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***Evaluation of Anticorrosion Properties of Submitted Zerust Film
and Cardboard***

From: Cortec Corporation Laboratories
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Project #: 10-122-1125(bis)

Test conducted by:

A handwritten signature in purple ink, appearing to read "Ming Shen".

Ming Shen

Approved by:

A handwritten signature in black ink, appearing to read "M. Kharshan".

Margarita Kharshan
Laboratory Director

Date: June 10, 2010



Background: A sample of clear yellow film with print “Zerust Valeno VCI E K-450” (measured 3 mil thick), and a sample of cardboard reportedly from Zerust were submitted for testing of anticorrosion properties.

Sample(s) labeled: The film is printed on one side “Zerust Valeno VCI E K-450”. The cardboard is not labeled.

Methods:

- Nitrite Test
- FTIR
- Razor Blade Test
- VIA Test

Materials:

- 1) Submitted film
- 2) Submitted cardboard
- 3) Carbon Steel Panels
- 4) Copper Panels
- 5) Methanol-lab grade
- 6) Razor Blade test kit
- 7) VIA test kit
- 8) Perkin Elmer FTIR 1000 Spectrometer

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

Results:

Nitrite Test

Sample	Nitrite
Submitted Film	positive
Submitted Cardboard	negative

FTIR

FTIR revealed that the submitted film contained no detectable amount of inhibitors.
See attached spectrum.

Razor Blade Test Performed on Carbon Steel Panels

Sample	Panel 1	Panel 2	Panel 3
Submitted Film	Pass	Fail	Pass
Submitted Cardboard	Fail	Fail	Fail
Control	Fail	-	-

Razor Blade Test Performed on Copper Panels

Sample	Panel 1	Panel 2	Panel 3
Submitted Film	Fail	Fail	Fail
Submitted Cardboard	Pass	Pass	Pass
Control	Fail	-	-

VIA Test




Sample	Plug #1	Plug #2	Plug #3
	Grade	Grade	Grade
Submitted Film	2	1	0
Submitted Cardboard	1	1	2
Control	Grade 0	-	-

Note: VIA Grading system is attached below

Interpretations:

3 mil yellow Zerust film failed VIA and Razor Blade Test on Copper, indicating it provided no protection for carbon steel in vapor phase and no protection for copper in contact. The cardboard also failed VIA and Razor Blade Test on Carbon Steel, meaning it didn't have protection for carbon steel either in paper phase or in contact.

For better protection for multi metal, in vapor phase and in contact, Cortec VpCI-126 film and Cor-Pak Linerboard are recommended.

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	