KN-70-2 PRIMROSE SHADE "KROLOR" YELLOW KY-790-D PROGRESS REPORT By: J. Jackson 9/19/66 - 3/69

1/79 (2)

(11) R. W. Dietz 7/24/81

Extra

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NEWARK, NEW JERSEY

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KN-70-2 #15

NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT

PRIMROSE SHADE "KROLOR" YELLOW KY-790-D PROGRESS REPORT

Period Covered September 19, 1966 - March, 1969 (Part Time)

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NEWARK PLANT

PIGMENT COLORS RESEARCH REPORT

SUBJECT: PRIMROSE SHADE "KROLOR" YELLOW KY-790-D PROGRESS REPORT

PERIOD COVERED: SEPTEMBER 19, 1966 - March, 1969 (Part Time)

SUBMITTED BY: J. JACKSON **DATE SUBMITTED:** 12/15/69

APPROVED BY: W. S. STRUVE **DATE RELEASED:** 1/30/70

ABSTRACT

This report summarizes attempts to produce a primrose-shade "Krolor". The product submitted after Semi-Works development was not considered adequate to compete with cadmium pigments of the same shade range.

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I. INTRODUCTION

The desirability of offering a complete line of color possibilities in any type of pigment is obvious. Sales requested that we develop a primrose addition to the "Krolor" line.

At the same time the project was active, utility in the plastics trade was the major objective. Sales experience with other "Krolors" indicates that broader applications would develop for a suitable product.

II. SUMMARY AND CONCLUSIONS

1. No product completely satisfactory in color, abrasion resistance, and thermal stability was developed during these studies. All samples submitted to Sales were criticized for one or more of these properties.

2. The shortage of equipment for manufacturing chrome yellow and "Krolors"coupled with the urgent nature of other studies, reduced the priority on this work to a low level.

3. Recent price increases and shortages of cadmium yellows and contemplated increase in yellow capacity may have changed these conclusions. Such a decision would have to be made by Sales in consultation with Research and Production.

4. The problem of the variation of Y-758-D batches in their receptivity for SiO_2 has not been resolved and would require a solution before premises 1 and 2 could be seriously studied. As discussed in the report, this could not be tied to soluble salt content or degree of washing.

III. RECOMMENDATIONS FOR FUTURE WORK

1. If the decision is reached to reopen this work, a Semi-Works run of the 00280 type extended with Dow's Polystyrene should be made. Products of this general type passed the Research abrasion tests but failed Chestnut Run's Banbury Mixer tests. No such experience was found with other "Krolors".

2. If the above is unsatisfactory, treatment of a "Krolor"-like 00280 with 10% Paraplex G54 as per 1877-54F should be considered.

3. The possible development of a new primrose base in #12 Building which lends itself to the product of more thermally stable KY-790-D is worthy of consideration. Ref. 1877-39 (NC68-24 copy attached.)

IV. PATENT STATUS

In the writer's opinion, nothing of a patentable nature was developed during these studies.

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V. EXPERIMENTAL - LABORATORY STUDIES

The manufacture of a primrose-shade "Krolor" has not yet been resolved.

Several problems were determined to be quite serious very early in the study.

1. Greater sensitivity of the base material to pH variations than other chrome yellows or molybdate oranges making it difficult to maintain a primrose-shade "Krolor" pigment.

2. Smaller particle size material (greater surface area) probably contributes to this difficulty.

3. Widely differing results in thermal and chemical stability resulting from application of a given amount of SiO_2 to the pigment surface of various primrose yellow lots of Y-758-D which were considered to be standard in color characteristics.

4. Need for partly washed, dried, and "baked" primrose base for maximum thermal stability.

VI. EXPERIMENTAL DETAILS

A. Laboratory Studies

1. Attempts to use wet color

The beginning studies shown in NB1848-3,4,5,12 attempted to utilize wet forms of pigment rather than the conventional dry and baked primrose yellow. The earliest studies utilized the yellow in the form of fin drum sticks (12 Bldg.) predispersed via (a) ball milling with and without surfactants such as Tamol 850 or sodium citrate, (b) homogenization in presence of sodium silicate (N-983) followed by 20% SiO_2 deposition ex N-983-sulfuric acid treatment and either an aluminum sulfate or calcium Staybelite coagulation.

The best results were obtained via the homogenizer route but all fell far short of a goal product. Silica coatings were poor as judged by acid and alkali sensitivity and by electron microscopy.

Experiments 1848-13, 16, 19 attempted to utilize TK-59 slurry pre-treated with sodium silicate as a base material. These were not satisfactory even when predispersed via homogenization.

B. Use of "Baked" Y-758-D

The next group of studies was based on the premise that dried and baked Y-758-D would be necessary. Y-758-D, lot 16689 (3250 lbs./hr.) was successfully converted to a "Krolor" via predispersion with the homogenizer (Ref. 1848-18) (See attached).

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Additional studies with baked Y-758-D showed that various lots of standardized material did not respond similarly to silica coating operations for unknown reasons. Y-758-D, 12089 (std.) was also a satisfactory base (see 1832-130). (Ref. 1848-18,21,26,29,31,32,34, 35).

We have been unsuccessful, to date, in making any non-dried and non-baked primrose yellow primrose yellow work as well as a baked primrose as a base for "Krolor" manufacture.

The variability of the results achieved in the laboratory with different lots of Y-758-D base material were minimized by (1) predispersing via colloid milling and homogenization in presence of sodium silicate, and (2) controlling the pH prior to sodium silicate/ H_2SO_4 addition at a very high level. The best method for this appeared to reside in use of the Corning type glass electrode at room temperature. (Ref. 1848, 34,5,7,8; 40,1,4; 51,2,4,6,9; 61)

C. Study of Other Variables

1. Surfactants

a. Post SiO_2 deposition-surface treatments

Many attempts were made to improve the abrasion resistance of KY-790-D by such treatments. The best result achieved involved 50% extensions made with a polystyrene latex - which are discussed in the Semi-Works section.

Treatment with 1-10% calcium Staybelite, Emery 3554D/Igepal CO630, Neofat 10, Amberols 750, 820; Paraplex G25, G54 added to slurry form of pigment prior to filtration washing drying gave rise to little improvement (Ref. 1848-18,21,43,45, 1877-10,61)

Reslurrying a pre-dried SW's KY-790-D, followed by addition of solutions of polystyrene-Xylol, Amberol 820 - diethylene glycol, Paraplex G25, G54 - in Perclene, filtration and drying, markedly improved the base KY-790-D lot (Ref. 1877-53,54F). This approach deserves further study. Wet addition prior to drying the KY-790-D was not equivalent.

Attempts to tighten up the silicate coating of KY-790-D by wet treatment with negative and positive SiO_2 sols such as lithium polysilicates (DuPont) or Positive Sol were unsuccessful (1877-55, 58,66).

