Red text is to guide the spec writer as to how to edit the spec and should be deleted when done. *Bold, Blue Italic and bracketed text is awaiting the spec writer's decisions.*

[Use for Pre-2014 SECTION 26 43 13
NEC PRE-2014
SURGE PROTECTIVE DEVICES (SPDs)]
[Use for NEC 2014 SECTION 26 43 13
NEC2014
NORMAL AND EMERGENCY SURGE PROTECTIVE DEVICES (SPDs)]
[Use for NEC 2017 NEC2017
NORMAL AND EMERGENCY SURGE PROTECTIVE DEVICES (SPDs)]
[Use for NEC 2020 SECTION 26 43 13
NEC2020
NORMAL AND EMERGENCY POWER OVERVOLTAGE PROTECTION (SURGE PROTECTIVE DEVICES SPDs)]

PART 1 - GENERAL

1.1 SCOPE

A. *[Use for Pre-2014 Pre-NEC 2014: This section describes the materials and installation requirements for surge protective devices (SPD) for the protection of all AC electrical circuits.]*

B. *[Use for NEC 2014 NEC 2014: This section describes the materials and installation requirements for surge protective devices (SPD) for the protection of all normal and emergency AC electrical circuits.]*

C. *[Use for NEC 2017 NEC 2017: This section describes the materials and installation requirements for surge protective devices (SPD) for the protection of all normal and emergency AC electrical circuits.]*

D. *[Use for NEC 2020 NEC 2020: This section describes the materials and installation requirements overvoltage protection (surge protection devices (SPD)) for the protection of all AC electrical circuits.]*

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. *[Other sections that may relate to the work in this section include, but are not limited to, the following:*
1. *[Section 26 24 13 – Switchboards]*
2. *[Section 26 24 16 – Panelboards]*
3. *[Section 26 24 19 – Motor Control Centers]*
4. *[Section 26 25 00 – Busway]]*

1.3 SUBMITTALS

A. Submit shop drawings and product information for approval and final documentation in the quantities listed according to the Conditions of the Contract. All transmittals shall be identified by customer name, customer location, and customer order number.

B. Product Data: For each type of product indicated. Include rated capacities, operating weights, operating characteristics, furnished specialties, and accessories.

C. Submittals shall include UL1449 most recent edition listing documentation verifiable by visiting www.UL.com, clicking “Certifications” link, searching using UL Category Code: VZCA and VZCA2:
   1. Short Circuit Current Rating (SCCR)
   2. Voltage Protection Ratings (VPRs) for all modes
   3. Maximum Continuous Operating Voltage rating (MCOV)
   4. I-nominal rating (I-n)
   5. SPD shall be UL1449 4th Edition as a Type 2 Component or Listed Assembly. When connected to supply or utility side of service SPD shall be labeled as Type 1.

D. Upon request, an unencapsulated, complete SPD shall be presented for visual inspection.

E. Minimum of ten (10) year warranty

1.4 RELATED STANDARDS

A. IEEE C62.41.1, IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits,

B. IEEE C62.41.2, IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits,

C. National Electrical Code:
   1. ***[Use for Pre-2014 Pre-NEC 2014: Articles 100 and 285]***
   2. ***[Use for NEC 2014 NEC 2014: Articles 100, 285, 670, 695, 700, and 708.]***
   3. ***[Use for NEC 2017 NEC 2017: Articles 100, 285, 620, 670, 695, 700, and 708.]***
   4. ***[Use for NEC 2020 NEC 2020: Articles 100, 242, 620, 670, 695, 700, and 708.]***

D. ***[Florida Building Code: Articles 449.3.15.6, 450.3.19.5, and 457.1.4.1.5]***

E. UL1283 - Electromagnetic Interference Filters (Type 2 only)

F. UL1449, most recent edition – Surge Protective Devices

1.5 QUALITY ASSURANCE

A. Manufacturer shall be ISO 9001 or 9002 certified.

B. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of ten (10) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

