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COMPETITIVE PRODUCTS REPORT

REVIEW OF WHITE HOUSE PAINT

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REVIEW OF WHITE HOUSE PAINT

Introduction:

Under Wilmington Trade Sales Investigation WT-454, #40 Outside White has been compared with 16 Competitive Outside White House Paints. The list of paints is given in Table I.

Summary:

Trends in House Paint Formulation:

Most competitive house paints still have the wartime vehicle with approximately 3.75# of oil per gallon. Two conflicting trends are shown by products which have attempted to improve on the wartime quality:

1. Du Pont and several other manufacturers have attempted to restore the good brushing of prewar paint by increasing the oil content. The other manufacturers in this group are National Lead, Montgomery-Ward, and Bruder. The National Lead paint is sold at a premium price. The increased oil content results in a somewhat higher cost than that of the wartime paints with a similar pigmentation. In the Du Pont product this increase in cost has been minimized by omitting the basic carbonate white lead that was in the prewar formula.

2. The second trend is represented by the new Devco and Reynolds' One Coat White and to a lesser degree by Pittsburgh Plate Glass. In these paints hiding has been raised by increasing the titanium oxide content, but both have the same oil content as wartime formulas. The Devco and Reynolds paint has a specially processed vehicle of excellent non-penetrating quality. Both have high gloss when applied to previously painted surfaces, and both are very poor in brushing. The cost of such products is low because of the low oil content and because both of them use lead-free zinc oxide to save the cost of the lead pigment. For several reasons, we would expect that such products might be applied in thin films with resulting poor durability. On the other hand Devco makes claims of superior durability for its product. The durability will be carefully checked by test fence exposure.

Glidden has recently announced a new One Coat White. We have not yet received a sample in this laboratory.

Several trends toward lowering the cost without harming quality may be noted. The first trend is the use of soya oil in the vehicle. Du Pont pioneered this development; two major manufacturers, Pittsburgh and Sherwin-Williams have followed. It is probable that there is soya oil in the new Devco & Raynolds' One Coat White and in a number of local products which do not carry a label analysis.

Another trend to lower cost is the use of lead-free zinc oxide. Both Pittsburgh and Devco have already adopted lead-free compositions. We have had the technical background to adopt lead-free house paint for a long time, but have been prevented up to the present because the grades of known durability were not available in sufficient volume. We expect to be able to release a lead-free formula for general sale in the near future in order to take advantage of the cost saving.

Competitive Position of #40 Outside White:

The superiority of #40 Outside White in the present state of competition is in easy brush application. Combined with this are good gloss and freedom from flashing. The only other paint which has this particular combination of properties is National Lead. The paints which remain on a wartime formula not only are poorer in brushing but are poorer in gloss and tend to flash. With the appearance of the Pittsburgh Plate Glass lead-free formula and more recently with Devco & Raynolds' One Coat White, products have been offered that have enamel flow and gloss. #40 White does not match these products in gloss, but is better than most other competitors. In hiding likewise it is better than most competitors but does not attempt to match the high hiding which has been put into the Pittsburgh and Devco & Raynolds products.

The outstanding deficiency of #40 Outside White at the present time is color. Of all the competitive paints, it ranks last in color of the wet paint and ranks twelfth in the color of the dried film. The wet color of the present #40 White is poorer than either the prewar or wartime #40. The dry color is about equal to prewar #40, although it is not as good as the wartime #40. The basic reason for the poor color of the current #40 Outside White is the fact that it has higher solids content than most competitive paints. When the oil and extender contents are reduced, as in wartime #40 White, the color is better than most competitive paints. We have also recognized recently that the grades of leaded zinc oxide and talc extender are relatively poor in color.

There has been criticism of the appearance of #40 Outside White in the can before it is stirred. This is chiefly a question of rapidity of settling. The current #40

Outside White settles out rapidly with a rather deep layer of supernatant liquid; this liquid is deep enough to hide the white color of the pigment below it. Paints of the oil saving type have better suspension of the pigment and show a much shallower layer of supernatant liquid, so that the color of the pigment shines through. On the other hand, this same type of suspension will likely result in caking on long standing.

Apart from the initial reaction of the customer, neither the wet color nor the appearance in the can before stirring have any actual relation to the performance of the paint. The color in the freshly dried film, however, is important for real satisfaction to the customer.

