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KIV-49-27

NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT

FINAL REPORT

Title: STUDY OF CONTINUOUS PROCESS FOR MANUFACTURE OF Y-493-D IN #12 BUILDING

Period Covered: March 15, 1949 - June 1, 1949

Charge: 1101-12-4

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NEWARK PLANT

PIGMENT COLOR RESEARCH REPORT

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Title: STUDY OF CONTINUOUS PROCESS FOR MANUFACTURE OF Y-493-D IN #12 BUILDING

Period Covered: March 15, 1949 - June 1, 1949

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SUBMITTED BY: Julius Jackson JULIUS JACKSON DATE SUBMITTED: 6-2-49

APPROVED BY: B. H. PERKINS DATE ISSUED: 6-20-49

DUP050067286

INTRODUCTION:

The responsibility of developing a plant continuous process for Y-493-D manufacture was transferred from the Plant Development Group to the Inorganic Research Group about March 15, 1949. All plant runs to date have been planned and supervised by the Plant Development or Production Division Groups. The status of the problem as of March 15, 1949 was summarized in RLM 49-21 by J. H. Baird and J. O. Morrison (see copy attached). Pigments had been manufactured which were fairly close tinctorially to Y-493-D, SD-48184 by H-108 linseed oil rubout (greening yellow test) but which were deficient in Fadeometer lightfastness, texture and color stability toward the heat and humidity test.

Our efforts have been confined to laboratory study and to an investigation of the status of the problem in greater detail than is set forth in the previous report. No production was scheduled in #12 Building until this study could be completed. This was deemed necessary because of the inability to blend substandard material (because of lightfastness deficiencies) to standard quality level. The avoidance of manufacture of poor quality pigment during the course of process development was considered particularly desirable in view of the current Chrome Green quality difficulties.

The responsibility for future work on continuous processes for plant manufacture of Y-493-D was transferred from the Chemical Division to the Production Division as of June 1, 1949. The results of the study of this problem by the Inorganic Group of the Chemical Division from March 15, 1949 to June 1, 1949 are summarized in this report.

SUMMARY:

1. A review of the process as to formulation of materials, retention times, etc. was made for comparison with SW K-2241, and standard #6 Building operations.

2. An intensive evaluation of the quality of experimental continuous process plant material was made by

a) H-108 linseed oil greening yellow tests.
b) Dulux alkyd grinds as greens.
c) H-108-Dulux rubouts as greens.

3. Weather-O-Meter exposures of representative products were made.

4. A laboratory simulation of #12 Building type of process was developed and found to yield results analagous to #12 Building experience.

5. The effect of vanadium content of bichromate solution on tinctorial properties and color retention by Weather-O-Meter exposure of Chrome Greens has been made.

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6. An attempt has been made to evaluate variables applied in #12 Building.

CONCLUSIONS:

1. Weather-O-Meter exposures of Dulux grinds show all products made in #12 Building to date to be inferior in lightfastness or resistance to color change to the old standard Y-493-D, SD-48184 (made with an equal quantity of stannous chloride). One product (13487 - Condition 1), a "white base" procedure sample, is approximately equal to Y-493-D, SD-86721 (75% of the stannous chloride) in color retention and resistance to darkening.

2. The process used for this best product was abandoned in #12 Building because products closer to standard (SD-48184) by H-108 linseed oil greening yellow test could be obtained by means of procedures not involving the precipitation of the white base (lead carbonate) step. A decision is necessary as to the proper method of evaluation of these products for future production since the conclusions of H-108 rubouts and Fadeometer exposure do not agree with Dulux grinds and Weather-O-Meter exposure. The latter test appears to the writer to be more significant.

3. The presence of vanadium compounds in the bichromate liquor used has very probably had an adverse influence on the quality of #12 Building production (as well as on all greens and shading yellows manufactured with such materials) and should be avoided.

4. The effect of sodium bifluoride is qualitatively similar to that experienced in batch operations.

RECOMMENDATIONS FOR FUTURE WORK:

1. Future work should compare the lead carbonate and non-lead carbonate procedures using low vanadium bichromate (13487 - Condition 1 vs 13530 - Condition 1).

2. A trial of the use of a split treatment for stannous chloride is recommended.

PATENT SURVEY:

No patent survey was made.

DISCUSSION:

An intensive evaluation of the experimental products made in the continuous unit particularly with respect to lightfastness and color retention in Weather-O-Meter exposure was undertaken. Evaluation of tinctorial properties were confined to H-108 linseed oil greening yellow tests, Dulux alkyd grinds, and Dulux H-108 rubouts (Reference 2). The Weather-O-Meter exposures were made in Dulux vehicles, and were conducted because of the fact that Fadeometer evaluations of Chrome Green pigments frequently give misleading information as to the lightfastness and color retention

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on out-door exposure. Past experience has led to the conclusion that Weather-O-Meter exposures have proven more reliable. Particular emphasis was placed on those plant runs which were considered to have been under good mechanical control, and which yielded pigments which were thought to be fairly close to standard tinctorially (13487 - 13530).

Ingredient Balances:

All ingredient balances, concentrations, etc. used in the plant continuous runs were checked and compared with semi-works K-2241 procedures and with standard batch operations. It was discovered that both the semi-works and #12 Building continuous processes were using much more sodium sulfide than standard batch manufacture; since they were using the material on an analyzed basis (ca. 60%) while standard batch procedures use the material on an "as is" (100%) basis. In addition, it was found that the sodium sulfide rotameter was behaving peculiarly, using more than the calculated amount of this reagent. This condition is not thought to have had any serious effect on lightfastness, although definite effects upon color are to be expected.

Type of Process:

Two basic processes were used in #12Building. The first of these involves the use of a "white base" procedure as exemplified by Run 13487 - Condition 1, and the second omits this "white base" step (e.g. 13530 - Condition 1). Evaluation of these products by H-108 linseed oil greening yellow rubout shows the 13530 process to give products which are closer to standard tinctorially. However, evaluation in Dulux by means of the Weather-O-Meter shows the white base procedures to be superior in color retention and resistance to darkening. The writer considers the latter evaluation to be the most realistic, short of out-door exposure. Future work should be guided by the Dulux test preferentially, unless this is found to be misleading. The use of "white base" procedures in #12 Building as applied in runs 13487 - 13530 gave darker bluer masstone greens, somewhat stronger in tint, than runs made without the $PbCO_3$ step. This was substantiated in laboratory simulations of #12 Building processes.

Little difference in lightfastness of H-108 linseed oil rubouts was noted; however, alkyd evaluation in Weather-O-Meter shows "white base" procedures to be superior insofar as #12 Building production is concerned and slightly inferior in a few attempts made in the laboratory. Further evaluation of this matter is indicated particularly since the issue is complicated by the presence of various amounts of vanadium in the bichromate used. This will be discussed more fully later.

Evaluation of Other Variables Attempted in #12 Building:

1. pH at sodium sulfide (N-368) treatment stage - Conflicting results upon tinctorial properties were observed by raising pH before sodium sulfide addition in #12 Building. However, lightfastness appeared to be somewhat improved.

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It is to be noted that increased quantities of sodium sulfide yield lighter masstone products in a non "white base" procedure, as compared with darker masstone products in orthodox "white base" procedure for Y-493-D.

2. Effect of adding stannous chloride (N-26) in various fashions.- Products made in #12 Building with the use of a vat for stannous chloride treatment seem to be somewhat superior in lightfastness to comparable pigments made with pipeline addition of this compound. This statement must be qualified since the simultaneous change of vat strike versus pipeline strike was made. In general, lighter, bluer, more intense masstone, weaker and bluer tints were obtained. In other comparisons the effect of variation in amount of sodium sulfide complicates the issue since this was also changed simultaneously.

The following aspects of the stannous chloride addition have been studied in the laboratory using a #12 Building type process without a "white base".

a. Hydrolysis of stannous chloride solutions prior to use was not found to be harmful to lightfastness.

b. Increase in stannous chloride quantity to 125% and 150% of that used in preparation of Y-493-D, SD-48184:-

Darker masstone products were obtained which were not better in lightfastness than the control at 100% of stannous chloride.

c. "Split" tin addition:-

The use of the "split" stannous chloride addition, similar to that used in batch operations, is to be recommended. Laboratory products made in this fashion seemed to be superior to those made with a single tin addition such as was done in the continuous plant Y-493-D procedures thus far.

d. Stirring longer than two minutes after stannous chloride addition is not recommended; products made with a long stirring time at this point are poor in lightfastness.

