



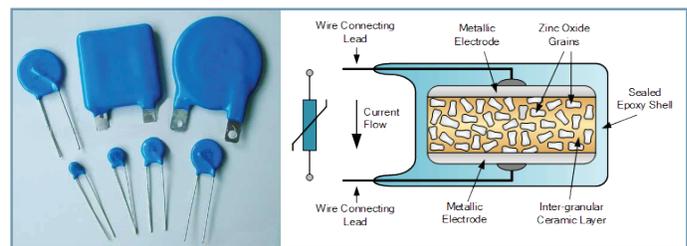
Current Technology

UL 1449 Imax Test Proposal

February 2017

UL 1449 I_{max} Test Proposal

All hard-wired Surge Protective Devices (SPDs) are marketed, specified, and sold based on the unit's single (8x20us) surge current capacity. Some SPD manufacturers market a per phase surge rating, which is the summation of the L-N (line to neutral) and L-G (line to ground) modes of protection. Some SPD manufacturers market their products on a per mode basis, where each mode (L-N, L-G, and N-G) contains the same amount of surge protection. Why some SPD manufacturers use per mode and some use per phase will be the topic of another technical note. Surge ratings can range from 20kA up to 600kA per phase (300kA per mode). The higher the surge current, the higher the price of the unit. This is very similar to tires. Tire stores offer multiple mileage ratings on their tires. Tires rated for 80,000 miles are more expensive than tires rated for 40,000 miles because the user has an expectation that the 80,000 mile tires, although more expensive up front, will last them longer.



Presently surge ratings are calculated values based on the number of surge components used in the construction of the SPD. There are no test standards or industry regulatory bodies that require SPD manufacturers to test their unit's surge rating. It is not part of the existing UL 1449 standard to test for the unit's single surge current rating. The problem with allowing SPD manufacturers to provide calculated values is that it may not accurately portray what the design is capable of doing. The SPD design may have the proper quantity of surge components, but how they are used in the SPD can and will impact the capabilities of the unit. Small printed circuit board traces, internal fusing componentry, internal thermal fusing, are all ways of building a safe SPD product, but they can also severely limit the capacity of the SPD. There are SPD manufacturers that market a 160kA per phase SPD, but include 10kA surge rated fuses in series on the printed circuit board of their design. The product data sheet suggests the units rating is 160kA, however the fuse limits the SPDs performance to 10kA. What if 80,000 mile tires wore out at 5,000 miles?

The Underwriters Laboratory (UL) Standards Technical Panel (STP) for surge protection devices was recently presented with several new proposals to consider regarding the UL1449 SPD safety standard. The STP consists of surge protection manufacturers, engineers, suppliers, and regulatory personnel (UL, ETL, and CSA). One of the items presented for consideration was an optional test called I_{max} ("I" is the electrical symbol for current). I_{max} was being proposed as is an optional test that would allow SPD manufacturers to test their unit's maximum surge current rating. The STP concluded their voting on all of the proposed changes on 1/6/2017, and by a vote of 20 to 16, I_{max} did not receive the required 2/3's majority to be included in the standard. Of the 36 people that voted, there were 13 SPD manufacturers represented. Only 3 SPD manufacturers voted for including I_{max} as an optional test in UL 1449.

WHY WOULDN'T AN SPD MANUFACTURER WANT TO PROVIDE THIS LEVEL OF PERFORMANCE TESTING TO THE MARKET?

Think about surge rating and surge capacity as it relates to engine size. Engine manufacturers can provide you with the cubic size of the motor, rated as cubic inch, cubic centimeters, or Liters, but they can also provide you with the output horsepower of the motor, which is what the engine can actually do. Two motors with the same size, ci's, can have completely different horsepower output. The same can be said for surge protection. Two surge devices can have the same amount of surge components mounted inside of them (engine size), but it is the horsepower (tested single surge current) that tells the true performance.



Single surge ratings are how SPD devices are specified, marketed and sold. With the I_{max} test voted down, there is no industry or regulatory requirement for SPD manufacturers to have to prove their products' robustness. SPD manufacturers will continue to provide calculated values based on the number of surge components used in the design. 77% of SPD manufacturers voted against having to prove their products robustness by voting against I_{max}.





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