

**SPECIFICATION
FOR
GAPLESS METAL OXIDE
DISTRIBUTION TYPE
SURGE ARRESTERS
WITH
POLYMERIC HOUSING**

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SCHEDULE I: TECHNICAL GUARANTEED PARTICULARS

1 SCOPE

This specification covers the design, manufacture, testing, supply and performance requirements for gapless metal oxide, polymeric housed distribution type surge arresters for outdoor use.

2 DEFINITIONS

SURGE ARRESTER

A device designed to protect electrical apparatus from high transient over voltages.

GAPLESS METAL-OXIDE SURGE ARRESTER

A surge arrester having one or several non-linear metal-oxide resistors with highly non-linear voltage-current characteristics, connected in series, but having no integrated series or parallel spark gaps.

POLYMERIC HOUSED SURGE ARRESTER

A surge arrester with a housing made of polymeric material without air voids neither between the housing and the metal-oxide resistors nor the housing itself. Arresters must have directly moulded housings. Arresters manufactured by slip-on, pre moulded housing will not be accepted in view of the weak interface between the housing and the assembled disc.

BONDING BETWEEN HOUSING AND METAL-OXIDE RESISTORS/INTERFACIAL SEALING

The adhesion between the polymeric housing and the metal-oxide resistors or any other metallic or non-metallic parts inside the housing must be strong enough, homogeneous, robust and resistant to thermal cycles and environmental stresses.

3 SYSTEM PARAMETERS

The arrester must be able to operate under the system parameters mentioned in this specification.

Nominal System Voltage	11 KV
Frequency	50 Hz
Grounding of Neutral	Solidly
Temporary Overvoltage (Earth Fault Factor)	10.4 KV for 10 sec.
Highest System Voltage	12KV
Short Circuit Levels	20KA
Insulation Withstand Level (BIL)	75KV

4 PRODUCT REQUIREMENTS

POLYMERIC HOUSING MATERIAL

The polymer material which is used for the arrester housing must be tracking and erosion resistant, stabilized against UV radiation and have proven records of at least 15 years in similar applications (like MV/HV cable terminations, insulators and arresters) in country.

HOUSING AND MECHANICAL REQUIREMENTS

The arrester shall meet the following specifications:

Creepage Length	300 mm (min.)
Pull Strength	1000 N (min)
Cantilever Load	75 Nm (min)
Torsion	30 Nm (min)

ELECTRICAL REQUIREMENTS

The arrester shall meet the following specifications based on IEC 60099-4:

Arrester Max. Cont. Operating Voltage U_c	7.65 KV rms
Arrester Rated Voltage U_r	9KV rms
Nominal Discharge Current I_n	5 kA p
Long Duration Discharge Class	75A, 1000μs
Max. Residual Voltage @ I_n	26.1 kVp
Lightning Impulse 1,2/50 μ s Withstand Voltage	75 KVp
Wet Power Frequency Withstand Voltage	28 KV rms

ACCESSORIES

The mounting accessories shall be designed to match all mechanical and electrical requirements specified for the arrester.

MOUNTING

Arresters shall be suitable for vertical and horizontal mounting.

TERMINALS

Terminals shall be made of M10 bolts to allow the connection of line and ground leads.

DIS-CONNECTOR

The earth end shall get connected to the earth terminal of the arrester through dis-connector. The function of the dis-connector is that in the event of, operation of surge arrester, the current shall pass to earth and the dis-connector shall disconnect (isolate) the earth terminal and it shall remain suspended on the mounting of the arrester. There by it will be disconnected from the earth and shall provide visual indication to the patrolling personnel. The line can be recharged without isolating the damaged arrester. The Suggestive arrangements of dis-connector is given in the drawing attached here with

CORROSION PROTECTION

The arrester and all its accessories shall be adequately protected against corrosion. All exposed ferrous components, unless of stainless steel or other non-corrosive metal, shall be hot-dip galvanized. Hardware shall be of stainless steel.

TENDER SAMPLE

FOUR tender sample of offered Polymeric surge arrester with dis-connector will have to be submitted along with the offer. This is mandatory.

5 TESTING

The arresters shall be tested in accordance with the following latest standards

- IEC 60099-4/ 2004-05 Standards

LOCATION OF TESTS

Routine tests and acceptance tests shall be carried out at the supplier's factory.

Type tests shall be carried out in the laboratories of an NABL accredited independent test institute/ Govt. approved lab.

Relevant type test certificates are mandatory and shall be issued by the NABL accredited independent institute/Govt. approved lab.

TYPE TEST FOR ARRESTERS WITH POLYMERIC HOUSING

All the tenderers must submit copies of type test certificates along with laboratory approved drawings for the products offered by them. Type tests should be carried out in accordance with the latest version of Specified standard at Govt. approved / NABL accredited lab and test reports should not be older than 7 years as on date of opening the tender.

Specification for Polymeric Surge Arresters

Surge arresters offered shall be manufactured with the same configuration & raw materials as used in the surge arrester for which type test reports are submitted.

- a. Insulation Withstand Test on Arrester Housing
- b. Residual Voltage Tests
- c. Long Duration Current Impulse Withstand Test
- d. Operating Duty Test
- e. Partial Discharge Voltage Test
- f. Accelerated ageing test
- g. Power frequency voltage versus time characteristics
- h. Weather Ageing Test

The arrester shall prove its resistance against pollution bypassing following type test:

- 1000hrs salt fog test at maximum continuous operating voltage U_c applied.
- i. "Time versus Current Curve" (for Dis-connector)

ROUTINE TESTS

The manufacturer shall carry out the following routine tests on each single arrester in accordance with IEC 60099-4/2004-05 Standards.

