

**SPECIFICATIONS FOR SUPPLY & INSTALLATION OF  
SURGE PROTECTION DEVICES FOR  
..... WATER SUPPLY SCHEME**

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# SPECIFICATION FOR SUPPLY AND INSTALLATION OF SURGE PROTECTION DEVICES AND ACCESSORIES FOR WATER SUPPLY SCHEME

## 1. GENERAL REQUIREMENTS

This specification is for supply and installation of surge protection devices to protect electrical system and equipment in the above treatment plant, against various over voltages and impulse currents such as lightning and switching surges. The Surge Protecting Device (SPD) shall be fitted with necessary disconnecting devices in order not to interfere with other protective devices such as RCD, Fuse or Circuit Breakers in order to isolate the protected equipment from the installation in case of SPD failure. SPD's shall be installed in separate enclosure and connect the SPD with minimum possible length of cables. (maximum length of 50m bound wire is preferred)

The following IEC standards are applicable for the work.

### **IEC 61643      Low-voltage surge protective devices**

- IEC 61643-1      Surge protective devices connected to low-voltage power distribution systems – Requirements and tests
- IEC 61643-12     Surge protective devices connected to low-voltage power distribution systems – Selection and application principles
- IEC 61643-21     Surge protective devices connected to low-voltage telecommunications and signalling networks – Performance requirements and testing methods
- IEC 61643-22     Surge protective devices connected to low-voltage telecommunications and signalling networks – Selection and application principles
- IEC 61643-311    Components for surge protective devices – Test specification for gas discharge tubes (GDTs)
- IEC 61643-321    Components for surge protective devices – Test specification for avalanche breakdown diodes (ABDs)
- IEC 61643-331    Components for surge protective devices – Test specification for metal oxide varistors (MOVs)
- IEC 61643-341    Components for surge protective devices – Test specification for thyristor surge suppressors (TSSs)

## 2. MULTI MOV Surge Diverters.

- I. MULTI MOV Surge diverters shall be designed to provide high energy surge diversion for individual phase power circuits and shall have following basic functions.
  - In power systems in absence of surge: the SPD shall not have a significant influence on the operational characteristics of the system to which it is applied.
  - In power systems during occurrence of surge: the SPD shall respond to surge by lowering its impedance and thus diverting surge current through it to limit the voltage to its protective level. The surge may initiate a power follow current through the SPD.
  - In power systems after the occurrence of surge: the SPD recovers to a high-impedance state after the surges and extinguishes any possible power flow current.
- II. The units shall be capable of mounting at main power switch boards and major distribution boards.
- III. Surge diverters shall be tested according to IEC 61643 class 1 test & class II as specified under clause 'Test'.
- IV. In a systems design MULTI *MOV* surge diverters shall be utilized upstream of power surge filters for effective protection of sensitivity loads.
- V. Installation of surge protection devices shall be complied with TT system.

## 3. Surge Ratings.

Multi MOVs of following rates shall be installed at the stages mentioned.

Stage	Rating of MOV
Main Incoming panel	100 kA
Sub Incoming panel	50 kA
Equipment level	20 kA

## 4. Tests

Surge protectors for main incoming panel/panels shall be tested according to IEC 61643-1 Class 1.

Surge protectors for sub incoming panel/panels shall be tested according to IEC 61643-1 Class II.

Test certificates of the above tests shall be submitted with the equipments

## 5. Material and dimensions of bonding components

Material, dimensions and conditions of use shall comply with IEC 62305-3. The minimum cross section for bonding components shall comply with Table 1 of IEC 62305-1.

## 6. Quality Assurance

The indirect lightning protection system shall conform to the requirements and standards for lightning protection systems in accordance with IEC 62305 & IEC 61643.

## 7. SPECIFICATIONS FOR SPDs

### 100kA SPD

Description	Rating
Nominal Voltage/Phases	400v/3 phase
Nominal Frequency	50Hz
Rated load current	.....
Nominal discharge current (8/20 $\mu$ s impulses)	100 kA
Required class of testing	IEC 61643-1 Class I
Response time	Less than 25 ns
Voltage protection level	Less than 1.3 kV
Maximum continuous operating voltage	Not less than 270 V
Temperature range	Up to 80 <sup>0</sup> C
Residual voltage	As low as possible
Fuse	Include with high energy spark gap fuse
Thermal disconnect	Internal
Alarms	Audio/visual indications
AC system	TT system.
Protection rating	Shall comply the IEC 60529
Short circuit protection	HRC fuse
Combination Arrestor	Suitable type

## 50 kA SPD

<b>Description</b>	<b>Rating</b>
Nominal Voltage/Phases	400v/3 phase
Nominal Frequency	50Hz
Rated load current	.....
Nominal discharge current (8/20 $\mu$ s impulses)	50 kA
Required class of testing	IEC 61643-1 Class II
Response time	Less than 25 ns
Voltage protection level	Less than 1.3 kV
Maximum continuous operating voltage	Not less than 270 V
Temperature range	Up to 80 <sup>0</sup> C
Residual voltage	As low as possible
Fuse	Include with high energy spark gap fuse
Thermal disconnect	Internal
Alarms	Audio/visual indications
AC system	TT system.
Protection rating	Shall comply the IEC 60529
Short circuit protection	HRC fuse
Combination Arrestor	Suitable type

## 20 kA SPD

<b>Description</b>	<b>Rating</b>
Nominal Voltage/Phases	400v/3 phase
Nominal Frequency	50Hz
Rated load current	.....
Nominal discharge current (8/20 $\mu$ s impulses)	20 kA
Required class of testing	IEC 61643-1 Class II
Response time	Less than 25 ns
Voltage protection level	Less than 1.3 kV
Maximum continuous operating voltage	Not less than .....V
Temperature range	Up to 80 <sup>0</sup> C
Residual voltage	As low as possible
Fuse	Include with high energy spark gap fuse
Thermal disconnect	Internal
Alarms	Audio/visual indications
AC system	TT system.
Protection rating	Shall comply the IEC 60529
Short circuit protection	HRC fuse
Combination Arrestor	Suitable type

## QUESTIONNAIRE FOR SURGE PROTECTORS

Description	
1. Make/Country of Manufacture	
2. Dimensions/Mounting	
3. Maximum operating voltage	
4. Nominal Discharge Current	
5. Maximal Discharge Current	
6. Max. lightning current by pole	
7. Residual Voltage	
8. Protection level	
9. Admissible short-circuit current	
10. Thermal disconnecter	
11. Fuses	
12. Installation ground fault breaker	
13. Status of indication(Visual/Electrical)	
14. Operating Temperature	
15. Protection Class	
16. Housing material	
17. Standard Compliance	
18. Conductor size	
19. Conductor Color Code.	
20.	
21.	
22.	