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## High Voltage Capacitors Environmental Testing

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In an era when vehicle weight is very important to mission success, non-traditional technology must be developed to provide protection without adding parasitic weight to a vehicle, such as added by heavy armor packages. Electromagnetic Armor (EMA) is one possible technology that may accomplish the goal of achieving lighter weight with equal or greater protection levels. EMA is a system that uses electrical energy to defeat threats. Electrifying these plates within a specific time frame is crucial and is highly dependent on capacitors that can store and discharge current rapidly. We conducted a 1,000 mile simulation of a combat vehicle terrain vibration test with high voltage, pulse forming capacitors at TARDEC. There were no significant changes in the capacitance and the dissipation factor (DF) of capacitors measured before and after the terrain vibration test. The test results confirmed that high voltage pulse forming polypropylene (PP) capacitors were durable and could withstand vibrations from various types of terrain in a real battlefield environment. We also conducted temperature tests with high voltage, pulse forming PP capacitors at TARDEC. We observed a reduction in the capacitance and an increase in the DF of the capacitors measured before and after the temperature test. High voltage and high frequency capacitor tests were conducted at the Army Research Laboratory. The capacitor did not have any detectable changes after the high voltage test. The test results indicated that high voltage pulse forming PP capacitors were durable and could probably withstand environmental changes, within operational range, in a real battlefield environment.

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