35-SDMS-01

REV.02

SPECIFICATION FOR SURGE ARRESTERS FOR 13.8KV AND 33KV MEDIUM-VOLTAGE OVERHEAD DISTRIBUTION NETWORK

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35-SDMS-01

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Revision History:

#	Date	Revision No.	Major Revision Description
1	11/03/2025	02	Clause 5.2.4: Change the stud size from M10 to M16
2	11/03/2025	02	Clause 5.2.9: Change the stud size from M10 to M16
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1 Scope

This specification defines the minimum technical requirements for design, engineering, manufacturing, testing, inspection and performance of surge arresters intended to be used on 13.8kV and 33kV medium-voltage overhead distribution network system of Saudi Electricity Company (SEC) in Saudi Arabia.

2 Cross references to other SEC standards

This specification shall always be read in conjunction with SEC General Specification No. 01-SDMS-01 (latest revision) titled "General Requirements for all Equipment/Materials," which shall be considered as an integral part of this specification. It shall also be read in conjunction with SEC purchase order and/or contract schedules, and scope of work/technical specifications for projects, as applicable.

3 Applicable codes and standards

The latest revision of the following codes and standards shall be applicable for the equipment/materials covered in this specification. In case of any deviation, the vendor/manufacturer may propose equipment/materials conforming to alternate codes or standards. However, the provisions of SEC standards shall supersede the provisions of these alternate standards in case of any difference.

Standard #	Title
IEC 60099-4	Surge Arresters – Part 4: Metal-Oxide Surge Arresters Without Gaps for AC Systems
IEC 60099-5	Surge Arresters – Part 5: Selection and Application Recommendations
IEC 62217	Polymeric HV Insulators for Indoor and Outdoor Use – General Definitions, Test Methods and Acceptance Criteria
IEC TS 60815-3	Selection and Dimensioning of High-Voltage Insulators Intended for Use in Polluted Conditions – Part 3: Polymer Insulators for AC Systems
IEC 60060	High-Voltage Test Techniques
IEC 60270	High-Voltage Test Techniques – Partial Discharge Measurements
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings of Iron and Steel Products

Table 1: List of applicable standards

4 Service and system conditions

The surge arresters shall be suitable for operation under the service conditions specified in the latest revision of SEC specification 01-SDMS-01.

All fittings and attachments of the surge arresters shall be capable of withstanding the effects of direct solar radiation at their installed locations. The temperature of surfaces exposed to direct solar radiation shall be regarded as 75°C plus the effect of any internal heating.

Unless otherwise specified, the surge arresters shall be designed to operate on the system parameters mentioned in Table 2.

System Parameter	**System**		
	13.8kV (Heavy Duty)	**33kV (Heavy Duty)**	**33kV (Riser Pole)**
Network Configuration	3-Wire System	3-Wire System	3-Wire System
Neutral Arrangement	Effectively Grounded & Non-Effectively Grounded System	Effectively Grounded & Non-Effectively Grounded System	Effectively Grounded & Non-Effectively Grounded System
Nominal Voltage	13.8kV	33kV	33kV
Highest System Voltage	17.5kV	36kV	36kV
Maximum Continuous Operating Voltage (MCOV)	15.3kV	29kV	29kV
Rated Frequency	60Hz	60Hz	60Hz
Short-Circuit Level (Heavy Duty/Riser Pole)	20kA	20kA	31.5kA
Power Frequency Withstand Voltage (Dry/Wet), kV_{rms}	As per 01-SDMS-01		
Creepage Distance, mm/kV	25 / 40	25 / 40	25 / 40
Nominal Discharge Current Based on 8/20 Micro-Second Waveform	10kA	10kA	10kA
Maximum Residual Voltage (kV_{peak} for 8/20 Micro-Second Discharge Current Waveform Having Peak of 10kA)	54kV	115kV	98kV

Table 2: Surge arresters design and system parameters

5 Material, design and construction requirements

5.1. General

5.1.1. The surge arresters shall meet or exceed the requirements of this specification in all respects and shall be manufactured and tested in conformance with relevant international standards.

5.1.2. Manufacturer's drawings shall show the outline of the surge arresters together with all pertinent dimensions and mounting accessories. Any variations in these dimensions due to manufacturing tolerances shall be indicated.

5.1.3. SEC reserves the right to accept or request the manufacturer to modify the surge arrester design and construction.

5.2. Design criteria

5.2.1. The surge arrester shall be gapless metal-oxide non-linear resistor type designed for outdoor service and is housed on a sealed casing to prevent ingress of moisture and dust.

