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NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT

Final Report

Title: RT-565-D; B.O.N. Red Light (2B Acid → BON, Mn) Laboratory and Plant Development.

Period Covered: October 1946 to April 1948

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Title: RT-565-D; B.O.N. RED LIGHT (2B ACID → BON, Mn)
LABORATORY AND PLANT DEVELOPMENT

Period Covered: OCTOBER 1946 to APRIL 1948

Charge: A-IC-240

SUBMITTED BY: F. S. Klein F. S. KLEIN DATE SUBMITTED: 10-1-48

APPROVED BY: A. A. Brizzolara 11/17/48 A. A. BRIZZOLARA DATE ISSUED: 11-18-48

I. INTRODUCTION

In the automotive and refinishing fields there was a definite need for a non-bleeding organic red pigment of satisfactory durability and with a shade intermediate between Molybdate Orange and Red Toner RT-525-D. A lead which yielded a pigment having the above qualities was uncovered in the course of the direct laking studies on the RT-525-D (Mn Red 2B) process. This experimental Red Toner was labeled K-2208.

At the request of Sales, three semi-works batches were made for the purpose of trade sampling. The automotive trade showed a real interest in this type of pigment and Sales decided to include K-2208 in our line of non-bleeding reds and maroons.

A variable study was run in the laboratory and in the semi-works and on the basis of these results, plant development was undertaken. The result is our present product RT-565-D; BON Red Light.

II. SUMMARY AND CONCLUSIONS

K-2208 was prepared by coupling "Lithosol" Red 2B Acid and beta-oxy-naphthoic acid (dissolved in 3 parts caustic and 4 parts soda ash) in the presence of manganese sulfate. Development at the boil followed.

In the laboratory the K-2208 process was not a duplicable procedure so the manganese sulfate was taken from the coupling and added later as in the regular strike procedure. This plus strike at the boil made for a more duplicable process and was coded K-2438.

The K-2438 process was taken into the semi-works where a short variable study comprising five batches was run. The variables were as follows:-

1. Lot 9069 - As K-2438.
2. Lot 9072 - As K-2438.
3. Lot 9111 - As K-2438 but development at 200°F instead of boil to keep down foaming.
4. Lot 9112 - As K-2438 but a 25% decrease in caustic.
5. Lot 9113 - As K-2438 but a 25% increase in caustic.

Lot 9072 was set up as a tentative standard. Lots 9069, 9072, 9111, and 9112 were all ok - lot 9112 having the lightest masstone. Lot 9113 was too dark in masstone to be of great interest.

From the semi-works RT-565-D (K-2438) was taken to the plant where eight batches were made. The first four were prepared exactly as K-2438. Three were darker in masstone and all were weaker than lot 9072 by rubout. In alkyd all were lighter and approximately equal in strength to lot 9072. Two mixes were made of the four lots but no standard was set up because the mixes were apparently contaminated - a white overstripe bleed appeared in alkyd enamel.

A variable study was run on the second set of four batches as follows:-

1. Lot 50554 - 10% decrease in soda ash.
2. Lots 50878, 51023, and 51354 - 20% decrease in soda ash.

All four batches were acceptable.

The last batch, lot 51354, was set up as standard and the present standard formula RT-565-D (S) was adopted.

III. DISCUSSION

The following additional variables were studied on RT-565-D in the laboratory:-

1. No manganese in coupling - better duplicability.
2. Soda ash substituted for caustic in dissolving BON - lighter masstone but more foaming.
3. Temperature of coupling - 0 to 30°C. most desirable.
4. Coupling time - little effect.
5. Para Soap in coupling - dark masstone and blue tint.
6. Temperature of strike - strike at boil most desirable.
7. Reverse strike - light masstone when struck at approximately 45°C. but no advantage over regular strike.
8. Development temperature - 45 to 100°C all appeared ok in the laboratory but it is believed that development at the boil is most easily duplicated.

9. Development time - little effect but 30 minutes at boil seems most duplicable.

10. Red 2B struck with manganese - good results.

11. Raw material tests - the lots of Red 2B Acid all appear ok.

12. Drying study - 140°F. most desirable.

13. Baking study of alkyds and rubouts - change to darker and bluer products occurred during baking at 180°F but products reverted to original shade upon exposure to atmosphere.

14. Vinyl testing - very good dispersion in vinyls.

IV. PATENT SITUATION

This process is covered by U.S. Patent 2,225,665.

