



(FORMERLY DAVID LITTER LABORATORIES)

116 East 16th Street, New York, N.Y. 10003
Telephone: 212-777-4410

LIBRARY
CALIFORNIA AIR RESOURCES BOARD
P.O. BOX 2815
SACRAMENTO, CA 95812

APPENDICES

EVALUATION
OF
PROPERTIES
OF
ARCHITECTURAL COATINGS

Agreement # A8-095-31

August 29, 1980

Jerry H. Willner
Jerry H. Willner
Group Leader

Saul Spindel
Saul Spindel
Technical Director

Sidney B. Levinson
Sidney B. Levinson
President

df
50 copies

Prepared for the

Air Resources Board
State of California
Sacramento, California

LIBRARY
CALIFORNIA AIR RESOURCES BOARD
1200 S 18
SANTA ANA, CA 92705

APPENDICESPage

Appendix I Publicity, Letters & Questionnaires

A	Publicity - Covering Letter	1
B	Publicity Release	2
C	Questionnaire - Covering Letter	4
D	Questionnaire	6
E	Letter to Raw Material Suppliers	8
F	Revised Covering Letter	9
G	Data Sheet (Revised Questionnaire)	11

Appendix II Test Data

Class

A	1A	Clear Interior Gloss Finishes	13
B	1B	Clear Interior Semigloss Finishes	15
C	1C	Clear Exterior Gloss Finishes	17
D	1D	Clear Exterior Satin Finishes	18
E	2	Semi-transparent Stains	19
F	3	Opaque Stains - CARB	20
G	3	Opaque Stains - Conventional	21
H	4A	Metal Primers - One Package - CARB	22
J	4A	Metal Primers - One Package - Conventional	23
K	4A-2	Metal Primers - Two Component	24
L	4A-Z	Metal Primers - Zinc Rich	25
M	4B	Exterior Wood Primers	26
N	4C	Interior Wall Primers	27
P	7	Tile-like Glaze Coatings	28
Q	8	Waterproofing Coatings	30
R	9A	Maintenance Topcoats - Light Duty - CARB	32
S	9A	Maintenance Topcoats - Light Duty - Conventional	33
T	9B	Maintenance Topcoats - One Package	34
U	9C	Maintenance Topcoats - Two Component	36
W	11	Swimming Pool Paints	38
X	13A	Mastic Coatings - Waterproofing	39
Y	14	Multicolor Paints	40

Appendix III Test Procedure

41



116 East 16th Street, New York, N.Y. 10003
Telephone: 212-777-4410

Publicity

Covering Letter

Dear Editor:

As you probably know, air pollution regulations have been issued which restrict the type and amount of solvents, other than water, that can be used in paint and coatings.

The California Air Resources Board (CARB), which has been in the forefront in developing regulations of this type, has taken the practical step of trying to determine whether it is possible for all major types of architectural coatings on the market to meet these strict requirements and yet demonstrate competitive performance vs equivalent conventional paints and coatings. They have contracted with the D/L Laboratories to assist them in this program.

Our first approach is to publicize their interest as widely as possible in order to alert manufacturers of these products as to CARB's interest. Commercial or prototype samples of these products will then be compared with equivalent conventional products by us.

We would therefore appreciate your inserting the enclosed Publicity Release in an early issue of your publication. If and when you do, please send us two copies of the item.

Thank you for your cooperation.

Sincerely,

Sidney B. Levinson
President

SBL/df
cc: S. Spindel

enc.



116 East 16th Street, New York, N.Y. 10003
Telephone: 212-777-4410

Publicity Release

CARB SEEKS ACCEPTABLE COATINGS

The California Air Resources Board (CARB), as part of their research program to investigate the current status of coating technology, is seeking commercial paints and coatings which meet CARB solvent limitation requirements. Consequently, CARB has contracted with the D/L Laboratories to locate and investigate the relative performance of commercial field applied products which contain less than 250 gm of volatile organic material (e.g., solvent) per liter of paint (excluding water) and which exhibit competitive performance to conventional products.

These paints and coatings are as follows:

1. Clear Finishes, e.g., varnish, lacquer (brushing), shellac
2. Wood Stains - semi-transparent type, either interior or exterior
3. Wood Stains - opaque type (heavy bodied)
4. Primers, Sealers or Undercoaters
5. Penetrating Wood Preservatives
6. Fire Retardant Coatings - Flame spread of 25 or less
7. Tile-like (high build) Glaze Coatings
8. Waterproofing Coatings, e.g., roof coatings, concrete waterproofing
9. Industrial Maintenance Topcoats
10. Metallic (e.g., aluminum) Coatings
11. Swimming Pool Paints
12. Graphic Arts Coatings, e.g., sign paints, bulletin boards



116 East 16th Street, New York, N.Y. 10003

13. High Build Mastic Coatings, e.g., texture paint, at least 15 mils thick
14. Multicolor Paints
15. Aerosol Spray Paints

These paints and coatings may be either water-base or high solids provided that they are similar to the equivalent competitive products in package qualities, application properties, appearance and performance. The water-base coatings may contain any organic solvents, provided that the total volatile organic material is less than 250 gms per liter of paint (excluding water). It is not necessary that the solvents meet the requirements of Rule 66 or its variation.

Your cooperation in obtaining this information is solicited. If you have any of the above products, either on the market or in preparation for marketing, please call or write to:

Sidney B. Levinson
President
D/L Laboratories
116 East 16th Street
New York, N.Y. 10003
Phone: (212) 777-4410



Appendix IC

(FORMERLY DAVID LITTER LABORATORIES)

116 East 16th Street, New York, N.Y. 10003
Telephone: 212-777-4410

Questionnaire

Covering Letter

Dear Sir:

The California Air Resources Board (CARB), as part of their research program to investigate the current status of the technology, is seeking commercial paints and coatings which meet CARB solvent limitation requirements. Consequently, CARB has contracted with the D/L Laboratories to locate and investigate the relative performance of commercial field applied products which contain less than 250 gm of volatile organic material (e.g. solvent) per liter of paint (excluding water) and which exhibit competitive performance to conventional products.

These paints and coatings are as follows:

1. Clear Finishes, e.g., varnish, lacquer (brushing), shellac
2. Wood Stains - semi-transparent type, either interior or exterior
3. Wood Stains - opaque type (heavy bodied)
4. Primers, Sealers or Undercoaters
5. Penetrating Wood Preservatives
6. Fire Retardant Coatings - Flame spread of 25 or less
7. Tile-like (high build) Glaze Coatings
8. Waterproofing Coatings, e.g., roof coatings, concrete waterproofing
9. Industrial Maintenance Topcoats
10. Metallic (e.g., aluminum) Coatings
11. Swimming Pool Paints



116 East 16th Street, New York, N.Y. 10003

12. Graphic Art Coatings, e.g., sign paints, bulletin colors
13. High Build Mastic Coatings, e.g., texture paints, at least 15 mils thick
14. Multicolor Paints
15. Aerosol Spray Paints

These paints and coatings may be either water-base or high solids provided that they are similar to the equivalent competitive products in package qualities, application properties, appearance and performance. The water-base coatings may contain any organic solvents provided that the total volatile organic material is less than 250 gms per liter or paint (excluding water). It is not necessary that the solvents meet the requirements of Rule 66 or its variations.

If you have any of the above products, either on the market or in preparation for marketing, will you please submit as much as you can of the information requested on the enclosed form. Use a separate form for each product you have to offer. More forms are available on request or you can duplicate them, if you prefer to do so.

We solicit your cooperation in obtaining this information and look forward to your reply.

Sincerely,

Sidney B. Levinson
President

SBL/df
cc: S. Spindel

enc.

LOW SOLVENT VS CONVENTIONAL
PAINTS AND COATINGS

Please supply whatever data you have, where applicable, on both the new product and the equivalent conventional coating. The latter may be either your own or one of your competitors. Use one form for each product.

