Maximize Static Dissipator Neutralization Efficiency

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***Abstract* – Plastic packaging materials are produced on roll-to-roll coating, printing and converting machines that convey insulating, polymer webs at speeds often exceeding 3 m/s. Static charges on these web cause a number of problems including sparks that ignite fires, that shock people, and that cause logic errors in the production machine control systems. Static charges attract airborne contaminates and, in sheeting and labeling operations, cause sheets and labels to stick and block. While many static dissipators are commercially available for controlling static on webs and sheets, their performance is highly variable. Here, the performance of static dissipators is analyzed to find that three key factors determine neutralization efficiency; the ion number density generated by the static dissipator (dissipator design), the length of the web exposed to ions (installation), and the web speed (process). A key result is that the static dissipator neutralization efficiency varies with the electric Reynolds number, the ratio of the dissipator time constant determined by the number of ions generated by the dissipator to the time that the web is exposed to ions from the dissipator. A second result is that the spacing between the static dissipator and the charged web is not a key factor. Rather, the web length exposed to ions from the dissipator is the key factor. Finally, a method is presented to measure the number of ions generated by a static dissipator to determine the dissipator time constant. Results from 3 commercially available static dissipators are compared.**

***Index Terms* – charge, density, dissipation, electrostatic analysis, static**