KN-68-6

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NEWARK PLANT

PIGMENT COLOR RESEARCH REPORT

SUBJECT: DEVELOPMENT OF "KROLOR" ORANGE YELLOW, KO-789-D

PERIOD COVERED: September, 1966 to July, 1968 (part time)

SUBMITTED BY: J. JACKSON DATE SUBMITTED: 9/6/68

APPROVED BY: A. A. BRIZZOLARA DATE RELEASED: 9/11/68

ABSTRACT
This report is concerned with the development of an orange shade molybdate red (light, yellow masstone and strong yellow tint) "Krolor"-type pigment for use in plastic and paint trades. The excellent combination of light stability and chemical and thermal resistance should lead to other applications for this product.

I. INTRODUCTION

The introduction of the "Krolor" line (silica-coated chrome yellows and oranges) to the trade provided new outlets for our chrome yellows and molybdate reds. Fullest exploitation of this line of products necessitates having the widest possible range of colors and properties.

Sales requested the development of a "Krolor" based on a lighter masstone-stronger yellower tint type product such as YE-421-D to expand the "Krolor" line based on YE-698-D, which is the base for "Krolors" KO-777 and KO-786.

II. SUMMARY AND CONCLUSIONS

1. A shipping lot (SL-90787-1) has been set up as a temporary standard for this code. This product appears adequate in properties for the plastics trade; but may not yield high enough gloss levels for some paint applications. Sales' present thoughts for paint use involve universal colorants where gloss is not a problem. References #5, 11.

2. Samples of calcium Staybelite treated (SW-00278) and zinc Staybelite treated (SW-00306-1) have been prepared and evaluated at Newark and Chestnut Run. Both products show markedly improved gloss levels in paint systems, with the zinc Staybelite product being preferred because of a tendency toward soft films (after baking or air drying) exhibited by the calcium-treated products.

Calcium and Zinc Staybelite-treated pigments cause gelation in vinyl solution (VYHH/VMCH) systems not shown by products treated with Emory 3554D/Igepal CO630 only. Reference #12.

3. KO-789-D types not treated with zinc or calcium Staybelite are markedly superior to other calcium Staybelite-treated "Krolors" in laminates where water dispersibility is a factor.

4. The utilization of presscake instead of dry color has not been successful. No real explanation has been found for this. This finding also applies to other chrome yellows and oranges utilized in "Krolor" manufacture.

III. RECOMMENDATIONS FOR FUTURE WORK

1. If the sales developments on this code demonstrate the need for improvements in gloss levels, the scale-up of the zinc Staybelite-treated type product (SW-00306-1) is recommended.

2. For applications where higher water dispersibility is needed, "Krolors" may be treated with Emory 3554/Igepal CO630 combinations instead of Staybelite treatment. These will result in better dispersions. Samples of these types based on "Krolor" Orange Y and "Krolor" medium yellow (1848-50D,E) have been submitted to Chestnut Run for evaluation. Reference #13.

1848-17	Continue study of ball milling dry color base - omitting Tamol 850. Study SiO_2 level and Emory 3554D/Igepal C0630 treatments.	1. Not as good as 2A indicating predispersion aided by Tamol 850. 2. Lower SiO_2 (10%) not as good as 20% level.
1848-20,22	Continue study of homogenization of dry color study SiO_2 levels, homogenization pressures.	1. 5000 PSI OK. 2. Highest SiO_2 best. 3. Excellent chemical stability in paint achieved.
1848-23	Study of pH prior to SiO_2 treatment. Use predispersions of dry color - homogenized.	1. pH 9.0 - 9.6 similar.
1848-32	Study of time cycle of SiO_2 treatment using presscake type base.	1. 5 hr. cycle better than 2-1/2 hr. cycle.
1848-33	Study of time cycle of SiO_2 treatment using dry color base.	1. Dry color superior to corresponding presscake. 2. Little difference between 5 hrs. and 2-1/2 hr. cycle.
1848-36	Attempt to develop colloid milling route using sodium silicate and Tamol 850 in multiple passes instead of homogenizer for simplifying equipment needs.	This route may be feasible, but more testing is required. Availability of homogenizer might be a deciding factor. Use of Tamol 850 seems to reduce thermal stability in plastics.
1848-39	Study reasons for inferiority of presscake. Dry at 80° - 200°F. Test via homogenization route.	All dried samples were similar to each other and superior to each other and superior to control ex presscake.
1848-42	Study use of Igepal C0630 Pluronic F-68, Surfynol low as presscake dispersants via homogenizer route.	Degraded quality of "Krolor".
1848-46	Study effect of texture treatments after SiO_2 deposition - Emory 3554D Igepal C0630, calcium Staybelite treatments.	None of the treatments used texture, enhance the plastics thermal stability or abrasion resistance results.
1848-47	Utilizing later developments of processing reconfirm need for homogenization.	Definitely required.