Type of Product:

	<u>LOW SOLVENT</u>	<u>CONVENTIONAL</u>
1. Trade Name:		
2. Code No:		
3. Water: (by vol)	_____ %	_____ %
4. Volatile Organic Material: (by vol)	_____ %	_____ %
5. Total Solids:		
Weight:	_____ %	_____ %
Volume:	_____ %	_____ %
6. <u>Application Properties:</u>		
a) Any Special problems or requirements?		
b) Speed of Dry:		
Tack free:	_____ hours	_____ hours
Dry hard:	_____ hours	_____ hours
7. <u>Appearance Properties:</u>		
a) Opacity:		
Thickness (dry):	_____ Mils	_____ Mils
Contrast Ratio:	_____ %	_____ %
b) Gloss - 60°:		
c) Reflectance (White):		

LOW SOLVENT

CONVENTIONAL

8. Performance Properties (as applicable):

- | | | |
|-------------------------|--------------|--------------|
| a) Adhesion (# hatch) : | _____ % | _____ % |
| b) Flexibility : | _____ in | _____ in |
| c) Resistance to: | | |
| (1) Water: | _____ days | _____ days |
| (2) _____ : | _____ days | _____ days |
| (3) _____ : | _____ days | _____ days |
| d) Durability: | | |
| Accelerated: | _____ hours | _____ hours |
| Exterior: | _____ months | _____ months |
| e) Salt Fog Resistance: | _____ hrs | _____ hrs |
| f) Flame Spread: | _____ | _____ |

9. Other Properties of Interest:

_____	_____ Unit	_____ Unit
_____	_____ Unit	_____ Unit

10. Approximate Retail Price:

1 gal:	\$ _____ per Gal	\$ _____ per Gal
5 gals:	\$ _____ per Gal	\$ _____ per Gal

11. Samples for Test:

- a) Qts Can Be Purchased From: _____
- b) If not, will you please send us 1 Quart for test purposes.

12. Company _____

By _____

Date _____

Please mail to:
 Sidney B. Levinson
 President
 D/L Laboratories
 116 East 16th Street
 New York, N.Y. 10003



(FORMERLY DAVID LITTER LABORATORIES)

116 East 16th Street, New York, N.Y. 10003
Telephone: 212-777-4410

Letter to Raw Material Suppliers

Re: California Air Resources Board (CARB)

The enclosed letter has been sent to major paint and coating manufacturers throughout the continental U.S.A. and to all paint manufacturers of any significant size in California.

Have you developed any coatings on the enclosed list which meet CARB requirements? If so, is any paint manufacturer presently either marketing or getting ready to market a similar product? In that event, will you either forward the enclosed information to him or advise us and we will do so.

We also would appreciate your sending us whatever literature is available on the products you have developed that are on the list and conform to the CARB requirements.

Sincerely,

Sidney B. Levinson
President

SBL/nv
cc: S.Spindel
enc.



(FORMERLY DAVID LITTER LABORATORIES)

116 East 16th Street, New York, N.Y. 10003
Telephone: 212-777-4410

Revised Covering Letter

The California Air Resources Board (CARB), as part of their research program to investigate the current status of coating technology, is seeking commercial paints which meet CARB solvent limitation requirements. Consequently, CARB has contracted with the D/L Laboratories to obtain and test the following products which contain less than 250 gm of volatile organic material (e.g., solvent) per liter of paint (excluding water) and which are competitive to conventional paints.

1. Clear Finishes
2. Wood Stains - semi-transparent and /or opaque
3. Primers and/or Undercoaters
4. Penetrating Wood Preservatives
5. Fire Retardant Coatings
6. Tile-like (high build) Glaze Coatings
7. Waterproofing Coatings, e.g., for roofs or concrete
8. Industrial Maintenance Topcoats
9. Aluminum Paints
10. Swimming Pool Paints
11. Sign Paints or Bulletin Colors
12. High Build Mastic Coatings, e.g., texture paints
13. Multicolor Paints



116 East 16th Street, New York, N.Y. 10003

These paints and coatings may be either water-base or high solids, provided that they are competitive to the equivalent conventional products. The water-base coatings may contain any organic solvents provided that the total volatile organic material is less than 250 gms per liter of paint (excluding water).

If you have developed any of these products, will you please send us a quart sample and any data that you have on the product(s).

We solicit your cooperation in obtaining this information and look forward to your reply.

Sincerely,

Sidney B. Levinson
President

SBL/nv
cc: S.Spindel

Data Sheet (Revised Questionnaire)

LOW SOLVENT VS CONVENTIONAL
PAINTS AND COATINGS

Please supply any data you have, where applicable, on the new product. If you can, include data on any equivalent conventional product which can either be your product or a competitive one.

Type of Product:

	<u>LOW SOLVENT</u>	<u>CONVENTIONAL</u>
Trade Name:		
Code No.:		
Water: (by volume)	_____ %	_____ %
Volatile Organic Material: (by vol.)	_____ %	_____ %
Total Solids:		
Weight:	_____ %	_____ %
Volume:	_____ %	_____ %
<u>Application Properties:</u>		
a) Any special requirements?	_____	_____
	_____	_____
	_____	_____
b) Speed of Dry:		
Tack free:	_____ hours	_____ hours
Dry hard:	_____ hours	_____ hours
<u>Appearance Properties:</u>		
a) Opacity:		
Thickness (dry):	_____ Mils	_____ Mils
Contrast Ratio:	_____ %	_____ %
b) Gloss - 60°	_____	_____
c) Reflectance (White):	_____	_____

LOW SOLVENT

CONVENTIONAL

Performance Properties (as applicable and available)

a) Water resistance:	_____ days	_____ days
b) Durability:	_____ years	_____ years
c) Salt Fog Resistance:	_____ hrs	_____ hrs
d) Flame Spread:	_____	_____

Other Properties of Interest:

_____	_____ Unit	_____ Unit
_____	_____ Unit	_____ Unit

Approximate Retail Price:

1 gal:	\$ _____ per Gal	\$ _____ per Gal
5 gals:	\$ _____ per Gal	\$ _____ per Gal

Samples for Test:

Please submit quart (or gallon) samples for test. White is the preferred color, if possible. If the conventional product is not yours, please advise where it may be obtained.

Company _____

By _____

Date _____

Please sent to:

Sidney B. Levinson
President
D/L Laboratories
116 East 16th Street
New York, N.Y. 10003

Appendix IIA

TEST DATA

Class IA

CLEAR INTERIOR GLOSS FINISHES

	From ----->	CARB				Conv.	
		1	5	15	19	6	10
		(15)	(33)	(8)	(15)	(15)	(33)
		(a)					
Viscosity	KU						
Initial		61	66	51	61	57	63
4 wks/120°F		64	61	51	70	57	68
Storage - 4 wks/120°F			(b)				
Skinning	Score	10	10	10	10	10	10
Drying Time	Hrs						
Set to touch		0.3	0.3	0.3	0.4	0.3	0.9
Tack free		0.3	1.4	0.3	2.0	0.6	4.5
Dry hard		0.4	16.5	1.0	3.0	1.4	7.0
Dry thru		0.4	16.5	1.0	3.0	1.4	7.0
Application Ease	Score	10	10	10	10	10	10
Gloss - 60°		95	95	100	100	94	95
Adhesion	%	100	100	100	100	100	100
Flexibility - Pass	Inch	1/8	1/8	1/8	1/8	1/8	1/8
Taber Abrasion	mgm	12	24	15	18	11	15
Alcohol (50%) - 1 hr							
Blistering	ASTM	8M	10	10	10	10	10
Color change	Score	9	10	9	10	10	9
Gloss change	"	8	10	10	10	10	10
Hardness	"	6	6	6	10	9	8
Recovery	"	10	9	9	-	10	9
Butyl Acetate ^(c) - 3 hrs							
Failure	Score	2	8	10	2	10	10
Hardness	"	0	0	0	0	4	8
Recovery		10	10	10	10	10	10

Appendix IIA

TEST DATA

Class IA

CLEAR INTERIOR GLOSS FINISHES (Cont)

