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NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT

CHROME GREENS
PREPARATION BY DRY-BLENDING PROCEDURE

Period Covered: February, 1946 - July, 1946.

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Progress Report

Title: CHROME GREENS
PREPARATION BY DRY-BLENDING PROCEDURE.

Period Covered: February, 1946 - July, 1946.

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DATE SUBMITTED: 7/19/46

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INTRODUCTION

An economic analysis indicated that the manufacture and sale of chrome greens would be more profitable if dry blending of the blue and yellow components were substituted for the orthodox slurry-blending procedure.² Dry blending would have at least two money-saving advantages: (1) elimination of double filtration of the blue component, and (2) reduction in amount of storage space for substandard green stock. Presumably the percentage of OK material would rise sharply since all dry blending could be based on results of laboratory board mixes.

This is not a new problem. During the period 1929 - 1932 work was carried out in an attempt to dry blend B-66-D and greening yellow, but was unsuccessful because of streakiness and non-uniformity of product. At that time it was felt that the hardness of iron blue was responsible for the unsatisfactory results. Early in 1946, micro atomization of greens was attempted for another purpose, but the high dusting and bulking characteristics of the product offset any advantage gained in uniformity and bright dry appearance (KN-46-49). Furthermore this procedure involved equipment not available on the Newark plant.

In view of the foregoing facts the present research program was set up primarily to test the use of B-216-D and the sealed vat, soft-textured B-2162-D, plus Y-493-D, in existing equipment. The Muench mixer (a conical rotating mixer with rubbing discs spaced at variable distances) was selected for the purpose because of its combined blending and grinding action. Two Muench mixers are available at Newark: a 2 barrel (500#) mixer in the Semi-Works and a 5 barrel (1250#) mixer in the plant.

SUMMARY AND CONCLUSIONS

To date, no 100% effective means has been found for eliminating streakiness (separation of blue and yellow) when the green is rubbed under a spatula. The Sales Department, however, has shown interest in G-647-D made in the Muench mixer from B-2162-D and Y-493-D and then mikro pulverized. Work has been confined to one light and one dark shade of both the G-550-D and G-604-D lines. In general, the dry blended dark shade greens are more homogeneous than the corresponding light shade greens, and those made with soft textured blue are superior in uniformity to those made with B-216-D.

It seems safe to conclude that neither the Muench mixer alone, or any other blender by itself, will provide a satisfactory answer to the problem. A considerable shearing action is apparently necessary in conjunction with the blending.

In the only ball-milling carried out to date (a 12" x 6" laboratory model), the dark, blue, intense dry appearance obtained in the resulting green was offset on rubout by extreme lightness and yellowness of mass tone and tint, indicating that the blue component might have been "everground".

None of the Muench mixed products exhibited "tailing" or vehicle separation on a Kent roller mill. There was, however, considerable separation of blue on the first loose pass for all products which had not been repulverized. The darker greens were understandably poorer in this respect than the light greens. Reference is made to the Paint Laboratory Memo Report on "Muench Mixed Chrome Greens" dated 6/26/46.

Greens (previously partially Muench mixed) ground on a small-scale Sprout Waldron attrition mill (12" interchangeable discs) were no better in quality than those which had been mikro pulverized.

Greens (previously partially Muench mixed) ground in a laboratory scale Micronizer (Intl Pulverizing Corp) were attractive in dry appearance and uniformity and showed a sharp decline in streaking. Bulking and dusting were apparently increased, however, and an additional disadvantage from an economic standpoint lies in the fact that this equipment is not available. Furthermore the Micronizer commands payment of royalties.

The use in a Muench mixer of Menter 28, a petroleum hydro carbon, in an amount equivalent to 5% of the total charge had the effect of producing an attractive, pellet-like, low dusting and bulking green with, however, no improvement in uniformity even when repulverized. A 50-50 mixture of Menter and Petronate had the same effect to a lesser extent. Both products on rub-out were light, yellow and weak versus standard. A three stage process of Muench mixing + repulverization + re-Muench mixing was found to be equally unsuccessful.

Muench mixed greens made from super-soft textured blues are considerably softer in texture than those made with B-216-D. This effect is especially noticeable in the darker shade.

PATENT STATUS

The preferred procedure appears to be free of patent infringement. No patentable developments appear to have resulted from the program to date.

RECOMMENDATION FOR FUTURE STUDY

It is suggested that future work be devoted to improving the darker shade of green in which Sales has shown interest, plus evaluation of the suggestion to blend slurry struck G-550-D with B-216-D (or B-2162-D) to produce the darker shade, and the converse, slurry struck G-647-D with Y-493-D to produce the lighter shade.

EXPERIMENTAL DETAILS

The method of Muench mixing used in each case was to charge the mixer with yellow and blue, the quantity of each depending on the shade desired, setting the discs as close as practicable (roughly 1/16" apart), and blending for 60 to 90 minutes. One disc rotated slowly with the blender itself (21 RPM), the other at 1250 RPM in the opposite direction. In few cases was any appreciable increase in blueness of dry appearance noted after 45-60 minutes. One exception was in the one plant mix made. In this case, improvement up to 90 minutes was noted, but the product failed to reach the depth of standard in dry appearance.

It is interesting to compare bulking, dusting and texture of the Muench mixed products with standard slurry struck greens:

Type	Components	How Made	Bulk, lb/gal.	Dusting %	Texture		
					1L	2L	4L
G-647-D	Std.	Slurry Struck	4.1	6.5	13-	13	14
"	B-2162-D+Y-493-D	Muench Mix	5.8	3.6	16-	16+	17-
"	B-216-D+Y-493-D	Muench Mix	6.0	2.2	13-	13-	14

(Cont'd.)

<u>Type</u>	<u>Components</u>	<u>How Made</u>	<u>Bulk, lb/gal.</u>	<u>Dusting %</u>	<u>Texture</u>		
					<u>1L</u>	<u>2L</u>	<u>4L</u>
G-550-D	Std.	Slurry Stuck	6.7	6.9	13	13+	16
"	B-2162-D+Y-493-D	Muench Mix	6.5	3.2	13+	16-	17
"	B-216-D+Y-493-D	Muench Mix	6.1	4.2	13	16	16+

There is a slight loss of texture, incidentally, upon repulverization.

Two small scale ball mill runs, both unorthodox in nature because of existing equipment, were made; one on G-647-D and one on G-550-D. Both runs used B-2162-D and Y-493-D. Four lbs. of pigment were milled with 25 lbs. of 1/2" steel balls and 2 lbs. of roofing nails to prevent balling-up. Despite an attractive dry appearance (dk and blue vs std.) the products in rubout were:

	<u>MT</u>	<u>Str</u>	<u>Tint</u>
G-647-D type vs G-647-D	lt. and yell	OK	s yell
G-550-D type vs G-550-D	lt. and yell	OK	v yell

EXPERIMENTAL DETAILS

Details are reported in DSN 46-24. Bulking evaluations were made on the Scott Bulkometer. Dusting was measured by the modified Roller Particle Size method. Photo micrographs and spectrophotometric curves of several of the samples are included in the Development Section Notebook.