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## *Evaluation of Branopac VCI Film and Pads*

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**Project #:** 16-096-1125.supplemental

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**Background:** Customer imports thousands of motor and gear parts. These parts get packed with Branopac VCI film and pads. The VCI properties of these products will be evaluated to determine their corrosion protection.

**Sample Received:** The following samples were received on 4-18-16 in good condition:  
 1. Blue Branopac VCI film, 3mils  
 2. Branopac pads

**Method:** VIA Test, CC-027  
 FTIR analysis, CC-006  
 Razor Blade Test, CC-004\*  
 Nitrite/Nitrate Test\*  
 \*Cortec Laboratories, Inc. is not accredited for the test(s) marked.

**Materials:** VIA test kit  
 Razor blade test kit  
 Paragon 1000 FTIR  
 Glycerol (lot #Q10A018)  
 VpCI-126 film, 3mils (batch #510220)  
 Methanol, ACS grade (lot #041715D)  
 Oven set for 40°C (oven #1)  
 Nitrite/Nitrate Test Strips (lot #HC435784)  
 Plain polyethylene film (control film)

**Procedure:** The tests were conducted according to standard procedures for each test.

**Results:**

**Razor Blade Test- Carbon Steel Panels**

Sample	Panel #1	Panel #2	Panel #3	End Result
Branopac VCI film	Pass	Pass	Pass	Pass
VpCI-126 film	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

**Razor Blade Test- Copper Panels**

Sample	Panel #1	Panel #2	Panel #3	End Result
Branopac VCI film	Fail	Fail	Fail	Fail
VpCI-126 film	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

**Nitrite/Nitrate Test Strips**

Sample	Results
Branopac VCI film (tested on both sides)	Does not contain nitrite/nitrate
Branopac pads (tested on both sides)	Contains nitrite/nitrate

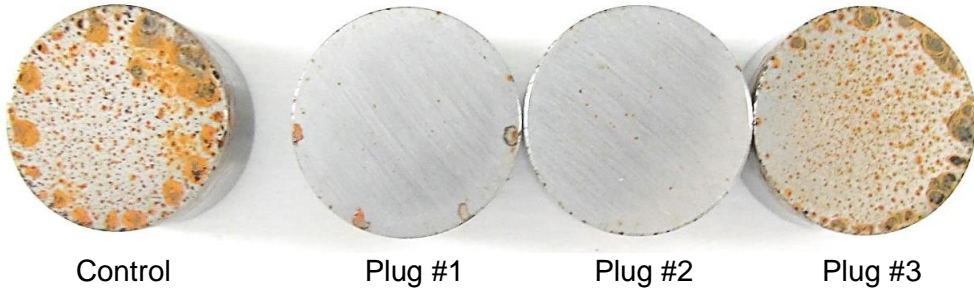
**Results:**

### VIA Test

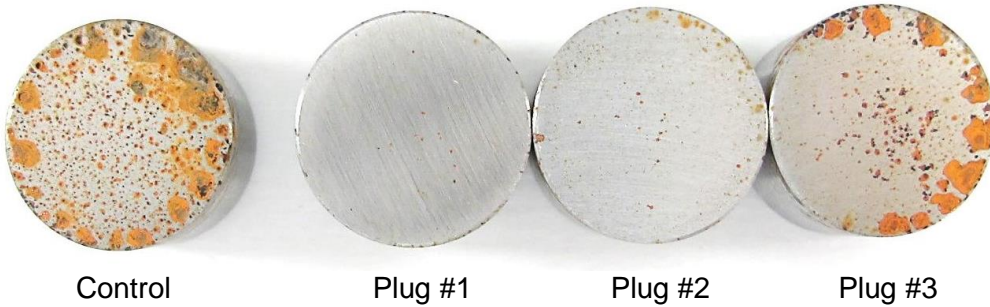
Sample	Plug #1	Plug #2	Plug #3	End Result
Branopac VCI film	Grade 2	Grade 2	Grade 0	Fail
Branopac pads	Grade 2	Grade 2	Grade 1	Fail
VpCI-126 film	Grade 3	Grade 3	Grade 2	Pass
Control	Grade 0	-	-	Fail

#### Photos from VIA test:

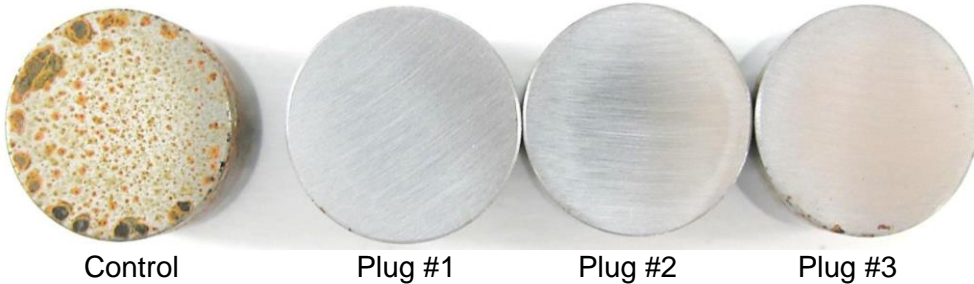
##### Branopac VCI Film



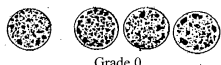

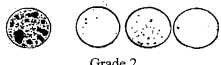
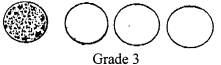
##### Branopac pads



