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Marshall Laboratory
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MEMORANDUM REPORT #M-669

REFERENCE COPY

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TWO PURPOSE AND TINTED HOUSE PAINTS MADE FROM SOYA PE OIL

Introduction:

Two Purpose house paint and house paint tints are borderline for wrinkling. The wrinkle resistance can be considerably improved by the use of a soya PE vehicle. Soya PE formulas have been developed and our field experience and durability studies on soya PE house paints have been reviewed. Initial properties and exposure background of Two Purpose and house paint tints are covered by this report. Field experience and exposure background of self-cleaning house paints are reported in Memorandum Report #M-670 which is issued simultaneously with this report.

Summary and Conclusions:

Compared with linseed oil paints soya PE paints are better in wrinkle resistance, through dry and color (white), lower in solids, and about the same for other properties.

A formula is ready for trial production and trial marketing if this is considered desirable.

Cost is increased about 7¢/gallon in the tints or 3¢/gallon in the whites.

Details:

A comparison of properties is shown in the attached table.

N35487

Wrinkle Resistance:

Wrinkle resistance is improved. At low temperatures and moist conditions and at 120°F. soya PE paints tested in films up to 7-1/2 mils thick do not wrinkle. At low temperatures the present linseed oil vehicle wrinkles at dry film thicknesses between 2 and 3 mils thick. Linseed oil films have occasionally wrinkled in brushouts at room temperatures.

Dry:

Through dry is improved and probably accounts for the above wrinkle resistance.

Color:

Initial color and color in the can of the two purpose white can be improved. The extent of improvement will depend on the ability of the plant to make a clean vehicle. A sample submitted by Spencer Kellogg is very clean and gives a definite improvement in color as does one sample made by the Marshall Laboratory. Manganese floating is not changed.

Solids:

Soya PE paints run about 5% lower in solids by volume. This is desirable because in some linseed oil tints (Live Oak Green) the solids are so high that there has been no thinner added to plant production and one batch was low in viscosity even with no thinner added and had to be bodied with 348-18323, ammonium stearate emulsion.

The lower solids partially offset the higher oil cost when the soya PE costs more.

Durability:

Exposures show that soya PE vehicles are equal to linseed for durability up to the 3 years at which we have evidence. See Memorandum Report #M-670 for durability evidence with other pigmentations.

In the calcium carbonate formula (40% PV) soya PE tints are no different from linseed tints for cleanliness. However, the same exposure study (11377) shows that there is an advantage for soya PE when magnesium silicate is the extender. Apparently the improved cleanliness of calcium carbonate paints overshadows the small improvement in cleanliness previously attributed to soya PE.

We do not have any evidence on a soya PE white containing 100% "Ti-Pure" R-610 (Two Purpose). An approximation of the mildew resistance and cleanliness of a soya PE Two Purpose white house paint may be deduced by analogy to the lighter colored tints. Florida north vertical exposures which accentuate mildew growth show no advantage for soya PE over linseed in a light cream paint. The same is true of Delaware exposures where several tints are exposed.

When asbestine is the extender soya PE is more flake resistant than linseed over yellow pine in Texas. Data shows that when calcium carbonate is used the difference doesn't exist.

Cost:

Costs of linseed oil paints are lower as shown in the table. The linseed oil tints use all raw linseed oil. The Two Purpose uses some refined linseed oil which costs a premium of 2¢ over raw oil. This accounts for the difference in the cost of tints and Two Purpose as seen on the attached table.

Raw material costs are based on 14.3¢/# soya oil acids. The soya PE paints will be reduced approximately 4¢ per gallon for each 1¢/# lowering of the soya acids cost.

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COMPARISON OF LINSEED OIL HOUSE PAINTS WITH SOYA PE HOUSE PAINTS

INITIAL PROPERTIES

Property	Linseed Oil House Paint	Soya PE House Paint
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Wrinkling

Ratings are in dry film thickness at which wrinkling occurs.

Moisture blistering room (38°F., Moist)	2.2 mils	Greater than 7.5 mils
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Outdoor test	3.2 mils	Greater than 7.5 mils
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Brushing by the Interchemical Viscometer Method

Yield	154 Dynes/cm	153 Dynes/cm
Visc.	2.9 poise	2.7 poise
Stormer	83 KU.	84 KU.

Duplicate brushing data determined from batches made from different lots of oil.

Yield	160 Dynes/cm	149 Dynes/cm
Visc.	3.4 poise	3.7 poise
Stormer	82 KU.	82 KU.

Sag Resistance

Sag blade reading Brushmarks	8-1/2 mm rounded	10 mm rounded
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Color

Improved
(see text)

Dry

TF Time Atlas Toppler Test	10 hours	10 hours
Through Dry Modified Bell Test	29 hours	14 hours

Gloss

ASTM-60° gloss	* 17%) 50%)	55%
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*Wrinkling interfered with this reading even though the panel was dried at room temperature.

Solids

% by volume	96%	91%
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Linseed (cont.) Soya PE (cont.)

Raw Materials Cost

Tints	\$1.42/gal.	\$1.49/gal.
Two Purpose	1.46	1.49

Durability

Series #11377 3 years old (See text for discussion.)

Mildew Resistance and Cleanliness

Series #11377 Cream 3 sets of exposure panels, Florida N.V. 95% limits
 ± 0.42 R-610 pigment

MgSiO ₃ extended	*7.16 $\pm$ 0.42)	(not a significant	7.11 $\pm$ 0.42
CaCO ₃ " (39% PV)	7.31 $\pm$ 0.42)	difference)	7.29 $\pm$ 0.42

After 3 years Delaware exposures show a consistent advantage for Soya PE when magnesium silicate is the extender. There is no difference when calcium carbonate is the extender.

* Ratings are levels of cleanliness graduated on a 0-10 scale where 10 is perfect. The levels are established by photographic standards.

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