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Evaluation of Zerust ExCorr Film and TechCorro [P]

Purpose: Evaluate anticorrosion properties of the submitted Zerust ExCorr film and the VCI paper TechCorro [P].

Materials:

1) Zerust ExCorr film
2) TechCorro [P] paper
3) Methanol, lab grade
4) Razor Blade test kit
5) VIA test kit
6) Perkin Elmer FT-IR 1000 Spectrometer
7) EM Quant Nitrate/Nitrite Test Strips

Method:

1) Razor Blade test, CC-004
2) VIA test
3) FT-IR Spectroscopy
4) Nitrite Test
5) Mechanical Properties: ASTM D 6988; ASTM D 882-02, ASTM D 1922-06a; ASTM D 1709-04a

Procedure: The above tests were performed according to standard procedures for each.

Results:

Nitrite Test

Sample	Nitrite
Zerust ExCorr	+
TechCorro	+

Razor Blade Test Performed on Carbon Steel Panels

Sample	Panel 1	Panel 2	Panel 3
Zerust ExCorr	Pass	Pass	Pass
TechCorro	Pass	Pass	Pass
VpCI-126*	Pass	Pass	Pass
Control	Fail	-	-

Razor Blade Test Performed on Copper Panels

Sample	Panel 1	Panel 2	Panel 3
Zerust ExCorr	Fail	Fail	Fail
TechCorro	Pass	Fail	Fail
VpCI-146*	Pass	Pass	Pass
Control	Fail	-	-

VIA Test

Sample	Plug #1	Plug #2	Plug #3
Zerust ExCorr	Grade 0	Grade 0	Grade 1
TechCorro	Grade 3	Grade 3	Grade 3
VpCI-126*	Grade 3	Grade 3	Grade 3
VpCI-146*	Grade 3	Grade 3	Grade 3
Control	Grade 0	-	-

Note: VIA Grading system is attached below.

*Typical results for VpCI-126 and VpCI-146.

Mechanical Properties

Property	**-**	**Test Method**	**Units**	**Zerust ExCorr**	**VpCI-126**
Caliper		ASTM D6988	mil	3.00	3.0
Breaking Factor	MD	ASTM D882-02	lbs/in	10.60	8.97
	TD			11.02	9.90
Tensile Strength at Break	MD	ASTM D882-02	psi	3660.90	2991.30
	TD			4085.75	3320.65
Elongation at Break	MD	ASTM D882-02	%	589.58	490.71
	TD			800.50	733.10
Yield Strength	MD	ASTM D882-02	psi	1915.27	1280.04
	CD			1418.52	1605.76
Tear Strength	MD	ASTM D1922-06a	mN	2911.61	2909.00
	CD			15162.34	10736.07
Dart Drop Impact Resistance		ASTM D1709-04, Test Method A	grams	572.66	369.74

FT-IR Spectroscopy

FT-IR results are attached at the end of the report.

Conclusion:

1. Based on the VIA test results, the submitted Zerust ExCorr film did not provide sufficient vapor-phase corrosion inhibition. The razor blade test results determined that it provided sufficient contact-phase protection for carbon steel panels, but failed to protect copper.

2. The VIA test results determined that TechCorro provides sufficient vapor-phase corrosion inhibition. The razor blade test results determined that the paper provided adequate contact-phase protection for carbon steel, but failed to protect copper. TechCorro paper is nitrite-based.

3. Based on the FT-IR test results Zerust ExCorr film doesn't contain sufficient amounts of corrosion inhibitors (if any) except nitrite.

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Estimated Cost of Project: 4 hours

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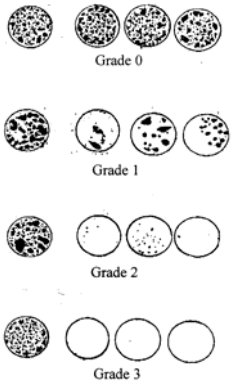
VIA Test Grades (Grade 2 or 3 are passing)

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