IEEE C62.41 Categories & Surge Environment

<table>
<thead>
<tr>
<th>Category</th>
<th>Service Entrance &amp; Outdoor Loads</th>
<th>Feeders &amp; Sub distribution Branch Circuit Panels</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category C</td>
<td>Line-side or load-side of service entrance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category B</td>
<td></td>
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<tr>
<td>Category A</td>
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</tbody>
</table>

Expected voltages & currents

- **High** 10kV – 10kA
- **Low** 6kV – 3kA
- 6kV – 0.5kA

UL 1449 SPD TYPES

<table>
<thead>
<tr>
<th>SPD Types</th>
<th>Suggested Surge Current Rating* (See considerations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>High Exposure Level 450 – 300kA, Low Exposure Level 300 – 200kA</td>
</tr>
<tr>
<td>Type 2</td>
<td></td>
</tr>
<tr>
<td>Type 3</td>
<td></td>
</tr>
</tbody>
</table>

Suggested Surge Current Rating* (See considerations)

- **High Exposure Level**
  - 450 – 300kA
  - 200kA
  - 100kA
  - 50kA

- **Low Exposure Level**
  - 300 – 200kA
  - 100kA
  - 50kA

Series

<table>
<thead>
<tr>
<th>Series</th>
<th>STZ</th>
<th>STXT</th>
<th>STXP</th>
<th>STXR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surge Current Rating</td>
<td>450, 300, 200, 150, 100kA</td>
<td>200, 100kA</td>
<td>100kA</td>
<td>50kA</td>
</tr>
<tr>
<td>SCCR</td>
<td>200kA [Permits direct connection to most electrical services]</td>
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</tr>
</tbody>
</table>

Standard Features

- **LED Status**
- **Phase Loss Indication**
- **Form C Contacts**
- **Audible Alarm**
- **EMI/RFI Filter**
- **Surge Counter**

Optional Features

- **NEMA 4X**
- **Disconnect Switch**
- **Standalone for internal installation, optional HMI port**

Approvals

- UL 1449 5th Edition Type 1 SPD - Suitable for Type 1 and 2 applications - CSA C22.2, Type 1 SPD

Warranty

- 15 years
- 10 years
- 10 years
- 5 years
Where do I apply surge protection?

Typical SPD applications within industrial, commercial, and residential areas include:

- Power distribution, control cabinets, programmable logic controllers, electronic motor controllers, equipment monitoring, lighting circuits, metering, medical equipment, critical loads, back-up power, UPS, HVAC equipment.
- Communication circuits, telephone lines, cable TV feeds, security systems, alarm signaling circuits.

Where do I need to install surge protection?

IEEE C62.41.1 defines location categories. These reflect the location in the power system and roughly correspond to UL device types, Category C, B, and A, as shown in the previous page.

Electrical equipment located outside of the building envelope should be considered Category C and Type 1 devices should be utilized at the circuit, because these are more susceptible to external surge events which can bypass the service SPD and enter the building through the external equipment and wiring. Examples of outdoor loads are parking lighting, outdoor HVAC units, gates, water pumps, surveillance cameras.

UL Standard 1449 defines several different types of devices based upon their installation location and use. The three most common are described 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 2 – Permanently connected SPDs intended for installation on the load side of the service equipment overcurrent device; including SPDs located at the branch panel and Molded Case SPDs.
- Type 3 – Point of use SPDs, installed at a minimum conductor length of 10 meters (30 feet) from the electrical service panel to the point of use, for example cord connected, direct plug-in, receptacle type and SPDs installed at the utilization equipment being protected. See marking in 80.3. The distance (10 meters) is exclusive of conductors provided with or used to attach SPDs.

How Much Protection Does your Facility Requires?

There is no formula to determine the exact surge current rating that should be used. Mersen provides a recommended kA rating, but it’s merely a recommendation based on the IEEE considerations.

- **Exposure Level:**
  - Low: Applications known for low lightning activity, little load switching.
  - High: More severe conditions result from extensive exposure to lightning or unusually severe switching surges

- **Equipment:**
  - How critical is the function of the connected equipment, cost of repair, cost of downtime, equipment sensitivity to surges damage, hardware failure or process upset.

- **Electrical system:**
  - Panel size does not play a major role in the selection of a kA rating.
  - SPD voltage must match application voltage. In cases where the input voltage to a panel is Y configuration, but all the loads are either L-G or L-L reference, a Delta system is the preferred SPD voltage configuration.
  - The SPD at or near service entrance or transformer does not require N-G protection. N-G protection mode is suggested downstream of N-G bond when the unit is installed > 10’ (3m) from service entrance or transformer.

Note: this guide is intended for informational purposes only, the electrical specifiers should use their own judgment to determine the need and correct selection of surge protection devices.

Mersen made the diligent efforts to ensure the information to be true and correct, it makes no warranty as to the accuracy and completeness of that Information.