Attempts to utilize F^-, Al^{+3}, TiO^{+2} as flocculants in various ways gave no substantial improvement (Ref. 1877-56,58).

Attempts to fix SiO_2 coating of KY-790-D with acrylic binders were unsuccessful (Ref. 1877-57).

2. Surfactants in the Predispersion

Various grades of sodium silicate were tested via the homogenization route but showed no advantage over #20 WW sodium silicate. Inclusion of $Na_4P_2O_7$ as a dispersant was not satisfactory. (Ref. 1848-54,62).

3. Pulverization of the Base Color

A single attempt using fluid energy milled Y-758-D gave a superior result versus controls made from "Vortac"-milled pigment (Ref. 1848-62). This lead should be considered in the future work on this type material. Attempts to simulate this fluid energy effect by double micropulverization of the dry color just prior to use was not as successful although some improvement was noted (Ref. 1848-65,6).

4. Baking of SiO_2-Coated Pigment

High temperature drying of SiO_2-coated KY-790-D-type pigment was found to improve the thermal resistance of the "Krolor". Unfortunately, this effect was found to be reversed by long term storage in paper containers (Ref. 1848-59A, 66, 71B).

5. Homogenization during SiO_2 Coating

A rehomogenization of the slurry after 50% of the SiO_2 deposition was made gave a slightly improved product. Continuous cycling through a high dispersion unit may be indicated (Ref. 1848-66).

6. Effect of Electrolytes on SiO_2 Deposition

As indicated earlier in this report, all attempts to utilize wet forms of this pigment have failed. Assuming the soluble salt level of these wet forms utilized was higher than desired, runs were made with well-washed (4500 ohm/cm^2) presscake, and dried and baked color. The presscake sample and the dry color samples made in this manner were unsuitable bases for "Krolor". A study was made of the effect of addition of sodium sulfate to this type pigment base, which led to the conclusion that the SiO_2 coating was markedly effected by the presence of soluble salts in the system.

Reslurrying and digestion of predried and baked Y-758-D in water, followed by washing to 4500 ohm/cm^2 and redrying and baking had no appreciable effect on the SiO_2 receptivity of the yellow. A lot (17635) which was satisfactory before washing to a higher ohm end-point was equally satisfactory after rewashing in the "Krolor" process. A lot (17631) which was unexplainably unsatisfactory as a base was unchanged after this treatment.

In all cases where poor "Krolor" products result, we have observed a peculiar pH profile.

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	Normal	Abnormal
pH of premix (homogenized yellow + Na silicate)	10.1-10.3	10.1-10.3
pH after homogenization	10-10.2	9.3-9.5
pH readjusted to	11.5	11.5 (cold)
pH after heating to 92°C	9.0-9.2	8.3-8.5 (low)
pH after adding standard ratio sodium silicate/H_2SO_4	6.0-6.5	3-5.5 (low)

The abnormal results are typical of those achieved with well-washed presscake or predried color. Most "Krolor" made on the primrose base followed this pH profile, i.e., good results achieved with higher pH types (Ref. 1877-1,2,5,6).

7. Nature of Precoating

Attempts at changing surface of Y-758-D to make more suitable for conversion to KY-790-D included studies on

Changes in $Al(OH_3)_3$ to various phosphates	(1848-69; 1877-41).
Pretreating with $PbSiO_3$	(1877-48)
Pretreating with Pb^{++}	(1877-49)
Pretreating with $CrO_4^=$	(1877-24)
Pretreating with $MoO_4^=$	(1877-7,31)
Prereduction with Sn^{++}	(1877-40)
Pretreating with Cymel 301 (capable reacting with OH^- groups)	(1877-50,2)

None of these approaches gave rise to improved KY-790-D.

8. Extension of "Krolor" KY-790-D

a. A study of the effect of extension of the KY-790-D-type "Krolor" with calcium Staybelite (25-50%) was made (1877-8). Small improvement in an abrasion test (1848-58 for method) but lowered the thermal stability in a prefluxed polystyrene test (see also SW's section).

b. Extension of KY-790-D with polystyrene latex (33-50%) improved abrasion resistance (see 1877-16-,19,20,21,22). Semi-Works trial of this approach was unsatisfactory in Chestnut Run's Banbury Mixer (See also SW section).

9. Miscellaneous Studies

Ref. 1848-58	Laboratory abrasion test not requiring two roll mill.
Ref. 1848-60,62	Study of alternatives for 20WW sodium silicate (2X and #16).
Ref. 1877-24	50% reduction time cycle - v sl. inferior results.

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Ref. 1877-24 — Decrease homogenization pressures - v sl inferior.

Ref. 1877-25 — Use of Na_2CO_3 instead of NaOH - slightly inferior.

Ref. 1877-28 — Restudy of pH adjust prior to N-983 treatment in light of SW's experience. High pH better in lab.

D. Alternative Base Materials as Substitutes for Y-758-D

Ref. 1848-6 — $SrCrO_4$ - This light masstone, extremely weak material was briefly studied as a base for a "Krolor"-type pigment. The pigment as such is more stable thermally than Y-758-D, but is extremely green and transparent. Attempts to make "Krolors" therefrom were successful from a thermal resistance standpoint, but tinctorial properties (high transparency - poor strength) are a serious deficiency.

Ref. 1848-8
1877-35,6 — Attempts to improve the opacity of $SrCr_4$ by cop-coprecipitation with $PbCrO_4$ gave rise to unattractive colored (green dull) pigments.
Y-493-D - Tested as is - this pigment is an inferior base material versus Y-758-D in thermal stability. "Krolors" were not made.
Y-539-D - Behaved similarly to Y-493-D.
Imperial's X-3148 was tested in 1877-47 as a basis for a primrose "Krolor" and found to be similar to Y-758-D types.
Imperial's X-3258 - a predarkened primrose yellow was tested (1877-65) and found to be very slightly better than X-3148 or Y-758-D as a base for "Krolor" in abrasion resistance.

1848-14,15,28,35
1877-12,3,8,20,38,39 — Non-white base primrose yellow. Tests indicate that $PbCO_3$ has a very low level of thermal stability. A primrose yellow based on a non-$PbCO_3$ process was made and converted to a a "Krolor". Findings indicated

1. Base Material very slightly more thermally stable.
2. "Krolor" types more thermally stable.
3. Development of a #12 Bldg. process based on this route would be required.
4. The product was benefitted by a fluid energy milling of the base prior to conversion to a "Krolor".

