Short-term Load (SSL)	Nm	4000	
12.3.	Test report confirming mechanical characteristics		Report reference number	

Item 9C : 220 kV Nominal Voltage (25mm/kV and mechanical load bearing)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	220	
2.4	Maximum system voltage	kV	242	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1050	
2.7	Power Frequency Withstand Voltage(wet)	kV _{rms}	460	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	154	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	300	
3.8	Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	6050	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Insulated base	
5.3	Diameter of mounting holes in base	mm	XXXXXX	

ESKOM COPYRIGHT PROTECTED

5.4	PCD	mm	110 - 255	
5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxxx	
7	Arrester earth terminal		xxxxxxxxx	xxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxx	xxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxx	xxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxx	xxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Preferred external flashover distance	mm	1850	
10.3	External diameter of arrester housing	mm	xxxxxxx	

10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	6000	
12.2	Minimum Specified Short-term Load (SSL)	Nm	9000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 9D : 220 kV Nominal Voltage (31mm/kV and mechanical load bearing)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	220	
2.4	Maximum system voltage	kV	242	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1050	
2.7	Power Frequency Withstand Voltage(wet)	kV _{rms}	460	
2.8	Short Circuit current rating	kA _{rms}	40	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	154	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	300	
3.8	Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	7502	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Insulated base	
5.3	Diameter of mounting holes in base	mm	XXXXXX	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 89 of 132

5.4	PCD	mm	110 - 255	
5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter		38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxxx	
7	Arrester earth terminal		xxxxxxxxx	xxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxx	xxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxx	xxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxx	xxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Preferred external flashover distance	mm	1850	
10.3	External diameter of arrester housing	mm	xxxxxxx	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Revision: **5**

Page: **90 of 132**

10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	6000	
12.2	Minimum Specified Short-term Load (SSL)	Nm	9000	
12.3	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

Item 10A : 275 kV Nominal Voltage (25mm/kV)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	275	
2.4	Maximum system voltage (U_m)	kV	300	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1050	
2.7	Switching Impulse Withstand Level (SIWL)	kV _(peak)	850	
2.8	Short Circuit current rating	kA _{rms}	50	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	180	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	560	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 25 \text{ mm/kV}$]	mm	7500	XXXXXXXXXX
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting (Insulated or Earthed)		Insulated	
5.3	Diameter of mounting holes in base	mm	XXXXXX	
5.4	PCD	mm	110-255	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 92 of 132

5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxxx	
7	Arrester earth terminal		xxxxxxxxx	xxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxx	xxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxx	xxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxx	xxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Preferred external flashover distance	mm	2350	
10.3	External diameter of arrester housing	mm	xxxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxxx	
11	Miscellaneous:		xxxxxxxxx	xxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxxx	xxxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	2500	

ESKOM COPYRIGHT PROTECTED

12.2	Minimum Specified Short-term Load (SSL)	Nm	4000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 10B : 275 kV Nominal Voltage (31mm/kV)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	275	
2.4	Maximum system voltage (U_m)	kV	300	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1050	
2.7	Switching Impulse Withstand Level (SIWL)	kV _(peak)	850	
2.8	Short Circuit current rating	kA _{rms}	50	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	180	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	560	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	9300	XXXXXXXXXX
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting (Insulated or Earthed)		Insulated	
5.3	Diameter of mounting holes in base	mm	XXXXXX	
5.4	PCD	mm	110 - 255	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 95 of 132

5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	2350	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx

ESKOM COPYRIGHT PROTECTED

12.1	Minimum Specified Long-term Load (SLL)	Nm	2500	
12.2	Minimum Specified Short-term Load (SSL)	Nm	4000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 10C : 275 kV Nominal Voltage (25mm/kV and mechanical load bearing)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	275	
2.4	Maximum system voltage	kV	300	
2.5	Supply frequency	Hz	50	
2.6	Minimum Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1050	
2.7	Minimum Switching Impulse Withstand Level (SIWL)	kV _(peak)	850	
2.8	Short Circuit current rating	kA _{rms}	50	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	180	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	560	
3.8	Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 25 \text{ mm/kV}$]	mm	7500	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Insulated base	
5.3	Diameter of mounting holes in base	mm	XXXXXX	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 98 of 132

