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MU-1780 (Rev. 3/78)

**NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT**

BT-476-D - "COWLES" DISPERSIBLE 3 PHASE CPC

Period Covered December 1974 - August 1975 (Part Time)

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NEWARK PLANT

PIGMENT COLORS RESEARCH AND DEVELOPMENT REPORT

E. I. DU PONT DE NEMOURS AND COMPANY

Title - BT-476-D - "'COWLES'" DISPERSIBLE β PHASE CPC

Work Done by - J. Jackson

Report Written by - J. Jackson

Previous Related Reports - None

Project Code - 4671-400

Period Covered - December 1974 - August 1975 (Part Time)

Notebooks - E6124

J. Jackson

Abstract

The original objective of matching Ciba Geigy Irgalite LGLD was reviewed from the point of view of determining:

- 1) Commercial objectives to be achieved
- 2) Desirability of achieving objective
- 3) Reviewing of technical progress made to date

A decision was reached to abandon the product development.

The sale of LGLD in the market place seems to have been relatively unimportant with essentially no promotion taking place in the United States since that time.

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I. INTRODUCTION

During 1971 - 1972, Ciba Geigy was actively promoting a line of easily dispersible dry pigments including Irgalite Blue LGLD (β phase CPC). This product was promoted for its superior rate of strength and texture development versus BT-383-D or BT-473-D in oleoresinous inks (see attached brochure).

This product was reported to be "Cowles Dispersible". Numerous reports on this subject were developed at Chestnut Run.

G-38-71	7/21/71	
G-38-71	9/17/71	Irgalite Blue vs Dupont β phase toners various applications
G-38-71	12/30/71	
G-38-71	5/24/72	

Office Trade Report	Sun Chemical	V. J. Lewis	4/27/72
PTSR Report	Borden Chemical	V. J. Lewis	6/12/72
Sun Chemical PTSR No.	27-38	8-7-72	Copy Attached
	42-51		
G-51-72	11-16-72	Development Testing Method	11-16-72 (TF 2302)

R and D was requested to develop a counteroffering. H. Matrick developed a potential product in the semi works (73-00476) by extending dispersion mill powder made in the absence of Arquad 16 with an Elvacite Resin (2046) (see KN 73-4) and (Ref. 1) Work Request NC-6-73 - 4/30/73 (copy attached). The conclusions of this report were later revised see (Ref 2) NC-6-73 - 9/17/73 copy attached and (Ref 3) NC-6-73 12-17-73 copy attached.

E. Gillow was assigned the task of scaling up this process at Newport (1973-1974). The objective of duplicating LGLD was never fully accomplished; that is, no plant production was made that was fully equivalent to competition. The opinion of relative quality of the semi works prototype (73-00476) and LGLD was also revised during this period (Ref. 2,3,4,5).

The writer was assigned the task of clarifying this situation. A meeting with all parties concerned was held to determine status of the problem and technical objectives to be accomplished. Ref No. 6, 7, 8 (copies attached) summarize the conclusions reached. Ref. 9-10-11 (attached) also give comments on trade requirements. At the time of the writing of this report the Ciba Geigy product seems to have been withdrawn from sale in the U. S. with little interest shown by the trade.

This may be the result of a combination of factors such as:

- 1) Excessively high price versus low cost presscake application via flushing
- 2) Necessity to put material over a roller mill after Cowles dispersion
- 3) Inherent dusty nature product
- 4) Greater use of water base systems
- 5) Inadequate performance in certain types of ink systems

II. SUMMARY AND CONCLUSIONS

The original appraisal of the semi works prototype 73-00476 could not be reproduced. This may have resulted from changes in test procedure, aging of pigment or error.

Plant production was also inferior to the competitive pigment in quality.

The market potential for this pigment was inaccurately determined. Ciba Geigy has apparently had very little success in promotion in the U. S.

III. PATENT STATUS

Nothing of a patentable nature was developed during these studies.

IV. EXPERIMENTAL - LABORATORY

A laboratory program was initiated with:

- 1) Study of comparisons of laboratory versus plant extraction (which suggested that the plant results could be improved), and
- 2) Study of the effect of increased milling cycle (7 hours vs. 5 hours) and higher resin level (5%) on dispersibility.

Such a sample - laboratory extracted - plant dispersion mill powder (N 478 - lot 153) resulted in the best Cowles ink mill strength and dispersibility to date. This sample was still defensive versus Ciba Geigy LGLD in texture development, but was superior tinctorially. (Reference E6124-64, E6124-66).

A letter recommending possible ways of improving the extraction so as to obtain higher strength BT-487-P or BT-476-D issued (JJ-VJLewis 2-19-75).

