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Evaluation of Green Daubert Film

From: Cortec Corporation Laboratories
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Project #: 12-075-1125(bis)

Test conducted by:

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Date: April 18, 2012



Background: Customer submitted a sample of green Daubert film and requested that the corrosion inhibiting properties and ESD properties be tested.

Sample Received: Green Daubert film, submitted 04-03-12, good condition, labeled 12-075

Method:

- 1) VIA Test CC-027
- 2) Razor Blade Test CC-004*
- 3) FTIR Test CC-006
- 4) Anti-Static Film Test, (Performed at Cambridge)*
- 5) Nitrite Test*

*Cortec Laboratory is not accredited for the test marked

Materials:

- 1) VIA test kit
- 2) Razor Blade test kit
- 3) Paragon 1000 FTIR
- 4) Anti-Static Film Test Kit
- 5) Nitrite/Nitrate Test Strips

Procedure:

- 1) All tests were performed according to their procedures.
- 2) Prior to the Anti-static tests being performed, the films were pre-conditioned for 13.5 hours inside a desiccant chamber at the following conditions.
 - a. RH inside chamber at start : 13.0%
 - b. Temperature inside chamber at the start 70.3°F.
 - c. RH inside chamber at end of 48 hour cure: 13.3%
 - d. Temperature inside the chamber at the end of 48 hours, 71.6°F.

Results:

Razor Blade Carbon Steel

Sample	Panel 1	Panel 2	Panel 3
Green Daubert Film	Pass	Pass	Pass
Control	Fail	-	-

Razor Blade Copper

Sample	Panel 1	Panel 2	Panel 3
Green Daubert Film	Pass	Pass	Pass
Control	Fail	-	-

VIA Test Results

Sample	Plug #1	Plug#2	Plug#3	Pass/Fail
Green Daubert Film	Grade 3	Grade 2	Grade 2	Pass
Control	Grade 0	-	-	

Note: The VIA grading system is attached to the end of the report

Anti-Static Film Tests

Surface Resistivity (Ohm/Sq)-Green Daubert Film

Sample	Limit 1.0×10^5 to 1.0×10^{12}	
	Outside Surface	Inside Surface
Sample 1	1.8×10^{11}	1.5×10^{12}
Sample 2	1.6×10^{12}	1.5×10^{12}
Sample 3	1.8×10^{11}	4.5×10^{10}
Sample 4	1.8×10^{11}	1.6×10^{11}
Sample 5	1.7×10^{11}	1.9×10^{11}
Sample 6	1.4×10^{11}	1.9×10^{11}

Static Decay Rate (in seconds)-Green Daubert Film

Sample	Limit 2 second decay rate at 10% threshold			
	Outside Surface		Inside Surface	
	+5000 Volts	-5000 Volts	+ 5000 Volts	- 5000 Volts
Sample 1	1.80	2.41	2.08	2.71
Sample 2	1.83	3.77	2.20	2.71
Sample 3	1.85	2.37	2.18	2.91
Sample 4	1.86	2.41	2.25	2.71
Sample 5	1.96	2.37	2.18	2.71
Sample 6	1.88	2.31	2.20	3.01

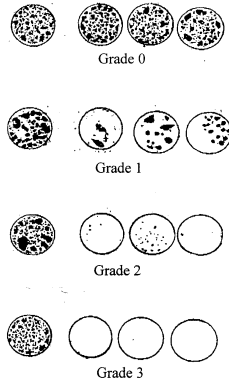
Nitrite Test

Sample	Result
Green Daubert Film	The film contains nitrite

Interpretations:

1. Based on the razor blade and VIA test results, the submitted Green Daubert Film provides sufficient contact and vapor-phase corrosion protection.
2. The Green Daubert film failed the Anti-Static tests.
3. The Green Daubert film was found to contain nitrite.
4. Based on FTIR spectra, this film contains a blend of sodium benzoate and nitrite as a corrosion inhibitor.

VIA Test Grades (Grade 2 or 3 are passing)

<p>Grade 0: Blind test No corrosion inhibiting effect</p> <p>Grade 1: Blind test Minute corrosion inhibiting effect</p> <p>Grade 2: Blind test Medium corrosion inhibiting effect</p> <p>Grade 3: Blind test Good corrosion inhibiting effect</p>	 <p>The visual reference shows four rows of circular test samples. Grade 0 consists of four circles with a dense, dark, granular appearance. Grade 1 consists of four circles with a lighter, more sparse granular appearance. Grade 2 consists of four circles with a very light, almost clear appearance. Grade 3 consists of four circles that are completely clear and white.</p>
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