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**NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT**

TITLE: LD (LATEX DISPERSIBLE) COLORS

Period Covered November, 1951 - June, 1953

CHARGE: A-1C

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NEWARK PLANT
CHEMICAL DIVISION - COLORS
FINAL REPORT

TITLE: L.D. (LATEX DISPERSIBLE) COLORS

PERIOD COVERED: NOVEMBER, 1951 - JUNE, 1953

CHARGE: A-IC

SUBMITTED BY: W. A. FLYNN

DATE SUBMITTED: 4/2/54

APPROVED BY: A. A. BRIZZOLARA

DATE ISSUED:

INTRODUCTION:

The object of the work described in this report was to develop a new line of dry colors specifically for use in latex emulsion paint of the styrene-butadiene type. Prior to the actual starting of development studies, a survey of the latex paint field was made in an attempt to determine the cause of the commonly reported deficiencies of the WD line currently in use at that time. These colors when added to latex paint tended to promote certain undesirable properties such as efflorescence, poor can storage stability and poor washability. It was established that the major source of the shortcomings of our WD line was the high proportion of the anionic water soluble dispersing agent, viz blancol which is present in very high quantities, averaging about half of the total WD pigment. This agent, which is the sodium salt of a naphthalene sulfonic acid-formaldehyde condensation product contains a relatively high percentage of Na_2SO_4 which contributes to efflorescence.

The immediate objective then, was to decrease the amount of agent, effectively increasing the toner content and at the same time to find a suitable Na free agent. It was also necessary that the new products disperse satisfactorily in latex paint.

SUMMARY & CONCLUSIONS:

A new line of dry colors designated with the suffix LD (latex dispersible) was developed for use in latex emulsion paint.

The toner contents of these colors range from 65-80% with 10% Clay in all cases, the balance consisting of the K salts of either or both of two new agents viz Daxad 11-KLS, N-741, a compound similar to blancol and "Lustrex 820", N-731, an alkali soluble sulfonated copolymer of styrene and maleic anhydride.

The LD colors, compared to the old WD products, represent a significant improvement. Strength and money value in most instances are considerably better. Efflorescence is practically eliminated and storage stability and wash resistance have been greatly improved.

Processwise, there is a considerable reduction in drying time compared to the WD colors.

Based on limited studies, there is an indication that the "Lustrex" containing LDs are good in migration resistance.

DISCUSSION OF RESULTS:

The new line of LD colors consists of the following types which

represent the color range most commonly used in emulsion paints:

RP-679-D	65%	BON Maroon Dark
RP-678-D	65%	"Watchung" Red
RP-691-D	40%	Alkali Resistant Red Medium
RP-681-D	75%	Toluidine Red
YP-664-D	75%	Toluidine Yellow
GP-739-D	80%	Pigment Green B
GP-740-D	65%	"Monastral" Green
BP-358-D	65%	"Monastral" Blue

Initial studies revealed that Daxad, a potassium salt of a compound chemically similar to Blancol, was satisfactory when used alone in only three of the colors, viz the BON Maroon, the "Watchung" Red and Pigment Green B. In the others, it was found that when Daxad alone was used, increasing the toner above 33%, which is equivalent to a reduction in agent below 67% resulted in poor dispersion and weakness in latex paint tint. Ladder series were run from 30% to 90% toner using Daxad and the K salt of "Lustrex 820" separately and in combination. Although in general, in the laboratory, it was possible to drop the Lustrex to as low as 16.5% in combination with an equal amount of Daxad in the presence of 67% color, it was decided to increase the Lustrex at the expense of the Daxad. This quantity of Daxad is slightly in excess of the minimum amount required to fluidize the presscake. In the case of the "Monastrals", which are sufficiently fluid by virtue of the agent (blancol) added during aqueous milling, no additional amount was required.

Other dispersing agents and methods of mechanically dispersing the presscake were tried. Of these, Lustrex and the Manton-Gaulin Homogenizer proved to be the most satisfactory. Laboratory work was based on the 2 gal. Abbe-Lenart¹ Mixer and the 25 GPH Manton-Gaulin Homogenizer. Semi-works development was conducted employing the 50 gal. Abbe and the 125 GPH M-G homogenizer, although some Semi-works development was based on the use of the 25 GPH unit. Final plant development and standardization involved the 500 GPH homogenizer. There were no apparent differences in material made from the different capacity homogenizers.

The colors were tested tinctorially in latex paint in tint and deeptone. To produce tints, 0.2% color on the total paint weight basis was used for the greens and blues and 0.3% for the reds and yellow. Deeptones were prepared using 2.0% of the greens and blue and 3.0% of the reds and the yellow. In order to simplify the testing method, the dry color in most cases was added directly to the base paint and stirred on a lightnin² mixer for 30 minutes. The paint was then brushed out on a wallboard (TF Method 1603-2). Paint property tests such as reactivity, efflorescence and wash resistance were

usually made on Semi-works or plant material representing temporary standards. In some cases, the dry addition test was supplemented by prewetting with water (1 color-1.5 water) in a change can mixer before adding to the white paint.

In general, replacement of Daxad with Lustrex yielded poorer wetting with water. The Lustrex colors tend to give thicker, granular pastes and do not disperse in water in the rapid dyelike manner of colors containing large amounts of blancol or Daxad such as the old WD line. However, as stated previously, considering the high toner content, dispersion in latex paint is quite good. In this respect, it was observed that where there was a tendency toward grittiness or poor dispersion, a reduction in the percentage of toner improved the dispersion.

During the course of the development work, some preliminary studies on the problem of migration in alkyd fortified latexes were made. Although time did not permit a more complete study, it may be stated that in general all the colors containing Lustrex were superior in migration resistance to controls containing Daxad.

The improvements obtained in the new LDs as compared to the old WDs may be summarized as follows:

1. Increased Strength - Superior Money Value.

All the LD colors with the exception of the "Monastrals" GP-740-D and BP-358-D and the Naphthanil, RP-691-D (which has no WD counterpart) range from 2 to 3 times stronger than the WDs and although the selling price per pound is higher, better money value is obtained.

2. Greater Stability on Can Storage.

Since the dispersing agent has been reduced, there is a significant improvement in reactivity and can stability.

3. Freedom from Efflorescence.

Practically no efflorescence occurs in paints formulated with these colors and Dow 762 latex.

4. Improved Washability.

The LD pigment itself contains a smaller percentage of dispersing agent and it is also possible to formulate deep tone paints with substantially smaller amounts of color. Therefore, the relatively

small amount of dispersing agent present in the paint has no adverse effect on wash resistance.

Plant development and standardization is completed on all of the new LDs except for the "Monastral" Green and the Naphthanil. Material is being selected for standard on the "Monastral" and the Naphthanil is ready for plant trial.

EXPERIMENTAL DETAILS:

Lab NB 1417-1 to 33 incl.
1435-1 to 44 incl.
1453-1 to 15 incl.
DSN 5-53-8 to 15 incl. and 53-23
WAF to AJS 5/5/53

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