(Gapless metal-oxide non-linear resistor type arrester is an arrester having one or more non-linear metal-oxide resistors connected in series and/or parallel but having no integrated series or parallel spark gaps.)

5.2.2. The surge arresters shall be distribution heavy-duty class with 10kA nominal discharge current for both 13.8kV and 33kV.

5.2.3. Distribution heavy-duty class surge arresters shall have a short-circuit level of 20kA for both 13.8kV and 33kV.

Riser pole surge arresters shall have a short-circuit level of 31.5kA.

5.2.4. The surge arresters shall be supplied with a disconnector that would disconnect the arrester from the system in the event of arrester failure, to prevent a persistent fault on the system, and to give visible indication of the disconnected unit. The disconnector shall have a M16 stainless steel threaded stud terminal with nuts and washers.

5.2.5. The surge arrester insulators shall be made of a polymer with grey color single-piece housing and sheds that are designed to minimize trapping of contamination of dust, sands, etc. Housing is made of UV-resistant high-temperature vulcanized silicon rubber with hydrophobic surface and is manufactured using a direct molding method.

5.2.6. The supplier/manufacturer shall describe the moisture sealing system used on the surge arresters and state its experience with the offered design. They should also describe in-house/factory test methods to verify the integrity of the sealing. Use of cold-curing sealants is not acceptable.

5.2.7. The mounting arrangement shall be vertical and it must be confirmed by the supplier in the technical offer. NEMA type insulating bracket and hot-dip galvanized NEMA type crossarm mounting bracket shall be provided to facilitate mounting of the arresters on angle bar fabricated steel crossarm and/or channel per SEC specification 20-SDMS-02.

5.2.8. All metallic parts of the surge arrester shall be stainless steel.

5.2.9. The terminals of the surge arresters shall be stainless steel M16 threaded stud with nuts and washers fit to accommodate 170.5mm² Merlin Aluminum conductors with terminal lugs conforming to SEC specification 12-SDMS-02. Full detail of the design of the terminals shall be submitted in the technical offer for SEC evaluation and approval.

6 Marking

Each surge arrester shall have a clear and durable nameplate that will remain visible throughout its lifetime and shall bear the following information:

a. Manufacturer and Model/Type
b. Rated Voltage and Frequency
c. Arrester Class Designation, i.e. Heavy Duty or Riser Pole
d. Nominal Discharge Current
e. Short-Circuit Level
f. Maximum Continuous Operating Voltage (MCOV)
g. Conformance Standard, i.e. IEC 60099-4
h. Serial Number
i. Year/Month of Manufacture
j. Origin
k. SEC Issued PO Number
l. Vendor Name
m. Reference SEC Specification
n. SEC Monogram

7 Testing and inspection

7.1. Routine Tests

Routine tests in conformance with the applicable clauses of IEC 60099-4 or equivalent shall be performed on all surge arresters. Additional tests such as acceptance tests and special thermal stability test in compliance with the applicable clauses of IEC 60099-4 shall also be performed should SEC requested. Electronic copies of the test reports shall be submitted to SEC in USB thumb drive for each batch to be delivered prior to issuance of the releases.

7.2. Type tests

Type test shall be performed in complete conformance with the applicable clauses of IEC 60099-4 or equivalent. It shall be performed at SEC approved laboratories.

SEC reserves the right to attend and witness the tests.

SEC reserves the right to request the supplier/manufacturer to repeat the type test every five (5) years, or as needed should the supplied surge arresters have frequent faults and failures.

7.3. Sample inspection

Samples together with actual CAD drawings, user manual and routine test reports shall be submitted for inspection/evaluation prior to issuance of approval for mass production. The following attributes shall be checked:

a. Dimensional verification

b. Markings

c. User Manual

d. Accessories

e. Packaging

8 Packing and shipping

Packing and shipping requirement shall generally be as per latest revision of SEC General Requirements for Equipment/Materials, 01-SDMS-01 or as per purchase order requirements.

Each surge arresters together with accessories like the disconnector, NEMA type insulating bracket, Hot-dip galvanized NEMA type crossarm mounting bracket, etc. shall be collectively packed in a box as a complete unit and shall be delivered ready for use.

Packing shall protect the surge arresters against damage during shipment and site handling.

Suppliers should coordinate with SEC Warehousing Department for additional packing, handling, and or shipping instructions, as applicable.

Each box shall be printed with the following information:

a. Purchase Order Number / Tender Number

b. Surge Arrester Rated Voltage

c. Manufacturer's Name and Model/Type

d. Year/Month of Manufacture

e. SEC Item Code

9 Guarantee

The supplier/manufacturer shall guarantee the products against all defects arising out of faulty design or manufacturing defects or defective materials for a period of five (5) years from the date of delivery.