3. Effect of high vanadium content in bichromate.- It was noted during the course of the laboratory investigation, that control processes did not appear as good in quality by Weather-O-Meter exposure as products of a similar type made in previous Y-493-D studies in the laboratory. In view of the discovery of vanadium in our recent bichromate purchases, it was decided to investigate its effect upon quality. Two levels of vanadium quantity were used. The "low" level of .016% V, on $Na_2Cr_2O_7.2H_2O$ basis, and a "high" level of .096% V were studied in the laboratory. (Samples of bichromate have been received which have contained as much as .157% vanadium). Running on duplicate processes, high vanadium

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products have been found to be fairly close in tinctorial properties to low vanadium products with high lead chromate content shading yellow, but considerably darker and bluer with low lead chromate content shading yellow. Lightfastness in linseed oil is somewhat worse, and color retention and resistance to darkening in Dulux exposures in Weather-O-Meter is definitely inferior.

4. Effect of $PbCrO_4$ content,- It was also noted that those products made in the laboratory at a higher chromate content are superior to similarly prepared products made with lower chromate content in Fadeometer and Weather-O-Meter evaluation in Dulux.

5. Use of sodium bifluoride,- One plant run, 13530, was made using various amounts of sodium bifluoride in the bichromate solution. The usual effect of producing light massstone greens (at fixed blue content) was noted.

No other evaluations, such as texture, heat and humidity tests, etc. were made. The latter test is thought by the writer to be affected by the same mechanism which influence lightfastness and color retention in Weather-O-Meter exposures. It is believed that the production of material satisfactory in this latter respect should also be satisfactory in the heat and humidity test.

REFERENCES:

1. Experimental Details
DSN-49-25
KN-44-82
KN-45-105
NB 1319-4-13

Attached letter

2. Letter, R.R.Denslow to V.H.Chalupski, Aug. 8, 1945.

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ADDENDUM:

Evaluation Techniques:

1. H-108 Dulux Rubouts

These rubouts were made as follows,-

Weigh out		5.76 grs. Yellow	
		.24 grs. Blue B-300 SD-89813	
		1.0 grs. H-108	
Mull		3 x 50	
Weigh out		3.8 grs. ink	
Add	6 ml.	RC-103) mixture	86 parts (Dulux testing)
		RC-203)	47 parts (procedure)
	1 ml.	KV-37	

Make Bird applicator drawdowns .003" or .005" thick.
Expose 48 hours minimum in Weather-O-Meter.

2. Alkyd Grinds

In using the above technique, it was noted that the quality of a given product, based on Weather-O-Meter exposure, was considerably better when paints were prepared in this fashion instead of grinding 72 hours with steel shot.
Investigation of this point led to the conclusion that iron contamination during grinding may be responsible.

Duplicate grinds made with "Porox" balls were superior by Weather-O-Meter evaluation of color retention to grinds made with steel shot. Other differences were also noted:-

1. Steel shot grinding yielded enamels with higher gloss than "Porox" grinds.

2. Steel shot grinding yielded enamels with initially lighter masstones. After dyring, the masstones were slightly yellower and duller than duplicate grinds made with "Porox" balls.

3. The H-108 Dulux rubout technique agrees quite favorably with "Porox" grinds.

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CC: Messrs. A.Siegel
V.H.Chalupski
J.Jackson
J.O.Morrison

COPY

Newark, New Jersey
March 21, 1949

DR. D. B. KILLIAN:NEWARK (3)

CONTINUOUS PROCESS FOR SHADING YELLOW
PROGRAM OF EXPERIMENTAL WORK

The problem of developing a continuous process for manufacture of Shading Yellow was transferred from the Development Group to the Inorganic Research Laboratory, with the classification of an A-I research problem, as of March 15th. The status of the problem, with an outline of the experimental program which it is proposed to follow in this work, is summarized in the following sections.

HISTORICAL

A continuous process K-2241 for manufacture of Shading Yellow was developed in the semi-works in 1945. The pigments obtained in the semi-works with use of this procedure were regarded as a satisfactory approximation to Y-493-D standard. The semi-works process represented an adaptation to continuous process equipment of a conventional "white base" procedure and did not involve any departures from conventional practice which could be regarded as "radical". This process, K-2241, was taken into the #12 Building unit in May 1948, and 11 runs have been made in the plant unit since that time.

The initial plant run represented an attempt to adapt the semi-works procedure to #12 Building equipment without change, insofar as possible. However, because the plant unit differs from that in the semi-works in several respects, in addition to the factor of size, it was not possible to adapt the semi-works method to the plant without the introduction of certain changes. The initial material made in the plant by the adaptation of the semi-works procedure was of poor quality. Following several plant runs on the semi-works "white base" procedure, without production of material approximating standard or the semi-works product, a procedure was tried which did not involve the production of a "white base". The material made in the plant by the latter procedure appeared to be better in quality than the samples made by the semi-works procedure involving "white base" production and, accordingly, plant studies were continued on this plant modification of the semi-works process.

Eleven plant batches have been made thus far in the plant in an attempt to develop a satisfactory process. As a result of this study in the plant, products approaching standard in tinctorial quality by the "greening" test have been obtained. However, all such products have been seriously deficient in lightfastness and have, in general, shown poor behavior on exposure to heat and humidity.

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CURRENT STATUS

A memorandum outlining the current status of this problem, with suggestions for future work, has been prepared by the Development Group. In brief, it is reported that a satisfactory tinctorial match to standard has been obtained, but that the lightfastness and behavior on exposure to heat and humiidity are definitely inferior to those of standard material. Recommendations for further study, involving the investigation of a number of variables, are also presented in the aforementioned memorandum. The results of an independent survey of the available information by the Inorganic Research Group confirmed the status report by the earlier workers, except that it is felt that the reports of a satisfactory tinctorial match to standard are somewhat optimistic.

PROPOSED PROGRAM

A review of experimental results obtained thus far reveals that additional experimental studies, either in #12 Bldg. or in the laboratory and semi-works will be necessary in order to arrive at a satisfactory process. It is our opinion that as much as possible of this work should be carried out in the laboratory, rather than in the #12 Bldg. unit. It is recognized that laboratory and semi-works results cannot always be translated directly into terms of significance for plant operations, but it is our opinion that the results of laboratory study of this matter can serve as a very useful guide to plant development investigations. For the present, it is proposed to devote our efforts to laboratory studies and to make the next plant run at such a time as laboratory results indicate a definite liklihood of obtaining satisfactory quality material in the plant. It is believed that such a program will result in a satisfactory solution of the problem more quickly, and with far less accumulation of substandard plant stock, than would be the case were the experimental study conducted entirely in the plant without the benefit of "guiding" experiments in the laboratory.

B. H. PERKINS,
CHEMICAL DIVISION

BHP:RMK

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RLM-49-21

CC: D.B.Killian
A.Siegel
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E.V.Widegren
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Res.Cfc.Report File-211.
Library Report File-211.

Newark, New Jersey
March 22, 1949

DR. B. H. PERKINS
NEWARK

CONTINUOUS MANUFACTURE OF Y-[illegible]-D SHADING YELLOW

We are forwarding herewith a brief summary of plant development work on subject problem to date, prepared by Mr. J. H. Baird. More complete information is available in the Chemical Division records and files previously delivered to Dr. J. Jackson. All source data, including instrument charts, are available in the #12 Building Process Files.

Basic laboratory studies are reported in KN-44-82. The recommended laboratory process for manufacture of standard quality pigment, chemically substantially identical with the conventional batch process, was carried through the semi-works without difficulty and established as K-2241, as reported in KN-45-105. Scale-up to the #6 Building pilot unit, however, resulted in unsatisfactorily dull, olive products, usually of inferior stability to the heat and humidity test. Subsequent renewal of semi-works activities, with concomitant laboratory study, confirmed the reproducibility of the K-2241 process in the semi-works and indicated the #6 Building difficulties to be associated with differences in design characteristics of the two units. Inasmuch as the #12 Building design embodied unique characteristics of its own, further development study was postponed pending availability of the plant facilities.

One plant run was made in 1947, five during 1948. All were based on the K-2241 ("lead carbonate base") process, embodying variables designed to reproduce laboratory and semi-works conditions. Quality was generally poor, although progress was made.

