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NEWARK PLANT
PIGMENT COLOR RESEARCH REPORT

Final Report

Miniature Panel Exposure Series #68
A.F.P. Analogues on Magnesium

Period Covered: Complete Exposure

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NEWARK PLANT

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Final Report

Title: Miniature Panel Exposure Series #68
A.F.P. Analogues on Magnesium

Period Covered: Complete Exposure

SUBMITTED BY:

G. Grimm *G. Grimm*

DATE SUBMITTED: 8/25/44

APPROVED BY:

F. E. Bolton *F. E. Bolton*
9/17/44

DATE ISSUED: 10/18/44

INTRODUCTION:

The preparation and the evaluation of complex ammonium phosphates on steel has been reported in KN-43-163. The present series sought to evaluate applicable compounds on light metals. The following materials were studied:

Ammonium magnesium phosphate, D-5115
Ammonium calcium phosphate, 1039-4B
Ammonium calcium meta-phosphate, 1039-4C
Ammonium aluminum phosphate, 956-6D
Ammonium zinc phosphate, D-5132
Ammonium ferrous phosphate, SW-6123

The exposure was on magnesium panels in a modified Navy 52-P-18 primer, with and without zinc yellow.

CONCLUSION:

The salt water immersion panels showed some promise for ammonium magnesium phosphate and ammonium ferrous phosphate in combination with zinc yellow as primer pigments in a light metal primer. The inclusion of these phosphate pigments in a zinc yellow primer improved its performance; each had about equal effect. When the phosphate compounds were the sole inhibiting pigments the performance was definitely inferior to the zinc yellow control.

No conclusions were drawn from the miniature panel moisture condensation exposures; the films had been nearly completely eroded but no corrosion was in evidence.

SUMMARY:

The results of immersion of miniature panels in 3% Turk Island salt solution have been tabulated at the end of this report. No moisture condensation data are available; after eight month exposure (0.2 mil film) the paints were badly eroded but no corrosion was evident. In the case of the ammonium zinc phosphate exposure (D-5132) the surface was covered with clear, colorless crystals, as yet unidentified.

EXPERIMENTAL DETAILS:

The primers described in the tabulation were prepared by half pint ball mill. 1" x 3" Dow metal panels (J-1 alloy) were given the Dow #7 surface treatment (acidic sodium bichromate bath). Duplicate panels were painted 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.

Similar single panels were prepared for immersion in a 3% solution of Turk Island Sea Salt (D-4226). Before immersion the

lower portion of the panels was scratched ($5/8'' \times 5/8''$ area) in a cross hatch pattern ($1/16''$ between lines) to this bright metal.

The paints containing ammonium calcium metaphosphate showed excessive reactivity that resulted in bad bodying; these paints were not exposed.

For further details refer to notebook 1039 experiment 5.

PANEL	PIGMENTATION		WEIGHT RATIO		DOW IMMERSION PANELS (3% TERK ISLAND SALT) CORROSION AT SCRATCHES		GENERAL APPEARANCE	
					DAYS IMMERSION			
1039-5A	Ammonium Mg Phosphate (D-5115)/R. Sienna/Ti Pure O/Lab. 3X		55/5/15/25		2	37	138	OK OK OK
B	" Ca " (1039-4B)	"	"	"	severe	"	"	sl V sl sl Corr. Corr. Corr.
C	" Ca H-Phosphate (1039-4C)/	"	"	"	Not exposed because of excessive reactivity.			
D	" Al Phosphate (958-6D)/	"	"	"	v slight severe ^①	OK	OK	OK OK
E	" Zn " (D-5132)	"	"	"	vv slight	"	v severe	" severe Corr.
F	" Fe " (SW-6123)/	"	"	"	severe	"	severe	" " OK
G	Elms Yellow, Y-539-D	/	"	"	Trace	slight ^②	"	" " "
H	D-5115/Y-539-D/R. Sienna/Ti Pure O/Lab. 3X		16/39/5/15/25		vv slight slight slight ^②	"	"	" sl Corr.
I	1039-4B/	"	"	"	v severe	severe	severe	" " sl Corr.
J	1039-4C/	"	"	"	Not exposed because of excessive reactivity.			
K	958-6D/	"	"	"	v slight	severe	severe	OK OK OK
L	D-5132/	"	"	"	v severe	severe ^③	severe ^③	OK OK severe Corr.
M	SW-6123/	"	"	"	Trace	slight	slight	OK OK sl Corr.
Bare Panel (Dow #7 Treatment)					None	None	Severe	Cons. sev. Corr. Corr. Corr.

All primers 40% pt in VT-282, 35 gal Tung/Linseed Phenolic Varnish.

- ① Pitted
② Small holes thru panel
③ Large hole thru panel