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NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT

Final Report

Y-539-D, Completion of Plant and Semi-Works Developme

Period Covered:

April, 1943 - February, 1944.

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Period Covered: April, 1943 - February, 1944.

SUBMITTED BY: J. R. Borst

DATE SUBMITTED: 5/9/44

APPROVED BY: *J. R. Borst*
V. Chalupski

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V. Chalupski May 24, 1944

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INTRODUCTION

This report completes the plant and semi-works development carried out on Y-539-D. Few changes have been made in the process as previously reported and the present summary covers only the work undertaken either to simplify rather minor points in the process or to improve the product. The previous work was reported in KN-43-79 and KN-43-101.

SUMMARY AND CONCLUSIONS

The first plant formula used for making Y-539-D (K-1877) made optional either press or vat washing. Vat washing was attempted on two plant batches of different sizes, each of which was made in a different vat. Practically no washing was obtained since the color failed to settle. The formula as written called for one per cent of caustic (on a dry pigment basis) for dispersing the zinc oxide. It was assumed that the caustic was the cause for the poor settling and several batches were struck varying the amount of this ingredient from zero to 1 per cent. Only one batch was made without caustic and this was the only one which showed an improvement in settling. This batch was of such poor quality, however, that for some time batches were made with caustic and press washed for a considerable length of time to minimize the chloride content. Later strikes made without caustic were of satisfactory quality and settled better than those omitting it. The reason for this improvement in batches made without caustic soda is not known.

A few variables were investigated in the semi-works while the plant study of settling was being carried out. It was found that a higher temperature for slurring and striking had no effect on the tinctorial properties. Likewise, a higher volume for slurring the zinc oxide and dissolving the potassium chloride before slurring the ZnO were ineffective tinctorially. The most important semi-works result helped to clarify the effect of the caustic soda. All semi-works batches made without caustic were equal to those with caustic and as indicated above this was contrary to plant experience. However, a batch made without caustic and with slow agitation had properties resembling those of the single poor plant batch made without caustic. It was concluded from this that the caustic functioned merely as a substitute for agitation by dispersing the zinc oxide. Two semi-works batches were made using bichromate crystals (N-9) instead of bichromate liquor and they analyzed 0.01 and 0.02 per cent Cl and 0.02 and 0.05 per cent SO₃ respectively. These batches were intended to be of high purity (low chloride and sulfate content) for testing purposes by F&F.

A single laboratory lead in the work on zinc yellow primer (AN-TT-P-656a) indicated that better water resistance could be obtained if the final pH of the color was slightly lower than the usual value (approximately 6.8). Accordingly, fourteen batches finished at a slightly lower pH were tested in the primer formula-

tions. These lots showed good consistency of P-656a properties but the contention that a lower pH gave better water resistance was not verified.

After a few simplifications in processing, the Y-539-D process was turned over to the plant as K-1948. This formula differs from the previous standard (K-1877) as follows:

1. The caustic soda for dispersing the zinc oxide has been reduced to one-eighth, for economy.
2. The strike time has been shortened, the spray for striking has been eliminated and dilution of the acid has been omitted, all for greater ease of operation.
3. The stirring time has been reduced from five to three hours to permit faster vat turn over.
4. The vat washing alternative has been eliminated since this color fails to settle well.
5. The press washing has been increased from four to six hours to insure adequate washing.

At the request of the plant some subsequent work on the washing of this code was undertaken. With the advent of colder weather (lower water temperature) the chloride content began to run above 0.05 per cent after press washing 6 hours. Increased time of washing failed to reduce the chlorides sufficiently. A small laboratory study indicated that washing with water at 140°F removed the chlorides to below the prescribed limits. Consequently, about 4000 gallons of water (for a batch of 4300 pounds) were heated to 140°F and pumped through the color. This gave very good results but caused some loss in yield due to the solubility of the zinc yellow. Water heated to 90°F was finally used for washing with satisfactory results.

EXPERIMENTAL DETAILS

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