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NEWARK PLANT

PIGMENT COLOR RESEARCH REPORT

Progress Report

MOLYBDATE ORANGE - LABORATORY WORK

Period Covered: March 1944 - July 1944

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Progress Report

Title: MOLYBDATE ORANGE - LABORATORY WORK

Period Covered: March 1944 - July 1944

SUBMITTED BY: R. R. Denslow

DATE SUBMITTED: 8-22-44

APPROVED BY: R. R. Denslow 8/28/44

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INTRODUCTION:

This report will serve to summarize miscellaneous work carried out in the laboratory during the period March 1944-July 1944. With respect to objectives, the experiments can be classified as follows:

1. Attempts to improve quality - especially lightfastness.
2. Attempts to increase batch size.
3. Attempts to prepare the pigment by "seeding".
4. Attempts to improve texture.

SUMMARY AND CONCLUSIONS:

1. No significant leads were obta ined to indicate the possibility of effecting any substantial improvement over the present standard in color or lightfastness.

2. By means of a simultaneous strike, it was possible to cut the strike volume to 60% of that used at present without sacrifice of quality.

3. "Seeding" experiments gave negative results.

4. A three-point improvement of texture was obtained by use of a) Petronate and b) Soya Lecithin.

DISCUSSION:

Lightfastness

No leads were obtained to indicate that any worthwhile improvement over YE-421-D is possible. Slight differences were obtained in several cases and, in general, the laboratory products were slightly but definitely superior to plant material made on the same formula, judged by fadeometer tests of rubouts in H-108 oil. Fadeometer tests of alkyd ena mels check the results in H-108 except that darkening was somewhat more severe in the enamel vehicle. Samples taken in the plant at various points of the process and finished in the laboratory indicated a falling off in quality as processing was continued, especially in the pressing and drying stages. The practical significance of this is doubtful since the difference between plant and laboratory products was not duplicated on outdoor exposure. Under these latter conditions, darkening was bad in both cases.

Some improvement in (fadeometer) lightfastness was obtained by adding all of the sodium carbonate after the salt treatment rather than splitting it as in the standard (K-1979) procedure. Omitting sodium silicate gave worse lightfastness. As indicated above, these observations probably have but little practical significance.

Batch Size

Very high dilutions are used in the standard (K-1979)

procedure. Attempts to reduce this by simply cutting volumes were unsuccessful, the product going light in masstone and weak. A slight improvement was obtained by striking slowly.

The most promising results were obtained by the simultaneous addition of the lead nitrate and chromate-molybdate solution to water, adjusting the rate of addition so that a lead excess existed throughout the strike (Reference: 1018-33, 34). Using volumes totalling 60% of the standard volume, satisfactory material was obtained by this procedure. In a single experiment, using the simultaneous strike technique but without cutting the total volume, a product even stronger than standard was obtained.

"Seeding" Experiments

It has been suggested (Research Suggestion #457) that it might be possible to prepare Molybdate Orange by controlling crystal structure by means of pre-formed seed. Following a preliminary experiment (1111-15) run elsewhere, two series were prepared in which small amounts of lead molybdate or molybdate orange were added to the lead nitrate prior to the strike (Ref. 1018-37,40).

The results were negative, the pigment failing to "turn" completely and work was discontinued for the present. (In this connection, see Dr. Seitz' memorandum of July 31st covering his visit on July 10, 1944).

Texture

Several series of treated pigments were prepared and evaluated for texture. Apparently satisfactory products (about 3 units better than standard) were made using a) Petronate and b) Soya Lecithin. The results with various agents are summarized briefly in the following table. For further details, reference should be made to the laboratory notebook (1018-24, 26, 30, 35).

AGENTS USED FOR TEXTURE IMPROVEMENT

Satisfactory	Remarks
Petronate	Optimum is 2-3%.
Petronate/TRO	1.5/1% satisfactory.
Petromix	Questionable. Probably ok if enough is used.
Lactonate	4-6% ok ; i.e. equivalent to Petronate
Soya Lecithin	1% Colloidal HX
Unsatisfactory	
TRO	v.slight improvement
Nujol	Emulsified with TRO
Neofat	Heavy body
Stearic Acid	" "
Variations in drying conditions	Cake thickness, softness, etc.

Semi-Works studies carried out concurrently have confirmed the above results insofar as actual comparisons have been made.

EXPERIMENTAL DETAILS:

Results are covered in Notebook 1018.

1018-21 Variations on K-1979. Use of $ZnSO_4$ and Chem. 56.

22 " " Effect of conc.strike.

23 " " Use of ferricyanide.

24 Texture Study.

25. Variations on K-1979.

26 Texture Study.

27 Variations on K-1979. Use of Nujol emulsion and Neofat.

28 " " Heat development.

29 " " " "

30 Texture Study.

31 Variations on K-1979. Especially rate of strike.

32 Attempt to improve lightfastness with Cuprous oxide.

33 Simultaneous Strike. Batch Size Study.

34 " " " " "

35 Texture Study.

36 Comparison of Lab. vs Plant processing.

37 Attempt to "seed" with lead molybdate.

38 Variations on K-1979. Method of adding sod. carbonate.

39 " " " " " " "

40 Further study of "seeding"