Lessening of production demands late in January permitted renewal of the development campaign, to which valuable collaboration has been contributed by the Production Division. Six additional runs have been made to date; during the last three, products of merit have been obtained through detailed study of pH conditions. The best formula developed to date appears to be that of Run 13511, Condition 4, in which initial striking of lead carbonate is eliminated.

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The process requires further study to improve light stability, which appears not to have been affected by removal of the lead carbonate step, to minimize differences between tinctorial properties in linseed oil and alkyd systems, and to improve control of texture. In this connection, more complete evaluation and inter-comparison of samples from Runs 13476, 13482, 13487, 13511 and 13550 is highly desirable, particularly including evaluation of the products for stability under heat and humidity exposure and for tinctorial properties in alkyd enamel. Finally, as discussed with Dr. Jackson, recently acquired information indicates the desirability of recalibrating all rotameters in order to eliminate uncertainties as to precise ingredient balances.

J. O. MORRISON,
CHEMICAL DIVISION

JOM:RMK

DUP050067296

Belleville, New Jersey
March 17, 1949

DR. J. O. MORRISON
NEWARK

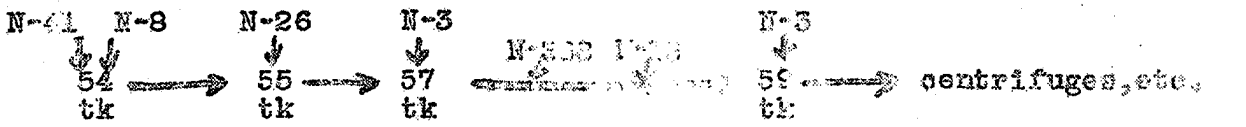
CONTINUOUS MANUFACTURE OF [illegible] YELLOW Y-493-D

Development of Y-493-D Shading Yellow in the plant continuous unit under Chemical Division supervision was initiated in November 1947, based on the semi-[illegible] Y-6341 process. Due to capacity limitations imposed by production demands for other products, activity during 1948 was limited to two runs in May and three in November. Active study was resumed in January 1949; six runs have since been made, ranging in length from four hours (6700 lbs.) to 12 hours (20,000 lbs.) employing variables aimed at producing standard quality Y-493-D.

On March 15, 1949, after the product had been reclassified as "A-I" research, responsibility for plant standardization of this code passed from the Plant Application Group to the Inorganic Research Group. To facilitate future study of the problem, a compilation of data obtained to date is herein presented, along with such conclusions and recommendations which appear to be in order at this time.

SUMMARY & CONCLUSIONS

Plant production of material which by conventional greening test is essentially equal timetable by to Y-493-D standard, but deficient in light stability and [illegible] resistance, has been accomplished and confirmed. The present preferred process (Run 13511, Condition 4) is satisfactory from an operating standpoint, involving the following [illegible] conditions:-



The ingredient balance is essentially the same as for the original SW standard, lot 8467, except for elimination of "white base" in the strike, modification of the quantities of soda ash used following the strike and treatment, and a 30% increase in the quantity of sodium sulfate in the chrome solution. In addition, retention times in the various vats are slightly different in the

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#12 Building formula because of equipment characteristics and process modifications:-

**N-41, lead nitrate, 28.95#/min. diluted to approximately 40 gallons with water is charged to a stirred vat (T-54), retention time 1.8 min., with

**N-8, chrome solution, 10.86# N-8/min. diluted to 25 gallons with water, containing sodium sulfate (N-108) at 1.14#/min., and sodium chloride (N-71) at 1.75#/min.

pH after strike 1.3 - 1.5 (no adjustment).

N-26, acid tin solution, 0.70#/min. (0.8#/gal.) of tin crystals, and 0.04#/min. of HCl, added in stirred vat (T-55).

pH after tin 1.0-1.2 (no adjustment).

N-3, soda ash, 3.0#/min., added in stirred vat (T-57), retention time 8 minutes.

pH after N-3 1.8 - 2.0 (no adjustment).

N-15, alum, 2.2 #/min., added in pipeline between T-57 and T-59.

N-368, sodium sulfide, 0.09#/min. added in pipeline between T-57 and T-59.

N-3, soda ash, (approx. 2.5#/min.) as necessary to adjust final pH in T-59, retention time 7 minutes, to 5.5 - 5.7.

The use of sodium bifluoride as an agent to improve light resistance of the product has been investigated in the most recent run (13530). Results, as yet incomplete, indicate a definite improvement in light stability when obtained, but the products are still inferior to standard in this respect.

Vat controls of one run (13477) have been tested in alkyd vehicle and were considerably duller in masstone versus standard than when rubbed in varnish vehicle.

Texture has been poor throughout the study. Wedge grit ratings of continuously manufactured N-93-D have ranged from two to four units poorer than standard. (See Run 13511, however).

Heat and humidity test results have been inconclusive, but in general, the average production appears to be inferior to standard in this respect.

**It has recently been reported that the original calibrations of the N-41 and N-8 rotameters were approximately 6% lower than the true flows. The flow rates reported here are based on those original calibrations.

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RECOMMENDATIONS

It is felt that the problem of matching Y-695-D tinctorially is near solution. Products have been produced on both the dark, yellow and light, blue sides of standard. Still to be solved are the inferior Fadeometer and Weatherometer resistances, and inferior texture. It is recommended that future work be directed toward correction of these deficiencies, and if time permits the following variables, as yet untested, be investigated:-

1. The use of potrenate (N-38C) for texture improvement.

2. Determination of optimum chrome-lime ratio and precipitant balance.

3. Determination of quantity of sodium sulfide (N-388) to be used. It was recently pointed out that this ingredient was being used on an analyzed basis in #12 Building, and on an "as is" (60%) basis elsewhere in the plant. As a further complication the sodium sulfide weigh tank has been found to have metered flows 40% in excess of specifications. This is known to have occurred during the 15511 run, and obviously should be corrected prior to resuming future production.

4. Optimum dilution of chrome and lime solutions.

5. Optimum amount of tin. The current formula specifies the quantity of tin formulated for Y-695-D prior to the 25% cut authorized by the Sales Department in February 1947.

It is further suggested that two hank samples of the two most recent runs, 15511 and 15580, be submitted for tinctorial properties and weatherometer stability for tinted pebbles, texture by wedge grit rating and resistance to heat and humidity.

DETAILS

A description of each of the experimental runs to date is appended. In the opinion of the undersigned, N. F. Klemke, runs prior to 15476 (February 1949) are subject to considerable experimental error because of mechanical difficulties such as lime plugging and failure of experimental equipment.

Complete details of all runs are filed in #12 Building and #10 Building.

J. H. BAIRD,
CHEMICAL DIVISION

JHB:RMK
Enc.

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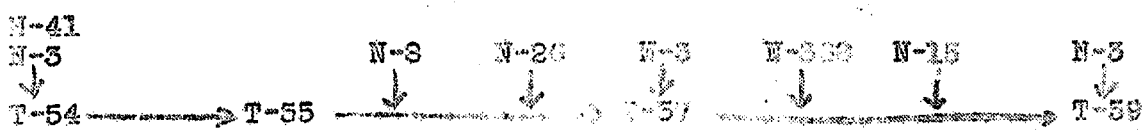
Y-493-D 10054 11-21-47

Control: Y-2241, 8467

Plan: 4 hours 6700 lbs.

Check K-2241 exactly but [illegible] high final pH (5.9-6.1).

Flow:



Details: Excessive pH variation throughout run.

Quality:

All material was dark and [illegible] in massstone, vs strong and dull in that. No other information is available on this run.

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Y-493-D 11451 5-25-48

Control: Y-2241, 8437 and 10054

Plan: 12 hours 20,000 lbs.

Check K-2241 procedure except vary final pH as follows:-

Condition 1 - High pH in T-57 (4.3-4.5) VC 1 & 2
" 2 - Low pH in T-57 (4.2-4.4) VC 3
" 3 - Normal pH in T-57 (4.3-4.7) VC 4
and 5% acetic [illegible] in chrome flow.

Flow: See 10054

Details: 1. Difficulty in controlling pH in T-57.

2. pH meters not operating satisfactorily. All pH data questionable.

Quality:

All material dark to very dark, olive and dull in masstone, and very dark, dull and yellow in tint by Control laboratory spooning test.