	From ----->	CARB				Conv.	
		1 (15) (a)	5 (33)	15 (8)	19 (15)	6 (15)	10 (33)
Mineral Spirits - 1 hr							
Blistering	ASTM	10	10	10	10	10	10
Color change	Score	10	10	9	10	10	10
Gloss change	"	10	10	10	10	10	10
Hardness	"	10	10	8	10	10	8
Recovery	"	-	-	9	-	-	9
Hot Water - 1 hr							
Blistering	ASTM	10	10	10	10	10	10
Color change	Score	10	10	10	10	10	10
Gloss change	"	10	10	10	10	10	10
Hardness	"	10	9	9	10	9	8
Recovery	"	-	9	10	-	10	9
Cold Water - 500 hrs							
Resistance	Score	10	9	9	10	10	10
Hardness	"	10	9	10	9	10	9
Recovery	"	-	10	-	10	-	9

a - Special sealer, all other samples - two coats, first coat reduced 10%

b - Slight separation

c - Simulates nail polish remover

Conv - Conventional

Appendix IIB

TEST DATA

Class 1B

CLEAR INTERIOR SEMIGLOSS FINISHES

	From ----->	CARB				Conv.		
		<u>2</u> (15) (a)	<u>11</u> (19)	<u>14</u> (8)	<u>17</u> (9)	<u>7</u> (15)	<u>16</u> (8)	<u>18</u> (9)
Viscosity	KU							
Initial		57	108	51	54	56	56	47
4 wks/120°F		58	150	51	51	62	53	47
Storage - 4 wks/120°F, Score								
Separation		9	10	10	8	9	9	10
Skinning		10	8	10	10	10	10	10
Settling		9	10	10	10	10	10	10
Redispersion		9	10	10	10	9	10	10
Drying Time	Hrs							
Set to touch		0.3	0.1	0.3	0.4	0.3	0.6	1.6
Tack free		0.3	0.1	0.3	0.4	0.6	1.0	5.0
Dry hard		0.4	0.2	1.0	2.0	1.4	1.0	6.5
Dry thru		0.4	0.2	1.0	2.0	1.4	1.0	6.5
Application Ease	Score	10	10	10	10	10	10	10
Gloss - 60°		15	64	38	7	24	29	31
Adhesion	%	100	10	10	10	10	10	10
Flexibility - Pass	Inch	1/8	1/4	1/8	1/8	1/8	1/8	1/8
Taber Abrasion	mgm	36	26	18	52	18	85	44
Alcohol (50%) - 1 hr								
Blistering	ASTM	10	10	10	10	10	10	10
Color change	Score	9	8	8	10	9	9	10
Gloss change	"	10	8	6	10	10	10	10
Hardness	"	6	8	6	10	10	10	10
Recovery	"	10	10	10	-	-	-	-
Butyl Acetate ^(b) - 3 hrs								
Performance	Score	6	2	0	0	10	0	10
Hardness	"	4	4	0	0	6	0	6
Recovery	"	10	10	8	10	10	0	10

Appendix IIB

TEST DATA

Class IB CLEAR INTERIOR SEMIGLOSS FINISHES (cont)

		CARB				Conv.		
		<u>2</u>	<u>11</u>	<u>14</u>	<u>17</u>	<u>7</u>	<u>16</u>	<u>18</u>
From ----->		(15)	(19)	(8)	(9)	(15)	(8)	(9)
Mineral Spirits - 1 hr		No effect ----->				No effect ---->		
Hot Water - 1 hr								
Blistering	ASTM	10	10	10	10	10	10	10
Color change	Score	10	10	9	10	10	10	10
Gloss change	"	10	10	10	10	10	10	10
Hardness	"	10	10	8	10	9	9	10
Recovery	"	-	-	10	-	10	10	-
Cold Water - 500 hrs								
Performance	Score	2 ^(c)	10	9	9	9	10	4 ^(c)
Hardness	"	0	10	10	9	10	10	8
Recovery	"	0	-	-	10	-	-	9

a - Special sealer, all other samples - 2 coats, first coat reduced 10%

b - Butyl Acetate simulates nail polish remover

c - Discolored and lost adhesion

Appendix IIC

TEST DATA

Class IC

CLEAR EXTERIOR GLOSS FINISHES

		CARB		Conv.	
		<u>3</u> (15) (a)	<u>12</u> (20)	<u>8</u> (15)	<u>13</u> (20)
Viscosity	KU				
Initial		61	54	58	61
2 wks/120°F		79	51	57	63
Storage- 4 wks/120°F					
Skinning	Score	10	10	10	10
Drying Time	Hrs				
Set to touch		0.3	0.3	1.1	0.2
Tack free		1.8	0.6	3.5	0.3
Dry hard		16.5	0.6	7.0	0.5
Dry thru		16.5	0.6	7.0	0.5
Application Ease	Score	10	10	10	10
Gloss - 60°		91	100	96	70
Adhesion	%	100	10	10	10
Flexibility - Pass	Inch	1/8	1+	1/8	1/8
Taber Abrasion	mgm	18	21	7	32
Accelerated Weathering-500 hrs					
Color change	Score	10	10	10	10
Gloss change	"	10	9	10	2
Chalking	ASTM	10	10	10	10
Checking	"	10	10	10	10
Cracking	"	10	9	10	10
Wrinkling	Score	10	10	10	2

a - Special sealer required

Appendix IID

TEST DATA

Class ID CLEAR EXTERIOR SEMIGLOSS FINISHES

		From ----->	$\frac{\text{CARB}}{4}$ $\frac{15}{(15)}$ (a)	$\frac{\text{Conv.}}{9}$ $\frac{15}{(15)}$
Viscosity	KU			
Initial			61	56
2 wks/120°F			92	53
Storage - 2 wks/120°F	Score		9	10
Separation			10	10
Skinning			9	10
Settling			9	10
Resispersion				
Drying Time	Hrs			
Set to touch			0.3	0.9
Tack free			0.3	3.5
Dry hard			2.5	7.0
Dry thru			16.5	7.0
Application Ease	Score		10	10
Gloss - 60°			10	29
Adhesion	%		100	10
Flexibility - Pass	Inch		1/8	10
Taber Abrasion	mgms		17	15
Accelerated Weathering - 500 hrs				
Color change	Score		10	10
Gloss change	"		10	10
Chalking	ASTM		10	6
Checking	"		10	10
Cracking	"		10	10

a - Special sealer required

Appendix IIE

TEST DATA

Class 2

SEMI-TRANSPARENT STAINS

		CARB		Conv.
		<u>1</u>	<u>3</u>	<u>2</u>
Color ----->		Brown	Brown	Brown
From ----->		(21)	(9)	(21)
Viscosity	KU			
Initial		60	71	51
4 wks /120°F		60	64	47
Storage - 4 wks/120°F	Score			
Separation		9	8	9
Skinning		10	10	10
Settling		10	10	10
Redispersion		9	9	9
Drying Time	Hrs			
Set to touch		0.6	0.5	3.0
Tack free		1.0	0.5	24
Dry hard		2.5	0.7	24
Dry thru		3.5	0.7	24
Application Ease	Score	10	10	10
Opacity	%	90	94	50
Water Absorption	%	2.6	1.4	1.0
Accelerated Weathering - 500 hrs				
Color change	Score	9	10	9
Gloss change	"	10	10	10
Chalking	ASTM	9	10	9
Checking	"	10	10	10
Cracking	"	10	10	10

