STANDARDS UPDATE NOTICE (SUN)
ISSUED: April 25, 2108

STANDARD INFORMATION

Standard Number: UL 1449
Standard Name: Standard for Surge Protective Devices
Standard Edition and Issue Date: 4th Edition Dated August 20, 2014
Date of Revision: March 17, 2016 and July 12, 2017
Date of Previous Revision of Standard: March 26, 2015

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **January 16, 2020**

IMPACT, OVERVIEW, 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. **N OTE:** 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requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revised requirements.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:

March 17, 2016:

- 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.
- Type 3 SPD - cord connected intended to be permanent mounted on furniture.

July 12, 2017:

- Revision to PV SPD requirements, Supplement SA.
- Revision to DC SPD requirements, Supplement SB.
- Field wiring terminals.
- Clarifications regarding capacitors.
- PTC-MOV combination SPD's.
- Scope revision and clarification of Withstand Test.

- SPD's in high altitudes.
- Clarification of the Inclined Plane Tracking Test.
- Type 3 SPD with hospital grade receptacles.
- Revision to Clause 23 regarding electromagnetic relays.

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.

STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		Additions to existing requirements are underlined and deletions are shown ~~lined out~~ below.
		The following changes reflect the March 17, 2016 revision
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.
	Info	**CONSTRUCTION**

6	Info	**General**
6.6		***New clause added;*** Unless specified otherwise, open-type SPDs shall comply with the applicable requirements for the SPD Type, as specified in this standard.
7.4		***New section added;*** **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.
18	Info	**Spacings**
18.9		***New clause added;*** 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.
33	Info	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 ~~±%~~ ±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, (In) ~~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.
39	Info	**Temperature Test**
39.16		***New clause added;*** 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 or a separate stuffer sheet. (See 80.35).
44	Info	**Current Testing**
Table 44.1		[d] The test voltage may be increased beyond the minimum values when agreed upon by all concerned parties.
44.1	Info	**General**
44.1.11		d) 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	Info	**Short circuit current rating test – For Type 1 and Type 2 SPDs and permanently connected Type 3 SPDs**
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.
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 SPDs**
Table 44.6		**Limited available short circuit current (A)**
49	Info	**Fault Current Test**
49.1.1		***New clause added;*** 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		b) Charring, glowing, or flaming of the supporting surface, tissue paper, or cheesecloth.
50	Info	**Overcurrent Test**

50.1.1	Info	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 <u>of a cord-connected SPD, or the specified cable installed in a SPD intended for connection using exposed wiring methods,</u> 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 section added;*** **Strength of Mounting Test**
73B.1		SPDs intended for connection using exposed wiring methods shall be mounted in accordance with the manufacturer's 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.
	Info	**RATINGS**
79	Info	**General**
79.5		***New clause added;*** 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".
	Info	**MARKINGS**
80	Info	**Details**

80.2.1	***New clause added;*** 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 cord-connected, direct plug-in and receptacle type applications." Lettering shall not be less than 2.4 mm (3/32 inch) high.
80.9	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	***New clause added;*** 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 No. 1: This marking is able to be provided on a on a stuffer sheet, on the individual carton or in the installation instructions when there is not sufficient room on the device for the marking. Exception No. 2: 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-486Bor UL 486E, with a value of tightening torque of 7 pound-inches (0.8 N•m).
80.36		***New clause added;*** 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		***New clause added;*** 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		***New clause added;*** Open-type SPDs shall be marked “Installation within an enclosure required, see installation instructions” or the equivalent.
80.39		***New clause added;*** 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.
	Info	**INSTRUCTION MANUAL**

81	Info	**Details**
81.1 b)		Instructions for mounting. For open-type SPDs, specifies 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		***New clause added;*** 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		***New clause added;*** 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”.
Supplement SA		***New supplement added;*** **PHOTOVOLTAIC (PV) SPDs**
Supplement SB		***New supplement added;*** **DIRECT CURRENT (DC) SPDs**
		The following changes reflect the July 12, 2017 revision

