

Electrostatics in Web Handling

Kelly Robinson, PE, PhD, IEEE Fellow
Owner, Electrostatic Answers

Abstract

Static charges on webs cause many problems including coating defects, sheet sticking, dust attraction, and sparks that can ignite solvent vapors, shock operators, and reset control systems. Controlling static charge is more demanding for electronic products built on flexible substrates. Using a roll-to-roll manufacturing process to produce RFIDs and printed electronic circuits brings electrostatic discharge (ESD) level sensitivities to web handling operations.

This half-day seminar begins with a review of fundamental concepts in electrostatics with demonstrations to illustrate ideas and reinforce understanding. In the Applied Electrostatics session, these fundamental concepts enable understanding of charging sources and demonstrations of web charge measurements. Commercial static neutralizers are demonstrated.

Some questions that will be answered in this seminar:

- Why do webs become charged?
- How is charge related to the voltage and to electric fields?
- How much charge is needed on a web to cause problems?
- Can static be reliably measured? If so, how?
- How can static on webs be effectively controlled?

AGENDA

Fundamental Electrostatics 2 hours

- How much charge is “a lot?”
- Big Picture model
- Web charging and the triboelectric series
- Instruments that measure static
- Induction charging
- Shielding: antistatic & Faraday bags

Applied Electrostatics 2 hours

- When do sparks fly?
- Van de Graaff generator and the needle point ionizer
- Commercially available ionizers: ionizing string; blower; static bar
- Charge dissipation by resistivity
 - How fast does charge dissipate?
 - Measure electrical resistivity
 - Example – roller resistivity