Standards Update Notice (SUN)

Issued: March 13, 2017

Standard Information

Standard Number: UL 1449
Standard Name: Standard for Safety for Surge Protective Devices
Standard Edition and Issue Date: 4th Fourth Edition, Dated August 20, 2014
Date of Revision: March 17, 2016
Date of Previous Revision to Standard: 4th Fourth Edition Revised March 26, 2015

Effective Date of New/Revised Requirements

Effective Date (see Schedule below): **December 29, 2017**

Impact, Overview, Fees and Action Required

Impact Statement: A review of all Listing Reports is necessary to determine which products comply with new/revised requirements and which products will require re-evaluation. **NOTE:** Effective immediately, this revised standard will be exclusively used for evaluation of new products unless the Applicant requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revised requirements.

Overview of Changes: Revision of PV requirements, Testing methods for Combination Type SPDs, Interchangeability of Metal Oxide Varistors (MOVs), Addition of tolerance requirements, Addition of requirements for DC SPDs, Addition of requirements for Open Type SPDs, Addition of requirements for SPDs intended for connection using exposed wiring methods, SPDs with only N-G protection, Editorial corrections to Table 36.2, Clarification of test method for Fault Current and Overcurrent Tests, Type 3 SPD - cord connected intended to be permanent mounted on furniture. Specific details of new/revised requirements are found in table below.

If the applicable requirements noted in the table are not described in your report(s), these requirements will need to be confirmed as met and added to your report(s) such as markings, instructions, test results, etc. (as required).

Client Action Required:

Information – To assist our Engineer with review of your Listing Reports, please submit technical information in response to the new/revised paragraphs noted in the attached or explain why these new/revised requirements do not apply to your product (s).

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.

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Description of New/Revised Technical Requirements

Clause	Verdict	Comment
-	-	*Additions to existing requirements are underlined and deletions are shown ~~lined out~~ below.*
1	Info	Scope
1.1		These requirements cover enclosed and open-type Surge Protective Devices (SPDs) designed for repeated limiting of transient voltage surges as specified in the standard on 50 or 60 Hz power circuits not exceeding 1000 V and for PV applications up to 1500 V dc and designated as follows: Type 1 – Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service equipment overcurrent device, as well as the load side, including watt-hour meter socket enclosures and Molded Case SPDs intended to be installed without an external overcurrent protective device. Type 1 SPDs for use in PV systems can be connected between the PV array and the main service disconnect.
3.11.1		ENCLOSED SPD – A SPD provided with a complete enclosure in accordance with the construction requirements of this standard.
3.25.1		OPEN-TYPE SPD – A Type 1, 2 or 3 SPD, with an incomplete or partial enclosure and with field wiring terminals and/or leads, suitable for field installation, in accordance with the National Electrical Code, ANSI/NFPA 70, within a suitable enclosure.
6.6		Unless specified otherwise, open-type SPDs shall comply with the applicable requirements for the SPD Type, as specified in this standard.
7.4	Info	**Open-type SPDs**
7.4.1		Any part of an open-type SPD intended to be installed through an opening in or as part of an enclosure shall comply with the Enclosure requirements for the SPD Type.
14.1.1.5		An SPD provided with integral pigtail leads intended for connection in the field to a power supply circuit conductor shall be provided with a conduit connection means that is acceptable in accordance with the National Electrical Code, ANSI/NFPA-70. Exception: Conduit connection means are not required for open-type SPDs.
18.9		For open-type SPDs, the spacings between live parts and metal parts that may be grounded, such as the heads of mounting screws that pass through an insulating panel, shall be judged as if they were grounded parts within an enclosure. The spacing between uninsulated live parts and the surface on which the device may be mounted is to be judged as if the mounting surface were part of an enclosure.