9	Info	**Insulating Materials**
9.1.2.1		***New clause added;*** When required by 9.1.2, the Inclined-Plane Tracking Test, UL 746C, shall be conducted on the insulating material used in SPDs rated over 600V at the rated voltage of the SPD. For dc rated SPDs, the equivalent ac voltage may be used where Vac=Vdc/1.414.
12	Info	**Supplementary Protection**
12.19		***New section added;*** An MOV provided with an integral PTC thermistor shall comply with the requirements in Section 73C, and the PTC thermistor shall comply with the requirement of the Standard for Thermistor-Type Devices, UL 1434 as current limiting devices with 100,000 times endurance cycles.
14	Info	**Supply Connections**
14.1	Info	**Type 1, Type 2 and Type 3 SPD – Permanently Connected**
14.1.3		***New section added;*** Pressure wire connectors
14.1.3.1		A field-wiring pressure wire connector provided with or specified for use an SPD shall comply with one of the following, as applicable: a) The performance requirements in the Standard for Wire Connectors, UL 486A-486B; or b) The performance requirements in the Standard for Equipment Wiring Terminals for Use With Aluminum and/or Copper Conductors, UL 486E.
14.1.3.2		The tightening torque for a field-wiring terminal shall be as specified by the SPD manufacturer and shall be marked as specified in 80.35 or 81.1. The specified tightening torque shall not be less than 90 percent of the value employed in the temperature test or static heating test as specified in the requirements in the Standard for Wire Connectors, UL 486A-486B, or the Standard for Equipment Wiring Terminals for Use With Aluminum and/or Copper Conductors, UL 486E, for that wire size corresponding to the ampere rating of the industrial control equipment. *Exception: When the tightening torque is less than 90 percent of the value specified, the connector shall be investigated in accordance with UL 486A-486B, or UL 486E, with the lesser assigned torque value.*
14.1.3.3		A pressure wire terminal shall comply with the Verification of the Performance of Terminal Assemblies Test in the Standard for Terminal Blocks, UL 1059.
14.1.5		***New section added;*** Spring type terminations
14.1.5.1		Spring type terminations shall comply with the requirements in Part III – Spring

		Force Connections in the Standard for Terminal Blocks, UL 1059.
14.1.6		***New section added;*** **Other means**
14.1.6.1		Other equally effective connection means may be used if investigated for the purpose.
14.1.7		***New section added;*** **Lead and terminal identification**
14.1.7.1		A field-wiring terminal intended for the connection of a grounded conductor shall be substantially white in color and shall be easily distinguishable from the other terminals, or proper identification of the terminal for the connection of the grounded conductor shall be clearly shown in some other manner, such as on an attached wiring diagram. If wire leads are provided instead of terminals, the surface of the grounded conductor shall be finished to show white or grey color and shall be easily distinguishable from the other leads.
14.1.7.2		In order to polarize the wiring of a permanently-wired device intended to be connected to a supply circuit rated at 125 V or 125/250 V or less, and employing an overcurrent-protective device other than an automatic control, one terminal or lead shall be identified for the connection of the grounded conductor of the supply circuit. See 14.1.7.1 for identification requirements. The grounded conductor or a terminal identified for this use shall be the one to which no overcurrent-protective devices of the single-pole type is connected.
18A		***New section added;*** **SPDs Used in Higher Altitude**
18A.1		SPDs, rated for use in an altitude greater than 2000 m shall incorporate surge components that are not influenced by changes in outside air pressure and density anticipated at higher altitudes, such as semiconductor devices (MOVs, etc.), hermetically sealed devices (such as Gas Discharge Tubes) or be completely encapsulated. *Exception: SPDs that incorporate components that are influenced by changes in outside air pressure and density, such as open air gap devices, that are not installed within a hermetically sealed or encapsulated environment, shall be subjected to surge testing while installed within a Barometric Chamber at the pressure corresponding to the rated altitude as specified in Table A.2 of IEC 60664–1.*
18A.2		SPDs, rated for use in an altitude greater than 2000 m, shall have through air (Clearance) spacings based on Table 18.1 multiplied by the applicable altitude correction factors specified in Table A.2 of IEC 60664-1.
18A.3		SPDs rated for use in an altitude greater than 2000 m, shall comply with the Conditioning Test, Section 73D.
23	Info	**Isolated Secondary Circuits**