V. EXPERIMENTAL DETAILS

Notebook 1240 - Experiments: 3-13, 15, 19-21, 25, 26-29, 35-40, 42, 45

VI. REFERENCES

1) Letter of J.H.Cooper to D.H.Dawson on 10-23-45.

2) Notebooks 1097-54 and 1098-56A (Earliest samples of K-2208).

3) SW Trial - Lot 8439 (made previous to work recorded in this report).

4) Memo of A.D.Mills on 10-25-45.

5) Memo of J.H.McMillan on 9-27-46.

U.S. Pat. 2,225,665

Cost Group - 36

CODE: RT-565-D K# (B)
GOAL: 899 SIZE: 1.5 Mol
DIAZO VAT: 315,323
COUPLING VAT: 100,105,106,107
STRIKE VAT:
(2734) NON-BLEEDING

APPROVED BY:
GL: 7-1-48
HA: 7-11-48
ET: 7-22-48
FSK: 7-16-48
EPAM: 8-2-48

VAT	NAME: BON RED LIGHT — INSTRUCTIONS	USE LBS.	N-CODE	ACCT. LB
PREP 1.	1. OBTAIN AND HOLD AT SCALE FOR USE IN DIAZO VAT IN STEP 5		467	
D.V. 2.	2. RUN 24" (803G) WATER INTO DIAZO VAT _____.			
	3. WEIGH IN DRUM AND POUR IN M _____ %	_____	7	64
	4. TURN ON AGITATOR AND STEAM.			
	5. WEIGH AND SHOVEL IN IN 5-10 MINUTES OBTAINED IN STEP 1.		467	332
	FROM _____ #NET LOT _____ %	_____	467	
	FROM _____ #NET LOT _____ %	_____	467	
	FROM _____ #NET LOT _____ %	_____	467	
	FROM _____ #NET LOT _____ %	_____	467	
	FROM _____ #NET LOT _____ %	_____	467	
	6. HEAT TO 95-100°F.			
	7. STIR 10 MINUTES TO DISSOLVE.			
	8. TEST AND RECORD: B.Y. _____, MUST BE +.			
	9. IF N-467 DOES NOT COMPLETELY DISSOLVE, RAISE TEMPERATURE IN 5° STEPS TO A MAXIMUM OF 120°F.			
	10. STIR 5 MINUTES.			
	11. TAKE 1 QUART SAMPLE FOR ANALYSIS.			
	12. STOP AGITATOR.			
	13. CHECK AND RECORD: _____, NORMAL 29" (983G).			
	14. CHECK AND RECORD: _____°F.			
	15. DELIVER SAMPLE TO LABORATORY.			
Misc. 3.	16. OBTAIN AND HOLD AT SCALE FOR USE IN VAT 313 IN STEP 21		82	
	17. WEIGH AND HOLD AT VAT 313 FOR STEP 23	192	3	192
313 4.	18. RUN 20" (300G) WATER INTO VAT 313.			
	19. WEIGH IN DRUM AND POUR IN M _____ %	_____	7	200
	20. TURN ON AGITATOR AND STEAM.			
	21. WEIGH AND ADD IN 3-10 MINUTES OBTAINED IN STEP 16.	300	82	300
	22. HEAT TO 130-140°F.			
	23. DUMP IN N3 WEIGHED IN STEP 17.			
	24. STIR 10 MINUTES OR LONGER TO DISSOLVE.			
C.V. 5.	25. INSTALL CHART IN TEMPERATURE RECORDER ON COUPLING VAT.			
	26. WHEN STEP 24 STIRRING COMPLETED RUN VAT 313 INTO COUPLING VAT.			
	27. ADJUST TO 14" (1344G) AT 65-75°F	_____	57	± 900
Misc 6.	28. WEIGH, DISSOLVE IN 30 GALLONS WATER IN DRUM, AND HOLD AT DIAZO VAT FOR STEP 33	107	5	107
	REPORT TO GROUP SUPERVISOR FOR CALCULATIONS BASED ON ANALYTICAL RESULTS.			
	"= _____ GAL. X _____ #/GAL. = _____ # N-467.			

CONTINUED ON PAGE 2.

