



The Impact of Demonstrative Testing

The physical characteristics of a damaged component which has been identified as the alleged cause of a fire incident is critical in establishing the role that the component played in the fire incident. One component in particular which exhibit unique physical characteristics when exposed to thermal energy from a fire or when impacted by excessive electrical energy from an overvoltage condition prior to a fire incident is a metal oxide varistor (MOV). The construction of the MOV is necessary to understand the various characteristics. The MOV consists of a ceramic pellet (ZnO), approximately the size of a dime, with metallized surfaces which are soldered to two metal leads and an epoxy coating. Oftentimes, when the MOV component is exposed to the thermal energy of a fire, the epoxy coating will burn away, and the solder will melt and allow the ceramic pellet to fall away from the metal leads. The ceramic pellet has a very high melting temperature and will not melt when exposed to the temperatures produced in a typical fire scenario.

The electrical withstand capabilities of the MOV is primarily dependent upon the electrical exposure provided to the component. Upon exposure to an elevated voltage of 175% of its rated voltage level, and for a sustained period of time; the MOV component will breakdown and allow an excessive amount of current to flow through the body of the ceramic pellet. This condition generates electrical arcing between the metal leads of the component. The ceramic pellet will oftentimes exhibit punch-through holes and melted ceramic material. The resultant physical characteristics of the metal leads reveal beads of resolidified metal on the ends of the leads.

A fire incident had occurred in an office area of a building, and a carpet remnant was recovered which contained the sections of an electrical power strip. The subject power strip incorporated an MOV component. However, the only components remaining of the subject MOV were the two metal leads of the subject MOV component. The Plaintiff's experts alleged that the subject power strip containing the subject MOV component was subjected to an overvoltage electrical event which caused the subject MOV to fail and subsequently cause the fire incident. The electrical tests demonstrated that exemplar MOV components would ignite. The Plaintiff's experts conducted electrical tests to demonstrate that the MOV, under adverse electrical conditions, would ignite. Examination of the ceramic pellets utilized in the adverse electrical tests exhibited fractures and punch-through openings. The metal leads exhibited beads on the ends. However, the subject ceramic pellet from the subject power strip was not recovered from the scene of the fire incident. The only remaining components from the subject MOV component were the metal leads which remained attached to the PCB of the subject power strip. Upon examination of the subject metal leads for the subject MOV component revealed machine cut ends; no evidence of electrical fault related beads, as was evident in the adverse electrically

tested MOVs. The Plaintiff's expert opinion were disproved through their own demonstrative testing.