Appendix IIF

TEST DATA

Class 3

OPAQUE STAINS

CARB

		<u>1</u>	<u>3</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>10</u>	<u>12</u>	<u>14</u>
	Color ---->	Bwn	Wht	Red	Wht	Bwn	Grn	Bwn	Bwn
	From ---->	(13)	(21)	(35)	(25)	(25)	(29)	(32)	(9)
Viscosity	KU								
Initial		62	69	58	71	62	81	90	83
4 wks/120°F		62	75	58	71	60	89	90	83
Storage - 4 wk/120°F, Score									
Separation		4	6	2	4	4	10	10	10
Skinning		10	10	10	10	10	10	10	10
Settling		8	8	9	9	9	10	10	10
Redispersion		6	8	8	6	8	10	10	10
Drying Time	Hrs								
Set to touch		0.4	0.2	0.5	0.3	0.5	0.3	0.3	0.5
Tack free		0.5	0.3	1.5	0.3	0.5	0.3	0.3	0.5
Dry hard		0.6	1.5	2.2	1.5	1.5	0.5	2.5	0.7
Dry thru		1.5	1.5	2.2	1.5	2.2	2.2	2.5	0.7
Application Ease	Score	10	10	10	10	10	10	10	10
Opacity	%	100	89	100	96	93	95	100	100
Water Absorption	%	1.4	0.6	5.8	2.2	0.8	2.1	0.5	1.2
Accelerated Weathering - 500 hrs									
Color change	Score	10	10	10	10	10	10	10	10
Gloss change	"	10	10	10	10	10	10	10	10
Chalking	ASTM	8	8	8	9	8	8	8	10
Checking	"	10	10	10	10	10	10	10	10
Cracking	"	10	10	10	10	10	10	10	10

Grn - Green

Appendix IIG

TEST DATA

Class 3

OPAQUE STAINS

Conventional

		<u>4</u>	<u>8</u>	<u>9</u>	<u>11</u>	<u>13</u>
	Color ----->	Brown	White	Brown	Green	Brown
	From ----->	(15)	(25)	(25)	(29)	(32)
Viscosity	KU					
Initial		89	58	55	53	57
4 wks/120 F		Gel	55	42	51	57
Storage - 4 wk/120°F , Score						
Separation		-	2	2	2	9
Skinning		-	10	10	10	6
Settling		-	6	4	6	10
Separation		-	6	4	8	9
Drying Time	Hrs					
Set to Touch		0.3	17	5.0	5.5	2.0
Tack free		2.2	19	6.5	6.5	4.0
Dry hard		6.5	31	18	16	5.5
Dry thru		6.5	31	19	48	5.5
Application Ease	Score	10	10	10	10	10
Opacity	%	100	97	100	99	100
Water Absorption	%	1.8	0.1	0.7	0.9	0.3
Accelerated Weathering - 500 hrs						
Color change	Score	10	9	10	10	10
Gloss change	"	8	10	10	10	10
Chalking	ASTM	8	6	6	8	8
Checking & Cracking	"	10	10	10	10	10

Appendix IIH

TEST DATA

One Package

Class 4A-1

METAL PRIMERS

CARB

		<u>1</u>	<u>2</u>	<u>4</u>	<u>10</u>	<u>13</u>	<u>20</u>	<u>23</u>	<u>24</u>	<u>32</u>	<u>36</u>	<u>42</u>	<u>49</u>	<u>51</u>
	Color ---->	<u>Gry</u>	<u>Bwn</u>		<u>Gry</u>	<u>Bwn</u>	<u>Bwn</u>	<u>Org</u>	<u>Bwn</u>	<u>Wht</u>	<u>Bwn</u>	<u>Wht</u>	<u>Grn</u>	<u>Wht</u>
	From ---->	(23)	(23)	(31)	(13)	(33)	(11)	(22)	(22)	(22)	(20)	(26)	(34)	(14)
Viscosity	KU													
Initial		75	70	110	94	74	88	118	98	113	124	89	95	90
4 wks/120°F		107	77	125	100	b	138	150	121	Gel	Gel	98	95	97
Storage - 4 wks/120°F	Score		a											
Separation		4	4	8	9	6	8	8	6	-	-	9	9	9
Skinning		10	10	10	10	10	10	10	10	-	-	10	10	10
Settling		4	4	9	9	0	8	9	6	-	-	10	8	10
Redispersion		4	2	8	9	0	8	9	6	-	-	10	9	9
Drying Time	Hrs													
Set to touch		0.2	0.3	0.2	0.2	0.5	16	0.4	5.0	0.2	0.1	0.2	20	0.2
Tack free		0.4	0.5	0.3	0.4	0.7	16	3.0	48	0.3	3.0	5.0	24	0.2
Dry hard		1.0	1.0	0.4	0.4	1.2	16	168	168	0.8	6.0	16	72	1.0
Dry thru		1.0	1.0	0.6	0.4	1.2	16	168	168	0.8	7.0	16	72	1.0
Application Ease	Score	10	10	10	10	10	10	9	10	10	10	10	10	10
Opacity	%	100	100	100	99	100	100	97	100	95	100	93	100	91
Adhesion	%	100	100	100	100	100	80	97	95	100	100	100	100	100
Enamel Holdout	%	100	91	79	100	100	87	86	94	67	84	90	70	64
Salt Fog	Hrs	36	36	24	15	500	132	500	132	53	285	240	500	45
Blisters - body	ASTM					6F		10					4F	
" at X	"					8D		6F					6D	
Corrosion	Score					6		9					8	
Creep at X	mm					9		0					4	
Acc. Weathering - 500 hrs														
Chalking	ASTM	8	8	8	8	8	8	2	8	9	10	6	8	10
Check. & Crack.	"	10	10	10	10	10	10	10	10	10	10	10	10	10

a - Gel particles

b - Cannot determine due to hard settling

Gry - Grey
Bwn - Brown

Org - Orange
Wht - White

Appendix IIJ

TEST DATA

Class 4A-1

METAL PRIMERS

One Package

Conventional

		<u>6</u>	<u>7</u>	<u>8</u>	<u>14</u>	<u>17</u>	<u>21</u>	<u>26</u>	<u>27</u>	<u>37</u>
	Color ---->	<u>Gry</u>	<u>Bwn</u>	<u>Bwn</u>	<u>Bwn</u>	<u>Wht</u>	<u>Bwn</u>	<u>Org</u>	<u>Bwn</u>	<u>Bwn</u>
	From ---->	(23)	(23)	(31)	(33)	(13)	(11)	(22)	(22)	(20)
Viscosity	KU									
Initial		74	73	72	75	78	86	87	74	72
4 wks/120°F		89	86	77	92	86	96	150	89	86
Storage - 4 wks/120°F	Score									
Separation		4	4	4	6	4	4	6	8	6
Skinning		10	10	10	10	10	10	2	2	10
Settling		9	6	4	8	4	4	6	8	6
Redispersion		6	6	4	8	4	4	6	8	6
Drying Time	Hrs									
Set to touch		0.5	0.5	0.6	0.5	0.3	0.3	0.4	2.5	0.5
Tack free		1.7	1.7	1.7	1.5	0.5	0.7	3.0	24	4.0
Dry hard		6.2	4.3	24	5.5	0.5	1.0	24	48	16
Dry thru		16	6.2	24	7.0	0.5	1.3	24	48	16
Application Ease	Score	10	10	10	10	10	10	10	10	10
Opacity	%	100	100	100	100	96	100	95	100	100
Adhesion	%	100	10	10	10	10	10	10	10	10
Enamel Holdout	%	91	95	84	90	98	76	83	90	96
Salt Fog	Hrs	100	80	220	500	15	130	130	20	285
Blisters - body	ASTM				10					
" at X	"				4MD					
Corrosion	Score				10					
Creep at X	mm				0					
Acc. Weathering - 500 hrs										
Chalking	ASTM	6	6	8	8	4	8	2	9	8
Check. & Crack.	"	10	10	10	10	10	10	10	10	10