Projected Improvement in Color:

There are developments in progress which will provide some improvement for all these aspects of color. A lead-free white, 301-867, has now been released for trial sale in Atlanta. It has slightly better wet color than 301-864 and is definitely better in the color of the freshly dried film. Since it also shows somewhat slower settling of the pigment, with a shallower layer of supernatant liquid in the can, the appearance in the can before stirring is improved. Adoption of this or a similar formula would put us about average for color as compared with the range of competitive paint.

The high soya alkyd-modified white adopted for trial sale in Trenton, 301-839, is definitely better than 301-864 in wet color and is outstanding in color of the dry film. The film is whiter than the best competitive paints, including Devco & Reynolds' One Coat White. The appearance in the can before stirring is approximately equal to prewar white or to 301-867 described above.

An improvement in color can be made by raw material substitutions. The previous grade of leaded zinc oxide supplied by American Zinc Sales Co. has already been replaced by better colored material from Eagle Picher. Steps are being taken to replace W-132 talc by extender of better color. The step that will probably be taken is to replace the entire extender blend, including W-132 talc, W-4 asbestine 3X, and W-34 barytes, by low oil absorption magnesium silicate, W-58 or KW-3624. This will improve the color. It will also produce a better appearance in the can unstirred because barytes will be eliminated; the high density of barytes causes more rapid settling than magnesium silicate.

Estimates of Durability:

The paints in this investigation will be exposed on the test fence for determination of durability. Some

durability results on a few of the products are already available, since we have long time exposure on Sherwin-Williams paint and about 12 months exposure on a number of products investigated last year. In comparison with the competitive paints of relatively low solids content employing an oil saving vehicle, we believe that 301-864 will be more durable because a thicker film will be obtained at equal spreading rate. We have deliberately maintained the hiding of this product at a level which is somewhat above that of most competitive paints but within the normal range so that the paint will not be spread too far. In self cleaning 301-864 is equal or superior to most competitive products - including Pittsburgh Plate Glass, Sears-Roebuck, Benjamin Moore, and the Devco & Reynolds Standard #547 White. It is slightly less clean than the National Lead White and Sherwin-Williams. Steps are being taken to increase the free chalking pigment slightly so that the product will be equal to these two paints in the future. It is less clean than one local product, Bruder, which shows excessive chalking and would be unsatisfactory from the standpoint of running of the chalk.

Cost:

The raw material cost of our product is higher than most competitive paint because we have increased the oil and solids content. The high-hiding enamel type paints made by Devco & Reynolds and Pittsburgh are considerably lower in raw material cost; this is because their one feature is a relatively high titanium oxide content while they maintain a low oil content at the expense of poor brushing properties. The National Lead White is considerably higher in cost because it contains a large amount of lead pigment for policy reasons. Our cost is not so high as some of the oil saving paints that maintain a conventional pigmentation with considerable amounts of lead pigment, such as Sears-Roebuck.

There are a number of possibilities to lower the cost of our product with possible slight improvements in quality; the most important of these is the adoption of a lead-free formula. Other immediate possibilities are the adoption of 301-863 with the higher soya content in place of 301-864, and elimination of Barytes from the extender composition by use of low-oil absorption Asbestine.

Details:

The experimental data are presented in Tables II and III and in the accompanying bar charts.

Composition:

The composition of the competitive paints is shown in Table II. This has been calculated from the label analysis where that was available. In other cases, the solids content, oil content and approximate pigment volume have been calculated from the determined percent solids by weight and the gallon weight. Raw material costs have been calculated for the important competitive paints using Du Pont calculating cost figures for August 1948. For the paints which contain soya oil, these figures are now rather out of date; in particular 301-863 should show a considerable saving at present.

Brushing:

Brushing is based on the opinion of a highly experienced laboratory painter. In estimating brushing the paint was lapped in after drying 5 minutes in order to determine the ease of lapping. The lapped panels were examined for gloss and flashing after the film had dried.

Drying:

Drying tests were carried out at normal temperature of 77°F and at low temperature, approximately 50°F. The paint was applied at two spreading rates corresponding to a normal film thickness and a heavy film. The data for the normal film are reproduced in Table III. Although it would be expected that the oil saving paints should dry and harden through better than paints such as 301-864 with a relatively high proportion of unbodied oil, actually it is found that 301-864 dries as well as most of the competitive paints which have an oil saving vehicle. The Pittsburgh Plate Glass paint is particularly slow drying; this is a lead-free paint at low pigment volume. The Devco & Reynolds' One Coat White is better in drying than Pittsburgh; it has a higher pigment volume, although it is also lead-free.

