

HEMP Power Filter Considerations in Use and Test

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Power filters are key to the mitigation of High-altitude Electromagnetic Pulse (HEMP) induced transients on the power system. In conjunction with suppression devices such as spark gaps and Metal Oxide Varistors (MOVs), they reduce transients on the power system to acceptable levels. They are usually placed in the entry vaults of electromagnetically shielded facilities or rooms, such that the induced transients are externally shunted to earth ground. For the most part they very successfully reduce the power transients to tolerable levels. Their use has become so common that little thought goes into their selection and in-situ test. The facility engineer generally will look at the attenuation characteristics, power levels, surge protection specifications and physical constraints. Occasionally, the anticipated transient suppression results are not met. This paper will address some considerations in the choice of filters, their installation and test.

Among the topics that are addressed is the use of suppression devices incorporated in the filter package. More often than not filters are purchased with suppression devices (usually MOVs) installed in the power input and sometimes in the power output of the filter housing. Since these devices are usually paralleling a filter capacitor, they usually have no effect in reducing the HEMP transient. Is there a better way to go? Another topic that is addressed is the in-situ acceptance test of filter installations. Procedures embodied in such HEMP protection standards as Mil Std 188-125 specify the test requirements for power system protection. The acceptable resultant residual transients are specified. Since power filters are inherently capacitive, residual levels are often not met. Should the Standards be changed? Comments on the design of high voltage power filters and failure analysis will also be made.

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