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Standard Process #1 - Ref. #1 1848-18A Laboratory

1. Weigh 150 gr Y-758-D (16689 - 3148 lbs./hr. - 12 Bldg.)
2. Add 20 gr. N-983 (DuPont #20 WW sodium silicate)
3. Add 1 L.H_2O
4. Premix - pH at 10.0 - 10.6.
5. Homogenize at 5000 PSI - 1 pass
6. Wash out with 100 cc H_2O - pH usually 9.6 - 10.2
7. Heat to 90°C.
8. Record pH - 8.15.
9. Adjust to pH - 8.0.
10. Weigh and add in 4 hrs. N-983 115 gr/600 cc H_2O
11. Weigh and add simultaneously over 5 hrs. N-27 17.3 gr/800 cc H_2O
12. Stir 10 min - 90°C.
13. Record pH - 4.8.
14. Readjust to pH 9.0.
15. Add sodium Staybelite solution - stir 5 min.

ex 20 gr N-528)
5.4 gr N-7) Boil 10 minutes
180 cc H_2O)

16. Add 8 gr. $CaCl_2.2H_2O$ N-20 /200 cc in 15 min.
17. Filter - wash to 2500 ohm/cm_2
18. Dry 16 hrs./180°F. - Regular or high speed pulverize.
19. Yield 188 gr. pigment.

Tests Conducted in 1848-18A Types

WR66-746 - Two roll mill into polystyrene chip - Grind up chip and mold 20 min./400°F. vs lt, vs int. 20 min./600°F. extremely lt, ext. intense

1848-18A vs Y-758-D 12839
WR66-758 - Attempt sand mill in 20J.
1848-18A - Oil absorption extremely high - had to abandon (sample too small to repeat.
1848-18B - Above type except Emery 3534D/Igepal CO630 treated vs Y-758-D, 12839 - MT color slightly dark and red.
Gloss - slightly inferior
Tint - sl red = toner basis
LF. - Weatherometer - much superior
Viscosity - v sl higher

Process #2 - Ref. 1848-52C, 54C - Further study of #1 type process using cold pH adjustments and blue tip Beckman electrodes (54C used Amber electrode).

1848-52C
1. Repeat steps 1, 2, 3, 4, 5, 6
7. Record pH 10.1 - Adjust to pH 11.5 with 5% NaOH.
8. Add 150 cc H_2O
9. Heat to 90°C.
10. Weigh and add in 4 hrs. 115 gr N983/600 cc H_2O.
11. Weigh and add in 5 hrs. simultaneously 17.3 gr H_2SO_4/800 cc H_2O.
12. Stir 10 min.

13. Record pH 6.0.
14. Adjust to pH 9.0 (5% NaOH).
    Add - Stir 2 minutes between
15. N-15 9 gr./36 cc
16. N-3 7.5 gr./30 cc.
17. N-15 11 gr./44 cc.
18. Record pH 5.4
19. Readjust to pH 5.6-5.7.
    Filter wash dry, etc. like Process #1.

This type process became the laboratory standard except for the substitution of Corning Electrode 476051 type (see 1848-59A).

Semi-Works Studies KY-790-D DSN 67-3

KY-790-D, SW00204	Attempt to scale up 1848-38C (colloid mill used for predispersion). Adjust to pH 9.45 at 92°C. prior to SiO_2 treatment - coagulate with $Al_2(SO_4)_3$. Result - unsatisfactory thermal resistance.
SW-00203 (study calcium Staybelite)	Attempt to reproduce 1848-43D (colloid mill - adjust to pH 9.6 at 92°C.) calcium Staybelite coagulation. Result - unsatisfactory.
KY-790-D, SW-00206 (study homogenization)	Attempt to reproduce 1848-44D and 45A type colloid mill and homogenize. Adjust to pH 9.45 prior to SiO_2 addition, coagulate with $Al_2(SO_4)_3$-Emery 3554D/Igepal CO630 treat. Result inferior to laboratory control but better than 00203, 00204.
00211	Similar to 00206 type using better control on pH meter. pH measurement at 92°C. found to be extremely difficult. Quality level achieved better than 00206 but inferior to lab goal.

Because of our inability to reproduce laboratory goal quality, the following lab studies were made in an attempt to determine causes of deviation.

1877-8 - Study of contact time yellow base-sodium silicate prior to and during predispersion.
1877-10 - Prolonged stir periods.
1877-10 - Open steam vs jacketed vessel.
1877-11 - Study of agitation.
1877-15 - Materials of construction.

None of these variables were found to produce significant effect effects in the laboratory.

SW-00225 - Attempt to use cold pH adjustment process and Corning electrode. Basic process Ref. 1848-52C. Contrasted to the laboratory experience, this Semi-Works run gave results inferior to those of SW-00211 and inferior to the laboratory pilot run 1848-60B made with same base material.

SW-00239 Further study of cold pH process. Basic process like 1848-52C except as piloted in 1848-60B (same lot of primrose yellow). In-process samples showed that SW's process resulted in inferior product during the SiO_2 coating. That is, homogenized pigment ex the SW's homogenizer processed in the laboratory, was definitely superior to the same material finished in the same manner in the Semi-Works.

SW-00263 Study lower SW's batch size in an attempt to determine why SW's different from laboratory. pH adjustments made via technique of adding fixed amounts of 5% NaOH to eliminate question of variation in equipment, i.e., a scale up of the lab quantities. Again in-process samples showed failure at N983/N27 additional step.

SW-00273 Because of the unexplained differences in requirements of laboratory pH (11.5 optimum) and Semi-Works, try lower pH adjustment after homogenization (used 10.6-10.7 instead of 11.5 optimum in laboratory). SW's results were superior to 00263, but on the defensive versus best lab types processed in normal (11.5 pH) manner.

SW-00280 Continue study of cold pH after homogenization. Use 10.3 pH vs 11.5 laboratory. (1) SW's run best to date. (2) SW's run on defensive vs high pH lab control. (3) 50% extension with Dow's Polystyrene latex markedly improved abrasion resistance. (See photostat attached.)

SW-00282 Repeat 00273 type using Na_2CO_3 instead of NaOH for pH adjustment and make 50% 3xtension with Dow Latex Polystyrene. Result: similar to 00280 - slightly inferior to best laboratory types. Polystyrene extension definitely beneficial. A sample of this material was submitted to Chestnut Run for evaluation (JJ-LAL 1/10/68 Ref. #5, NC-68-2 Ref. #6) but reported to be unsatisfactory. Details can be found in attached report.

VII. REFERENCES

1. Miscellaneous product improvement studies - JJ - Dec. 13, 1966.
2. Notebook references: 1848 - 1877.
3. DSN 67-3 "Krolor" based on Y-790-D.
4. JJ - HA - Y-758-D - #12 Bldg. base for Y-790-D "Krolor" 1/14/67 D (copy attached).
5. JJ - JAL - Y-790-D - Primrose "Krolor" Evaluation in Plastics 1/10/68 (00282-50% Polystyrene Extension) (copy attached)
6. Acknowledgement NC-68-2 2/27/68
7. NC-68-2 Work Request Report (Copy attached) 3/19/68
8. JJ - JAL - KY-790-D Primrose "Krolor" Evaluation in Plastics 7/17/68 (copy attached).
9. Acknowledgement NC-68-24 (7/19/68)
10. NC-68-24 Work Request Report (copy attached) 10/17/68
11. Series P-68806 Comparison "Krolor" and Cadmium Pigments in Plastics 10/2/68
12. Exposure Series P68808, 6/16/69 (KY-790-00282-unsatisfactory in vinyl).

