**SECTION 26 43 13**

**SURGE PROTECTION DEVICES**

1. GENERAL
   1. RELATED DOCUMENTS
      1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
   2. SUMMARY
      1. Section includes field-mounted (installed external to electrical equipment) SPDs for low-voltage (120 to 600 V) power distribution and control equipment.
      2. The requirements of this specification section supersede those in other specification sections.
   3. DEFINITIONS
      1. Inominal: Nominal discharge current.
      2. MCOV: Maximum continuous operating voltage.
      3. Mode(s), also Modes of Protection: The pair of electrical connections where the VPR applies.
      4. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.
      5. OCPD: Overcurrent protective device.
      6. SCCR: Short-circuit current rating.
      7. SPD: Surge protective device.
      8. VPR: Voltage protection rating.
   4. ACTION SUBMITTALS
      1. Products will only be considered for approval if the request is accompanied with the appropriate SPD SPECIFIED PERFORMANCE COMPLIANCE FORM attachment(s), for each unit, at the conclusion of this specification, fully executed with the required supporting documentation and signed by an authorized company representative. For any approval request to be considered complete, the required supporting documentation shall be provided for each model to be supplied. (Information shall be organized in tabular content according to the numerical identifier shown on the right side of each Performance Specification section.)
      2. Product Data: For each product.
         1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
         2. Copy of UL Category Code VZCA certification, as a minimum, listing the tested values for VPRs, Inominal ratings, MCOVs, type designations, OCPD requirements, model numbers, system voltages, and modes of protection.
      3. Documentation of Performance
         1. Provide a copy of peak surge current test report, certifying that the SPD has been tested to, and survives, the peak surge current rating as specified.
         2. Provide a copy of repetitive impulse test report, certifying that the SPD has been tested to, and survives, the number of repetitive impulses as specified.
      4. Method and Equipment to be Used for Installed Testing (For Spec Section 3.2)
   5. INFORMATIONAL SUBMITTALS
      1. Field quality-control reports.
      2. Sample Warranty. For manufacturer’s special warranty.
   6. CLOSEOUT SUBMITTALS
      1. Maintenance Data: For SPDs to include in maintenance manuals.
      2. Copy of installed test report.
   7. WARRANTY
      1. Manufacturer's Warranty: Manufacturer agrees to repair or replace SPDs that fail in materials or workmanship within specified warranty period.
         1. Warranty period.
            1. Fifteen (15) years from date of Substantial Completion.
2. – PRODUCTS
   1. GENERAL SPD REQUIREMENTS
      1. SPD and Accessories. Listed and labeled as defined by NFPA 70, by Underwriter’s Laboratory, and marked for intended location and application.
      2. Comply with NFPA 70.
      3. Comply with UL 1449.
      4. MCOV of the SPD shall be at least 115% of the nominal system voltage.
   2. SURGE PROTECTION DEVICE
      1. Manufacturer: Subject to compliance with requirements, provide product by one of the following:
         1. Current Technology CGP Series (Basis of Design).
         2. Engineer Approved Equal.
            1. Other manufacturers wishing to have specific products evaluated for equivalence shall provide, for each unit, ATTACHMENT 1 – SPD SPECIFIED PERFORMANCE COMPLIANCE FORM, fully executed with the required documentation. For any approval request to be considered complete, the required supporting documentation shall be provided for each model to be supplied. (Information shall be organized in tabular content according to the numerical identifier shown on the right side of each Performance Specification section.) The request for approval shall be signed by an authorized company representative and submitted no less than 10 days prior to the bid date.
            2. Failure to provide the required documentation, for each model to be supplied, no less than 10 days prior to the bid date will disqualify products from consideration for this project.
      2. SPD REQUIREMENTS
         1. Comply with UL 1449 3rd Edition, Type 1.
         2. Provide the following features and accessories.
            1. Mounted external to electrical equipment.
            2. Thermal protection that disconnects the SPD before damaging internal suppressor components.
            3. SPD monitoring shall include:

Indicator lights which display protection status.