5.4	PCD	mm	110 - 255	
5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxxx	
7	Arrester earth terminal		xxxxxxxxx	xxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxx	xxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxx	xxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxx	xxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Preferred external flashover distance	mm	2350	
10.3	External diameter of arrester housing	mm	xxxxxxx	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Revision: **5**

Page: **99 of 132**

10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	6000	
12.2	Minimum Specified Short-term Load (SSL)	Nm	9000	
12.3	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

Item 10D : 275 kV Nominal Voltage (31mm/kV and mechanical load bearing)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	275	
2.4	Maximum system voltage	kV	300	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1050	
2.7	Switching Impulse Withstand Level (SIWL)	kV _(peak)	850	
2.8	Short Circuit current rating	kA _{rms}	50	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		3	
3.3	Nominal discharge current	kA	10	
3.4	Switching Impulse discharge current	kA _(peak)	1	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	180	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	560	
3.8	Repetitive Charge Transfer Rating (Q_{rs})	C	1.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV_r	7	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	9300	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Insulated base	
5.3	Diameter of mounting holes in base	mm	XXXXXX	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 101 of 132

5.4	PCD	mm	110 - 255	
5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxxx	
7	Arrester earth terminal		xxxxxxxxx	xxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxx	xxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxx	xxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxx	xxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Preferred external flashover distance	mm	2350	
10.3	External diameter of arrester housing	mm	xxxxxxx	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Revision: **5**

Page: **102 of 132**

10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load (SLL)	Nm	6000	
12.2	Minimum Specified Short-term Load (SSL)	Nm	9000	
12.3	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

Item 11A : 400 kV Nominal Voltage (25mm/kV)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	400	
2.4	Maximum system voltage (U_m)	kV	420	
2.5	Supply frequency	Hz	50	
2.6	Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1550	
2.7	Switching Impulse Withstand Level (SIWL)	kV _(peak)	1050	
2.8	Short Circuit current rating	kA _{rms}	63	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		4	
3.3	Nominal discharge current	kA	20	
3.4	Switching Impulse discharge current	kA _(peak)	2	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	245	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	XXXXXX	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	2.4	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	10	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 25 \text{ mm/kV}$]	mm	10500	XXXXXXXXXX
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting (Insulated or Earthed)		Insulated	
5.3	Diameter of mounting holes in base	mm	XXXXXX	
5.4	PCD	mm	225-300	

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 104 of 132

5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	3200	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx

ESKOM COPYRIGHT PROTECTED

12.1	Minimum Specified Long-term Load(SLL)	Nm	6000	
12.2	Minimum Specified Short-term Load(SSL)	Nm	9000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 11B : 400 kV Nominal Voltage (31mm/kV)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	400	
2.4	Maximum system voltage (U_m)	kV	420	
2.5	Supply frequency	Hz	50	
2.6	Minimum Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1550	
2.7	Minimum Switching Impulse Withstand Level (SIWL)	kV _(peak)	1050	
2.8	Short Circuit current rating	kA _{rms}	63	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		4	
3.3	Nominal discharge current	kA	20	
3.4	Switching Impulse discharge current	kA _(peak)	2	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	245	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	XXXXXX	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	2.4	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	10	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	13020	XXXXXXXXXX
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting (Insulated or Earthed)		Insulated	
5.3	Diameter of mounting holes in base	mm	XXXXXX	
5.4	PCD	mm	225-300	

ESKOM COPYRIGHT PROTECTED

5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	3200	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx

12.1	Minimum Specified Long-term Load(SLL)	Nm	6000	
12.2	Minimum Specified Short-term Load(SSL)	Nm	9000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 11C : 400 kV Nominal Voltage (25mm/kV and mechanical load bearing)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	400	
2.4	Maximum system voltage	kV	420	
2.5	Supply frequency	Hz	50	
2.6	Minimum Lightning Impulse Withstand Level	kV _(peak)	1550	
2.7	Minimum Switching Impulse Withstand Level	kV _(peak)	1050	
2.8	Short Circuit current rating	kA _{rms}	63	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		4	
3.3	Nominal discharge current	kA	20	
3.4	Switching Impulse discharge current	kA _(peak)	2	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	245	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	XXXXXX	
3.8	Repetitive Charge Transfer Rating (Q_{rs})	C	2.4	
3.9	Minimum Thermal energy rating (W_{th})	KJ/kV_r	10	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 25 \text{ mm/kV}$]	mm	1050	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Insulated base	
5.3	Diameter of mounting holes in base	mm	XXXXXX	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 110 of 132

5.4	PCD	mm	225-300	
5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter		38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxxx	
7	Arrester earth terminal		xxxxxxxxx	xxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxx	xxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxx	xxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxx	xxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Preferred external flashover distance	mm	3200	
10.3	External diameter of arrester housing	mm	xxxxxxx	

ESKOM COPYRIGHT PROTECTED

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Revision: **5**

Page: **111 of 132**

10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load(SLL)	Nm	12000	
12.2	Minimum Specified Short-term Load(SSL)	Nm	18000	
12.4	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

Item 11D : 400 kV Nominal Voltage (31mm/kV and mechanical load bearing)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	400	
2.4	Maximum system voltage	kV	420	
2.5	Supply frequency	Hz	50	
2.6	Minimum Lightning Impulse Withstand Level	kV _(peak)	1550	
2.7	Minimum Switching Impulse Withstand Level	kV _(peak)	1050	
2.8	Short Circuit current rating	kA _{rms}	63	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		4	
3.3	Nominal discharge current	kA	20	
3.4	Switching Impulse discharge current	kA _(peak)	2	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	245	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	XXXXXX	
3.8	Repetitive Charge Transfer Rating (Q_{rs})	C	2.4	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV_r	10	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	13020	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Insulated base	
5.3	Diameter of mounting holes in base	mm	XXXXXX	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 113 of 132

5.4	PCD	mm	225-300	
5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxxx	
7	Arrester earth terminal		xxxxxxxxx	xxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxx	xxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxx	xxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxx	xxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxx	xxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxxx	
10.2	Preferred external flashover distance	mm	3200	
10.3	External diameter of arrester housing	mm	xxxxxxx	

ESKOM COPYRIGHT PROTECTED

10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load(SLL)	Nm	12000	
12.2	Minimum Specified Short-term Load(SSL)	Nm	18000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 11E : 400 kV Nominal Voltage (Extreme Pollution Environment)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	400	
2.4	Maximum system voltage (U_m)	kV	420	
2.5	Supply frequency	Hz	50	
2.6	Minimum Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1550	
2.7	Minimum Switching Impulse Withstand Level (SIWL)	kV _(peak)	1050	
2.8	Short Circuit current rating	kA _{rms}	63	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		4	
3.3	Nominal discharge current	kA	20	
3.4	Switching Impulse discharge current	kA _(peak)	2	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	245	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	XXXXXX	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	2.4	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV_r	10	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 38 \text{ mm/kV}$]	mm	15960	XXXXXXXXXX
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting (Insulated or Earthed)		Insulated	
5.3	Diameter of mounting holes in base	mm	XXXXXX	
5.4	PCD	mm	225-300	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 116 of 132

5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	3200	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx

ESKOM COPYRIGHT PROTECTED

12.1	Minimum Specified Long-term Load(SLL)	Nm	8000	
12.2	Minimum Specified Short-term Load(SSL)	Nm	10000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 11F : 400 kV Nominal Voltage (Extreme Pollution Environment and mechanical load bearing)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Extreme	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	400	
2.4	Maximum system voltage	kV	420	
2.5	Supply frequency	Hz	50	
2.6	Minimum Lightning Impulse Withstand Level (LIWL)	kV _(peak)	1550	
2.7	Minimum Switching Impulse Withstand Level (SIWL)	kV _(peak)	1050	
2.8	Short Circuit Current rating	kA _{rms}	63	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		4	
3.3	Nominal discharge current	kA	20	
3.4	Switching Impulse discharge current	kA _(peak)	2	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	245	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	XXXXXX	
3.8	Repetitive Charge Transfer Rating (Q_{rs})	C	2.4	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV_r	10	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 38 \text{ mm/kV}$]	mm	15960	
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting		Insulated base	

