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Marshall Laboratory
January 29, 1953

MEMORANDUM REPORT NO. M-543

Prepared by: M. P. Morse

SETTLING OF "FLOW-KOTE"

INTRODUCTION

A low gloss "Flow-Kote" formulation was recently placed in plant production and some of the batches were found to give hard settling on the Travelometer when adjusted to 60 KU Stormer viscosity. It was requested that the product be investigated to determine the reason for the observed settling behavior.

SUMMARY

1. Microscopic examinations show no differences in degree of dispersion or particle size distribution between batches having good and poor settling characteristics.

2. At very low rates of shear, the viscosity of batches showing bad settling is much lower than is the viscosity of batches showing little or no settling. This means that the batches showing bad settling had insufficient flocculation present to prevent settling.

3. The Brookfield Viscosimeter is quite satisfactory for low rate of shear measurements of "Flow-Kote." Viscosity measurements at 0.4 RPM correlate well with Travelometer results.

STATUS

The maintenance paint group has found that shelf storage samples at normal room temperatures do not decrease to 60 KU nor do they show hard settling. There is, therefore, no need to improve settling at 60 KU and perhaps no need to improve settling at package viscosity (70 KU).

Memorandum Report No. M-543 January 29, 1953

Shelf storage at elevated temperatures does reduce the Stormer viscosity of "Flow-Kote" but it is not known if a reduction to 60 KU through shelf aging will produce the hard settling obtained by dilution of the original sample to 60 KU. Study of this has been requested.

ACTION

Brookfield viscosity measurements will be used to investigate the settling characteristics of plant and laboratory batches of "Flow-Kote" at package viscosities when subjected to the Travelometer and shelf storage at normal and elevated temperatures.

EXPERIMENTAL DETAILS

Samples of batches giving good and poor settling characteristics on the Travelometer were obtained and examined. Drawdowns were made on glass (1 mil dry film thickness) and examined with the binocular microscope. No significant differences in size distribution or degree of dispersion were observed. There was no evidence of seed or grit which might cause bad settling.

Seven-day Travelometer ratings were obtained on thirteen Philadelphia plant batches, and one Fort Madison plant batch, all adjusted to 60 KU Stormer viscosity. A laboratory batch containing a new china clay extender and a Sherwin-Williams batch were also tested in the same manner.

The viscosity at 0.4 RPM was determined with the Brookfield Viscosimeter for each of the above batches adjusted to 60 KU.

Since the maintenance paint group has found the Travelometer ratings on the same batch of "Flow-Kote" to vary by ± 1 rating units due to experimental error, we have compared samples of 8 to 10 rating (little or no settling) against those having a rating of 5 or less (bad settling). The attached table shows that the viscosities at 0.4 RPM correlate very well with the Travelometer ratings. Those samples having ratings of 6 and 7 are not listed.

The low viscosities of the samples showing bad settling indicate that these samples were not sufficiently flocculated to prevent settling.

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Attach.

Sample	Color	History	Travelometer 7 Days	Brookfield Poises at 0.4 RPM
P-47776	White	Lab. batch - New China Clay	9-10	100
SR-45274	White	Sherwin-Williams Super Kem-Tone	8	75
P-455885	White	Phila. Plant - Ft. Mad. process	10	94
P-455883	White	Phila. Plant - New mix. proced.	9	95
P-465337	Desert Rose	Phila. Plant - Old Mix Proced.	4	10
P-465494	Desert Rose	Phila. Plant - New Mix Proced.	5	45
P-465331	Vista Blue	Phila. Plant - New Mix Proced.	5	35
P-455473	Moss Green	Phila. Plant - New Mix Proced.	5	10
P-455399	Bellflower Blue	Phila. Plant - New Mix Proced.	5	10
P-455975	Aspen Green	Phila. Plant - New Mix Proced.	5	11

NOTE: #2 spindle used for 0.4 RPM.

TM-228A used for Travelometer ratings.

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