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## *Comparing Corrosion Protection of Various Products on Copper Strip*

**Purpose:** Compare Coppershield product currently used by customer to similar Cortec products for protection of copper strip.

**Method:** ASTM D-1748 Humidity cabinet

**Materials:** 3 copper strips  
 Henkel Coppershield  
 VpCI-239 liquid  
 VpCI-316  
 DI (Deionized) water

**Procedure:** The following procedure was used:

- 1) The copper strips were all cleaned with methanol prior to testing.
- 2) After cleaning, the strips were dipped in one of the following solutions:
  - a. Coppershield, used as received (4.5% solution, according to the bottle)
  - b. VpCI-239, used neat
  - c. VpCI-316, used at 5% in DI water.
- 3) All pieces were dipped for ~2 seconds, according to customer specification.
- 4) After dip, all strips were allowed to drip dry.
- 5) After drying, strips were placed in ASTM D-1748 humidity cabinet.
- 6) Strips were visually inspected periodically.
- 7) After 312 hours, all strips were removed from ASTM D-1748 humidity cabinet.
- 8) Parts were visually inspected and photographed.

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

| Protection          | Time to Failure (Hours) |
|---------------------|-------------------------|
| Coppershield (4.5%) | <72                     |
| VpCI-239            | DNF                     |
| VpCI-316 (5%)       | DNF                     |

DNF – Did not fail during 312 hours of testing.

**Conclusion:** There were problems with the Coppershield product even before humidity testing began. Within 30 minutes of application, the copper strip dipped in the Coppershield product had turned light green over ~25% of its total surface area. This green color turned to black as testing progressed.

No corrosion was seen on either of the Cortec products. Previous testing indicates that VpCI-239 also effectively protects copper in SO2 conditions.



**Project #:** 08-239-1825(bis)



Figure 1: Copper strips, after dipping, prior to testing. From left to right: VpCI-239, VpCI-316, Coppershield.



Figure 2: Copper strip dipped in Coppershield (4.5% solution), after 312 hours in ASTM D-1748 humidity cabinet testing.



Figure 3: Copper strip dipped in VpCI-239, after 312 hours in ASTM D-1748 humidity cabinet testing.



Figure 4: Copper strip dipped in VpCI-316 (5% solution), after 312 hours in ASTM D-1748 humidity cabinet testing.