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***Evaluating Corrosion Protection  
Properties of Versa Pak Films***

**To:** Jessica Carpenter Glanz

**For:** Customer

**From:** Cortec Laboratories, Inc.  
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**Project #:** 16-204-1125.supplemental.bis

**Results reported by:**



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**Background:** The customer is currently using two green Versa Pak films to protect against corrosion. A recent trial run performed by them showed ineffective corrosion protection properties. Cortec Laboratories was asked to test these films for their corrosion protection properties and possibly evaluate sources of failure.

**Sample Received:** One light green Versa Pak film, ~2 mils (50 microns)  
 One dark green Versa Pak film, ~3 mils (75 microns)

**Method:** VIA Test, CC-027  
 Razor Blade Test, CC-004\*  
 Nitrite/Nitrate Test\*  
 FTIR Analysis, CC-006

\*Cortec Laboratories, Inc. is not accredited for the test(s) marked.

**Materials:** VIA test kit  
 Razor Blade test kit  
 Nitrite/Nitrate test strips (lot HC553793)  
 Paragon 1000 FTIR

**Procedure:** All tests were followed according to standard procedure.

**Results:**

VIA Test Results

Sample	Plug 1	Plug 2	Plug 3	Control	Overall
Light Green Versa Pak Film	0	0	0	0	Fail
Dark Green Versa Pak Film	1	2	0	0	Fail

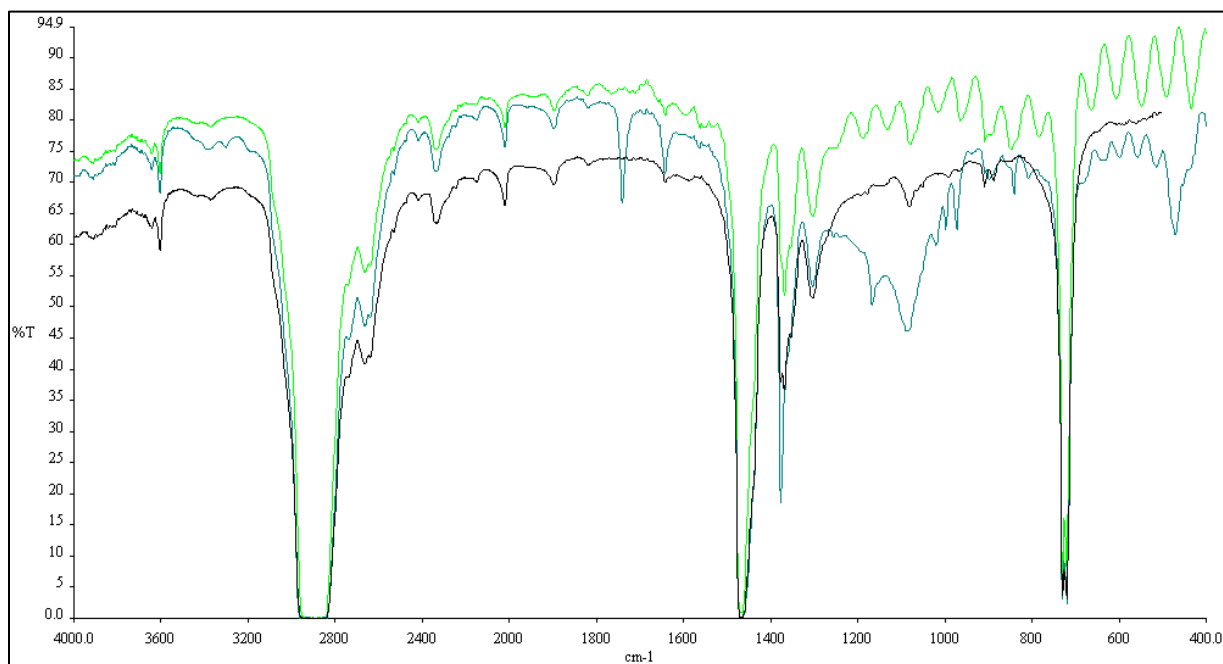
Carbon Steel Razor Blade Test Results

Sample	Panel 1	Panel 2	Panel 3	Control	Overall
Light Green Versa Pak Film	Fail	Fail	Fail	Fail	Fail
Dark Green Versa Pak Film	Fail	Fail	Pass	Fail	Fail

Copper Razor Blade Test Results

Sample	Panel 1	Panel 2	Panel 3	Control	Overall
Light Green Versa Pak Film	Fail	Fail	Fail	Fail	Fail
Dark Green Versa Pak Film	Fail	Fail	Fail	Fail	Fail

