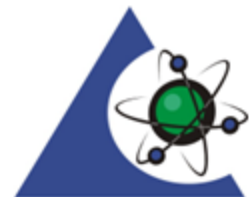




ISO/IEC 17025:2017 Accredited

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**PJLA
Testing**
Accreditation # 116482

Evaluation of Lordtech Polimeros Film Compared to Cortec VpCI-126 Film

From: VIA and Razor Blade Testing performed by:
Cortec Laboratories, Inc.
4119 White Bear Parkway
St. Paul, MN 55110

Mechanical Properties Testing performed by:
Cortec Advanced Films
410 East First Ave.
Cambridge, MN 55008

cc: Boris Miksic
Cliff Cracauer
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Scott Bryan
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Project #: 23-183-1125.bis

Results reported by:

Brian Benduha
Lab Technician II

Results approved by:

Rick Shannon
Technical Services Manager



Background:

A sample of blue film manufactured by Lordtech Polimeros was submitted for testing compared to VpCI-126 film.

Sample Received:

1. Blue film, 1.5mils

Method:

- NACE Standard VIA Test, TM 0208-2018
- Razor Blade Test, CC-004*
- Mechanical Properties Testing*

*The test marked is not covered under Cortec Laboratories, Inc. ISO 17025 Scope of Accreditation

Materials:

1. VIA test kit (testing jars with lid apparatus, steel plugs, 400grit sandpaper)
2. Buehler Plug Grinder, Ecomet V Polisher (manual turn table plug grinder)
3. VpCI-126 film, lot: 020240
4. Steel panels, SAE 1008/1010 (Q-Panel, S-35 DG, 3"x5"x0.032")
5. Copper panels
6. Glycerin (lot: Z01I006)
7. Methanol, ACS grade (CAS #67-56-1)
8. Scale I (0.0g)
9. Lint-free cotton wipes
10. DI water
11. Plain Polyethylene film
12. Calibrated thermometer (QA-CHQ-107)

Procedure:

All testing was conducted according to standard procedure.

Results:**Razor Blade Test- Steel Panels**

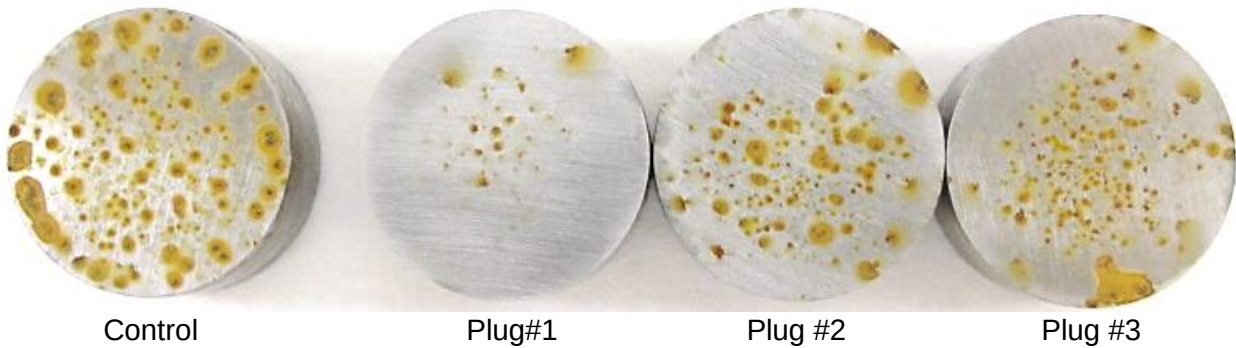
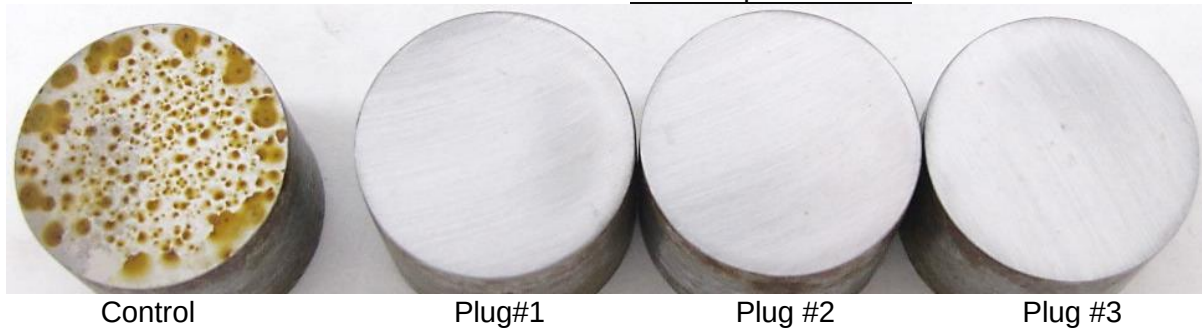
Sample	Panel #1	Panel #2	Panel #3	End Result
Lordtech Polimeros Film	Fail	Fail	Fail	Fail
Cortec VpCI-126 Film	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