##### VpCI-126 Film

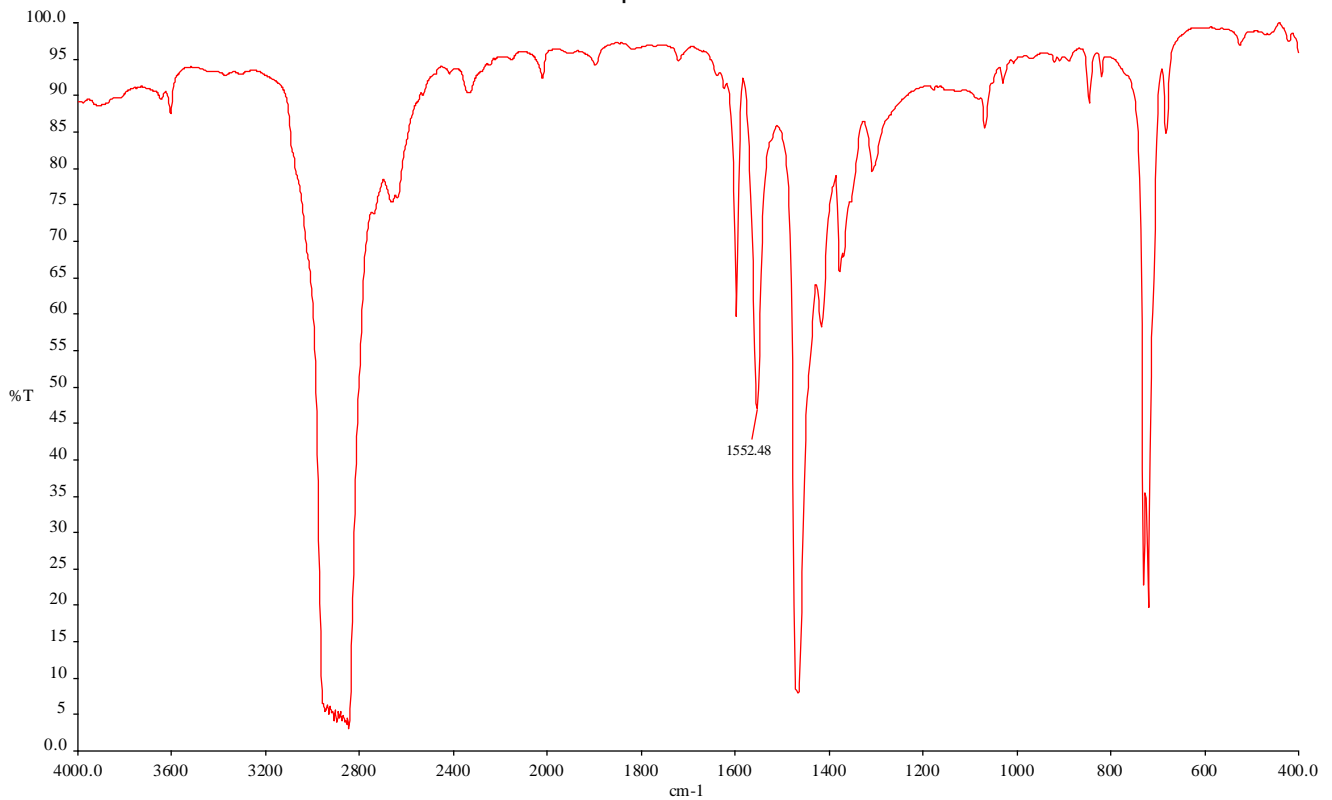


VIA Test Grades (Grade 2 or 3 are passing)  
 All three plugs must be grade 2 or better to pass the test

		
<b>Grade 0:</b>	Blind test No corrosion inhibiting effect	
<b>Grade 1:</b>	Blind test Minute corrosion inhibiting effect	
<b>Grade 2:</b>	Blind test Medium corrosion inhibiting effect	
<b>Grade 3:</b>	Blind test Good corrosion inhibiting effect	

## FTIR Analysis

Branopac VCI film



**Interpretations:**

According to the razor blade testing, the Branopac VCI film provides contact corrosion protection for steel, but not for copper. For corrosion protection in the vapor phase, the results of the VIA test were mixed, but ultimately failing. Since two out of three plugs passed the test, and one plug failed, it is possible that the inhibitor is not evenly distributed throughout the film construction. The Branopac Pads had similar failing VIA results. VpCI-126 film, however, passes both the razor blade and VIA test with excellent vapor phases protection as well as multi-metal contact corrosion protection.