



TRIBOGARD® **STATIC DISSIPATIVE LABELS**

How Does Electrostatic Discharge (ESD) Relate to Labels?

Static charges are generated when a label is removed from its liner, **up to 1,000 volts/square inch, or more** even when ESD workstation protection is observed. Since traditional pressure sensitive labels may act as an insulator, labels may retain or even accumulate a charge for a long period of time before it can dissipate. Given that many electronic components and devices are susceptible to damage at levels of under 200v, this presents bar code label users with a potential problem.

There are two challenges which must be addressed. The first is to eliminate the charge generated when the label is removed from the liner. The second challenge, is to ensure that the surface of the label is static dissipative once it is affixed to the board, so that it will not be a dielectric (storage) surface for any other charge which may be carried to it after the product is labeled.

Voltage Testing as the label is peeled

Per the definition of a static safe workstation in EIA-625, a static safe label must generate less than 200 volts when removed from the liner. Voltage testing was done in accordance with Polyonics' Test Methods. A label strip was cut into 1 sq. in. pieces, by a technician wearing proper static safe attire and grounding straps. Each of 10 of these pieces of label material was peeled and the voltage measured with a static discharge instrument. In all cases, **TRIBOGARD®** materials measured **less than 25 volts** per square inch when tested according to this standard.

TRIBOGARD® label technology allows any charge generated by the label as it is peeled from the liner, to dissipate virtually immediately. This leaves us to face the challenge of **surface resistivity**; and, don't forget, these are labels which must be printed upon, and the bar code images must be chemically resistant to withstand the manufacturing processes.

According to EIA, the criteria for **surface resistivity** is:

- resistivity less than $10^3 \Omega$ is "conductive"
- resistivity between $10^3 - 10^{12} \Omega$ "static dissipative", and
- resistivity greater than $10^{12} \Omega$ is "insulative"

POLYONICS **TRIBOGARD®** label materials are considered **static dissipative** as defined by **EIA-625**, “Requirements for Handling Electrostatic-Discharge Sensitive (ESDS) Devices” and **EIA-541**, “Packaging Material Standards for ESD Sensitive Items.” The test method used was **EOS/ESD S11.11**, “Surface Resistance Measurement of Static Dissipative Planes: Materials.” Using this method, the surface resistivities of the labels falls between **10⁶ - 10¹⁰ Ω**, clearly in the mid-range for static dissipative.

Static decay testing

Finally, static decay testing was performed, according to **EIA-541**, “Packaging Material Standards for ESD Sensitive Items” Appendix F “Measurement of Electrostatic Decay Properties of Dissipative Planar Materials.” The intent of this test is to determine the label material’s ability to dissipate 99% of a 5kV charge to ground within a specific time period, in this case up to 2 seconds. Too fast, say at the speed of light, and you would hear the “snap” of static discharge, which could cause damage to sensitive components. Discharge times on the order of milliseconds results in safe dissipation of the charge.

References:

EIA: Electronic Industry Association (USA)

EOS/ESD: Electronic Overstress/ Electrostatic Discharge Association (USA)

ASTM: American Society for Testing and Materials (USA)

For more information on **TRIBOGARD®** products click www.polyonics.com/static.html.

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