Clause	Verdict	Comment
33.1		The following requirements shall be applied when substituting discrete component Type 5 MOVs within SPDs: a) Interchangeability of MOVs shall be applicable to Type 1, Type 2, or Type 1, 2, component assemblies and Type 4 component assemblies. Also, Type 3, Type 3 component assemblies where the MCOV of the MOVs is greater than the Current Testing voltage in Table 44.1. b) ~~The SPD shall be provided with a metal enclosure or a plastic enclosure that complies with flammability 5 inch (127 mm) flame test in the Standard for Polymeric Materials-Use in Electrical Equipmemt Evaluations, UL 746C.~~ c) Replacement MOV shall have the same orientation and location as the original MOV. d) Replacement MOV shall comply with the requirements in this standard. e) Replacement MOV shall have the same MCOV as the original MOV with a maximum tolerance of ~~±2%~~ ±4%. f) Replacement MOV disk diameter shall be equal to the original MOV or the geometric area shall be equal, i.e. when replacing a round MOV with a square one with a tolerance of ±10%. g) Replacement MOV shall have the following test specification data equivalent to the original MOV: 1) Nominal Discharge Current, (I_n) ~~Peak Surge Current~~ i) Replacement MOV shall have an equal or greater In rating as the original MOV. 2) Measured Limiting Voltage (MLV) i) Replacement MOV MLV shall be less than ~~or equal to, but not greater than 10 percent, of the original MOV.~~ 110% of the original MOV. Exception: If replacement MOV(s) has a MLV rating, greater than 110%, conduct Determination of Voltage Protection Rating Test, Section 40.6 on the SPD with the replacement MOV installed. If the average limiting voltage measured is less than or equal to, but not greater than 10% of the average limiting voltage measured using the original MOV(s), then the replacement MOV is considered to comply with this requirement. 3) Dielectric Withstand i) ~~Replacement MOV shall comply with the Dielectric Withstand Test in this standard.~~ 4) Nominal Varistor Voltage i) Replacement MOV nominal varistor voltage (Vn) shall be within ±4% of the original MOV's nominal varistor voltage (Vn). h) ~~The replacement MOV epoxy flammability rating shall be equivalent to the original MOV epoxy flammability rating with a minimum UL 94 V-0.~~ The coating of the replacement MOV shall be of the same generic material, such as epoxy powder coating, as the original MOV.
Table 36.1		**SPD Testing Matrix**
Table 36.2		**Testing for Type 5 and Type 4 Component Assemblies**

Clause	Verdict	Comment
39.16		Open-type SPDs, subjected to the Temperature Test, shall be mounted in an enclosure considered representative of the intended use. The maximum enclosure dimensions are to be determined by one of the following methods: a) 150 percent of the dimensions of the device – that is, length, width, and height; b) Dimensions needed to meet the wire-bending space specified in UL 508, Table 6.8; c) The intended enclosure, such as a standard outlet box; or d) The intended enclosure, which may be larger than indicated in 39.16(a) – (c) provided the size is marked on the device, detailed in the installation instructions or provided on a separate stuffer sheet. (See 80.35).
Table 44.1		d The test voltage may be increased beyond the minimum values when agreed upon by all concerned parties.
44.1.11		Creation of any openings in the enclosure that result in accessibility of live parts, when evaluated in accordance with the accessibility of live parts test in 66.2. For open-type SPDs only, this applies to parts intended to be installed through an opening in or as part of an enclosure.
44.2.3(c)		~~Use lower voltage rated (MCOV shall be in a range of 60 – 80 percent of the nominal system voltage of the SPD mode being tested) nonlinear voltage limiting components from the same manufacturer and product family with identical chemical composition. Test the lower voltage rated component at the maximum voltage specified in 44.1~~. Use lower voltage rated nonlinear voltage limiting and/or voltage switching components. Test at the maximum voltage specified in 44.1 until disconnection occurs. 1) Voltage limiting components may be replaced with lower voltage rated components from the same manufacturer and product family with identical chemical composition. 2) Voltage switching devices may be replaced with lower voltage rated (breakdown voltage is lower than the peak of the test voltage) components from the same manufacturer and product family with identical physical dimensions. 3) For combination type SPDs with voltage limiting components in series with voltage switching devices, voltage limiting components may be replaced with lower voltage rated components from the same manufacturer and product family with identical chemical composition and voltage switching devices may be replaced with lower voltage rated (breakdown voltage is lower than the peak of the test voltage) components from the same manufacturer and product family with identical physical dimensions to achieve conduction.

Clause	Verdict	Comment
44.3.2(c)		~~Use lower voltage rated (MCOV shall be in a range of 60 - 80 percent of the nominal system voltage of the SPD mode being tested) nonlinear voltage limiting components from the same manufacturer and product family with identical chemical composition. Test the lower voltage rated component at the maximum voltage specified in 44.1.~~ Use lower voltage rated nonlinear voltage limiting and/or voltage switching components. Test at the maximum voltage specified in 44.1 until disconnection occurs. 1) Voltage limiting components may be replaced with lower voltage rated components from the same manufacturer and product family with identical chemical composition. 2) Voltage switching devices may be replaced with lower voltage rated (breakdown voltage is lower than the peak of the test voltage) components from the same manufacturer and product family with identical physical dimensions. 3) For combination type SPDs with voltage limiting components in series with voltage switching devices, voltage limiting components may be replaced with lower voltage rated components from the same manufacturer and product family with identical chemical composition and voltage switching devices may be replaced with lower voltage rated (breakdown voltage is lower than the peak of the test voltage) components from the same manufacturer and product family with identical physical dimensions to achieve conduction.
Table 44.4		**Intermediate current test – available fault current from AC source of supply for Type 1 and Type 2 SPDs**
Table 44.5		**Intermediate current test – available fault current from the AC source of supply for Type 3 SPDsb**
Table 44.6		**Limited available short circuit current (A)**
49.1.1		The representative devices shall be placed on a softwood surface covered with a double layer of white tissue paper. The orientation of the representative device shall be such as to create the most severe conditions representative of normal installation. Each representative device is to be loosely draped with a double layer of cheesecloth. The cheesecloth shall cover openings (for example, receptacle openings, ventilation openings) where flame, molten metal, or other particles may be expelled as a result of the test. However, the cheesecloth shall not be deliberately pushed into openings. Exception: For totally enclosed devices, having provisions for conduit connection(s), the cheese cloth shall be kept away from the conduit opening. This is accomplished by installing a length of conduit that directs venting away from the cheesecloth. Alternatively, when conduit is not installed, a 2 inch cheesecloth margin is to be maintained around the conduit opening.
49.3		Charring, glowing, or flaming of the supporting surface, tissue paper, or cheesecloth.