There was nothing significant in vat controls except that the vat control representing low pH in T-57 (VC-3) was appreciably lighter than the others.

Heat and humidity tests were carried out; VC-3 was ck after 70 hours, both others alive after 264 hours. Others were very good.

No texture or alkyd evaluations were made.

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Control: 11451, SW-8467

Plan: 12 hours 20,000 lbs

Condition 1 - Equilibrium @ standard conditions. VC-1
" 2 - Increased addition of acrike. VC-2
" 3 - 20% substitution by soda ash (T-54). VC-3
" 4 - Omission of sodium sulfide. VC-4

Flow: See 11451

Details:

1. Agitator in T-54 [illegible] during Condition 2.

Quality:

All material dark to very dark, olive and dull in masstone and vs strong, [illegible] in tint by the Control Laboratory. No significant results were obtained from vat controls. VC-3 [illegible]. All samples were inferior in light stability.

In heat and humidity tests all samples were inferior to standard.

No texture or alkyd evaluations were made.

DUP050067302

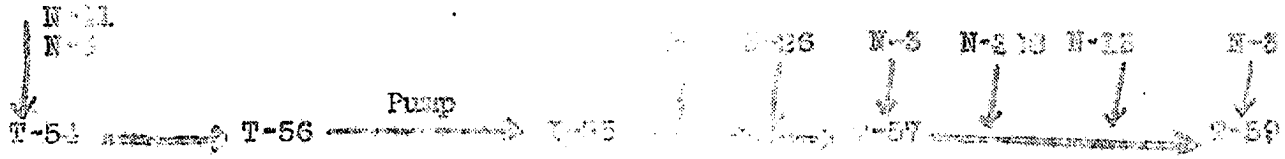
Y-493-D 12971 11-4-48

Control: 11451, SW-8407 but with [illegible] flow (see below).

Plan: 8 hours 14,000 [illegible]

Condition 1 - Equilibrium [illegible] conditions. VC-1
" 2 - Cut [illegible] 54 by 30%. VC-2
" 3 - As 2 but [illegible] flow 0%. VC-3

Flow:



The change in flow [illegible] provide additional aging for the white [illegible]

Details:

No mechanical difficulties [illegible]. Suspect uneven surges from [illegible] pump between T-56 and T-55, however.

Quality:

All material was dark, [illegible] strong, vs strong and dull in [illegible] was weaker than VC-1, but close in [illegible] VC-3 is dark, weak and blue versus VC-2. [illegible] light stability data reported.

Texture was 4 points [illegible] than standard by wedge grit. Drier samples [illegible] apparently represented Conditions [illegible] were OK in heat and humidity test. No [illegible] exudations.

DUP050067303

Y-493-D 12976 11-8-48

Control: 12971, but with [illegible] solution in which M-108 was [illegible]

Plan: 6 hours 10,000 lbs.

Condition 1 - Equilibration at standard conditions (chrome [illegible] standard rate, sulfide [illegible] 51 5%) (No VC)

" 2 - Increased dilution of strike (30%) " "
" 3 - Omission of [illegible] sulfide, " "

Flow: See 12971

Details:

During Condition 2, [illegible] allowed and volumes built up in T-56 and T-[illegible]. Pressed to reduce dilution from 30% to 2[illegible]

Quality:

Condition 1 (control) [illegible] dark, dull masstone, 5% strong, blue, dull [illegible]. Condition 2 was similar except for a [illegible] increase in blueness of masstone. Condition 3 showed lighter masstones and vs weaker tints. All masstones were dull. No data on light [illegible] fastness.

Texture was 4 points [illegible] than standard by wedge grit rating.

Heat and humidity tests - Samples representing Conditions 2 and 3 were [illegible] No tests on Condition 1.

No alkyd evaluation.

DUP050067304

Y-493-9 12981 11-9-48

Control: 12976 (same flow, [illegible] ratio)

Plan: 7 hours 11,000 lbs.

Omit sodium sulfide through [illegible].

Condition 1 - Equilibrium at 12976 conditions (No VC)
" 2 - Increase [illegible] by 20%; Decrease [illegible] by 20%.
" 3 - By-pass [illegible].

Flow:

Conditions 1, 2 - [illegible]

Condition 3 - By-pass [illegible] discharging directly from [illegible] to [illegible].

Details:

1. Chrome and tin [illegible] throughout run.

2. No pH measurements [illegible] because of difficulty [illegible] through pH meter.

Quality:

No tinctorial results [illegible] #10 Building or #12 Building files.

Texture inferior to [illegible] by 3-1/2 - 4 points.
Heat and humidity: All [illegible] poor.
No alkyd evaluation.

DUP050067305

Control: 12976

Flow: 8 hours 10,000 Gal.

Condition 1 - Equilibrium [illegible] 12976 conditions (VC-1)
" 2 - Cut T-8 in [illegible] by 30% and in T-57 by [illegible] (VC-2)
" 3 - Standard T-8 [illegible], but add chrome [illegible] (VC-3)

Flow:

Conditions 1,2 - See [illegible]
" 3 - At [illegible] to introduce T-8 [illegible] of T-55 + T-57 [illegible]

Details:

1. Plugging of line [illegible] throughout early portion of run.

2. Unable to prevent [illegible] sampling from pump between T-13 and [illegible], which were erratic fluctuations [illegible] ratio. Strike pH varied [illegible].

Quality:

Color was dark to [illegible] plate and drill in mass-tone, 90-10% in that [illegible]) to Control Laboratory results. [illegible] showed no significant differences [illegible] T-8 apparently was more intense in [illegible] than the others.

All samples were [illegible] than standard and 2 points worse than [illegible] in wedge grit texture.

No heat and humidity [illegible] evaluations.

DUP050067306

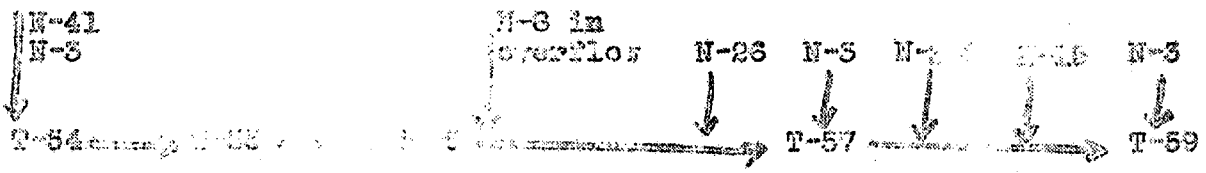
Y-493-D [illegible] 2-18-49

Control: [illegible] as described below.

Plan: [illegible] lbs.

[illegible] Equilibrium at 12976 condition (VC-1)
[illegible] N-3 in T-54 42%; Raise N-3 in T-57 86% (VC-2)
[illegible] but cut N-3 in T-54 42%; (VC-3)
raise N-3 in T-57 40%.
Represents a net cut of [illegible] in N-3.

Flow:



[illegible] made to eliminate use of pump. [illegible] T-55, which caused considerable [illegible] pump.

Details:

3. pH [illegible] between chrome and tin additives. No flow to pH meter.

9 [illegible] in T-57 to 42" although standpipe was [illegible] 36".

Quality:

Material [illegible] lighter and more intense throughout runs. Each of the variables was Condition 3 which gave [illegible] of cleaning up had the pump been [illegible]. Light stability was deficient in all cases.

Finishes [illegible] points worse than standard.

No [illegible] or alkyd evaluations.

DUP050067307

X-103-D [illegible] 2-22-46

Control: 13476, but chrome/sulfate ratio as in the batch X-[illegible] process (9.65:1)

Plan:

Condition 1: 6 hours 10,000 lbs.

Standard [illegible] flow, but sulfate reduced from 0.166#/# chrome to 0.105#/# chrome.

Condition 2: As Condition 1, 13476 but cut [illegible] in T-57 to 1.07#/min instead of 1.67#/min. Former is amount corresponding to SW-8467.

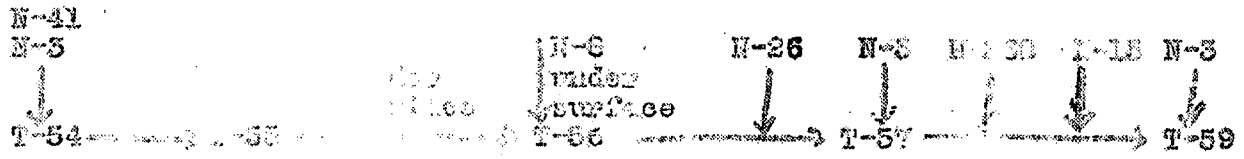
" 3: Dissolve bichrome into lead under surface of T-56, keeping other ingredients in same locations.