Razor Blade Test- Copper Panels

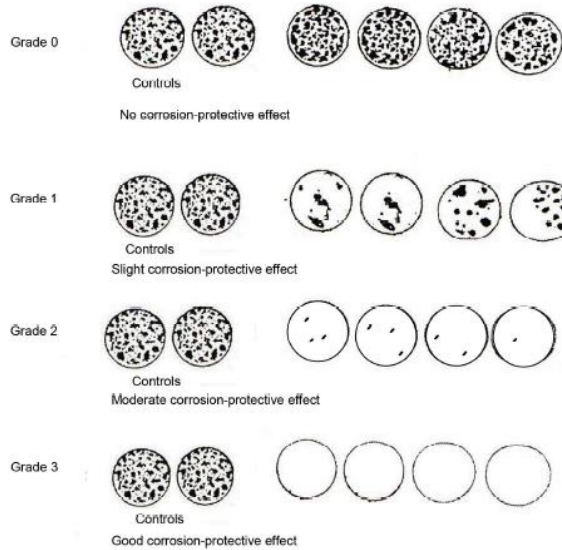
Sample	Panel #1	Panel #2	Panel #3	End Result
Lordtech Polimeros Film	Fail	Fail	Fail	Fail
Cortec VpCI-126 Film	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

Results:**NACE VIA Test**

Sample	Plug #1	Plug #2	Plug #3	End Result
Lordtech Polimeros Film	Grade 1	Grade 1	Grade 1	Slight corrosion protective effect
Cortec VpCI-126 Film	Grade 3	Grade 3	Grade 2	Good corrosion protective effect
Control	Grade 0	-	-	No corrosion protective effect

Photo of VIA plugs after testing:Lordtech Polimeros FilmCortec VpCI-126 Film

VIA Test Grades



Mechanical Properties Testing

Property		Test Method	Units	Lordtech Polimeros	Cortec 1.5 Mil
Caliper		ASTM D6988	mil	1.50	1.50
Breaking Factor	MD	ASTM D882-02	lbs/in	5.39	6.04
	TD			4.36	3.67
Tensile Strength at Break	MD	ASTM D882-02	psi	3793.00	3701.00
	TD			2992.00	2273.00
Elongation at Break	MD	ASTM D882-02	%	404.98	464.94
	TD			576.06	473.00
Yield Strength	MD	ASTM D882-02	psi	2756.15	2357.01
	TD			1702.61	1525.16
Puncture Resistance	Outside	MIL-STD-3010, TM 2065	lbf	2.58	3.33
Puncture Resistance	Inside	MIL-STD-3010, TM 2065	lbf	2.62	2.86
Tear Strength	MD	ASTM D1922-06A	gram force	84.00	120.00
	TD			692.80	697.60
Coefficient of Friction		ASTM D1894	static	0.01	0.01
			kinetic	0.20	0.57

Interpretations:

The Lordtech Polimeros Film does not provide sufficient contact corrosion protection to pass the razor blade test for steel or copper and only provides slight corrosion protection in the vapor phase. In comparison, VpCI-126 film provides excellent contact and vapor phase corrosion protection. Mechanical properties are also shown in the table above.