

About This Paper:

The ZAPSHIELD™ is an active animal barrier for installation on live distribution and substation bushings and insulators. The electric field of an energized circuit causes the ZAPSHIELD to build and store an electric charge. Once touched by an animal the ZAPSHIELD's electrostatic discharge scares the animals away.

The ZAPSHIELD manufactured by Rauckman Utility Products, LLC. and a 3M™ Electrostatic Animal Guard (formerly known as Guthrie Guard, Figure 3), were put through capacitive discharge tests (Figure 2) to simulate field applications. Tests were performed at the high voltage test lab at F. Gano Chance Research Center in Centralia, Missouri.

This paper presents the test data in a graphical format for both products.



Figure 1: ZAPSHIELD Model W-1525R

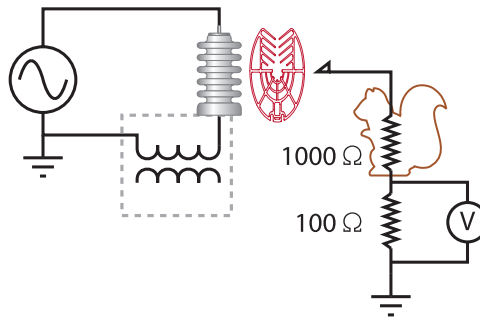


Figure 2: Test Setup Schematic for the ZAPshield and the 3M Electrostatic Animal Guard. 1000 Ohm Resistor Represents a Squirrel's Body Impedance.

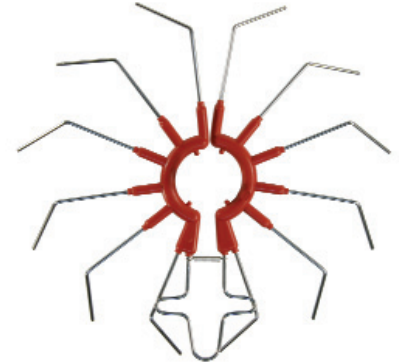


Figure 3: 3M Electrostatic Animal Guard (formerly the Guthrie Guard) Model GG-1525

TEST 1 - TRANSFORMER BUSHING:

A 7.2 kV, 10 kVA single phase, pole mount transformer was secured on a 10-inch aluminum beam (Figure 4) with its tank grounded. Tests were conducted with the ZAPSHIELD and the 3M Guard mounted between bushing's skirts 1 & 2, 3 & 4, and 5 & 6 (from top).

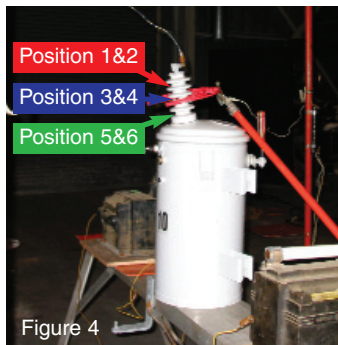


Figure 4

TEST 2 - STATION POST INSULATOR

A LAPP post insulator (cat. # 315210-70) was mounted on a 10-inch aluminum beam (Figure 5). Tests were conducted with the ZAPSHIELD and the 3M Guard mounted under the 1st and the 3rd (from top) major diameter skirt of the insulator.

