

## **PART 1 GENERAL**

### **1.1 REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 ANSI/IEEE C67.41, C62.45.
- .3 UL1449 - Second edition.
- .4 NFPA.
- .5 IEEE Standard 1100.
- .6 UL1283 - EMI/RFI noise attenuation standard.
- .7 NEMA LS1.

### **1.2 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 26 05 00 – Common Work Results – Electrical.
- .3 Section 26 23 00 – Metal Enclosed Drawout Switchgear – Low Voltage.

### **1.3 SUBMITTALS**

- .1 Submittal for approval: Provide the following transient protection submittals:
  - .1 Dimensional drawing of each transient voltage surge suppressor (TVSS) type, indicating proposed mounting arrangements.
  - .2 Written functional description of the transient protection circuit in terms of components, configuration, design approach, and performance capability per NEMA LS1.
  - .3 The means of connection of the TVSS to the electrical distribution system per NEMA LS1.
- .2 Provide UL-1449, Second Edition data card from manufacturer showing the Suppressed Voltage Rating (SVR) for the specific catalog number submitted. Typical UL 1449, Second Edition data is not acceptable.
- .3 Per the requirements of CEC, mark the devices with the short circuit current rating. Meet or exceed the available fault current. Provide test data from an independent testing laboratory to demonstrate the short circuit current rating has been tested on a complete device

- .4 Submit test report data clearly demonstrating the maximum surge current rating has been tested on a COMPLETE TVSS unit including all necessary fusing/overcurrent protection, thermal disconnects, integral disconnects and monitoring systems.
- .5 Submit data demonstrating the TVSS unit, including all overcurrent protection, is fully capable of a minimum repetitive surge current rating of 10,000 ANSI/IEEE C62.41, Category C3 (10kA) impulses without failure or a change in performance characteristics of more than 10%.

#### **1.4 WARRANTY**

- .1 Provide manufacturer a product warranty against defects in operation and material for a period of not less than 5 years from date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.1 ENVIRONMENTAL**

- .1 General Requirements:
  - .1 No audible noise.
  - .2 No appreciable magnetic fields.
  - .3 Operating Conditions:
    - .1 30 to 130 Degrees F
    - .2 15 to 85 Percent Humidity Non-Condensing
  - .4 Enclosure: Heavy duty NEMA 2, drip-tight enclosure, as indicated.

#### **2.2 TRANSIENT VOLTAGE SURGE SUPPRESSORS**

- .1 General Requirements:
  - .1 Rated for a 347/600 volt, 60 Hertz, 3-phase, 4-wire switchboard, 2000A.
- .2 Provide surge suppressors in accordance with the following requirements:
  - .1 Unit parallel in design and connected in parallel to exterior main service entrance switches (2). Each surge suppression element (MOV) individually fused so that a failure of one element and/or fuse has no affect other surge suppression elements.
  - .2 Provide UL 1449, 2<sup>nd</sup> edition listed unit.
  - .3 Provide maximum UL 1449 2<sup>nd</sup> Edition Suppressed Voltage Rating (SVR) for 347/600 Volt systems as follows:
    - .1 L-N = 700V
    - .2 L-G = 700V
    - .3 N-G = 700V

- .4 L-L = 1500V
- .4 Provide maximum surge current rating of 200,000 amperes L-N, 200,000 amperes L-G, and 200,000 amperes N-G, based on ANSI/IEEE C62.41 standard 8 by 20 microsecond current waveform. Provide a higher maximum surge current rated device if required to meet the requirements.
- .5 Provide unit with a short circuit current rating, which equals or exceeds that of the Main Switchboard.
- .6 Provide UL 1283 listed unit as an electromagnetic interference filter and provide 50 Ohm noise attenuation of at least 30 dB at 100 kHz, 50 dB at 1 MHz, 50 dB at 10 MHz, and 45 dB at 100 MHz.
- .7 Include solid-state, long-life externally mounted LED visual status indicators that indicate the on-line status and operational integrity of each phase of the unit.
- .8 Provide Form C summary alarm output contact rated for at least 1 amp at 120VAC for remote annunciation of TVSS status.
- .9 Provide integral, non-fused disconnect system which causes no interruption to the protected load for testing and maintenance. Disconnect system shall not require removal or replacement for warranty or other repairs.
- .10 Provide an audible alarm with an alarm on/off switch to silence the alarm and a push-to-test switch to test the alarm function.
- .11 Provide an adjustable (resetable) counter to totalize transient voltage surges in both the normal and common mode. Provide readout with at least a seven-digit LCD located on the unit front cover and provided with a 10-year battery back-up to maintain counts in the event of power loss.
- .12 ISO 9001 certified.

## **PART 3 EXECUTION**

### **3.1 GENERAL REQUIREMENTS**

- .1 Install suppression system immediately next to service equipment where so approved by the Departmental Representative.
- .2 Install conductors between suppressor and point of attachment to service equipment sized in accordance with manufacturer's Shop Drawings and conductor lengths as short as possible, preferably not to exceed 600 mm.
- .3 Grounding: bond suppressor ground to the equipment grounding conductor and service entrance ground.

### **3.2 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results - Electrical.
- .2 Inspect primary and secondary connections for tightness and signs of overheating.

- .3 Check fuses for correctness of type and size.
- .4 Check grounding connections.

**END OF SECTION**