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 Daubert Film Samples Compared to VpCI-126 Film

To: Customer

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

cc: Boris Miksic
Cliff Cracauer
Robert Kean
Jay Zhang
Mike Gabor

Project #: 18-196-1125.bis

Results reported by:

Brian Benduha
Lab Technician

Approved by:

John Wulterkens
Technical Service Engineer

Background: The customer is a world-class producer of precision manufactured metal products. They are having corrosion issues using various Daubert films to protect parts going to China. This report will compare the corrosion protection of the three submitted Daubert films to Cortec's VpCI-126 film.

Sample Received: The following samples were received on 10-9-18 in good condition:

1. Light Blue Daubert film bag, 8"x10", 4.5mil
2. Blue Daubert gusseted film bag, 8.5"x10"x18", 4mil
3. Green Daubert film, 2mil

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 for the razor blade testing:

Razor Blade Test- Carbon Steel Panels

Sample	Panel #1	Panel #2	Panel #3	End Result
Light Blue Daubert Film	Pass	Pass	Pass	Pass
Blue Daubert Film	Pass	Pass	Pass	Pass
Green Daubert Film	Pass	Pass	Pass	Pass
VpCI-126 Film*	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

Razor Blade Test- Copper Panels

Sample	Panel #1	Panel #2	Panel #3	End Result
Light Blue Daubert Film	Fail	Fail	Fail	Fail
Blue Daubert Film	Fail	Fail	Fail	Fail
Green Daubert Film	Fail	Fail	Fail	Fail
VpCI-126 Film*	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

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

Results: The following results were found:

NACE VIA Test

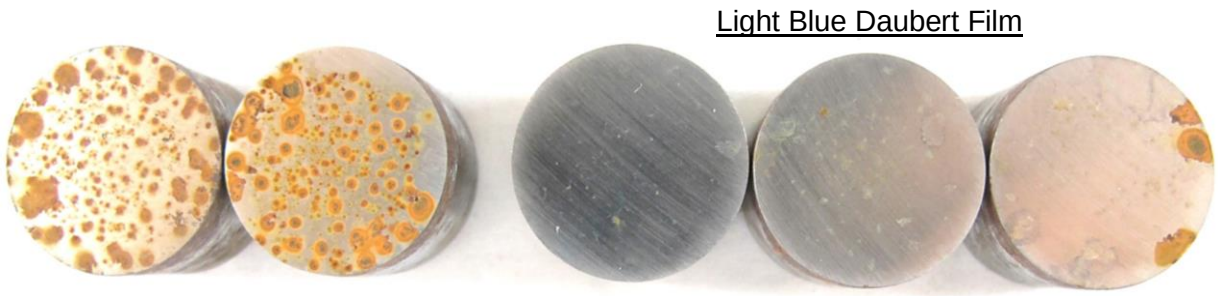
Sample	Plug #1	Plug #2	Plug #3	End Result
Light Blue Daubert Film	Grade 2	Grade 2	Grade 1	Fail
Blue Daubert Film	Grade 2	Grade 1	Grade 1	Fail
Green Daubert Film	Grade 1	Grade 1-2	Grade 1-2	Fail
VpCI-126 Film*	Grade 3	Grade 3	Grade 2	Pass
Control	Grade 0	Grade 0	-	Fail

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

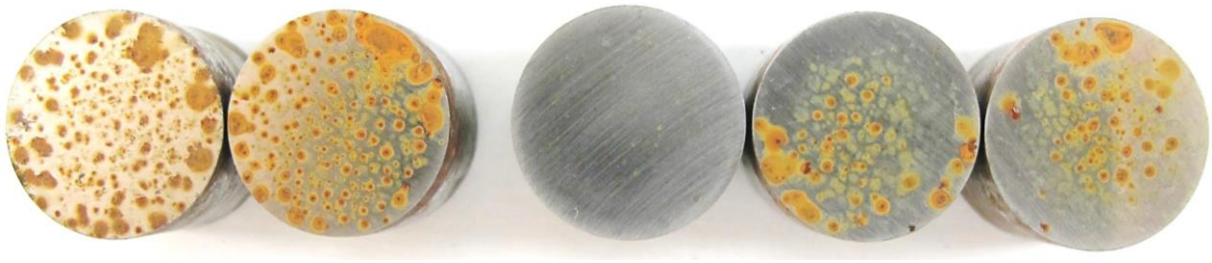
Nitrite/Nitrate Test Strips

Sample	Results
Light Blue Daubert Film	Contains nitrite/nitrate
Blue Daubert Film	Does not contain nitrite/nitrate
Green Daubert Film	Contains nitrite/nitrate