C. The SPD shall be compliant with the Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC.

D. ***[SPD packaging and manual shall include a Prop 65 warning.]***

1.6 DELIVERY, STORAGE AND HANDLING

A. Handle and store equipment in accordance with manufacturer’s Installation and Maintenance Manuals. One (1) copy of this document to be provided with the equipment at time of shipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. ***Provide Surge Protective Devices (SPD) formally known as Transient Voltage Suppressor (TVSS) from one of the following suppliers:***
   1. SIEMENS
   2. ***[ ]***
   3. ***[ ]***

2.2 ELECTRICAL DISTRIBUTION EQUIPMENT

A. **[Include this entire section if you are spec'ing an SPD for external mounting for switchgear, switchboards, meter centers and/or motor control centers. Otherwise delete it.]** ***[[Use for Pre-2014 Pre-NEC 2014: Service Entrance][Use for NEC 2014 NEC 2014: Normal and Emergency Power Service Entrance Switchgear, Switchboards, Meter and Motor Control Centers][Use for NEC 2017 NEC 2017: Normal and Emergency Power Service Entrance Switchgear, Switchboards, Meter and Motor Control Centers][Use for NEC 2020 NEC 2020: Normal and Emergency Power Service Entrance Switchgear, Switchboards, Meter and Motor Control Centers]***

1. Externally or wall mounted SPD shall be UL1449 listed and labeled as Type 2, verifiable at UL.com, without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.
2. SPD shall be UL labeled with 20kA I-nominal (I-n) (verifiable at UL.com) as recommended for UL 96A Lightning Protection Master Labeling and NFPA 780.
3. SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR).
4. ***[Pick standard or Critical verbiage . Delete the other. Standard SPD SPD shall provide surge current paths for all modes of protection: L-N, L-G, L-L, and N-G for grounded Wye systems; L-L and L-G for Delta, and impedance grounded Wye systems.][Critical "True or Discrete 10-Mode" or "L-L Enhanced" Protection paths: SPD shall provide "directly connected protection elements" between all possible modes of protection: L-N, L-G, L-L, and N-G for grounded Wye systems; L-L and L-G for Delta and impedance grounded Wye systems.]***
5. SPD shall be connected to the electrical service via a dedicated breaker or with a 200kA rated integral disconnect switch.
6. SPD shall meet or exceed the following criteria:
   a. Minimum surge current capability shall be 300kA per phase.
   b. UL1449 – Most recent edition. Voltage Protection Ratings shall not exceed the following:

VOLTAGE	L-N	L-G	N-G	L-L
208Y/120 Grounded Wye	700V	700V	700V	1200V
480Y/277 Grounded Wye	1200V	1200V	1200V	2000V

7. UL1449 Listed Maximum Continuous Operating Voltage (MCOV) (verifiable at UL.com):

System Voltage	Allowable System Voltage Fluctuation (%)	MCOV
208Y/120	25% or 50%	150V or 180V
480Y/277	15%	320V

8. SPD, Type 2 only, shall incorporate a UL 1283 listed EMI/RFI filter with minimum attenuation of - 50dB at 100 kHz.
9. Suppression components shall be heavy duty 'large block' MOVs, each exceeding 30mm diameter.
10. SPD shall include a serviceable, replaceable module.
11. SPD shall be equipped with the following diagnostics:
    a. Visual LED diagnostics including a minimum of one green LED indicator per phase, and one red service LED.
    b. Audible alarm with on/off silence function and diagnostic test function (excluding branch).
    c. Form C dry contacts
    d. Surge Counter

    No other test equipment shall be required for SPD monitoring or testing before or after installation.

12. SPD shall have a response time no greater than 1/2 nanosecond.
13. Unless otherwise noted, SPD enclosure type shall match or exceed NEMA enclosure rating of equipment to which it is connected. Minimum NEMA 1 for indoor installations and NEMA 3R for exterior locations.
14. SPD shall have a 10-year warranty.]