" 4: As 3, but add sodium bifluoride (8 lbs. per mole N-41) to N-3 solution.

Flow:

Condition 1, 3 - Same 13473

Condition 2:



Details:

1. Condition 1 gave very olive-appearing slurry and [illegible] condition. Reversed to [illegible] 30 minutes prior to starting [illegible]

3. pH in [illegible] (bichrome strike) was 1.9; pH in T-57 [illegible]

Quality:

Conditions 1 [illegible] checked control - dk. blue in MF, [illegible], [illegible] tints. Condition 2 [illegible] olive [illegible] and blue in tint. The effect of [illegible] (Cond. 3) was to lighten masstone and [illegible] strength with a slight tendency toward [illegible] chromate.

[illegible] were inferior to standard in light [illegible] color scale under conditions 2 and 3 were notably improved in this respect.

[illegible] slight [illegible]

DUP050067308

Control: 15432 solutions.

Flow: 8 hours 35,000 lbs.

Condition 1 - Equilibrium conditions used in 13470 (Condition 1. (VC-1)

" 2 - Increase M-5 in T-57 5%; omit M-6 in T-57 (VC-2)

" 3 - Omit T-57, No water base, M-5 in T-57 increased 10%, M-8 in T-57 was a 35% solution in T-57. (VC-3)

" 4 - As 3, but M-5 increased in T-57 to balance total M-5 equal to 45% acidic ion. (VC-4)

Flow: See 13473.

Details: 1. pHs in T-57 during Cond. Plants 1, 2, 3, 4, were 4.5, 3.0, 1.8, [illegible] respectively.

Quality:

This was the first batch made for the Building without objectionable odor. Spectros by Control Laboratory test [illegible] blue and blue while tints were equal and blue, VC-3, representing Condition 3, was a slow [illegible] for standard - equal depth, s.intense [illegible] blue in tint. All were [illegible] lightfastness, however.

All samples showed a slight tendency to darken after one week's exposure to heat and humidity. This should be rechecked [illegible] confirmation after an extended period.

There were no texture evaluations.

In alkyd vehicle, all trial samples were lighter and bluer than standard, VC-1 being the closest match in this system. All samples darkened excessively upon exposure in fadeometer and weatherometer.

DUP050067309

T-49[illegible] D | 13511 | 8-8-49

Control: 13487

Plan: 12 hours 80,000 lbs.

Condition 1 - As [illegible]
" 2 - " " 3
" 3 - " " 3, but omit N-3 [illegible] in N-[illegible], to feeds rub in either T-54 or T-57.
" 4 - Revise [illegible] as specified below, soda ash as in Condition 2.
" 5 - As 4, but [illegible] sodium bifluoride (2 lbs./ gal. N-[illegible] in brine solution (see [illegible] below).

Flow:

Condition 1 - 2 S[illegible] [illegible] to N-3 in T-54.
" 3 - " " " " " T-54 or T-57.
" 4-- 5 S-[illegible] N-[illegible] [illegible] N-3 N-[illegible] N-[illegible] N-3
[illegible] T-57 T-59

Details:

1. Discrepancy discovered upon quantity of sodium sulfide used in combination process (on analyzed basis, 100%), and in standard lead process (on commodity basis, 60%). Flow of sulfide reduced for 30 minutes during Condition 3, then reverted to original rate.

2. Error discovered in [illegible] solution. It had been adjusted to pH 9.3 [illegible] of 2.0. Shut down after condition [illegible].

3. Resumed production with [illegible] recovered lead solution on Condition 2 and [illegible] through Conditions 3 and 4. No time remained for [illegible] Condition 5. Sodium sulfide flow was at the [illegible] rate ("as is" basis) after rosterite.

Quality:

Conditions 2 and 4, as specified, gave material essentially equal in depth [illegible] examined, tinctorially equivalent to the N-3 [illegible] from 13487.

Condition 3 produced dark, yellow, [illegible] maroon, blue, dull tints. Color [illegible] during the periods when Na_2S was at the lower [illegible] was generally slightly lighter in [illegible].

DUP050067310

All samples were [illegible] versus standard.

[illegible] obtained. [illegible] in alkyd.

Wedge grit texture [illegible] greatly improved, ranging from 15 to [illegible] throughout most of the [illegible] Rating dropped to 14 late in the run after [illegible] had been shut down temporarily to make up additional tin crystals solution.

DUP050067311

Control: 13511, Condition 4

Plan: 6 hours 10,000 [illegible]

Condition 1 - As [illegible]
" 2 - As 1, but [illegible] to X-6 solution (1 lb./ 1.4-2)
" 3 - As 2, but [illegible] /bbl X-41
" 4 - As 2, but [illegible] /bbl X-41

Flow: See 13511, Condition 4-2

Data:

1. Control of chemicals [illegible] throughout [illegible]
2. Av pH after grinding [illegible]
3. Av pH after X-6 [illegible]
4. Calculations either [illegible] an excess of [illegible] was used, indicating [illegible], by the potameter. [illegible] an excess of [illegible] to batch manufacture.

Quality:

All fluoride-treated [illegible] light, blue and intense versus [illegible] increasing as the [illegible] increased. This was the first [illegible] material produced to date in pilot [illegible]. Shades were generally ok and [illegible] the blue, intense side of standard.

Complete evaluation of [illegible] of this series has not been [illegible], indications are that there is a definite [illegible] but not equalling standard.

Heat and humidity, and [illegible] evaluations are pending.

Texture ranged from [illegible] for standard). The [illegible] increasing sodium bifluoride in the [illegible].

DUP050067312

CODE: Y-436-D K# (B)
GOAL: 2432# SIZE: 7 Mol.
DIAZO VAT:
COUPLING VAT:
STRIKE VAT: 241,242,243,244,245,246,247
STD. HRS. NON-BLEEDING

APPROVED BY:
JHB. 5-11-49
HA: 5-16-49
CWO: 5-19-49
JK: 6-9-49

VAT	NAME: CHROME YELLOW LIGHT — INSTRUCTIONS	USE LBS.	N-CODE	ACCT. LBS.
PREP 1	1. WEIGH AND HOLD AT STRIKE VAT FOR STEP 22	14	3	14
	2. WEIGH AND HOLD AT VAT 351 OR 356 FOR STEP 15	70	71	70
	3. WEIGH AND HOLD AT VAT 351 OR 356 FOR STEP 16	185	108	185
	4. WEIGH AND HOLD AT STRIKE VAT FOR STEP 23	112	15	112
	5. WEIGH AND HOLD AT STRIKE VAT FOR STEP 45	112	479	112
	6. WEIGH AND HOLD AT VAT 357 FOR STEP 36	300	3	300
	7. WEIGH AND HOLD AT HOGSHEAD FOR STEP 28			
	M T %		27	123
	8. WEIGH AND HOLD AT HOGSHEAD FOR STEP 30	99	525	99
	9. WEIGH AND HOLD AT VAT 351 OR 356 FOR STEP 20.			
	M %		7	7.5
S.V. 2	10. RUN 33-37" (± 1750G.) WATER INTO STRIKE VAT.			
	11. RUN IN FROM SCALE TANK 354			
	FE M T %		41	2317
	FE M T %			
	12. ADJUST TO 75" (3750G.) AT 78-82°F.			
	13. ADJUST TO PH 4.7-4.9 WITH N-7 OR N-33.	+ —	7	+ 2
	RECORD: PH			
351 OR 356 3	14. RUN 10" (282G.) WATER INTO VAT 351 OR 356.			
	15. DUMP IN N-71 WEIGHED IN STEP 2.			
	16. DUMP IN N-108 WEIGHED IN STEP 3.			
	17. WEIGH INTO SCALE TANK 351 OR 356			
	M T %		10	736
	18. ADJUST TO 25" (705G.) AT 78-82°F.			
	19. ADJUST TO PH 8.9-9.1 WITH N-33 OR N-7.			
	RECORD: PH			
	20. POUR IN IN 2-3 MINUTES N-7 WEIGHED IN STEP 9.			
S.V. 4	21. STRIKE VAT 351 OR 356 AT 78-82°F INTO STRIKE VAT AT 78-82°F ON THE SURFACE IN 28-32 MINUTES.			
MISC. 5	22. DISSOLVE N-3 WEIGHED IN STEP 1, IN 15 GALLONS WATER AT 80-120°F IN DRUM AND HOLD AT STRIKE VAT FOR STEP 24.			
	23. DISSOLVE N-15, WEIGHED IN STEP 4, IN 45 GALLONS WATER AT 80-120°F IN WOOD BARREL AND HOLD AT STRIKE VAT FOR STEP 40.			
S.V. 6	24. WHEN STEP 21 STRIKE COMPLETED, AND BEFORE WASHING IN VAT 351 OR 356, POUR INTO STRIKE VAT N-3 PREPARED IN STEP 22.			
	25. WASH IN VAT 351 OR 356.			
	26. HEAT TO 180°F IN 80-100 MINUTES.			
	RECORD: TIME STARTED			
	RECORD: TOTAL MINUTES			
HOGSHEAD 7	27. RUN 50 GALLONS WATER INTO HOGSHEAD.			
	28. POUR IN N-27 WEIGHED IN STEP 7.			
	29. START LIGHTNIN AGITATOR.			
	30. SIFT IN IN 2-4 MINUTES N-525 WEIGHED IN STEP 8.			