ESKOM COPYRIGHT PROTECTED

5.3	Diameter of mounting holes in base	mm	xxxxxx	
5.4	PCD	mm	225-300	
5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
5.6	Reference number of drawing showing mounting details		xxxxxx	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter		38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
6.6	Reference number of drawing showing details of line terminal		xxxxxx	
7	Arrester earth terminal		xxxxxxxx	xxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxx	xxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
7.5	If dissimilar metals are used for clamping arrangement, state types		xxxxxx	
7.6	Reference number of drawing showing details of earth terminal		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxx	xxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxx	xxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxx	xxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	3200	

**SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS**

Unique Identifier: **240-75540566**

Revision: **5**

Page: **120 of 132**

10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load(SLL)	Nm	14000	
12.2	Minimum Specified Short-term Load(SSL)	Nm	20000	
12.3	Test report confirming mechanical characteristics		Report reference number	

ESKOM COPYRIGHT PROTECTED

Item 12A : 765 kV Nominal Voltage (25mm/kV)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	765	
2.4	Maximum system voltage (U_m)	kV	800	
2.5	Supply frequency	Hz	50	
2.6	Minimum Lightning Impulse Withstand Level (LIWL)	kV _(peak)	2100	
2.7	Minimum Switching Impulse Withstand Level (SIWL)	kV _(peak)	1300	
2.8	Short Circuit Current rating	kA _{rms}	63	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		5	
3.3	Nominal discharge current	kA	20	
3.4	Switching Impulse discharge current	kA _(peak)	2	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	465	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20 μ s)	kV	XXXXXX	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	3.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV _r	14	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 25 \text{ mm/kV}$]	mm	20125	XXXXXXXXXX
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting (Insulated or Earthed)		Insulated	
5.3	Diameter of mounting holes in base	mm	XXXXXX	
5.4	PCD	mm	225 -350	

5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	5500	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	yrs	30	
12	Mechanical characteristics		xxxxxx	xxxxxx

12.1	Minimum Specified Long-term Load(SLL)	Nm	19000	
12.2	Minimum Specified Short-term Load(SSL)	Nm	28000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Item 12B : 765 kV Nominal Voltage (31mm/kV)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Unit	Schedule A	Schedule B
1	Surge arrester identification:		XXXXXXXXXX	XXXXXXXXXX
1.1	Supplier		XXXXXX	
1.2	Manufacturer, physical address and name of factory		XXXXXX	
1.3	Product code:		XXXXXX	
2	Electrical Characteristics		XXXXXXXXXX	XXXXXXXXXX
2.1	IEC 60815 Pollution class:		Very Heavy	
2.2	System earthing		Effective	
2.3	Nominal system voltage (U_n)	kV	765	
2.4	Maximum system voltage (U_m)	kV	800	
2.5	Supply frequency	Hz	50	
2.6	Minimum Lightning Impulse Withstand Level (LIWL)	kV _(peak)	2100	
2.7	Minimum Switching Impulse Withstand Level (SIWL)	kV _(peak)	1300	
2.8	Short Circuit Current rating	kA _{rms}	63	
3	Surge Arrester Parameters		XXXXXXXXXX	XXXXXXXXXX
3.1	Arrester classification		Station class	
3.2	IEC line discharge class		5	
3.3	Nominal discharge current	kA	20	
3.4	Switching Impulse discharge current	kA _(peak)	2	
3.5	Arrester rated voltage (U_r)	kV	XXXXXX	
3.6	MCOV (U_c)	kV	465	
3.7	Maximum residual voltage (U_{res}) at 10kA (8/20μs)	kV	XXXXXX	
3.8	Minimum Repetitive Charge Transfer Rating (Q_{rs})	C	3.6	
3.9	Minimum Thermal energy rating (W_{th})	kJ/kV_r	14	
4	Arrester housing:		XXXXXXXXXX	XXXXXXXXXX
4.1	Housing material:		Silicone Polymer	
4.2	Minimum external creepage distance: [$U_m \times 31 \text{ mm/kV}$]	mm	24995	XXXXXXXXXX
4.3	Arrester housing profile designed in strict accordance with IEC 60815 with no deviations		Yes	
5	Arrester mounting details		XXXXXXXXXX	XXXXXXXXXX
5.1	Orientation		Vertical	
5.2	Method of mounting (Insulated or Earthed)		Insulated	
5.3	Diameter of mounting holes in base	mm	XXXXXX	
5.4	PCD	mm	225-300	