Photo from the NACE VIA test:



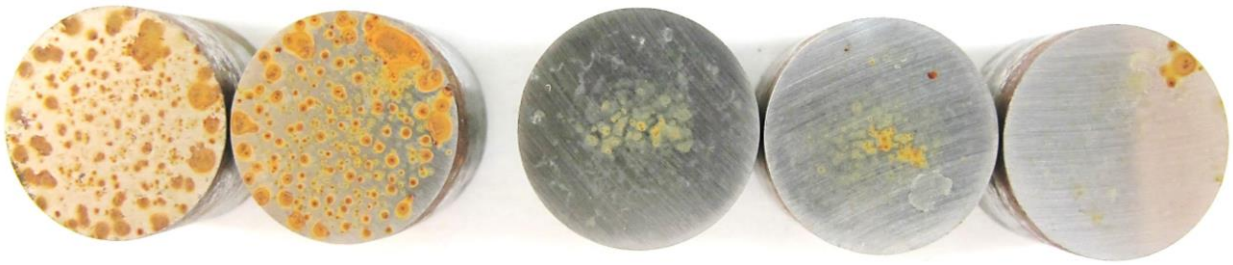
Blue Daubert Film



Control #1 Control #2 Plug#1 Plug #2 Plug #3

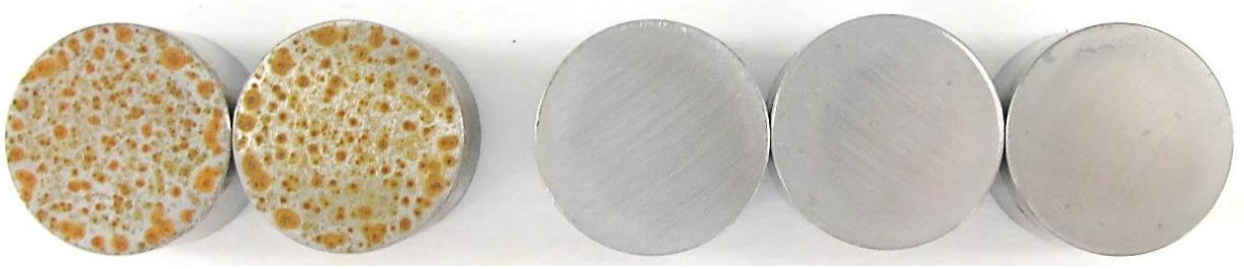
Photo from the NACE VIA test:

Green Daubert Film



Control #1 Control #2 Plug#1 Plug #2 Plug #3

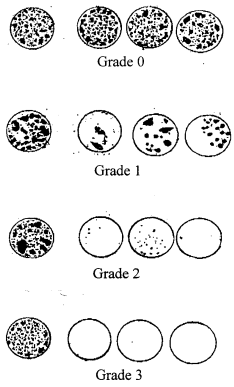
VpCI-126 film



Control #1 Control #2 Plug#1 Plug #2 Plug #3

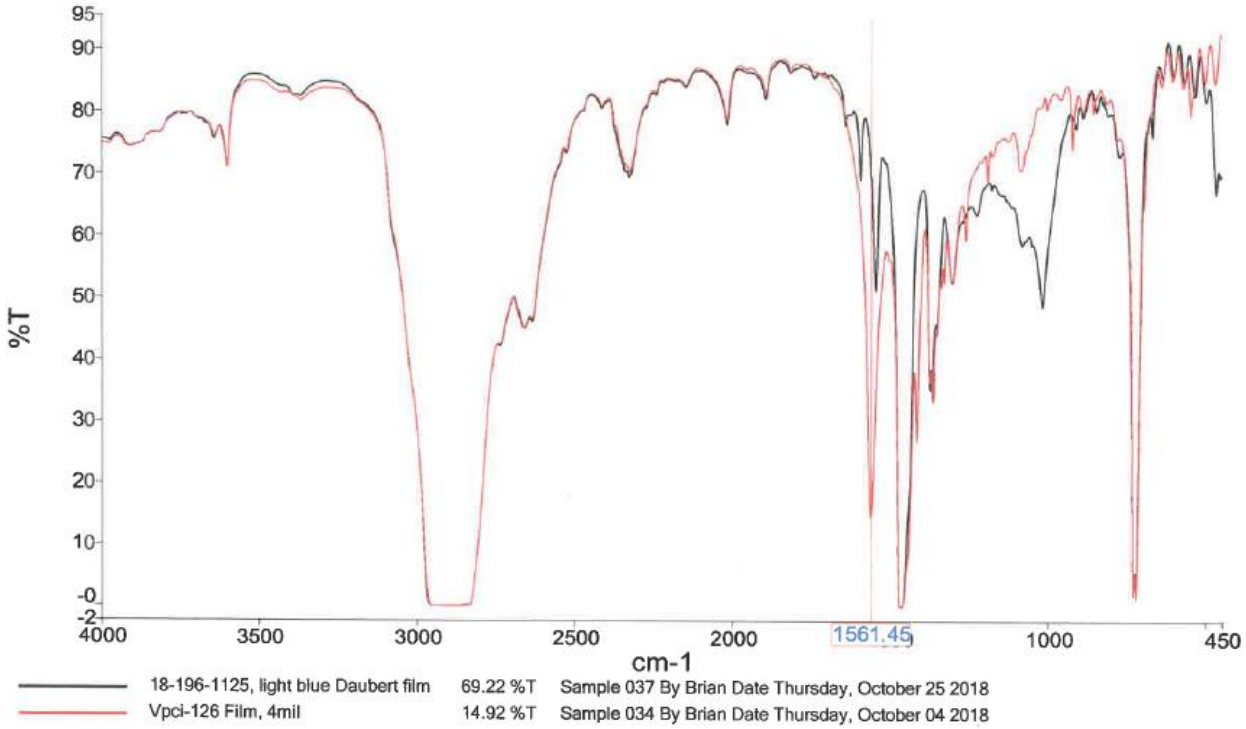
VIA Test Grades (Grade 2 or 3 are passing)
All three plugs must be grade 2 or better to pass the test

