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SUBJECT

HOUSE PAINT PRIMER STUDIES OF 1935 SERIES

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General Statement

This report on house paint primers is supplementary to "Outline of Exterior House Paint Primer Studies," distributed at the Technical and Operating Meeting of November, 1935. The general description of formulations and physical characteristics of these primers may be found by referring to the above bulletin. Further copies may be obtained on request.

Purpose

The purpose of the 1935 exposure series was to cover the basic features of house paint primer formulations in a systematic manner. A study was made of the fundamental features of house paint primer formulations as suggested by the current literature and the leading pigment companies such as the National Lead Co., New Jersey Zinc Co., Titanium Pigments Co., Krebs Color & Chemical Co. and Sherwin-Williams. The various primers in the series were formulated so that a complete study could be made of the vehicle and pigment composition.

The vehicle was studied from the standpoint of the proper proportions of volatile to non-volatile, raw oil to processed oils and the effect of the presence of resins. The pigments were studied from the standpoint of pigment volume concentration, and composition. The grape pigments used were white lead carbonate, lead titanate, zinc sulfide and titanium pigments. The white lead content was held quite high in most of the formulations. The inerts studied were silica, dead burned calcium sulfate, mica, asbestine, Celite #110, aluminum powder, serecite, and flake graphite. Six competitive exterior house paint primers purchased on the market along with white lead in oil were also included in these tests.

Application

The exterior primers were applied on 6 inch clapboard siding both edge-grain white pine and flat-grain yellow pine. All paints were applied out-of-doors and allowed to dry for 48 hours before recoating. One-third of each panel was painted with a guide paint of S.W.P. Outside White (present Titanium Dioxide type) with three coats being applied and reduced according to label directions.

The balance of each panel was primed with an experimental exterior primer with two additional coats of SWP Outside White on the center section and one coat over the end section, producing 3 coat and 2 coat jobs respectively. All units were exposed vertical, south in the latitude of Chicago for a period of two years which is regarded as sufficient for preliminary indications of failure.

Observations On Two Coat System

Upon examination of these tests, it becomes quite evident that the two coat system as advocated by several competitive paint manufacturers, particularly Devoe and Raynolds is very much inferior as to durability compared to the standard three coat practice. All of the two coat exposures now show very clearly the lack of opacity due to erosion and a considerable number are showing a definite checking type of failure, indicating lack of proper protection to the wood.

Among the competitive exterior primers there were none in the two coat work which appeared equal in general appearance to SWP Outside White which was applied as three coat work. The degree of failure on the two coat system is much more evident on the Southern Yellow Pine than on the Northern White Pine panels. This difference could not be noted in the three coat system with primer.

All formulations carrying lead titanate are showing a definite checking type of failure and in several cases where a definite percentage of mica

when introduced in conjunction with the lead titanate, the failure was very bad. The failures are apparently due to the extremely soft film that is produced by the use of lead titanate and flaky inerts, such as mica.

Among the competitive exterior primers exposed the only two that are still in good condition are Benjamin Moore's Moorwhite Primer and U. S. Gutta Percha's "Barrelled Sunlight Outside Undercoater." The Barreled Sunlight Undercoater also produced the best appearing two coat job as it was rather high in opacity.

On all of the 77 experimental two coat systems tested, a definite cracking and checking failure has started except those shown below. The film integrity of these is still good, but as stated above, the opacity and general appearance is inferior to the regular three coat self primed system such as used on the "guide."

Primers of Satisfactory Performance to Date

18 S	Pigment, 90% White Lead, 10% Zinc Sulphide: For vehicle see previous report.
19	Pigment, 90% White Lead, 10% Titanium Dioxide: For vehicle see previous report.
21	Pigment, 76% White Lead, 9% Zinc Sulphide, 15% Asbestine
22	Pigment, 76% White Lead, 9% Titanium Dioxide, 15% Asbestine
23	Pigment, 76% White Lead, 9% Titanium Dioxide, 15% Mica
36	Pigment, 38% White Lead, 37% Titanox B, 25% Asbestine (MW-401 Primer)
40	Pigment, 40% White Lead, 10% Mica, 40% Lead Titanate, 10% Asbestine
49	Pigment, 100% White Lead
52	Pigment, 88% White Lead, 12% Aluminum Powder
56	Pigment, 30% White Lead, 39% Leaded Zinc 35/65, 9% Titanium Dioxide, 8% Asbestine, 14% Aluminum Powder

Reasons of Satisfactory Performance to Date Continued

[illegible] Pigment, 30% White Lead, 39% Leaded Zinc, 9% Titanium Dioxide, 8% Asbestine, 14% Mica.

[illegible] Pigment, 29% White Lead, 54% Leaded Zinc 35/65, 4% Asbestine, 13% Aluminum Pd.

[illegible] Pigment, 29% White Lead, 54% Leaded Zinc 35/65, 13% Mica, 4% Asbestine

[illegible] Pigment, 12% White Lead, 38% Titanium Dioxide, 25% Silica, 25% Asbestine

[illegible] Pigment, 64% White Lead, 19% Titanox B, 7% Zinc Oxide, 10% Asbestine

[illegible] Pigment, 35% White Lead, 45% Leaded Zinc 35/65, 10% Titanium Dioxide, 10% Asbestine

[illegible] Pigment, 35% White Lead, 45% Leaded Zinc 35/65, 10% Titanium Dioxide, 10% Asbestine

[illegible] Pigment, 68% Leaded Zinc, 2% Titanium Dioxide, 30% Asbestine

[illegible] Pigment, 35% White Lead, 45% Leaded Zinc 35/65, 10% Titanium Dioxide, 10% Asbestine

Observations of Three Coat System

In making a direct comparison of the three coat system where the special exterior primer and two additional coats of house paint were applied versus the regular three coat system, we find that several of the exposures show a slight surface cracking. These are principally the lead titanate types where the under coat has remained soft. The guide coat of Rx 471 SWP Outside White self-primed is in good condition on all exposures. The two and three coats of white lead in oil showed bad checking and bad dirt collection.

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