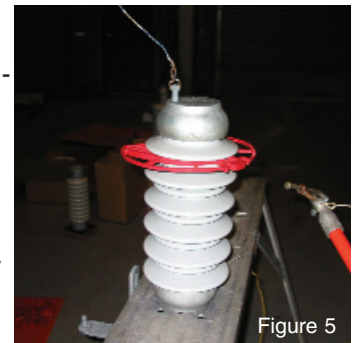


Figure 5

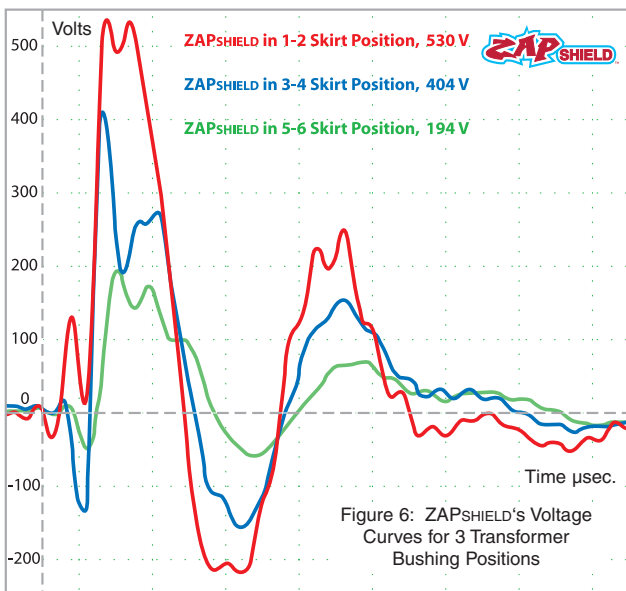


Figure 6: ZAPSHIELD's Voltage Curves for 3 Transformer Bushing Positions

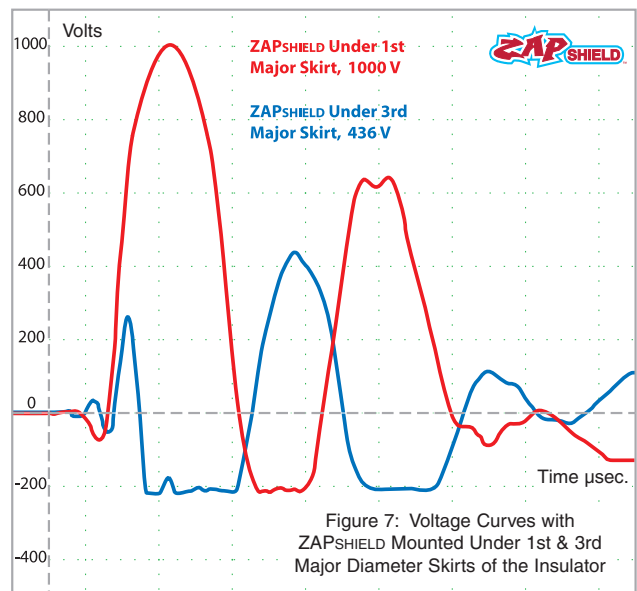


Figure 7: Voltage Curves with ZAPSHIELD Mounted Under 1st & 3rd Major Diameter Skirts of the Insulator

