



● 4119 White Bear Parkway, St. Paul, MN 55110 USA  
● Phone: (651) 429-1100, Fax: (651) 429-1122  
● Toll Free: (800) 4-CORTEC, E-mail: info@cortecvci.com  
● cortecvci.com • corteclaboratories.com

***Evaluation of Corrosion Protection Properties of  
Armor Film used by Customer***

**From:** Cortec Laboratories, Inc.  
4119 White Bear Parkway  
St. Paul, MN 55110

**cc:** Boris Miksic  
Cliff Cracauer  
Robert Kean  
Jay Zhang

**Project #:** 16-256-1125.supplemental.bis

**Results reported by:**

A handwritten signature in black ink, appearing to read "Anne Carlson".

Anne Carlson  
R&D Engineer

**Approved by:**

A handwritten signature in black ink, appearing to read "Eric Uutala".

Eric Uutala  
Technical Service Manager



**Background:** The Customer is a world leader in the design and manufacture of precision metal components used in a variety of industries, from automotive to agriculture. The Customer submitted an Armor brand film sample to Cortec Labs. This film is being used for preservation of components, and the Customer has asked Cortec Labs to evaluate this film's corrosion inhibiting properties.

**Sample Received:** Blue film, received in good condition, ~4 mils (100 microns)

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

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

**Materials:** VIA test kit  
Razor Blade test kit  
Nitrite test strips, lot HC553793  
Paragon 1000 FTIR

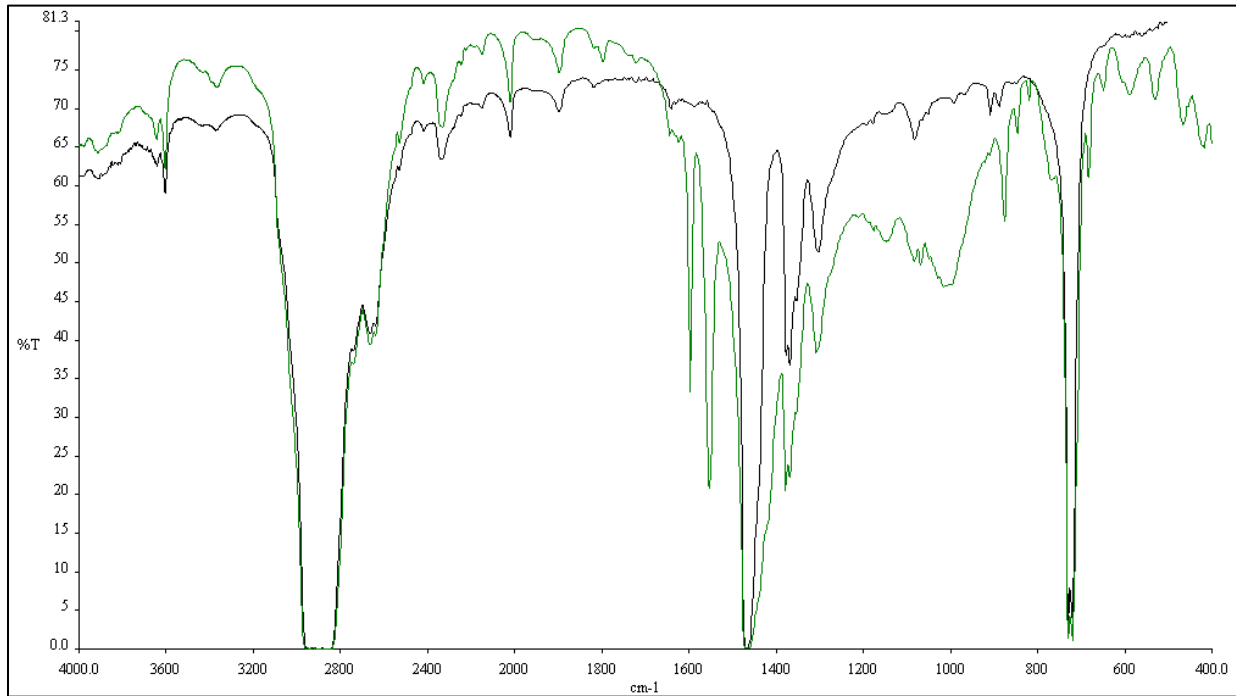
**Procedure:** All tests were followed according to their standard procedures.

**Results:**

**Corrosion Inhibition Testing, Armor Film**

Test	Panel 1	Panel 2	Panel 3	Control	Overall
VIA Test	0	0	0	0	Fail
Copper Razor Blade Test	Fail	Fail	Fail	Fail	Fail
Carbon Steel Razor Blade Test	Fail	Fail	Fail	Fail	Fail

## FTIR Analysis

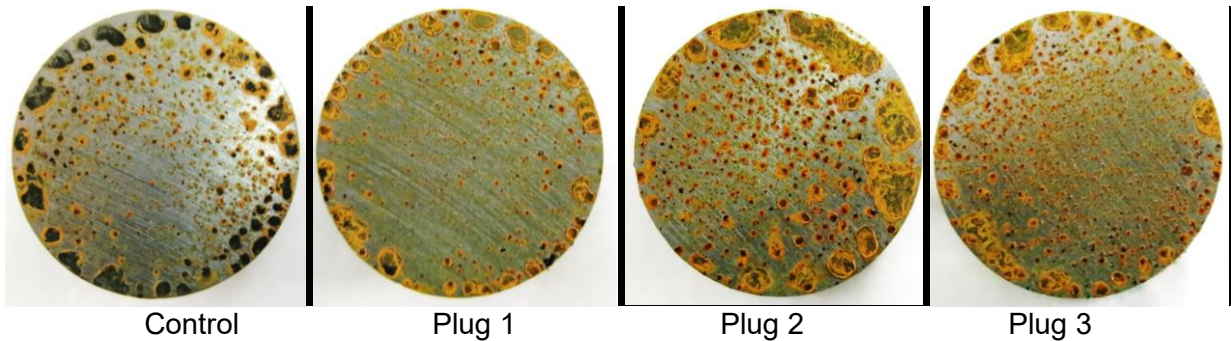


Above: Armor film (green line, higher baseline %T) compared to polyethylene control (black line, lower baseline %T)

*Results relate only to the items tested*


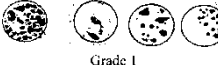

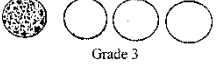
**Photos:**

### VIA Test Results for Armor 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:** The submitted Armor film does not pass any of Cortec's standard corrosion preventive tests, according to the results above. It did not perform any better than the control polyethylene film for protecting copper nor carbon steel in the contact phase, according to the razor blade test. It also didn't perform any better than the control in protecting against corrosion in the vapor phase, according to VIA results.

FTIR analysis shows the presence of desiccant and coloring. Either the desiccant material is added to the film for its bulk properties (and is therefore not very effective as a desiccant), or the film has already been saturated. No nitrite was found.