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NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT

RED TONER RT-427-D (PCONA → BN)
ECONOMY FORMULA, K-2244

Period Covered: October - December 1945.

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NEWARK PLANT

PIGMENT COLOR RESEARCH REPORT

Final Report

Title: RED TONER RT-427-D (PCONA → BN)
ECONOMY FORMULA, K-2244

Period Covered: October - December 1945.

SUBMITTED BY: A. D. Reidinger A.D. Reidinger per A.A.B. DATE SUBMITTED: October 25, 1946

APPROVED BY : A. A. Brizzolara A.A. Brizzolara 10/29/46 DATE ISSUED : 10/30/46

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INTRODUCTION

Manufacturing costs of RT-427-D were too high to make this toner a profitable item and efforts have been made for some time to effect savings in ingredients and in process costs. A reduction in the amount of muriatic acid used and a two fold increase in batch size were put into practice as a result of previous laboratory work but since these did not provide the economies desired the present program was undertaken.

SUMMARY

A formula, K-2244, was developed which by use of a reversed order of coupling - beta naphthol solution into the diazo-made possible economies amounting to ten cents per pound. The product obtained in the laboratory was a passable match for the RT-427-D standard, being only very slightly lighter and duller in masstone.

Semi-works and plant trials have been made and the formula is now being used in plant production.

DISCUSSION OF RESULTS

In addition to the change in order of coupling K-2244 differs from the standard procedure in the following respects -

1. Increase in amount of sodium nitrite to obtain more complete diazotisation.

2. Use of sulfamic acid instead of urea for quicker and more accurate reaction with the excess nitrite.

3. Reduction in amount of beta naphthol to slightly less than the theoretical ratio to compensate for the slightly lighter masstone resulting from the reverse coupling.

The chief advantages of K-2244 over the standard procedure are:

1. Slightly lower ingredient costs through reduction in the amount of muriatic acid. Since the excess acid in the diazo can be utilized to precipitate the beta naphthol as it is added, the acid formerly used for the latter purpose, can be omitted.

2. Further increase in batch size from the present 600 pound charge to 1200 pounds can be made without change in the total volume of the batch. A limiting factor in such a modification of the standard formula, if made without increase in volume, was the heavy consistency of the beta naphthol suspension when acidified. This is avoided with the reverse order of coupling.

3. Elimination of clarification of diazo was also found to be possible. It is not certain whether this is a result of the change in coupling procedure or of the use of the larger excess of nitrite in the diazo. It is probable that the quality of para chlor ortho nitroaniline will affect the success of this change on the plant scale but the savings in equipment and labor costs were sufficient to warrant the attempt to omit this step.

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Savings effected are estimated to be of the following order-

Ingredients cost	$1.02	(per 100# color)
Out of pocket	4.85	
Total (mfg.) cost	9.89	

Goal yield was determined to be 1230 pounds per 4 mol charge.

In addition to the changes in formula referred to above, the following variables were studied.

Volume of Beta naphthol solution - Volume to which the Beta Naphthol is diluted before coupling was reduced to fit the plant solution vat. This change which represents a cut to 60% of the volume used in the regular formula, K-2079, had no effect in the laboratory. However at 50% inconsistent results were obtained, some products being yellow and dull in masstone, and weak and yellow in tint.

Temperature of Beta naphthol solution - A temperature of 20 to 25°C gave satisfactory results in the laboratory. In one series greater intensity was obtained by cooling the BN solution to 5°C.

Other modifications tried were:
Use of Hindox to assist wetting of the PCONA.

Better diazotization was obtained but the product was slightly yellower and duller in masstone.

Use of sulphuric acid instead of hydrochloric.
As in some previous trials, this resulted in duller products.

Simultaneous diazotization and coupling - A very brown pigment was obtained by mixing the beta naphthol solution PCONA and sodium nitrite and then acidifying.
Solution of Beta naphthol by boiling in water - Products of good tinctorial quality were obtained by preparation of a Beta naphthol suspension by boiling the intermediate with water and allowing it to crystallize. Several procedures were tried but the mechanical difficulties involved appear to make practical application difficult.

EXPERIMENTAL DETAILS -
See Note Book 1147 - Exp. 13-30.

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