B. **[Include this entire section if you are spec'ing an SPD for external mounting for panelboards, busways or motor control centers.]*[Distribution, Branch and Emergency Panelboards, Motor Control Center and Busway[Use for Pre-2014 Pre-NEC 2014: Distribution and Branch Panelboards] [Use for NEC 2014 NEC 2014: Normal and Emergency Power Distribution and Branch Panelboards][Use for NEC 2017 NEC 2017: Normal and Emergency Power Distribution and Branch Panelboards][Use for NEC 2020 NEC 2020: Normal and Emergency Power Distribution and Branch Panelboards]***

1. Externally or wall mounted SPD shall be UL1449 listed and labeled as Type 2, verifiable at UL.com, without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.
2. SPD shall be UL labeled with 20kA I-nominal (I-n)
3. SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR).
4. ***[Pick standard or Critical verbiage . Delete the other. Standard SPD SPD shall provide surge current paths for all modes of protection: L-N, L-G, L-L, and N-G for grounded Wye systems; L-L and L-G for Delta, and impedance grounded Wye systems.][Critical SPD "True or Discrete 10-Mode" or "L-L Enhanced" Protection paths: SPD shall provide "directly connected protection elements" between all possible modes of protection: L-N, L-G, L-L, and N-G for grounded Wye systems; L-L and L-G for Delta and impedance grounded Wye systems.]***
5. SPD shall be directly connected to the bus or through a dedicated 30A breaker.
6. SPD shall meet or exceed the following criteria:
   a. Minimum surge current capability shall be 150kA per phase.
   b. UL1449 – Most recent edition. Voltage Protection Ratings shall not exceed the following:

VOLTAGE	L-N	L-G	N-G	L-L
208Y/120 Grounded Wye	700V	700V	700V	1200V
480Y/277 Grounded Wye	1200V	1200V	1200V	2000V

7. UL1449 Listed Maximum Continuous Operating Voltage (MCOV) for L-N, L-G, and N-G modes of protection (verifiable at UL.com):

System Voltage	Allowable System Voltage Fluctuation (%)	MCOV
208Y/120	25% or 50%	150V or 180V
480Y/277	15%	320V

8. SPD, Type 2 only, shall incorporate a UL 1283 listed EMI/RFI filter with minimum attenuation of - 50dB at 100 kHz.
9. Suppression components shall be heavy duty 'large block' MOVs, each exceeding 30mm diameter.
10. SPD shall be equipped with the following diagnostics:
    a. Visual LED diagnostics including a minimum of one green LED indicator per phase, and one red service LED.
    b. Audible alarm
    c. Form C dry contacts
    d. ***[Surge Counter]***

e. No other test equipment shall be required for SPD monitoring or testing before or after installation.

11. SPD shall have a response time no greater than 1/2 nanosecond.
12. Unless otherwise noted, SPD enclosure type shall match or exceed NEMA enclosure rating of equipment to which it is connected. Minimum NEMA 1 for indoor installations and NEMA 3R for exterior locations.
13. SPD shall have a 10-year warranty.

C. **[Include this entire section if you are spec'ing an SPD for external mounting for Elevators, Dumbwaiters, Escalators, Moving Walks, Platform Lift, or Stairway Chairlifts. Otherwise delete it.][**Emergency System Load Disconnects for Elevators, Dumbwaiters, Escalators, Moving Walks, Platform Lift, or Stairway Chairlifts

1. SPD shall be mounted external to electrical distribution equipment, and it shall be UL1449 labeled as Type 1, verifiable at UL.com, without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.
2. SPD shall be UL labeled with 20kA I-nominal (I-n)
3. SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR).
4. SPD shall provide surge current paths for all modes of protection: L-N and N-G for Wye and split phase systems; L-G and L-L for Delta and impedance grounded Wye systems.
5. SPD shall be directly connected to disconnect or through a dedicated 30A breaker.
6. SPD shall meet or exceed the following criteria:
   a. Minimum surge current capability shall be 50kA per phase.
   b. UL1449 Most recent edition. Voltage Protection Ratings shall not exceed the following:

VOLTAGE	L-N	N-G	L-L
208Y/120 Grounded Wye	600V	600V	1000V
480Y/277 Grounded Wye	1200V	1000V	2000V

