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House Paint
House Paint Primer
Gloss.

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Mr. B. 52

MEMORANDUM REPORT M-433

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GLOSS VARIATIONS OF NEW HI GLOSS OUTSIDE WHITE

Recently, in preparation for a Trade Sales meeting at Philadelphia exhibit panels of the New HI Gloss Outside White (301-892) were prepared. These exhibit panels were prepared according to label directions. The new #40 Outside White was applied over the regular house primer 347-817, and also over itself reduced with one quart of raw linseed oil to the gallon.

The panels when dried showed spotty gloss, that is, these were patches on the panels that were flat or nearly so. This peculiar spotty gloss was worse on the panel where the primer was the new #40 reduced with linseed oil.

To investigate this uneven gloss, panel tests were conducted by the Marshall Laboratory. In these tests, the primers were applied at three different spreading rates, then the topcoat applied at two spreading rates on each board.

SUMMARY:

Three factors have been found to influence the gloss level and the uniformity of gloss:

1. A thin topcoat produces lower gloss and more gloss variation.
2. The type of primer influences the gloss. The gloss is highest when 301-892 is used as primer without addition of oil in the first coat.
3. The spreading rate of the primer has little effect on gloss when 301-892 is self-primed. The House Primer, 347-817, is more sensitive to differences in spreading rate; the gloss is lowest over thin coats of 347-817.

As a practical conclusion, 347-817 House Primer is deficient in holdout as compared with self priming. Improvement is desirable.

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The spotty gloss of the exhibit panel is the result of uneven application, with low gloss where the topcoat is thin.

ACTION PROPOSED:

Uniformity of gloss was one of the properties reported in the extensive field trial of 301-892. Since the reports were consistently favorable, no action on 301-892 appears necessary.

Improvement of the holdout of 347-817 will be suggested as an objective under P-1047, the house paint support project.

DETAILS:

The three primers, 347-817, 301-892 reduced (4/1 H-253), and 301-892 unreduced were applied at three spreading rates to duplicate clapboards: 450, 600 & 750 sq. ft./gallon.

The topcoat, 301-892, was applied at two different spreading rates, 500 and 750 sq. ft./gallon, to each board. The primer was four days old before the topcoat was applied.

After the topcoat had dried for 24 hours, each section of each board was rated visually for gloss and uniformity. Further gloss measurements were made after 48 hour dry, using the 60° Photovolt gloss meter. There were eight gloss measurements taken from each section of each board, that is eight from the side where the topcoat was applied at 500 sq. ft./gallon, and 8 from the side where it is 750 sq. ft./gallon.

The values in Table I, are the average 60° gloss of two boards at a given spreading rate. The standard deviation has been calculated, and the results have been tested statistically. Three variations have an effect that is statistically significant:

1. Topcoat spreading rate
2. Primers
3. Primer spreading rate for 347-817 only; there is no significant variation of gloss with spreading rate of the primer for the self-primed systems.

The values in Table II are the range of gloss among light readings at different places for one paint system on a single panel. This is a measure of the spottiness or variability of gloss independent of board-to-board variation or large differences in spreading rate. The values in the table are the average range for two boards. A complete analysis of variance has been calculated for these values. The only significant effect comes from the topcoat spreading rate. This means that the gloss is more variable with a thin topcoat than with a thick one.

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Notebook Reference: 3832 p. 181-184, 3830 p. 61-69.

MARSHALL LABORATORY

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TABLE I

60° GLOSS OF TWO COAT SYSTEMS ON NEW WOOD

Primer	Primer Spreading Rate sq.ft./gal.	Topcoat Spreading Rate	
		500 sq.ft./ gallon	750 sq. ft./ gallon
347-817	450	78%	67%
	600	66	55
	750	66	57
301-892 reduced	450	64	63
	600	68	63
	750	69	64
301-892	450	73	70
	600	76	69
	750	75	69

Each value in the table is the average of two determinations. Standard deviation of a single determination; 4.3% (18 degrees of freedom)

TABLE II

RANGE OF GLOSS ON A SINGLE PANEL

Primer	Primer Spreading Rate sq.ft./gal.	Topcoat Spreading Rate	
		500 sq.ft./ gallon	750 sq. ft./ gallon
347-817	450	12	27
	600	16	26.5
	750	11	24.5
301-892 reduced	450	17.5	26
	600	13.5	18.5
	750	11.5	20.5
301-892	450	17	22.5
	600	9.5	20
	750	16.5	18.5

Each value in the table is the average of two determinations. Standard deviation of a single determination: 6.2 (18 degrees of freedom)