Audible alarm with silence switch.

Form C contacts rated at 5 A and 250 V, one normally open and one normally closed for remote monitoring of protection status.

Service required indication

Surge counter.

* + - * 1. Integral Test Point with test data from factory provided for comparison. Information is provided in the form of suppressed voltage rating given by portable test set and written on a Diagnostic Signature Card which will be provided with the device. See section 3.2.
    1. Comply with UL 1283.
    2. Performance Ratings
       1. Peak Surge Current Rating
          1. The peak surge current withstand rating per mode shall be as indicated in the table below.
          2. The peak surge current rating shall the surge current at which the SPD was tested and which the SPD survived—with less than a 10% degradation in VPR. Testing documentation shall be provided.
          3. Peak surge current ratings which are the arithmetic sum of the ratings of individual MOVs in a given mode are not acceptable.
       2. Repetitive Impulse Rating
          1. The minimum repetitive impulse capacity (10 kA and 20 kV) of the SPD per mode shall not be less than as indicated in the table below, for the respective Service Entrance current rating.
          2. The minimum repetitive impulse capacity shall be the number of impulses at which the SPD was tested and which the SPD survived—with less than a 10% degradation in VPR. Testing documentation shall be provided.
          3. Minimum repetitive ratings which are derived by calculations are not acceptable.

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| Product Application and Performance Rating Chart | | | |
| Source Current Rating | Tested Surge Current Capacity  per Mode | Tested Surge Current Capacity  per Phase | Tested Repetitive Impulse Capacity  per Mode |
| 2000 A and (above) | 200 kA | 400 kA | 6,500 |
| 1600 A | 150 kA | 300 kA | 5,500 |
| 1000 A - 1200 A | 120 kA | 240 kA | 4,500 |
| 800 A | 100 kA | 200 kA | 4,000 |
| 400 A - 600 A | 80 kA | 160 kA | 3,500 |
| 200 A | 50 kA | 100 kA | 3,000 |

* + 1. Protection modes and UL 1449 VPR for the applicable modes of grounded WYE/delta and high leg delta circuits shall not exceed the following.
       1. For 480Y/277 V and 480 V delta systems:
          1. Line to Neutral: 1200 V
          2. Line to Ground: 1200 V
          3. Neutral to Ground: 1200 V
          4. Line to Line: 1800 V
       2. For 208Y/120 V and 208 V delta systems:
          1. Line to Neutral: 800 V
          2. Line to Ground: 800 V
          3. Neutral to Ground: 800 V
          4. Line-to-Line 1200 V
    2. SCCR: Equal to or exceed 200 kA.
    3. Inominal rating: 20 kA.

1. – EXECUTION
   1. INSTALLATION
      1. Comply with NECA 1.
      2. Install SPD external to electrical equipment.
      3. Install an OCPD or disconnect if required to comply with the UL listing of the SPD.
      4. Install SPDs with conductors between suppressor and points of attachment as short and straight as possible, and adjust circuit-breaker positions to achieve shortest and straightest leads. Do not splice and extend SPD leads unless specifically permitted by manufacturer. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.
      5. Use crimped connectors and splices only. Wire nuts are not acceptable.
      6. Utilize the following conductors for connection of the device to the source, for all phase conductors, neutral (if applicable) and ground conductors.
         1. For Switchboards, 1200 A and above, utilize #2 AWG conductors.
         2. For Switchboards and Panelboards, 200 A - 1000 A utilize Current Technology HPI-6Y low impedance cable assembly.
   2. FIELD QUALITY CONTROL
      1. Perform the following tests and inspections with the assistance of a factory-authorized service representative.
         1. Compare equipment nameplate data for compliance with Drawings and Specifications.
         2. Inspect anchorage, alignment, grounding and clearances.
         3. Verify that electrical wiring installation complies with manufacturer’s written installation requirements.
         4. Testing: Perform the following field tests and inspections and prepare test reports:
            1. After installation of surge protection devices, but before electrical circuitry has been energized, test for compliance with requirements.
            2. Utilize a portable test set and test devices to confirm:

The suppressed voltage rating of the installed unit is within 10% of the suppressed voltage rating of the device when tested prior to shipment from the factory.

