

Serial No. KN-44-37

Copy No. 1

Numerical File

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

LIBRARY COPY

NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT

EVALUATION OF NEW LITHOLS AS REPLACEMENTS
FOR RT_364-D and RT-402-D

Period Covered:

FILE: 173.03

DATE: 6/5/44

NJ8685

N37970

KN-44-37

173.03

SERIAL NO. KN-44-37

Copy No. /

Copy to:

- #1 - Numerical File
- 2 - Research Office (173.03)
- 3 - Library File (173.03)
- 4 - Paint Laboratory
- 5 - Mr. F. E. Bolton - Sales Service File
- 6 - Mr. A. Siegel/Dr. J. H. Cooper

NEWARK PLANT

PIGMENT COLOR RESEARCH REPORT

TITLE: EVALUATION OF NEW LITHOLS AS REPLACEMENTS FOR
RT-364-D and RT-402-D

SUBMITTED BY: D. H. Stubbs

DATE SUBMITTED: May 19, 1944.

APPROVED BY: F. E. Bolton

DATE ISSUED: 6/5/44

INTRODUCTION:

This evaluation is another in the series of studies carried out at the request of the Research Department. Efforts to develop suitable substitutes for our present line of Lithols, but at lower ingredient cost or with the elimination of the use of critical materials, have been under way for some time. The purpose of this evaluation was to determine whether some of these products are satisfactory replacements for present standards when used in typical enamels.

PIGMENTS EVALUATED:

- (1) RT-364-D (SD-48034) Standard Barium Lithol
- (2) Lab. 1089-33 Naphthenate treated Barium Lithol
- (3) Lab. 1089-30E As 1089-33 but 10% "Amyloform" added.
- (4) SW-7134 Modified RT-463-D - Over-developed
- (5) RT-402-D (SD-47050) Standard rosinated Barium Lithol
- (6) SW-7141 RT-402-D type plus additional rosin.

REFERENCES:

Letter-Dr. J. H. Cooper to F. E. Bolton 5/1/44

Reports - KN-43-170, KN-43-158, KN-44-1, KN-44-10
Printing Ink Evaluation of above Lithols - KN-44-38

SUMMARY & CONCLUSIONS:

RT-402-D cannot be replaced with SW-8141, since the latter is too low in hiding and shows some tendency toward higher consistency. In other properties the two are substantially equal.

Replacement of RT-364-D can apparently be made with either 1089-33 or SW-7134. Either of these products are superior in color retention on baking, and in the quantity of yellow which they will tolerate in blends. Sample 1089-33 has a slight superiority in texture and gloss over RT-364-D. Both 1089-33 and SW-7134 yield cleaner color than RT-364-D in blends with Y-469-D.

Sample 1089-30E is equal to standard (RT-364-D) in all respects except texture, but is very deficient in this property. With the trend toward "HY-CAP" colors 1089-30E should be of no interest, regardless of its cost picture.

EXPERIMENTAL DETAILS:

A. Grinding and Texture

These pigments were ground in 1/3 gallon ball mills using the following grinding formula:

Pigment	10.0%
GE-2458	35.0%
Solvesso #3	13.5%

Add steel balls and tumble
After completely dispersed, add

GE-2458	40.0%
KV-30	1.5%

It had been planned to take samples from the grinds after various periods of tumbling but since most of the bases showed perfect dispersion after only 24 hours, texture development could not be studied. However, relative textures after 24 hours grinding were compared and found to be approximately as follows, as judged by draw-downs over plastic with a .002" Bird applicator:

<u>Pigment</u>	Sherwin Williams	
	Fineness Gauge	
	<u>Rating</u>	<u>Texture</u>
SW-7141	8	Best
RT-402-D	7	↓ Worst
1089-33	6.5+	
RT-364-D & SW-7134	6.0	
1089-30E	5.5	

From these data it can be seen that SW-8141 is slightly better in texture than the RT-402-D, for which it was planned as a replacement. It was noted to be much more transparent, however.

Among the RT-364-D replacements 1089-33 has highest gloss and best texture. RT-364-D and SW-7134 are about equal, while 1089-30E (amyloform treated 1089-33) is inferior to all pigments studied, showing very pronounced lack of dispersion.

B. Consistency, Hiding, and Bleed

The following tabulation shows relative viscosity, hiding and bleed of all pigments examined in this study:

<u>Pigment</u>	<u>Viscosity</u> (in KU)	<u>Hiding</u>	<u>Bleed</u>
RT-364-D	60	—	very slight
1089-30E	59	equal	" "
1089-33	59	"	" "
SW-7134	59	"	" "
RT-402-D	59	—	" "
SW-7141	66	much lower	" "

Apparently any of the proposed replacements for RT-364-D would be satisfactory from the standpoint of hiding, bleed, or viscosity. The replacement for RT-402-D would be acceptable in bleed, but is too low in hiding, and shows signs of yielding a paint of higher consistency.

C. Discoloration on Baking

Baking tests as such were not made on the pigments included in this study. The overstripe bleed test (TF-79-29) calls for pouring of panels and baking for 1 hour at 225°F, followed by the application of a white overstripe, after which the panel is baked for another hour at 225°F. By examining the color of the panels after two hours of baking at 225°F, it is possible to estimate the color stability on baking.

RT-364-D darkens worst of all members of the series, followed by others in approximately the following order:

RT-364-D	Worst
SW-7141 & RT-402-D	
SW-7134	
1089-33	
1089-30E	Best

D. Blends with Chrome Yellow

Because many of the cheaper red enamels were made with blends of Lithol Red and Chrome Yellow or Chrome Orange, it is important to know the amount of yellow which each unit weight of red will tolerate in yielding the same color. To study this property a blend of 70 parts Y-469-D and 30 parts RT-364-D was used as the color standard. The following tabulation shows the quantity of yellow which may be blended with each red in order to obtain equal depth of color:

Pigment	RT-364-D	1089-30E	1089-33	SW-7134	RT-402-D	SW-7141
Quantity of Red	1.0 gm.	1.0 gm.	1.0 gm.	1.0 gm.	1.0 gm.	1.0 gm.
" of Y-469	2.33 gm.	2.33 "	2.7 "	2.79 "	3.62 "	3.56 "
Red/Yellow ratios	30/70	30/70	27.3/ 72.7	26.6/ 73.4	21.7/ 78.3	21.9/ 78.1

Since chrome yellow is more opaque and much less expensive than any of the Lithol Reds, it is to the advantage of the customer to have a lithol which will tolerate the largest quantity of yellow. From the above tabulation it may be seen that the RT-402-D type has a substantial advantage over the RT-364-D. Considering only the replacements for RT-364-D, SW-7134 represents the best money value, with 1089-33 a close second.

All of the experimental products gave blends of higher color saturation than the respective standards which they were planned to replace.