PLAINTIFF'S
EXHIBIT
UC-508

Technical Service Report

by

M. L. Arnold

SEVERAL COMPARISONS OF FLEXBOND 315 AND UCAR 360 LATEXES

for

Fiberboard Paper Products Corp.
San Francisco, California

Jennat Corporation
A Subsidiary of Union Carbide Corporation
Gardena, California
July 17, 1967

A22995

SEVERAL COMPARISONS OF FLEXBOND 315

AND UCAR 360 LATEXES

INTRODUCTION

Over the past two years several latex evaluations comparing Ucar 360 and Airco's Flexbond 315 have been made by the Tarrytown and Jennat laboratories. This report covers three of these investigations.

In one examination (Evaluation I) the Ucar 360 was "plugged in" the Airco's recommended High Hiding interior formulation for Flexbond 315. A direct comparison was made between these two latices.

In another evaluation (Evaluation II) Ucar 360 was compared to an East Coast manufactured commercial paint based on Flexbond 315. In this specific examination the Ucar 360 was checked in the pigment grind of the commercial paint and in Union Carbide's Formulation I-1212 (55PVC; $1.26/gal. RMC).

In Evaluation III, Flexbond 315 and Ucar 360 resins were examined in Formulation I-1210 (53PVC; $1.16 gal. RMC). This time a commercial paint of West Coast origin based on 315 latex was used as a control.

SUMMARY

Evaluation I

Ucar 360 proved to be superior to Flexbond 315 in scrub resistance and marginally better in leveling. The Airco resin showed specific advantages in color development and touch-up properties

A22996

Published by AsbestosClaims.Law
asbestosclaims.law/library/15747/2

Evaluation II

When Ucar 360 latex was compared to Flexbond 315 in the manufacturer's pigment grind, both systems were essentially equal. However, when the commercial paint based on 315 was compared to a Ucar 360 paint formulation of approximately the same raw material cost, the 360 latex easily outscrubbed the control paint and was considered better in such important properties as wet crocking, reflectance, and leveling.

Evaluation III

In this evaluation, again Ucar 360 excelled in scrub resistance when likened to the Flexbond 315 paints. One other significant feature of Ucar 360 was demonstrated on this examination. In areas of heavy paint "build-up" caused by perhaps an over loaded brush, the Ucar 360 paint resisted cracking whereas both paint systems employing 315 showed severe cracking and checking.

In considering all the test data, it is clearly established that Ucar 360 is a most versatile and top-rated vehicle. Ucar 360 latex offers several distinct advantages, particularly in scrub resistance when compared to Flexbond 315.

DISCUSSION

In the three evaluations, the testing and panel preparation, for the most part, followed the established procedures of the Tarrytown and Jennat laboratories.

The can property tests such as viscosity, freeze-thaw, heat stability, and the film properties which include hiding, reflectance, scrub and stain removal were run on the untinted paints.

A22997

All of the application properties and a number of the film property were tested on 1'x 2" Upson board panels. These Upson boards are completely coated by roller with a tinted paint. After drying for several hours another roller coat is applied to the upper half of the panel only. Again, after several more hours, the edges of the panel are brush coated. During the panel preparation the paints are judged for foaming, cratering, and brushability. After 24 hours the panels are examined for color and sheen uniformity, lapping, framing, ghosting, and leveling. The panels are then tested for burnishing, wet crocking, water staining, and touch up.

The burnishing test is performed by firmly rubbing several folds of cheesecloth across the paint for twenty-five strokes. A stroke consists of one back and forth motion. This test was done on the upper left hand corner of the panels. Immediately below the burnished area the results of the wet crocking test appear. The test is identical to the burnishing test except the cheesecloth is wet. Water staining is simply tested by squirting several drops of water on the panel and after drying, examined for streaking and or spotting. This test is usually performed near the lower end of the panel. Paint is brushed on a section in the upper half of the panel and rated twenty-four hours later for touch-up qualities.

