Competitor Product Evaluation: Acrylic Based Copper Filled Coating In A Salt Fog Environment

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1 INTRODUCTION

This report compares the performance of a competitor's acrylic based copper filled coating with Chomerics' CHO-SHIELD® 2000 series coatings in a salt fog environment. Both coatings are designed for use in EMI shielding applications. The competitor's coating is being offered as a corrosion resistant equivalent material to CHO-SHIELD 2000 series coatings.

On composites and non-conductive materials, the primary coating property of interest is electrical stability during salt fog exposure. On aluminum or other dissimilar metal substrates, important properties also include substrate protection and galvanic compatibility.

The specific objectives of this test program were: 1) to measure the surface resistance of the competitor's and CHO-SHIELD 2002 coatings on G-10 plastic as a function of time in a salt fog, and 2) to determine substrate protection properties of the competitor's coating on 2024-T3 aluminum (with a MIL-C-5541, Class 3 chromate conversion coating).

2 TEST METHOD

The competitor's coating was sprayed on G-10 and aluminum panels and cured for 4 hours at room temperature plus 1 hour at 160° F (71° C). The aluminum panels were then edge sealed with a non-conductive epoxy coating.

Panels were exposed to salt fog in tray racks at approximately 22 degrees to the vertical, according to the conditions of ASTM 8117.

After salt fog exposure, panel surfaces were wiped dry and surface resistance was measured using the probe shown in Figure 1. Chomerics document CEPS-0002 provides details of this measurement procedure.

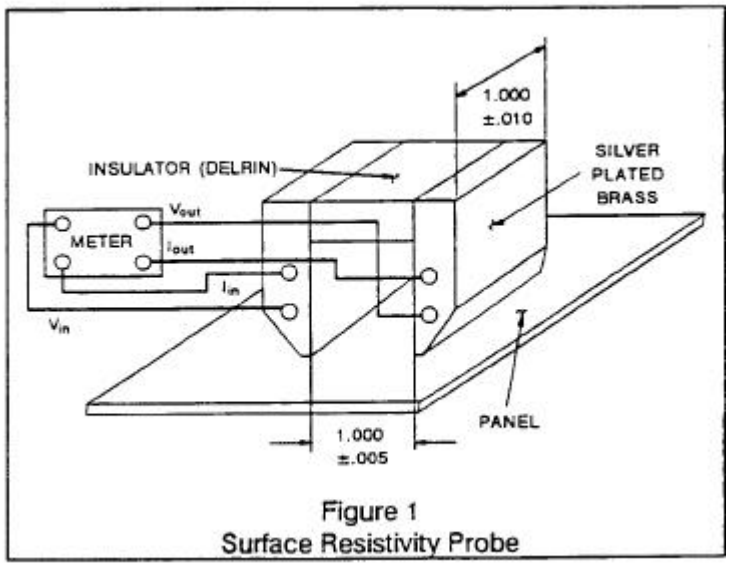

Figure 1
Surface Resistivity Probe

3 RESULTS

Electrical Stability on G-10

Figure 2 is a comparison of the surface resistance of CHO-SHIELD 2002 and the competitor's coatings during salt fog exposure. The competitor's coating increases rapidly in resistance, reaching a value greater than 100 ohms/square after 7 days of exposure. The CHO-SHIELD coating experiences some increase in surface resistance in the first 21 days, but then stabilizes. The surface resistance of the CHO-SHIELD coating is more than 2 orders of magnitude lower than the surface resistance of the competitor's coating after only 7 days of salt fog exposure.

These results are useful in comparing the intrinsic electrical stability of the competitor's coating and CHO-SHIELD 2002 without the complicating effects of galvanic corrosion. Protecting the conductive coating a nonconductive overcoat (in non-contact areas) would probable only slower electrical degradation, and would not eliminate the problem of resistance increase in critical contact areas.