CONTINUED ON PAGE 2.

VAT	PAGE: 2 CODE: Y-436-D LBS: 2432# INSTRUCTIONS	USE LBS.	N-CODE	ACCT. LBS.
	31. STIR 15 MINUTES OR LONGER TO DISSOLVE.			
	NOTE: IF N-525 DOES NOT DISSOLVE COMPLETELY, ADD SEVERAL ADDITIONAL POUNDS OF N-27		27	
	32. HOLD FOR STEP 46.			
351 8	33. WEIGH INTO SCALE TANK 351 AND HOLD FOR STEP 42. M T %		390	56
357 9	34. RUN 15" (108G.) INTO VAT 357.			
	35. TURN ON AGITATOR AND STEAM.			
	36. DUMP IN N-3 WEIGHED IN STEP 6.			
	37. HEAT TO 80-120°F.			
	38. STIR TO DISSOLVE.			
S.V. 10	39. WHEN STEP 26 HEATING COMPLETED, STIR STRIKE VAT 10 MINUTES AT 180°F.			
	40. RUN IT IN 4-5 MINUTES N-15 PREPARED IN STEP 23.			
	41. STIR 2 MINUTES.			
	42. RUN VAT 351 INTO STRIKE VAT IN 3-5 MINUTES.			
	43. RUN VAT 357 INTO STRIKE VAT IN 15-20 MINUTES: WATCH FOAM			
	44. STIR 5 MINUTES.			
	45. DUMP IN IN 2-3 MINUTES N-479 WEIGHED IN STEP 5.			
	46. RUN HOGSHEAD INTO STRIKE VAT IN 2-3 MINUTES.			
	47. STIR 5 MINUTES.			
	48. TEST AND RECORD: PH _____, NORMAL 4.9-5.1.			
	49. IF NECESSARY, ADJUST TO PH 5.2-5.5 WITH N-3 OR N-33. RECORD: PH _____.	± 10	3	± 10
	50 PRESS WITH AGITATION.			
	TIME START _____ TIME FIN _____ OPTR _____			
	" " " " "			
	" " " " "			

DUP050067314

K13

CODE: Y-436-D GOAL: 2432#

PROCESS: (B) DATE: HA: 5-16-49

MAKING AREA NOTES JK: 6-8-49

EST. LOSS LBS.

REMARKS

PRESSING AREA INSTRUCTIONS

VAT

DATE

TIME

RELEASED BY

PRESS NO. 2

NO. OF CAKES 30

PRESS WITH AGITATION

WASH TO 2000 OHMS

MAKE FIRST TEST AFTER 4 HRS.

LOAD ON 4 CARS.

SPECIAL INSTRUCTIONS NON-BLEEDING.

SAMPLES

DELIVER TO

PRESSING AREA NOTES

DESCRIBE YOUR YIELD

RECOVERY CONDITIONS

EST. LOSS LBS.

CAKES USED

HOURS WASHED OHMS

DRYER CARS ACTUAL : OR PULP CONTAINERS

NOTES ON SPECIAL INSTRUCTIONS

SAMPLED BY

RELEASED BY

DRYING AREA INSTRUCTIONS

TYPE	L.V.	H.V.	HURRICANE
HOURS	45	30	45
TEMP.	160	160	160

LUMP CONTAINER SEE CHART.

SPECIAL INSTRUCTIONS NON-BLEEDING.

SAMPLES

DELIVER TO

DRYING AREA NOTES

LUMP — OK — WET — SALTS — CONTAMINATED WITH

REMARKS

NO. DRYER CARS PULLED

LUMP WEIGHT

EST. LOSS LBS.

SAMPLED BY

RELEASED BY

GRINDING AREA INSTRUCTIONS

GRINDER NO. 10 H.S.P.

SPECIAL INSTRUCTIONS NON-BLEEDING.

SAMPLES 2 ENVELOPES & ONE 8 OZ BOTTLE.

DELIVER TO CONTROL LABORATORY.

DO NOT MIX BEFORE SAMPLING

PACKAGING SEE CHART.

GRINDING AREA NOTES

LUMP — OK — WET — SALTS — CONTAMINATED WITH

REMARKS

EST. LOSS LBS.

REMARKS

SAMPLED BY

DATE MIXED

QUALITY REMARKS

LUMP WEIGHT CHECK

DUP050067315

K-13695

LUMP WEIGHT

GROSS	CONTAINER USED	TARE	NET	# OF CARS PULLED BY	GROSS	CONTAINER USED	TARE	NET	# OF CARS PULLED BY
TOTAL					TOTAL				

OPERATION	INITIAL	DATE
NCR TRANSCRIPTION		
AUDIT		
CLEAR SCHEDULING		
CLEAR S.O. FILE		

DUP050067316

GLOSSARY OF RAW MATERIAL "N" CODES

N-3 - Soda Ash

N-7 - Caustic Soda

N-10 - Chromate of Soda Liquor

N-15 - Aluminum Sulfate

N-27 - Sulfuric Acid

N-33 - Nitric Acid, Weak

N-41 - Lead Nitrate Liquor

N-71 - Salt

N-91 - Silicate of Soda

N-108 - Anhydrous Sodium Sulfate

N-390 - "L" Liquor

N-479 - Sodium Tetra Pyro Phosphate

N-525 - Zinc Oxide

DUP050067317

CODE: Y-525-D K# (B)
GOAL: 2421# SIZE: 7 Mol.
DIAZO VAT:
COUPLING VAT:
STRIKE VAT: 241,242,243,244,245,246,247
STD. HRS. NON-BLEEDING

