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## ***Evaluation of Armor Film Compared to VpCl-126 Film***

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**For:** Customer

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**Project #:** 18-197-1125.bis

**Results reported by:**

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**Approved by:**

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Robert T. Kean, Ph.D.  
Laboratory Director



**Background:** Customer packages machine tool parts in Armor film bags. This report will compare the corrosion protection of the Armor film to VpCI-126 film.

**Sample Received:** Armor film bag, 4mils, received on 9/27/18 in good condition.

**Method:** FTIR Analysis, CC-006  
Razor Blade Test, CC-004\*  
NACE Standard VIA Test, TM0208-2008, item No. 21253\*  
Nitrite/Nitrate Test\*  
\*The tests marked are not covered under Cortec Laboratories, Inc. ISO 17025 Scope of Accreditation

**Materials:** VIA test kit (testing jars/apparatus, steel plugs, 400grit sandpaper)  
VpCI-126 film, 4mil (batch #510220)  
Carbon Steel panels, SAE 1010 (for razor blade testing)  
Copper panels (for razor blade testing)  
Glycerol (lot #Q10A018)  
Nitrite/Nitrate Test Strips (lot #HC719626)  
Methanol, ACS grade (lot #071417B)

**Procedure:** For VIA testing, the procedure was followed according to NACE VIA Test, TM0208-2008 option 2 (option 2 uses machine-aided grinding and polishing for the steel plugs).

Note- the VIA tests were conducted using two strips of sample per jar (1" X 6" per strip)

The FTIR analysis and razor blade testing was followed according to standard procedure.

**Results:** The following results were found:

#### Razor Blade Test- Carbon Steel Panels

Sample	Panel #1	Panel #2	Panel #3	End Result
Armor Film	Fail	Fail	Fail	Fail
VpCI-126 Film*	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

#### Razor Blade Test- Copper Panels

Sample	Panel #1	Panel #2	Panel #3	End Result
Armor Film	Fail	Fail	Fail	Fail
VpCI-126 Film*	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

#### NACE VIA Test

Sample	Plug #1	Plug #2	Plug #3	End Result
Armor Film	Grade 1	Grade 0	Grade 0	Fail
VpCI-126 Film*	Grade 3	Grade 3	Grade 2	Pass
Control	Grade 0	Grade 0	-	Fail

\*Note- The results for VpCI-126 film used in this report was previously tested (from 16-083-1125)

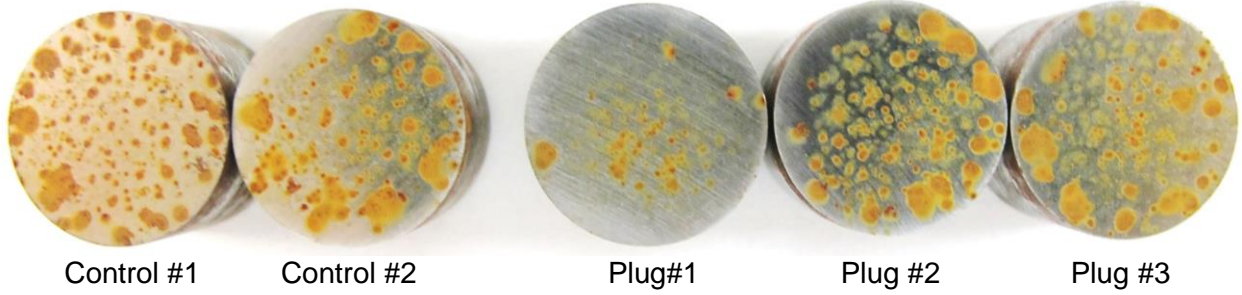
**Results:**

**Nitrite/Nitrate Test Strips**

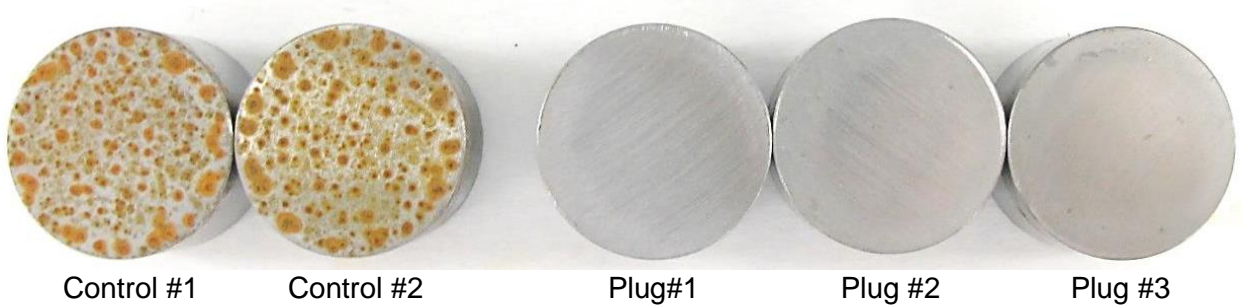
The Armor film does not contain any nitrite/nitrate