1848-53,55	Studies on use of YE-637-D as a base for KO-789-D type product. 53-homogenized, finished various ways. 55-colloid milled.	1. Use of YE-637-D is inferior to YE-734-D type bases. 2. Less than 20% SiO_2 is not most desirable. 3. Neither Ca Staybelite or Emory 3554D/Igepal CO630 treatments enhanced plastics stability results. 4. Ca Staybelite-treated products gave higher gloss in paint and soft finishes. 5. Excellent lightfastness and chemical resistance achieved in paint. 6. Greater intensity of color and apparently equal light stability (typified by SW-01000 type) seem to preclude interest in the YE-637-D approach.
1848-58	Development of a simple abrasion test.	Subsequently used to test all pigments.
1848-63	Test J.F.Higgins 9.0 CrO_4/ MoO_4 1.25 x batch sized SW's 00124-2 in place of YE-734-D.	1. Not fully equivalent to YE-734-D. 2. Presscake inferior to dry color.
1877-3	Study use of YE-734-D press-cake in presence of various amounts Na^+.	1. Addition of Na_2SO_4 had a very small beneficial effect.
1877-14	Study effect of colloid milling at various concentrations 1.25 - 3.75 lbs./gal. and multiple passes.	1. All approximately equal. 2. 2nd pass - no improvement. All OK.
1877-17, 26	Study effect of extending KO-789-D with Dow-Latex DL860 (polystyrene) 20-50% extension.	Abrasion resistance improves as % increased.
1877-23	Study concentration of N983/N27 for SiO_2 treatment and time of addition.	Increases in concentration and shortening time of addition of these solutions should be possible for plastics applications, with homogenizer type processes.

1877-29	Calcium Staybelite-treated "Krolor". Study variations in $Al_2(SO_4)_3$ coagulation and pH.	All gave high gloss products and soft films in 30J. Omission of Al^{+3} treatment did not adversely affect thermal stability or abrasion resistance in plastics.
1877-30	Study (1) use of KWood rosin, Tall oil rosin in place of Staybelite resins, (2) strike concentrations.	1. Staybelite results in very high gloss soft panels not shown by other rosins. 2. Increased batch size via increased concentration for KO-789-D seems feasible.
1877-33	KO-789-D treated with Carboset #531 (acrylic emulsion).	Not of interest.
1877-34	Comparison of calcium and zinc Staybelites.	Zinc Staybelite gives good gloss levels accompanied by normal film hardness levels.
1877-43	Comparisons of zinc Staybelite and zinc Palmitate treatments versus prior art pigments.	Being studied for patent reasons.
1848-59, etc.	Studies of dehydration of the "Krolor" pigments SW-01000, 00200, etc. were made by baking dry color for periods of 30 mins. to 2 hrs. at 260-350°F.	Initial abrasion resistance markedly benefited. Mechanism may involve dehydration of SiO_2 shell. Subsequent tests made after prolonged storage showed effect to be reversed back toward original. See WRNC 67-23.

B. Semi-Works Studies Ref: DSN 67-2

Reference	Object	Conclusion
YE-421-D, 44157	To obtain base material for "Krolor".	YE-421-D omitting petronate and turkey red oil is a satisfactory base. This type material was formerly coded YE-734-D and is presently coded YC-1-D as a raw material for "Krolor" orange.
00997	Scale-up 1848-10B_2 and 1848-32D colloid milled only. Presscake used as YC-1-D source.	Quality in plastics inferior to lab goal. Comparable in thermal stability to YE-777-D, 86729
00200	Colloid mill dry color YC-1-D as base material.	00200 superior to YE-777-D, 86729. Very poor gloss in paint systems. Dry color