The supplier/manufacturer shall guarantee that the arrester disconnectors are of good quality and tested to function properly. SEC reserves the right to suspend/delist the manufacturer from the list of prequalified manufacturers should the disconnectors failed to operate at site during arrester failure.

The supplier/manufacturer shall guarantee that the supplied NEMA type insulator bracket shall be of high-quality, rigid and shall withstand mechanical forces applied on the surge arrester assembly during installation and normal operating conditions.

The supplier shall guarantee the uniformity of the products delivered with the approved samples.

10 Submittals

10.1. Submittals required with tender/inquiry

10.1.1. Summary in table form with the following information: list of items offered, manufacturer, origin, catalogue number, and quantity

10.1.2. Clause-by-clause compliance with the latest revision of SEC specification 35-SDMS-01.

10.1.3. Manufacturer's Catalogue and User Manual in True-PDF format

10.1.4. Certificate stating that the raw material has been sampled, tested and inspected in accordance with relevant standard specifications.

10.1.5. Product type test reports and certificates carried out from SEC approved laboratories

10.1.6. Filled-up technical data schedule on each of the items offered, e-copy in Excel (*.xlsx) format

10.1.7. Manufacturer CAD drawings, e-copy in AutoCAD 2013 (*.dwg) format, for each of the items offered

10.1.8. USB Flash Drive containing e-copy of all the documents mentioned above

10.2. Submittals required following award of contract

10.2.1. Samples in compliance with Clause 7.3 of this specification

10.2.2. Quality assurance tests

10.2.3. Manufacturing and routine test schedules

10.2.4. Manufacturer recommendation and industry best practices to test the surge arresters at site which includes list of tools and test instruments related thereto.

10.2.5. Special tests, if applicable

11 Technical data schedule

SEC Inquiry No: Item No:

No	Description	SEC Specified Values (*)	Vendor Proposed Values (**)
1	**General**	-	
	Reference Manufacturing Standard	IEC 60099-4	
2	**Design Requirements**	-	
2.1	Arrester Type	Gapless Metal-Oxide Non-Linear Resistor Type	
2.2	Nominal System Voltage	13.8kV / 33kV	
2.3	Highest Rated Voltage	17.5kV / 36kV	
2.4	Rated Frequency	60Hz	
2.5	Nominal Discharge Current	10kA	
2.6	Rated Short-Circuit Current	20kA HD / 31.5kA RP	
2.7	Power Frequency Withstand Voltage (Dry/Wet), kV_{rms}	*	
2.8	Maximum Continuous Operating Voltage (MCOV)	15.3kV / 29kV	
2.9	Maximum Residual Voltage	54kV / 115kV / 98kV	
2.10	Arrester Class Designation	Heavy Duty or Riser Pole	
2.11	Insulator Housing Material	High-Temp. Vulcanized Silicone Rubber	
2.12	Housing Color	Grey	
2.13	Housing UV Resistant	Yes	
2.14	Arrester Terminal	Stainless Steel Threaded Stud w/ Nuts and Washers	

2.15	Arrester Disconnector Provided	Yes	
2.16	Disconnector Terminal	Stainless Steel Threaded Stud w/ Nuts and Washers	
2.17	Disconnector Method of Operation	Drop-Off type	
2.18	Safe Cantilever Strength at Line Terminal, kN	**	
2.19	Moisture Sealing System	**	
2.20	Mounting Arrangement	Vertical	
2.21	NEMA Type Insulating Bracket Provided	Yes	
2.22	HDG NEMA Type Crossarm Mounting Bracket Provided	Yes	
3.0	**Others**		
3.1	Product is Type Tested	Yes	
3.2	SEC Approved Laboratory	**	
3.3	Date Tested	**	
3.4	Manufacturer	**	
3.5	Model/Type	**	
3.6	Country of Origin	**	
3.7	Submittals Required with Tender/Inquiry Included or Not?	**	

Table 3: Technical Data Schedule

Surge Arrester

SEC Inquiry No: Item No:

- Additional Technical Information or Features Specified by SEC

- Additional Supplementary Data or Features Proposed by Bidder/Vendor/Supplier.

- Other Particulars to be filled-up by the Bidder/Vendor/Supplier.

- List of Deviations and Clauses to which exception is taken by the Bidder/Vendor/Supplier. (Use separate sheet, if necessary).

Description	Manufacturer of Material/Equipment	Vendor/Supplier
Name of Company		
Location and Office Address		
Name and Signature of Authorized Representative with Date		
Official Seal / Stamp		