APPROVED BY:
JHB: 5-11-49
HA: 5-17-49
CWO: 5-19-49
RAL: 5-20-49
JES: 6-2-49

VAT	NAME: CHROME YELLOW LIGHT — INSTRUCTIONS	USE LBS.	N-CODE	ACCT. LBS
PREP 1	1. WEIGH AND HOLD AT STRIKE VAT FOR STEP 20	14	3	14
	2. WEIGH AND HOLD AT VAT 351 OR 356 FOR STEP 14	70	71	70
	3. WEIGH AND HOLD AT VAT 351 OR 356 FOR STEP 15	266	108	266
	4. WEIGH AND HOLD AT STRIKE VAT FOR STEP 21	112	15	112
	5. WEIGH AND HOLD AT STRIKE VAT FOR STEP 43	112	479	112
	6. WEIGH AND HOLD AT VAT 357 FOR STEP 34	300	3	300
	7. WEIGH AND HOLD AT HOGSHEAD FOR STEP 26 M T %		27	123
	8. WEIGH AND HOLD AT HOGSHEAD FOR STEP 28	99	525	99
S.V. 2	9. RUN 33"-37" (+ 1750G.) WATER INTO STRIKE VAT.			
	10. RUN IN FROM SCALE TANK 354			
	Fe M T %		41	2317
	Fe M T %			
	11. ADJUST TO 75" (3750G.) AT 78-82°F.			
	12. ADJUST TO pH 4.7-4.9 WITH N-7 OR N-33.	±	7	±
	RECORD: pH			
351 OR 356 3	13. RUN 10" (282G.) WATER INTO VAT 351 OR 356.			
	14. DUMP IN N-71 WEIGHED IN STEP 2.			
	15. DUMP IN N-108 WEIGHED IN STEP 3.			
	16. WEIGH INTO SCALE TANK 351 OR 356 M T %		10	650
	17. ADJUST TO 25" (705G.) AT 78-82°F.			
	18. ADJUST TO pH 8.2-8.4 WITH N-33 OR N-7		33	± 1
	RECORD: pH			
S.V. 4	19. STRIKE VAT 351 OR 356 AT 78-82°F INTO STRIKE VAT AT 78-82°F ON THE SURFACE IN 28-32 MINUTES.			
MISC. 5	20. DISSOLVE N-3, WEIGHED IN STEP 1, IN 15 GALLONS WATER AT 80-120°F IN DRUM AND HOLD AT STRIKE VAT FOR STEP 22.			
	21. DISSOLVE N-15, WEIGHED IN STEP 4, IN 45 GALLONS WATER AT 80-120°F IN WOOD BARREL AND HOLD AT STRIKE VAT FOR STEP 38.			
S.V. 6	22. WHEN STEP 21 STRIKE COMPLETED, AND BEFORE WASHING IN VAT 351 OR 356, POUR INTO STRIKE VAT N-3 PREPARED IN STEP 20.			
	23. WASH IN VAT 351 OR 356.			
	24. HEAT TO 205°F IN 80-100 MINUTES.			
	RECORD: TIME STARTED			
	RECORD: TOTAL MINUTES			
HOGSHEAD 7	25. RUN 50 GALLONS WATER INTO HOGSHEAD.			
	26. POUR IN N-27 WEIGHED IN STEP 7.			
	27. START LIGHTNIN AGITATOR.			
	28. SIFT IN IN 2-4 MINUTES N-525 WEIGHED IN STEP 8.			
	29. STIR 15 MINUTES OR LONGER TO DISSOLVE.			
	NOTE: IF N-525 DOES NOT DISSOLVE COMPLETELY, ADD SEVERAL ADDITIONAL POUNDS OF N-27		27	

CONTINUED ON PAGE 2.

DUP050067318

VAT	PAGE: 2 CODE: Y-525-D LBS: 2421# INSTRUCTIONS	USE LBS.	N-CODE	ACCT. LBS.
	30. HOLD FOR STEP 44.			
351 8	31. WEIGH INTO SCALE TANK 351 AND HOLD FOR STEP 40 M T %		390	56.
357 9	32. RUN 15" (108G.) INTO VAT 357. 33. TURN ON AGITATOR AND STEAM. 34. DUMP IN N-3 WEIGHED IN STEP 6. 35. HEAT TO 80-120°F. 36. STIR TO DISSOLVE.			
S.V. 10	37. WHEN STEP 24 HEATING COMPLETED, STIR STRIKE VAT 10 MINUTES AT 205°F. 38. RUN IN IN 4-5 MINUTES N-15 PREPARED IN STEP 21. 39. STIR 2 MINUTES. 40. RUN VAT 351 INTO STRIKE VAT IN 3-5 MINUTES. 41. RUN VAT 357 INTO STRIKE VAT IN 15-20 MINUTES: WATCH FOAM. 42. STIR 5 MINUTES. 43. DUMP IN IN 2-3 MINUTES N-479 WEIGHED IN STEP 5. 44. RUN HOGSHEAD INTO STRIKE VAT IN 2-3 MINUTES. 45. STIR 5 MINUTES. 46. TEST AND RECORD: pH _____, NORMAL 4.9-5.1. 47. IF NECESSARY, ADJUST TO pH 5.2-5.5 WITH N-3 OR N-33 RECORD: pH _____.	± 10	3	± 10
	48. PRESS WITH AGITATION .			
	TIME START _____ TIME FIN _____ OPTR _____ " " _____ " " _____ " _____ " " _____ " " _____ " _____			

DUP050067319

K1369

CODE: Y-525-D GOAL: 2421#

PROCESS: (B) DATE: HA: 5-17-49

MAKING AREA NOTES JK: 6-8-49

EST. LOSS LBS.

REMARKS

PRESSING AREA INSTRUCTIONS

VAT

DATE

TIME

RELEASED BY

PRESS NO. 2

NO. OF CAKES 30

PRESS WITH AGITATION

WASH TO 2000 OHMS

MAKE FIRST TEST AFTER 4 HRS.

LOAD ON 4 CARS.

SPECIAL INSTRUCTIONS NON-BLEEDING.

SAMPLES

DELIVER TO

PRESSING AREA NOTES

DESCRIBE YOUR YIELD

RECOVERY CONDITIONS

EST. LOSS LBS.

CAKES USED

HOURS WASHED OHMS

DRYER CARS ACTUAL OR PULP CONTAINERS

NOTES ON SPECIAL INSTRUCTIONS

SAMPLED BY

RELEASED BY

DRYING AREA INSTRUCTIONS

TYPE	L.V.	H.V.	HURRICANE
HOURS	45	30	45
TEMP.	160	160	160

LUMP CONTAINER SEE CHART.

SPECIAL INSTRUCTIONS NON-BLEEDING.

SAMPLES

DELIVER TO

DRYING AREA NOTES

LUMP — OK — WET — SALTS — CONTAMINATED WITH

REMARKS

NO. DRYER CARS PULLED

LUMP WEIGHT

EST. LOSS LBS.

SAMPLED BY

RELEASED BY

GRINDING AREA INSTRUCTIONS

GRINDER NO. 10 H.S.P.

SPECIAL INSTRUCTIONS NON-BLEEDING.

SAMPLES 2 ENVELOPES & ONE 8 OZ BOTTLE.

DELIVER TO CONTROL LABORATORY.

DO NOT MIX BEFORE SAMPLING

PACKAGING SEE CHART.

GRINDING AREA NOTES

LUMP — OK — WET — SALTS — CONTAMINATED WITH

REMARKS

EST. LOSS LBS.

REMARKS

SAMPLED BY

DATE MIXED

QUALITY REMARKS

LUMP WEIGHT CHECK

DUP050067320

K-13695

LUMP WEIGHT

GROSS	CONTAINER USED	TARE	NET	# OF CARS PULLED BY	GROSS	CONTAINER USED	TARE	NET	# OF CARS PULLED BY
TOTAL					TOTAL				

OPERATION	INITIAL	DATE
NCR TRANSCRIPTION		
AUDIT		
CLEAR SCHEDULING		
CLEAR S. O. FILE		

DUP050067321

CODE: Y-528-D K# (C)
GOAL: 2499# SIZE: 7 MOL.
DIAZO VAT:
COUPLING VAT:
STRIKE VAT: 241,242,243,244,245,246,247
STD. HRS. NON-BLEEDING

APPROVED BY:
JHB: 5-11-49
HA: 5-18-49
CWO: 5-19-49
RAL: 5-27-49
JK. 6-9-49

VAT	NAME: CHROME YELLOW MEDIUM — INSTRUCTIONS	USE LBS.	N-CODE	ACCT. LBS
358 1	1. PUMP INTO VAT 358 FROM SCALE TANK 354			
	FE M T %		41	2317
	FE M T %		41	
	2. ADJUST TO 100" (4730G.) AT 68-72°F.			
	3. ADJUST TO pH 3.2-3.3 WITH N-7 OR N-33.		33	
	RECORD: pH .			
351 OR 356 2	4. WEIGH INTO SCALE TANK 351 OR 356			
	M T %		10	1047
S.V. 3	5. RUN 4-6" (+ 249G.) WATER INTO STRIKE VAT.			
	6. RUN SCALE TANK 351 OR 356 INTO STRIKE VAT.			
	7. ADJUST TO 30" (1494G.) AT 68-72°F.			
	8. ADJUST TO pH 8.9-9.1 WITH N-7 OR N-33		7	
	RECORD: pH .			
	9. STRIKE VAT 358 AT 68-72°F INTO STRIKE VAT AT 68-72°F			
	ON THE SURFACE IN 28-32 MINUTES.			
	RECORD: TIME STARTED .			
	RECORD: TOTAL MINUTES .			
	10. TURN ON STEAM.			
	11. TEST AND RECORD: pH , NORMAL 6.1-6.4.			
	12. TEST AND RECORD: CHROME EXCESS , MUST BE +.			
	13. IF EXTRA N-10 ADDED, RETEST AND RECORD: pH .			
	14. ADJUST TO pH 5.9-6.0 WITH N-7 OR N-33.			
	RECORD: pH .			
	15. HEAT TO 178-182°F IN 120-130 MINUTES.			
	RECORD: TIME STARTED .			
	RECORD: TOTAL MINUTES .			
Misc. 4	16. WEIGH, DILUTE TO 40 GALLONS IN DRUM AND HOLD AT STRIKE			
	VAT FOR STEP 17 M %		7	42
S.V. 5	17. WHEN STEP 15 HEATING COMPLETED, SYPHON IN IN 2-3 MINUTES			
	N-7 PREPARED IN STEP 16.			
	18. STIR 10 MINUTES.			
	19. FLOOD TO 153" (7619G.).			
	20. DRAW 2 WATERS AT 4 HOUR INTERVALS.			
	DO STEPS 21-35 STARTING ABOUT 1 HOUR BEFORE DRAWING LAST WATER.			
345 6	21. STIR VAT 345 FOR 3-5 MINUTES.			
351 7	22. WEIGH INTO SCALE TANK 351 M T %		390	28
357 8	23. RUN 11" (80G.) WATER INTO VAT 357.			
	24. TURN ON AGITATOR AND STEAM.			
	25. WEIGH AND DUMP IN	104	15	104
	26. HEAT TO 80-120°F.			
	27. STIR TO DISSOLVE.			