DUP050081885

13. JJ-PDG - Colors Based on Predarkened Chrome Yellow 4/25/69
14. JJ-RHZ - KY-790-D - History - Chestnut Run Evaluations (copy attached) 12/30/69

dc

Will recopy for Copy

CODE Y-720-D NAME [illegible] DATE CHARGE 71-702

2 ppm [illegible] 0273 bad at low PH
USING TK29 at 50 R.P.M
USE CORNING ELECTRODE

FORMULA:

"AS IS" LBS.	"AS IS" OZ.	MATERIAL	100% WT.	R. M. OR LOT NO.	GALS.	VAT	MANIPULATION	TESTS
16	8	Y720		18621			Weigh and mix in [illegible]	
1000	gr	N983					disperse in 111 lbs water	
							STIR 10 min PH 10.2	
							PASS thru Homogenizer at 5000 PSI	
							WASH OUT with 5 lbs water	
							Transfer to TK 29	
							WASH IN with 6 lbs WATER	
							PH of slurry 10.3	
		Sample (A)	1275 gms				Weight of water 16.5 lbs (SAMPLE)	
		Sample (B)	1675 gms				Heat to 92°C	
							120 cent DW 8.6 (Sample)	
12	4	[illegible]	66 lbs	water			Add rate = 125 cc/min	
8	12	[illegible]	88 lbs	water			add rate 134.5 cc/min	
							STIR 5 min PH [illegible] HS	
							SAMPLE (C)	
							Adjust to PH 5.0 & 9 using 1N NaOH	
							add STIR 2 min	
4	8	N15	1 gal water					
3	0	N3	1 Gal "					
5	0	N15	1 Gal "					
1	0	N778	300 cc				Recirculate UNTIL	
		N778					4.8 → add to 5.6 then cook	
		STIR	5 MIN				Adjust to PH 5.6	
							Pressure 4 passes	
							Wash 40 x 500 ohms	
							Dry 180°F 24 hrs	
							Regular Speed Pulverize	

WASH TIME: 1ST 2ND 3RD 4TH 5TH

DRAW TO: 1ST 2ND 3RD 4TH 5TH | GOAL 22 lbs EST | LP. GRD. | R.P.M.

SUGGESTED BY: WRITTEN BY: JJ CHECKED BY: MADE BY:

DEVIATIONS:

24 5# / cu ft

K-1777

DUP050081887

23-P

Well ready Original roll right

DUPONT

FORMULA SHEET

COLOR CODE Y-790-D DATE 1-4-67 NAME PRIMROSE KROLOR K-

OBJECT To try High PH Process using Na_2CO_3 instead of NH

BASED ON 1877-25C and 00273

BATCH SIZE-MOLS. BATCH No. OF "K" SAMPLE

MATERIAL	100% WT.	GAL.	C. C.	MANIPULATION
lbs 863 Y758-D cc ~~965~~ N983	18631			Weigh - Sift into dissolved in 111 lbs WATER - 76F STIR 10 min PH 10.6 Corning Electrode Pass thru colloid MILL and Homogenize at 5000 PSI WASH out with 5 lbs water Transfer to TK 29 WASH IN WITH 6 lbs WATER Record PH 10.4
5 gr Na_2CO_3 in 500 cc H_2O				WEIGH and add - STIR 5 Min ~~PH~~ Record PH 10.55
21.4 lbs 16 lbs 403 N983 in 66 lbs H_2O 5 gr 98% H_2SO_4 in 88 lbs H_2O				add water 16½ lbs HEAT TO 90°C RECORD PH 9.2 adding 4 Hrs = 125 cc/MIN add in 5 Hrs = 134.5 cc/MIN
				STIR 5 min - RECORD PH 6.6 Adjust to PH 8.9 → 9.1 PH 8.9 using N7 1-9 Parts H_2O 600 cc add. STIR 2 min
5 gr N15 - 1 Gal Water 4 gr N3 - 1 Gal " 0 gr N15 - 1 Gal "				
2 gr N978 >300 cc WARM water 2 gr N979				Record PH 5.3 adjust to PH 5.5 → 5.7 N7 Solution Record PH 5.65 75 cc
add				add STIR 5 min (19½")
15 lbs Dow Latex DL860 @ 49.5% Solids as is weight				TAKE 2 QT Sample add STIR 5 min at 50# filter into 8 frames Wash to 2500 Mhos dry at 180°F to Constant Weight
finish complete - Yield 25-7 lbs / 1.0 cu ft = 24.5 lbs/cu ft Dry Weight Standard Deviation selected and [illegible]				

PACKAGE GOAL YIELD 44 lbs LBS PER COST GROUP SIGNATURE Julius Jackson

DUP050081888

See 1877-28 and earlier work

CC: W. J. McClure
R. A. Hageman
C. W. Oskins
R. Gedd

W. S. Struve /
A. A. Brizzolara
J. Jackson

December 14th, 1967
Newark, New Jersey

MR. H. ARNOUL
NEWARK, NEW JERSEY

Y-758-D - #12 BUILDING - BASE FOR Y-790-D KROLOR

We have repeatedly attempted to utilize "well washed", #12 Building production lots as a base for Y-790-D type KROLOR without success. Unless new information is developed, I foresee a need for utilizing two procedures for manufacturing this code:

1. Well washed Emery/Igepal treated for the ink trade
2. Standard quality (not well washed or organically treated) for Y-790-D.

The present program to upgrade the gloss and dispersibility of #12 Building Chrome Yellow production, will probably make the "Krolor" type products less desireable in thermal stability.

I recommend that facilities be maintained in #12 Building to permit future manufacture of Chrome Yellows of our presently standard types.

In other words, we must be able to Parallel wash (as well as Series wash for the ink and paint trade), or demonstrate the ability to reproduce the "poorer washed" quality of Parallel washed material via Series washing. In addition, the use of organic treating agents for Chrome Yellow KROLOR base materials is not desireable.

Julius Jackson

Julius Jackson
Research Associate

AS

DUP050081889

E. I. du Pont de Nemours
and Company

cc: W.F.Spengeman, Chestnut Run
H.B.Clark, " "
G.H.Mattie, Wilmington
P.D.Graham, "
R.H.Zabel, "
M.Hunt/E.Gonick, "
W.S.Struve/A.A.Brizzolara
R.A.Hageman/H.Arnoul
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Pigments Department
Newark, New Jersey

January 10, 1968

J. A. LAMIET (2)
CHESTNUT RUN

Y-790-D PRIMROSE "KROLOR"
EVALUATION IN PLASTICS

We are submitting a sample of lot 00282 for evaluation in plastics. This product is a 50% extension made with polystyrene.

