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NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT
Final Report

Miniature Panel Series #66
Evaluation of Ammonia Salt and Phosphate
Modification of Zinc Yellow

Period Covered: February, 1943 - November, 1943.

FILE:

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Final Report

Title: Miniature Panel Series #66
Evaluation of Ammonia Salt and Phosphate
Modification of Zinc Yellow

Period Covered: February, 1943 - November, 1943.

SUBMITTED BY: G. Grimm *G. Grimm* DATE SUBMITTED: 8/23/44

APPROVED BY: F. E. Bolton *F. E. Bolton* DATE ISSUED: 10/21/44

10/20/44

INTRODUCTION:

The promise shown by ammonium ferrous phosphate as a metal protective pigment opened conjecture as to the effect of ammonia and phosphate modifications of Y-232-D on the performance of zinc yellow in metal primers. Research suggestion #265 proposed phosphated zinc yellow in the expectation that the phosphate ion would contribute to the rust inhibitive quality of the pigment. Suggestion #405 recommended the ammonium salt of zinc yellow to replace the potassium salt manufactured at present.

A series of zinc yellows embodying the suggested modifications was prepared in the laboratory, based on Y-232-D with the necessary alteration in the formula to produce the following pigments:

- 285-43A Y-232-D (K1554) control
- B " NH_4 " salt of zinc yellow
- C " K^+ " " " " " ("Na" free)
- D Phosphated zinc yellow
- E "Na" salt of zinc yellow ("K" free)

A partial evaluation of these pigments was made in the miniature panel series 66. Further evaluation was carried out in the paint laboratory exposure series 6747.

CONCLUSION:

The " NH_4 " salt and the phosphated zinc yellow demonstrated no advantage over Y-232-D. In the single pigment primers, the suggested modifications were definitely inferior to the standard material; in combination with iron oxide and extender their performance was equal to that of Y-232-D.

The exposure curves of the zinc yellow/ Fe_2O_3 /Jasperine primers indicate that the sodium free zinc yellow is markedly superior to the standard Y-232-D. However, the result must be weighted by the fact that the Y-232-D/ Fe_2O_3 /Jasperine showed abnormal behavior in that previous experience demonstrated improved performance of the combination with Fe_2O_3 /Jasperine as compared with single pigment zinc yellow primer; in this case the combination appears to have impaired the performance of Y-232-D.

SUMMARY:

The exposure curves of the primers exposed in this series have been plotted at the end of this report. The data have not been summarized in tabular form as the curves were believed to be self explanatory.

The partial analysis of the modified zinc yellows is tabulated below:

		% Cl	% SO ₃
985-43A	Y-232-D (K1554) Control	0.006	3.32
B	"NH ₄ " salt	0.979	0.14
C	"K" salt ("Na" free)	0.053	0.83
D	Phosphate modification	0.012	0.71
E	"Na" salt	4.542	2.51

The high chloride content of the sodium salt makes questionable the evaluation of that sample. Its poor behavior may be inherent or may be due to the abnormally high content of corrosive containment.

EXPERIMENTAL DETAILS:

The following primers were ground in one half pint ball mills with steel balls:

Primer	Pigmentation	Weight Ratio
958-70A	958-43A, Y-232-D Control	100
B	B, "NH ₄ " salt	"
C	C, "K" salt (Na free)	"
D	D, Phosphate Modification	"
E	E, "Na" salt	"
F	958-43A/Fe ₂ O ₃ /Jasperine	60/20/20
G	B/ " "	"
H	C/ " "	"
I	D/ " "	"
J	E/ " "	"
K	Fe ₂ O ₃ /Jasperine	50/50

In every case the pigment volume was 40% in KV-15 (50/50 alkyd/R.L.O.).

Duplicate 1" x 3" cold rolled steel panels were sanded and solvent wiped then coated with the test primers using the "Dry Brush Technique", (± 0.2 mil dry film).

The exposure was carried out in the roof moisture condensation box: sun and weather during the daylight hours with positive moisture condensation at night.

For complete exposure details refer to notebook 958, experiment 70.