In addition to rating leveling by the brushouts on Upson boards, this characteristic was, in some cases, checked by using the New York Production Club leveling blade.

Scrub tests were run using a Gardner Straight Line Washer equipped with a one-pound brush. Paints were applied to Leneta panels with a six mil wet film drawdown blade and dried at room

A22998

temperature normally for seven days. [illegible]
five per cent Lava soap slurry.

Stain removal tests were run on the same [illegible]
paints were air dried also for seven days before testing. [illegible]
was used rather than a brush and Lava soap was rubbed on the brushes
every 50 cycles. The test is terminated at the end of [illegible] cycles.

Evaluation I

Airco's high hiding interior white paint was the test formulation chosen for this evaluation. A pigment grind was prepared and split in half. One portion was let down with Flexbond 315, the other half with Ucar 360 latex. Table I shows the Airco [illegible] formulation.

In this evaluation, Flexbond 315 demonstrated better color development and touch-up properties than the [illegible]

Ucar 360 was clearly superior to the Airco latex in scrub resistanc exhibiting only 20% wear after [illegible] wear for 315. A photograph showing the scrub [illegible] with this report (Appendix I).

The Ucar 360 coating also displayed a [illegible] at best in leveling.

All other properties tested showed the two systems [illegible] Table II for test results.

Evaluation II

In this particular investigation, a commercial [illegible] paint of East Coast origin and based on Flexbond 15 was used as the control. The paint manufacturer supplied a [illegible] the pigment grind to the Tarrytown Laboratory and [illegible]

A22999

on the quantity of Ucar 360 latex required in the "let down" stage. The actual composition of the control paint is unknown. [illegible] in this comparison segment was a Ucar 360 standard test formulation I-1212 (55PVC; $1.26 RMC). The I-1212 formulation (see Table III) is in the approximate raw material cost range of the control paint.

The I-1212 with Ucar 360 was a significantly better paint than the East Coast coating regardless of the latex used. In such properties as wet crock resistance and reflectance, the I-1212 was significantly better; in scrub resistance, the I-1212 was outstandingly better. Only in hide did the test formulation show a deficiency when compared to the commercial paint systems. However, if the I-1212 was "shaded off" to the reflectance of the control paints, it is thought the hiding would at the very least be equivalent. Table IV presents the test data on this phase of work.

Evaluation III

In this final evaluation, Ucar 360 and Flexbond 315 were examined in Formulation I-1210 (53PVC; $1.16/gal. RMC) (see Table V for formulation). A commercial latex paint (RMC $1.19/gal.) manufactured on the West Coast using 315 as the vehicle acted as the control.

The test formulation employing either latex showed significant improvement in scrub and water resistance at a slightly lower RMC when likened to the control paint.

Outstanding improvement in scrub resistance was noted in the Ucar 360 test paint (10 day air dry, 5% lava). After 1,000 scrubs the Ucar 360 showed only 5 percent wear with no break in film continuity whereas the control paint exhibited initial wear at 340

A23000

cycles and at 650 total cycles showed 75 percent wear. In the test paint based on Flexbond 315, first wear was observed at 650 cycles and at 900 cycles 40 percent of the film had eroded.

An interesting result was obtained for a special leveling test. In this specific method for measuring leveling, a piece of pipe (open on both ends) 3/4 inch diameter and 1 1/2 inch height is placed in the center of a glass plate. The pipe is filled to the top with paint and carefully lifted from the glass surface. The diameter of the paint puddle formed is an indication of flow or leveling. The larger the diameter, the better the flow. This test was done at both room temperature and 38° F. No difference in this property was seen between the three paint systems. However, on drying for several days all samples based on Flexbond 315 showed heavy checking and cracking. This cracking phenomenon was not seen in the Ucar 360 paints. This behavior is thought to be indicative of a heavy paint build up on say a wall corner or perhaps from paint drippings. A photograph showing the results of this test is found on Appendix II.

In general, most of the other properties examined in Evaluation III were for the most part considered equal. Table V presents the test data.