**Photo from the NACE VIA test:**





**Armor Film, 4mils**



**VpCI-126 film, 4mils**

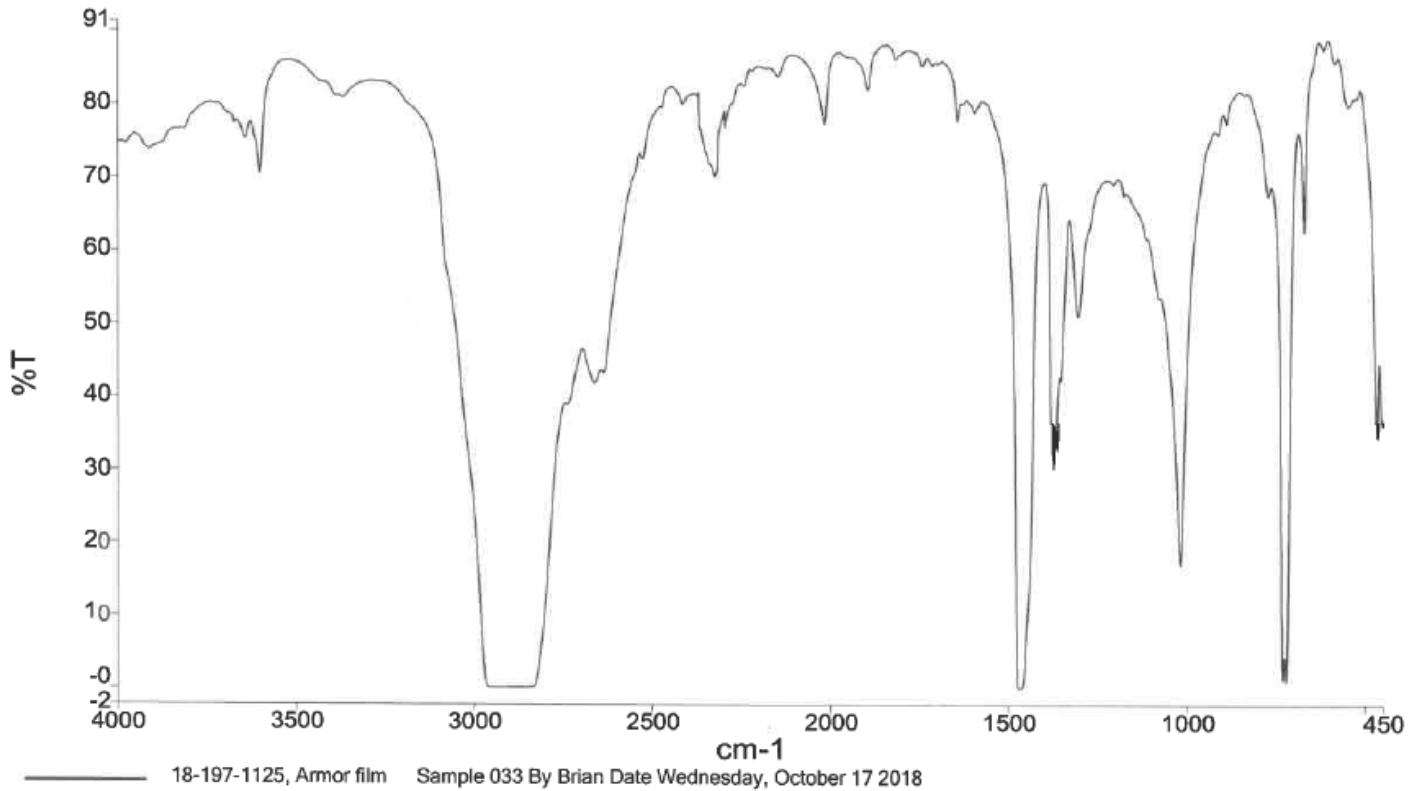


VIA Test Grades (Grade 2 or 3 are passing)  
All three plugs must be grade 2 or better to pass the test

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	

**FTIR Analysis:**

Armor Film



**Interpretations:**

The Armor film does not provide sufficient corrosion protection to pass the VIA or razor blade tests. The FTIR spectrum is consistent with a film containing desiccant. Spectral peaks corresponding to known inhibitor chemicals are small or absent. In comparison, Cortec's film (VpCI-126), provides excellent corrosion protection in both the vapor phase and contact phase.