		base superior to presscake. Sales accepted this lot as a goal for standardization of plant quality for plastics.
00201	Dry color YC-1-D used as base for "Krolor" and sample predispersed via colloid milling and homogenization.	These products were found to be superior to 00997 and 00200 (1) in thermal stability and abrasion resistance in plastics, (2) in gloss levels and durability in paint systems. See Exp. Series 67417, 67424.
01000	Dry color YC-1-D used as base for "Krolor" and sample colloid milled and homogenized.	
00278	YC-1-D type base (dry) made like 01000 except treated with 10% calcium Staybelite.	Very slightly inferior to 01000 in plastics stability. Superior to 01000 in gloss paint, but films tend to be excessively soft. Correctable by increasing bake temperature or lengthening cure cycle.
00306	YC-1-D type base (dry) made like 01000 except 10% zinc Staybelite treatment.	Plastics results similar to calcium Staybelite essentially equal to control not Staybelite treated. Superior to 01000 type in paint gloss and normal in film hardness. Excellent all around product. See Exp. Series 68445. Evaluated at Chestnut Run in plastics (see NC-68-20).

TABLE I

SAND MILLED - 30J ALKYD

	P/B	Mills to Complete Hiding	20° Gloss	Film Hardness
YE-637-D, 82739 (Control)	.65	2-1/4	55-56	Normal
KO-789-D, 00278 (10% Ca Staybelite)	.65	2-1/2	70-71	Soft
KO-789-D, 00306-1 (10% Ca Staybelite)	.65	2-1/2	68	Normal

C. Plant Development Studies - DSN 67-2

Reference	Object	Conclusions
Lot 52097	YC-1-D dry base. Scale-up of SW-00200 type. Colloid milled only.	Satisfactory reproduction of SW-00200 in plant operation. Product as expected lighter, yellower in color and superior

		in thermal stability and abrasion resistance to YE-777-D, 86729. ("Krolor" standard of dk.red M.T.type.) Chestnut Run tests show superiority in plastics vs. SW-00200.
52134	Scale-up of SW-01000 type using YC-1-D and homogenizer only.	1. Preferable to colloid mill prior to homogenization. 2. Superior plastics performance vs. 52097 or YE-777-D, 86729, and OK vs. SW-01000. 3. High speed pulverization yields better gloss in paint at expense of small degradation in plastics. 4. Gloss levels in paint lower than YE-421-D or YE-637-D types. 5. Gloss levels improved by addition of calcium Staybelite to paint grinds (pre-dry mixing) but films tend to be softer. 6% level optimum properties. See Exp.Series 68445, 68447.
52225	Dry base YC-1-D attempt to colloid mill and homogenize.	1. Homogenizer failed during run. 2. Quality level in plastics sl. better than 52097 (colloid milled only). 3. Plastics quality inferior to 52134 lot.
52814	Increase batch size. Dry base YC-1-D. Attempt to colloid mill and homogenize.	1. Homogenizer failed, subsequent investigation showed that previous use (homogenizing N852) just prior to lots 52225, 52814 is probably cause of erosion of ball valves and rods, due to acid attack of metal.
53079	Larger batch size. Dry base YC-1-D. Colloid milled and homogenized. Analysis showed 19% SiO_2 in final product.	1. Plastics evaluation shows product to be similar to 52134 and better than 52097. 2. Paint properties superior to 52134. See Exp.Series 68445, 68447.

TABLE I - COLOR COMPARISONS - RUBOUT

Lot #	YE-734-D Lot #	Method of Dispersion Colloid	Homog.	MT	Base Color vs YE-421-D Strength	Tint		YE-789-D Lot vs. SW 00200	
52097	51259	x	-	lt_4D_8	98	Y_{10} D_4	dk_8 1/6 D_{17}	106	$R_{16}D_{16}$
52134	51260	-	x	$lt_6R_4D_4$	96	Y_{10}	lt_6 Y_{10} D_{17}	92	Y_{15}
52225	(51260 (51259	x	Partially				$dk_{13}D_{29}$	100	R_{11} D_{11}
52814	52379	x	"	R_6 D_6	99	Y_{10}	lt_2 D_{16}	92	Y_{15} I_4
53079	(52378 (52378	x	x	lt_{12} D_{15}	98	Y_{15}	$lt_{15}Y_{15}D_{24}$	87	Y_{29}
Mix 90098-1		x	Partially	-	-	-	lt_2 D_6	97	Y_{15}
SW00200	46965-1	x	-	$dk_4R_{14}D_{14}$	93	$Y_{18}I_{15}$	-C O N T R O L -		