On an overall basis, Ucar 360 has demonstrated itself to be a versatile and top-quality vehicle and more than an adequate replacement for Flexbond 315.

Pertinent exhibits regarding these evaluations accompany this report.

M. L. Arnold

A23001

T A B L E I

AIRCO'S HIGH-HIDING INTERIOR WHITE FORMULATION

Ingredients	Pounds
Cellosize QP-4400 (3% solution)	100
Potassium tripolyphosphate	2
R & R 551	8
Igepal CO-630	3
Nopco NDW	2
Ethylene Glycol	25
Titanox RA-46	250
Zeolex 10	35
Al-Sil-Ate W	150
Gold Bond R Silica	50
Phenylmercuric acetate (18% mercury)	0.3
Water	185
Nopco NDW	1
Butyl Carbitol acetate	9
Cellosize QP-4400 (3% solution)	110
FLEXBOND 315	260

Paint Properties	
Yield	100 gallons
Solids	52.8%
PVC	55.4%
Raw Material Cost -	$1.37 per gallon

A23002

T A B L E II

EVALUATION I TEST DATA

UCAR 360 vs Flexbond 315
(In Airco's Formulation)

	Flexbond 315	UCAR 360
Initial Visc. KU	92	91
10 Days at 140°F	92	93
Reflectance, %	92.0	92.0
Contrast Ratio	.975	.975
Leveling (N.Y.P.C.)	.5	.5+
Enamel Holdout	Pass	Pass
Color Development	+	-
Wet Crock	-	-
Touch-up	+	-
Burnishing	-	-
Scrub Resistance		
One Day Wear		
Cycles to First Wear	1115	1220
Total Cycles (% Wear)	1,400 (20)	1,400 (10)
One Week Wear		
Cycles to First Wear	930	1,020
Total Cycles (% Wear)	1,400 (60)	1,400 (20)
Stain Removal	-	+
PVC, %	55.4	
Total Solids, %	52.8	
RMC/Gal. (Approx.)	$1.32	

A23003

- Means average or equivalent.

+ Means slightly better than counterpart.

T A B L E III

I-1212

INTERIOR FLAT WALL PAINT

Test Formulation

Ingredients	Pounds	Gallons
Water	400.0	47.9
CELLOSIZE QP-15,000	5.0	0.4
Tamol 731	6.0	0.7
TERGITOL NPX	3.0	0.3
Ethylene Glycol	15.0	1.6
Butoxyethoxy Propanol	12.0	1.[illegible]
Colloids 581-B	4.0	0.5
Phenyl Mercuric Acetate	0.[illegible]	---
Ti-Pure 901	250.0	[illegible]
Camelcarb	125.0	[illegible]
Al-Sil-Ate W	75.0	3.5
Desertalc 55	50.0	[illegible].1
UCAR 360 (55 N.V.)	260.[illegible]	2[illegible].9
	1204.	100.0

PVC = 55%
Total Solids = 54%
Weight/gal. = 12 pounds
RMC = $1.26/gal.

A23004

T A B L E IV

TEST DATA - EVALUATION II

	Commercial Paint Flexbond 315	Commercial Paint Ucar 360	I-1212 Ucar 360
Viscosity, K.U.			
Initial	86	[illegible]	94
7 Days at 140° F.	95	91	--
Freeze-Thaw, cycles	5+	5+	[illegible]
Leveling	poor	poor	good
Color Acceptance	OK	fair	OK
Wet Crock Resistance	fair	fair	good
24-Hour Touch-Up	good	fair	good
Reflectance, %	87.0	[illegible]	94.0
Contrast Ratio	.992	[illegible]	.[illegible]
Scrub Resistance			
1 Day Dry	500	500	[illegible]

