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

PART 1 - GENERAL

1.1 SCOPE

A. ***[Use for Pre-NEC 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. 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.

C. Upon request, an unencapsulated, complete SPD formally known as TVSS shall be presented for visual inspection.

D. 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-NEC 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, 645, 670, 695, 700, and 708.]***
   4. ***[Use for NEC 2020 NEC 2020: Articles 100, 242, 620, 645, 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. 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. ***[Use for Pre-NEC 2014 Provide Integrally Mounted Surge Protective Devices (SPD) formally known as Transient Voltage Suppressor (TVSS) from one of the following suppliers:]***

B. ***[Use for NEC 2014 Provide Integrally Mounted Surge Protective Devices (SPD) formally known as Transient Voltage Suppressor (TVSS) from one of the following suppliers:]***

C. ***[Use for NEC 2017 Provide Integrally Mounted Surge Protective Devices (SPD) formally known as Transient Voltage Suppressor (TVSS) from one of the following suppliers:]***

D. ***[Use for NEC 2020 Provide Integrally Mounted Overcurrent Protection - 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 in switchgear, switchboards, meter centers and/or motor control centers. Otherwise delete it.]** ***[Use for Pre-NEC 2014 Pre-NEC 2014: Service Entrance Switchgear, Switchboards, Meter and Motor Control Centers][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]***

SPD shall be factory installed integral to electrical distribution equipment, and it shall be UL1449 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.

1. 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.
2. SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR). ***[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.]***
3. SPD shall meet or exceed the following criteria:
   a. **[Do you want our classic TPS3 or our new TPS4? Tip: TPS3 has a surge counter, minimum 300ka surge capacity and a higher voltage protection rating (let-through voltage). TPS4 has an event counter with time/date stamp, minimum 500ka surge capacity and a lower voltage protection rating (let-through voltage)?** ***[TPS3 Minimum surge current capability shall be 300kA per phase.][TPS4Minimum surge current capability shall be 500kA per phase.***
   b. ***[TPS3 UL1449 Most recent edition. Voltage Protection Ratings shall not exceed the following:***
      1.) ***Voltage 208/120V – Line to Neutral, Line to Ground and Neutral to Ground at 700V. Line to Line at 1200V.***
      2.) ***Voltage 480/277V – Line to Neutral, Line to Ground and Neutral to Ground at 1200V. Line to Line at 2000V.***
   c. ***[TPS4 UL1449 Most recent edition. Voltage Protection Ratings shall not exceed the following:***
      1.) ***Voltage 208/120V – Line to Neutral, Line to Ground and Neutral to Ground at 500V. Line to Line at 1000V.***
      2.) ***Voltage 480/277V – Line to Neutral and Line to Ground at 1000V. Neutral to Ground at 900V. Line to Line at 2000V.***
4. UL1449 Listed Maximum Continuous Operating Voltage (MCOV) (verifiable at UL.com):

System Voltage	Allowable System Voltage Fluctuation (%)
208Y/120	25%
480Y/277	15%

5. SPD shall incorporate a UL 1283 listed EMI/RFI filter with minimum attenuation of -50dB at 100 kHz.
6. Suppression components shall be heavy duty 'large block' MOVs, each exceeding 30mm diameter.
7. SPD shall be serviceable and replaceable.
8. 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. ***[TPS3 Surge Counter][TPS4 Event Counter with time and date stamp]***

   No other test equipment shall be required for SPD monitoring or testing before or after installation.
9. SPD shall have a response time no greater than 1/2 nanosecond.
10. SPD shall have a 10-year warranty.

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

1. SPD shall be factory installed integral to electrical distribution equipment, and it shall be UL1449 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 factory installed integral to electrical distribution equipment.
3. SPD shall be UL labeled with 20kA I-nominal (I-n)
4. SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR).
5. ***[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.***
6. SPD shall be connected to the bus of the distribution equipment with an appropriately sized 200kA SCCR rated disconnect.
7. SPD shall meet or exceed the following criteria:
   a. ***[TPS3 Minimum surge current capability shall be 150kA per phase.][TPS4 Minimum surge current capability shall be 300kA per phase.]***
8. ***[TPS3 UL1449 Most recent edition. Voltage Protection Ratings shall not exceed the following:***
   a. ***Voltage 208/120V – Line to Neutral, Line to Ground and Neutral to Ground at 700V. Line to Line at 1200V.***
   b. ***Voltage 480/277V – Line to Neutral, Line to Ground and Neutral to Ground at 1200V. Line to Line at 2000V.***

9. ***[TPS4 UL1449 Most recent edition. Voltage Protection Ratings shall not exceed the following:***
   a. ***Voltage 208/120V – Line to Neutral, Line to Ground and Neutral to Ground at 500V. Line to Line at 1000V.***
   b. ***Voltage 480/277V – Line to Neutral and Line to Ground at 1000V. Neutral to Ground at 900V. Line to Line at 2000V.]***
10. 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 (%)
208Y/120	25%
480Y/277	15%

11. SPD shall incorporate a UL 1283 listed EMI/RFI filter with minimum attenuation of -50dB at 100 kHz.
12. Suppression components shall be heavy duty 'large block' MOVs, each exceeding 30mm diameter.
13. SPD shall include a serviceable, replaceable module.
14. 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. ***[TPS3 Surge Counter][TPS4 Event Counter with time and date stamp]***
    e. No other test equipment shall be required for SPD monitoring or testing before or after installation.
15. SPD shall have a response time no greater than 1/2 nanosecond.
16. SPD shall have a 10-year warranty.