23.1.5		***New clause added;*** An electromechanical relay that is relied upon to provide isolation between primary and secondary circuits or between other circuits, as required by this standard, shall be constructed in accordance with the Standard for Industrial Control Equipment, UL 508, and shall be able to withstand for 1 minute, without breakdown, an ac dielectric voltage withstand potential equal to 1000 V plus twice rated voltage between the input and output circuits.
51	Info	**Withstand Test**
51.1		A ~~Type 1 SPD watt-hour meter socket adapter and Type 2~~ two-port SPDs, intended for use in permanently-connected applications, shall be subjected to testing in accordance with 51.2 – 51.11. The SPD shall withstand the designated current levels until the overcurrent protective device(s) opens and: a) The fuse mentioned in 51.11 shall not open; b) There shall be no breakage to the extent that the integrity of the mounting of live parts is impaired; and c) There shall be no ignition of a double layer of cheesecloth, draped over the SPD so that the cloth is within 3.2 mm (1/8 inch) of any openings in the enclosure.
72	Info	**Capacitor Failure Test**
72.2		Capacitors ~~rated 1 uF or less~~ that comply with the requirements in the Standard for Fixed Capacitors for Use in Electronic Equipment, UL 60384-14, as indicated in Exception 2 of Paragraph 25.1, may be failed in accordance with 72.1, or may be replaced with jumper wire having a minimum gauge size equal to the capacitor leads. The jumper wire shall not open during testing.
73C	Info	***New section added;*** **PTC-MOV Testing Sequence**
73C.1		The test program in Table 73C.1 shall be conducted. Specimen group 1 consists of three test samples. Specimen group 2 and 3 consist of one test sample and is to be conducted for each limited available short circuit current test level, as detailed in Table 44.6. Note: Specimens may employ an additional lead or other connection means to allow for conducting the Calibration Test.

Table 73C.1

Test program

Specimens	Test	UL Standard	Clause
1	Surge Testing Sequence		
	Calibration Test	UL 1443	11
	Surge Testing– Nominal Discharge Current (In)	UL 1449	41
	Repeat Calibration Test	UL 1443	11

		Operational Voltage Test	UL 1449	43
	2	Limited Current Abnormal Overvoltage Test Sequence		
		Calibration Test Limited Current Abnormal Overvoltage Test at each current level for 7 hours measuring surface temperature. (Ts) Repeat Calbration Test	UL 1434 UL 1449 UL 1434	11 44.4 11
	3	Limited Current Abnormal Overvoltage/Overload Cycling Test Sequence		
		Calibration Test Overvoltage/Overload Cycling Test for 50 cycles at each current level measuring surface temperature. (Ts) Repeat Calibration Test	UL 1434 UL 1449 UL 1434 UL 1434	11 73C.2 14 11
73C.2		Samples of the SPD shall be operated for 50 cycles at each current level specified in paragraph 44.4and surface temperature (Ts) shall be measured of the PTC-MOV. The measured surface temperature shall not exceed the manufacturer's specified surface temperature (Ts).		
73D		***New clause added;*** **High Altitude Conditioning**		
73D.1		Three samples of the SPD shall be placed in a barometric chamber for 168 hours. at the pressure corresponding to the rated altitude as specified in Table 18.2 and connected to a source of supply at rated MCOV or 115% of rated voltage, whichever is greater and shall meet the pass criteria as specified in 43.5.		
	Info	**RATINGS**		
79.6		***New clause added;*** An SPD evaluated for use in altitudes above 2000 m shall be rated for this altitude in increments according to Table A.2 of IEC 60664–1.		
	Info	**MARKINGS**		

80.23		A Type 3 SPD, intended for use in other than permanently-connected applications, that incorporates a ~~molded-on or assembled-on~~ hospital grade attachment plug or receptacles shall be marked with the following or equivalent wording: "CAUTION: Risk of Electric Shock – Do not use in General Patient Care Areas or Critical Patient Care Areas. This surge protective device has not been evaluated for use where Article 517 of the National Electrical Code requires Hospital Grade components."
80.40		***New clause added;*** An SPD rated for use in an altitude higher than 2000 m, see 79.6, may be marked to indicate the maximum altitude.
SA	Info	**PHOTOVOLTAIC (PV) SPDs**
SA10	Info	**Thermal Responsive Device Testing (Section 46)**
SA10.2		***New clause added;*** Clause SA8.3 shall be used for Thermal Responsive Device Testing (Section 46). No voltage is to be applied during In testing.
SB	Info	**DIRECT CURRENT (DC) SPDs**
SB10	Info	**Thermal Responsive Device Testing (Section 46)**
SB10.1		Each specimen group consists of 3 test samples and is to be subjected to Current Testing at the 2.5 A and 10 A test levels. Where lower voltage rated MOVs are used, no voltage is to be applied during In testing.
SB14	Info	**Markings**
SB14.2		~~DC SPDs evaluated for general DC Applications only shall be marked: "Suitable for use in DC Systems Only"or the equivalent.~~
SB14.3		~~SPDs evaluated for both AC and general DC Applications may be marked: "Suitable for use in AC and DC Systems." In this case, both the AC and DC ratings shall be marked on the SPD.~~
SB14.4		~~SPDs evaluated for both general DC and PV Applications may be marked: "Suitable for use in DC Systems and Photovoltaic (or PV) Applications."~~
		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.