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PIGMENT COLOR RESEARCH REPORT

Final Report

PIGMENT GREEN B TONER GT-646-D
PLANT DEVELOPMENT & STANDARDIZATION FOR USE IN RUBBER.

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NEWARK PLANT

PIGMENT COLOR RESEARCH REPORT

Final Report

PIGMENT GREEN B TONER GT-646-D PLANT DEVELOPMENT AND STANDARDIZATION FOR USE IN RUBBER.

MARCH - OCTOBER, 1947

SUBMITTED BY: E. J. Hess E.J. Hess DATE SUBMITTED: 7/15/48

APPROVED BY: J. O. Morrison J.O. Morrison August 23, 1948 DATE ISSUED: 10/6/48

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INTRODUCTION:

Within a few months after the Pigment Green B dry toner process, GT-646-D, K-2256, was accepted by the Production Division, the Sales Division released this color for rubber and paint use. Immediately thereafter considerable difficulty was experienced in meeting orders because of weakness by the rubber standardization test. Masstone standardization for paint was also a problem but the very small amount of business involved made it unnecessary to consider this.

As use in rubber was not studied in the original work on GT-646-D (this type now represented a major portion of the sales), a laboratory study was planned in an attempt to correct the difficulty with strength in rubber.

The study was concluded satisfactorily (see KN-47-36), and in March, 1947, plant production using the revised formula was started in order to set up a new GT-646-D standard for rubber.

SUMMARY AND CONCLUSIONS:

Plant GT-646-D production made using the variable developed in the laboratory (an approximate 28% cut in the sodium oleate amount) averaged 10-15% stronger in rubber than the standard lot 8548.

Attempts to adjust the strength by slight variations in the sodium oleate weight were unsuccessful. Small increases over the optimum 50 pounds per 3.32 mol batch gave weak products. In the laboratory, amounts lower than the optimum figure gave no strength improvement and increased dullness of tint.

Standardization at the desired level was finally accomplished by adding approximately 10% Blanc Fixe to the color slurry before filtration.

A comparison of the standard blend, lot 81496, versus the previous standard, lot 8458, and a competitive product, Akron's #709 Green (C #49729) follows:

Varnish dryer rubout:
Lot 81496 vs lot 8548: vs light - OK - 1-2% weak - trace dull
Lot 81496 vs C#49729: dk, intense-vs intense-5% strong-vs intense.

Rubber test
Lot 81496 vs lot 8548: 5% strong - vvs yellow and intense.
Lot 81496 vs C #49729: 5% strong - intense.

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A standard process, K-2494, based on this new standardization for rubber use was set up in July, 1947. K-2494 differs from the previous standard K-2256 as follows:

1. The sodium oleate amount is decreased from 69 pounds to 50 pounds per 3.32 mol batch.

2. The "Dresinate" is dissolved under more dilute conditions (about 1#/gallon instead of 1-1/2#/gallon) to eliminate a possible fire hazard.

3. Approximately 10% Blanc Fixe (70 pounds per 3.32 mol batch) is added to the color slurry before filtration to adjust to the desired strength.

Difficulty with the rubber testing method delayed evaluation and acceptance of the standard lot until September, 1947.

The Production Division accepted supervision of manufacture of GT-646-D for rubber in October, 1947.

DISCUSSION:

Sales release of GT-646-D for use in rubber disclosed the fact that despite the good performance of the K-2256 formula in manufacture for ink most of this material was weak versus the GT-646-D standard, lot 8548, in rubber. The comparatively high strength, in rubber, of lot 8548 was apparently accidental as the K-2256 process was used in the manufacture of the components of this standard blend. Variation in the quality of the sodium oleate may also have had some effect.

A laboratory study disclosed that a decrease in the oleate to 50 pounds per 3.32 mol batch would give a product much stronger in rubber than lot 8548 and with little effect otherwise except for a lightening of the rubout masstone and a very slight dulling of the tint. Further decreases in the oleate resulted in no strength improvement and a considerable increase in dullness (see KN-47-36).

