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## *Evaluation of Daubert's Premium Metal Guard Film*

**Purpose:** To test the VCI and physical properties of the submitted sample of Premium Metal Guard film, which was manufactured by Daubert.

**Materials:** Submitted sample of Daubert's blue Metal Guard Film (4mils)  
 Razor Blade Test Kit  
 VIA Test Kit  
 Perkin Elmer FT-IR 1000 Spectrometer  
 EM Quant Nitrite/Nitrate Test strips (Lot # OC555062, Exp 9/08)

**Method:** Razor Blade Test  
 VIA Test  
 FT-IR Analysis  
 Nitrite Test

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

**Results:** Razor Blade Test (carbon steel)

Material	Panel #1	Panel #2	Panel #3
Submitted sample of Daubert's blue Metal Guard Film	Pass	Pass	Pass
VpCI-126 ES film	Pass	Pass	Pass
Control	Fail	Fail	Fail

VIA Test

Material	Panel #1	Panel #2	Panel #3
Submitted sample of Daubert's blue Metal Guard Film	Grade 1	Grade 1	Grade 2
VpCI-126 ES film	Grade 3	Grade 3	Grade 3
Control	Fail	Fail	Fail

Nitrite Test: The submitted film contains nitrite on both sides of the film



Physical Properties:

Formulation	Daubert film 6/27/07	126 Film	126 ES Film
Mil	4	4	3.5
Breaking Factor Machine Direction (lbs/in)	9.13	13.09	14.76
Breaking Factor Cross Direction (lbs/in)	12.49	12.32	14.04
Machine Direction Tensile Strength at Break(psi)	2345.49	3521.17	4098.12
Cross Direction Tensile Strength at Break(psi)	3296.67	3425.49	3980.97
Machine Direction Elongation at Break (%)	151.5	435.3	412
Cross Direction Elongation at Break (%)	325.7	394.3	346.3
Machine Direction Tensile Strength at Peak(psi)	2513.48	3522.92	4098.12
Cross Direction Tensile Strength at Peak(psi)	3296.67	3598.17	3980.97
Machine Direction Tear Strength (Newtons)	2302.08	9469.92	8161.92
Cross Direction Tear Strength (Newtons)	4656.48	17004	16167
Puncture Strength (Joules)	1.37	1.14	1.58

**Conclusion:** Daubert's blue Metal Guard film failed to pass the VIA test, and has poor mechanical properties in any direction. Based on the FT-IR results it can be concluded that Daubert's film contains a blend of sodium benzoate and nitrite as corrosion inhibitors, in an insufficient amount to pass the requirements of VCI film.

**Project #:** 07-153-1125

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



Grade 0



Grade 1



Grade 2



Grade 3

## FTIR Analysis