Appendix IIK

TEST DATA

Class 4A-2

METAL PRIMERS

2 Component

		CARB			Conventional	
		29	39	43	28	40
		Wh't From -----> (22)	Red (28)	Wh't (10)	Bwn (22)	Red (28)
Viscosity	KU					
Parts A/B			(a)	(d)		
Initial		150/106	139/N		102/91	72/52
4 wks/120°F		(b)/125	(c)/N		150/150	104/52
Mixed Paint		119			106	61
Storage - 4 wks/120°F, Score						
Separation		-/ 4	4/10	10	10/8	6/10
Skinning		-/ 10	10/10	10	2/10	10/10
Settling		-/ 6	0/10	10	9/8	8/8
Redispersion		-/ 4	0/10	10	10/8	8/8
Pot Life	Hrs	30+	24	2	24	30+
Drying Time	Hrs					
Set to touch		0.2	0.4	0.1	0.2	0.3
Tack free		1.0	3.0	0.1	0.2	0.7
Dry hard		3.0	6.0	(e)	3.0	1.5
Dry thru		3.0	6.0	(e)	3.0	1.5
Application Ease	Score	10	10	(f)	10	10
Opacity	%	89	100	100	100	100
Adhesion	%	100	100	50	100	100
Enamel Holdout	%	67	78	0	88	81
Salt Fog	Hrs	53	500	400	300	500
Blisters - body	ASTM		2F			10
" at X	"		2F			2F
Corrosion	Score		10			9
Creep at X	mm		0			0
Acc. Weathering	Hrs	120	500	500	500	500
Chalking	ASTM		4	2	9	4
Check. & Crack.	"		10	10	10	10
Erosion & Rusting	Score		10	8	10	10

- a - Gardner Holdt
- b - Solidified or gelled
- c - Cannot determine due to extremely hard settling
- d - Powder mixed with water
- e - Cannot determine - powdery surface
- f - Must be sprayed

Appendix III

TEST DATA

Class 4A-Z

METAL PRIMERS

Zinc - Rich

		CARB			Conventional	
		30	33	35	31	34
Color ---->		Gry	Gry	Gry	Grn	Gry
From ---->		(22)	(22)	(22)	(22)	(22)
Viscosity	KU					
Parts A/B		(a)	(b)	(b)	(a)	(b)
Initial		65/Z5	53	83	53/G	53
4 wks/120°F		65/Z6	51	74	53/H	Gel
Mixed Paint		126	74	98	72	72
Storage - 4 wks/120°F,	Score					
Separation		9/10	8	6	9/10	-
Skinning		10/10	10	10	9/10	-
Settling		10/10	8	8	9/10	-
Redispersion		10/10	8	8	9/10	-
Pot Life	Hrs	24	30+	30+	30+	1.5
Drying Time	Hrs					
Set to touch		0.3	0.1	16	0.4	0.2
Tack free		0.3	0.1	16	0.4	0.2
Dry hard		16	0.3	48	16	0.2
Dry thru		16	0.3	48	16	0.2
Application Ease	Score	10	10	10	10	10
Opacity	%	100	10	10	10	10
Adhesion	%	100	100	98	100	100
Enamel Holdout	%	67	30	81	42	42
Salt Fog	Hrs	53	1000	95	1000	1000
Blisters - body	ASTM		10		10	10
" at X	"		10		10	10
Corrosion	Score		10		10	10
Creep at X	mm		0		0	0
Acc. Weathering - 500 hrs						
Chalking	ASTM	9	9	6	6	8
Checking & cracking	"	10	10	10	10	10

a Gardner Holdt

b Liquid portion to which powder portion is added

Appendix IIM

TEST DATA

Class 4B

EXTERIOR WOOD PRIMERS

		CARB					Conventional			
		3	5	11	41	44	9	15	18	47
Color	----->	White					White			
From	----->	(21)	(36)	(13)	(22)	(9)	(36)	(13)	(21)	(9)
Viscosity	KU									
Initial		79	86	72	95	85	80	73	106	69
4 wks/120°F		86	95	72	108	95	95	82	128	69
Storage - 4 wk/120°F	Score									
Separation		6	9	4	9	9	6	6	8	9
Skinning		10	10	10	6	8	10	10	2	10
Settling		8	8	8	10	10	9	9	8	8
Redispersion		9	9	4	9	10	8	8	8	9
Drying Time	Hrs									
Set to touch		0.2	0.4	0.4	0.4	0.1	1.0	0.4	1.5	2.0
Tack free		0.5	0.5	0.4	1.4	0.4	16	7.0	7.0	24
Dry hard		0.7	0.6	1.4	5.5	0.6	16	55	48	72
Dry thru		1.0	6.7	1.4	5.5	0.6	16	55	48	72
Application Ease	Score	10	10	10	10	10	10	10	10	10
Opacity	%	95	96	94	96	82	95	91	92	86
Adhesion	%	100	100	100	100	100	100	98	100	100
Bleeding	Score	6	4	8	6	4	8	6	6	8
Enamel Holdout	%	96	86	74	96	54	95	97	91	55
Accelerated Weathering	Hrs	500	310	500	500	500	310	500	240	310
Color change	Score	10	10	10	8	6	10	8	6	9
Gloss change	"	10	10	10	9	6	10	6	9	8
Chalking	ASTM	8	8	9	9	9	8	8	8	8
Checking	"	10	10	10	10	10	10	10	10	10
Cracking	"	10	6	10	6	10	8	10	8	6

Appendix IIN

TEST DATA

Class 4C

INTERIOR WALL PRIMERS

		CARB					Conv.	
		12	19	22	25	45	16	46
		White	White	White	White	White	White	White
Color	----->							
From	----->	(13)	(7)	(4)	(22)	(9)	(13)	(9)
Viscosity	KU							
Initial		90	83	91	76	94	98	85
4 wks/120°F		95	90	100	79	104	100	84
Storage - 4 wk/120°F, Score								
Separation		4	9	9	9	9	6	8
Skinning		10	10	10	10	6	2	10
Settling		2	10	10	10	10	8	9
Redispersion		4	9	9	10	10	6	9
Drying Time	Hrs							
Set to touch		0.4	0.3	0.2	0.2	0.4	0.7	0.4
Tack free		0.4	0.3	0.6	0.2	0.4	1.0	1.0
Dry hard		1.0	0.7	1.5	1.5	0.5	1.5	1.0
Dry thru		1.0	0.7	1.5	1.5	0.5	3.0	1.4
Application Ease	Score	10	10	10	10	10	10	10
Opacity	%	90	91	90	90	94	94	89
Adhesion	%	100	100	100	100	100	100	100
Enamel Holdout	%	96	90	94	78	86	90	75

Appendix IIP

TEST DATA

Class 7

TILE - LIKE GLAZE COATINGS

		CARB						Conventional				
		<u>1</u>	<u>2</u>	<u>5</u>	<u>6</u>	<u>12</u>	<u>16</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>15</u>	
Color	---	Wht	TR	Wht	Wht	Wht	TR	White	----->			
From	---	(1)	(1)	(16)	(21)	(16)	(5)	(16)	(16)	(21)	(1)	
Viscosity	KU											
Initial												
Part A/B		106/137	144/83	98/56	150/56	69/X ^(a)	150/M ^(a)	118/55	106/96	140/79	112/62	
Paint		109	120	74	150	140	136	77	99	120	96	
4 wks/120°F (Part A/B)		131/150	150/92	108/74	150/95	150/X	150/N	150/55	150/Ge1	150/82	125/62	
Storage - 4 wk/120°F	Score											
Separation		4/8	9/10	8/10	10/10	10/10	10/10	9/10	9/-	9/10	6/10	
Skinning		10/10	10/10	10/10	10/10	10/10	10/10	10/10	10/-	10/10	10/10	
Settling		2/8	10/10	10/10	10/10	9/10	10/10	10/10	10/-	10/10	10/9	
Redispersion		1/8	10/10	9/10	10/10	9/10	10/10	9/10	9/-	9/10	9/10	
Pot Life	Hrs	0.4	2	4	7+	48	2	7+	7+	6	16	
Drying Time	Hrs											
Set to touch		3.5	4.5	2.0	2.0	0.3	3.0	0.3	1.3	1.8	0.5	
Tack free		16	16	16	5.5	3.0	16	1.3	6.0	4.8	1.3	
Dry hard		16	16	16	16	24	16	2.5	6.0	16	2.5	
Dry thru		16	16	16	16	24	16	2.5	6.0	16	2.5	
Application Ease	Score	9	9	9	8	9	10	9	10	9	10	
Gloss - 60°		42	98	75	92	28	95	74	79	94	80	
Retention (UV)	Score	8	8	10	10	10	8	8	10	8	10	

a - Gardner Holdt

TR - Tile Red

Appendix IIP

TEST DATA

Class 7

TILE - LIKE GLAZE COATINGS (cont)

