STANDARDS UPDATE NOTICE (SUN)
ISSUED: April 5, 2021

STANDARD INFORMATION

Standard: IEEE C62.34
Standard ID: Standard for Test Methods and Performance of Low-Voltage (1000 V rms or Less) Surge Protective Devices Used on Secondary Distribution Systems (Between the Transformer Low-Voltage Terminals and the Line Side of the Service Equipment) [IEEE C62.34:2017]
Previous Standard ID: Standard for Performance of Low-Voltage Surge-Protective Devices (Secondary Arresters) [IEEE C62.34:1996]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **April 1, 2022**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard.

Overview of Changes:

- Addition of marking requirements
- New nominal discharge current test
- New loss of neutral test
- New through-fault current withstand test (two-port SPDs only)
- New short circuit current rating (SCCR) test
- New low and intermediate fault current withstand tests
- New rated temporary overvoltage (TOV) withstand verification test
- New temperature rise (two-port SPDs only) test

Specific details of new/revised requirements are found in table below.

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 – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records.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.
5	Info	**Ratings, markings, and information**
5.1		**Identification** The following information shall be provided by the manufacturer: a) *Manufacturer's name, trademark, or trade name b) *Manufacturer's model number c) *Maximum continuous operating voltage (MCOV) d) *Nominal discharge current (per mode) e) Maximum discharge current (per mode) with the MLV f) *Voltage protection level g) *Rated load current (two-port SPDs and in-line SPDs) h) *Labeling of all status indicators (if no indicators are present, this must be stated) i) *Position of normal use (if relevant) or mounting arrangement j) *Terminal markings (if necessary) k) Installation instructions l) *Nationally Recognized Testing Laboratory listings (marks) m) If a loss of neutral withstand voltage rating is assigned by the manufacturer, the relevant test voltage maximum shall be supplied. n) *Short-circuit current rating (SCCR) o) *System configuration (nominal system voltage and type) p) *SPD Type (if listed to ANSI/UL 1449) q) Degree of protection provided by the enclosure (i.e., IP or NEMA rating) r) *External SPD disconnector/over-current protective device requirements (if applicable) s) Storage and operating temperature ranges t) *"Indoor Use," "Outdoor Use," or "Indoor/Outdoor Use" Items marked with an asterisk (*) shall be permanently attached to the arrester in order to permit the complete information to be obtained from the manufacturer. Marking shall be indelible and easily legible. Letters shall be at least 2 mm in height.

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6		**Construction** Secondary arresters with leads shall meet the following specifications: — Current-carrying capacity equal to or greater than copper with a diameter of 1.6 mm (AWG #14); the metallic conductor shall be made of noncorrosive material (e.g., copper or tin-plated copper, but not aluminum). — Arresters with permanently attached wire leads or wire leads attached to screw terminals shall have leads that are insulated to not less than ~~1.2 times the maximum voltage~~ 600 V (ac) or rated system voltage, whichever is greater. Secondary arresters can be suitable for either: — Both indoor and outdoor operation, or — For indoor operation only Arresters for outdoor installations shall be certified for use in that application (i.e., resistant to ultraviolet radiation, water ingress, and corrosion). All secondary arrester housings shall be either nonflammable or self-extinguishing. Refer to UL 94 [B18] and UL 746C [B19] for appropriate verification test methods.
7	Info	**Design tests**
7.1		**General** During design testing, any switches or circuit breakers in the device under test are to be set in the same position as during normal operation of the arrester. Unless otherwise specified, fuses or circuit breakers inside the device under test shall neither be removed nor bypassed during these tests. Many of the tests indicated in this standard test specification are inherently hazardous. The precautions for personnel and property described in this clause shall be observed to reduce safety risks. Existing safety codes and the applicable safety directives and prescriptions of the organization where the tests are being performed shall also be observed. During the testing described in this standard, the voltage and energy levels can be hazardous, and appropriate care shall be exercised. Surge testing can generate significant amounts of electromagnetic interference (EMI). For this reason, care should be taken not to expose personnel with electrical prosthetic devices, including implanted pacemakers, to the immediate environment of a surge test. Consideration shall also be given to the possibility of ignition or explosion within the SPD. Where an examination of the device indicates a likelihood of ignition, factors to be considered include the following:

