



• 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 Blue Film

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

cc: Boris Miksic
Anna Vignetti
Kristy Gillette

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Test conducted by:

Liz Austin
Sr. Lab Technician

Approved by:

Margarita Kharshan
Laboratory Director



Background: Test submitted film to determine if it provides corrosion protection, and also determine the mechanical properties.

Sample Received: Blue film, manufactured by ITW, received 08-09-11, poor condition

Method:

- 1) VIA Test CC-027
- 2) Razor Blade Test CC-004
- 3) FTIR Test CC-006
- 4) Nitrite Test

Materials:

- 1) VpCI-126, sample GW0362516
- 2) VIA test kit
- 3) Razor Blade test kit
- 4) Perkin Elmer Paragon 1000 Spectrophotometer
- 5) Nitrite/Nitrate test strips, Lot # HC960672

Procedure: The tests were performed according to standard procedures.

Results:

Razor Blade Test-Carbon Steel Panels

Sample	Panel 1	Panel 2	Panel 3
Blue Film	Fail	Fail	Fail
VpCI-126	Pass	Pass	Pass
Control	Fail	-	-

Razor Blade Test -Copper Panels

Sample	Panel 1	Panel 2	Panel 3
Blue Film	Fail	Fail	Fail
VpCI-126	Pass	Pass	Pass
Control	Fail	-	-

VIA Test

Sample	Plug #1	Plug #2	Plug #3
Blue Film	Grade 0	Grade 1	Grade 0
VpCI-126	Grade 3	Grade 2	Grade 3
Control	Grade 0	-	-

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

Mechanical Properties

<u>Property</u>	<u>-</u>	<u>Test Method</u>	<u>Units</u>	<u>Blue Film</u>	<u>VpCI-126</u>
Thickness	-	-	-	2.0	2.00
Breaking Factor	MD	ASTM D882-02	lbs/in	10.22	8.07
	TD			8.81	8.03
Tensile Strength at Break	MD	ASTM D882-02	psi	5401.21	4586.96
	TD			4445.74	4171.95
Elongation at Break	MD	ASTM D882-02	%	689.43	592.03
	TD			802.76	671.18
Yield Strength	MD	ASTM D882-02	psi	1312.67	1545.34
	CD			1463.92	1517.03
Tear Strength	MD	ASTM D1922-06a	mN	7785.22	2644.78
	CD			10108.22	7267.25

Interpretations:

1. Based on the test results, the submitted blue film has failed to provide sufficient vapor-phase or contact-phase corrosion protection.
2. Analysis of the FTIR spectrum determined that the blue film does not have a sufficient amount of inhibitor, if any.
3. VpCI-126 provided sufficient vapor and contact-phase corrosion inhibition.
4. The mechanical properties of the submitted blue film and the VpCI-126 are comparable, with a few exceptions. The blue film has higher tear strength, and slightly higher elongation at break than VpCI-126.

VIA Test Grades (Grade 2 or 3 are passing)