		CARB						Conventional				
		<u>1</u>	<u>2</u>	<u>5</u>	<u>6</u>	<u>12</u>	<u>16</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>15</u>	
Color	---->	Wht	TR	Wht	Wht	Wht	TR	White	----->			
From	---->	(1)	(1)	(16)	(21)	(16)	(5)	(16)	(16)	(21)	(1)	
Adhesion	%	100	100	100	100	100	100	100	80	100	100	
Flexibility - Pass	Inch	1+	1+	1/8	1/8	1/8	1+	1/8	1/8	1/8	1/8	
Taber Abrasion	mgm	58	34	23	17	35	40	30	41	13	35	
Water Resistance	Hrs	672	672	672	672	192	672	168	672	672	672	
Blistering	ASTM	10	10	10	10		10		10	10	10	
Color change	Score	10	10	9	10		10		10	10	10	
Gloss change	"	10	10	10	10		10		10	10	10	
Hardness	"	10	10	10	10		10		10	10	10	
Color Retention	Score	2	4	8	2	2	8	2	9	2	2	

Appendix IIQ

TEST DATA

Class 8

WATERPROOFING COATINGS

		CARB						Conventional			
		3	4	6	8	13	14	15	7	11	12
Color	---->	Clr	Clr	Wht	Wht	Gry	Blk	Blk	Wht	Clr	Clr
From	---->	(24)	(24)	(17)	(12)	(3)	(3)	(20)	(17)	(1)	(1)
Viscosity	KU	(a)	(a)							(a) (d)	(a) (d)
Initial		A-	A-	82	108	140	92	126	118	A-	B
4 wks/120°F		(b)	(b)	150	(c)	Ge1	128	150	150	A-/A-	K/A-
Storage - 4 wk/120°F	Score										
Separation		-	-	9	-	-	9	10	10	10/10	10/10
Skinning		-	-	10	-	-	9	9	8	10/10	10/10
Settling		-	-	2	-	-	10	10	10	10/10	10/10
Redispersion		-	-	2	-	-	9	9	10	10/10	10/10
Drying Time	Hrs										
Set to touch		1.1	1.2	0.2	0.2	3.8	1.0	1.0	0.2	1.5	0.5
Tack free		1.1	2.0	0.2	0.6	7.0	500	500	0.2	72	1.3
Dry hard		1.1	2.0	0.2	0.6	24	500	500	2.0	72	2.5
Dry thru		1.1	2.0	0.2	0.6	24	500	500	2.0	120	2.5
Application Ease	Score	10	10	10	10	6	10	10	10	10	10

Clr - Clear
Blk - Black

Appendix II Q

TEST DATA

Class 8

WATERPROOFING COATINGS (cont)

		CARB						Conventional			
		3	4	6	8	13	14	15	7	11	12
Color	----->	Clr	Clr	Wht	Wht	Gry	Blk	Blk	Wht	Clr	Clr
From	----->	(24)	(24)	(17)	(12)	(3)	(3)	(20)	(17)	(1)	(1)
Adhesion	%	100	100	100	100	100	100	100	100	100	100
Opacity	%	Clr	Clr	82	3	100	100	100	76	Clr	Clr
Water Absorption	%	10.5	11.0	4.1	5.5	5.3	3.8	3.8	2.7	8.9	2.8
Water Resistance	Hrs	500	500	500	500	500	24	500	500	500	500
Color change	Score	10	10	9	6	10		8	10	10	9
Gloss change	"	10	10	10	6	10		8	10	10	10
Hardness	"	10	10	10	4	0		0	6	10	10
Recovery	"	-	-	-	10	4		0	10	-	-
Acc. Weathering - 500 hrs											
Color change	Score	10	9	8	10	9	10	10	8	8	10
Gloss change	"	10	10	10	10	9	4	10	10	10	9
Chalking	"	10	2	8	10	10	10	10	6	9	10
Check. & Crack.	"	10	10	10	10	10	10	10	10	10	10

a - Gardner Holdt

b - Gel particles

c - Solidified

d - Two component

Appendix II R

TEST DATA

Light Duty

Class 9A

MAINTENANCE TOPCOATS

CARB

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>15</u>	<u>27</u>	<u>28</u>
	Color ---->	Red	Blue	Whit	Whit	Whit	Whit	Red
	From ---->	(23)	(23)	(23)	(31)	(36)	(21)	(21)
Viscosity	KU							
Initial		82	70	97	86	64	86	64
4 wks/120°F		150	83	Gel	97	61	98	Gel
Storage - 4 wk/120°F	Score							
Separation	"	10	9	-	10	4	10	-
Skinning	"	10	10	-	10	10	10	-
Settling	"	9	10	-	10	6	10	-
Redispersion	"	9	10	-	10	8	10	-
Drying Time	Hrs							
Set to touch		0.3	0.3	0.3	0.3	0.2	0.2	0.2
Tack free		16	4	3.5	3.0	2.5	0.4	1.0
Dry hard		24	4	3.5	3.0	5.0	3.0	3.5
Dry thru		32	4	3.5	3.0	5.0	3.0	3.5
Application Ease	Score	10	10	8	10	9	10	10
Opacity	%	93	81	97	99	94	97	80
Gloss - 60°		46	67	31	38	74	75	64
Adhesion	%	80	100	100	100	100	100	80
Flexibility-Pass	Inch	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Acc. Weathering - 500 hrs								*
Color change	Score	10	10	10	10	10	9	9
Gloss change	"	9	8	9	9	10	9	9
Chalking	ASTM	10	8	9	9	8	10	10
Check. & Crack.	"	10	10	10	10	10	10	10

* Blistered and wrinkled

Appendix IIS

TEST DATA

Light Duty

Class 9A

MAINTENANCE TOPCOATS

Conventional

		<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>16</u>	<u>29</u>	<u>30</u>
	Color ----->	<u>Red</u>	<u>Blu</u>	<u>Wht</u>	<u>Wht</u>	<u>Wht</u>	<u>Wht</u>	<u>Red</u>
	From ----->	(23)	(23)	(23)	(31)	(15)	(21)	(21)
Viscosity	KU							
Initial		77	71	76	70	78	79	79
4 wks/120°F		89	87	80	74	Gel	112	104
Storage - 4wks/120°F	Score							
Separation		6	8	4	4	-	10	10
Skinning		10	10	10	10	-	0	0
Settling		10	10	10	10	-	10	10
Redispersion		9	10	9	9	-	10	10
Drying Time	Hrs							
Set to touch		0.6	0.7	0.7	0.9	0.6	0.6	0.6
Tack free		16	16	16	4.0	1.8	16	16
Dry hard		16	16	16	4.0	2.0	16	16
Dry thru		16	16	16	4.0	2.0	16	16
Application Ease	Score	10	10	10	10	10	10	10
Opacity	%	100	100	98	99	100	95	77
Gloss - 60°		85	79	87	77	79	75	63
Adhesion	%	100	100	100	100	100	100	100
Flexibility - Pass	Inch	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Acc. Weathering - 500 hrs								
Color change	Score	8	8	8	8	9	9	6
Gloss change	"	6	6	6	6	6	9	4
Chalking	ASTM	6	6	6	6	8	9	9
Check. & Crack.	"	10	10	10	10	10	10	10

