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Series A

September 9, 1943

To: J. Chipman

From: John P. Howe

In Re: Visit to Grasselli Laboratories, Cleveland, Ohio, August 30, 1943

This meeting was the usual biweekly review of the coating work done at the Grasselli Laboratories.

HOT DIP -- reported by E. R. Boller

Double Jacketing

Tests on specimens hot dipped in 85-15 Zn-Al and canned immediately afterwards at the Aluminum Company were reported. The following is a summary of the tests at the end of 25 days:-

(1) Double Jacketed Slugs

Nineteen were declared good at the start -- 15 still good with no noticeable change -- 2 proved to be leakers and failed -- 2 developed small pimples

Eight were declared leakers due to imperfect weld although this was unintentional - these have failed -- 3 were made leakers intentionally and have failed

(2) Controls

Eight were declared satisfactory -- of these five have changed only at the top - the pressed-over rim has raised slightly which shows a small pimple -- 1 burned up completely in test but showed evidence of having been dropped -- 1 was known to have been dropped - just before this a small pimple had been noticed.

In the case of the leakers, it was found that the attack was at cracks in the undercoat. Examination under low power magnification showed that the coat had cracked rather seriously in the jacketing procedure. It was planned to examine 5 of the 15 specimens still satisfactory.

In view of these results, Mr. Woodhouse strongly recommended that ways and means be devised to apply a jacket to these slugs in such a way as to not damage the undercoat. He proposed that the group at Grasselli work on this problem. The writer agreed to take this point up in Chicago and give a reply.

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DATE MAR 5 1969
For the Atomic Energy Commission
ROBERT L. JACKSON *RLJ* for the
Chief, Declassification Branch

Aluminum-Silicon and Aluminum Hot Dips

It has been found definitely that a satisfactory coat cannot be obtained by dipping metal directly in Al-Si. Specimens so prepared failed in the water corrosion test within a week at cracks in the coat. Predips have been tried in an effort to improve the quality of the coat. One successful method is as follows. Five minute pickle in 50% nitric acid, 3 minute dip in zinc at 520°C, 6 or 7 second dip in Al-Si, 30 second roll on transite rollers followed by quenching. This method produced an Al-Si coat approximately 8 mils thick. Microscopic examination shows it to consist of at least three distinct layers. An inner alloy layer similar to that formed when dipped initially in Al-Si is present but is very much thinner. Analysis shows it to be approximately 33% Si, 17% Al and 50% tuballoy. The exterior of the coat contains 2-4% base metal. Solution tests show that it dissolves in 40% nitric acid leaving a sludge because of the silicon content. Slugs in the corrosion test have gone 17 days with a development of barnacles and pits in a manner identical with the Al-Si alloy. In the corrosion tests, it is planned to record the number of pits developed per slug and measure the depth. Tests at 300°C show the coat to be unsuitable for higher temperatures in air. It is planned to determine the temperature limit.

It has been found possible to apply pure aluminum directly over zinc in a similar manner. Slugs so prepared are being tested for corrosion.

An alternative predip may be made in a 67-33 or 47-53 Cu-Sn melt. These are to be examined for thermal stability and corrosion resistance.

ELECTROPLATING -- reported by A. G. Gray

Results obtained by the Chicago group were reviewed by Mr. Gray. The main difficulties encountered were recounted: (1) lack of adherence between any electroplate placed over the heat treated zinc; (2) the diffusion of the base metal through zinc and brass electroplates. Prevention of the latter depends on the solution of the former problem. To this end, Mr. Westbrook suggested: (1) current reversal at the start of the application of a plate over the zinc; (2) use of a high cyanide brass bath to apply brass with the zinc.

It was pointed out by Mr. Weygandt that interdiffusion of zinc and the base metal was a problem fundamental to several coating methods and hence should be studied thoroughly.

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cc-Greninger
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