We are insterested in:

1) Your opinion as to whether or not the product is adequate in thermal stability and abrasion resistance for commercial use.

2) Your assessment of the number parts, per hundred of resin, required to be equal to or competitive with other commercials such as cadmium yellows.

A cost analysis will be prepared when pricing of this type pigment is established.

Julius Jackson

JULIUS JACKSON

JJ:mm

DUP050081890

Ref #6

DISTRICT SALES MGR. P. J. Monahan PIGM. Newark
TECHNICAL REP. PIGM.
DIRECTOR/ASS'T. DIRECTOR W.F.S./H.B.C. PIGM. C.R.
REGION MGR. J.A.Lamiet PIGM. C.R.
REGION SUPRV. T.B.Reeve PIGM. C.R.
PROJECTS FILE X C.R.
TECHNICAL MGR. P.D.Graham PIGM. WILM.
R.H.Zabel, Pigm.Wilm.
W.S.Struve/A.A.Brizzolara, Pigm.Nwk.
P.A.Arnoul, Pigm.Nwk.

CHESTNUT RUN
DATE: 2/27/68

[illegible] #2

[illegible] NEWARK ATTENTION: J. JACKSON

[illegible]: NO.: HC-68-2

[illegible]: Evaluate X-790-D, lot 00282, in plastics.

[illegible]: 1/12/68 EST. START EST. COMPLETION 3/25

REMARKS:

Determination of money value and resistance to abrasion complete.

Requested by J. Jackson to repeat resistance to abrasion test and evaluate under moderate abrasion. Work is scheduled for mid-March.

SIGNED: [signature]

DUP050081891

Pot #7

PIGMENTS DEPARTMENT
CHESTNUT RUN

LABORATORY REPORT

PC-6803-P

CUSTOMER	WORK REQUEST NO	DATE
	NC-68-2 First & Final	3/19/68

DISTRIBUTION

W.F. Spengeman/H.B. Clark, C.R.
J.A. Lamiet
T.B. Reeve
H.F. Bartolo (4)
Pigments, C.R. File (2)

P.D. Graham (2), Pigm., Wilmington
R.H. Zabel "
W.S. Struve/A.A.Brizzolara, Newark
H. Arnoul "
J. Jackson "
H.R. Linton "

KROLOR® PRIMROSE YELLOW Y-790-D IN POLYSTYRENE

INTRODUCTION

Research submitted Krolor® Primrose Yellow Y-790-D lot SW-00282 (50% polystyrene laked) to determine heat stability and resistance to abrasion in general-purpose polystyrene, and economics versus cadmium. Krolor® Yellow Light Y-781-D was used as the control for heat stability and resistance to abrasion tests.

CONCLUSIONS

Krolor® Primrose Yellow Y-790-D is not considered a suitable Krolor® release due to considerably poorer heat stability and resistance to abrasion than Krolor® Yellow Light Y-781-D. On a commodity basis, four times the loading of a cadmium of comparable shade would have to be used to obtain equal depth of tint, and equal hiding in masstone (Tables I & II).

Exhibits have been provided J. Jackson.

EXPTL. DETAILS

Heat stability was compared under moderate and high shear dispersion. Dispersions were prepared in the Banbury under high shear conditions, using a hand stirred charge of color (11 gm. - Krolor® pigment basis) and general-purpose polystyrene pellets (1100 gm.); two similar charges were dispersed.

The Banbury was operated as follows:

Run at second speed for one minute; stop, raise ram and brush down loose pigment to chamber; lower ram and operate for one minute at second speed; stop, reverse speed for 15 seconds; run

H.F. BARTOLO/ WS

DUP050081892

forward at second speed for additional minute; drop charge, cut and chop.

Dispersions were prepared in the Banbury under moderate shear as a 15 phr concentrate in general-purpose polystyrene. Pigment (150 gm.-Krolor® pigment basis) and resin (1000 gm.) were combined by hand stirring, and charged to the Banbury. Processing was similar to high shear Banbury cycle. The concentrate was let down to 1 phr in a 3 minute Banbury cycle.

Heat stability was determined in the laboratory Van Dorn injection molder, using a continuous molding procedure (one chip per minute) so that chip numbers 16, 29, 42 and 56 represent approximately ten minute dwell times at 450, 500, 550 and 600° F., respectively; chip 3 represents minimum hold time to reach color equilibrium at 400° F. (approx. three minutes).

Typical molding conditions were:

Plunger forward	15 seconds
Mold closed	45 "
Booster	off
Ram pressure	500 psi
Ram speed	green
Spreader	40 rpm
Mold temperature	ambient
Mold, single stair chip	

Comparisons for tinting strength and hiding were made in general-purpose polystyrene versus a cadmium of similar hue. Pigment was added to fluxed resin on the two-roll mill, and dispersed under high shear. Comparison was made at 1 phr masstone for equal hiding and at .1/ 1.0 phr color/R-101 titanium dioxide at equal depth of tint. Pressouts were prepared on the laboratory 50 ton press.

Pigments Evaluated

Krolor® Primrose Yellow Y-790-D, SW-00282

Other Pigments Used

Krolor® Yellow Light Y-781-D SL-86728
Harshaw's Cadmium Primrose Yellow 1465, C-65129

Other Matls. Used

Dow's Styron 666, general-purpose polystyrene pellets

REFERENCES

NC-68-2
PC file 6803-P (L. Dingess, D. Frank)

CHARGE: 8253-4671-700

H.F.B.

DUP050081893

NC-68-2

TABLE I Krolor®, Y-790-D in Polystrene (1)

Pigment	Dispersion	Color (2)	Heat Stability vs. 400° F. Control (3) 450°	500°	550°	600°
Y-781-D	High Shear (4,6)	control	9, d	8, d	6, d	4, d
Y-790-D	" " (4,6)	green, intense	8, d	6, d	3, d	1, d
Y-781-D	" " (4,7)	equal	8, d	6, d	5, d	4, d
Y-790-D	" " (4,7)	green	7, d	3.5, d	2, d	1, d
Y-790-D	Moderate Shear (5,7)	green, sl. intense	8.5, d	6, d	5, d	3.5, d

(1) Heat stability determined in injection molded chips pigmented at 1 phr in general purpose polystyrene (Styron 666) with 10 minutes dwell time at temperatures indicated.

(2) Based on comparison of 400° F. control chips.

(3) Control chip dwell time - 3 minutes.
Degree of change: 10 = none 8 = slight 6 = considerable
4 = bad 2 = v. bad 0 = complete failure

(4) High Shear - Banbury dispersion using dry color at 1 phr and polystyrene pellets.

(5) Moderate Shear - Banbury dispersion at 15 phr followed by letdown to 1 phr in polystyrene.