NOTE - Poor correlation between base color and "Krolor"

TABLE II - POLYSTYRENE TESTS vs SW 00200

Heated at	Pre Fluxed Resin 20 min/400°F	20 min/600°F	Abrasion Test (1848-58) 20 min/600
52097	sdk,sy,sl dull	vvs yellow	vvs intense
52134	slt,sy,sl int	sl lt,l int.	lt, intense
52225	vvs red	sl lt, sl int	slt, sl int.
52814	slt,sy,sl int	sl lt, sl int	slt, sl int
53079	slt,sy,sl int	sl lt, sl int	slt, sl int
Mix 90098-1	vs lt, sl int	slt, sl int	= (?)

All lots with the exception of plant mix were superior to SW 00200, with the homogenized lots having a small superiority. Chestnut Run requested to examine these lots, to determine the future course of commercialization (See NC 67-54)

Research To Follow Ext 265 J Jackson
Homogenize is described before & after Run

245 Preparation of Lot C.V. 53079

MAKING INSTRUCTIONS: BATCH UNIT

D.V.

PROCESSES		APPROVED BY
(C) YE-789-D	( )	FSC 11-22-67
( )	( )	AMJ 12-4-67
( )	( )	RG 12-4-67
( )	( )	
TYPED BY		
SC 12-4-67		

CO 04 CODE YE-789-D PKG.

53079 ~~JAN 1 '68~~ Jan 23 6P

EST. WGT. 680 LBS.

STD. HRS. TIME 7A M

Lot Removed 9078-1

444 2056SV

01 YE734D 52379
01 YE734D 52378

TOTAL WGT 3180# (REQ 80343) NON-BLEEDING

EQUIPMENT		NAME: "KROLOR" ORANGE Y	USE LBS.	N CODE	ACCT. LBS.
PREP 1	~~1~~	CHECK AND, IF NECESSARY, COUPLE BOTH METERING PUMPS TO DRIVE SHAFT			
	~~2~~	OBTAIN FOR STEP 10 1250 LOT 52379 LOT	~~447~~	YE-734	~~447~~
	~~3~~	OBTAIN FOR STEP 25 1250 LOT 52378 LOT	~~2056~~	YE-734	~~2056~~
	~~4~~	WEIGH IN DRUM FOR STEP 8	165	983-D	165
	~~5~~	WEIGH IN DRUM FOR STEP 23	165	983-D	165
	6	OBTAIN FOR STEP 47	1914	983-D	1914
339 2	~~7~~	RUN 47" (376 G) WATER INTO V-339			
	~~8~~	POUR IN N-983-D FROM STEP 4			
	~~9~~	STIR 2 MIN	WATER ON		
	~~10~~	DUMP IN YE-734 FROM STEP 2			
	~~11~~	STIR 2 MIN OR LONGER TO SMOOTH SLURRY → MAKE SURE			
LM 3	~~12~~	PUMP V-339 THROUGH CM AT ZERO SETTING INTO ALM #			
	~~13~~	START AGITATOR			
	~~14~~	WHEN V-339 MT IMMEDIATELY SHUT OFF CM			
		NOTE: DO NOT LET CM RUN DRY			
339 4	~~15~~	RUN 12" (98 G) WATER INTO V-339			
LM 5	~~16~~	PUMP V-339 THROUGH CM AT ZERO SETTING INTO ALM			
	~~17~~	WHEN V-339 MT IMMEDIATELY SHUT OFF CM			
SV 6	~~18~~	INSTALL CHART IN V-245 TEMP RECORDER } PUT UP ABOVE			
	~~19~~	RUN IN 29" (1450 G) WATER }			
	~~20~~	RUN IN ALM THROUGH HOMOG AT 4800-5200 PSI ← STARTED AT 9:30 A.M.			
		NOTE: COLLECT IN DRUM MATERIAL HOMOGENIZED BELOW 4800 PSI & RETURN TO ALM			
	~~21~~	WHILE HOMOGENIZING START AGITATION WHEN SLURRY LEVEL REACHES AGITATOR STARTED HOMOGENIZING at 9:30 A.M.			
339 7	~~22~~	RUN 47" (376 G) WATER INTO V-339			
	~~23~~	POUR IN N-983-D FROM STEP 5			
	~~24~~	STIR 2 MIN			
	~~25~~	DUMP IN YE-734 FROM STEP 3			
	~~26~~	STIR 2 MIN OR LONGER TO SMOOTH SLURRY			
1 8	~~27~~	WHEN VOLUME IN ALM PERMITS PUMP V-339 THROUGH CM AT ZERO SETTING INTO ALM			
	~~28~~	WHEN V-339 MT IMMEDIATELY SHUT OFF CM			
		NOTE: DO NOT LET CM RUN DRY			
339 9	~~29~~	RUN 12" (98 G) WATER INTO V-339			