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

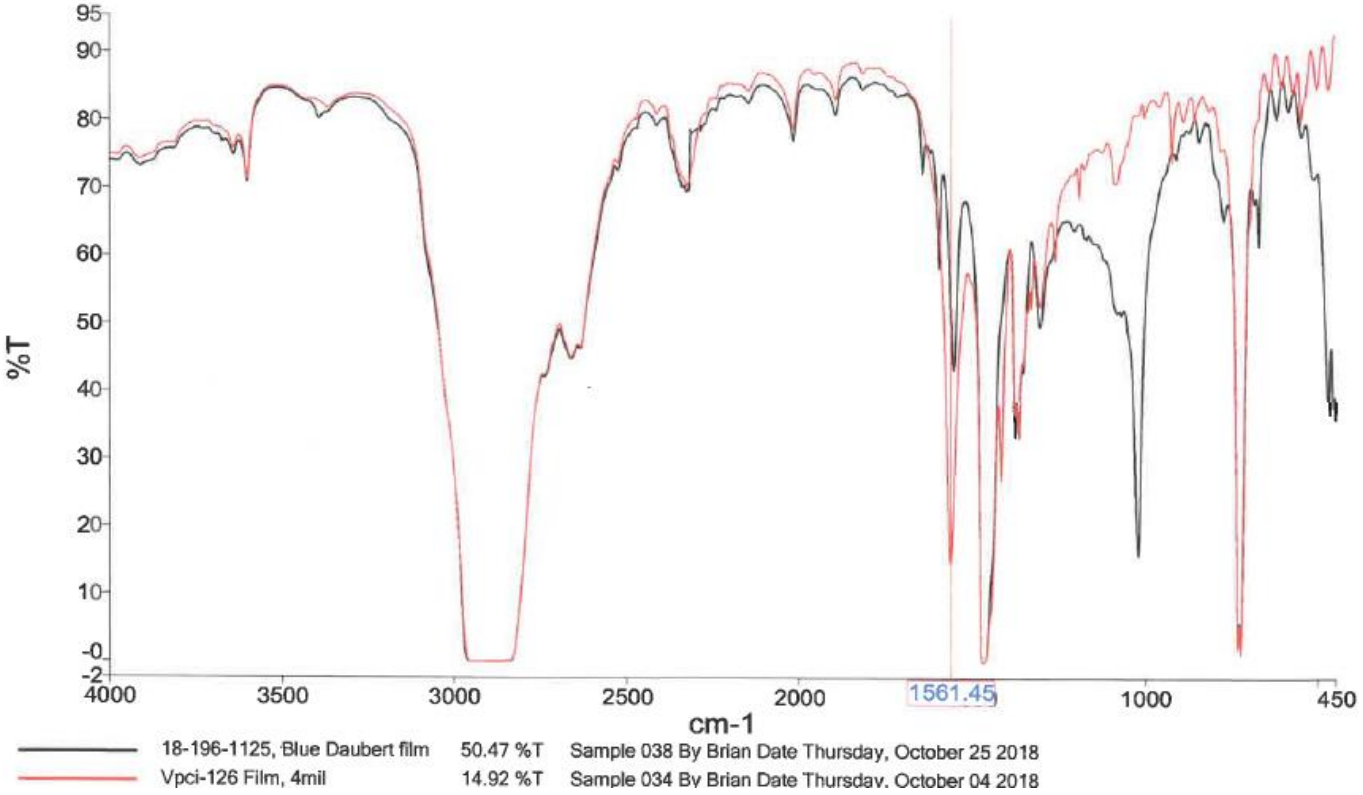


FTIR Analysis:

Light Blue Daubert Film Compared to VpCI-126

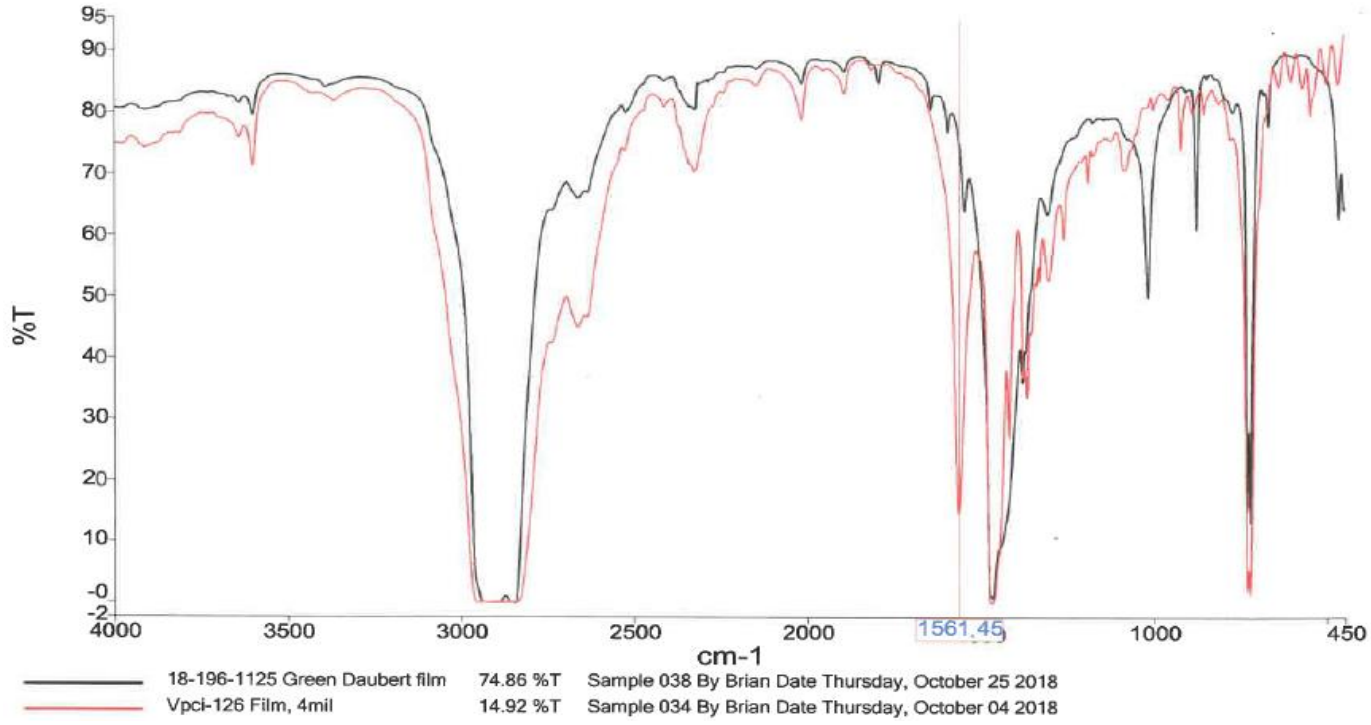


Blue Daubert Film Compared to VpCI-126



FTIR Analysis:

Green Daubert Film Compared to VpCI-126



Interpretations: According to the FTIR analysis, all three Daubert films contain desiccant, but VpCI-126 film shows a stronger peak of inhibitor. As a result, the Daubert films do not provide sufficient vapor phase corrosion protection to pass the NACE VIA test. For contact corrosion protection, the Daubert films protect for carbon steel, but failed the razor blade test for copper. VpCI-126 film provides excellent vapor phase protection and also provides contact protection for both carbon steel and copper.