

**CONSTRUCTION STANDARD SPECIFICATION**

**SECTION 16289**

**SURGE PROTECTION DEVICES**

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## **CONSTRUCTION STANDARD SPECIFICATION**

### **SECTION 16289**

#### **SURGE PROTECTION DEVICES**

##### PART 1-GENERAL

###### 1.01 SUMMARY

- A. This section defines the requirements of surge protection devices (SPD) for low voltage power systems. SPDs intended for Service Entrance equipment installation is discussed, and they must apply to the IEEE C62.41, category C3 waveforms.

###### 1.02 REFERENCES

- A. The current editions of the following standards are part of this Section:

- NFPA 70 National Electric Code,
  - NFPA 780,
  - IEEE C62.41 and C62.45,
  - NEMA LS-1,
  - UL 1449 and UL 1283
  - IEEE 1100

- B. Related Construction Standard Specifications:

- 1. Section 01330, "Submittal Procedures"
  - 2. Section 13100, "Lightning Protection"
  - 3. Section 16001, "Electrical Work"
  - 4. Section 16440 "Electrical Panelboards"

###### 1.03 SUBMITTALS

- A. Product Data: Submit the following:

- 1. Physical Characteristics
  - 2. Peak Surge Current Ratings: Per mode and per Phase

- B. Product Certificates: Signed by manufacturers of surge protection devices, certifying that products furnished comply with the following:
  - 1. UL 1283 certification.
  - 2. UL 1449 listing and classification.
- C. Warranties: Special warranties specified in this Section
- D. Operations and maintenance data:  
Provide three (3) copies of instruction books, operating manuals, comprehensive trouble shooting guide, spare parts list and special bulletins covering on-site storage.
- E. Furnish independent certified test results.
- F. Submit formal report of factory tests within ten (10) days of factory tests, stating tests conducted, acceptable limits of such tests, actual test results, and original test data sheet with legible signatures of those conducting, witnessing, and approving such tests.

#### 1.04 QUALITY ASSURANCE

- A. SPDs shall be tested per ANSI/IEEE C62.45, to comply with ANSI/IEEE C62.41. The test surge for Category C3 is a Biwave; 8 x 20 microseconds at 10,000 amperes short circuit; and 1.2 x 50 microseconds at 20,000 volts open circuit.
- B. The system shall be life cycle tested to 5,000 sequential Category C3 waveforms without failing or degrading the UL 1449 suppression rating by more than 10%.
- C. Device must meet NEMA LS-1 requirements. Each suppression path must be individually fused. All fuses must be capable of allowing the suppressor's maximum rated transient current to pass without fuse operation. Fuses must be able to handle 200,000 AIC.
- D. The system shall be tested to MIL-STD 220A for electrical line noise attenuation per 50- ohm insertion loss measurement method of RF frequencies up to 100 MHz.

### PART 2-PRODUCTS

#### 2.01 MANUFACTURERS

- A. The SPD may be an integral part of the service entrance switchboard/switchgear or service entrance power panel, or a separate unit subject to compliance with requirements. Manufacturers offering products that may be incorporated in the work include:

1. Square D model XTE/XG
2. General Electric Tranquell HE
3. Siemens TPS 6
4. Cutler Hammer CPS H2
5. Lightning Protection Corporation (LPC)

## 2.02 SYSTEM DESCRIPTION

- A. The SPD must have replaceable metal oxide varistor (MOV) modules. The units shall have a minimum Peak Surge Current rating as follows:
  1. Per Mode: 150,000 Amps
  2. Per Phase: 300,000 Amps
- B. The Maximum Continuous Operating Voltage (MCOV), of all suppression components utilized in the unit shall not be less than 115% of the facility's normal line-line operating RMS voltage .
- C. Minimum (4) Protection Modes: The SPD shall provide line-to-neutral (L-N), line-to-line (L-L), line-to-ground (L-G), and neutral-to-ground (N-G) protection.
- D. The unit shall include solid-state externally mounted visual status indicators that monitor the functional status of each phase of the unit.
- E. All overcurrent protection devices shall be monitored and provide indication of operability or failure of suppression path.
- F. The unit shall have a Surge Counter, which displays the combined total number of transient voltage surges detected from L-G, L-L, L-N, and N-G, with reset button.
- G. The unit shall be provided with a written warranty, executed by manufacturer agreeing to repair or replace components of surge suppressors that fail in materials or workmanship within five (5) years from date of Substantial Completion.

## PART 3-EXECUTION

### 3.01 INSTALLATION

Install SPDs according to manufacturer's written instructions. The following also apply:

- A. SPDs shall be installed as close as possible to their respective panels. Lead length shall not exceed 36" between bus and unit.
- B. Avoid short radius bends in leads connecting the SPD and the bus of the protected equipment.
- C. Cable connection between bus and SPD shall be a minimum #8 AWG.
- D. Connecting wires shall be twisted to reduce magnetic inductance.
- E. SPD shall be connected to a dedicated circuit breaker at the main service entrance.

### 3.02 FIELD TESTING

Perform the following field quality-control measures:

- A. After installing surge protective devices, but before electrical circuitry has been energized, verify compliance with section 3.01 of this document.
- B. During the time of energization, complete startup checks according to manufacturer's written instructions.
- C. Repair or replace malfunctioning units. Retest after repairs or replacements are made.

END OF SECTION