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE
SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 125 of 132

5.5	Supplied with all bolts, nuts, tapered washers and flat washers		Yes	
6	Arrester line terminal			
6.1	Type		Stem	
6.2	Diameter	mm	38	
6.3	Minimum length	mm	125	
6.4	Orientation		Vertical	
6.5	Material		xxxxxx	
7	Arrester earth terminal		xxxxxxxxxx	xxxxxxxxxx
	Earth terminal to be provided with clamping arrangement suitable for clamping of the following conductor:		xxxxxxxxxx	xxxxxxxxxx
7.1	Conductor material		Copper	
7.2	Conductor type		Strap	
7.3	Conductor dimensions	mm	50 x 3	
7.4	Material used for clamping arrangement		xxxxxx	
8	Drawings to be submitted with tender (Single copies of drawings shall be submitted as part of the original tender showing the following detail)		xxxxxxxxxx	xxxxxxxxxx
8.1	Outline dimensions of arrester, fit as for service		Reference Number:	
8.2	Mounting details		Reference Number:	
8.3	Line and earth terminal, conductor clamping arrangement		Reference Number:	
8.4	Details of grading rings		Reference Number:	
9	Arrester characteristic data required		xxxxxxxxxx	xxxxxxxxxx
9.1	V-I characteristic curve, AC		Reference Number:	
9.2	V-I characteristic curve, DC		Reference Number:	
9.3	Temporary overvoltage withstand capability curve in per unit of MCOV, with and without prior duty		Reference Number:	
10	Physical dimensions of arresters		xxxxxxxxxx	xxxxxxxxxx
10.1	Overall height of arrester	mm	xxxxxx	
10.2	Preferred external flashover distance	mm	5500	
10.3	External diameter of arrester housing	mm	xxxxxx	
10.4	Diameter of voltage grading rings	mm	xxxxxx	
10.5	Distance of grading ring from top of arrester	mm	xxxxxx	
11	Miscellaneous:		xxxxxxxxxx	xxxxxxxxxx
11.1	Total mass of assembled unit	Kg	xxxxxx	
11.2	Minimum expected life of arrester at 40°C and MCOV	hrs	30	

ESKOM COPYRIGHT PROTECTED

12	Mechanical characteristics		xxxxxx	xxxxxx
12.1	Minimum Specified Long-term Load(SLL)	Nm	19000	
12.2	Minimum Specified Short-term Load(SSL)	Nm	28000	
12.3	Test report confirming mechanical characteristics		Report reference number	

Annex C – - Type test report summary sheet (To be completed per item)

Item Number as per Annex A convention :								SANS/IEC60099-4 Reference Section
Test	File name of electronic test report submitted	Applicable page number	Product code used in type test report	Full product code of item offered	Name of test facility and electronic file name of accreditation certificate/evidence	Comments	Outcome Passed/Failed	
1	Insulation withstand test on the arrester housing							Lighting Impulse 10.8.2 Switching Impulse 10.8.2 Power Frequency 10.8.2
2	Residual voltage test							Steep Current 10.8.3 Switching Impulse 10.8.2 Power Frequency 10.8.3
3	Test to verify long term stability under continuous operating voltage							10.8.4
4	Repetitive charge transfer withstand							10.8.5
5	Heat dissipation behaviour verification of test sample							10.8.6
6	Operating duty test							10.8.7