VAT	PAGE 2 CODE: RT-565-D LBS: 899 INSTRUCTIONS	USE LBS.	N-CODE	ACCT. LBS
D.V. 7.	29. IF NECESSARY, ADJUST DIAZO VAT BASED ON ANALYTICAL RESULTS BY ADDING FROM _____ #NET LOT _____ %	_____	467	
	OR			
	REMOVING _____ GALLONS.			
	30. IF N-467 IS ADDED, STIR 10 MINUTES TO DISSOLVE.			
MISC. 8.	31. WEIGH IN DRUMS AND HOLD AT DIAZO VAT FOR STEP 35 M _____ T _____ %	_____	28	158
D.V. 9.	32. ADJUST DIAZO VAT TO 44" (1501G) AT 32-36°F.	_____	57	± 4050
	33. POUR IN N-5 PREPARED IN STEP 28			
	34. STIR 3-5 MINUTES.			
	35. POUR IN AS QUICKLY AS POSSIBLE N-28 WEIGHED IN STEP 31.			
	36. STIR 2 MINUTES AT 32-36°F.			
	37. TEST AND RECORD: KI TEST _____, MUST BE + KI TEST.			
C.V. 10.	38. COUPLE DIAZO VAT INTO COUPLING VAT AT 65-75°F UNDER THE SURFACE THROUGH THE DISTRIBUTOR IN 20-30 MINUTES, MAINTAIN COUPLING VAT AT 65-75°F DURING COUPLING.			
	RECORD: TIME STARTED _____.			
	RECORD: TOTAL MINUTES _____.			
	39. STIR 10 MINUTES.			
	40. TEST AND RECORD: BON _____, MUST BE +.			
	41. TEST AND RECORD: DIAZO _____, MUST BE -.			
	42. TEST AND RECORD: pH _____, NORMAL 10.6-11.2.			
	43. HEAT TO BOIL IN 50-60 MINUTES.			
	44. CHECK ACCURACY OF RECORDER.			
	LOW: THERMOMETER _____ RECORDER _____.			
	HIGH: THERMOMETER _____ RECORDER _____.			
321 11.	45. WHILE HEATING STEP 43 RUN 35" (595G) WATER INTO VAT 321.			
	46. WEIGH AND DUMP IN	507	336	507
	47. ADJUST TO 65-75°F.			
	48. STIR 5 MINUTES OR LONGER TO DISSOLVE.			
C.V. 12.	49. WHEN STEP 43 HEATING COMPLETED STRIKE VAT 321 INTO COUPLING VAT AT BOIL ON THE SURFACE IN 9-11 MINUTES, MAINTAIN COUPLING VAT AT BOIL DURING STRIKE.			
	50. STIR 30 MINUTES AT BOIL.			
	51. FLOOD TO 52" (4940G).			
	52. CHECK AND RECORD: _____ °F.			
	53. PRESS WITHOUT AGITATION.			
	TIME START _____ TIME FIN _____ OPTR _____			
	" " _____ " " _____ " _____			
	" " _____ " " _____ " _____			

RP-565-D (B)

The "B" process replaces the previous standard formula K-2438 and differs as follows:

1. The process has been established on a stepwise basis.

2. The dilute volumes have been increased to those used in RP-428-D (B) since the K-2438 volumes were too concentrated and impractical.

3. The ratio of caustic to soda ash, 180#: 240#, has been changed to 200#: 192# respectively. The latter ratio was used in the manufacture of standard, lot 51354.

4. Because of steam limitation it was necessary to increase the heat development from 15-20 to 50-60 minutes.

5. Since an increase in caustic and a decrease in soda ash for dissolving 2.0.M. results in a bluer product and a decrease in caustic and an increase in soda ash results in a yellower product, the following table may serve for variations when required:

Ast. Caustic	=	Ast. Soda Ash
170 lbs.	=	232 lbs.
180 lbs.	=	218 lbs.
190 lbs.	=	205 lbs.
200 lbs.	=	192 lbs. (Ratio used in standard)
210 lbs.	=	179 lbs.
220 lbs.	=	166 lbs.

An further increase in soda ash may result in undesirable foaming.

And further increase in caustic may result in undesirable blueness.

Light mastone RP-565-D can be shaded with RP-525-D. However, the reverse is not recommended because RP565-D is somewhat inferior in general properties.

The following calculated composition and goal yield have been established for this formula:

CALCULATED COMPOSITION

Im Toner of Red 2B	79%
Hydrous Manganese Oxide	21%

GOAL YIELD

"as is"	899.4#
Anhydrous	859 #
Moisture:	4.5%
Reference:	N.B. 1240-45.

Additional information and variables can be obtained by referring to the K-2438 formula.

Signed F. S. Klein F. S. KLEIN - 11/4/48

FSK:CC

Approved A.A. Breitzolarn - 10/4/48