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## *Evaluating Six Year Old VpCI-126 Film and Starbright Cutting Fluid*

- Background:** John Dinwiddie of Flex-Pac Inc. sent Cortec two VpCI-126 Blue Film bags that were manufactured in 2001. The corrosion inhibiting ability of these bags will be tested. In addition, the cutting fluid currently used by Flex-Pac's customer will be tested, and compared to Eco-Line Cutting Fluid.
- Purpose:** To evaluate the corrosion inhibiting abilities of VpCI-126 Blue Film bags manufactured about 6 years ago. In addition, evaluate the corrosion inhibiting properties of a cutting fluid made by StarChem.
- Method:** ASTM D 1748 Humidity Cabinet  
German VIA Test  
Razor Blade Test  
FT/IR Spectroscopy
- Materials:** VIA Test Kit  
1010 Carbon Steel Panels  
Perkin Elmer Spectrometer  
VpCI-126 Blue Film bags, Lot #000220, provided by Flex-Pac Inc.  
Starbright 455 cutting fluid, manufactured by StarChem, provided by Flex-Pac Inc.  
EcoLine Cutting Fluid (1:40 dilution with water)
- Procedure:** The following procedure was used:
- 1) Two VpCI-126 Blue Film bags and a small sample of Starbright 455 cutting fluid were received.
  - 2) The following tests were performed on the film, according to their respective work instructions.
    - a. Razor blade test
    - b. FT/IR analysis
    - c. German VIA Test
  - 3) Next, 2 carbon steel panels were coated; one with Starbright 455 and the other with a 2.5% solution of Eco-Line Cutting Fluid.
  - 4) After drying, both panels (along with a control panel) were placed in ASTM D 1748 humidity cabinet.
  - 5) All panels were visually inspected periodically.
  - 6) After 504 hours, panels were removed from ASTM D 1748 humidity cabinet.
  - 7) Panels were visually inspected and photographed.
- Results:** The following results were found:
- FT/IR Analysis:** FT/IR spectrum is attached. FT/IR analysis showed the distinguishing characteristics consistent with the version of VpCI-126 Blue Film being made at that time.



**Razor Blade Test**

| <b>Product</b>               | <b>Panel 1</b> | <b>Panel 2</b> | <b>Panel 3</b> |
|------------------------------|----------------|----------------|----------------|
| VpCI-126 Film,<br>Lot#000220 | Pass           | Pass           | Fail           |

**German VIA Test**

| <b>Product</b>                        | <b>Plug 1</b> | <b>Plug 2</b> | <b>Plug 3</b> | <b>Control</b> |
|---------------------------------------|---------------|---------------|---------------|----------------|
| VpCI-126, Lot<br>#000220              | Grade 2       | Grade 1       | Grade 1       | Grade 0        |
| VpCI-126<br>(Manufactured in<br>2007) | Grade 3       | Grade 3       | Grade 3       | Grade 0        |

**Humidity Testing:** 504 Hours in ASTM D 1748 Humidity Chamber

- 1) The control panel was severely corroded after 504 hours. Corrosion covered >90% of the surface area of the panel.
- 2) The panel coated with Starbright 455 was moderately corroded after 504 hours. Corrosion covered 25% of the surface area of the panel.
- 3) The panel coated with EcoLine Cutting Fluid was very lightly corroded after 504 hours. Five small spots (~2mm) were present on the panel, constituting less than 1% of the total surface area of the panel.

**Conclusion:** Submitted VpCI-126 Blue Film showed VpCI properties when analyzed by FT/IR, and also provided some contact corrosion protection. The amount of vapor protection given was not sufficient, however. If these bags are to be used in the future, they should be used mainly in applications where contact protection is needed.

Starbright 455 cutting fluid did not provide adequate corrosion protection, when compared to a 2.5% solution of Eco Line Cutting Fluid. The Starbright product was very thin, and most of it dripped off the panel when applied.

**Project #:** 07-135-1125



**Starbright 455 Cutting Fluid, after 504 hours in humidity.**



**Eco-Line Cutting Fluid (2.5% solution), after 504 hours in humidity.**