Appendix IIT

TEST DATA

Class 9B

MAINTENANCE TOPCOATS

One Package

		CARB						Conventional			
		5	11	13	17	25	26	10	12	14	18
Color ----->	From ----->	Wht (36)	Wht (33)	Gry (.33)	Wht (11)	Gry (34)	Wht (30)	Wht (36)	Wht (33)	Gry (33)	Wht (11)
Viscosity	KU										
Initial		82	76	71	79	94	83	70	78	71	102
4 wks/120°F		93	72	60	150	95	89	108	76	77	120
Storage - 4 wks/120°F	Score										
Separation		6	6	6	8	6	8	4	8	9	9
Skinning		10	10	10	10	10	10	10	10	10	10
Settling		9	6	2	10	8	10	6	9	10	10
Redispersion		10	8	2	9	8	10	6	9	10	9
Drying Time	Hrs										
Set to touch		0.4	0.5	0.4	16	16	0.1	0.9	0.4	0.2	0.9
Tack free		2	15	0.6	16	168	0.3	6.0	4.0	0.2	6.0
Dry hard		2	24	0.8	16	216	0.4	6.5	7.0	0.8	16
Dry thru		2	24	0.8	16	216	0.4	16	7.0	0.8	16
Application Ease	Score	10	10	10	10	10	10	10	10	10	10
Opacity	%	100	97	100	98	100	97	86	98	100	98
Gloss - 60°		53	87	88	75	7	45	89	92	86	89
Adhesion	%	100	100	100	100	80	100	95	100	100	80
Flexibility - Pass	Inch	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Taber Abrasion	mgm	15	57	51	83	35	29	36	38	70	64

Appendix IIT

TEST DATA

Class 9B

MAINTENANCE TOPCOATS (cont)

One Package

		CARB						Conventional			
		5	11	13	17	25	26	10	12	14	18
		Whit (36)	Whit (33)	Gry (33)	Whit (11)	Gry (34)	Whit (30)	Whit (36)	Whit (33)	Gry (33)	Whit (11)
<u>RESISTANCE TO -</u>							(b)				
Water	Hrs	168	72	288	120	24	500	144	168	288	24
Xylol	Hrs	168	3	24	1	1	1	1	3	24	1
Mineral Spirits	Hrs	500	500	500	500	72	500	500	500	500	500
Color change	Score	8	0	6	10		9	0	0	8	6
Gloss change	"	8	8	6	6		10	0	9	8	8
Hardness	"	6	4	2	8		8	6	2	8	10
Recovery	"	8	8	6	10		10	8	6	8	-
Alcohol	Hrs	2	24	24	1	72	500	1	2	24	1
HCl (5%)	Hrs	5	24	24	500	500	1	192	48	48	120
Salt Fog (a)	Hrs	64	136	500	400	500	300	64	136	(c)	210
Blisters - Body	ASTM			10		10					
" at X	"			10		10					
Corrosion	Score			6		8					
Creep at X	Creep			2		2					
Acc. Weathering (a)	Hrs										
Color change	Score	10	10	8	9	6	9	8	10	(c)	9
Gloss change	"	10	6	4	8	10	10	8	6		6
Chalking	"	9	10	8	8	9	10	6	9		8
Check. & Crack.	"	10	10	10	10	10	10	10	10		10

a - Primed

b - Slight rusting

c - Not tested. Topcoat lifted the primer

Appendix IIU

TEST DATA

Class 9C

MAINTENANCE TOPCOATS

2 Component

		CARB				Conventional	
		19	20	22	24	21	23
		Whit From ----> (22)	Bge (22)	Whit (28)	Whit (18)	Bge (22)	Whit (28)
Viscosity	KU						
Parts A & B		(a)	(a)	(a)			
Initial		125/C	116/Z4	108/N	112/89	127/92	72/72
4 wks/120°F		150/D	140/Z5	126/N	120/116	150/104	104/72
Mixed Paint		90	150	88	93	100	72
Storage - 4 wks/120°F, Score							
Separation		8/10	8/10	6/10	10/6	8/9	4/6
Skinning		10/10	10/10	10/10	10/10	10/10	10/10
Settling		10/10	10/10	6/10	10/6	6/10	6/10
Redispersion		9/10	9/10	6/10	10/6	6/10	6/8
Pot Life	Hrs	24	3.5	24	30+	24	30
Drying Time	Hrs						
Set to touch		2.5	0.2	0.6	0.1	0.2	0.3
Tack free		16	5.0	7.0	16	0.5	0.6
Dry hard		16	5.5	16	24	2.5	1.5
Dry thru		16	5.5	16	24	2.5	1.5
Application Ease	Score	10	10	10	10	10	10
Opacity	%	95	99	94	86	95	88
Gloss - 60°		63	6	20	55	7	4
Adhesion	%	100	100	100	100	100	100
Flexibility - Pass	Inch	1/8	1/8	3/4	1/8	1/8	1/8
Taber Abrasion	mgm	102	105	38	73	108	85

Appendix II U

TEST DATA

Class 9C

MAINTENANCE TOPCOATS (cont)

2 Component

		CARB				Conventional	
		19	20	22	24	21	23
		Whit	Bge	Whit	Whit	Bge	Whit
		(22)	(22)	(28)	(18)	(22)	(28)
<u>RESISTANCE TO -</u>							
Water	Hrs	500 ^(b)	48	500 ^(b)	24	500 ^(b)	432
Xylol	Hrs	1	500	24	500	500	500
Mineral Spirits - 500 hrs							
Blistering	ASTM	10	10	10	10	10	10
Color change	Score	10	10	8	10	10	10
Gloss change	"	10	10	10	10	10	10
Hardness	"	10	10	10	10	10	10
Alcohol	Hrs	1	500	5	1	500	500
HCL (5%)	Hrs	500	1	96	1	72	5
(c)							
Salt Fog	Hrs	500	18	500	24	500	500
Blisters - Body	ASTM	10		10		10	10
" at X	"	10		10		10	10
Corrosion	Score	6		6		6	6
Creep at X	mm	2		2		2	2
(c)							
Acc. Weathering	- 500 hrs						
Color change	Score	8	8	9	8	6	8
Gloss change	"	6	9	10	6	10	10
Chalking	ASTM	4	4	4	4	4	4
Check. & Crack.	"	10	10	10	10	10	10

a - Gardner Holdt

b - No significant effect

c - Primed

Bge - Beige

Appendix IIW

TEST DATA

Class 11

SWIMMING POOL PAINTS

		CARB		Conv.
		<u>1</u>	<u>3</u>	<u>2</u>
Color	----->	White	----->	----->
From	----->	(20)	(27)	(20)
Viscosity	KU			
Initial		93	80	72
4 wks/120°F		140	85	74
Storage - 4 wk/120°F, Score				
Separation		8	6	6
Skinning		4	8	10
Settling		10	10	10
Redispersion		9	9	8
Drying Time	Hrs			
Set to touch		0.3	0.3	0.2
Tack free		0.4	0.4	0.3
Dry hard		0.4	0.4	0.3
Dry thru		0.6	0.6	0.3
Application Ease	Score	10	10	10
Opacity	%	96	94	94
Adhesion	%	100	100	90
Water Resistance - 1000 hours		No Eff.	No Eff.	No Eff.
Resistance to 0.01% Sodium Hypochlorite Sol.		No Eff.	No Eff.	No Eff.
-700 hrs				
Accelerated Weathering -				
-500 hrs				
Color change	Score	10	8	10
Gloss change	Score	10	6	10
Chalking	ASTM	10	10	10
Checking	ASTM	10	10	10
Cracking	ASTM	10	10	10