(6) Initial series of tests - (7) repeat series of tests.

DUP050081894

TABLE II Economics - Krolor®, vs. Cadmium (1)

Pigment	Pigment Loading	
	Tint (2) Color/TiO_2	MT (3)
Harshaw's 1465 (4)	0.1/1 phr	1 phr
Y-790-D	0.4/1 phr	4 phr

(1) Comparison made in general purpose polystyrene; dispersion made on 2-roll mill.

(2) Comparison made at equal color depth of tint.

(3) Comparison made at equal hiding.

(4) Harshaw Cadmium Primose Yellow 1465 - $3.95/lb.

DUP050081895

PJM - please issue work request and refer it to me
JJ

CC: W.F.Spengeman, Chestnut Run
H.B.Clark, " "
S.J.Gorman, Wilmington
P.D.Graham, "
R.H.Zabel, "
M.Hunt/E.Gonick, "
W.S.Struve/A.A.Brizzolara, Nwk.
R.A.Hageman/H.Arnoul, "
H.F.Bartolo, Chestnut Run

Newark, New Jersey
July 17, 1968

JOHN A. LAMIET (2)
Pigments - Chestnut Run

KY-790-D PRIMROSE "KROLOR"
EVALUATION IN PLASTICS

We are forwarding to the attention of H. F. Bartolo, samples of specially prepared primrose yellow shade "Krolors" which are superior in thermal stability and abrasion resistance to anything else we have been able to make to date.

Since we have not been able to evaluate Y-790-D types, extended with polystyrene in a manner that duplicates your findings on Y-790-D, 00282 (PC-6803-P), we are requesting evaluation under high shear conditions in the Banbury before proceeding further.

The samples to be tested are as follows:

1. Y-790-D, SW-00282, control
2. Y-781-D, standard, control
3. 1877-39A Special toner
4. 1877-39B 50% polystyrene lake of A
5. 1877-39C Special toner
6. 1877-39D 50% polystyrene lake of B

As discussed with H. F. Bartolo, samples A and C and B and D can be combined, if necessary, to obtain adequate test quantities.

Julius Jackson

JULIUS JACKSON
RESEARCH DIVISION

dc

DUP050081896

DUPONT

PIGMENTS DEPARTMENT

WORK REQUEST

☐ WHITE PIGMENTS ☒ PIGMENT COLORS

DISTRIBUTION

☐ DISTRICT MGR.	☒ TECH. MGR. ~~WHITES~~ COLORS P.D.Graham Pigts.,Wilm.	☐ EXPORT MGR.
☐ SALESMAN	☐ MGR. TECH. WHITES	☒ LAB. DIR. RESEARCH WSS/AAB/[illegible]
☒ DIR. TECH. SERV. LAB (4) W.F. [illegible], C. R.	☐ SUPT. PROD. CONTROL	☒ OTHER R.H.Zabel Pigts.,Wilm.

CUSTOMER	PROFILE	W.R. NO. NC-68-24	DATE 7/19/68
ADDRESS	CLASS W C	DISTRICT	SALESMAN
PROSPECTIVE BUSINESS (LBS.)	USE		COMPLETE WORK BY
COMPETITOR	COMPETITIVE NAME AND CODE		SELLING PRICE

(THIS WR REPLACES NC-68-24 DATED 7/18/68)

OBJECT:

DETAILED DESCRIPTION OF WORK REQUIRED:

Evaluate the following samples in plastics as per letter JJ-JAL, 7/17/68.

KY-780-D, SW-00282, control
KY-781-D, standard, control
1877-38A Special toner
1877-39B 50% polystyrene lake of A
1877-39C Special toner
1877-39D 50% polystyrene lake of B

CHARGE
8253
4651-500

LIST/DESCRIPTION OF MATERIALS BEING SENT TO LABORATORY: HOW? WHEN?

Samples already sent.

ISSUED BY J. Jackson

APPROVED BY P. J. Monahan
DISTRICT MANAGER

DUP050081897

Ref #10

1502 REV 6-61

DU PONT

PIGMENTS DEPARTMENT
CHESTNUT RUN

LABORATORY REPORT

FIRST & FINAL

See PC 6803-1 for KY790-00282 eval

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PC-6875-P

CUSTOMER	WORK REQUEST NO	DATE
	NC-68-24	October 17, 1968

DISTRIBUTION

W.F. Spengeman/H.B. Clark, C.R.
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W.W. Riches, Pigm. C.R.
J.A. Lamiet, Pigm. C.R.
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Pigments Chestnut Run File (2)
S.J. Gorman, Pigm. Wilm.
P.D. Graham, Pigm. Wilm. (2)
R.H. Zabel, Pigm. Wilm.
~~W.S. Struve~~/A.A.Brizzolara, Newark
H. Arnoul, Pigm. Newark
T.L. Mitchell, Pigm. C.R.

SUBJECT EXPERIMENTAL PRIMROSE "KROLOR®" YELLOWS IN POLYSTYRENE

INTRODUCTION:

We evaluated experimental Krolor® Yellows in polystyrene to determine thermal stability under high shear dispersion conditions. The following experimental pigments were evaluated in general purpose polystyrene:

1877-39-A	Special toner (100%)
1877-39-B	50% Polystyrene lake of A
1877-39-C	Special toner (100%)
1877-39-D	50% Polystyrene lake of C

1/4 strg as Cl yellow
.50% Polystyrene

Previously evaluated Primrose "Krolor®" Yellow, KY-790-D, SW-00282, was included as a color control and "Krolor®" Yellow Light KY-781-D, SL-86728 was included as a heat stability control.

CONCLUSIONS:

The experimental lake sample, 1877-39-D provides the best color and heat stability of the experimentals tested, but a toner which would combine the more desirable primrose color of KY-790-D with the degree of heat stability shown by 1877-39-D would offer much broader application and acceptability in plastics.

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T.L. Mitchell 10/17/68

SIGNED T.L. MITCHELL/jah

DUP050081898

SUMMARY:

1-Heat stability rankings for these products tested under high shear dispersion conditions are:

Good (8)	1877 - 39 D (lake)
Fair (6)	1877 - 39 B (lake) KY-781-D
Poor (4)	KY-790-D (lake)
Bad (2)	1877 - 39 A (toner) 1877 - 39 C (toner)

2-The experimental lakes are decidedly more intense in initial color (400°F) than the corresponding toners, but still lack the desired intensity and greenness of KY-790-D, SW-00282.

EXPERIMENTAL DETAILS:

Heat stability under abrasive conditions was tested by Banburying and injection molding under the following conditions:

Banbury Dispersions:

Hand-stirred blends of color and Dow's Styron 666-K-26-7 general purpose polystyrene pellets (1100 gms. resin/1.0 phr dry toner) were placed in the Banbury heated to 250°-260°C and dispersed as follows:

Run at second speed for one minute; stop, raise ram and brush down loose pigment into chamber; lower ram and operate for one minute a second speed; stop reverse speed for 15 seconds; run forward at second speed for additional minute; drop charge, cut, combine charges and chop. Two such batches of each pigment were made for heat stability testing.