Clause	Verdict	Comment
50.1.1		The representative devices shall be placed on a softwood surface covered with a double layer of white tissue paper. The orientation of the representative device shall be such as to create the most severe conditions representative of normal installation. Each representative device is to be loosely draped with a double layer of cheesecloth. The cheesecloth shall cover openings (for example, receptacle openings, ventilation openings) where flame, molten metal, or other particles may be expelled as a result of the test. However, the cheesecloth shall not be deliberately pushed into openings. Exception: For totally enclosed devices, having provisions for conduit connection(s), the cheese cloth shall be kept away from the conduit opening. This is accomplished by installing a length of conduit that directs venting away from the cheesecloth. Alternatively, when conduit is not installed, a 2 inch cheesecloth margin is to be maintained around the conduit opening.
56	Info	Strain Relief Test
56.1		The strain-relief means provided on the supply cord of a cord-connected SPD, or the specified cable installed in a SPD intended for connection using exposed wiring methods, shall withstand for one minute without displacement a direct pull of 156 N (35 lbf) applied to the cord with the connections within the SPD disconnected.
73B	NEW	**Strength of Mounting Test**
73B.1		SPDs intended for connection using exposed wiring methods shall be mounted in accordance with the manufacturers installation instructions. A force, in addition to the weight of the equipment, is applied downwards through the center of gravity of the equipment, for 1 min. The additional force shall be equal to three times the weight of the equipment but not less than 156 N (35 lbf). The equipment and its associated mounting means shall remain secure during the test. After the test, there shall be no malfunction of or damage to the mounting bracket, its securing means, or the SPD.
79.5		Status or alarm circuit connections provided within SPDs shall be provided with the following electrical ratings: voltage (volts), ac power frequency (Hz) or direct current (dc), current (amperes), type of load and, if applicable, ″Class 2″.
80.2.1		Type 1 and 2 SPDs and Component Assemblies intended for connection to and protection of the Neutral to Ground mode only, shall be marked: ″Neutral to Ground Applications Only″ or the equivalent. ″WARNING: Risk of Electric Shock or Fire – Do not install in 120 VAC Single Phase cordconnected, direct plug-in and receptacle type applications.″ Lettering shall not be less than 2.4 mm (3/32 inch) high.
80.9		An SPD rated for use in an elevated, 40°C (104°F) or higher, ambient air temperature, see 79.4, shall be marked to indicate the maximum rated ambient air temperature.