C. **[Include this entire section if you are spec'ing an SPD inbranch panelboards Otherwise delete it.]** ***[Use for Pre-NEC 2014 Branch Panels - Pre-NEC 2014: Branch Panelboards][Use for NEC 2014 Branch Panels - NEC 2014: Normal and Emergency Power Branch Panelboards][Use for NEC 2017 Branch Panels - NEC 2017: Normal and Emergency Power Branch Panelboards][Use for NEC 2020 Branch Panels - NEC 2020: Normal and Emergency Power Branch Panelboards]***
1. The panelboard shall be UL 67 Listed and the SPD shall be UL1449 Type 2 applications.
2. The unit shall be top or bottom feed according to requirements. A circuit directory shall be located inside the door.
3. SPD shall be factory installed integral to electrical distribution equipment, and it shall be UL1449 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.
4. SPD shall be factory installed integral to electrical distribution equipment.
5. SPD shall be UL labeled with 20kA I-nominal (I-n)
6. SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR).
7. "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.
8. SPD shall be connected to the bus of the distribution equipment with an appropriately sized 200kA SCCR rated disconnect.
9. SPD shall meet or exceed the following criteria:

a. ***[TPS3 Minimum surge current capability shall be 100kA per phase.][TPS4 Minimum surge current capability shall be 200kA per phase.***

10. ***[TPS3 UL1449 Most recent edition. Voltage Protection Ratings shall not exceed the following:***
    a. ***Voltage 208/120V – Line to Neutral, Line to Ground and Neutral to Ground at 700V. Line to Line at 1200V.***
    b. ***Voltage 480/277V – Line to Neutral, Line to Ground and Neutral to Ground at 1200V. Line to Line at 2000V.]***
11. ***[TPS4 UL1449 Most recent edition. Voltage Protection Ratings shall not exceed the following:***
    a. ***Voltage 208/120V – Line to Neutral, Line to Ground and Neutral to Ground at 500V. Line to Line at 1000V.***
    b. ***Voltage 480/277V – Line to Neutral and Line to Ground at 1000V. Neutral to Ground at 900V. Line to Line at 2000V.]***
12. UL1449 Listed Maximum Continuous Operating Voltage (MCOV) (verifiable at UL.com):

System Voltage	Allowable System Voltage Fluctuation (%)
208Y/120	25%
480Y/347	15%

13. SPD shall incorporate a UL 1283 listed EMI/RFI filter with minimum attenuation of -50dB at 100 kHz.
14. Suppression components shall be heavy duty ‘large block’ MOVs, each exceeding 30mm diameter.
15. SPD shall include a serviceable, replaceable module.
16. 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
    c. Form C dry contacts
    d. ***[TPS3 Surge Counter][TPS4 Event Counter with time and date stamp]***

    No other test equipment shall be required for SPD monitoring or testing before or after installation. **William: Delete this question on the next line**
17. The field connections to the panelboard shall be main lug or main breaker.
18. The unit shall be constructed with flush or surface mounted trim and shall be in a NEMA Type 1 enclosure.

D. **[Include this entire section if you are spec’ing an SPD in Elevators, Dumbwaiters, Escalators, Moving Walks, Platform Lift, or Stairway Chairlifts. Otherwise delete it.*[Emergency System Load Disconnects for Elevators, Dumbwaiters, Escalators, Moving Walks, Platform Lifts or Stairway Chairlifts in compliance to Article 620.51(E).***

1. SPD shall be mounted internal to emergency load disconnect, 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 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 L-N/G and L-L modes of protection.
5. SPD shall be directly connected to disconnect.
6. SPD shall meet or exceed the following criteria:
   a. ***[TPS3 Minimum surge current capability shall be 50kA per phase.][TPS4 Minimum surge current capability shall be 100kA per phase.]***
7. ***[TPS3 UL1449 Most recent edition. Voltage Protection Ratings shall not exceed the following:***

a. ***Voltage 208/120V – Line to Neutral, Line to Ground and Neutral to Ground at 700V. Line to Line at 1200V.***
b. ***Voltage 480/277V – Line to Neutral, Line to Ground and Neutral to Ground at 1200V. Line to Line at 2000V.]***

8. ***[TPS4 UL1449 Most recent edition. Voltage Protection Ratings shall not exceed the following:***
   a. ***Voltage 208/120V – Line to Neutral, Line to Ground and Neutral to Ground at 500V. Line to Line at 1000V.***
   b. ***Voltage 480/277V – Line to Neutral and Line to Ground at 1000V. Neutral to Ground at 900V. Line to Line at 2000V.***

9. 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 (%)
208Y/120	25%
480Y/277	15%

10. Suppression components shall be heavy duty 'large block' MOVs, each exceeding 30mm diameter.
11. SPD shall be equipped with the following diagnostics:
    a. Visual protection status LED diagnostic indicator
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.]

E. **[Include this entire section if you are spec'ing an SPD in 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 INSTALLATION

A. Install per manufacturer's recommendations and contract documents.

3.2 ADJUSTMENTS AND CLEANING

A. Remove debris from installation site and wipe dust and dirt from all components.

B. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.3 TESTING

A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture's recommendations.

B. Check all installed panels for proper grounding, fastening and alignment.

3.4 WARRANTY

A. Equipment manufacturer warrants that all goods supplied are free of non-conformities in workmanship and materials for one year from date of initial operation, but not more than eighteen months from date of shipment.

END OF SECTION