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 128 of 132

Item Number as per Annex A convention :									SANS/IEC60099-4 Reference Section
Test	File name of electronic test report submitted	Applicable page number	Product code used in type test report	Full product code of item offered	Name of test facility and electronic file name of accreditation certificate/evidence	Comments	Outcome Passed/Failed		
7	Power-frequency voltage versus time								10.8.8
8	Short-circuit tests								10.8.10
9	Bending test								10.8.11
10	Seal leak rate (Applicable to units with enclosed gass volume)								10.8.13
11	Radio interference voltage (RIV) test								10.8.14
12	Test to verify the dielectric withstand of internal componenets								10.8.14 Where applicable
13	Weather ageing test/ Pollution related test as per cl. 3.2.2.f								10.8.17

ESKOM COPYRIGHT PROTECTED

Notes:

- 1) Should the product naming convention used in type test report differ from that of the product offered, clear unambiguous explanation must be given indicating how the product tested is applicable to that offered in the comments column provided.
- 2) If more than one type test is contained in a single report, page numbers must also be provided.

ESKOM COPYRIGHT PROTECTED

When downloaded from the WEB, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorized version on the WEB.

Annex D – - Summary sheet of drawings, outlines and characteristic curves (To be completed per item)

Item Number as per Annex A convention :							
Detail/Drawing required		Electronic File name of drawing/sheet	Product code used in Drawing/Sheet	Full product code of item offered	Date of Issue	Comments	Submitted (Y/N)
1	Overall dimensions, including, creepage, shed profile, mounting details with drilling plan.						
2	Line and earth terminal type details and physical dimensions.						
3	Minimum electrical clearances.						
4	Insulating base type details and physical dimensions (where applicable).						
5	V-I characteristics (protective level characteristics) at 8/20 μ s, 30/60						

ESKOM COPYRIGHT PROTECTED

SPECIFICATION FOR STATION CLASS METAL OXIDE SURGE ARRESTERS

Unique Identifier: 240-75540566

Revision: 5

Page: 131 of 132

Item Number as per Annex A convention :							
Detail/Drawing required		Electronic File name of drawing/sheet	Product code used in Drawing/Sheet	Full product code of item offered	Date of Issue	Comments	Submitted (Y/N)
	µs and 1/2 µs front (steep current) impulses						
6	Temporary overvoltage withstand capability curve, with and without prior duty.						

Notes:

- 1) If a drawing or characteristic curve is not submitted or not applicable, clear justification must be provided in the comments column. Omission of key information may result in disqualification.
- 2) Characteristic Curves submitted as part of a test report and/or data sheet are not acceptable. Curves shall be submitted as drawings that contain the manufacturers name, logo and a unique drawing number as a minimum
- 3) Should the product naming convention used in the drawing/sheet differ from that of the product offered, clear unambiguous explanation must be given indicating how the product indicated is applicable to that offered in the comments column provided.
- 4) Clear unambiguous definitions of rated voltage, reference voltage and protective level
- 5) AC voltage-resistive current curves from 20°C to 180°C and Region of thermal stability information may be required before contract award or to be made available during factory inspection

ESKOM COPYRIGHT PROTECTED

Annex E – - Deviations and Declaration (To be completed per item)

Item Number as per Annex A convention :		
Deviation		Comments
1		
2		
3		
4		
5		
6		
7		

Notes:

- 1) For each item, all deviations to any requirement in this specification and associated technical schedule or annex (A-C) must be listed above with clear explanations/ justification with regards to fitness for use for the full expected life of the product.

Declaration by supplier:

With the exception of the above deviations, this specification, associated technical schedules, factory evaluation and annexes together with the requirements contained within, will be fully complied with in the manufacture, testing, supply, provision of drawing and documents, packaging, labelling, transport and delivery of the product being offered, amongst others. Further it is declared that all information provided has been checked and is correct.

Signature_____ Date: _____

Full Name and Designation of Authorised Representative:_____

ESKOM COPYRIGHT PROTECTED