Plant trial of the new variable was started in March, 1947. Eight batches made using 50 pounds of sodium oleate gave products averaging 20% strong in rubber versus the GT-646-D standard, lot 8548.

Attempts to cut the strength by slight increases in the oleate amount were unsuccessful because of poor duplicability. Of two batches made with 55 pounds of sodium oleate, one was OK in strength but the other finished up 20% strong. Increasing the oleate amount to 60 pounds gave 20% weak products in two instances.

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An approximate 10% addition (70 pounds per batch) of Blanc Fixe was finally used for strength adjustment giving a product averaging 5-10% stronger than standard in rubber.

A comparison of rubber and rubout test results on a number of these batches indicate there is little or no correlation between the two. The major effect of the lowered oleate on the rubout result was a noticeable increase in masstone lightness. This was of no importance, however, as paint sales of this color is negligible.

A blend of eight batches of the "low oleate - added Blanc Fixe" type was submitted in June, 1947, for evaluation as a GT-646-D standard for rubber replacing lot 8548.

Meanwhile, a competitive product, Akron Chemical Company's #709 Green (C #49729) made its appearance on the market selling at a very slightly lower price than GT-646-D. At first our rubber tests indicated the competitive material to be about 15% stronger and duller than the standard, lot 8548. Because of variability in the test, however, a study was made which resulted in a revision of the testing method to give a more duplicable result (the new test method is a modified TF-90-4 procedure using 120 passes over the rubber mill instead of 30 passes). By the revised testing method the competitive product was found to be equal to standard in strength and very much duller in tint.

The difficulty with the testing method extended the proposed standard evaluation period considerably and results were not available until late in August, 1947.

Manufacture had continued during this period with the following changes in the basic process being used to control quality:

1. Many of the batches had been coming through about 15% stronger than lot 8548 even with the 10% Blanc Fixe addition. Attempts to adjust this strength by increases in the "Dresinate" (sodium rosinate) amount were not too successful. Further addition of Blanc Fixe, if permissible, would seem to be the simplest method of solving this problem.

2. Some difficulty with grinding fires with GT-646-D and a lake based on GT-646-D (GP-653-D) was thought to be due to the precipitation of free rosin in the color (a result of incomplete solution of "Dresinate" in a small volume in a drum). A one-third increase in the dilution of this material (use of a vat instead of a drum required) apparently corrected this difficulty.

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A new GT-646-D standard formula, K-2494 (subsequently designated the "A" process) was issued in July, 1947, based on the revised making procedure. K-2494 differs from the previous standard, K-2256, as follows:

1. The sodium oleate amount is decreased from 69 lbs. to 50 lbs. per 3.32 mol batch.

2. The "Dresinate" is dissolved under more dilute conditions (about 1#/gallon instead of 1-1/2#/gallon) to eliminate the possible fire hazard.

3. Approximately 10% Blanc Fixe (70 pounds per 3.32 mol batch) is added to the color slurry before filtration to adjust to the desired strength.

4. There had been some indication that the goal yield in use for K-2256 revised to fit the K-2494 process (785 pounds per 3.32 mol batch) was much too high. After a laboratory study the goal yield for K-2494 was set at 734 pounds (Reference: 1253-22).

The new standard, lot 81496, was finally accepted by Sales in September, 1947, and the Operating Division accepted supervision of GT-646-D manufacture in October, 1947.

PATENT SITUATION:

There is no patent restriction on the manufacture of GT-646-D. It is not believed that this study has resulted in any patentable development.

GLOSSARY:

GT-646-D A Pigment Green B dry toner containing about 10% Blanc Fixe and about 5% Magnesium Rosinate.

GP-653-D An extension of GT-646-D containing about 47% toner, about 24% each of Titanium Dioxide and Whiting, and about 5% of water soluble salt (principally sodium sulfate).

"Dresinate" - Sodium rosinate in dry powder form.

Pigment Green B - An iron salt of nitroso B Naphthol.

EXPERIMENTAL DETAILS: DSM-48-12.

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