

E. I. DU PONT DE NEMOURS & COMPANY  
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NEWARK, NEW JERSEY

NEWARK PLANT  
PIGMENT COLOR RESEARCH REPORT

Final Report

ECONOMY STUDY - RED TONER RT-427-D  
LABORATORY, SEMI-WORKS AND PLANT

Period Covered: September 1943 - June 1945

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SUBMITTED BY: V. Chalupski

DATE SUBMITTED: 10-30-45

*V. Chalupski Nov. 19, 1945*  
APPROVED BY: V. Chalupski

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## INTRODUCTION

Two lines of attack were investigated for the reduction in cost of RT-427-D. First, reduction in the large excesses of acid were studied; second, increases in batch size were investigated. A limited amount of work was done in the laboratory, semi-works and plant which resulted in the standardization of a new operating formula, K-2079.

## SUMMARY AND CONCLUSIONS

Study was first undertaken in the laboratory to reduce the excesses of hydrochloric acid. It was found that the acid excess in the diazo could be reduced from 3 mols to 1; the acid excess in the beta naphthol suspension was reduced from 3-1/2 mols to 1-1/2 mols excess. Further reduction resulted in dull masstones. Increase in concentration (and batch size) were tried; double concentration was satisfactory, and three times concentration also appeared possible, although the slurry was somewhat thick. At four times concentration, undesirable results were obtained. Combinations of the two variables, within limits, were also found satisfactory in the laboratory.

This low acid-high concentration formula was checked in the semi-works. Results were fairly normal, the product tending to be a little light and dull, which is not unusual for the semi-works.

The same process was then taken to the plant, first trying the cut acid alone. It was found that the full reduction recommended by the laboratory gave questionable quality, and therefore a reduction of 1 mol each of acid in the diazo and beta was standardized on. A long series of plant batches was then made at double concentration with the reduced acid. In this series, the following variables were studied in order to obtain standard quality pigment:

1. Amount of Commodity weight of para-chlor-ortho-nitro-aniline.

During this period, this intermediate was obtained from both DuPont and the Verona Chemical Company. Considerable difficulty was encountered because of variation in uniformity of the intermediate. This was finally handled by cut-and-try methods.

2. Increase in drying temperatures.

Drying temperature was increased from 200° to 220°F. in order to speed up drying, and to get sufficiently dark masstones in a reasonable length of time.

3. Amount of Washing.

It is well known that the depth of masstone of this color is effected by the degree of washing. Complete washing results in

light masstone, strong, yellow tint pigment. It was found necessary to study this variable again and establish controls for the correct amount of washing. This color should be washed to a pH of about 2.5-3.0.

An attempt was made to speed up the diazotization step by stepping up the diazotization temperature slightly, from 32° to 45°F. The desired purpose was not accomplished, so this change was not adopted; future study may be justified because of a small possible ice saving.

The K-2078 process was turned over to the plant on a trial basis in January, 1945, and taken over by them permanently in June, 1945. The savings effected by the use of the new formula is indicated in a comparison of the second and third quarter replacement cost, 1945. Savings in ingredients is \$1.09, in out-of-pocket \$4.37 and total cost \$4.98, per hundred pounds.

#### EXPERIMENTAL DETAILS

Laboratory work - N.B. 1063, Expts. 1,3,5,6,7,8,9, 11

Semi-Works & Plant - Development Section Data Book DSN-45-16.

In this notebook will be found a summary of the use of toluidine toner to shade RT-427-D for the years 1942, 1943 and 1944. Toluidine as a shading agent in this color is uneconomic; over the period an average of 0.68% was used in blends.