- AC Reference Voltage Test (final arrester)
- Partial Discharge Test (final arrester including hardwares/accessories)
- Residual Voltage Test (final arrester or metal-oxide resistors)

The manufacturer shall provide a routine test report including all relevant details with respect to the test limits. On request, the manufacturer shall also provide a routine test protocol including all measuring results.

Sample test are not acceptable.

ACCEPTANCE TESTS

The acceptance tests shall be carried out as per IEC: 60099-4/ 2004-05 standards.

- 1. Power frequency reference voltage test ***
- 2. Lightning impulse residual voltage test[#]**
- 3. Internal partial discharge test**
- 4. Visual examination & Dimensional verification**

(*) Power Frequency Reference Voltage test : evaluation of the Tender/Audit sample will be considered on the basis of value of **Reference Voltage range (Min./Max.) and Reference Current** declared by the Bidder/Supplier in GTP Sr. no. 24 & 25.

Specification for Polymeric Surge Arresters

(#) Also for **Lightning Impulse Residual Voltage Test** Bidder/Supplier has to declare/offer its **maximum value of lightning impulse residual Voltage at Lightning Impulse current 500 A** in GTP (Sr. no. 29) & evaluation of Tender/Audit sample will be considered on the basis of said value at ERDA/Third party NABL Accredited laboratory.

Qualification of tender/Audit sample decided as per the result of Acceptance test considering above and same shall be binding to both MGVCL & Bidder/Supplier.

6. MARKING

Each arrester shall be provided with a nameplate, bearing the following information, as a minimum, in English language:

- Arrester Type
- IEC standard
- Continuous Operating Voltage U_c
- Rate Voltage U_r
- Nominal Discharge Current
- Rated Short Circuit Current
- Manufacturers name or trademark
- Month & Year of manufacture
- Date of supply with period of guarantee
- **"PROPERTY OF MGVCL"**

7. DRAWINGS

The tenderer shall furnish catalogues, literature and detailed dimensional drawings of complete arrester with dis-connector showing clearances, polymeric housing details & name plate details.

8. QUALITY ASSURANCE

The manufacturer shall be certified in accordance with ISO 9001. The supplier has to provide a copy of a valid certificate along with his quote.

Relevant manuals shall be presented upon request.

9. PACKING AND SHIPMENT

Arresters shall be securely packed, complete with all accessories, in strong non-returnable boxes, in such a manner as to prevent damage during shipment.

Specification for Polymeric Surge Arresters

SCHEDULE 1: GUARANTEED TECHNICAL PARTICULARS

REQUIREMENTS FOR GAPLESS METAL OXIDE
DISTRIBUTION TYPE ARRESTERS WITH POLYMERIC HOUSING

Table to be filled in by the manufacturer / Definitions according to IEC 60099-4

Sr. No.	Description	Unit/Rating	Offered by Bidder
1.	Name of Manufacturer		
2.	Arrester Type or Designation		
3.	Arrester Continuous Operating Voltage U_c	KV rms	
4.	Arrester Rated Voltage U_r	KV rms	
5.	Nominal Discharge Current I_n	KA	
6.	Line Discharge Class		
7.	High Current Discharge Current 4/10 μ s	KA	
8.	Long Duration Current Amplitude	A	
9.	Long Duration Current Duration	μ s	
10.	Rated Short Circuit Current I_{sc}		
	a. High current	KA	
	b. Low current	A	
11.	Pull Strength	N	
12.	Cantilever Strength	Nm	
13.	Torque strength	Nm	
14.	Total Height of Arrester	Mm	
15.	Creepage Length	Mm	
16.	Flashover Distance	Mm	
17.	Lightning Impulse 1.2/50 μ s Withstand Level	KVp	
18.	Wet Power Frequency Withstand level	KV rms	

Specification for Polymeric Surge Arresters

Sr. No.	Description	Unit/Rating	Offered by Bidder
19.	Housing Type		
20.	Housing Material		
21.	Colour of Housing		
22.	Void-free Design (State)	Yes / No	
23.	Bonding/Interfacial Sealing (state)	Yes / No	
24.	Reference Voltage Range (min/max)	KV	
25.	Reference Current	mA	
26.	Max. Partial Discharge Level	pc	
27.	TOV Curve enclosed?	Yes/No	
28.	Arrester will be able to operate under the system parameters mentioned in cl. no. 3?	Yes/No	
29.	Maximum Residual Voltage of Arrester for Lightning Impulse Current 8/20 μs at 500A	KV	
30.	Maximum Residual Voltage of Arrester for: Lightning Current Impulse 8/20 μ s at 2.5kA 5 kA 10 kA Steep Lightning Current Impulse 1/10 μ s at Nominal Discharge Current In	KV KV KV KV	
31.	Minimum recommended Center-to-Center Distance between Arresters	mm	
32.	Minimum recommended Distance from Center of Arrester to nearest Grounded Object	mm	
33.	Whether earth dis-connector as mentioned in the specification is provided?	Yes/No	
34.	Make of Dis-connector	Manufacturer name or trademark	
35.	Metal Oxide ZnO block	(i) Make (ii) Rating (iii) No. of MOV block used in L. A. unit	
36.	Name of material used in manufacture of the polymer housing with class/grade)	SILICONE Wacker-Germany, Dow Corning-USA	