A23005

Published by AsbestosClaims.Law
asbestosclaims.law/library/15747/11

T A B L E . V

EVALUATION III

I-1210

INTERIOR FLATWALL PAINT

Ingredients	Pounds	Gallons
Water	421.0	50.5
Tamol 731	5.0	0.6
KTPP	2.0	---
TERGITOL NPX	1.0	0.1
Colloids 581-B	6.0	0.8
Ethylene Glycol	20.0	2.2
Butyl CARBITOL Acetate	15.0	1.8
PMA 30	0.5	---
Ti-Pure R-901	200.0	5.7
Cold Bond R Silica	50.0	2.3
Al-Sil-Ate W	100.0	4.5
Vicron 15-15	75.0	3.3
CELLOSIZE QP-15,000	5.5	0.4
UCAR 360 (55% N.V.)	250.0	27.8
	1151.1	100.0

PVC = 53%
Total Solids = 49%
RMC = $1.16/gal.

A23006

Published by AsbestosClaims.Law
asbestosclaims.law/library/15747/12

TABLE VI

TEST DATA - EVALUATION III

Test	Control	I-1210 UCAR 360	I-1210 Flexbond 315
Viscosity (KU)	90	96	95
Odor	Moderate	Moderate	Moderate
Freeze-Thaw (5 cycles)	Passed	Passed	Passed
Foaming	Slight	Slight	Slight
Brushability	Good	Good	Good
Lapping	OK	OK	OK
Framing	None	None	None
Sheen Uniformity	Good	Good	Good
Burnishing	Fair	Fair	Fair
Wet Crocking	Poor	Fair	Fair
Water Staining	Poor	Good	Good
Color Uniformity	Good	Good	Good
Color Acceptance	Good	Good	Good
Color Development	Excellent	Good	Good
Touch-up	Good	Good	Good
Enamel Holdout			
Room Temperature	Good	Good	Good
38° F.	Good	Good	Good
Reflectance (percent)	89.0	92.0	91.5
Contrast Ratio	.949	.973	.967
Stain Removal*			
Lanolin	100	100	100
Wax crayon	Slight	Moderate	Mod.-Heavy
#2 pencil	50	50	60
Ball point pen	250	Trace	Trace
Lipstick	Trace	Moderate	Light
Total cycles	300	300	300
Scrub (6 Mils wet)			
5 percent Lava (10 days air dry)			
Cycles to initial wear	350	None	650
Total cycles	650	1000	900
Erosion, percent	75	5	40

* This is reported in either the number of cycles required to remove the stain or the condition of the stain not removed.

A23007

Published by AsbestosClaims.Law
asbestosclaims.law/library/15747/13

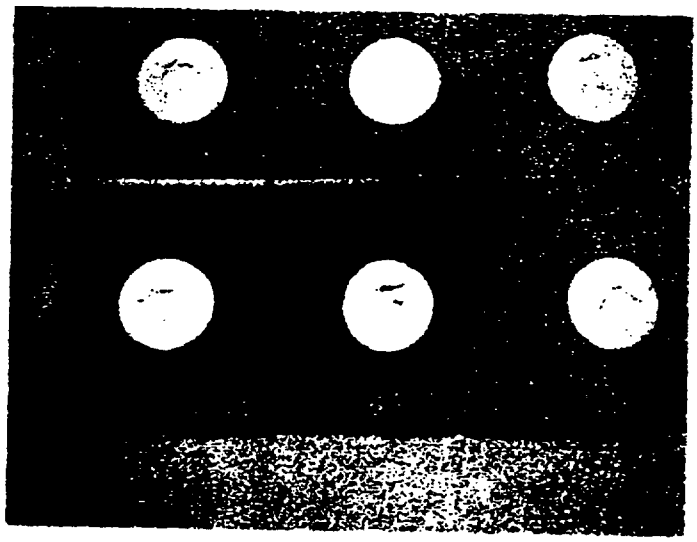
APPENDIX I
Scrub Panels Photographs
(Evaluation I)



APPENDIX II

EVALUATION II

Glass [illegible]



A23009

DISTRIBUTION

Mr. W. Fitzpatrick
Mr. D. Kelly
Mr. N. Lasher
Dr. T. Mahoney
Mr. W. McLean
Mr. M. Robinson
Dr. R. Stickle

A2301C