

E. I. DU PONT DE NEMOURS & COMPANY
KREBS PIGMENTS DEPARTMENT
256 VANDERPOOL STREET
NEWARK, NEW JERSEY

LIBRARY COPY

NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT

Progress Report

PLANT STUDY OF Y-493-D and G-550-D LINE PROCESSES

Period Covered: **MAY 1, 1944 - FEBRUARY 1, 1945**

FILE: **214**

DATE: **3/7/45**

KN-45-8

214

Serial No. KN-45-8

Copy No. 1

Copy to:

- #1 - Numerical File
- 2 - Research Office (214)
- 3 - Library File (214)
- 4 - #10 Building File
- 5 - # 6 " "
- 6 - Imperial Chemical Industries, Ltd.
- 7 - " " " "
- 8 - " " " "
- 9 - Dr. D. H. Dawson/Library File, *Rec'd by library 3-30-45*
- 10 - Extra.

NEWARK PLANT

PIGMENT COLOR RESEARCH REPORT

Progress Report

PLANT STUDY OF Y-493-D and G-550-D LINE PROCESSES

MAY 1, 1944 - FEBRUARY 1, 1945

SUBMITTED BY: V. Chalupski

DATE SUBMITTED: 2/23/45

APPROVED BY: *V. Chalupski Mar. 7, 1945*
V. Chalupski

DATE ISSUED: 3/7/45

PLANT STUDY OF Y-493-D and G-550-D LINE PROCESSES

INTRODUCTION:

Plant production for a number of years of Y-493-D and the G-550-D line of greens has shown a trend toward bluish (less olive) masstone and blue tint. This is apparently due to corrective measures which were taken to eliminate light masstone. Orientation runs in the plant over a period of a year have indicated that better control can be obtained, using a number of simple variables, the effects of which have been checked in the Development Laboratory. This report covers this preliminary orientation work; a systematic study has been planned and is to be carried out in the plant.

SUMMARY AND CONCLUSIONS:

Although the formulas for Y-493-D and that for the base yellow of the G-550-D line are practically the same, there are certain differences which are the result of differences in batch sizes and concentration. This must be borne in mind in all of the following discussion.

At one time the amount of sodium bichromate used in these formulas was about 123 lbs. per mole. A gradual drift to light masstone (by greening test) was unexplained at the time, but was corrected by the plant by decreasing the amount of chromate, and increasing the amount of sulfate an equivalent amount. This change resulted in bluish, less olive masstones and slightly weak, blue tint. In attempting to discover the necessity for this change, information developed in the Research Laboratory on another problem indicated that the ratio between depth of masstone and blueness of tint could be varied over a wide range by changing the total acidity of the strike; it is quite likely that changes in acidity of the lead nitrate and sodium bichromate solutions which occurred over a long period were the causes for the original drift to light masstones. Following this lead, the acidity variable was studied in the laboratory and plant; results are discussed below.

Another change which may have occurred in operation, the time of stirring after strike before addition of the restraining agent, was suggested by the plant for additional study. It is believed by correct combination of the three variables mentioned above - chromate:sulfate ratio, total acidity and stirring time before restraining agent - can be used to give the desired control for the Y-493-D and G-550-D line formulas.

Most of the work done in the plant was on the G-551-D shade. In the laboratory, shading yellow only was made.

The currently standard amounts of sodium bichromate were 119 lbs. per mole for the Y-493-D and 124 lbs. per mole for the G-550-D line. Increasing this amount by 5 to 10 per cent gave slightly olive (less bluish) masstone with some lightness, and yellow tints; these results were obtained both in the plant and in the laboratory. By combining this variable with increases in soda ash in the lead nitrate, the depth of masstone was increased with slightly less bluishness; tints remain yellow. Increases of the soda ash in the lead nitrate in the order of 10 to 25% appeared to give these effects; larger increase up to 50% resulted in olive and dull products.

Increases in stirring time after the strike gave very definite effects in the laboratory. Increasing this stirring time resulted in dark, olive masstone and weak, dull tints. The effect was only slight with a 10 minute stir period but very noticeable in 20 minutes and even more so with a 30 minute period. In the plant, a 15 minute stirring period has been used and the effect has been rather slight in a number of cases; this should be carefully checked in view of the very definite effects obtained in the laboratory.

EXPERIMENTAL DETAILS:

See DSN-45-3

APPENDIX:

Formulas - recent plant usage

G-550-D line

Y-493-D

MOLAR BASIS

Batch Size	2-1/2 mol (usual)	7 mol
Pb(NO ₃) ₂	331#	331#
Temp.-vol.-pH	80°- 1045 gal.- 4.7	75°- 808 gal.- 4.7
Na ₂ CO ₃	40#	40#
NaCl	20#	15#
Na ₂ SO ₄	13.2#	16.7#
Na ₂ Cr ₂ O ₇ ·2H ₂ O	124#	119#
Temp.- pH	80° - 4.7	75° - 4.7
- strike in 20 min. then add at once -		
Tin crystals	4#	4#
Na ₂ CO ₃	10#	10#
Na ₂ S	1#	1#
Al ₂ (SO ₄) ₃ ·18H ₂ O ("as is" wt.)	4#	4#
- adjust pH to 4.5 - 5.0 -		
- draw 3 or 4 waters -		
Al ₂ (SO ₄) ₃ ·18H ₂ O	20#	20#
Tin crystals	4#	4#
Alkali	±10# NaHCO ₃	±5# Na ₂ CO ₃
- goal yield about 326 lbs. -		