

Cross Reference:-

- (1) SBO-1013-F
- (2) Archer-Daniels-Midland Co.
- (3) Pittsburgh Plate Glass Co.
- (4) Central Soya Co.
- (5) Pillsbury Mills, Inc.
- (6) SBO Alkyds
- (7) 764-042

Mr. R. L. Selby, Lab.
Mr. E. C. Fitzgerald, Lab.
Dr. L. F. Stone, Toledo

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Philadelphia Laboratory
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MEMORANDUM REPORT NO. M-285

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EVALUATION OF LOW COST SOYA BEAN OILS

Introduction:

It is apparent that if non-break type of oils or other oils having less refinement could be used in alkyds, a considerable saving could be made in our products. One of these products, 764-042 uses RC-114, a 52.4 soya bean alkyd. At present, H-59, an alkali refined soya bean oil, is used in this alkyd at a premium of 1.6¢ over crude oil, thus a saving could be made if one of the oils listed below were substituted for H-59.

<u>Oil</u>	<u>Supplier</u>	<u>Premium over Crude Oil</u>
Clarified Raw Soya Oil	Archer-Daniels-Midland Co.	0.6¢
Excelsior Non Break Soya Oil	" " " "	1.2¢ (possibly 1.0¢)
Non-Break Soya Oil #210	Central Soya Co.	0.5¢
Soya Oil	Pillsbury Mills, Inc.	0.8¢
SO #900 Selected Soya Oil	Pittsburgh Plate Glass Co.	----
H-59	-	1.6¢

Summary & Conclusion:

Based on laboratory tests 764-042 type primers containing RC-453 analogs made with the above low cost oils are comparable to the H-59 controls. However, plant trials of these primers are necessary to determine whether plant production will be satisfactory, especially in humidity cabinet performance.

From our laboratory data and cost data, we recommend that plant trial batches of 764-042 be made using Soya Oil from Pillsbury Mills and Non-Break Soya Oil #210 from Central Soya Company. In addition, we recommend a plant trial of SO-900 Selected Soya Oil from Pittsburgh Plate Glass Company. Although we have no cost information

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on this oil at present since it is being produced in pilot plant quantities only, we believe that it will be in line with the other low cost oils.

Excelsior Non-Break Soya Oil is not recommended because of its higher cost as compared to the above recommended oils. Clarified Raw Soya Oil is not recommended because ADM cannot guarantee its uniformity and non-break quality.

Experimental Details:

The oils evaluated were made into RC-453 analogs. The constants for these alkyds, shown in Table I, are within the specifications for RC-453.

These alkyds were then evaluated in 764-042 and tested for stability, film properties, humidity cabinet performance, resistance to grease spalling and Florida durability. Initially, the primers have comparable balance of properties to 764-042 control, although they may vary in individual tests from the control. In one test, several primers appeared softer than the control, however, check tests indicated comparable hardness. Several of these primers show considerable bodying after storage of 3 to 5 months, however, the bodying of this primer was no greater than the bodying of 764-042 control.

Table II shows the specification for the various non-break oils. Further details will be found in Notebook #5127, pages 5 to 51 and Exposure Series #10835, and #10891.

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H. A. Wray
H. A. WRAY

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TABLE I

CONSTANTS OF RC-453 ANALOGS

	<u>Standards</u>	<u>PRCR-47020</u>	<u>PRCR-47019</u>	<u>PRCR-47048</u>	<u>PRCR-47028</u>	<u>PRCR-47021</u>	<u>PRCR-47158</u>
Oil		H-59	Clarified Raw	Central Soya	Excelsior Non-break oil	Pillsbury Soya	Pittsburgh SO #900 Oil
Solids	60.0% $\pm$ 1.0%	60.5%	60.5%	59.8%	60.5%	61%	60.4%
Viscosity	Y to Z-1	Z-1	Z-1-1/4	Z+1/4	Y+1/2	Z	Z
Acid Number	4.5 $\pm$ 1	4.9	4.2	5.0	4.8	5.0	5.28
Color	4 $\pm$.5	3.4	3.1	3.4	2.9	3.1	3.0
Gallon Weight	8.01 $\pm$.05	8.01	8.02	8.00	8.00	8.02	8.02
Cloud	-----	Haze	Haze	Cloud	Haze	Haze	Sl. Haze

Thinner = H-202/H-287 = 40/60

TABLE II

OIL SPECIFICATIONS

Name of Oil	Clarified Raw	Excelsior Non-Break	Superb	#210 Non-Break Soya Oil	Soya Oil	Selected Oil #900
Code	--	--	(H-59)	KH-3759	KH-3758	KH-3760
Supplier	ADM	ADM	ADM	Central Soya Co.	Pillsbury	P. P. G.
Specific Gravity	0.924 Min.	0.924 Min.	0.924	-	0.915-0.920	0.922
Saponification Number	190 Min.	190 Min.	190 Min.	-	190-195	-
Iodine Number	130 Min.	130 Min.	130 Min.	-	130-133	130 Min.
Acid Number	1 - 3	1 - 4	0.3 Max.	About 1.0	0.2 Max.	2 Max.
Color (Gardner 1933)	12-App.	8 - 9	6	10 - 11	13 - 14	11 Max.
Break	-	-	-	0.07 Max.	0.02 Max.	Negative
Viscosity	A - B	A	A	A	A	A-