TEST 1 - TRANSFORMER BUSHING

TEST 2 - STATION POST INSULATOR

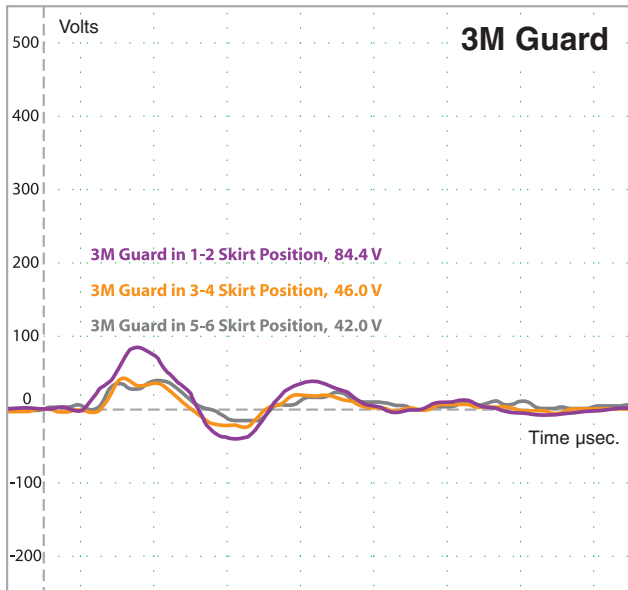


Figure 8: 3M Guard's Voltage Curves for the Transformer Bushing 3 Positions

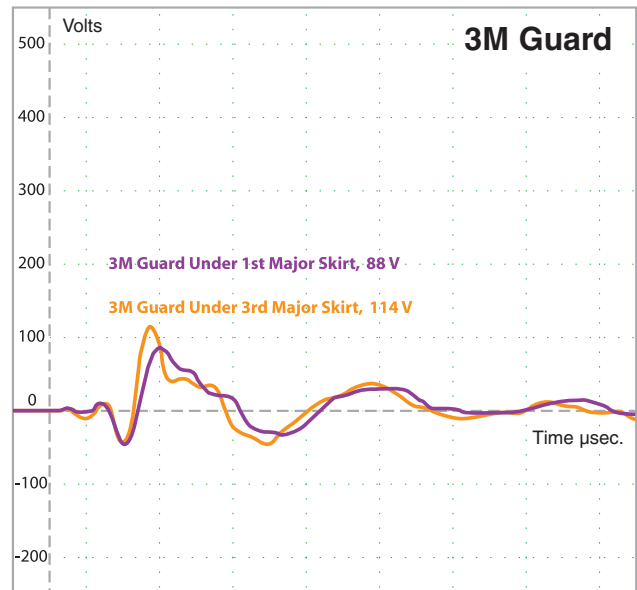


Figure 9: Voltage Curves with 3M Guard Mounted Under 1st & 3rd Major Diameter Skirt of the Insulator

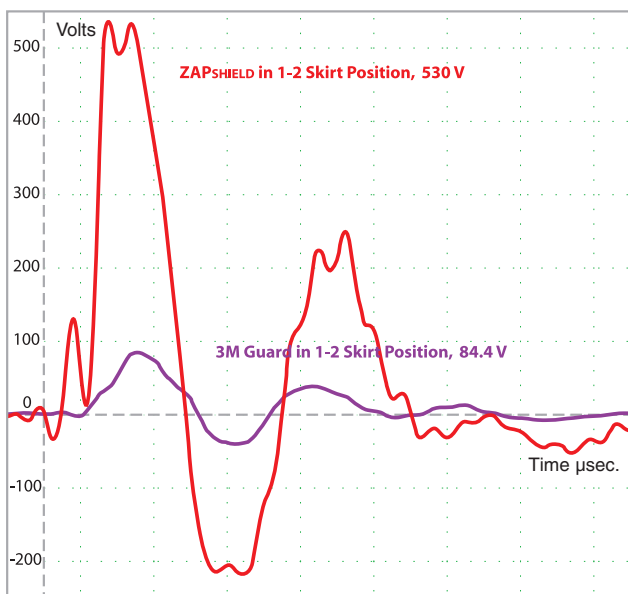


Figure 10: Comparison of 1-2 Skirt Position Voltage Curves for ZAPSHIELD vs. 3M Guard**

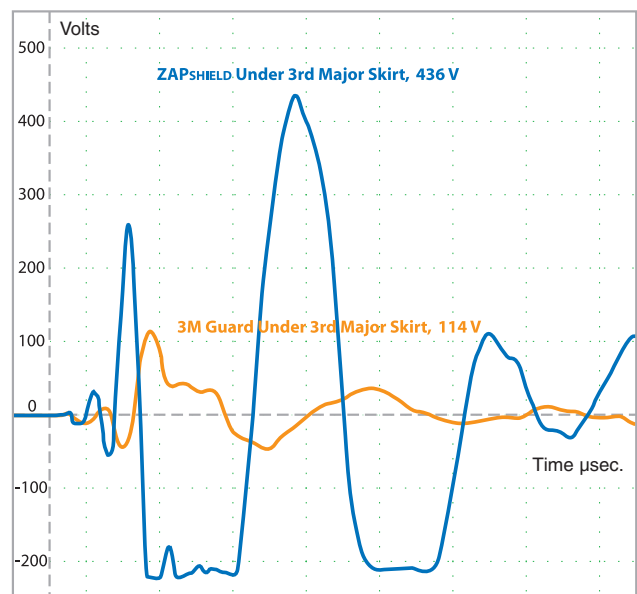


Figure 11: Voltage Curves Comparison of ZAPSHIELD & 3M Guard Mounted Under 3rd Major Diameter Skirt of the Insulator.

**This is the preferred installation location for a 7.2 kV phase-to-ground application according to both Rauckman and 3M's installation instructions.