CONTINUED ON PAGE 2.

DUP050067322

VAT	PAGE: 2 CODE: Y-528-D LBS: 2499# INSTRUCTIONS	USE LBS.	N-CODE	ACCT. LBS.
OGSHEAD 9	28. RUN 50 G. WATER INTO HOGSHEAD.			
	29. WEIGH AND POUR IN M T %		27	123
	30. START LIGHTNIN AGITATOR.			
	31. WEIGH AND SIFT IN IN 2-4 MINUTES	99	525	99
	32. STIR 15 MINUTES OR LONGER TO DISSOLVE.			
	NOTE: IF N-525 DOES NOT DISSOLVE COMPLETELY,			
	ADD SEVERAL POUNDS OF N-27		27	
MISC. 10	33. WEIGH, DILUTE WITH 50 GALLONS WATER IN DRUM, AND			
	HOLD AT STRIKE VAT FOR STEP 43	56	91	56
	34. WEIGH AND HOLD AT STRIKE VAT FOR STEP 48	112	479	112
	35. WEIGH AND HOLD AT VAT 357 FOR STEP 40	125	3	125
S.V. 11	36. AFTER LAST WATER DRAWN, RUN VAT 357 INTO STRIKE VAT IN			
	3-5 MINUTES.			
	37. STIR 3 MINUTES.			
357 12	38. RUN 11" (80G.) WATER INTO VAT 357.			
	39. TURN ON AGITATOR AND STEAM.			
	40. DUMP IN N-3 WEIGHED IN STEP 35.			
	41. HEAT TO 80-120°F.			
	42. STIR TO DISSOLVE.			
S.V 13	43. WHEN STEP 37 STIR COMPLETED, ADD TO STRIKE VAT IN 1-2			
	MINUTES N-91 PREPARED IN STEP 33.			
	44. STIR 3 MINUTES.			
	45. RUN SCALE TANK 351 INTO STRIKE VAT IN 3-5 MINUTES.			
	46. RUN VAT 357 INTO STRIKE VAT IN 4-5 MINUTES.			
	47. STIR 5 MINUTES.			
	48. SIFT IN IN 2-3 MINUTES N-479 WEIGHED IN STEP 34.			
	49. RUN HOGSHEAD INTO STRIKE VAT IN 2-3 MINUTES.			
	50. STIR 5 MINUTES.			
	51. TEST AND RECORD: pH _____, NORMAL 5.1-5.5.			
	52. IF NECESSARY, ADJUST TO pH 5.1-5.5 WITH N-3 OR N-33.			
	RECORD: pH _____.			
	53. PRESS WITH AGITATION.			
	TIME START TIME FIN OPTR			
	" " " " "			
	" " " " "			

DRAW TO	FLOOR TO	HOUR	DATE	OPER.	REMARKS
X	153				
	153				
	X				DRAW
X	X				TREAT
X	X				PRESS WITH AGITATION.

DUP050067323

K1361

CODE: Y-528-D GOAL: 2499#
PROCESS: (C) DATE: HA: 5-18-49

MAKING AREA NOTES JK: 6-8-49

EST. LOSS LBS.
REMARKS

PRESSING AREA INSTRUCTIONS

VAT		
DATE		
TIME		
RELEASED BY		
PRESS NO.	17	18
NO. OF CAKES	95	95
PRESS WITH	AGITATION	
WASH TO	-	OHMS
MAKE FIRST TEST AFTER	-	HRS.
LOAD ON	3 CARS.	
SPECIAL INSTRUCTIONS	NON-BLEEDING.	

SAMPLES
DELIVER TO

PRESSING AREA NOTES

DESCRIBE YOUR YIELD
RECOVERY CONDITIONS

EST. LOSS LBS.
CAKES USED

HOURS WASHED OHMS

DRYER CARS ACTUAL OR PULP CONTAINERS
NOTES ON SPECIAL INSTRUCTIONS

SAMPLED BY
RELEASED BY

DRYING AREA INSTRUCTIONS

TYPE	L.V.	H.V.	HURRICANE
HOURS	17	11	
TEMP.	220	220	

LUMP CONTAINER SEE CHART.
SPECIAL INSTRUCTIONS NON-BLEEDING.

SAMPLES
DELIVER TO

DRYING AREA NOTES

LUMP — OK — WET — SALTS — CONTAMINATED WITH
REMARKS

NO. DRYER CARS PULLED
LUMP WEIGHT
EST. LOSS LBS.
SAMPLED BY
RELEASED BY

GRINDING AREA INSTRUCTIONS

GRINDER NO. 10 H.S.P.
SPECIAL INSTRUCTIONS NON-BLEEDING.

SAMPLES 3 ENVELOPES & ONE 8 OZ BOTTLE.

DELIVER TO CONTROL LABORATORY.
DO NOT MIX BEFORE SAMPLING

PACKAGING SEE CHART.

GRINDING AREA NOTES

LUMP — OK — WET — SALTS — CONTAMINATED WITH
REMARKS
EST. LOSS LBS.
REMARKS

SAMPLED BY
DATE MIXED

QUALITY REMARKS

LUMP WEIGHT CHECK

DUP050067324

K-13695

LUMP WEIGHT

GROSS	CONTAINER USED	TARE	NET	# OF CARS PULLED BY	GROSS	CONTAINER USED	TARE	NET	# OF CARS PULLED BY
TOTAL					TOTAL				

OPERATION	INITIAL	DATE
NCR TRANSCRIPTION		
AUDIT		
CLEAR SCHEDULING		
CLEAR S. O. FILE		

DUP050067325

Y-528-E (C)

STANDARD FORMULA NOTES

The "C" process replaces the previous standard formula, Y-528-D (B) and differs as follows:

1. Tetra sodium pyrophosphate (E-479) and zinc sulfate of Newark manufacture are added in succession to the chrome vat following the soda ash and prior to final pH adjustment.

2. Pressing is carried out with agitation in order to secure maximum effectiveness of the treatment.

3. The goal yield has been increased 5.4% as a result of the probable formation of zinc pyrophosphate during the treatment. The two batches made by this process to date averaged 2480 lbs. lump.

No additional variable studies have been made. The principal effects of the zinc sulfate-sodium pyrophosphate treatment observed in both brushout coatings and beater dyeings, are greatly improved lightfastness, slightly increased strength, and greener, more intense masstones and tints.

Lot 90512, a blend of plant batches 65748 and 65901, has been submitted to Sales Service for approval as the new standard.

Following are the calculated composition and goal yield:

CALCULATED COMPOSITION			GOAL YIELD
Lead Chromate	2262#	91.1%	2499# "as is"
Inorganic Treating Agents	211	8.9	2473# anhydrous
	2473#	100.0%	Moisture: 1.08%
			Reference: N.B. 951-135.

Additional information and variables can be obtained by referring to the Y-528-D (B) formula notes.

Signed J. H. Baird
J. H. BAIRD

Approved J. O. MORRISON

H. ARNOUL - 5/18/49

JHB:CC

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