



VPI Conductile[®] ESD Tile Testing to ESD STM97.2

Executive Summary

VPI Conductile[®] ESD Tile using two VPI ESD adhesives was tested to ESD STM97.2 in combination with a person wearing ESD heel grounders and two different pairs of static dissipating shoes. The results show that with all the footwear, the VPI floors will generate 15 volts or less at a confidence level of 99.87%. These results indicate excellent triboelectric protection performance for the floor/footwear systems evaluated.

Floor Test Specimen Preparation

36" X 36" squares of VPI Conductile[®] in color White 02 were adhered to hardboard using both VPI #150 Epoxy and #165 Acrylic adhesive, rolled and allowed to cure and condition. Two grounding strips were included per STM97.2. These are the same floor specimens that were used for the STM7.1 and STM97.1 testing (see below and Table I for these test results).

	<u>Point to Point</u>	<u>Point to Ground</u>
Conductile/VPI #150, STM7.1 ohms	3.7×10^5	0.8×10^5
Conductile/VPI #165, STM7.1 ohms	3.7×10^5	0.4×10^5

Test Hardware and Software

See Figure I. A Prostat 710B Autoanalysis kit was used. This includes the PFM-711A Field Meter fitted with the CPM-711A Charge Plate Assembly. The field meter is coupled to the PGA 710B Autoanalyzer, which is connected via USB to a PC. The charge plate receives the voltage

generated on the person from a hand-held chrome steel probe. The field meter reads the voltage collected on the charge plate and transmits it to the 710B, where an analog to digital conversion occurs. The digital signal from the 710B is then fed to the Autoanalysis software for processing.

Electrical Connection Configurations

The test floors were grounded via a bolt inserted into the grounding slot of a 110-volt electrical outlet, and attaching a 12-gauge wire fitted with alligator clips to the bolt and to one of the grounding strips on the floor. The field meter was also grounded to the 110-volt ground.

Walking Pattern

A walking pattern conforming to Figure 1 of STM97.2 was used. Colored labels were adhered to the floor to assist in maintaining consistency in the walking pattern from test to test. A Seiko metronome was set at 65 beats per minute and used to establish a consistent pace in conformance with STM97.2 requirements (greater than one pace per second).

Test Procedure

At the start of the test the test person stood with feet in positions 5 and 6 of STM97.2 Figure 1. The test person, while holding the electrode, zeroed himself by touching the grounding strip. The charge plate was then zeroed and recording commenced as the test person started the walk pattern. The left foot was placed in position 1, the right in position 2, the left in position 3, the right in position 4, the left back to position 5 and the right back to position 6. This pattern was continued to the metronome beat for six cycles of six steps each.

Test Results

See Table II. These results, especially for the shoes, indicate excellent triboelectric protection performance for the VPI flooring in conjunction with the ESD footwear. The 3 Sigma result is especially important. The term '3 Sigma' refers to three standard deviations from the average. Statistically, the 3 Sigma voltage is that voltage which has a 99.87% probability of never being exceeded.

Reference Documents (These are the Prostat Autoanalysis-generated reports)

Prostat_Conductile_150_HeelStraps.pdf

Prostat_Conductile_150_K11280.pdf

Prostat_Conductile_150_K30400.pdf

Prostat_Conductile_165_HeelStraps.pdf

Prostat_Conductile_165_K11280.pdf

Prostat_Conductile_165_K30400.pdf

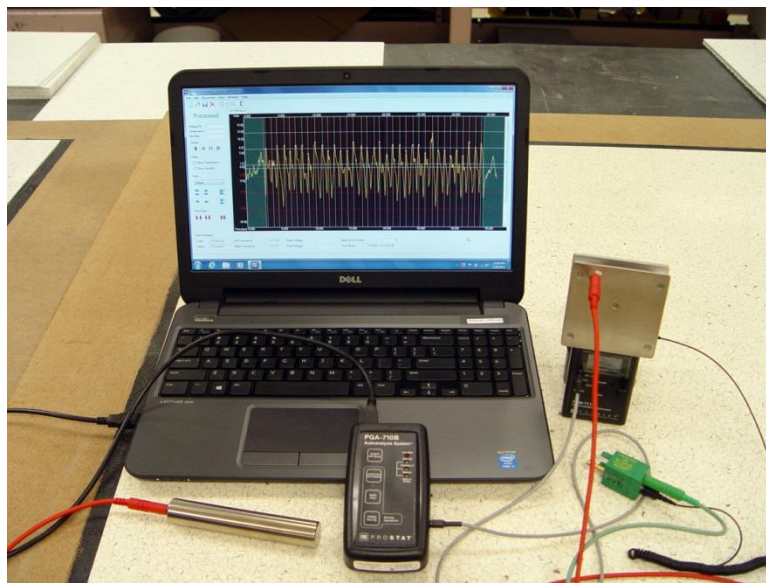


Figure i. Prostat 710B Autoanalysis Kit

Table I. ESD STM97.1 Test Results									
					Average Resistance, ohms			Extremes, ohms	
Floor	Adhesive	Foot-wear	RH, %	Number Tests	Both Feet	Left Foot	Right Foot	Minimum	Maximum
Metal Plate	N/A	Heel Straps	24	27	7.8E+05	1.1E+06	1.1E+06	7.4E+05	1.1E+06
Metal Plate	N/A	HyTest K11280	20	27	1.7E+06	3.3E+06	3.3E+06	1.7E+06	3.4E+06
Metal Plate	N/A	HyTest K30400	20	27	1.6E+06	3.2E+06	3.3E+06	1.6E+06	3.3E+06
Conductile	VPI #150	Heel Straps	24	27	9.8E+05	1.3E+06	1.3E+06	7.8E+05	1.3E+06
Conductile	VPI #150	HyTest K11280	20	27	1.8E+06	3.4E+06	3.5E+06	1.8E+06	3.5E+06
Conductile	VPI #150	HyTest K30400	20	27	1.7E+06	3.3E+06	3.3E+06	1.7E+06	3.3E+06
Conductile	VPI #165	Heel Straps	24	27	9.9E+05	1.2E+06	1.2E+06	9.4E+05	1.2E+06
Conductile	VPI #165	HyTest K11280	20	27	1.8E+06	3.3E+06	3.4E+06	1.8E+06	3.4E+06
Conductile	VPI #165	HyTest K30400	20	27	1.7E+06	3.2E+06	3.3E+06	1.7E+06	3.3E+06

Table II. Prostat Autoanalysis ESD STM97.2 Test Results										
					Positive Voltages (V)			Negative Voltages (V)		
Floor	Adhesive	Foot-wear	RH, %	Test Cycles	Average	Maximum	3 Sigma (99.87%)	Average	Maximum	3 Sigma (99.87%)
Conductile	VPI #150	Heel Straps	13	35	7.0	12.0	12.7	-9.0	-14.0	-15.1
Conductile	VPI #150	HyTest K11280	14	33	2.7	4.0	5.1	-1.9	-3.0	-3.9
Conductile	VPI #150	HyTest K30400	14	28	0.4	2.0	3.3	-2.8	-4.0	-4.7
Conductile	VPI #165	Heel Straps	13	35	7.7	14.0	15.6	-11.8	-18.0	-21.6
Conductile	VPI #165	HyTest K11280	14	35	1.7	3.0	4.2	-2.1	-4.0	-4.2
Conductile	VPI #165	HyTest K30400	14	32	0.6	1.0	2.6	-2.8	-4.0	-4.9