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9-16-52

AUTOCCLAVING OF ANODIZED SLUG JACKETS**Introduction:**

In connection with the program evaluating several anodic finishes for use on slug jackets, samples of Martin Hardcoat and Alumilite Hardcoat were autoclaved. Autoclaving consists of 40 hours exposure of slugs to steam at 90-105 psig.

The purpose of the test was to determine if anodizing could become a part of the canning operation prior to autoclaving, other factors permitting, or if it must follow autoclaving.

Procedure:

The anodic films were applied in the manner recommended by ALCOA in Bulletins No. 5 and 6 pertaining to their booklet "Instructions for Applying Alumilite Finishes. Briefly, the coating procedures were:

(1) Alumilite Hard Coat (Alumilite #226)

- (a) Clean in alkaline cleaner.
- (b) Rinse in cold running water
- (c) Inspect for water breaks on the surfaces, if any noted repeat (a) and (b).

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- (e) Rinse in running cold water for 5 minutes.
(f) Air dry.

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(f) Air dry.

Results:

Of the methods available for film removal, chemical methods appear feasible only after the autoclave film is altered by some pre-treatment. Present tests indicate that etchants will slowly dissolve the autoclave film, but these etchants react violently with the metal beneath the film. At discontinuities in the autoclave film, which are always present, the slug jacket is deeply attacked (pitted) before the film is completely removed.

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Heating of the autoclave film in the range of 400° to 500°C for 10 to 30 minutes, changes its character such that it is somewhat or perhaps completely soluble in phosphoric-chromic acid deoxidizing solution. The solubility of the film after heating is being studied currently. In discussion with H.L. Mars of the Pile Fuels Sub-Unit, he expressed several objections to heating process slugs in this temperature range.

1. Heating might adversely effect the compound or bonding layers, i.e. craze or crack them.
2. Heating for an extended period might promote diffusion of aluminum into uranium or uranium into aluminum at voids in the bonding layer.
3. To evaluate the suitability of process pieces for in-pile exposure after heating, a production test of a fairly large number of slugs would be required. The production test would cause a considerable delay in the over-all program.

The most fruitful lines of attack at this time appear to be low temperature (below 200°C) chemical means of film removal and mechanical film removal.

Of the mechanical schemes for removing film, particle blasting offers many advantages. Sand blasting, provided a fine grit is employed, should provide adequate film removal accompanied by some surface hardening as a result of cold work in the aluminum. Vapor blasting, grit suspended in water, produces a satin-like finish, good cutting action, and does not remove an excessive amount of metal.

For cleaning aluminum aircraft surfaces, remove corrosion product, ground corn cobs or corn stalks in an air blast have been very effective and produce little or no effect on the metal beneath the film. These materials may not be sufficiently abrasive to remove the autoclave film, but could be investigated.

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FIGURE I

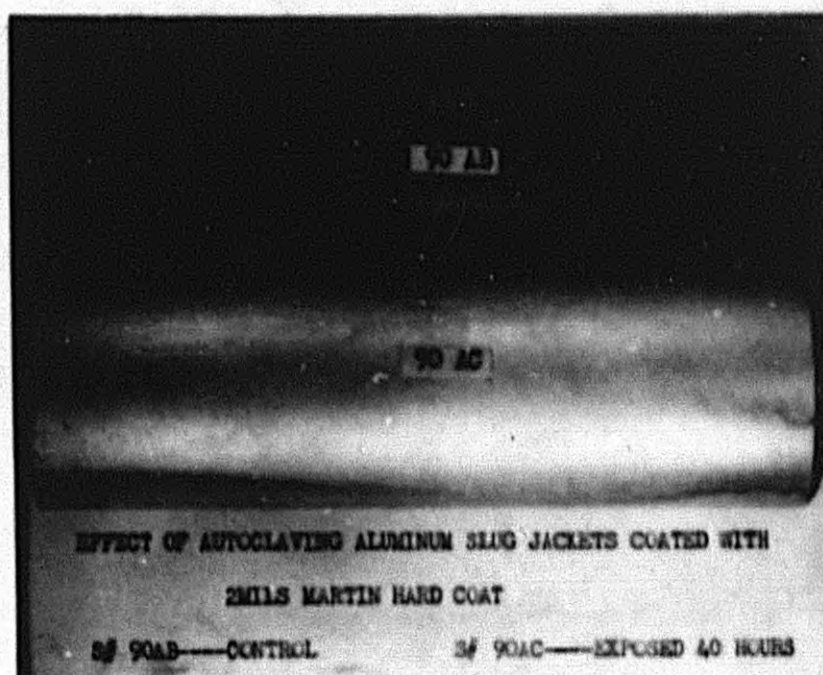
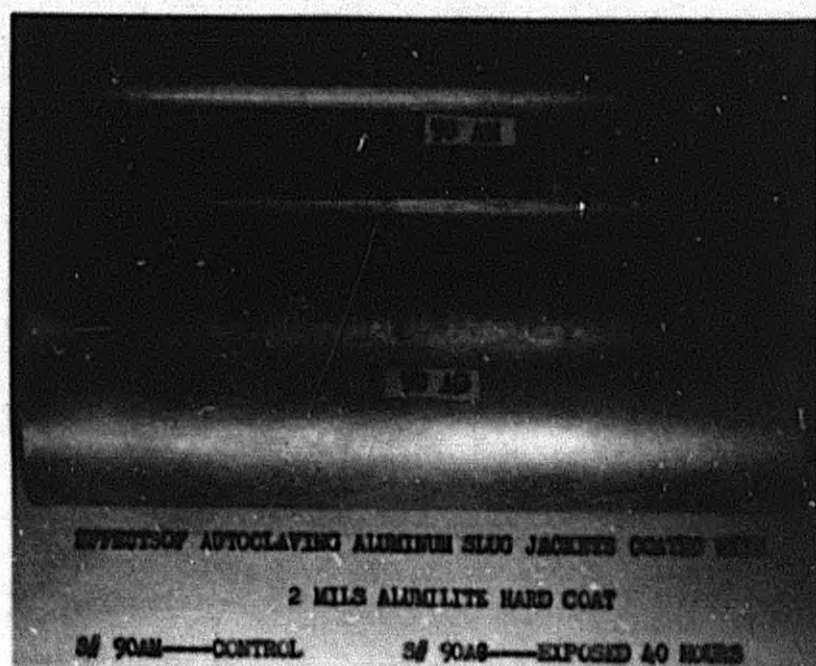


FIGURE II



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