PAGE 2 CG 04 CODE (C)YE-789-D EST. WGT. 3180 LBS.

			USE LBS.	N CODE	ACCT. LBS.
	30	PUMP V-339 THROUGH CM AT ZERO SETTING INTO ALM			
	31	WHEN V-339 MT IMMEDIATELY SHUT OFF CM			
	32	METER IN 800 WATER STARTED TO RUN IN AT 11			
	35	RUN IN ALM THROUGH HOMOG INTO SV			
	34	RECORD: pH 10.7 (10.3-10.7)			
	35	IF NECESSARY ADJ TO pH 10.3-10.7 RECORD: pH		33-D	
		ASSUME 50%		7-D	
	36	HEAT TO 190-194°F IN 60-65 MIN			
		RECORD: TIME START 11	PH 10.2		
	37	RECORD: ACCURACY HT °F & RECORDER °F			
		RECORD - INCHES			
	38	RUN 4" (110 G) WATER INTO V-343			
	39	WEIGH IN RUBBER-LINED DRUM & POUR INTO V-384		27-D	286
		M 1,76[illegible]			
	43	PUMP V-384 INTO V-343			
	44	FILL V-384 WITH WATER & PUMP INTO V-343			
	42	REPEAT STEP 41			
	43	ADJ V-343 TO 55" (1512 G) WITH WATER			
	44	STIR 10 MIN FOR STEP 53			
	45	RUN 6" (284 G) WATER INTO V-349			
	46	POUR ±30 G WATER AT 120-130°F INTO V-384			
	47	WEIGH & POUR IN N-983-D FROM STEP 6 INTO V-384 AS VOLUME PERMITS & PUMP INTO V-349			
	48	WHENEVER PUMP RATE DROPS OFF REPEAT STEP 46			
	49	FILL V-384 WITH WATER & PUMP INTO V-349			
	50	REPEAT STEP 49			
	51	ADJ V-349 TO 25" (1202 G) WITH WATER			
	52	STIR 10 MIN FOR STEP 55			
	53	RECORD SV pH 10.2 (9.5-9.8) PH.			
	54	IF NECESSARY ADJ TO pH 9.5-9.8 RECORD: pH 7.8	8	33-D	
		ASSUME 50%		7-D	
	55	METER IN V-343 & V-349 SIMULTANEOUSLY AT 5 GPM IN 230-250 MIN. MAINTAIN SV AT 190-194°F DURING STRIKE			
		RECORD: TIME START FINISH			
		RECORD: INCHES: V-343 V-349 V-343 V-349	STARTED 4 GPM		
		START 55 24 4 HOUR 11 0			
		1 HR 44 18 5 HOUR 0			
		2 HR 33 12			
		3 HR 22 6			
	56	WHEN LEVEL IN V-349 IS ±1" IMMEDIATELY ADJ TO 7" (371 G) WATER WHILE CONTINUING METERING IN V-343 & V-349			
	57	WHEN V-343 OR V-349 MT SHUT OFF METERING PUMP & DRAIN V-343 & V-349 INTO SV			
	58	TURN OFF STEAM			
	59	STIR 5 MIN FOR STEP 71			
	60	RUN 34" (245 G) WATER IN V-357			
	61	TURN ON AGITATOR & STEAM			
	62	DUMP IN	328	15-A	328
	63	HEAT TO 80-120°F			
	64	STIR 5 MIN OR LONGER TO DISSOLVE			
	65	DURING STRIKE CLEAN HOMOG & CM PER STANDARD PRACTICE	25	3-A	25