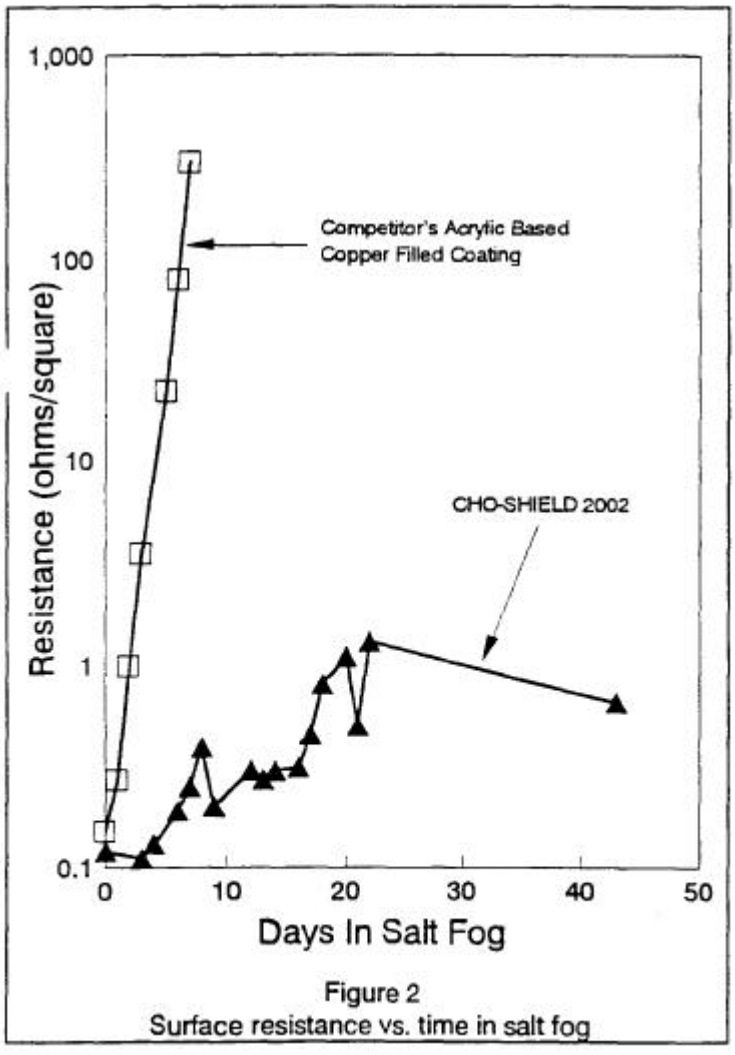

Figure 2
Surface resistance vs. time in salt fog

Protection Of Aluminum Substrates

Figure 3 shows the appearance of a 2024 aluminum panel coated with the competitor's coating after 24 hours of salt fog exposure. After 48 and 72 hours of exposure, blistering continues to increase, with the beginnings of corrosion to the underlying aluminum. This behavior is in contrast to tha of CHO-SHIELD 2002 coating, which can protect an aluminum substrate for more than 500 hours in salt fog

Pre-exposure adhesion of the competitor coating to the aluminum was 58. The coating performs poorly on aluminum not because of poor adhesion, but because of the permeability of the binder system used

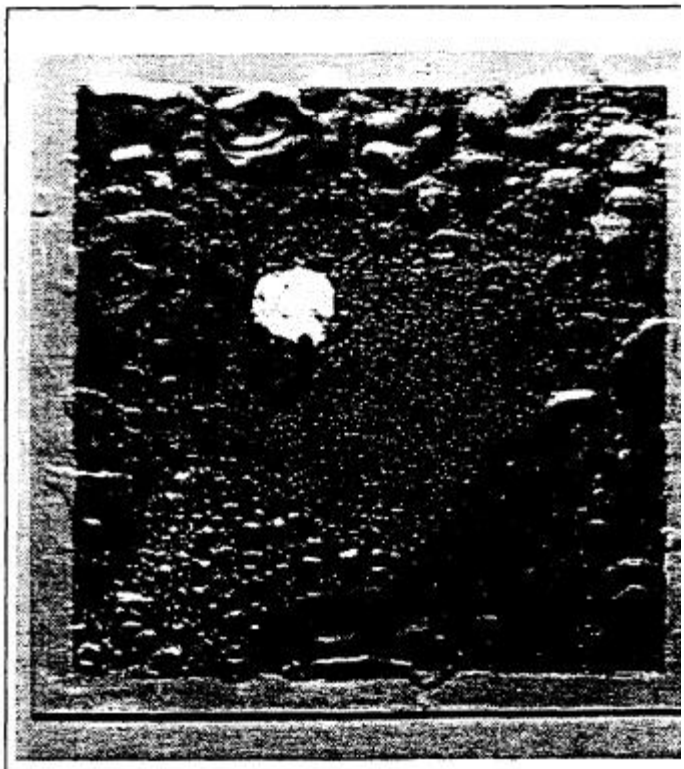

Figure 3
Competitor's coating on 2024-T3 aluminum
after 24 hours of salt fog exposure

4 CONCLUSION

The tested competitor's coating is not electrically stable in salt fog. Even if its electrical

instability is retarded by a non-conductive overcoat, electrical termination to the conductive coating would be poor.

This competitor's coating provides little salt fog protection of aluminum substrates, and should not be recommended for use as a corrosion resistant flange treatment.