



MICROSTAT LABORATORIES
RIVER'S EDGE TECHNICAL SERVICE

Specialists in Materials Testing and Technical Services

TEST REPORT

Polyonics, Inc.

ESD-Safe Tape and Label Samples

TESTED FOR

Triboelectric Charge Generation
and
Surface Resistance

Report #: 2015-079
January 26th, 2016



SUMMARY

Four sets of test samples (two label and two tape materials) were submitted to evaluate the voltage generated during peeling of the adhesive-based labels and tapes from their liners to determine if they were compatible with ANSI/ESD S20.20 requirements for process required insulators. In addition to the triboelectric voltage generation testing, surface resistance measurements of the products were also measured. The supplied samples had acceptable surface resistances (below 1.0×10^{11} ohms) when tested per ANSI/ESD STM11.11. The behaviors of the tape and label products during the triboelectric voltage generation testing were typical of static dissipative materials. The static dissipative materials, while they accumulated some voltage when they were peeled or rubbed, allowed the measurable voltage to bleed to near zero very quickly when the materials were grounded.

The supplied tapes and labels, because they didn't hold any accumulated voltage, pose low risk when used in ESD-Safe work areas, and should benefit anybody needing to use these tapes and labels during assembly of ESD sensitive products.

EXPERIMENTAL PROCEDURE AND DISCUSSION

Several forms of each type of material was received. The materials subjected to testing are listed below in Table 1.

Table 1
Test Matrix

Type	Product	Description
Label	XF-446	ESD/2mil PET/1 mil PSA/-55 liner
Label	XF-782	ESD/2mil PI/1 mil PSA/-55 liner
Tape	XT-637	ESD 1mil PET/1 mil PSA/-55 liner
Tape	XT-622	ESD 1mil PI/1 mil PSA/-55 liner

Surface Resistance Testing

Larger samples (6" x 6") of the materials were subjected to surface resistance testing using the methods described in ANSI/ESD STM11.11. The samples were conditioned at 12% R.H. & 72 ° F conditioning for 48 hours prior to testing. Data from this testing is summarized below in Table 2.

Table 2
Surface Resistance Data Summary

Type	Product	Average Surface Resistance (10 Samples)
Label	XF-446	$3.93 \times 10^7 \Omega$
Label	XF-782	$1.05 \times 10^{10} \Omega$
Tape	XT-637	$1.53 \times 10^7 \Omega$
Tape	XT-622	$2.56 \times 10^8 \Omega$



Triboelectric Voltage Accumulation Testing

Triboelectric voltage generation is dependent upon both of the surfaces that are joined and then separated. During assembly processes several steps can occur in the use of tapes and labels that can create risk for ESD sensitive (ESDS) items. One risk that can occur is when the tape/label is peeled from the liner and charge develops on one or both surfaces and then those items are brought near ESDS product. Having voltage present on the tape/label after it is peeled and then placed or moved near an ESDS item can increase the risk of ESD damage to sensitive devices.

The label/tape versus liner test was performed by peeling the tape/label off of the liner, and measuring the voltage on the adhesive surface of the tape/label and also on the surface of the liner with an electrostatic voltmeter. A minimum of 10 measurements was taken and the averages reported in Table 3 below which contains a summary of data from this testing.

Discussion of Results

The surface resistance of the various ESD products were all measured to be in the static dissipative range with resistance values in the 1.5×10^7 to 1×10^{10} ohms range.

The triboelectric voltage accumulation testing followed as expected for static dissipative materials. All of the materials charged considerably when they were peeled from the liner and held with insulative tweezers. However, when the liners and ESD materials were held with static dissipative or conductive tweezers, the voltage generated through the separation from the liner was bled to ground within a few seconds. This would imply that one necessary control when utilizing these ESD products would be to provide a ground path through the use of grounded and conductive application tooling.

Table 3
Summary of "Label vs Liner" Triboelectric Voltage Data

Product	Avg. Voltage on Tape/Label (after peeling from liner)	Average Voltage on Liner (after peeling tape/label)
XF-446	20	-8
XF-782	27	-6
XT-637	15	-19
XT-622	24	-17



EQUIPMENT USED FOR ELECTRICAL TESTING

Keithley Model 6517a Electrometer/High Resistance Meter
ETS 803B Surface Resistance Probe
TREK Model 341 ElectroStatic Voltmeter
Ion Systems Benchtop ionizer

The results provided in this report are accurate within the limits appropriate to each test standard. The results of this report are statistically significant only to the samples submitted for testing. MicroStat Laboratories/River's Edge Technical Service, Inc. has no controls, and assumes no responsibility for the tested product's functionality or use.

Carl E Newberg

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Date