DUP050028384

UIPMENT		PAGE 3 CG04 CODE (C)YE-789-D EST. WGT. 3180 LBS.	USE LBS.	N CODE	ACC LBS.
DRUM 17	66	RUN IN ±30 GAL WATER			
	67	HEAT TO 130-140°F			
	68	POUR IN	32	978-A	3
	69	POUR IN	6	979-A	
	70	STIR TO UNIFORMITY			
SV 18	71	RECORD SV pH 3.5 (7.0-8.5) Very low! adjusted to 7.4 with 2 N NaOH			
	72	RUN IN V-357 IN 3-4 MIN			
	73	STIR 5 MIN			
	74	POUR IN ASSUME 50%	150.	7-D	15
	75	STIR 5 MIN			
	76	RECORD: pH 3.4 (6.2-6.5)			
	77	IF NECESSARY ADJ TO pH 6.2-6.5 RECORD: pH 6.4 ASSUME 50%	80	7-D 27-D	
	78	POUR IN N-978-A/N-979-A FROM STEP 70			
	79	STIR 10 MIN			
	80	FLOOD TO 153" (7619 G)			
	81	PRESS WITH AGITATION			
		pH 6.5 at end			
		TIME START TIME FIN OPTR			

REV.

9008-1	Mix of plant lots 52097, 52134, 52225, 52814, 53079 for study.	Satisfactory in plastics performance to 00200 set up as good by Sales for release to the trade.
90293-1	"Vortac" mill portion of 90098-1 like YE-421. Regular speed magnehelic .14-.17. Feed 3-1/2.	1. Plastics tests all very close to each other and 90098-1. No effect from "Vortac" remilling.
90294-1	"Vortac" mill portion of 90098-1 like YE-779. High speed magnehelic .17-.20. Feed 3-1/2 - 4.	2. Paint gloss markedly improved as a result of regrinding in "Vortac" mill with high speed type 90294-1 best.

TABLE III

(1) "Vortac" milling of unextended YE-789-D

YE-789-D, 90294-1 (Hi-Speed "Vortac" mill - like YE-779-D)

YE-789-D, 90293-1 (Regular speed "Vortac" mill - like YE-421-D)

(2) Zinc Staybelite treatment (10%)

YE-789-D, 00306-1 Hi-Speed micropulverized

00306-2 Lo-Speed micropulverized

Paint evaluations are tabulated below.

30J - SAND MILLED

(All sprayed to complete hiding - red and grey Morest Chart)

	Lot	P/B	20° Gloss	Mills to Complete Hiding	Film Hardness
YE-637-D	82739	.5	55-56	2-1/4	Normal
YE-789-D	00278	.65	70-71	2-1/2	Soft
YE-789-D	00326-1	.65	68	2-1/2	Normal
	00326-2	.65	61-66	2	Normal
	90098-1*	.65	36	2-1/2	Normal
	90294-1	.65	48-49	2-1/2	Normal
	90293-1	.65	44-46	2-1/4	Normal

*Control micropulverized then "Vortac" milled as 90293-1, 90294-1.

These results indicate (1) continued finding of excessive softness of calcium Staybelite product, (2) zinc Staybelite treatment seems to be a satisfactory alternative, (3) "Vortac" milling of unextended YE-789-D may be satisfactory since gloss deficiencies vs. YE-637-D are small.

90787-1	Remix of 53079 for sampling to the trade. Temporary std.	1. Better plastics properties than 00200 (Sales goal).
90818-1	Similar to the above.	See Exp. Series 68445. 2. Gloss levels of mixes 90787-1, 90818-1 were unexpectedly high (better than original plant lot readings!)
90789-1,2	Remix of 52097, 52225, 52814,90098-1,90293-1, 90294-1. Mad to standardize stock.	OK for plastics trade.

Miscellaneous Evaluations on KO-789-D

The following samples have been included in various type evaluations at Chestnut Run.

KO-789-D, lot 52134 - Exp.Series P-68808 - Vinyl Plastic.
KO-789-D, 53079 Colloid milled and homogenized.
52097 - Colloid milled only.
52134 - Homogenized
90098-1 - Mix all current production.
Evaluated in Plastics NC-67-34 3/20/68
Asbestos Flooring
See also Plastics Exp.Series P-68805, 68806

KO-789-D, SW-01000 PVA Emulsion Paint - Bennett's
Excellent alkali fastness. WR 6606-608-75-67 12/20/67

KO-789-D, SW-01000 "Dalvor" Fluorocarbon Resin G-67-34 9/8/67
Better color retention than conventional oranges.
Better adhesion than KO-786-D and KO-787-D which contained calcium Staybelite.