EXPERIMENTAL - PLANT

Plant lot BT-476-D - 55462 was made at Newport based on a 5 hour dispersion mill cycle and 3% addition of Elvacite resin 2046. A drying study 180°F (lot 55468) was made for comparison with normal 220°F dry.

These lots were evaluated in various manners:

Rubout vs. Matrick's 73-00476 Coal Standard

Darker masstones, 2 - 4% strength advantage and very slightly redder hue.
vs LGLD

Masstones, much darker - more transparent, 2 - 3% weak, green hue. These properties seem adequate.

Cowles Dispersibility - See Table I and attached copies Ref. No. 12, 13, 14

Tests conducted at Newark and Chestnut Run show these lots to be inferior to LGLD. Modification of the testing method to compensate for the lower viscosity evidenced by the BT-476-D type pigment did not correct the situation.

Addition of thixotropes such as Baker's "Thixin" R to increase the shear

during dispersion did not solve this problem.

The best Cowles dispersibility to date has been achieved with a higher level of "Elvacite" (5%) (Ref. E6124-66). Such a product in laboratory extracted form seemed competitive with LGLD. Plant manufacture at the highest permissible level of "Elvacite" (4.5%) was planned. This ratio is based on competitive patent considerations, which do not allow use of more than 5% extender.

Plastics

These pigments show excellent dispersibility in soft vinyl (comparable to BT-449-D). Chestnut Run was requested to evaluate the commercial possibilities in this area, but stated subsequently that they were inadequate (Ref. 15, 16, 17, 18).

Ball Milled Thermoset Acrylic TAE-4

Lot 55468 vs. BT-383-D

The product appears to be superior in this acrylic system. The metallics are distinctly greener and show better two-tone characteristics, i.e., less red scattering, an objectionable property of BT-383-D.

BT-476-D lot 56657 - was manufactured at 4.5% resin level (highest permissible because of competitive patents) and was also examined at Newport (Ref. 17, 18) in plastics and via Cowles dispersion (Ref. 19, 20). The product was not equivalent to LGLD.

Analysis of the status of product development, reaction to trade sampling and changes in interest toward greater emphasis on development of presscakes indicated that this study should be discontinued (Ref. 21).

V. REFERENCES

1. Experimental Monastral Blue G BT-476-D NC-6-73 4-30-73 (Copy Attached)
2. Experimental Monastral Blue G BT-476-D NC-6-73 9-17-73 (Copy Attached)
3. Experimental Monastral Blue G BT-476-D NC-6-73 12-17-73 (Copy Attached)
4. E. Gillow Status Plant BT-476-D lots 42229,42330,42266,42267,42288 7/73 (Copy Attached)
5. XOP 428 - BT-476 Plant Procedures (Copy Attached)
6. JJ-WSS BT-476 Cowles Dispersibility 12-17-74 (Copy Attached)
7. J.R.Webster-C.F.Rolle BT-476 Cowles Dispersibility 12-20-74 (Copy Attached)
8. JJ-WSS BT-476 Cowles Dispersibility 1-14-75 (Copy Attached)
9. L.A.Schlapfer-C.F.Rolle BT-476 Cowles Dispersibility 1-17-75 (Copy Attached)
10. L.A.Schlapfer PTSR Wikoff Chemical 1-22-75 (Copy Attached)
11. G-63-74 BT-476-D in Inmonts Publication Gravure Ink 11-14-74 (Copy Attached)
12. JJ-JRW BT-476 Production 3-10-75 (Copy Attached)
13. NC-3-74 Evaluation BT-476-D Production 7-14-75 (Copy Attached)
14. LAS-CFR Monastral Blue BT-476-D (Bower's Ink) 5-20-75 (Copy Attached)
15. JJ-TBR BT-476 etal Evaluation Plastics 3-4-75 (Copy Attached)
16. BT-476-D Evaluation Plastics 6-20-75 (Copy Attached)
17. BT-476-D 56657 evaluation Plastics 7-1-75 (Copy Attached)
18. ANRD 11-75 BT-476-D Plastics 3-11-76 (Copy Attached)
19. JJ-JRW BT-476-D 56657 Cowles Dispersibility 7-1-75 (Copy Attached)
20. JRW BT-476-D 56657 Cowles Dispersibility 8-12-75 (Copy Attached)
21. CFR-LAS BT-476-D Cowles Dispersible Toner 8-29-75 (Copy Attached)
22. Irgalite Blue LGLD Brochure Ciba Geigy (Copy Attached)

GENERAL REFERENCES

NB Ref. E6124

Monthly Summaries BHP New Inorganics and Physical Chemistry