Color:

The most reliable method of comparing color both of the wet paint and of the freshly dried film is to rate the paint visually. This visual rating is shown in Table III on arbitrary scales. The scales are different for wet color and for dry color. In addition the color of each paint both wet and dried has been measured on the Beckman Spectrophotometer as an absolute measurement. This measurement has three factors describing (1) the brightness and (2) the two numerical values which indicate the hue. The brightness reading is reproduced in Table III. It should be noted that a difference of less than 2.0 units in the brightness reading is one that is hardly perceptible to the eye.

Hiding:

Hiding was determined by measurement of contrast ratio at various spreading rates. The spreading rate was controlled by drawing the films down over black or white glazed paper with a Bird applicator. Estimates of hiding were also made visually and the theoretical hiding for the composition of the paint was calculated according to a method in Gardner's "Physical and Chemical Examination of paints". The value shown in Table III is an estimate taking all these methods into account. It is believed that the values determined in this manner are accurate to about 10 sq. ft. per gallon.

Modifications of #40 Outside White:

A number of other Du Pont products were included in the tests but are not shown in Table III. They include 301-756 #40 Outside White on the prewar and wartime formulas, 301-867 Lead-Free Outside White and 301-839 Trenton White. These products have been discussed in the Summary of this report although they are not listed in the table.

Presentation by Bar Charts:

The bar charts in Figures 1, 2 and 3 present the data from the Tables graphically. The values for solids content by volume and raw material cost in Figure 1 are taken directly from Table I. The values for hiding in Figure 1 are taken directly from Table II.

In Figure 2, composite values are shown both for ease of brushing and for gloss. The values for ease of brushing in Figure 2 are the sum of the ratings for initial ease of brushing and for lapping that are given separately in Table II. The values for gloss in Figure 2 are the sum of the ratings for gloss and for flashing at the lap that are given separately in Table II; the two ratings are combined because they go together to make up the initial appearance of the dried film.

The values for drying time in Figure 2 are an average of the four drying times listed in Table II:

1. Touch dry at 77°F
2. " " " 50°F
3. Through dry at 77°F
4. " " " 50°F

To present the drying time graphically, the ordinate axis of the chart has been reversed. A long drying time means a short distance from the base line and a low order of value, while a short drying time means a long distance from the base

line and a high order of value. The chart, then, is read in the same direction as all the other charts when comparing paints for the order of excellence.

The values for color in Figure 3 are taken directly from Table II. For the visual ratings, the numerical designations have been omitted because they are purely arbitrary; the important thing is the order between the paints that are compared.

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TABLE I - SAMPLES OF COMPETITIVE WHITE HOUSE PAINT

<u>Sample</u>	<u>Manufacturer</u>	<u>Name</u>
SR-42334	M. A. Bruder & Sons	Stay-White Outside House Paint
SR-42368	Cook Paint & Varnish Co.	Outside White House Paint
SR-42338	Cutler's Paint Stores	Outside Double White
SR-42364	H. B. Davis Co.	Outside White Ready Mixed House Pa
SR-42363	Devos & Reynolds Co.	#547 Outside White Gloss House Pa
SR-42308	" " "	White One-Coat House Paint
SR-42333	Felton, Sibley & Co., Inc.	Outside Gloss White Super-Lastic
SR-42365	The Glidden Co.	Outside White Gloss Endurance Pain
SR-42337	Boston Varnish Co.	675 Outside White Kyanize Super-S
SR-42362	Benjamin Moore & Co.	Outside White House Paint
SR-42352	National Lead Co.	#110 Bright White Dutch Boy House
SR-42335)	Pittsburgh Plate Glass Co.	1-54 Titanic Outside White Sun-Pro
SR-42361)		
SR-42366	Sears, Roebuck & Co.	143 Master White Master Mixed Hous
SR-42339	Sherwin-Williams Co.	471 Gloss White SWP House Paint (I
SR-42336	" " "	" " " " " " (I
SR-42358	Montgomery-Ward & Co.	75-1 Titanium White Super House Pa

*New formula: contains soya and tung oil