VI. REFERENCES

1. Miscellaneous Product Improvement Studies - September, 1966 - Julius Jackson

2. Research Notebooks 1848, 1877 - J.Jackson

3. Development Section Notebook DSN-67-2 - J.Jackson

4. NC-67-11 Evaluation KO-789-D in Plastics Evaluation 00997, 01000, 00200 5/1/67

5. R.H.Zabel - W.S.S. "Krolor" Orange YE-789-D 5/4/67 (copy att.)

6. NC-67-23 Evaluation KO-789-D in Plastics 8/30/67

7. NC-67-34 Evaluation KO-789-D in Plastics 3/20/68

8. Work Request NC-68-20 Evaluation of KO-789-D, SW-00306-1 7/17/68

9. KO-789-D, Check List HA - PDG 5/13/68

10. KO-789-D, Check List JJ - PDG 5/15/68

11. R.J.Lombardo - R.A.Hageman KO-789-D 6/21/68o

12. Sherwin Williams KY-787 Reactivity in Solution Vinyls - W.W.Spencer - G.R.Porter 8/2/68

13. Medium Yellow for Laminates JJ - W.W.Riches 8/7/68

14. Physical Properties KO-789-D, SL-90789 L.W.Pancoast 6/24/68
Physical Properties KO-789-D, SL-90787 L.W.Pancoast 8/15/68

15. New Product Release - "Krolor" Orange Y - KO-789-D R.H.Zabel 8/29/68

16. "Krolor" Evaluation Bennett's PVAc Emulsion Paint 6606-608-75-67

dc

Ref #5

K-13004

E. I. DU PONT DE NEMOURS & COMPANY
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J. Jackson - Newark
W. F. Spengeman/H. B. Clark-C.R.
J. A. Lamiet/T.B.Reeve/A.F.Lewis-CR

Wilmington, Delaware
May 4, 1967

W. S. STRUVE
PIGMENTS
NEWARK PLANT

"KROLOR" ORANGE Y YE-789-D

After reviewing Chestnut Run's closeout on NC Work Request 67-11 (issued 5/1/67), and exhibits prepared in conjunction with this work, we recommend the following:

CLEARED Nov 1967

1 - Proceed with development of "Krolor" Orange Y YE-789-D equal to SW Lot 00200 (2 passes through colloid mill). As soon as patents covering this product are filed and Research and Production agree on a method of production, we will arrange limited sampling of Semi-Works Lot. 00200 or any other material you wish to select as representative of material we will produce on a commercial scale.

YE637D

2 - It is suggested Chestnut Run evaluate YE-789-D Lot 00200 in selected paint systems.(1) It would be desirable to check gloss, chemical resistance and lightfastness versus Molybdate Orange YE-421-D, and any other orange pigment now in use. Newark should issue an NC Work Request. Hopefully this material will prove satisfactory in at least on systems where YE-789-D might be used in volume.

Note(1) - Consideration might be given to a "32J", Universal Colorant, and a selected trade sale finish.

3 - Sales requests a program be started or continued to improve abrasion resistance of "Krolor" Orange R YE-777-D and "Krolor" Yellow Light Y-781-D using the colloid mill. An estimate of when such products might be available for Chestnut Run evaluation, and limited trade sampling, will help guide our promotional plans.

NSC/C.V.1

Sales has selected material made via dry color and colloid milling route (SW Lot 00200) even though a product made via dry color, colloid milling, homogenizing (SW Lot 01000) is slightly better in heat stability (resistance to abrasion). This decision is based on known production problems which will be encountered with a homogenizer, and the fact colloid milled material is so much better in abrasion than current YE-777. We feel most plastic compounders will be able to use YE-789-D using their conventional processes and equipment.

This does not mean we should stop working for still better materials with still higher resistance to abrasion. However, we do not want to delay release of YE-789-D or any other new "Krolor" pigment while waiting for "perfect products". Availability of a broader color range, plus the degree of improvement shown by YE-789-D SW Lot 00200, should accelerate sales of "Krolor"pigments.

R. H. ZABEL

RHZ:MW