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a) The amount of combustible material likely to be involved initially
b) The probable rate of propagation
c) The consequences of such propagation; that is, the probability of extension beyond the SPD

Appropriate precautions shall be taken to keep these factors within manageable limits. Precautions may include suitable extinguishing agents in sufficient quantity, physical separation from other combustibles, or other appropriate measures. In evaluating the possibility of explosion, consideration should be given to component failure whenever hazardous materials are available in sufficient quantity to create an explosive atmosphere.

All surge testing shall be conducted by technically qualified personnel who are aware of the hazards of such testing. The voltage and current levels generally associated with surge testing are well above those considered lethal. Some considerations are the possibility of an accidental discharge of the surge generator, the consequences of a flashover to an unfavorable circuit, the possibility of a charge being trapped in the SPD, or the consequence of a violent component failure. Testing personnel should never stand in the line of sight of components on printed circuit boards or panels with the enclosure open during SPD surge testing. On occasion, a component can unexpectedly fail in an explosive manner during surge testing. Fragments of the ruptured case and the component might cause injury to personnel in the vicinity. If visual observation is desired, a suitable transparent barrier shall be provided.

Surge testing of SPDs is best conducted only in an area dedicated solely to that purpose. The boundaries of the area should be clearly defined and appropriately marked. The surge test area should be kept free of all materials, meters, and test setups that are not associated with the surge test being conducted. Where possible, the area should be isolated and equipped with electrical or mechanical interlocks, or both, on all entrances into the test area and on removable barrier panels. All metal fences and barriers should be bonded to the grounding system. Consideration should be given to the possibility of the surge flashing over to circuits or metallic parts that were not intended to be surged.

When the SPD can be enclosed in an effective barrier, the preceding requirements for installation are easier to satisfy. This barrier may simply be sufficient separation—including separation from the floor, which should be presumed to contain conduit or other metal. Alternatively, the entire barrier may be made up of physical insulation. In either case, it should be complete, except where it is penetrated for insertion of input or output lines and measurements probes; and it must be able to provide adequate protection for a peak voltage equal to at least twice the peak of the incident test surge. (Circuits in breakdown mode at or near the surge peak can oscillate at high frequencies. Such oscillatory flashovers can

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		thereby increase effective applied peaks by a factor approaching two.) Interlocks should be provided to reduce risks associated with access between tests. Capacitors in the test circuit or the device under test can retain a trapped charge. Suitable bleeders or short-circuiting devices should be provided to protect the operator against any such trapped charge after passage of the test surge. EMI from surge testing could conceivably cause malfunction of robots and other automatic equipment. Such equipment should be removed from the immediate vicinity of surge testing operations. The importance of conducting surge tests in a prudent manner cannot be overemphasized; safeguarding personnel has to be the prime consideration.
7.3		**Surge parameters** Tests in this standard may be performed with a combination waveform generator or with separate surge generators for current and voltage tests. The specifications for the waveforms are: Open-circuit voltage waveform: — Front time: 1.2 µs ± 0.36 µs — Tail time (time to half value): 50 µs ± 10 µs Short-circuit current waveform from a combination wave generator: — Front time: 8 µs (+1.0 µs, −2.5 µs) — Tail time (time to half value): 20 µs (+8 µs, −4 µs) Short-circuit current waveform from a current surge generator: — Front time: 8 µs (+0.8 µs, −0.8 µs) — Tail time (time to half value): 20 µs (+2 µs, −2 µs) ~~Both voltage and current values shall be as stated ± 10%~~. The voltage peak value shall be as stated ± 3% and the current peak value shall be as stated ± 5%, unless otherwise stated. The ratio of peak open-circuit voltage to peak short-circuit current for the combination wave generator is 2 Ω ± 0.25 Ω.