Eff. - Effect

Appendix IIX

TEST DATA

Class 13A

MASTIC COATINGS - WATERPROOFING

		CARB					Conv		
		3	4	6	10	12	13	8	9
		Wht (6)	Wht (6)	Wht (22)	Wht (12)	Blk (12)	Blk (12)	Blk (20)	Wht (12)
Viscosity	KU			(a)					
Initial		138	114	150	102	104	135	150	135
4 wks/120°F		140	123	150/150	(b)	134	150	150	(b)
Storage - 4 wks/120°F	Score								
Separation		9	9	10/8	-	8	10	10	-
Skinning		10	8	10/10	-	10	10	10	-
Settling		10	10	10/10	-	9	10	10	-
Redispersion		9	9	10/9	-	9	10	10	-
Drying Time	Hrs								
Set to touch		2.0	2.0	3.0	0.2	0.2	0.2	3.0	0.3
Tack free		500	500	16	0.2	16	16	500	0.5
Dry hard		500	500	16	0.4	16	16	500	0.5
Dry thru		500	500	16	0.4	16	16	500	0.5
Application Ease	Score	8	8	4	10	10	10	6	10
Adhesion	%	100	100	100	100	100	100	100	100
Opacity	%	100	100	100	100	100	100	100	100
Water Absorption	%	3.3	1.9	0.1	4.3	6.3	6.8	0.6	1.0
Water Resistance	Hrs	24	24	500	500	500	500	500	500
Color change	Score			8	10	10	10	8	10
Gloss change	"			8	10	10	10	8	10
Hardness	"			0	6	4	4	0	4
Recovery	"			0	8	9	9	0	8
Acc. Weathering - 500 hrs									
Color change	Score	10	10	8	10	10	10	6	10
Gloss change	"	10	10	6	10	10	10	4	10
Chalking	ASTM	9	9	4	10	10	9	10	10
Check. & Crack.	"	10	10	10	10	10	10	10	10

a - Two Component

b - Solidified

Appendix IIY

TEST DATA

Class 14

MULTICOLOR PAINTS

		<u>CARB</u> <u>1</u> (2)	<u>Conv.</u> <u>2</u> (37)
Viscosity	KU		
Initial		77	75
4 wks/120°F		83	Gel
Storage - 4 wk/120°F, Score			
Separation		10	-
Skinning		10	-
Settling		10	-
Redispersion		10	-
Drying Time	Hrs		
Set to touch		1.2	1.2
Tack free		1.2	1.2
Dry hard		1.2	1.2
Dry thru		1.2	1.8
Application Ease	Score	10	
Appearance	Score	2	8
Opacity	%	77	99
Gloss - 60°		5	6
Adhesion	%	100	90
Flexibility - Pass	Inch	1/8	

Appendix III

TEST PROCEDURE

The following test methods were used, except as noted in the test conducted:

ASTM D ---- refers to methods described in Part 27 "Paint - Tests for Formulated Products and Applied Coatings" issued by the American Society for Testing and Materials, Philadelphia, PA.

Method ---- refers to tests described in Federal Standard No. 141A "Methods for Testing of Paint, Varnish, Lacquer and Related Materials" issued by the General Services Administration, Washington, DC.

Other tests are described.

Package Qualities

1. Viscosity: -
 - a) Pigmented Paints: - Unit - KU
ASTM D-562 "Consistency of Paints Using the Stormer Viscometer"
 - b) Clear Liquids: - Unit - G/H
Method 4271 "Viscosity of Transparent Liquids (Gardner Tubes)"
2. Viscosity Stability: - Unit - KU or G/H
ASTM D-1849 "Package Stability of Paint". Viscosity was redetermined after storage.
3. Storage Stability: - Unit - Score
ASTM D-1849 "Package Stability of Paint"

4. Pot Life: - Unit - Hours

Eight ounces (8 oz) of the multi-component products were mixed in accordance with the supplier's instructions. They were periodically checked for workability. The same test was conducted with the powder paints after mixing with water.

Application

5. Drying Time: - Unit - Hours

ASTM D-1640 "Drying, Curing or Film Formation of Organic Coatings at Room Temperature"

6. Application Ease: - Unit - Score

The coating was brush-applied to an appropriate substrate and scored for relative ease of application. Sample Nos 4-43, 14-1 and 14-2 had to be spray-applied. Note: All multicolor paints (Class 14) are sprayed.

Coating Appearance

7. Gloss: - No Unit

ASTM D-523 "Specular Gloss"

8. Opacity: - Unit - %

ASTM D-2805 "Hiding Power of Paints"

9. Enamel Holdout: - Unit - %

The test primer was dried for 24 hours. An enamel was then applied on the primer and allowed to dry for 24 hours. The gloss of the enamel was then determined in accordance with ASTM D-523 (see above).

$$\text{Enamel Holdout (\%)} = \frac{\text{Gloss on Primer}}{\text{Gloss on Sealed Surface}} \times 100$$

10. Bleeding: - Unit - Score

The test primers were applied on red cedar and dried for one week. The relative degree of staining caused by bleeding from the cedar was observed and scored.

11. Appearance: - Unit - Score

The multicolor paints (Class 14) were compared for relative appearance and definition of the multicolor pattern.

Coating Performance

12. Adhesion: - Unit - %

ASTM D-3359 "Measuring Adhesion by Tape Test"

13. Flexibility: - Unit - Inch

ASTM D-1737 "Elongation of Attached Organic Coatings with Cylindrical Mandrel Apparatus"

14. Taber Abrasion: - Unit - mgm

Federal Method 6192 "Abrasion Resistance (Taber Abraser)"

15. Water Absorption: - Unit - %

Preweighed appropriate substrate specimens were coated with the test paint and dried for one week. Groups 2 and 3 were tested on wood and submerged for 30 minutes. Groups 8 and 13 were tested on concrete and submerged for 72 hours. The panels were then wiped to remove excess water and reweighed.

$$\text{Water Absorption (\%)} = \frac{\text{Gain in Weight}}{\text{Weight before Immersion}} \times 100$$

16. Immersion Resistance Tests: -

The following tests were conducted with completely coated substrate specimens partially immersed:

Cold water

Xylol (Xylene)

Mineral spirits

Alcohol (100%)

Coatings which withstood the maximum period of exposure were evaluated for -

Blistering - ASTM D-714 "Evaluating Degree of
Blistering of Paints"

Color change - Score

Gloss change - Score

Hardness - Initial and after recovery for
24 hours - Score

Coatings which failed prematurely were removed and the time until failure was recorded.

17. Spot Resistance Tests: -

The following tests were conducted by placing 1 mm of reagent on the test coating and keeping it covered to prevent evaporation.

Hot water

Alcohol (50%)

Butyl acetate

Hydrochloric acid (HCl) - 50% solution

Where possible, the coatings were evaluated as described in No. 16 above. If not, the time until failure was recorded.

Exposure Resistance

18. The coatings were exposed to ultraviolet light for two weeks and then compared with the unexposed coatings for -

Gloss Retention (change in gloss) Unit - Score

Color Retention (change in color) Unit - Score

19. Salt Fog (Corrosion Resistance): -

ASTM B-117 "Salt Spray (Fog) Testing"

Duplicate coated panels were exposed. Before exposure, the panels were scored with an "X" to expose the steel.

Panels which withstood a minimum of 500 hours of exposure were evaluated as follows:

Blistering - overall and along the "X"

ASTM D-714 "Evaluating Degree of Blistering of Paints"

Corrosion after stripping the paint - Score

Creep of corrosion from the "X" - mm

Panels which failed before the maximum period were removed and the time of exposure recorded.

20. Accelerated Weathering: -

ASTM G-53 "Recommended Practice for Operating Light and Water Apparatus for Exposure of Non-metallic Coatings"

Duplicate panels were exposed. Panels which were exposed for at least 500 hours were evaluated for the following changes -

Color change - Score

Gloss change - Score

Chalking - ASTM D-659 "Chalking of Exterior Paints"

Checking - ASTM D-660 "Checking of Exterior Paints"

Cracking - ASTM D-661 "Cracking of Exterior Paints"

Panels which failed prematurely were removed and the time of exposure recorded.

Score: -

The scoring system used was that developed by ASTM:

<u>Score</u>	<u>Performance</u>	or	<u>Effect</u>
10	Perfect		None
9	Excellent		Trace
8	Very good		Very slight
6	Good		Slight
4	Fair		Moderate
2	Poor		Severe
0	No value		Failed

