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Cross Reference:

Refrigerator Finishes
Pitting
Silicone Antifoam Agent
RC-718

HJS

Philadelphia Laboratory
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MEMORANDUM REPORT #M-229

PITTING OF 700 LINE "DULUX"

This is a report on the work that was done at the Toledo Plant during the week of Nov. 29 in connection with pitting of "Dulux" White 700 Line enamels.

Because of pitting encountered at Parker Wolverine with 725-23904 and with Toledo production, the writer was requested to spend some time at Toledo investigating this difficulty.

Formulations were made up during the first part of the week in which ingredients were eliminated step by step in an attempt to tie down pitting to some particular constituent. However, these tests were of little value since everything showing pitting, even an RC-718 free enamel.

Since factory intermediates had been used and there was also a possibility of contamination from spray out to spray out it was decided to prepare laboratory mill base and alkyd resin intermediates free of contamination with silicone compounds. A batch of "47 Process" alkyd base was also made using a batch of RL-295 resin that had been made about a year ago which was before any silicone compound contamination.

Since contamination could develop from the spray gun and flow outs tend to obscure pits that might form, a test was developed using a doctor blade drawn down on glass. The advantage of this procedure is that the pits can be seen as holes thru the glass and the doctor blade can be cleaned in boiling caustic after each test more thoroughly than a spray gun.

With this testing procedure and using alkyd mill base and resin intermediates free from contamination with silicone compounds we were able for the first time to show practically freedom from pitting using old RC-718 (made about a year ago) whereas enamels made with current RC-718 exhibited definite pitting, numerous dimples, and round glossy spots. The dimples appear to be pits that did not penetrate through the film and the round glossy spots look like dimples that had flowed out during the baking. Because of the potent effect of silicone compounds on flooding, it is felt that these glossy spots were caused by extremely low concentrations of

anti-foaming agent effecting the flooding properties. It is significant that none of these glossy areas were observed with old RC-718 and that these were most prevalent in the 704-6731 type formulation.

It is important to note that even with RC-718 free enamels using old or laboratory prepared alkyd resins that every test is not absolutely free of pitting. It is felt that an occasional pit in this case could have been caused by dirt or possibly contamination although every precaution was taken to prevent the latter.

Since it appeared that the doctor blade test duplicated pitting condition, plus other phenomenon (dimpling & glossy spots) this test was applied to a number of factory batches of enamels with the following confused results.

Two batches of 704-6731 representing one batch which showed definite pitting on the customer's line and another batch with less pitting. Doctor blade tests on these batches showed no glossy spots, no dimpling and at the most, only one isolated pit.

Two recent batches of 704-25105 showed no glossy spots, no dimpling, and at the most only one isolated pit.

It is the writer's understanding that the Toledo Laboratory will make further tests on retain samples of 700 Line Whites and also RC-718 free enamels of different ages to determine if there is any period of production when pitting was less severe then now encountered.

Current production of 700 Line enamels will be tested both by spray out and doctor blade when possible so as to obtain as much information as possible on these two methods of testing.

It is also worthy of note before concluding this report that tank samples of RC-718 taken from the top, middle and heel showed no significant different in pitting. It was also observed that enamel made up with these samples did not show as much pitting as the enamel referred to above made up with current RL-718.

In concluding, it is the writer's opinion that although the doctor blade method of application provides the best method for prevention of contamination, its chief draw back is that the test area is too small and the necessity of using glass substrate is attendant with a safety hazard due to breakage, etc.

Since enamel contanimation tests with silicone valve grease produce pitting, it is suggested that the use of this material in spray guns, valves etc. be discontinued.

I want to thank the Toledo organization for the splendid cooperation and support afforded the writer during this visit.

PHILADELPHIA LABORATORY

H. J. STUART

HJS:hfm