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80.12		Type 2 SPDs and Permanently-Connected Type 3 (other than receptacle type) SPDs intended to be installed at the utilization equipment being protected requiring an external fuse or circuit breaker as specified in 44.1.14 shall be marked in accordance with 80.11 and, in conjunction with that marking shall also be marked ″When Protected by __a__ Class Fuses rated: _b____and minimum c_, Volts″ and/or ″ When protected by a circuit breaker rated: _b _ and _minimum c_, Volts.” a) Class CC, CD, G, H, J, L, R, T or K fuse. Reference to Class H or Class K fuses shall not appear in the marking if the indicated rms symmetrical fault current is greater than 10,000 A. b) Current rating of fuse or circuit breaker. c) Nominal system voltage. Exception: For other than Molded Case and open-type SPDs, the marking may be on a separate sheet or in the installation instruction if there is not sufficient room on the device for the marking. Molded Case SPDs requiring an external fuse or circuit breaker, shall be marked as detailed above. Location of required markings for Molded Case SPDs shall be in accordance with the ″Location Categories″ in UL 489, Tables 9.1 and 13.1.
80.35		SPDs provided with terminals for connection of field-wiring shall have the following markings adjacent to the terminal: a) Conductor size or range of sizes; b) Tightening torque or range of values; c) Solid or stranded conductor other than as shall be marked ″Solid″ (or “Sol”) or ″Stranded″ (“or Str”) or with both markings as applicable; d) ″Al Only″ or ″Use Aluminum Conductors Only ″ if the terminal is acceptable only for connection to aluminum wire; or ″Cu/Al″ or ″Use Copper or Aluminum Conductors″ or ″Use Copper, Copper-Clad Aluminum, or Aluminum Conductors ″ if the terminal is acceptable for connection to either copper or aluminum wire; or ″Cu Only″ or ″USE COPPER OR COPPER-CLAD ALUMINUM CONDUCTORS ″ if the terminal is acceptable for connection to either copper or copper-clad aluminum wire; e) If a terminal is acceptable for the connection of more than one conductor in the same opening and is intended for such use, the marking shall indicate the proper connection; and f) Conductor strip length. Exception: A field-wiring terminal intended only for the connection of a control circuit conductor (i.e. a status circuit) is not required to be marked with a value of tightening torque when tested in accordance with the applicable requirements in UL 486A-486B or UL 486E, with a value of tightening torque of 7 pound-inches (0.8 N•m).

Clause	Verdict	Comment
80.36		An open-type SPD intended for use in an enclosure, larger than indicated in 39.16 (a) – (c), shall be marked with the intended enclosure dimensions. Exception: This marking is able to be provided on a separate sheet or in the installation instructions when there is not sufficient room on the device for the marking.
80.37		SPDs provided with status or alarm circuit connections shall be marked with the following electrical ratings as applicable to the status or alarm circuit connections: voltage (volts), ac power frequency (Hz) or direct current (dc), current (amperes), type of load and, if applicable, ″Class 2″. Exception No. 1: If the type of load is general purpose, a type of load marking is not required. Exception No. 2: This marking is able to be provided on a separate sheet or in the installation instructions when there is not sufficient room on the device for the marking.
80.38		Open-type SPDs shall be marked ″Installation within an enclosure required, see installation instructions″ or the equivalent.
80.39		An SPD, intended for connection using exposed wiring methods, shall be marked ″CAUTION: Risk of Electric Shock – Only intended for installation in accordance with National Electrical Code, ANSI/NFPA-70, Article 398″ or the equivalent.
81.1(b)		Instructions for mounting. For open-type SPDs, instructions specify that the SPD is intended for installation within a suitable enclosure in accordance with the National Electrical Code, ANSI/NFPA 70.
81.1(g)		SPDs with terminals for connection of field-wiring shall include: 1) Conductor size or range of sizes; 2) Tightening torque or range of values; 3) Solid or stranded conductor other than as shall be marked ″Solid″ (or ″Sol″) or ″Stranded″ (″or Str″) or with both markings as applicable; 4) ″Al Only″ or ″Use Aluminum Conductors Only ″ if the terminal is acceptable only for connection to aluminum wire; or ″Cu/Al″ or ″Use Copper or Aluminum Conductors ″ or ″Use Copper, Copper-Clad Aluminum, or Aluminum Conductors ″ if the terminal is acceptable for connection to either copper or aluminum wire; or ″Cu Only″ or ″USE COPPER OR COPPER-CLAD ALUMINUM CONDUCTORS ″ if the terminal is acceptable for connection to either copper or copper-clad aluminum wire. 5) If a terminal is acceptable for the connection of more than one conductor in the same opening and is intended for such use, the marking shall indicate the proper connection; and 6) Conductor strip Length.
81.4		An SPD, shall be provided with installation instructions and the parts needed to mount the product as instructed, unless the parts are readily available to the installer. Parts not provided shall be described in detail in the instructions, with a warning that no substitutions shall be permitted.
81.5		Installation Instructions for an SPD intended for connection using exposed wiring methods shall include the following or equivalent wording: ″CAUTION: Risk of Electric Shock – Only intended for installation in accordance with National Electrical Code, ANSI/NFPA-70, Article 398″.

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Clause	Verdict	Comment
SUPPLEMENT SA	NEW	**PHOTOVOLTAIC (PV) SPDs**
SUPPLEMENT SB	NEW	**DIRECT CURRENT (DC) SPDs**
SB1	Info	Scope
SB1.1		These requirements cover DC SPDs intended for use in general DC applications, not exceeding 1500 Vdc, where the available dc short circuit current is greater than 2.5A, and known as DC SPDs. DC SPDs shall comply with the requirements in this standard except as amended by this Supplement, as follows.
		CUSTOMERS PLEASE NOTE: This Table and column "Verdict" can be used in determining how your current or future production is or will be in compliance with new/revised requirements.