

STRUCTURE PROBE™

SPECIALISTS IN MATERIALS RESEARCH

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November 14, 1983

Mr. Tom Heiss
Advanced Protective Products, Inc.
P.O. Box 251
Richmond Hill, NY 14419

Dear Tom:

We have completed our metallography investigation of the heavily corroded steel plate that you submitted for analysis by personal delivery on October 11, 1983. One portion of the plate had been painted with a red primer coat. We were asked to prepare a metallographic cross section to examine the nature of the interaction between primer, rust and steel plate. Both the metallographic mount and the steel plate were returned to you during a previous visit to Metuchen.

Metallography describes all variations of the sample preparation procedure which generally starts with cutting a sample cross section, mounting in epoxy or bakelite, grinding with SiC or diamond, polishing with diamond and/or alumina, etching and photographing. The term includes all materials and composites (not just metals), many variations of the procedure depending on the specific situation and all kinds of documentation techniques from photomacrography/microscopy to electron microscopy/microanalysis.

Small pieces were cut from the primer coated area and epoxied together with the coated surfaces touching. This new sample was mounted in 24 hour epoxy and prepared by standard metallography procedures: grinding with 240, 400, 600 grit SiC; polishing with 6 μ m and 1 μ m diamond and briefly with fine alumina; and no final etching step. Photomicrographs were taken in black/white and in color.

Three sets of photomicrographs are attached. The 40X set shows the steel plate at the top and bottom. At the center is the dark layer of epoxy with the smooth primer surface on either side. The black material between the primer and the steel plate is the iron oxide corrosion product (rust). The primer

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Member ACS

has filled all of the open spaces in the corrosion product and has formed an unbroken protective layer covering all observed portions of the very irregular surface.

The 110X and 196X sets show two areas in more detail. At 110X, the steel plate is at the top and the epoxy is at the lower left. At 196X, the epoxy is at the upper right and the steel plate is beyond the field of view at the bottom. Again, the primer has surrounded all loose portions of the corrosion product.

Based on this limited metallography study, the red primer appears to fill all open areas in the corrosion product, surround all loose portions and produce a relatively unbroken protective layer.

Please let us know if we can help further with this or any other materials problem.

Sincerely,


J. Stephen Duerr, Ph.D., P.E.
Technical Director

JSD:jk
Encl/

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