7. UL1449 Listed Maximum Continuous Operating Voltage (MCOV) for L-N, L-G, and N-G modes of protection (verifiable at UL.com):

System Voltage	Allowable System Voltage Fluctuation (%)	MCOV
208Y/120	25%	150Vor 180V
480Y/277	15%	320V

8. Suppression components shall be heavy duty 'large block' MOVs, each exceeding 30mm diameter.
9. SPD shall be equipped with the following diagnostics:
   a. Visual protection status LED diagnostic indicator
10. Unless otherwise noted, SPD enclosure type shall match or exceed NEMA enclosure rating of equipment to which it is connected. Minimum NEMA 1 for indoor installations and NEMA 3R for exterior locations.]

D. **[Include this entire section if you are spec'ing an SPD for external mounting for rooftop or exterior circuits. Otherwise delete it.]**[Individual Dedicated Surge Protective Devices for Rooftop or Exterior Circuits

1. Rooftop or Exterior Circuits greater than 30A (Compliance to FBC 449.3.15.6 and 450.3.27.5)
   a. All voltage must be verified by location on drawings, one-line diagrams and equipment scheduled. Circuits are to be surge protected with SPD's having a `minimum surge current capacity of 50kA per phase. SPD modes of protection

shall be (L-G and L-L) for circuits without a neutral and (L-G, G-N, and L-L) for circuits including a neutral.

b. SPD shall be connected to load equipment or load disconnect following section 3.1 installation requirements.

2. Rooftop or Exterior Circuits less than 30A (Compliance to FBC 449.3.15.6 and 450.3.27.5)

a. Meeting the intent of NEC 314.28, low amperage (30A or less) 1 or 2-pole circuits are to be surge protected by running circuits through a surge protected hub or tap box. This type of installation needs to be made during the rough in stage when conduits are being pulled. When utilizing a tap box, SPDs are mounted on the exterior of the box and cabled to power distribution blocks.

b. SPDs are fastened to a dedicated enclosure or mounted within a hub containing UL 1953 listed power distribution blocks allowing for straight or angled tap box pulls. Power distribution blocks allow for safe a secure circuit taps that allow for SPD connection as well.

c. Circuits are to be surge protected with SPD's having a minimum surge current capacity of 50kA per phase. SPD modes of protection shall be (L-G and L-L) for circuits without a neutral and (L-G, G-N, and L-L) for circuits including a neutral.***]***

PART 3 - EXECUTION

3.1 EXAMINATION

A. (Section 01700) - Execution Requirements: Verification of existing conditions before starting work.

1. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive work.
2. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
3. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the owner.

3.2 INSTALLATION

A. Power protection SPD installation shall meet the following criteria:

1. Install per manufacturer's recommendations and contract documents.
2. Install units plumb, level and rigid without distortion
3. One primary suppressor shall be installed external to the service entrance in accordance with manufacturer instructions.
4. Service Entrance SPD shall be installed on the line or load side of the main service disconnect.
5. Service Entrance SPD ground shall be bonded to the service entrance ground.
6. At Service Entrance or Transfer Switch, a UL approved disconnect switch shall be provided as a means of servicing disconnect if a 60A breaker is not available.
7. One SPD shall be installed external to each designated distribution panelboard.
8. At Distribution, MCC and Branch, SPD shall have an independent means of servicing disconnect such that the protected panel remains energized. A 30A breaker (or larger) may serve this function.
9. SPD shall be installed per manufacturer's installation instructions with lead lengths as short (less than 24") and straight as possible. Gently twist conductors together.
10. Installer may reasonably rearrange breaker locations to ensure short & straightest possible leads to SPDs.
11. Before energizing, installer shall verify service and separately derived system Neutral to Ground bonding jumpers per NEC 250.24(B) and 250.28.

3.3 ADJUSTMENTS AND CLEANING

A. Remove debris from SPD and wipe dust and dirt from all components.
   1. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.4 TESTING

A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture's recommendations.
   1. Check all installed panels for proper grounding, fastening and alignment.

END OF SECTION