Advice & Counsel



Frank Altmayer, MSF, AESF Fellow AESF Technical Director

Scientific Control Labs, Inc. 3158 Kolin Ave. Chicago, IL 60623-4889 E-mail: faltmayer@sclweb.com

Interpreting CASS Results

Dear Advice & Counsel,

Please settle a disagreement between our customer and our lab personnel. We are conducting an eight hour CASS (Copper Accelerated Salt Spray) test in accordance with ASTM B368. Our parts a plated plastic, with a copper- (duplex) nickelchromium finish (photo 1). After the test, the parts may have extremely fine pitting which is almost impossible to see without magnification. However, our client considers the appearance of these pits a failure of the test. Enclosed are the parts for your independent analysis of the test results.

Signed, I. M. Wright

Dear Mr. Wright,

Normally, failure in any accelerated corrosion test is typically determined by the identification/appearance of base metal corrosion, unless the specification for the part provides an alternate criterion. An example of such an alternate would be the appearance of white corrosion on chromated zinc plated parts after salt spray. This white corrosion is not base metal corrosion but simply a breakdown of the chromate film. For this reason chromated parts typically have two accelerated corrosion test requirements; white corrosion failure and red rust failure.

In your case there is no base metal, because the part is made of plastic, so alternate criteria for failure must be used.

For accelerated corrosion test failure evaluation criteria we consulted ASTM B604 (Standard Specification for Decorative

Electroplated Coatings of Copper Plus Nickel Plus Chromium on Plastics). Para 6.6.2 of this specification requires that parts be examined for evidence of corrosion penetrating to the substrate (plastic) or the copper layer, and for blistering of the coating. Any evidence of copper corrosion, blistering of the coating, or substrate exposure is cause for rejection. Further, Para 6.6.3 of this specification states that "Surface deterioration of the coating itself is expected to occur during the testing of some types of coatings".

We examined these parts visually, at 10X, and at very high magnification (1000X) for conformance to ASTM B604.

There was no evidence of corrosion penetrating to the substrate (plastic), as there was no plastic visible in the surface pores we found, even at high magnification (photo 2). Also, there was no evidence of copper corrosion products (crystals which typically are a blue green color), and there was no evidence of blistering of the coating.

We found microscopic porosity in the surface, which is normal for a porous chromium deposit over bright nickel. In fact the production of numerous corrosion cells over a large surface area is the exact mechanism by which this type of plated coating provides corrosion protection.

In a nutshell, Mr. Wright, you are right. These parts pass the eight hour ASTM B368 CASS test. Now all you have to do is convince your customer.