## FTIR Analysis

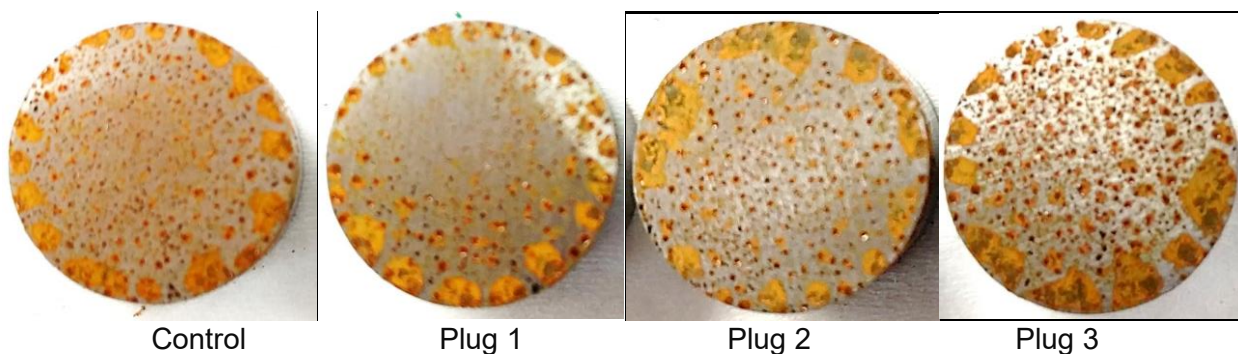


Above: light green Versa Pak film (bright green colored, highest overall %T) and dark green Versa Pak film (teal colored), compared to plain PE (black, lowest overall %T)

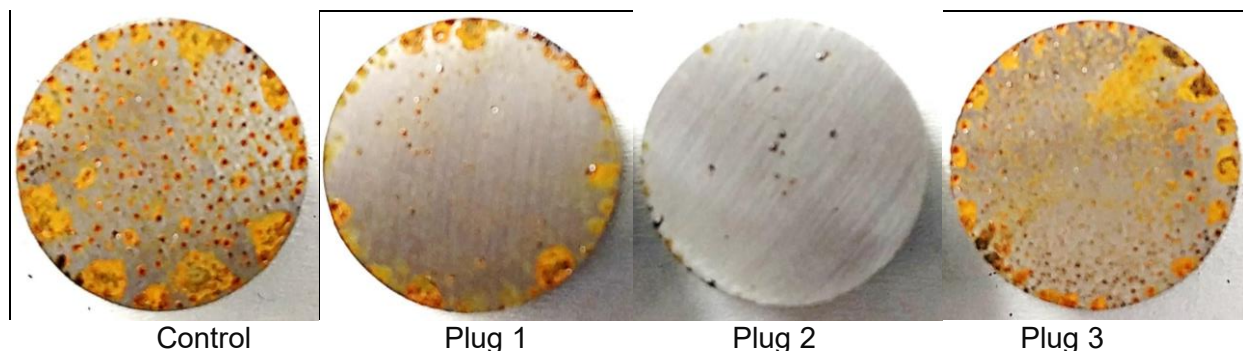
*Results relate only to the items tested*

## Photos:

### VIA Test – Light Green Versa Pak Film

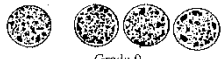


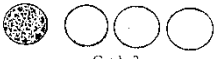


VIA Test – Dark Green Versa Pak Film



VIA Test Grading

All three plugs must be grade 2 or better to pass the test

Grade 0:	Blind test No corrosion inhibiting effect	
Grade 1:	Blind test Minute corrosion inhibiting effect	
Grade 2:	Blind test Medium corrosion inhibiting effect	
Grade 3:	Blind test Good corrosion inhibiting effect	

**Interpretations:** Neither of the Versa Pak films provides sufficient corrosion protection. VIA test results show that neither film provides vapor phase corrosion protection. Razor blade testing shows that they also fail to protect both steel and copper from contact phase corrosion.

Based on FTIR analysis, neither Versa Pak film appears to contain corrosion inhibitor-specific chemicals. The dark green film appears to contain desiccant, which would absorb some humidity, causing a lower relative humidity temporarily in the space close to the film. This would have a small effect, as higher humidity does cause higher corrosion rates; however, desiccant is not effective once it has been saturated.

No nitrates were found in either film.