

# TIP SHEET

## NAVIGATING THE UL SAFETY REQUIREMENTS FOR SURGE PROTECTION

BY PETER WALSH, PE, SENIOR FIELD ENGINEER

### I. Introduction

Specifiers and users of Surge Protective Devices (SPDs) are adjusting to new terminology and requirements. UL revised their 1449 Safety Standard for Surge Protective Devices to increase safety. The National Electrical Code (NEC) incorporated specific language to require the use of these safer products. This tip sheet will explain some of the changes affecting specifiers and users.

### II. National Electrical Code SPD Requirements Relating to UL

The NEC is a regulatory requirement for installing most new electrical equipment. OSHA has more impact on the operation of the equipment after installation. They both effectively require safe products for surge protection.

NEC Section 285.5 states, "Listed. An SPD (surge arrester or TVSS) shall be a listed Device." If the installation has to meet the NEC, the SPD has to be listed. Electrical inspectors have the obligation to reject installations not meeting this requirement. Installers and users can have liability issues if they don't comply with the NEC.

NEC Section 100 defines "Listed" as, "Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose."

Electrical inspectors oftentimes require UL listings rather than listings from other test organizations. UL has been very actively involved with electrical safety. UL knows the limitations inherent with their own test standards. They promptly investigate any counterfeiting or unauthorized use of their listing marks.

NEC Section 110.3(B) describes the installation and use of equipment. "Listed or labeled equipment shall be installed and used in accordance with any instructions included in the listing or labeling." That means the UL listing and installation instructions effectively have the weight of the NEC behind it. This is why UL requirements are so important with SPDs.

### III. Background of UL 1449

UL and electrical industry people made substantial revisions for the safety of devices tested to UL 1449 Third Edition. UL officially introduced it in September 2006.

These revisions included changing the device name to Surge Protective Device (SPD) from Transient Voltage Surge Suppressor (TVSS).

The revisions also included new application Categories, new Voltage Protection Ratings, and new testing methods to verify safety. UL requires manufacturers and importers to start using the new Third Edition as of September 2009.

Products are still available that do not comply with the Third Edition. While UL does not permit manufacturing and labeling new products that are

not compliance with the Third Edition, products manufactured and labeled before September 2009 are still available as suppliers liquidate their inventory.

## IV. Installing to Comply with UL 1449

Products that comply with UL 1449 Third Edition are in one of the following Categories:

Category 1: SPDs that have been tested for placement anywhere in the electrical system as long as their ratings are not exceeded. Ratings include voltage, electrical system characteristics, and Short-Circuit Current Rating (SCCR).

Category 2: SPDs similar to category 1, but need to be connected on the load side of the service disconnect overcurrent device.

Category 3: These SPDs are restricted to connection on the load side of a branch circuit overcurrent device at least thirty feet from the service entrance.

Category 4: SPDs in this category are not allowed to be generally applied in field installations. They are missing compliance in at least aspect of the safety standard. It could be as minor as the enclosure doesn't cover the terminal connections, or as major as low SCCR.

UL can mark SPDs with two different classifications. A product that fully complies with the UL 1449 Third Edition categories 1, 2, or 3 is marked with a small holographic label bearing the letters SPD. It also has the UL Listing Symbol.

When a product is compliant only with Category 4 of UL 1449 Third Edition, UL labels it a Recognized Product. Recognized products require additional safety evaluation for the application. This type is not intended to be field applied. Normally this type is installed at an OEM or an electrical panel manufacturer location. If it is integrated into a listed panel, a UL representative will review the application to confirm it meets safety requirements. The UL recognition symbol is shown as a mirror image UR.

Non-UL listed products can be misleading. Some SPD manufacturers self-test their units using their own opinions of what is important. They can state

on the packaging that the SPD is UL 1449 Third Edition compliant, but it is just their opinion. The use of these products is not in compliance with NEC regulations because they are not listed. Some independent third party testing labs will test to only portions of UL 1449 Third Edition at the manufacturer's request. In this case the labels of the SPD can be misleading to the user. That is why electrical inspectors sometimes reject labels that are non-UL.

## V. Some Examples of Complying with UL 1449 and the NEC

If a maintenance person wanted to protect an existing machine panel against voltage surges, he might select a Mersen STT24803PYG. This is rated 277/480 volts supplied by a three-phase wye solidly grounded neutral source with not over 200kA short-circuit current. This is UL listed for a fully compliant field installation.

An OEM could select either the listed Mersen STT24803PYG as above, or the Mersen STP4803PYM, which is only UL recognized. If the UL recognized product is chosen, the application must meet the UL "Conditions of acceptability". In this example, mounting the SPD inside of the machine panel fully complies.

If there is any question about the veracity of an UL SPD status, UL has an easy verification procedure on their website at [www.UL.com](http://www.UL.com). At the bottom of the home page, click on Certifications. Then enter the name of the manufacturer to verify the appropriate UL listing.

