

## **Surge Protection Device (SPD) Safety Bulletin:**

### **IEEE Emerald Book (IEEE Std-1100) 2005 Section 9L.1.3.1:**

**"... TOV (Temporary Over Voltage) stress causes many more SPD (TVSS) failures than actual transient surges (or lightning). The result may be smoke, fire, or explosion for some of the metal-oxide varistor (MOV) based SPDs. This occurs regularly in real world SPD installations, but can be controlled with **component level fusing or thermal fusing**. Done properly, this fusing will interrupt excessive continuous current through the component, interrupt available utility fault current, and yet pass transient current. **Component level fusing in a SPD can provide a fail-safe system preventing catastrophic failure or complete loss of protection.**"**

One method used by a number of manufacturers to pass the intermediate and short circuit current testing for UL1449 Edition 2.5 (Feb 2007) involves an MOV with a clamping voltage close to that of the full phase test voltage within those tests. This means that during the testing at full phase voltage...the MOV device will maintain thermal stability and a limited current... This means that over-current fusing is **not** required to pass the testing...

While these manufacturers will claim a low MCOV in their written specifications, in reality, the clamping voltage level for the MOV will be substantially higher in order to pass these tests. This limits performance (SVR or VPL or let-through) and the clamping voltage of the product is **very high**, due to the higher than published MCOV of the MOV.

The concern this raises is what happens to the product when a surge damages the MOV. As the MOV ages or is damaged, its clamping voltage level is lowered below full phase voltage, which may result in the MOV failing short circuit, resulting in an intermediate or short circuit current flowing. Without integral over current protection there is a real concern that the product would fail unsafely (smoke, fire, or explosion).

This is the reason why we believe that **integrated** over-current protection, both at the component level and at the SPD level.... eventually will become mandatory for all surge protection devices (SPD), regardless of the 'loopholes' for manufacturers that currently exist within UL 1449 Edition 2.0 testing procedures.