The SPD is properly installed.

The presence of an X0 bond at the most proximal upstream separately derived source.

* + 1. An SPD will be considered defective if it does not pass tests and inspections.
    2. Repeat tests and inspection after replacement or repair of defective units.
    3. Prepare test result and inspection reports and submit them to the project engineer.
  1. STARTUP SERVICE
     1. Complete startup checks according to manufacturer’s written instructions.
     2. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests, and reconnect them immediately after the testing is completed.
     3. Energize SPDs after power system has been energized, stabilized, and tested.
  2. DEMONSTRATION
     1. Engage a factory authorized service representative to train Owner’s maintenance personnel to operate and maintain SPDs.

END OF SECTION 26 43 14

**ATTACHMENT 1 – SERVICE ENTRANCE SPD SPECIFIED PERFORMANCE COMPLIANCE FORM**

**Required for all requests for approval for each model to be supplied.**

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| PERFORMANCE SPECIFICATION | SPEC. SECTION REFERENCE | SPECIFICATION REQUIREMENT | PROPOSED | CONFIRMING DOCUMENTATION REQUIRED | COMPLANCE  VERIFIED?  YES / NO | Tab |
| Product | 2.2 A. 1. | Current Technology CGP |  | Product Data Sheet |  | 1 |
| Warranty | 1.7 A. 1. a. | 15 Years |  | Published Warranty Certificate |  | 2 |
| Tested Surge Current Capacity | 2.2 D. 1. | As Per Drawings & Chart in Specification |  | Independent Test Report |  | 3 |
| Repetitive Impulse Capacity | 2.2 D. 2. | As Per Drawings & Chart in Specification |  | Repetitive Test Report Summary |  | 4 |
| Voltage Protection Rating(s) | 2.2 E. 2. | 120 V Systems:  L-N: 800 V,  L-G: 800 V,  N-G: 800 V,  L-L: 1200 V | L-N: ­­­­ \_\_\_\_\_\_  L-G: ­­­­\_\_\_\_\_\_  N-G: \_\_\_\_\_\_  L-L: \_\_\_\_\_\_ | Page(s) from UL File Showing Voltage Protection Ratings |  | 5 |
| 2.2 E. 1. | 277 V Systems:  L-N: 1200 V,  L-G: 1200 V,  N-G: 1200 V,  L-L: 1800 V | L-N: ­­­­ \_\_\_\_\_\_  L-G: ­­­­\_\_\_\_\_\_  N-G: \_\_\_\_\_\_  L-L: \_\_\_\_\_\_ |  |
| Status Monitoring System | 2.2 B. 2. c. 1.) | Status Indication Lights |  | Product Data Sheet for Monitoring System |  | 7 |
| 2.2 B. 2. c. 2.) | Audible Alarm with Silence Switch |  |  |
| 2.2 B. 2. c. 3.) | Form C Contacts |  |  |
| 2.2 B. 2. c. 4.) | Service Required Indication |
| 2.2 B. 2. c. 5.) | Surge Counter |
| Integral Test Port | 2.2 B. 2. d. | Integral Interface with Portable Test Set/Surge Generator |  | Product Data Sheet Showing Test Port Option |  | 8 |
| Installed/Field Test Service  after Installation | 3.2 A. 4. | Confirm Proper Installation and Wiring to SPD and Provide Benchmark of Initial Performance |  | Provide Data Sheet(s) for Equipment Used to Perform Installed Testing |  |

**Signature confirming the validity of the information given above:**

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