Heat Stability:

Using a continuous molding procedure (one chip per minute) in the laboratory Van Dorn injection molder, chip numbers 16, 29, 42 and 56 represent approximately 10 min. dwell times at 450, 500, 550 and 600°F, respectively, with chip #3 representing the minimum hold time needed to reach color equilibrium at 400°F (approx. three minutes).

Typical molding conditions were:

Plunger forward	15 seconds
Mold closed	45 seconds
Booster	OFF
Ram pressure	500 psi
" speed	green
Spreader	40 rpm
Mold temperature	ambient
Mold, single stain chip	

DUP050081899

REFERENCES:

W.R. NC-68-3 & NC-68-9 (PC-6804-P)
W.R. NC-62-24 (PC-6875-P · L. Dingess)
TF-6010-1

CHARGE: 8253-4651-500

TABLE I MASSTONE THERMAL STABILITY

Sample	Loading* (phr)	Color at 400°F	Heat Stability vs. 400°F Chip** 450°	500°	550°	600°
KY-790-D	2.0	Control	7d	5d	3d	1d
Primrose Krolor© Yellow						
KY-781-D	1.0	- - -	8d	6.5d	4d	2.5d
Chrome Yellow Light						
1877-39-A (Toner)	1.0	Dk.,red, dull,vs. opaque	7d	4.5d	2.5d	0
1877-39-B (lake of A)	2.0	Red,s.dk.,s. dull,vs opaque	8.5	6d	4.5d	2d
1877-39-C (Toner)	1.0	V.Dk.,dull, red,vs. opaque	7d	4d	2d	0
1877-37-D (lake of C)	2.0	Red,s. opaque vs.dk.,vs. dull	9.5	8	6.5d	4d

*Equal toner loading
**See Experimental Details

DUP050081900

W.F. Spanggoman/H.B. Clark, C.R.
G. Wormald, C.R.
J.A. Lamlet, C.R.
A.F. Lewis, C.R.
D.E. Yonker, C.R. (2)
H.F. Bartolo, C.R. (6)
W.W. Riches, C.R.

W.S. Struve/A.A. Brizzolara, Nwk.
B.J. Godfrey, Pigm. Newark
P.D. Graham, Pigm. Wilm.(2)
Pigments, Chestnut Run File (3)
C.G. Quinn, C.R. (3)
E.F. Klenke, Pigm. Newark
J.J. Jackson, Pigm. Newark
R.H. Zabel, Pigm. Wilm.

Chestnut Run
October 2, 1968

SERIES P-68806
INITIAL REPORT
(Ref. WR. NC-67-33,34,38; NC-68-2)

KROLOR® AND CADMIUM PIGMENTS IN PLASTICS

OBJECT:

Compare durability of Krolor® and cadmium pigments in resin systems.

EXPERIMENTAL DETAILS:

Masstone and tint swatches (1" X 5") of cadmium and Krolor® pigments, prepared at equal opacity and depth of color in polyethylene and polystyrene, are being exposed in Delaware for examination at 6 mo. intervals.

REFERENCES: WR. NC-67-33,34,38; NC-68-2
PC-6799-P, 67100-P, 67105-P, 6803-P

CHARGE: 6606-200

Krolor® Orange R KO-786-D lot 52197
Krolor® Yellow Medium KY-787-D lot 52569
Krolor® Primrose Yellow KY-790-D SW00282
Harshaw's Cadmium Yellow 1465 C-65129
Harshaw's Cadmium Dark Orange 797-H C-64471
Imperial's Deep Cadmium Yellow X-2826 C-65401
Harshaw's CP Cadmium Red Light 1410 C-65107

EXPOSURE CONDITIONS:

45°S Delaware, 1 set-readings at 6 mo. intervals

H. F. BARTOLO
PIGMENTS TECHNICAL SERVICE LABORATORY

jah

DUP050081901

P-68806

TABLE I

Exhibit	Resin	Pigment	Color/R-101 (phr)	PC File
1	Al 7050	Deep Cad. Yellow X-2826	1.0	67105-P
2	"	Krolor® KY-787-D	1.5	"
3	"	Deep Cad. Yellow X-2826	0.1/1.0	"
4	"	Krolor® KY-787-D	0.14/1.0	"
5	Polystyrene	Cad. Yellow 1465	1.0	6803-P
6	"	Krolor® KY-790-D	4.0	"
7	"	Cad. Yellow 1465	0.1/1.0	"
8	"	Krolor® KY-790-D	0.4	"
9	Al 7050	Krolor® KO-786-D	0.15/1.0	6799-P
10	"	Cad. Dk. Orange 797-H	0.1/1.0	"
11	"	"	1.0	"
12	"	Krolor® KO-786-D	1.5	"
13	"	Cad. Red Lt. 1410/ Dk. Orange 797-H (1/1)	0.1/1.0	67100-P
14	"	Krolor® KO-789-D Lot 52134	0.1/1.0	"
15	"	Krolor® KO-789-D Lot 52097	0.1/1.0	"
16	"	Cad. 1410/Cad. 797-H (1/1)	1.0	"
17	"	Krolor® KO-789-D Lot 52097	1.0	"
18	"	Krolor® KO-789-D Lot 52134	1.0	"

DUP050081902

W.F. Spangeman/R.J. Fahl, C.R.
G. Wormald, C.R.
J.A. Lanier, C.R.
A.F. Lewis, C.R.
D.E. Yonker, C.R. (2)
H.F. Bartolo, C.R. (6)
W.W. Riches, C.R.
R.H. Zabel, Pigm., Wilm.

W.S. Struve, Pigm., Newark
B.J. Godfrey, Pigm., Newark
P.D. Graham, Pigm., Wilm. (2)
Pigments Chestnut Run File (3)
C.G. Quinn, C.R. (3)
E.F. Klenke, Pigm., Newark
J.J. Jackson, Pigm., Newark

J. Jackson Pigments, Newark

Chestnut Run
June 23, 1969

SERIES P-68806
INTERIM REPORT
(Ref. WR. NC-67-33, 34, 38; NC-68-2)

KROLOR® AND CADMIUM PIGMENTS IN PLASTICS

6 Months Report Delaware 45° South

INTRODUCTION:

Krolor® pigments are compared with cadmium pigments of similar hue in masstone and tint in polyethylene and polystyrene; exhibits are scheduled for evaluation at 6 month intervals.

CONCLUSIONS:

Based on the limited exposure, no significant differences are noted between Krolor® and cadmium pigments of similar hue in either masstone or tint formulation. Examination of the exhibits is scheduled to continue for a 36 month exposure period. Color failure is generally more severe in yellow hues than in the oranges. Failure in tint formulations was generally more severe than in masstone formulations.