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7.4	Info	**Determination of voltage protection level**
7.4.4		**Test procedure** The test shall be performed without simultaneously energizing the arrester with power-frequency voltage. No load is used for either a one-port or two-port device under test. The surge generator shall be calibrated for an 8/20 µs current waveform into a short circuit. No further waveform adjustment of the generator is necessary. Apply one surge of each polarity to each mode of protection with a magnitude through the SPD of 0.1, 0.2, 0.5, and 1.0 times the rated nominal discharge current to each line terminal. Measure voltage as follows: a) For a one-port arrester with wire leads, conductors with a length of 150 mm ~~(±10 mm)~~ (−0 mm, +10 mm) (when straight) shall be used between the body of the arrester and the point where the voltage probes are connected to the loop that contains the surge current. b) For arresters that do not have permanently attached wire leads, these tests are to be conducted with 150 mm (~~±10 mm)~~ (−0 mm, +10 mm) of AWG #14 insulated wire attached to each terminal. However, if the manufacturer specifies a wire gauge in the installation instructions, then the test shall be performed with 150 mm ~~(±10 mm)~~ (−0 mm, +10 mm) of the smallest diameter wire recommended by the manufacturer. c) For arresters that are contained inside a panel or enclosure, measurement of the voltage protection level shall be made at a distance of 150 mm ~~(±10 mm)~~ (−0 mm, +10 mm) from the point where the conductors enter or exit the panel or enclosure. d) For arresters that are designed to be used in a revenue (kWh) meter socket, the voltage protection level shall be measured at the socket. e) If a combination waveform generator is used, the peak voltage of the combination wave generator shall be adjusted to impress the specified current amplitude through the SPD.
7.6		***New section added;*** **Nominal discharge current test** This parameter is used to help select an appropriate SPD for the application surge environment and to determine a realistic voltage protection level based on the threat analysis of the facility. Because each facility is different, the point of application of the SPD is different, and therefore, the threat level of each facility is different. SPDs with higher nominal discharge current ratings are used in more severe surge environments. See standard for details.

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7.7		***New section added;*** **Loss of neutral test** This test demonstrates the SPD's ability to deal with a loss of neutral condition due to a corroded connector or conductor or any other system condition which results in a high resistance neutral connection or complete loss. See standard for details.
7.8		***New section added;*** **Through-fault current withstand test (two-port SPDs only)** This test determines if a two-port SPD is capable of withstanding the magnitude of available system fault current that could flow through the SPD terminals (input to output), not as a result of the failure of the SPD, but when a short circuit occurs on the load side of the SPD. See standard for details.
7.9		***New section added;*** **Short circuit current rating (SCCR) test** The capability of an SPD to fail in an acceptable manner when high available fault currents exist is an essential detail of the initial SPD design. The high current SCCR test establishes or verifies the rating of an SPD for the maximum available fault current of a system in which that particular SPD can be installed per the National Electrical Code® (NEC®) [B14]. See standard for details.
7.10		***New section added;*** **Low and intermediate fault current withstand tests** The design of an SPD and its associated OCPD might be optimized for disconnecting and surviving a high current fault test. High current faults are characteristically explosive in nature, whereas low and intermediate faults are more between slow-burn and moderately explosive. Therefore, it can be the case where an SPD and its associated OCPD pass a high current fault test, yet, fail a low fault current, slow-burn type fault test. See standard for details.

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		New section added; **Rated temporary overvoltage (TOV) withstand verification**
7.11		The purpose of this test is to demonstrate that an SPD can withstand TOV conditions that can occur in power distribution systems and remain in service without adverse effects during and after the event. See standard for details.
		New section added; **Temperature rise (two-port SPDs only)**
7.12		Two-port and in-line SPDs are limited in application by the amount of load current that can flow from the input terminals to the output terminals of the device without creating a hazardous condition. A hazardous condition might occur due to the overheating of the connection itself or the current-carrying components of the SPD making up, or connected between, the input and output terminals. See standard for details.
8	Info	**Routine tests**
8.3		**Power-frequency voltage test** Energize each protected mode of the SPD at 110% MCOV for not less than two (2) s. Verify that current is in the normal range declared by the manufacturer.