EXPERIMENTAL DETAILS:

Sources of detailed information on exposure and preparation of exhibits are listed in the initial report on exposure series P-68806.

CHARGE: 6606-200.

H. F. Bartolo
PIGMENTS TECHNICAL SERVICE LABORATORY

HFB:mal
Attachment

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DUP050081903

SERIES P-68806
Interim Report

TABLE I - DURABILITY IN PE & PS(1)

Exhibit	Pigment	Loading, phr (Color/TiO_2)	6 Mos. Del., 45° S.
1	Harshaw X-2826	1.0	9, d vs less int.
2	KY-787-D	1.5	9, d vs less int.
3	Harshaw X-2826	0.10/1.0	7, d sl. less int.
4	KY-787-D	0.14/1.0	8, d less int.
5	Harshaw 1465-01	1.0	6, d red, less int.
6	KY-790-D	4.0	5, d red, less int.
7	KO-786-D	0.15	6, d red
8	KY-790-D	0.4/1.0	6, d red
9	KO-786-D	0.15/1.0	6, l
10	Harshaw 797-H	0.10/1.0	7, l
11	Harshaw 797-H	1.0	9, d vs less int.
12	KY-786-D	1.5	9, d vs less int.
13	Harshaw 1410/797-H	0.05/0.05/1.0	7, l
14	KO-789-D, lot 52134	0.10/1.0	7, l sl less int.
15	KO-789-D, lot 52097	0.10/1.0	8, l sl less int.
16	Harshaw 1410/797-H (1/1)	1.0	9, d vs less int.
17	KO-789-D, lot 52097	1.0	8, l s less int., s yellow
18	KO-789-D, lot 52134	1.0	9, d vs less int.

(1) Degree of Change: 10 = none; 8 = slight; 6 = considerable; 4 = bad; 2 = v bad; 0 = complete failure.

d = dark; l = light

HFB:mal
6/23/69

DUP050081904

E. I. DU PONT DE NEMOURS AND COMPANY
Pigments Department

cc: S.J.Gorman, Pigts.,Wilm.
L.F.Andrews, " "
P.D.Graham, " "
H. Arnoul, (2) Newark
M.Hunt/E.Gonick," Wilm.
W.S.Struve, Newark
E.F.Klenke, "
J. Jackson, "

Newark, New Jersey
December 30, 1969

R. H. ZABEL
PIGMENTS
WILMINGTON

KY-790-D - HISTORY - CHESTNUT RUN EVALUATIONS

EXPERIMENTAL SAMPLES

At the October 3, 1969 meetingof Production-Sales-Research, a request was made of the writer to summarize the history of the above subject.

Ref. 1 JJ - J.A.Lamiet Y-790-D Primrose "Krolor" 1-10-68

This request for the evaluation of KY-790-D, 00282 (a 50% extension based on polystyrene) was reported out in Ref. 2.

Ref. 2 Work Request NC-68-2 3-19-68

The conclusion reached in that report were:

a) "not considered a suitable "Krolor" release due to considerably poorer heat stability and resistance to abrasion than "Krolor" light Y-781-D (KY-781-D - SL 86728);

b) "on a commodity basis four times the loading of a primrose cadmium shade would be required equal depth of tint and equal hiding in masstone" (Harshaw's Cadmium Primrose Yellow 1465 used. Priced $3.95 as of date of report).

The above conclusions were based on Banbury dispersions. Details of readings are given on the attached Table I.

Additional laboratory studies were conducted in an attempt to develop a more suitable primrose yellow base for the manufacture of a "Krolor" pigment.

DUP050081905

Ref. 3 JJ - J.A.Lamiet KY-790-D Primrose Yellow 7-17-68
Evaluation in Plastics

This requested the evaluation of several laboratory samples (NB 1877-39A B C D) versus KY-790-D, 00282 and KY-781-D. These samples included two experimental toners and the corresponding 50% polystyrene extensions. The products were strictly experimental and would require the development of a 12 Bldg. process to manufacture the basic yellow.

Ref. 4 Work Request 68-24 summarizes the findings on these samples. The conclusions reached were:

a. "The experimental sample 1877-39D (50% polystyrene lake) provides the best color and heat stability of the experimentals tested, but a toner which would combine the more desirable primrose shade of KY-790-D (00282) with the degree of heat stability shown by 1877-39D would offer much broader application and acceptability in plastics."

For details see Table II.

These conclusions again lead to the conclusion that

a) lakes are objectionable although they gave adequate thermal stability;

b) product excessively red in hue;

c) product would require 12 Bldg study.

Ref. 5 KY-790-D, 00282 was included in a ~~vinyl~~ Polyethylene & Polystyrene dispersion study P-68806. Six month data indicates a large inferiority versus "Krolor" such as KY-787-D (5 vs. 8) at six months.

On the basis of the above it would appear that the maximum selling price that could be put on this product at the time was in the order of $1.00/lb. Various discussions with Production personnel lead to the conclusion that this process was not attractive, and no further work to develop this type material was undertaken.

In the light of current price and supply problems with cadmium yellows, these conclusions might be altered.

Julius Jackson

JULIUS JACKSON
RESEARCH DIVISION

mm

Attach.

TABLE I

DATA EX NC 68-2

		Color	Heat Stability vs. 400°F Control			
	Dispersion	400° Control chip	450°	500	550	600
Y-781-D Set 1 SL 86728	High Shear	Control	9 dk	8 dk	6 dk	4 dk
Y-790-D Set 1	High Shear	Green, Intense	8 dk	6 dk	3 dk	1 dk
Y-781 Set 2	High Shear	Control	8 dk	6 dk	5 dk	4 dk
Y-790 Set 2	High Shear	Green	7	3.5 dk	2 dk	1 dk
Y-790 Set 2	Lower Shear	Green Sl Int	8.5 dk	6 dk	5 dk	3.5 dk

TABLE II

DETAILS EX NC 68-24

Sample	Loading PHR	Color at 400°F	Heat Stability vs. 400°F Chip 450	500	550	600
KY-790-D(00282)	2.0	Control	7 dk	5 dk	3 dk	1 dk
KY-781-D(SL-86728)	1.0	(not given,would be dark and red)	8 dk	6.5 dk	4 dk	2.5 dk
1877-39A Toner	1.0	dk red dull vs opaque	7 dk	4.5	2.5	0
1877-39B(50% Ext. of A)	2.0	Red-s dk, s dull vs opaque	8.5	6	4.5	2
1877-39C Toner	1.0	v dk, dull, red vs opaque	7	4	2	0
1877-39D (50% Ext. ofC)	2.0	Red, vs dk, vs dull sl opaque	9.5	8	6.5	4

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Filing Specialists

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